551 16

128763

BY THE U.S. GENERAL ACCOUNTING OFFICE
Briefing Report To The Chairman,
Subcommittee On Department Operations,
Research, And Foreign Agriculture,
Committee On Agriculture
House Of Representatives

Status Of Farmers Home Administration Efforts To Install Office Automation

128763

034171

October 4, 1985

**INFORMATION MANAGEMENT
& TECHNOLOGY DIVISION**

B-220242

The Honorable Berkley Bedell
Chairman, Subcommittee on Department Operations,
Research, and Foreign Agriculture
Committee on Agriculture
House of Representatives

Dear Mr. Chairman:

This briefing report, in response to Phase 1 of your
June 17, 1985, letter, discusses the status and limitations of
field office prototype tests conducted by the Farmers Home
Administration (FmHA). It also points out that the Department of
Agriculture can modify its computer equipment purchases and deliv-
ery dates to meet changing needs; and that the Department's Kansas
City Computer Center should be able to handle the workload pro-
duced by field office computers.

FmHA plans to automate many operations in its approximately
2,250 field offices and redesign its loan accounting system to
allow electronic updating of loan accounts, status-of-loan inquir-
ies, and interoffice communication, among other functions. FmHA
estimates a $257 million benefit, at a cost of $91 million more
than if its existing systems were continued over the next decade.

In June 1985 FmHA began testing a prototype of its field-
office automation system in selected offices to refine its train-
ing approaches and software, and identify productivity savings
resulting from automation. Our review showed that FmHA is attain-
ing its training and software refinement goals. Its third goal--
measuring savings--will yield little quantifiable information on
productivity savings because of FmHA's approach of using subjec-
tive measurement data. Hence, the test is an insufficient guide
on productivity improvements FmHA can expect from automation.

FmHA recognized that the field-office prototype system did
not fully replicate the planned system. For example, the hardware
to be acquired under a September 10, 1985, contract can
simultaneously handle multiple users and tasks--a capability not
available in the prototype hardware. Further, the prototype test
excluded about two-thirds of the planned software. Another
limitation of the prototype test was its inability to determine
whether approximately 55 percent of anticipated benefits could be
realized from the planned system. This was because these benefits
are dependent upon availability of the new loan accounting
system--with telecommunications capability--which is not scheduled
for completion until 1987. We noted that FmHA does not have
detailed plans to obtain information to validate the anticipated
benefits of the planned system.

As components of the planned system are installed nationwide, FmHA could benefit from testing the system components to validate its expected benefits.

Regarding the Department's ability to modify the recently awarded contract with Electronic Data Systems Corporation, our review of the contract showed that the Department is not obligated to procure a specified number of computers on a set timetable. As needs and conditions change, the Department can modify the contract and solicit changes to the equipment, software, or other contract requirements up to a specified amount. Penalties can be levied if delivery and maintenance requirements are not met.

Concerning the Kansas City Computer Center's capacity to handle future workload, it appears that the Center can handle the estimated workload generated by field-office computers: the Center plans to upgrade its computer resources on a schedule that should provide the needed computer capacity. That capacity could be reached earlier than expected, however, due to possible shifts in peak workload from field-office automation. Center officials recognize the need to carefully monitor computer usage as the FmHA production system is implemented and plan to acquire the necessary analytical tools.

We reviewed pertinent material and interviewed officials at FmHA and USDA headquarters, FmHA's St. Louis finance office, and the Department's Kansas City Computer Center. We also visited two of the first three prototype sites. We focused our review of the September 10, 1985, office automation contract on whether the Department has flexibility in determining the number, specifications, and delivery schedules for purchased equipment, and selected provisions on contractor maintenance and delivery obligations. Our ability to fully evaluate FmHA's prototype test results was reduced because the test was not completed during our review. Although we did not obtain official agency comments, officials informally reviewed a draft of this briefing; we have incorporated their comments where appropriate.

As requested, unless you publicly announce its contents earlier, we plan no distribution of this briefing report for 15 days. We will then send copies to the Department's Assistant Secretary for Administration, and three Administrators—Agricultural Stabilization and Conservation Service, FmHA, and Soil Conservation Service. Copies will go to other interested parties upon request.
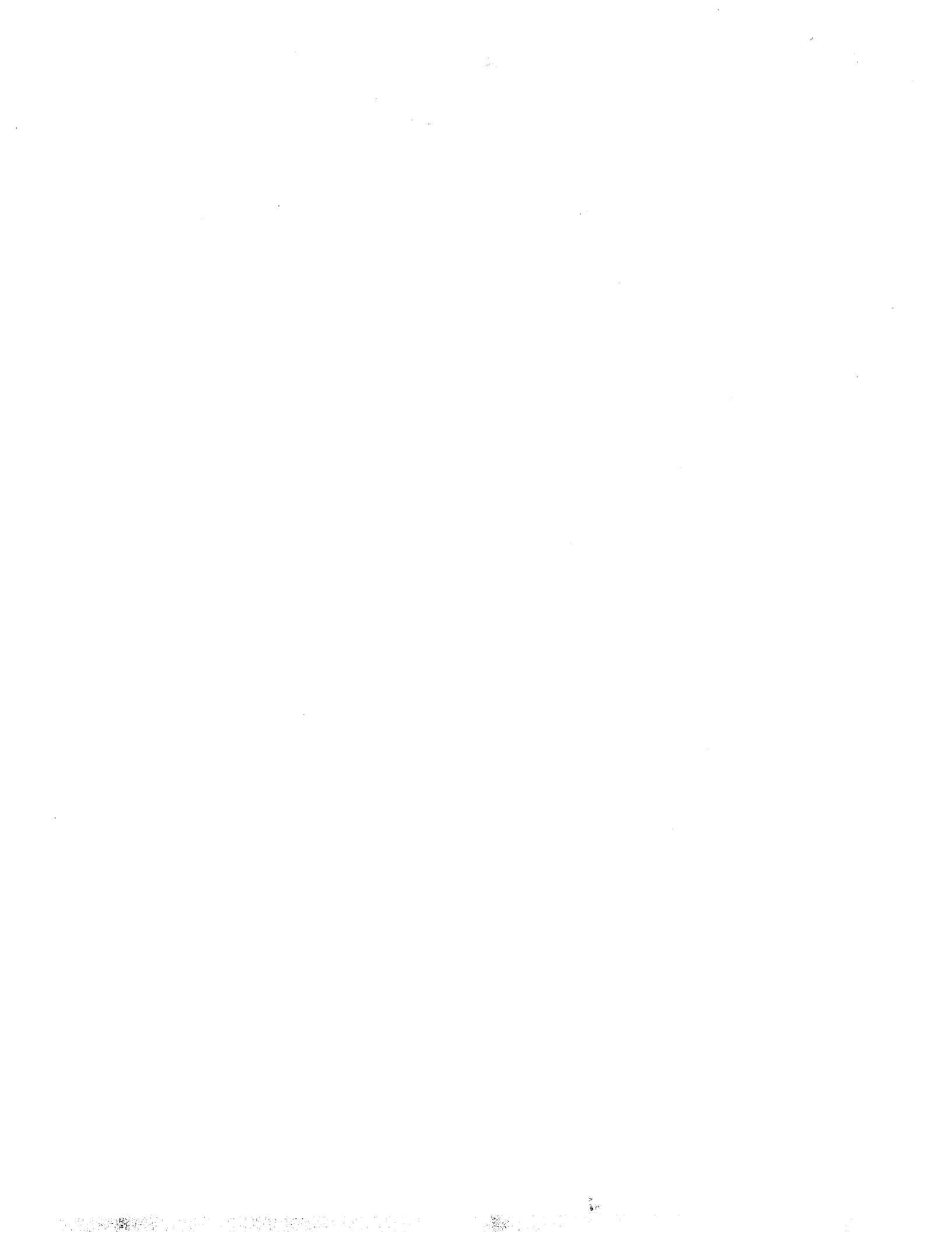
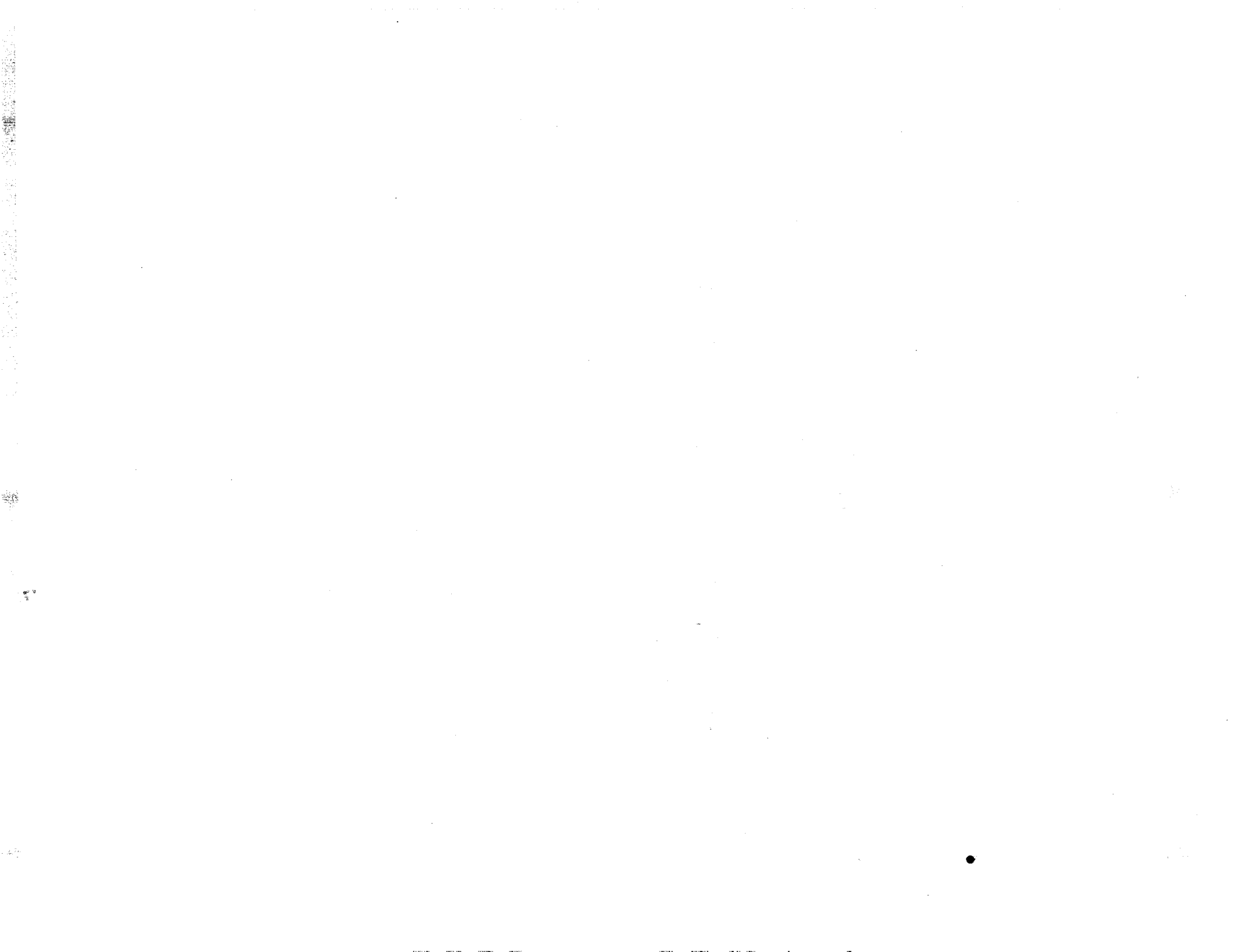Sincerely yours,

Howard Rhile
Associate Director

C O N T E N T S

BRIEFING

ON

GAO'S REVIEW OF THE FARMERS HOME ADMINISTRATION'S FIELD OFFICE COMPUTER ACQUISITION

REQUESTED BY THE CHAIRMAN, SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH, AND FOREIGN AGRICULTURE, HOUSE COMMITTEE ON AGRICULTURE

BACKGROUND

THE CHAIRMAN'S REQUEST

THE CHAIRMAN ASKED GAO TO EVALUATE:

- THE ADEQUACY OF FmHA'S PROTOTYPE TEST OF COMPUTERS IN FIELD OFFICES

- THE APPROPRIATENESS, CONDITIONS AND TERMS OF FmHA'S/SCS'S REQUEST FOR PROPOSALS AND THE RESULTING CONTRACT

- THE EXTENT TO WHICH USDA'S KANSAS CITY COMPUTER CENTER CAN HANDLE THE WORKLOAD EXPECTED FROM COMPUTERS IN THOUSANDS OF FIELD OFFICES

THE CHAIRMAN'S REQUEST

This briefing report presents the results of Phase 1 of our review covering three aspects of the Farmers Home Administration's (FmHA) automation of its field offices as requested by the Chairman of the House Subcommittee on Department Operations, Research, and Foreign Agriculture, on June 17, 1985. These were (1) the adequacy of FmHA's prototype test of computers in field offices; (2) the appropriateness, conditions, and terms of the Request for Proposals (RFP) and the resulting contract to acquire computers and associated software for the Department of Agriculture's (USDA) field offices; and (3) the extent to which the USDA's Kansas City Computer Center (KCCC) can handle the workload expected from computers operating in thousands of field offices.

Review approach

We performed work at FmHA's headquarters and St. Louis finance office; and we visited two of the first three FmHA field-office prototype sites at Lawrenceburg, Tennessee, and Bolivia, North Carolina. At these locations, we interviewed field-office employees to determine whether FmHA followed its prototype test plan at these sites. Our ability to fully evaluate the FmHA prototype test was limited because FmHA is in the early stages of the test. FmHA had begun the test in 10 of 16 test sites when we completed our field work at the end of August 1985. FmHA plans to complete the prototype test in April 1986.

We also performed work at KCCC and USDA headquarters in Washington, D.C. We reviewed KCCC's computer capacity to the extent that information was available. We also reviewed KCCC's workload projections through 1991 and its plans to purchase new ADP equipment. We also discussed with FmHA officials and those of the Agricultural Stabilization and Conservation Service (ASCS) the extent to which installing computers in their field offices would increase the workload at KCCC. FmHA and ASCS are the major users of KCCC. The center processes FmHA's loan accounting system and other computer-based information systems. The center also

3

processes ASCS information systems such as the price support system and the deficiency payment system. KCCC will also support computer workload generated by field-office computer systems of FmHA and ASCS. ASCS is currently automating approximately 2,800 field offices under a contract awarded to International Business Machines, Inc., in September 1984. The Soil Conservation Service (SCS) does not use KCCC.

In addition, we reviewed the RFP issued November 24, 1984, to automate the field offices of FmHA and SCS and the resulting contract awarded to Electronic Data Systems Corporation on September 10, 1985. We focused on whether the RFP and the contract obligate USDA to acquire a specified number of computers on a set timetable and whether the contract allows USDA to make modifications to meet changing mission needs or conditions. Because the contract was voluminous and only recently awarded, we limited our review of this document to determining whether it conformed to the RFP with respect to these issues.

FARMERS HOME ADMINISTRATION

	NUMBER OF OFFICES	NUMBER OF EMPLOYEES		
		MIN.	AVG.	MAX.
HEADQUARTERS WASHINGTON, D.C.	1		454	
FINANCE OFFICE ST. LOUIS, MO	1		726	
STATE OFFICES	46	8	30	42
DISTRICT OFFICES	267	1	2-3	5
COUNTY OFFICES	1932	1	3-4	13

FARMERS HOME ADMINISTRATION

FmHA is a credit agency for agricultural and rural development in the USDA. FmHA provides most of its financial assistance in the form of direct loans ranging from short-term loans for production-related expenditures to long-term loans for a variety of construction projects and capital acquisitions. Its offices consist of the headquarters in Washington, D.C.; the finance office in St. Louis, Missouri; 46 state offices (some offices serve multiple states); and approximately 2,200 county and district offices. The following table shows FmHA's loan programs and the number of active borrowers and outstanding loan balances within each program as of September 30, 1984.

Loan Programs	Active Borrowers	Amount (Billions)
Economic Emergency	60,459	$ 4.3
Farm Emergency	125,778	10.0
Farm Operating	118,572	4.1
Farm Ownership	124,954	6.9
Rental Housing	10,478	5.7
Single-family Housing	1,011,803	22.1
Water and Waste	12,873	6.1
Other	23,347	2.3
All Programs	1,488,264	$61.5

FmHA's headquarters develops nationwide plans, policies, and procedures for making and servicing loans. It also monitors, inspects, and evaluates the administration of these loan programs by the state, district, and county offices.

FmHA's finance office maintains the obligation and corresponding fund controls related to disbursing loan funds to borrowers. The finance office is responsible for maintaining FmHA's loan accounting system, which operates on computers at KCCC.

State office directors have overall administrative responsibility for loan programs in their respective states. They provide direction for program operations in the state, ensure adherence to approved program plans, and provide advisory support to district and county offices.

Each state is divided into several districts. District directors administer loan programs at the district level. Each district has several county offices.

County offices are the organizational units responsible for executing loan programs for emergencies, farm ownership and operation, and single-family housing within their counties; and they make the majority of FmHA loans. FmHA services each county (or parish) in the 50 states plus the Pacific Trust Territory, American Samoa, Guam, Puerto Rico, and the Virgin Islands. These offices have approximately 8,500 field-office employees administering loan programs. The county and district offices are typically in rural locations and are small in size.

FmHA'S PLANNED COMPUTER SYSTEM

COUNTY/DISTRICT OFFICES

STATE OFFICES

- OFFICE AUTOMATION AND TELECOMMUNICATION CAPABILITIES

- MAINTAIN LOAN ACCOUNTS

FINANCE OFFICE

KANSAS CITY COMPUTER CENTER

- OPERATE LOAN ACCOUNTING SYSTEM
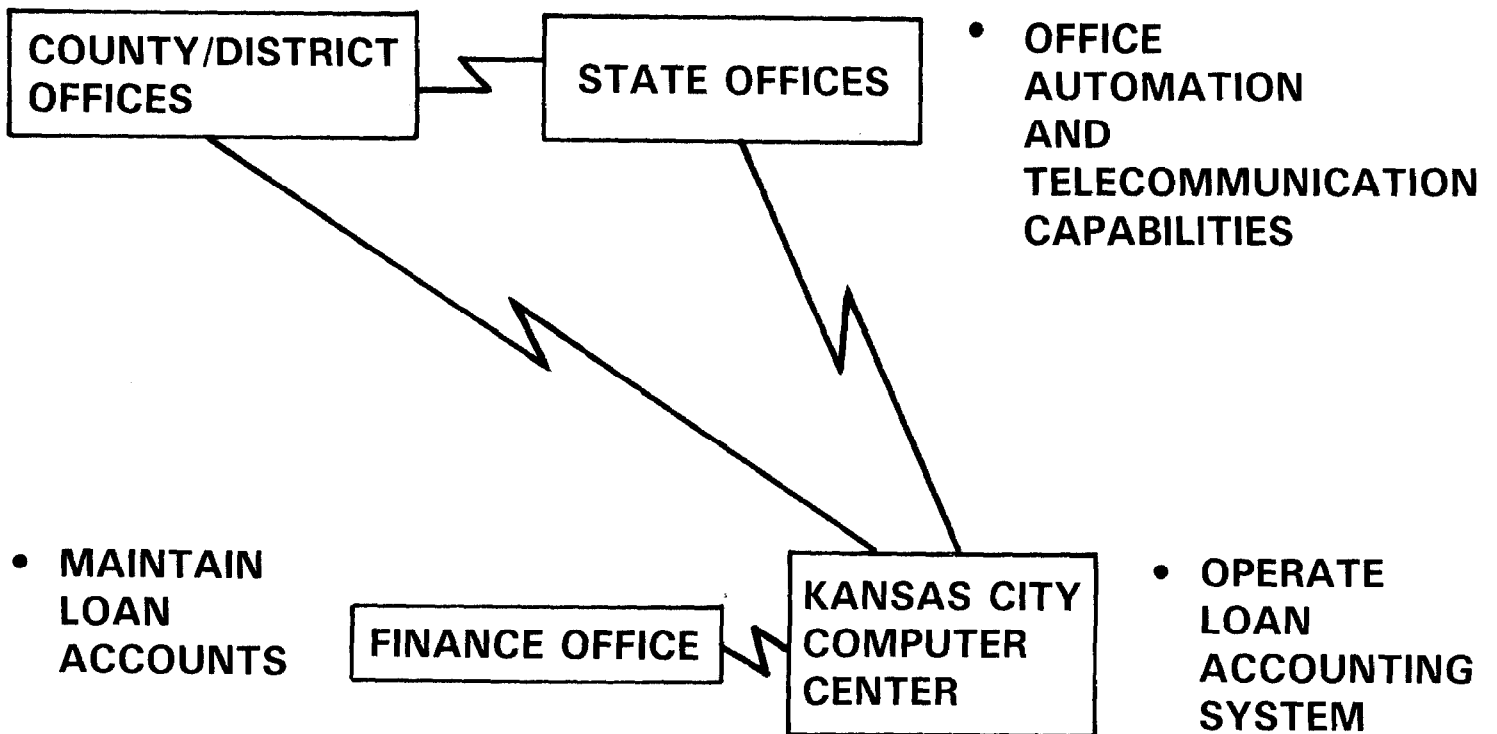
FmHA'S PLANNED COMPUTER SYSTEM

FmHA plans to (1) automate about 2,250 county, district, and state offices; and (2) redesign its loan accounting system, which operates at the KCCC to allow field offices to electronically process loan transactions and receive information on borrowers' loan balances and payments. FmHA awarded a contract to Electronic Data Systems Corporation with a potential cost of about $223 million, on September 10, 1985, for the office-automation component of the system. FmHA plans to begin installing the systems in November 1985 and complete nationwide installation in November 1987. FmHA awarded a separate, $4.1 million contract on July 22, 1985, to the OAO Corporation for development of the new loan accounting system. FmHA plans to complete development of this system by the end of 1987.

The office-automation component of the project involves acquiring multifunction workstations consisting of mini- and microcomputers, disk drives, video displays, printers, and software. The planned capabilities include word processing, creating financial analysis and planning schedules, and loan management functions. Field offices now perform these functions manually.

As part of the new accounting system, FmHA plans to provide field offices the capability to directly access the new loan accounting system using a USDA telecommunications network. The finance office is responsible for managing this system. It will operate on computers at KCCC and will permit field-office employees to initiate loan obligations, post transactions, determine the status of borrower accounts, obtain borrower files, and correct loan data. Currently, field-office employees communicate with the St. Louis finance office by mail and telephone to accomplish accounting transactions. Finance office employees use remote access terminals to interact with the existing loan accounting system at KCCC. As computers are installed in the field offices, they, too, will have the capability to directly enter and retrieve data from the existing loan accounting system at KCCC.

To manage the installation of the office automation systems, FmHA has assigned the following specific responsibilities. FmHA headquarters is responsible for planning, developing, and implementing 72 office-automation software applications. The finance office is responsible for providing training assistance to FmHA state offices. Selected state personnel will train field-office personnel until a training contractor has developed computerized tutorial packages. The remaining field-office personnel will be trained at their offices using the tutorial packages. Electronic Data Systems Corporation will provide the office-automation equipment, general purpose software, and related support. State offices are responsible for coordinating the installation of the computer equipment in their states and coordinating equipment maintenance requests from field offices.

FmHA'S ESTIMATED BENEFITS AND COSTS FOR THE PLANNED SYSTEM
(PRESENT VALUE)

ESTIMATED BENEFITS (000)

	$	PERCENT
FIELD OFFICE PRODUCTIVITY IMPROVEMENTS	162,462	63
REDUCTION OF LOAN LOSSES AND DELINQUENCIES	49,097	19
REDUCTION OF BANK ACCOUNT BALANCES	31,299	12
FINANCE OFFICE PRODUCTIVITY IMPROVEMENTS	14,302	6
TOTAL	257,160	100

ESTIMATED COSTS (000)

PLANNED SYSTEM	344,102
LESS PRESENT LOAN SYSTEM	(252,975)
DIFFERENCE	91,127

FmHA'S ESTIMATED BENEFITS AND
COSTS FOR THE PLANNED SYSTEM

FmHA's November 15, 1983, economic study shows quantifiable savings of about $257 million over a 10-year period. The study categorized the benefits as (1) state, district, and county office productivity improvements, (2) reductions of loan losses and delinquencies, (3) reduction of bank account balances, and (4) finance office productivity improvements. In addition, the economic study showed several other expected benefits for which a dollar value was not estimated. The study estimated that the incremental cost of the new system would be about $91 million more than the cost of the existing system over 13 years. The study indicated that costs will accrue over a 13-year period and that benefits will accrue over 10 years. All dollar figures were discounted to present value.[1]

Productivity improvements
in field offices

The economic study showed that automating FmHA field-office activities and implementing the new loan accounting system would free about three million staff hours annually. An FmHA management report stated that field-office personnel would use the freed staff hours to increase the time spent servicing delinquent loan accounts, thereby reducing delinquencies. The two documents estimated that the government would save about $162 million over a 10-year period in interest costs on funds borrowed to make loans.

Reduced loan delinquencies
and losses

FmHA's economic study estimated that the new loan accounting system would further reduce loan delinquencies and losses and save about $49 million in interest costs over a 10-year period. The study stated that improved timeliness and accuracy of borrower delinquency data would permit faster initiation of followup efforts

---

[1]The need for discounting arises because benefits and costs associated with ADP development projects usually are not experienced in the same time period. A dollar spent next year is assumed to be worth less today than a dollar spent today. The farther into the future a benefit or cost is, the smaller its equivalent present value.

which, in turn, would reduce the total amount of delinquencies and losses.

Reduced bank
account balances

FmHA's economic study also estimated that the new accounting system would save about $31 million in interest costs over a 10-year period by reducing the amount of borrowed funds needed by the government to maintain local bank accounts. Since the current accounting system involves a long request-to-receipt cycle to obtain loan disbursements, field-office personnel now request funds prematurely in anticipation of clients' requests for loan advances. FmHA expects the new loan accounting system to reduce this cycle time thus allowing field-office personnel to better manage and therefore reduce the level of funds in local bank accounts.

Finance office
productivity improvements

The last category of savings estimated in FmHA's economic study concerns savings from reduced data entry costs at the finance office. FmHA estimates that it can save about $14 million over a 10-year period by eliminating some contract costs for data entry and the need for 356 data entry personnel at the finance office. FmHA's study assumed that these reductions could be made at the finance office because, under the new loan accounting system, data entry will be transferred to field offices. The study assumed that no additional personnel would be required in the field offices to perform data entry functions. The time saved in the field offices by eliminating typing, mailing, and reconciling documents for the current system would be used to perform these data entry functions.

Nonmonetary benefits

FmHA's economic study shows that the planned system will result in several nonmonetary improvements in service to the public and the Congress. These benefits include more complete, accurate,

timely, and consistent financial and management reports; improved data for analyzing the effectiveness of agency programs; and improved response to congressional and public inquiries.

Incremental present-value costs

The FmHA economic study shows the 13-year present-value cost to develop and operate the new loan accounting system and automate its field offices at about $344 million. The study also indicates that the 13-year present-value cost to continue operating FmHA's existing loan accounting systems at about $253 million. According to the study, the incremental cost for the new system will therefore be about $91 million.

FmHA'S
PROTOTYPE TEST

FmHA'S PROTOTYPE TEST

FmHA INTENDED TO REPLICATE THE PLANNED OPERATIONAL ENVIRONMENT TO THE EXTENT PRACTICABLE TO:

- EVALUATE TRAINING AND DOCUMENTATION

- EVALUATE THE EFFECTIVENESS, EFFICIENCY, AND EASE OF USE OF SELECTED SOFTWARE APPLICATIONS BEFORE CONVERSION TO THE PLANNED SYSTEM

- MEASURE SOME BENEFITS EXPECTED FROM OFFICE AUTOMATION

FmHA'S PROTOTYPE TEST

In its prototype test plan, FmHA stated that it intended the prototype test to replicate the operating environment of the planned system as closely as practicable. FmHA officials identified three objectives to accomplish within the test environment.

First, FmHA wanted to gain experience in training its staff and obtain feedback regarding training needs. FmHA officials planned to use the test experience to help determine field-office employees' training needs and refine training materials, and to confirm that the user manuals are clearly written for field-office employees.

Second, FmHA wanted to obtain user feedback on the performance of 24 office-automation software applications to answer the following questions: (1) does the software accomplish the task it was designed to accomplish; (2) is the task completed efficiently for the user, and (3) how easy is it for field-office employees to use the applications. FmHA's purpose was to evaluate the 24 applications in a field-office environment before providing them to the winning hardware vendor for conversion to the new equipment.

Third, FmHA wanted to measure benefits experienced during the prototype test, such as data accuracy and freed time, and to use this data to set field performance norms or standards from which to estimate dollar savings that FmHA could expect from automating selected county and district office functions.

To conduct its prototype test, FmHA selected 13 county and three district offices throughout the United States as test sites. FmHA selected the sites from among those offices whose supervisors had expressed interest in office automation by serving on FmHA's office-automation task force. This task force was established prior to the prototype test to define county and district office functions to be automated and to provide the first user feedback on early versions of the software.

The prototype test began at Bolivia, North Carolina; Lawrenceburg, Tennessee; and Salina, Kansas, the last week of June 1985. FmHA is staggering the equipment installation at the other 13 sites with three to four offices being added each month. FmHA plans to run the test for 6 months at each site; thus the first three sites will complete the test in December 1985, and the last sites will complete it in April 1986.

CONSTRAINTS PRECLUDING FmHA'S FULL REPLICATION OF THE PLANNED ENVIRONMENT DURING THE PROTOTYPE TEST

- PROTOTYPE HARDWARE, SOFTWARE, AND TELECOMMUNICATIONS DIFFERED FROM THE PLANNED SYSTEM

- A KEY COMPONENT, THE NEW LOAN ACCOUNTING SYSTEM, WAS NOT AVAILABLE

- DOCUMENTATION, SUPPORT SERVICES, AND TRAINING WERE NOT FULLY DEVELOPED FOR USE DURING THE TEST

- THE TEST PERIOD LIMITED FIELD STAFF LEARNING TIME AND DID NOT ENCOMPASS A FULL BUSINESS CYCLE

CONSTRAINTS PRECLUDING FmHA'S FULL REPLICATION OF THE PLANNED ENVIRONMENT DURING THE PROTOTYPE TEST

According to the prototype plan, FmHA's intent was to recreate the planned operating environment as closely as practicable. The plan recognized, however, that FmHA was conducting the test under constraints that precluded full (1) replication of the planned environment and (2) demonstration of the extent that the production system would actually improve productivity. FmHA's test plan stated that test results would be constrained by limitations of the prototype hardware, software, telecommunications, documentation, training, support services, and test duration.

The prototype test microcomputers did not have the capabilities that FmHA requires of the production computers. For example, the prototype test computer's operating system did not have multiuser or multitasking capabilities, and its processing speed was slower than that of the planned hardware. FmHA wanted to avoid the time-consuming task of converting the prototype software to a multiuser/multitasking computer, and wanted to avoid the appearance of advance selection of a vendor by doing so.

The office-automation software used in the prototype test represented one-third of the software intended for the production environment. FmHA plans to install 72 office-automation software applications for that system, but is only testing 24 of the most important applications. Also, because the contractor will have to recode the software into a language compatible with the production equipment, the prototype test software was not in its actual production form.

The prototype environment also lacked the full telecommunications capabilities that FmHA plans for its production system. During the test, the sites were capable of making limited inquiries to KCCC and processing 27 of the 86 types of recordkeeping transactions planned for the system. The planned telecommunications environment will enable electronic posting to loan accounts at KCCC and transfer of reports and data files to and from field offices and KCCC.

The prototype test environment was constrained further because FmHA's planned new loan accounting system was not part of the test. FmHA's 1983 economic study shows that about $61 million of the $162 million in interest savings attributed to field-office productivity improvements are associated with the new loan accounting system. Further, the study shows that about $80 million in interest savings expected by reducing loan delinquencies, losses, and the level of funds in local bank accounts is attributable to the new loan accounting system. Therefore, according to the study, about $141 million (about 55 percent) of the total estimated dollar benefits of $257 million is associated with the new loan accounting system, which FmHA plans to implement in 1987.

According to the test plan, the test environment was also constrained because the planned user manuals, training plans, and support services were not fully developed for use during the test.

FmHA also recognized in its test plan that the 6-month test period would constrain the time allowed for the test participants to learn the system and that this could impact performance results obtained during the test. Further, FmHA recognized that the test period did not cover an entire cycle of business activities for any loan program. FmHA's plan states that any attempt to measure improvements in loan-making quality or reduction in loan delinquencies and losses over an incomplete business cycle would be inconclusive.

FmHA'S OBJECTIVE #1: EVALUATE TRAINING AND DOCUMENTATION

- FmHA IS OBTAINING EXPERIENCE ON PROVIDING TRAINING TO FIELD OFFICE EMPLOYEES ON AUTOMATION SUBJECTS

- FmHA IS OBTAINING USERS' FEEDBACK ON TRAINING AND DOCUMENTATION AND IS MAKING CHANGES BASED ON THE FEEDBACK

FmHA'S OBJECTIVE #1: EVALUATE TRAINING AND DOCUMENTATION

One of FmHA's test objectives was to gain experience in training its staff, determine users' training needs, and validate the usefulness of the training manuals. FmHA planned to obtain feedback from the users on the effectiveness of the training. According to an FmHA official, comments regarding user manuals were for general information purposes only. FmHA does not plan to refine the prototype user manuals because these manuals will not be used with the planned system. All manuals will be rewritten to address the planned equipment and software.

Planned prototype training and documentation

During the prototype test, employees of the test offices were to receive pretraining documentation consisting of a systems operations guide and an overview of the prototype test. According to the test plan and FmHA officials, FmHA planned to have finance office and headquarters personnel begin training employees of the three initial prototype sites in June 1985 at the St. Louis finance office. Initially, finance office personnel were to provide one clerk from each of the prototype sites with 2 weeks of instruction in processing various types of recordkeeping transactions. County supervisors, assistant supervisors, and all clerks were to receive a week of training from headquarters personnel prior to installation of the prototype system at their sites. Instruction was to cover the test hardware and software, how to use this equipment and the 24 office automation applications, and how to access the existing loan accounting system through telecommunications. County and assistant supervisors were to learn software applications for financial analysis and planning; the clerks were to learn the records management and word processing software.

Following the classroom training, FmHA planned to send headquarters and software development contractor personnel to each prototype site. This team was to get the employees started in

using the test system and to obtain users' comments. This visit was to last 2 to 5 days at each test site. FmHA planned to provide more training during two additional visits to each site during the test.

According to an FmHA official, FmHA planned to obtain user feedback on training and documentation during the training and the site visits. Headquarters staff also planned to obtain feedback through telephone surveys of the test-site staff. Information from the telephone surveys was to be compiled into monthly status reports by headquarters personnel.

Results

FmHA officials stated that they had trained 80 employees by August 30, 1985--61 from field offices and 19 from headquarters.

Our review of the monthly status report and telephone surveys for July and August 1985 showed that county office employees were generally satisfied with the training and documentation. At the two sites we visited, all trainees stated that they received the materials before their training. All permanent employees but one said they received training in June 1985, prior to installation of their equipment. (The one person did not complete the training for personal reasons.) At these sites, the county office employees were generally satisfied with their training and documentation; our observations showed that the employees were adequately operating the test equipment and software.

FmHA officials stated that they have used the initial feedback to refine the training program. For example, FmHA no longer differentiates the training given to county supervisors, assistant supervisors, and clerks. To meet their work needs, everyone is trained in both financial analysis and planning, recordkeeping, and word processing applications.

Although the prototype test is not yet complete, FmHA is achieving its objective of gaining experience in training and obtaining users' comments and suggestions on training.

FmHA'S OBJECTIVE #2:
EVALUATE SOFTWARE EFFECTIVENESS, EFFICIENCY, AND EASE OF USE

- FmHA IS OBTAINING FEEDBACK ON SOFTWARE EFFECTIVENESS, EFFICIENCY, AND EASE OF USE

- FmHA IS REFINING SOFTWARE BASED ON USER FEEDBACK

FmHA'S OBJECTIVE #2:
EVALUATE SOFTWARE EFFECTIVENESS,
EFFICIENCY, AND EASE OF USE

FmHA's second objective was to evaluate 24 office-automation software applications for effectiveness, efficiency, and ease of use by obtaining user feedback during the prototype test. FmHA's goal was to further refine these applications before release to the contractor for development.

Planned activities

FmHA planned to install the 24 office-automation software applications among the prototype field offices and obtain users' comments. The software planned for use during the prototype test dealt with important office functions such as creating financial schedules, maintaining basic borrower files, word processing, and processing collections and delinquencies. An FmHA official stated the prototype test would help FmHA determine how "user friendly" the 24 software applications were. For example, he said that the prototype test users were asked to evaluate the various computer-generated instructions or "menus" used by the applications and to suggest improvements that would make them easier to use.

FmHA headquarters and contractor personnel planned to obtain user feedback during the three site visits and from telephone surveys. In addition, FmHA plans to administer a post-automation test at each prototype test site at the end of 6 months to determine the accuracy of computer calculations on financial schedules and whether the software applications are hard, easy, or very easy to use.

Results

As of August 31, 1985, FmHA had installed the 24 software applications at 10 of the test sites and was obtaining user feedback through site visits and telephone surveys. Our review of the monthly status report and the telephone surveys for July and August 1985 indicated general user satisfaction with the software.

FmHA officials stated that the feedback had been useful in modifying the software applications. For example, an application involving collections and delinquency processing automatically generated a printed report. FmHA has changed the software to allow the user the option of viewing the report on the computer screen.

Although the prototype test is not complete, FmHA is accomplishing its objective of obtaining feedback and refining the 24 software applications for effectiveness, efficiency, and ease of use by obtaining feedback from field-office users. FmHA officials said they will provide the 24 applications to the contractor for conversion to the new equipment by mid-October 1985.

FmHA'S OBJECTIVE #3:
MEASURE SELECTED BENEFITS
FROM OFFICE AUTOMATION

- THE BENEFITS MEASURED DURING THE PROTOTYPE TEST MAY NOT BE RELIABLE FOR ESTABLISHING STANDARDS FOR FIELD OFFICE PERFORMANCE UNDER OFFICE AUTOMATION

FmHA'S OBJECTIVE #3:
MEASURE SELECTED BENEFITS
FROM OFFICE AUTOMATION

FmHA's third objective was to measure selected benefits experienced during the prototype test. In its prototype test plan, FmHA stated it would use the measurement benefit data to determine "norms" or standards for its field offices' mission performance under automation and to calculate a dollar value for the time that would be freed in field offices for selected applications.

FmHA recognized that to achieve many of the benefits cited in its economic study, the new loan accounting system would need to be in operation. FmHA estimated that these benefits represented about 55 percent of the dollar benefits for the total project. FmHA was further restricted in measuring benefits during the prototype test because it tested only 24 of the 72 planned office automation applications. An FmHA official stated that more software applications were not attempted during the prototype test primarily because field-office employees would have had too much to learn during the training period.

FmHA methodology

FmHA's prototype test plan targeted three field-office business functions for measuring mission performance and time saved during the prototype test:
(1) preparing financial spreadsheets for analysis and planning,
(2) preparing standard letters, and
(3) posting collections to a local database and identifying delinquent borrowers.
Within each function, FmHA planned to measure several indicators of mission performance including data accuracy and the number of borrowers serviced in a given time period.

FmHA planned to measure these indicators at two points in time by observing and timing various activities. A preautomation test

was to be administered at each test site the same week the computers were installed. A post-automation test is to be administered after 6 months at each test site and at 16 "control" sites with similar workloads.

Results

As of September 20, 1985, FmHA headquarters officials had obtained preautomation tests from seven of the 10 test sites at which equipment had been installed. We were informed that FmHA did not perform the test at one site and that the tests for the remaining two sites were in the mail. FmHA did not follow its planned methodology for conducting the pre-test. FmHA asked employees to estimate the time required to manually perform selected functions instead of using the planned methodology of observing and timing activities. According to an FmHA official, FmHA did not intend to actually time field-office activities as described in the plan. The official stated FmHA actually intended to obtain the time to perform activities through observations and estimates from field-office employees.

FmHA may obtain some indications of the benefits to be achieved under automation as a result of its prototype test. However, the limitations on the number of prototype test sites for which preautomation data were obtained and the use of subjective measurement methodology limit the usefulness of the results in establishing field-office performance norms or standards and in determining the amount of time saved through automation. For example, the use of employee estimates of the time needed to perform different office functions can introduce errors because respondents may base their answers on different time periods or they may exclude some experiences from their estimates.

REQUEST FOR PROPOSALS
AND
CONTRACT

APPROPRIATENESS, CONDITIONS, AND TERMS OF RFP AND CONTRACT

- RFP AND RESULTING CONTRACT DO NOT OBLIGATE USDA TO PROCURE A SPECIFIED NUMBER OF COMPUTERS ON A SET TIME TABLE

- RFP AND RESULTING CONTRACT DO NOT RESTRICT USDA FROM MODIFYING THE CONTRACT TO MEET CHANGING NEEDS OR CONDITIONS

- RFP AND RESULTING CONTRACT APPEAR TO ADEQUATELY PROTECT USDA AGAINST CONTRACTOR NONPERFORMANCE

APPROPRIATENESS, CONDITIONS, AND
TERMS OF RFP AND CONTRACT

We reviewed the RFP for the acquisition of computer equipment and software in field offices to determine whether it (1) obligates the USDA to procure a specified number of computers on a set time-table, (2) restricts USDA from modifying the contract to meet changing needs or conditions, and (3) provides adequate recourse for contractor nonperformance. We also reviewed the resulting contract, awarded September 10, 1985, on a limited basis because of time constraints. From our review, it appears that the contract requires compliance with the terms and conditions of the RFP.

USDA awarded the contract to Electronic Data Systems Corporation for a potential cost of approximately $223 million. Under the contract, AT&T, a subcontractor, is expected to supply more than 5,000 3B-2 minicomputers and more than 10,000 PC-6300 microcomputers to FmHA and SCS. In addition, the contract covers general purpose software, training, and maintenance support services.

Our review indicated that the RFP and contract specify that USDA is not required to acquire a specific number of computer systems. However, since the contract is a requirements-type con-tract, the USDA must procure all of its requirements (as identified in the RFP) for field-office systems from the contractor.

The RFP contains an estimated timetable for installation in field offices, but does not contain language that restricts USDA from modifying the schedule. USDA plans to specify the actual installation dates and locations by issuing purchase orders against the contract. The RFP further specifies that the government may solicit engineering changes to the equipment, software, or other requirements of the contract.

The RFP also contains a number of contractor nonperformance penalty clauses that provide liquidated damages to the government if the contractor fails to install functionally operating systems

41

on the specified timetable. Liquidated damages shall be computed on the basis of one-half percent of the total purchase price for each calendar day of delay. In addition, the RFP contains diagnostic, preventive, and remedial maintenance provisions for hardware and software and provides credits to the government if the contractor fails to perform. For example, credit will accrue to the government if the contractor fails to arrive for maintenance within the designated response time.

USDA'S KANSAS CITY COMPUTER CENTER CAPACITY

# OFFICE AUTOMATION SUPPORT EQUIPMENT
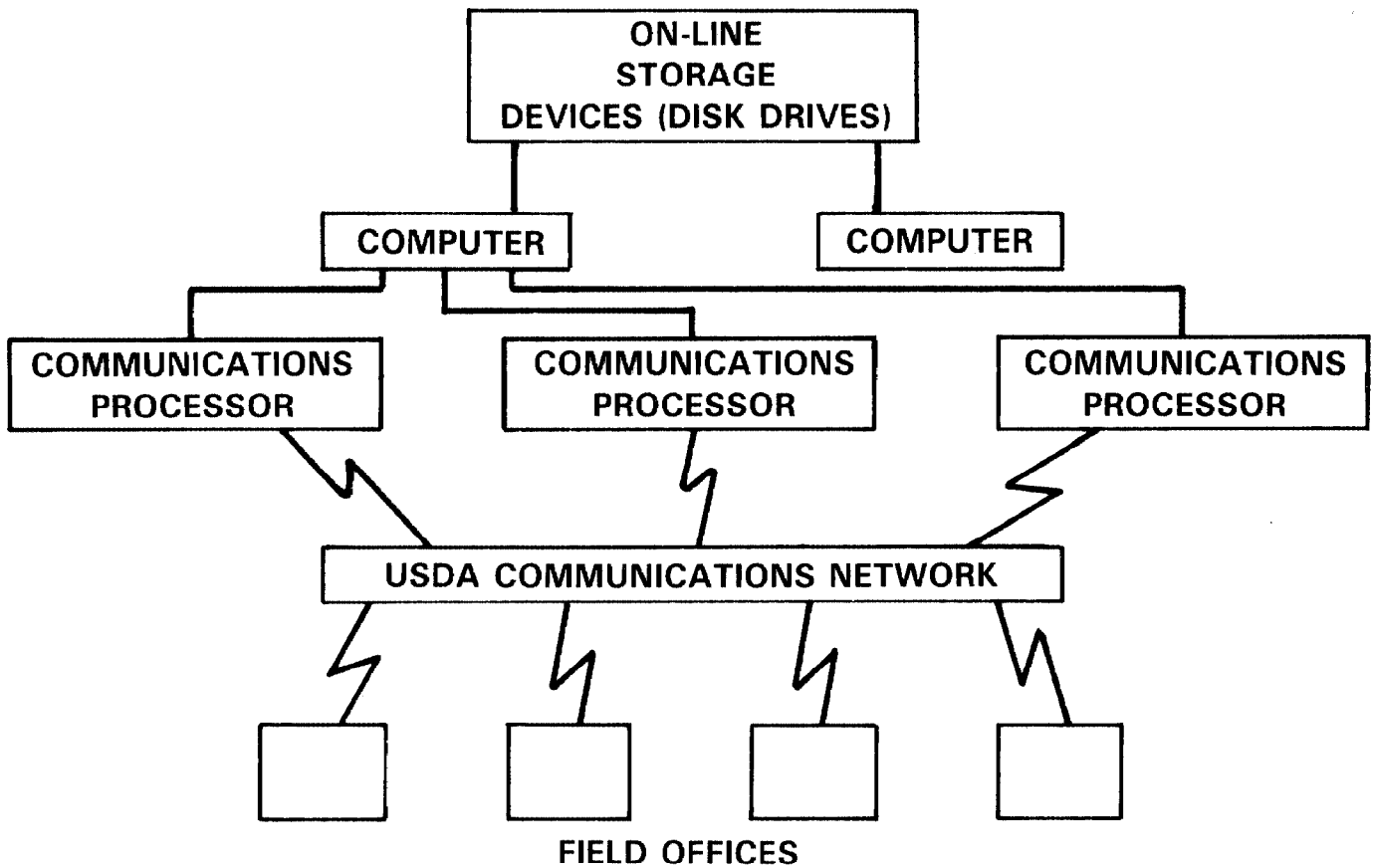
FIELD OFFICES

OFFICE AUTOMATION SUPPORT EQUIPMENT

According to KCCC officials, KCCC will use two computers, an
IBM model 3084Q and an IBM model 3083EX, to support ASCS and FmHA
field-office computer systems. Other KCCC equipment that will sup-
port those systems are KCCC's online disk drive storage devices
(IBM Model 3380s) and two Amdahl model 4705E front-end communica-
tions processors. According to KCCC officials, KCCC will acquire a
third front-end communications processor in January 1986 to support
FmHA field-office computer systems. This processor will be an IBM
model 3725.

In determining a computer system's capacity to handle
workload, it is common practice to measure the performance of
certain key components at peak workloads. These components include
the central processing unit (CPU), storage devices, front-end
communications processors, memory, and channels. We reviewed KCCC
utilization data on CPU and storage devices. Utilization data were
not available for front-end communications processors. However,
our review of the field-office workload projections for these
processors indicated that the third processor, to be acquired in
January 1986, will have the capacity to handle the projected
field-office workload. Data on memory and channel utilization were
not in a form that would have enabled us to complete our analysis
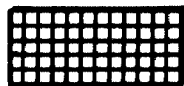during the period of our review.

JULY 1985 USE OF KCCC CPU AND DISK CAPACITY

UTILIZATION

KCCC RESOURCE ELEMENTS
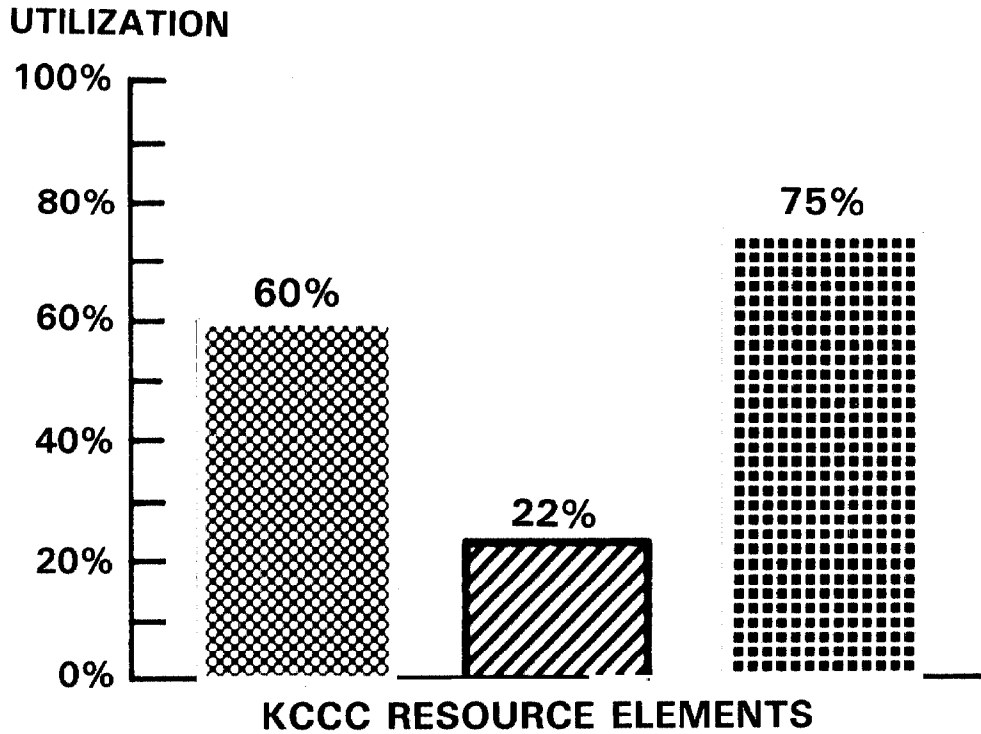
IBM COMPUTERS' CENTRAL PROCESSING UNIT (CPU) PRIME-TIME HOURS

IBM COMPUTERS' CPU NON-PRIME-TIME HOURS
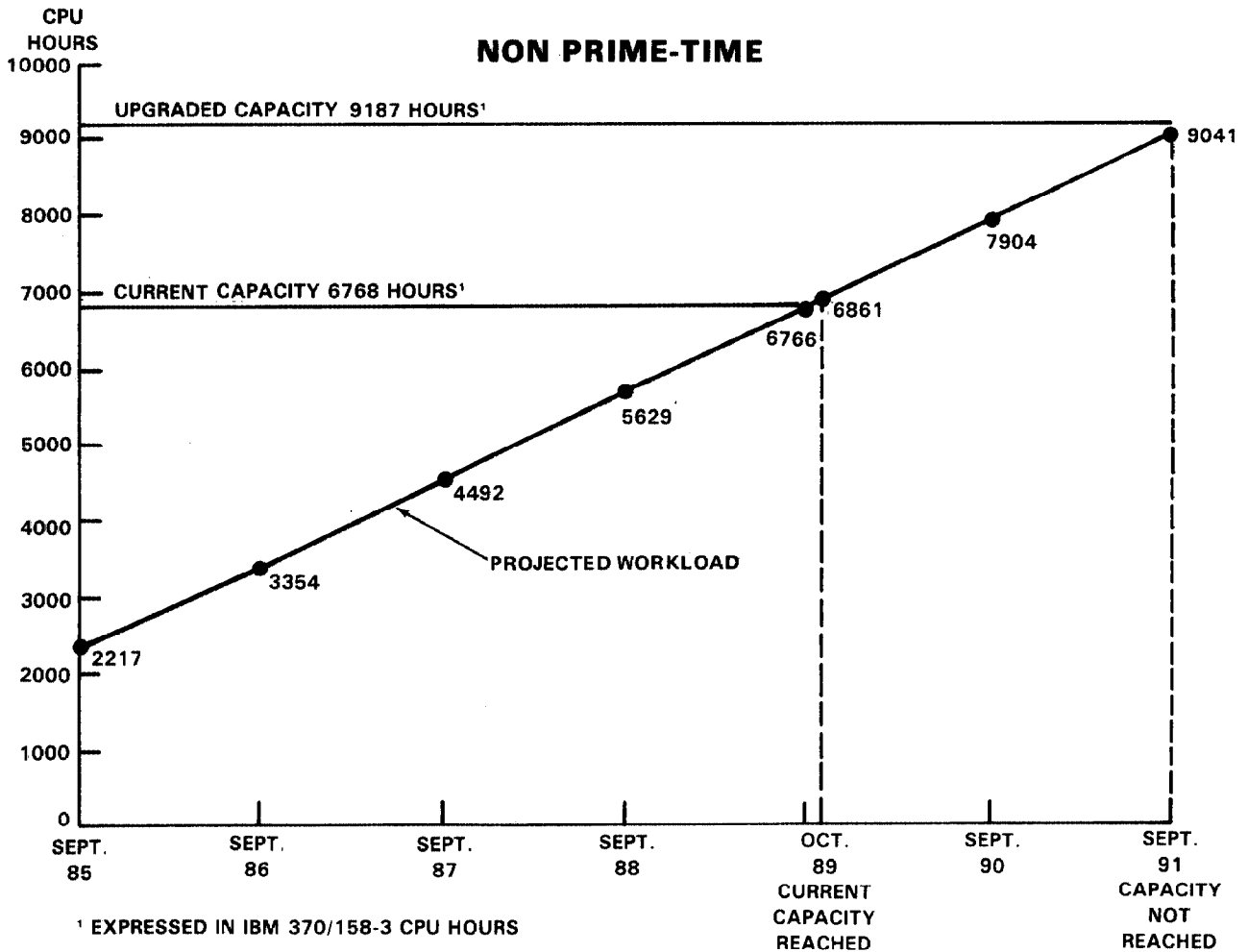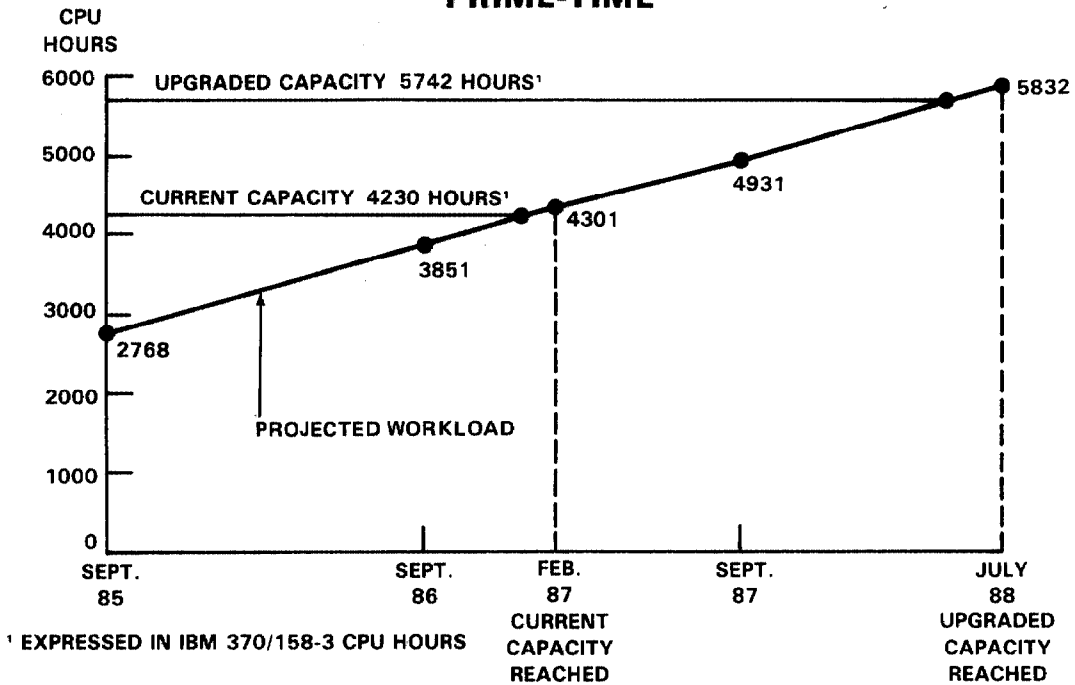
DISK DRIVE STORAGE CAPACITY

JULY 1985 USE OF KCCC
CPU AND DISK CAPACITY

During July 1985, the latest month for which CPU and disk capacity utilization data were available, the agencies that the KCCC served used: (1) 60 percent of the IBM computers' available monthly CPU-hour prime-time (7:00 a.m. to 5:00 p.m.) capacity, (2) 22 percent of the IBM computers' available monthly non prime-time (5:00 p.m. to 7:00 a.m.) CPU-hour capacity, and (3) 75 percent of the IBM's available online storage capacity. Accordingly, for these resource elements, 40 percent, 78 percent, and 25 percent unused capacity was available to user agencies during July 1985. July CPU hour and online storage utilization represented the highest utilization for these resources during fiscal year 1985.

KCCC management considers CPU hours as its most critical resource element in meeting users' requirements because, they stated, it is the costliest resource and requires long lead-times to acquire additional CPU-hour capacity.

KCCC CAN INCREASE ITS CURRENT CPU HOUR CAPACITY WITHIN ITS EXISTING CONTRACT

PRIME-TIME

CPU HOURS

UPGRADED CAPACITY 5742 HOURS[1]

CURRENT CAPACITY 4230 HOURS[1]

PROJECTED WORKLOAD

2768 3851 4301 4931 5832

SEPT. 85	SEPT. 86	FEB. 87 CURRENT CAPACITY REACHED	SEPT. 87	JULY 88 UPGRADED CAPACITY REACHED

[1] EXPRESSED IN IBM 370/158-3 CPU HOURS

NON PRIME-TIME

CPU HOURS

UPGRADED CAPACITY 9187 HOURS[1]

CURRENT CAPACITY 6768 HOURS[1]

PROJECTED WORKLOAD

2217 3354 4492 5629 6766 6861 7904 9041

SEPT. 85	SEPT. 86	SEPT. 87	SEPT. 88	OCT. 89 CURRENT CAPACITY REACHED	SEPT. 90	SEPT. 91 CAPACITY NOT REACHED

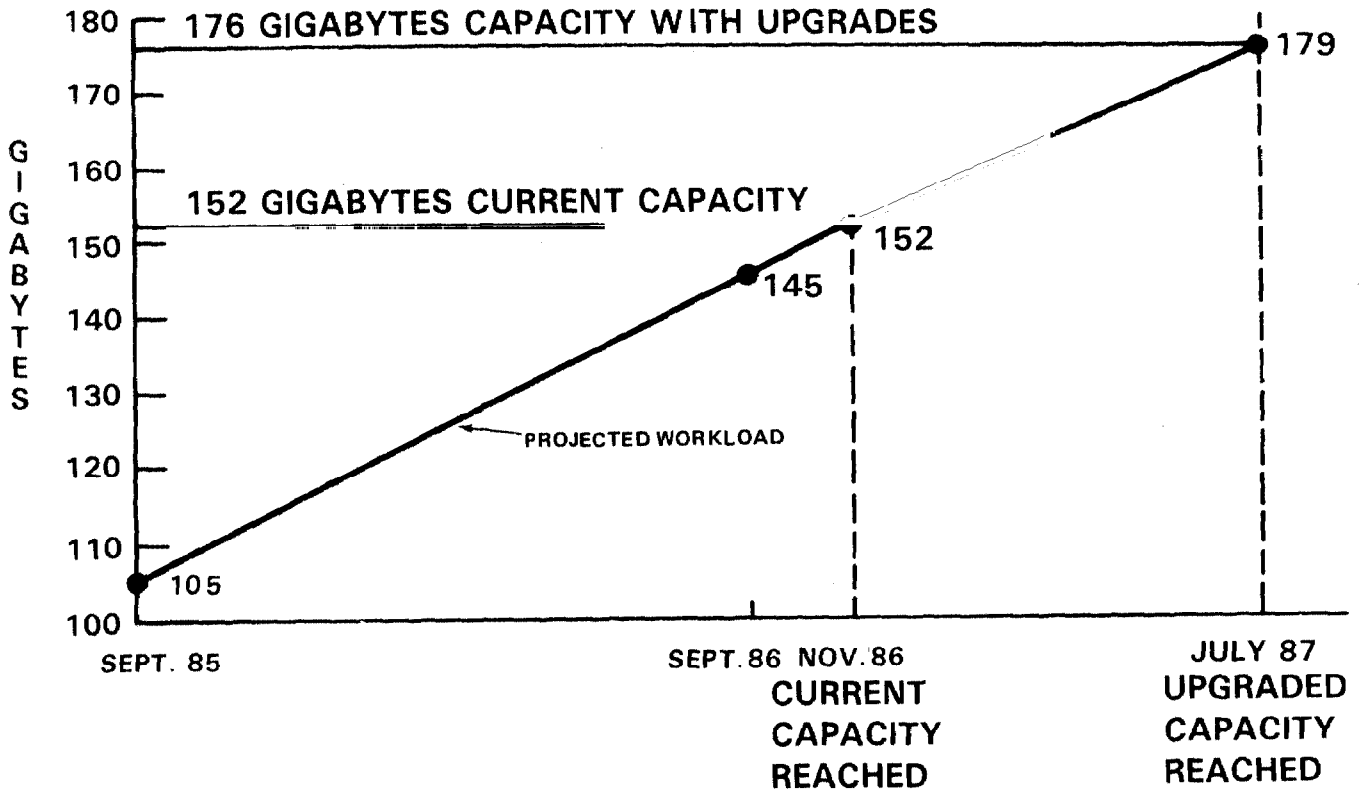[1] EXPRESSED IN IBM 370/158-3 CPU HOURS

48

KCCC CAN INCREASE ITS CURRENT CPU-HOUR
CAPACITY WITHIN ITS EXISTING CONTRACT

KCCC can upgrade its IBM computers under its current IBM contract. If KCCC exercises its options to upgrade its computers, monthly prime-time CPU-hour capacity would grow from 4,230 hours to 5,742 hours and monthly non prime-time capacity would expand from 6,768 hours to 9,187 hours. These increased CPU-hour capacities would (1) enable KCCC to meet all users' projected CPU-hour monthly prime-time requirements to July 1988, as opposed to February 1987, with its existing capacity, and (2) enable KCCC to meet all users' projected CPU-hour monthly non prime-time requirements through September 1991, as opposed to October 1989 with its existing capacity. (User workload projections available as of August 1985 do not go beyond September 1991.)

ASCS plans to have all of its field-office minicomputers installed by September 1986. According to FmHA's implementation plan, FmHA plans to have 95 percent (2,231 of 2,351) of its microcomputer systems installed in field offices by July 1987.

KCCC CAN INCREASE ON-LINE STORAGE
CAPACITY WITHIN ITS EXISTING CONTRACT

180 ┌─ 176 GIGABYTES CAPACITY WITH UPGRADES

GIGABYTES

170

160

152 GIGABYTES CURRENT CAPACITY

150 — 152

145

140

130

PROJECTED WORKLOAD

120

110

105

179

100

SEPT. 85

SEPT. 86 NOV. 86
CURRENT
CAPACITY
REACHED

JULY 87
UPGRADED
CAPACITY
REACHED

NOTE: ONE GIGABYTE EQUALS ONE BILLION BYTES OF STORAGE CAPACITY.

KCCC CAN INCREASE ONLINE STORAGE CAPACITY
WITHIN ITS EXISTING CONTRACT

KCCC's current contract with IBM has options that allow KCCC to increase its present online storage capacity from 152 gigabytes to 176 gigabytes. (A byte is a single character of information, such as a letter or a number. A gigabyte is one billion bytes.) If KCCC exercises its contract options, it could meet all users' projected online storage requirements to July 1987. With its current capacity of 152 gigabytes, KCCC can meet projected requirements to November 1986.

KCCC PLANS TO AWARD NEW CONTRACTS TO REPLACE MUCH OF ITS EXISTING ADP EQUIPMENT

- KCCC PLANS TO AWARD A CONTRACT IN MAY OR JUNE 1986 TO REPLACE ITS EXISTING ON-LINE DISK STORAGE DEVICES.

- KCCC PLANS TO COMPETITIVELY REPLACE ITS IBM COMPUTERS IN OCTOBER 1986.

KCCC PLANS TO AWARD NEW CONTRACTS TO REPLACE
MUCH OF ITS EXISTING ADP EQUIPMENT

According to USDA and KCCC officials, KCCC will award a contract in May or June of 1986 to replace KCCC's existing online storage devices. KCCC officials note that installation of the new disk drives will begin within 60 days of contract award and will be phased in over a 4-year period. This contract will enable KCCC to increase its current online storage capacity from 152 gigabytes to 500 gigabytes. This will allow KCCC to meet user agencies' projected online storage capacity requirements through September 1991. (User workload projections available as of August 1985 do not go beyond September 1991.)

USDA and KCCC officials also stated that KCCC plans to award a contract in 1986 to competitively replace KCCC's IBM computers and that the new computers will be operational in October 1986. The officials stated the contract will contain options for upgrading the computers as workload increases.

FmHA AND ASCS OFFICIALS' PERSPECTIVE ON HOW FIELD OFFICE COMPUTERS WILL AFFECT USE OF KCCC COMPUTERS

- FmHA OFFICIALS STATED THAT THEY BELIEVE THE INSTALLATION OF COMPUTER SYSTEMS IN FmHA FIELD OFFICES WILL NOT INCREASE FmHA'S USE OF KCCC'S COMPUTERS AND DISK DRIVES

- ASCS OFFICIALS STATED THEY BELIEVE THE INSTALLATION OF COMPUTER SYSTEMS IN ASCS FIELD OFFICES WILL DECREASE RATHER THAN INCREASE ASCS'S USE OF KCCC'S ADP EQUIPMENT

FmHA AND ASCS OFFICIALS' PERSPECTIVE
ON HOW FIELD OFFICE COMPUTERS WILL
AFFECT USE OF KCCC COMPUTERS

Neither FmHA nor ASCS prepared an analysis to determine whether the installation of computers in their field offices would affect their use of KCCC's computers and online disk drives. Officials from both agencies, however, believe that no increased usage of KCCC's CPU-hour resources due to the installation of computer systems in their respective field offices will occur. KCCC officials stated that they cannot now determine if automation of FmHA and ASCS field offices will increase use of KCCC's computer resources.

FmHA officials do not believe that its field-office automation will significantly increase use of KCCC's computer resources or online storage capacity because the field-office computers will not generate additional KCCC workload. Rather, the field offices will transmit loan transaction data and inquiries to KCCC for processing; this information is now transmitted to KCCC by FmHA's finance office. Based on an FmHA analysis of communications processor workload, FmHA officials believe the installation of the field-office computers will increase FmHA's use of KCCC's front-end communications processors. (KCCC is acquiring one additional such processor to accommodate the FmHA workload.)

ASCS officials, on the other hand, believe that the installation of minicomputer systems in ASCS field offices will decrease ASCS' use of KCCC's computers. This is because detailed data, such as commodity loan data now processed on KCCC's computers, will be processed by ASCS' field-office minicomputer systems. Whether this will occur cannot be determined until ASCS develops and implements all planned field-office software systems, such as the ASCS Price Support System and the County Office Expense System.

KCCC'S CAPACITY AND WORKLOAD PROJECTIONS

- IT APPEARS THAT BASED ON KCCC'S WORKLOAD PROJECTIONS, KCCC CAN HANDLE THE WORKLOAD GENERATED BY FIELD OFFICE COMPUTER SYSTEMS. HOWEVER,

  - KCCC'S WORKLOAD PROJECTIONS DO NOT ACCOUNT FOR PEAK WORKLOAD

  - KCCC HAS NOT ESTIMATED THE EFFECT OF PROJECTED WORKLOAD ON COMPUTER MEMORY AND CHANNEL REQUIREMENTS

KCCC'S CAPACITY AND WORKLOAD PROJECTIONS

Based on the August 1985 capacity of KCCC's computers and then-projected workload, it appears that KCCC can handle the field-office computer systems' workload until KCCC replaces its computers in October 1986. However, there are some areas of uncertainty associated with projecting both KCCC's future workload and its capacity to handle that workload. KCCC and its user agencies have no projections for peak prime-time, CPU-hour utilization or memory and channel requirements.

Peak workload

KCCC's current monthly CPU-workload projections do not take into account peak (i.e., 1 to 2 hours) workload periods. According to KCCC officials, KCCC has not had the tools to analyze and project peak workload periods. Installing computers in FmHA field offices may result in high peak workload periods. Currently, the finance office transmits the majority of FmHA transactions to KCCC for processing during non prime-time hours. As computers are installed in FmHA field offices, they will transmit transactions for processing during prime time or regular office hours. Furthermore, if most field offices transmit simultaneously, periodic saturation of KCCC's computers could result in processing delays.

KCCC's director stated that KCCC plans to monitor FmHA's use of KCCC's computers as FmHA begins installing computer systems in its field offices. Also, in October 1985, KCCC plans to acquire software to enable analysis and projection of peak workloads. According to the director, KCCC will use this monitoring process to determine possible shifts in workload and the size of new computers that KCCC plans to acquire. He also stated that KCCC should be able to meet FmHA's processing requirements until KCCC replaces its computers; this is because FmHA plans to phase in the field-office computer systems rather than install them all at once.

Memory and channel requirements

KCCC officials do not currently project computer memory and channel requirements because KCCC does not have the necessary analytical tools. Sufficient computer memory and channel resources are critical to meet users' workload requirements. Computer memory stores data and software during the processing cycle. If memory is insufficient, processing delays can result. Channels control the fetching and sending of data to and from terminals and storage devices. Again, if sufficient channels are not available, processing delays can occur.

KCCC's director stated that he does not believe that it is critical to project memory and channel requirements and that the current contract has no options for acquiring these resources. According to him, KCCC plans to acquire a software tool to determine memory and channel requirements under given workloads. Further, he said that KCCC can acquire additional memory and channels, if needed, within 60 to 90 days through sole-source procurement actions.

SUMMARY OF OBSERVATIONS

- ADEQUACY OF FmHA'S PROTOTYPE TESTS
  - SOME OBJECTIVES ARE BEING ACHIEVED
  - NOT ADEQUATE TO VALIDATE PRODUCTION SYSTEM TRAINING PLANS, APPLICATIONS, AND PERFORMANCE.

- APPROPRIATENESS, CONDITIONS, AND TERMS OF RFP ANC CONTRACT
  - USDA NOT OBLIGATED TO PURCHASE SPECIFIED NUMBER AND CAN MODIFY CONTRACT AS NEEDS CHANGE
  - CONTRACT CONTAINS PERFORMANCE PROVISIONS

- CAPACITY OF USDA'S KANSAS CITY COMPUTER CENTER
  - KCCC APPEARS TO HAVE ADEQUATE CAPACITY PROVIDED WORKLOAD PROJECTIONS ARE ACCURATE

SUMMARY OF OBSERVATIONS

Our review of the results of the first few months of the prototype test indicate that FmHA is accomplishing two of its three objectives. FmHA is obtaining experience on its training program and has made refinements to the office-automation software. However, FmHA's approach to measuring selected benefits from automation to set field performance norms or standards and estimate agency-wide benefits will, in our opinion, yield little useful information because subjective measurement data were used.

Regardless of whether FmHA accomplishes its stated objectives, the prototype test does not appear useful for either providing information on the adequacy of the production training program and software or the extent that the production system will improve FmHA's mission performance in the system's intended environment. The production training program is different from that used in the prototype test. Instead of using centralized training, as FmHA is doing in the prototype, FmHA plans to have selected state personnel provide decentralized training to field-office personnel and to use computerized tutorial packages to train field-office staff.

About two-thirds of the application software in the production system were not developed for the prototype test and therefore could not be evaluated for effectiveness, efficiency, and ease of use. Many of the production system's applications depend upon completion of the new loan accounting system in 1987 and establishment of telecommunications links with the new system at KCCC.

FmHA's ability to measure overall improvements in mission performance are therefore dependent upon the introduction of the production system with all of its hardware, software, and telecommunications features. FmHA officials stated that they have no detailed plans to obtain this information, although they plan to prepare periodic status reports on the production system's implementation. We believe, therefore, that FmHA could benefit from tests of that system to validate training, software,

61

and mission performance as the various system components (such as telecommunications, office-automation applications, and the new loan accounting system) are phased in. We recognize that if FmHA follows its planned schedule for installing equipment in its field offices, all equipment will have been installed by the end of 1987, when the new accounting system is expected to be implemented. We believe, however, that FmHA should conduct tests to validate those components of the project not dependent on the new accounting system prior to installing field office equipment nationwide. Further, before implementing the new accounting system in all field offices, FmHA should validate that system in selected field offices, including associated mission-performance improvements.

The contract for the production system does not obligate USDA to procure a specified number of computers on a set timetable or restrict USDA from modifying the contract to meet its needs. The contract provides recourse for nonperformance.

KCCC appears to have adequate capacity to handle the field-office computer systems' workload until KCCC replaces its computers in October 1986. However, KCCC needs to begin monitoring key systems components--memory and channels--in addition to other components to ensure that it has the capacity to handle the field-office workload.

(510126)

35118

AN EQUAL OPPORTUNITY EMPLOYER

UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

————

OFFICAL BUSINESS
PENALTY FOR PRIVATE USE $300