

The 1965 Hawaii Computer Farm Accounting Program

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THE 1965 HAWAII COMPUTER FARM ACCOUNTING PROGRAM

Ludwig Auer

SUMMARY

In this report computer farm accounting as currently practiced in Hawaii is described in terms of processing procedures and computer programs. Procedures for filing the monthly reporting forms, the processing through clerical channels, and the resulting monthly, quarterly, and annual summaries are discussed. Throughout, the technical aspects of the computer analysis are stressed and FORTRAN IV programs for monthly, quarterly, and annual programs are presented. Also tentative cost estimates are prepared. They indicate that processing and computing costs for 12 monthly summaries and 4 quarterly summaries (including one annual summary), are in the neighborhood of \$15 ranging from \$10 to \$20 depending on the computer time required for individual farm records and the total number of farmers participating in the program. These estimates do not include charges for computer programming and other overhead costs. The computer programs described in this report are limited to net cash income accounting. Potential future refinements are discussed briefly.

INTRODUCTION

Computer farm analysis is a new field now opening up and developing rapidly. At the research level, agricultural economists have used computers extensively in production function analysis, regression analysis, and linear programming studies of farm situations, agricultural regions, and national agriculture. At the farm level the use of the computer has been more limited, in part because of the lack of reliable input-output data, the high cost per farmer, and the lack of computer programs specifically designed to deal with management problems on the farm. But now with the development of more efficient computers and simplifications in computer programming, computer services can be made available to every farmer at very low cost. Computers can be effectively employed in the collection of essential farm management data which in turn may serve as input-output information for computer analysis of farms. Still, the related computer programming expenditures and the cost of computer services per farm depend largely on the extent of farmer participation. The more farmers participate in such a program, the lower the cost per individual farm. If the computer is to become an efficient tool for solving farm management problems, the "overhead" costs for continuous development and improvement of farm management programs need to be reduced through farmer participation. Farm management specialists, in cooperation with the extension service, have made significant contributions in this area. Further developments can be of great benefit to farmers, the agricultural industry, and the consumer.

The Hawaii computer farm accounting project is an effort in this direction. Its principal goal is to develop, by use of computer facilities, a farm accounting program that will benefit a large number of farmers and can be made available at very low cost. Also it is expected that summaries of computer farm accounts can provide valuable information on the State's farming situation and actually facilitate economic analysis of critical problem areas. In addition, related computer programs and empirical results can be invaluable for classroom teaching. In all these objectives, the Hawaii project corresponds to farm accounting programs established by agricultural colleges across the country. Lately, computer services at a number of universities have been engaged to speed up the processing of farm accounts. For this purpose, account book entries are coded individually by office personnel, then processed by computer, and immediately returned to the farmer. Thus, the high speed computer is effectively used in reducing the processing time, a feature of advantage to the farmer who must frequently plan for the immediate future on the basis of past performances. Yet, the time for data processing can be still further reduced if the task of coding account book entries is shifted from the central office back to the farm. This is the essential feature of the Hawaii computer farm accounting program. It has been made acceptable to farmers by replacing the traditional farm account book by simplified computer forms, introducing a readily understood coding system, and an efficient computer program with built-in checks against possible coding errors. The initial phase of this project, a computer cash accounting system, has been completed. It has been adopted by the University of Hawaii Cooperative Extension Service and since the beginning of the year, farmers in Hawaii are participating actively in this program.

It is the objective of this report to describe the technical aspects of the 1965 Hawaii computer farm accounting program. The report covers the coding system, the monthly reporting forms, and processing procedures and computer programs for monthly, quarterly, and annual summaries. It only deals with net cash income accounting but possibilities of future expansion into inventory and efficiency analysis are considered. It is written at this stage of development because technical exchange with others, working in the same area of research is considered useful and essential for further improvement.

NET CASH INCOME ACCOUNTING

Cash accounting is essential for all farm accounting and it is important that farmers have a good knowledge of its features before the program is expanded. This is particularly so if farmers who did not keep any records before, are to participate in the program. Without a detailed knowledge of farm accounting procedures, farmers can enter their cash transactions on standardized computer forms (to be described later). Then the computer summarizes all entries by categories on a monthly, quarterly, and annual basis so that farmers receive 12 monthly and 4 quarterly summaries. The quarterly summaries are cumulative, the first covering the first three months of the year, the second six months, the third nine, and the fourth the whole year. All 16 summaries provide net cash income statements with details on cash expenses and receipts, loans repaid or received, and accounts to be paid or receivable.

Major Receipt and Expense Classes

For the purpose of coding computer farm accounts all transactions are categorized into 31 receipt and expense classes as listed below:

<u>Major Receipt Classes</u>		<u>Major Expense Classes</u>	
<u>Code No.</u>	<u>Class</u>	<u>Code No.</u>	<u>Class</u>
1	Cattle	10	Capital purchase
2	Hogs	11	Feed purchases
3	Poultry	12	Veterinary and medicine
4	Livestock products	13	Feeder livestock purchases
5	Vegetables and melons	14	Fertilizer and plants
6	Fruits and nuts	15	Pest and disease control
7	Field crops	16	Hired labor
8	Other crops	17	Machine hire
9	Miscellaneous receipts	18	Marketing charges
10	Capital sale	19	Farm fuels and lubricants
30	Bank loans received	20	Tractor, truck, car shares
31	Non-farm income	21	Supplies purchased
		22	Farm utilities
		23	Repairs and maintenance
		24	Farm rent
		25	Miscellaneous farm expenses
		26	Farm organization dues
		27	Farm insurance
		28	Farm taxes
		29	Interest on farm loans
		30	Bank loan repayments
		31	Non-farm expenses

The first nine of these classes describe income items. Class number 10 refers to capital sales or purchases such as sale of second-hand machinery, sale or purchases of livestock for breeding, purchase of farm machinery, tractors, buildings, farm land, etc. Classes 11 to 29 segregate farm expenditures. Class 30 records bank loans and bank loan repayments and, finally, class 31 is used to keep a record of all household expenses and non-farm income.^{1/}

Stratification of receipts and expenses into 31 classes is admittedly somewhat arbitrary but fills the immediate needs of local farmers. Individual classes correspond to major income and receipt items of account books formerly distributed by the Department of Agricultural Economics to Hawaiian farmers. Also this classification conforms to State and Federal income tax requirements. And, while it is simple enough to serve as a code which farmers will readily accept it does not preclude the possibility of further refinement.

^{1/} A more detailed description of these receipt and expense classes is to be presented in: Edmund R. Barmettler, et al., Handbook for Computer Farm Accounting: Option I. (In process of publication by the Cooperative Extension Service, University of Hawaii.)

Monthly Reporting Form

For net cash income accounting a single standard reporting form has been designed which is made available to farmers through the Extension Service. Emphasis is placed on simplicity and only a few columns are needed for daily entries. Each form is identified by farm, number, month, year, and geographic location. Expenses and receipts are described and the dollar value of the transaction is entered. It is simply a daily record of expenses and receipts with a short code or description for classification purposes.

Exhibit 1 is a copy of the monthly reporting forms. It is a journal type reporting form.^{2/} Each transaction is listed by date, described in detail, coded by class, and entered as an expense or a receipt. The code numbers are listed on the back of each reporting form so that a farmer filing his account can never misplace the code but has access to it at all times. A sample shown on the back of each form, illustrates how entries are recorded (Exhibit 2). For example, the first line entry of sample farm 17 refers to a cash purchase of "barbed wire 6 @ 100 Rod rolls" with code number 23 for repairs and maintenance, at an expense of \$80.70 which was paid on January 2, 1965. Thus items are described in several ways: in words, by code number, and description of the expense or receipt class. Only the code number is required for computer analysis but the more detailed description is a cross check and helps to detect and prevent errors of entry.

When cash transactions are entered no additional entries are required; not so in case of payments on accounts. If payments on a sale or a purchase are expected at a later date, a number 1 is entered in credit column C on the far right. Later, when cash payments are actually made, a 2 is entered in the same column C. For example, on sample farm No. 17 (Exhibit 2) 32 feeder calves are sold on January 17 to John Doe on account. Payments of \$3,076.48 are to be made later and, therefore, a 1 is entered in the C-column. At the end of the month a partial payment of \$300.00 is received and indicated by entering a 2 in the C-column. Any future payments on this account are marked in the same manner. Similarly, purchases on account are recorded by entering the full amount of the bill under expenses, adding the number 1 in the C-column at the time of transaction and a 2 when payments are made. For example, on January 24 a payment of \$150.00 is made on the feed account. This is a payment on an account, identified by a 2 in the C-column. It, in turn, resulted from an earlier non-cash feed purchase described at the time in terms of the full amount owed and was indicated by a 1 in the C-column. Thus non-cash (credit) transactions and payments are identified for computer analysis.

In contrast to such non-cash, credit transactions "Bank loans received" and "Bank loan repayments" are entered in the usual manner of cash transactions. They are recorded under code number 30 as a receipt at the time of the loan and later, under the same code number, as an expense when the loan is repayed. A distinction is made between repayment of loans and interest payments. Interest payments are entered as a separate regular expense item under code number 29 and treated in the analysis as such.

^{2/} Entries do not have to be in chronological order but they must belong to the same month.

Exhibit 2: Reverse side of computer farm accounting form

IF YOU HAVE QUESTIONS, SEE YOUR COUNTY EXTENSION AGENT.

Please use these code numbers:

Code No.	Expenses	Code No.	Receipts
10	Capital purchase	23	Repairs and maintenance
11	Feed purchases	24	Farm rent
12	Veterinary and medicine	25	Misc. farm expenses
13	Feeder livestock purchases	26	Farm organization dues
14	Fertilizer and plants	27	Farm insurance
15	Pest and disease control	28	Farm taxes
16	Hired labor	29	Interest on farm loans
17	Machine hire	30	Bank loan repayments
18	Marketing charges	31	Non-farm expenses
19	Farm fuels and lubricants		
20	Tractor, truck, car shares		
21	Supplies purchased		
22	Farm utilities		
		1	Cattle
		2	Hogs
		3	Poultry
		4	Livestock products
		5	Vegetables and melons
		6	Fruits and nuts
		7	Field crops
		8	Other crops
		9	Miscellaneous receipts
		10	Capital sale
		30	Bank loans received
		31	Non-farm income

Computer Farm Accounting Form 1

Option I. NET CASH INCOME ACCOUNT

CONFIDENTIAL

Farm No.: <u>17</u> Month: <u>January</u> Year: 19 <u>65</u>	1 Hawaii 2 Maui 3 Lanai 4 Molokai ⑤ Oahu 6 Kauai	MAILING INFORMATION NAME: <u>John Smith</u> ADDRESS: <u>10 Farm Road</u> <u>Waianae, Hawaii 96792</u>

DESCRIPTION				TRANSACTION		
DATE	DETAILS OF TRANSACTION	CODE	CLASS	EXPENSES	RECEIPTS	C*
2	Barbed wire 6 @ 100 Rod rolls	23	Rep.	80.70		
16	Disinfectants	12	Vet.	45.31		
24	Payment on feed account (Albers)	11	Feed	150.00		2
17	32 Feeder calves sold, Ave. weight 437 lbs. John Doe - will pay later	1	Cattle		3076.48	1
25	Yearling bull - purchased from Jim North	10	Cap.	350.00		
12	2 Truck tires	20	Truck	64.00		
24	Gross sales tax - 1/2 %	28	Taxes	17.38		
12	Interest on bank loan	29	Int.	19.45		
4	Rock salt and mineral mix (Waldron's)	11	Feed	48.65		
30	Partial payment on feeder calves from John Doe	1	Cattle		300.00	2

* In column C, do not enter a number if expenses or receipts are paid in cash in full at the time of the transaction. Enter the number 1 in column C if you are going to receive or pay later. Later on, when you actually receive or pay in cash, partially or in full, enter the number 2 in column C. Do not enter 1 or 2 in column C for bank loans or bank loan repayments.

Processing of the Reporting Forms

Processing procedures of the monthly forms are illustrated diagrammatically in Figure 1. The farmer mails in the monthly forms; they are checked for inconsistencies; the entries are punched on data cards, verified, summarized, and returned directly to the farmer. Records received by the 10th of a month are, as a rule, summarized and returned within two weeks or less. If there are inconsistencies, e.g., wrong code numbers, the date of transaction is omitted, or expenses are entered as receipts, they may be detected by the clerical staff or by check routines built into the computer program as will be shown later. The monthly records are processed irrespectively of such errors but the nature of inconsistencies is recorded on the monthly summary before they are returned. In case of errors, the farmer can resubmit his corrected reporting form and obtain a revised summary free of charge. All monthly data cards are stored after processing. Every three months they are sorted according to farms and a quarterly summary is prepared for each farmer. Quarterly summaries are cumulative, i.e., the first summary covers three months, the second six months, etc. The fourth and final summary computes sum totals for the whole year. Should summaries be incomplete (e.g., only part of the year is covered) the computer will identify and describe the missing months. The quick return of monthly summaries has been found very useful. It keeps farmers up to date and practically eliminates errors in quarterly and annual summaries, thereby lowering processing costs.

FORTRAN Computer Programs

The computer programs described subsequently are written in FORTRAN IV language for the IBM-7040 computer equipped with IBM-1401 card to tape equipment. For net cash income accounting two programs have been developed: the first program is for monthly summaries, the second program for quarterly and annual summaries. Both programs are discussed in terms of flow diagrams, input information, and print-out of summaries. Complete FORTRAN IV programs on monthly and quarterly summaries are listed in Appendix I and II.

FORTRAN Program for Monthly Summary

Daily entries on monthly reporting forms, the data inputs, are punched on data cards according to a fixed format. As illustrated in Exhibit 3 the first ten columns of the data card are reserved for identification of the farm account by island, farm number, month, and year. The next 70 columns are used for listing the entries of the reporting forms "five per card," 14 columns for each. Individual entries are recorded by day of month, class code number, expense or receipt, dollar amount, and cash or credit transaction. The data card of Exhibit 3, for example, records the first five entries of the sample account of farm number 17 shown earlier in Exhibit 2. The relevant figures of the first entry are: the date (2), class code (23), expense code (1), dollar amount (80.70), and cash transaction (0). They are entered in columns 11-12, 13-14, 15, 16-23, and 24, respectively. The corresponding figures of the fourth entry are: the date (17), class code (1), receipt code (2), dollar amount (3,076.48), and non-cash, credit transaction (1). In this manner the daily entries are transferred from the farmers' record forms to the data cards. All data cards of the same farm and month have the same identification number on the first 10 columns. If the cards are punched in the same order as the data are entered on the farmers' record forms, the computer print-out will follow the same order.

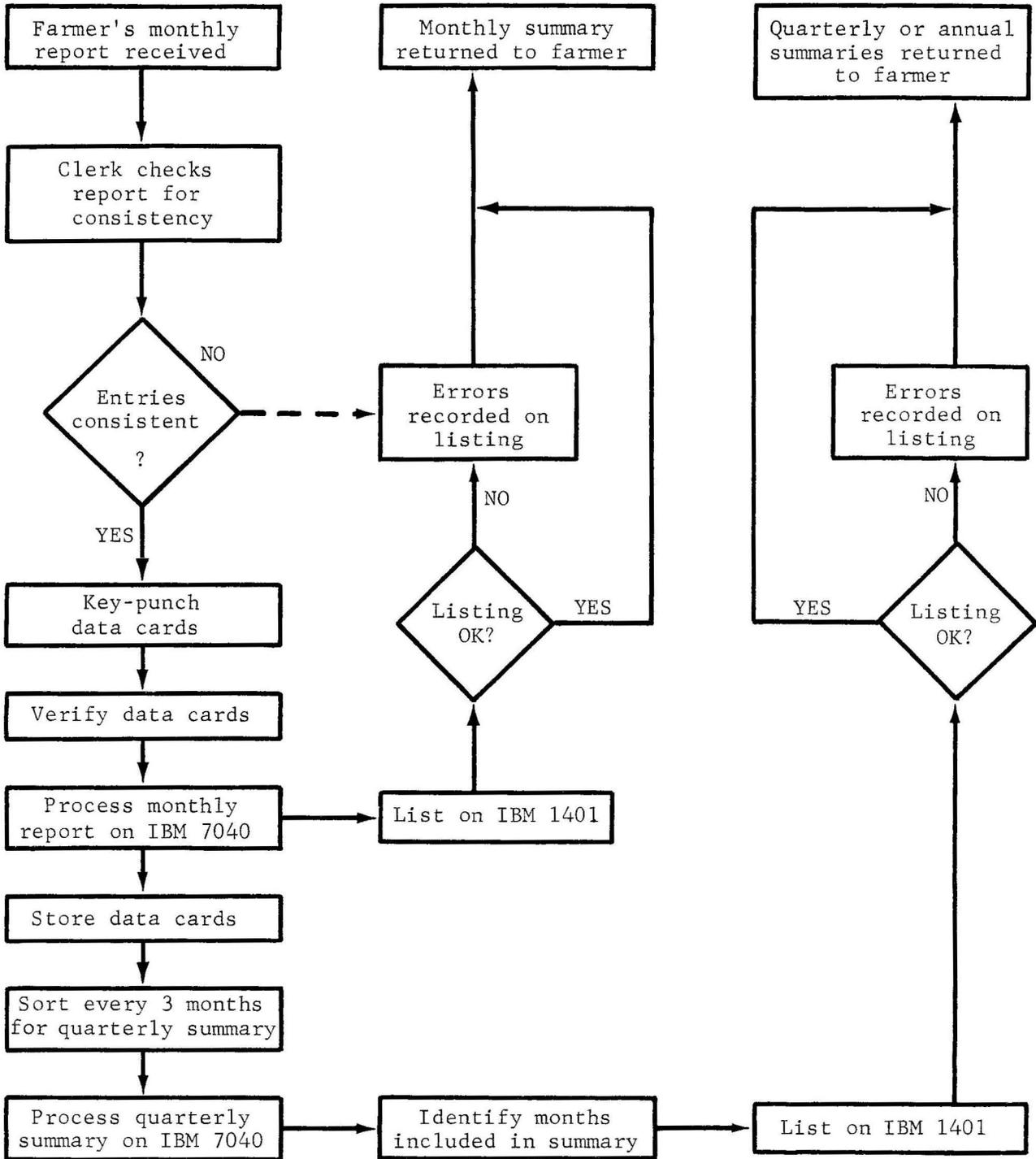


Figure 1: Flow chart of processing channels for monthly reporting forms

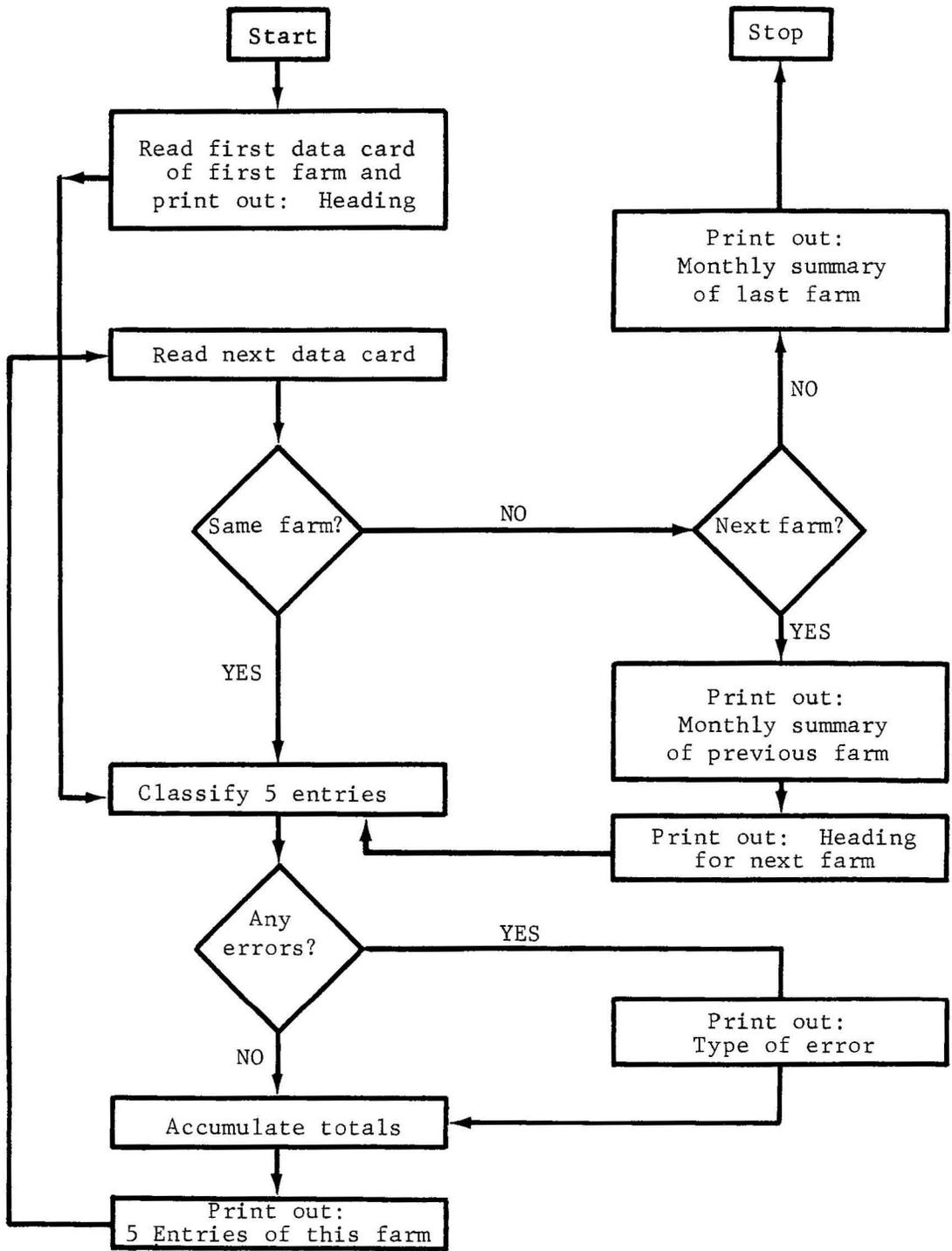


Figure 2: Flow diagram of computer program for monthly summary of farm accounts

The print-out of the monthly summary, the program output, follows the format instructions of the computer program. The print-out consists of three sections: the heading, 5-entry print-out, and monthly summary (Exhibit 4). In the computer program the heading is written according to FORMAT statements 101, 201 to 206, 301 to 306, and 401 and WRITE statements 151, 251 to 256, 351 to 356, and 451 (Appendix I). Six FORMAT statements are used to identify farms on six Hawaiian islands: Hawaii, Maui, Lanai, Molokai, Oahu and Kauai.^{3/} There are two sets of six FORMAT statements: 201 to 206 and 301 to 306. The second set, 301 to 306, is only used in case the monthly print-out of any individual farm exceeds one page and is continued over two or more pages, a feature which is controlled in the program by inserting "line counters" as, for example, the LINENO's in IF-statements 471 to 475 and the IF-statement prior to WRITE statement 25. The other two FORMAT statements, i.e., 101 and 401, serve to print those parts of the heading which are the same for all farms and each page of the print-out. The next section of the print-out, previously referred to as the 5-entry print-out, follows from FORMAT statements 501 to 531 and WRITE statements 551 to 581, one for each of the 31 expense and receipt classes described earlier.^{4/} The sequence of the print-out is completely determined by the order of entries on the data cards. Only if the entries on the computer farm accounting form are arranged by date and key-punched on data cards in the same order, can they be printed out by the computer in order of dates.^{5/} Finally, the monthly summary is computed by adding up the column entries and selected expense and receipt classes, i.e., non-farm expenses and receipts, loans repaid and/or received, and the capital account. The print-out of this monthly summary is controlled by FORMAT statements 601 to 606 and WRITE statements, interspersed with instructions for summation, towards the end of the program (Appendix I).

Error routines are built into the computer program. They are activated by errors of omission and miscoding and result in a printed description of the type of error. The following error messages are possible:

```
NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG
NEXT ENTRY HAS NO DATE
NEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG
CLASS CODE OF NEXT ENTRY WAS ZERO AND HAS BEEN CHANGED TO 32
CLASS CODE OF NEXT ENTRY WAS GREATER THAN 31 AND HAS BEEN CHANGED TO 32
NEXT ENTRY SHOULD NOT HAVE HAD 1 OR 2 IN C-COLUMN AND HAS BEEN
CHANGED TO ZERO
```

^{3/} Both sets of FORMAT statements, required here to describe farms at six locations, could be reduced to 2 single FORMAT statements by (1) use of numbers rather than word description of the islands, or (2) by use of a 2-word alphameric code to be read in as part of the data deck. This would be a desirable change if the program was to cover many locations.

^{4/} Here again the number of FORMAT and WRITE statements could be reduced to a single statement by alphameric output specification, a desirable modification if the number of code classes is enlarged.

^{5/} A subroutine for arranging the entries by date could be devised but such a rearrangement would make checking of entries more difficult and thereby defeat its purpose of greater efficiency.

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COMPUTER FARM ACCOUNTING, COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF HAWAII

OPTION 1 NET CASH INCOME ACCOUNT, MONTHLY SUMMARY
ISLAND HAWAII FARM NO 17 MCNTH 1 YEAR 1965

DAY OF MCNTH	CLASS CODE	DESCRIPTION	CASH EXPENSES	CASH RECEIPTS	ACCOUNTS TO BE PAID	ACCOUNTS RECEIVABLE
2	(23)	REPAIRS AND MAINTENANCE	80.70	0.00	0.00	0.00
16	(12)	VETERINARY AND MEDICINE	45.31	0.00	0.00	0.00
24	(11)	FEED PURCHASES	150.00	0.00	0.00	0.00
17	(1)	CATTLE	0.00	0.00	0.00	3076.48
25	(10)	CAPITAL PURCHASE OR SALE	350.00	0.00	0.00	0.00
12	(20)	TRACTOR, TRUCK, CAR SHARES	64.00	0.00	0.00	0.00
24	(28)	FARM TAXES	17.38	0.00	0.00	0.00
12	(29)	INTEREST ON FARM LOANS	19.45	0.00	0.00	0.00
4	(11)	FEED PURCHASES	48.65	0.00	0.00	0.00
30	(1)	CATTLE	0.00	300.00	0.00	0.00
2	(23)	REPAIRS AND MAINTENANCE	249.20	0.00	0.00	0.00
4	(11)	FEED PURCHASES	0.00	0.00	390.00	0.00
6	(24)	FARM RENT	365.00	0.00	0.00	0.00
13	(10)	CAPITAL PURCHASE OR SALE	0.00	1952.00	0.00	0.00
14	(21)	SUPPLIES PURCHASED	15.60	0.00	0.00	0.00
19	(19)	FARM FUELS AND LUBRICANTS	143.25	0.00	0.00	0.00
27	(25)	MISC. FARM EXPENSES	25.00	0.00	0.00	0.00
30	(16)	HIRED LABOR	360.00	0.00	0.00	0.00
30	(16)	HIRED LABOR	180.00	0.00	0.00	0.00
1	(16)	HIRED LABOR	46.75	0.00	0.00	0.00
2	(20)	TRACTOR, TRUCK, CAR SHARES	31.25	0.00	0.00	0.00
3	(18)	MARKETING CHARGES	43.14	0.00	0.00	0.00
4	(2)	HOGS	0.00	986.12	0.00	0.00
5	(25)	MISC. FARM EXPENSES	20.00	0.00	0.00	0.00
MONTHLY SUMMARY						
1.	TOTALS		2254.68	3238.12	390.00	3076.48
2.	NONFARM EXPENSES AND RECEIPTS (31)		0.00	0.00	0.00	0.00
3.	LOANS REPAYED, RECEIVED (30)		0.00	0.00		
4.	FARM EXPENSES AND RECEIPTS		2254.68	3238.12	390.00	3076.48
5.	FARM NET CASH INCOME (EXCL. LOANS)			983.44		
6.	TOTAL OF CAPITAL ACCOUNT (10)		350.00	1952.00	0.00	0.00

Exhibit 4: Computer print-out of January summary of sample farm No. 17

Their use is illustrated in Exhibits 5 and 6. For example, the second item in Exhibit 4, the remainder of \$551.00 on the cattle sale (to be paid later), was entered in the expense column instead of the receipt column. Therefore, the print-out: NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG. Similarly an error message is printed out when an expense, such as the feed purchase on June 3rd, is entered as a receipt. Errors for omission, such as missing a date (e.g., hog sale, June 2nd) or a missing number for the code class (e.g., property taxes, June 28th) are detected and identified by an error message. If code numbers are missing or if they are wrong because they exceed the coding range (e.g., electricity, June 28th) the entries are arbitrarily transferred to code class 32, set aside for \$-ERROR IN CLASS CODING. To keep credit accounts completely separate from bank loans and repayments, the C-column is never used for code classes 29 and 30. Therefore, a misplaced 1 or 2 in the C-column is ignored by the computer but a statement saying the NEXT ENTRY SHOULD NOT HAVE HAD 1 OR 2 IN C-COLUMN AND HAS BEEN CHANGED TO ZERO is printed out (Exhibit 6). However, no attempt is made to make the necessary dollar-corrections by computer. Instead, the monthly summaries containing error messages of this kind are returned to the farmer for correction, if necessary with comments added by the clerical office staff. Once corrected by the farmer the revised record form is returned and reprocessed. Thus errors on monthly summaries are eliminated before the quarterly summaries are prepared.

FORTRAN Program for Quarterly and Annual Summary

For the quarterly summary the same data cards as for the monthly summaries are used. However, before they are processed they are sorted so that cards of the same farm, but different months, can be processed together. This means sorting all cards of the same year by island and farm numbers. It does not matter in what order the monthly data cards of individual farms are arranged. The computer program is designed to recognize individual months and will identify any missing months.

A flow diagram of the computer program for quarterly summaries illustrates its basic features (Figure 3). At the start a data control card is read in which tells how many quarters, i.e., 1, 2, 3, or 4, are to be summarized. Then the data cards of individual farms are read in. They are the same cards as those used earlier for the monthly summaries except now data cards of several months are read in at once. As before, the first data card causes the heading to be printed out. This data card as well as all subsequent cards are checked for coding errors or omissions before they are processed further. If there are no errors, the "five per card" entries are classified according to code numbers and totals are accumulated for each class. Additional data entries are processed until all data cards of a given farm are read. If there are no errors, they are classified continuously and totals are accumulated for each class as well as expense and receipt categories. Then the quarterly summary of this farm is printed out. Now the same process starts all over again, the heading for the quarterly summary of the next farm is printed out, "five per card" entries are checked for errors, etc. This summary of records is continued until all farm data cards are processed and the program stops.

Computer Farm Accounting Form 1
Option I. NET CASH INCOME ACCOUNT

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Farm No.: 6
Month: June
Year: 19 65

1 Hawaii
2 Maui
3 Lanai
4 Molokai
5 Oahu
6 Kauai

MAILING INFORMATION
NAME: L. Smith
ADDRESS: 66 Volcano Road
Sunset Hill, Oahu

DESCRIPTION				TRANSACTION		
DATE	DETAILS OF TRANSACTION	CODE	CLASS	EXPENSES	RECEIPTS	C*
1	Cattle Sales (cash payment)	1	Cattle		2000.00	
1	" " (rest to be paid later)	1	Cattle	551.00		1
	Hogs sold (will get cash later)	2	Hogs		118.00	1
3	Feeds purchased including salt	11	Feed	552.00		
3	Broiler Sales	3	Poultry		119.00	
6	Lettuce sold to Greenway Stores	5	Veg.		111.00	1
7	Paid to Dr. Sato, old bill for vaccination	12	Vet.	53.00		2
12	Aloha feeds (old bill)	11	Feed	617.00		2
12	Ointments	12	Vet.	18.00		
12	Feeders bought, but not paid yet.	13	Livestock	319.00		1
14	Fertilizer 10-10-10 (not paid yet)	14	Fert.	420.00		1
15	Honey sold to Mamo Groceries	8	Others		54.00	2
	Lettuce and celery to Greenway Stores	5	Veg.	121.00		
16	Combine Harvesting of Corn	17	Mach.	240.00		
16	Custom work with tractor for John Doe promised to pay later	9	Misc.		55.00	1
17	Marketing charges for cattle	18	Market	25.00		
18	Gasoline and oil from co-op	19	Fuel	226.00		1
22	Farm organization fees	26	Dues	34.00		
28	Property taxes (final payment)		Tax	36.00		
28	Electricity	52	Utility	41.00		
29	Loan from State Bank	30	Loan		750.00	2
29	Interest payment on loan	29	Int.	25.00		

Exhibit 5: Input data of sample farm No. 6 containing errors

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COMPUTER FARM ACCOUNTING, COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF HAWAII

OPTION 1 NET CASH INCOME ACCOUNT, MONTHLY SUMMARY
ISLAND OAHU FARM NO 6 MONTH 6 YEAR 1965

DAY OF MONTH	CLASS CODE	DESCRIPTION	CASH EXPENSES	CASH RECEIPTS	ACCOUNTS TO BE PAID	ACCOUNTS RECEIVABLE
1	(1)	CATTLE	0.00	2000.00	0.00	0.00
NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG						
1	(1)	CATTLE	0.00	0.00	551.00	0.00
NEXT ENTRY HAS NO DATE						
0	(2)	HOGS	0.00	0.00	0.00	118.00
NEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG						
3	(11)	FEED PURCHASES	0.00	552.00	0.00	0.00
3	(3)	POULTRY	0.00	119.00	0.00	0.00
6	(5)	VEGETABLES AND MELONS	0.00	0.00	0.00	111.00
NEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG						
7	(12)	VETERINARY AND MEDICINE	0.00	53.00	0.00	0.00
12	(11)	FEED PURCHASES	617.00	0.00	0.00	0.00
12	(12)	VETERINARY AND MEDICINE	18.00	0.00	0.00	0.00
12	(13)	FEEDER LIVESTOCK PURCHASE	0.00	0.00	319.00	0.00
14	(14)	FERTILIZER AND PLANTS	0.00	0.00	420.00	0.00
15	(8)	OTHER CROPS	0.00	54.00	0.00	0.00
NEXT ENTRY HAS NO DATE						
NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG						
0	(5)	VEGETABLES AND MELONS	121.00	0.00	0.00	0.00
16	(17)	MACHINE HIRE	240.00	0.00	0.00	0.00
16	(9)	MISCELLANEOUS RECEIPTS	0.00	0.00	0.00	55.00
17	(18)	MARKETING CHARGES	25.00	0.00	0.00	0.00
18	(19)	FARM FUELS AND LUBRICANTS	0.00	0.00	226.00	0.00
22	(26)	FARM ORGANIZATION DUES	34.00	0.00	0.00	0.00
CLASS CODE OF NEXT ENTRY WAS ZERO AND HAS BEEN CHANGED TO 32						
28	(32)	\$-ERROR IN CLASS CODING	36.00	0.00	0.00	0.00
CLASS CODE OF NEXT ENTRY WAS GREATER THAN 31 AND HAS BEEN CHANGED TO 32						
28	(32)	\$-ERROR IN CLASS CODING	41.00	0.00	0.00	0.00
NEXT ENTRY SHOULD NOT HAVE HAD 1 OR 2 IN C-COLUMN AND HAS BEEN CHANGED TO ZERO						
29	(30)	BANK LOANS OR REPAYMENTS	0.00	750.00		
29	(29)	INTEREST ON FARM LOANS	25.00	0.00	0.00	0.00
MONTHLY SUMMARY						
1. TOTALS			1157.00	3528.00	1516.00	284.00
2. NONFARM EXPENSES AND RECEIPTS (31)			0.00	0.00	0.00	0.00
3. LOANS REPAYED, RECEIVED (30)			0.00	750.00		
4. FARM EXPENSES AND RECEIPTS			1157.00	2778.00	1516.00	284.00
5. FARM NET CASH INCOME (EXCL. LOANS)				1621.00		
6. TOTAL OF CAPITAL ACCOUNT (10)			0.00	0.00	0.00	0.00

Exhibit 6: Error messages resulting from processing input data of sample farm No. 6 (Monthly Summary)

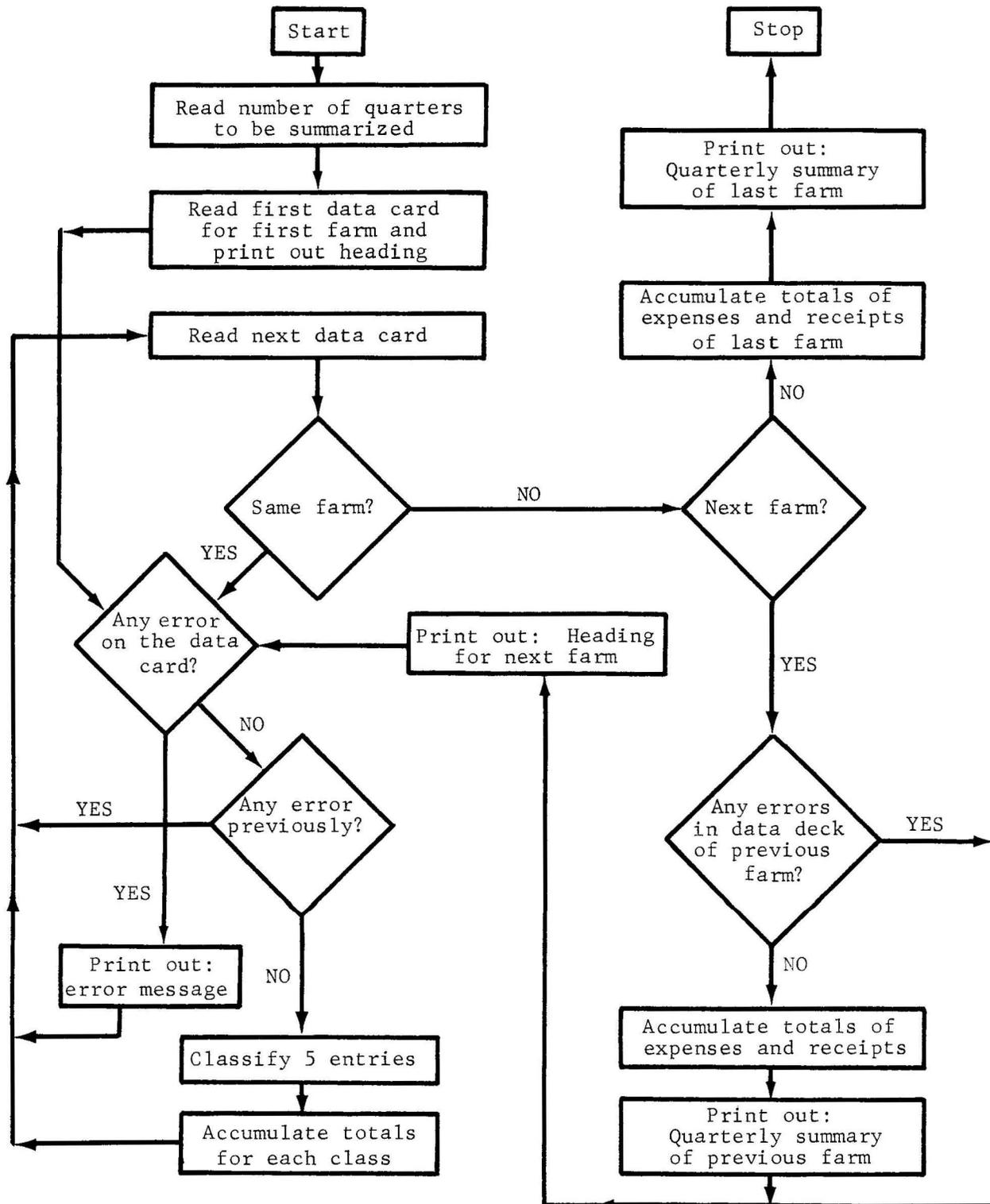


Figure 3: Flow diagram of computer program for quarterly summary of farm accounts

The print-out of the quarterly summaries follows a programmed pattern (see Exhibit 7 and Appendix II). The heading is printed out according to FORMAT statements 101, 201 to 204, 301 to 306 and 401, and the WRITE statements 151, 251 to 254, 351 to 356, and 451. Different FORMAT and WRITE statements (i.e., 201 to 204 and 251 to 254) are used for each of the four quarterly summaries. And again, as earlier for the monthly summaries, six FORMAT and WRITE statements (i.e., 301 to 306 and 351 to 356) are used for description of individual islands.^{6/} The remainder of the heading is printed out according to FORMAT statements 101 and 401. In contrast to the monthly summary, the quarterly summary arranges all receipt and expense totals in the order of receipt and expense classes (WRITE and FORMAT statements 101 to 131). In addition to a listing of cash receipts, cash expenses, accounts receivable and accounts to be paid, there is a record of "accounts received" and "accounts paid". At the beginning of the year all "accounts receivable" and "accounts to be paid" are entered; then payments during the year are subtracted from these accounts and recorded under "accounts received" and "accounts paid".^{7/} Thus, there is a quarterly and annual record of all credit transactions. The totals of all expense and receipt classes are summarized at the bottom of the summary page and grouped into non-farm expenses and receipts, loans, farm expenses and receipts, and farm net cash income. Also the totals of the capital account are listed. They refer to purchase or sale of farm buildings, farm machinery, breeding stock, and all other items which are not immediately used up but are expected to last longer than one year. They are listed separately so that they can be depreciated as required.

Error routines of the quarterly and annual program will detect errors of omission and miscoding similar to those of the monthly summary. Data cards containing errors are identified and the types of errors are described in one or several of the following error messages:

ERROR ON DATA CARD, ISLAND NO. X₁ FARM NO. X₂ MONTH X₃ DATE X₄
ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG
ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG
CLASS CODE OF ENTRY IS MISSING
CLASS CODE OF ENTRY IS GREATER THAN 31
ENTRY SHOULD NOT HAVE 1 OR 2 IN C-COLUMN

The first of these messages identifies the data card containing the error by numbers X₁, X₂, X₃, and X₄. Subsequent messages describe the different types of errors. They correspond to error descriptions of the monthly summaries.

^{6/} As mentioned earlier a single FORMAT and WRITE statement, instead of six, would suffice to describe different islands (farm locations) if alphanumeric format specification was used.

^{7/} If at the beginning of the year "accounts receivable" or "accounts to be paid" are not recorded, subsequent payments are still subtracted just as if they had been entered, and consequently negative values may appear in these columns.

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COMPUTER FARM ACCOUNTING, COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF HAWAII

OPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO MARCH SUMMARY
ISLAND HAWAII FARM NO. 17 YEAR, 1965

CLASS DESCRIPTION CODE	CASH	ACCOUNTS	ACCOUNTS	ACCOUNTS
RECEIPTS	RECEIPTS	RECEIVABLE		RECEIVED
(1) CATTLE	300.00	3076.48		0.00
(2) HCGS	3140.42	370.00		0.00
(3) PCLLTRY	0.00	0.00		0.00
(4) LIVESTOCK PRODUCTS	0.00	0.00		0.00
(5) VEGETABLES AND MELONS	102.11	0.00		0.00
(6) FRUITS AND NUTS	601.72	291.00		0.00
(7) FIELD CROPS	0.00	0.00		0.00
(8) OTHER CROPS	0.00	0.00		0.00
(9) MISCELLANECUS RECEIPTS	132.12	0.00		0.00
(10) CAPITAL SALE	1952.00	0.00		0.00
(30) BANK LCANS RECEIVED	0.00	0.00		0.00
(31) NON-FARM INCCME	125.00	-0.00		0.00
EXPENSES	CASH	ACCOUNTS	ACCOUNTS	
(10) CAPITAL PURCHASE	EXPENSES	TO BE PAID	PAID	
(11) FEED PURCHASES	612.00	0.00	0.00	
(12) VETERINARY AND MEDICINE	1589.75	390.00	0.00	
(13) FEEDER LIVESTOCK PURCHASES	57.31	0.00	0.00	
(14) FERTILIZER AND PLANTS	370.00	0.00	0.00	
(15) PEST AND DISEASE CONTROL	380.00	0.00	0.00	
(16) HIRED LABOR	61.00	0.00	0.00	
(17) MACHINER HIRE	794.65	0.00	0.00	
(18) MARKETING CHARGES	75.00	75.00	0.00	
(19) FARM FUELS AND LUBRICANTS	84.74	0.00	0.00	
(20) TRACTOR, TRUCK, CAR SHARES	376.65	0.00	0.00	
(21) SUPPLIES PURCHASED	95.25	0.00	0.00	
(22) FARM UTILITIES	60.60	0.00	0.00	
(23) REPAIRS AND MAINTENANCE	41.00	0.00	0.00	
(24) FARM RENT	361.40	86.20	0.00	
(25) MISC. FARM EXPENSES	382.38	0.00	0.00	
(26) FARM ORGANIZATION DUES	196.91	0.00	0.00	
(27) FARM INSURANCE	0.00	0.00	0.00	
(28) FARM TAXES	0.00	0.00	0.00	
(29) INTEREST ON FARM LOANS	17.38	0.00	0.00	
(30) BANK LCAN REPAYMENTS	19.45	0.00	0.00	
(31) NON-FARM EXPENSES	800.00	0.00	0.00	
SUMMARY JANUARY 1, 1965 TO MARCH 31, 1965	0.00	-0.00	0.00	
1. TOTALS	6375.47	6353.37	551.20	3737.48
2. NONFARM EXPENSES AND RECEIPTS (31)	0.00	125.00	-0.00	0.00
3. LOANS REPAID, RECEIVED (30)	800.00	0.00		0.00
4. FARM EXPENSES AND RECEIPTS	5575.47	6228.37	551.20	3737.48
5. FARM NET CASH INCOME (EXCL. LOANS)		652.90		-0.00
6. TOTAL OF CAPITAL ACCOUNT (10)	612.00	1952.00	0.00	0.00

Exhibit 7: Computer print-out of January to March summary of sample farm No. 17

However, errors are not processed as previously. If an error is detected in a quarterly (or annual) summary of a given farm, processing is reduced to checking the remaining data cards of that farm and noting any additional errors by error messages. For example, if the data of sample farm No. 6 (see earlier Exhibit 5) are processed by this program, the data inputs are not summarized. Instead a set of error messages is printed out as shown in Exhibit 8. Thus, data inputs for quarterly or annual summaries are summarized only if the data deck is free of errors.^{8/}

Processing Costs

At present it is impossible to estimate accurately the processing costs per farm and year. However, it is expected that handling and computer costs (excluding computer programming and other overhead costs) will fall within a range of approximately \$10 to \$20 per farm and year, an estimate based on computations presented in Appendix III. This estimate compares favorably with preliminary estimates of accounting projects of other states. The relatively low costs are due to the simplicity of the system, its efficient data input format, and coding of the data by the farmer himself rather than clerical staff in a central office. It is also expected that other features of analysis can be added to this program without raising processing costs significantly.

Limitations

The current program is limited to "Net Cash Income Accounting". As such it records and summarizes:

1. Farm receipts
2. Farm cash operating expenses
3. Accounts receivable or payable
4. Accounts received or paid
5. Capital assets purchased and sold
6. Bank loans and repayments
7. Non-farm income and household expenses

The current program does not, however, cover changes in farm inventories or maintain a depreciation schedule. Nor does it provide for any efficiency analysis. If farm accounting is not to terminate with a mere factual reporting of the past but is to serve as a useful tool in decision-making, it must be supplemented with inventory and efficiency analyses. The question arises if and how the computer programs presented here can be modified or supplemented to accommodate both.

^{8/} This computer check for error is, of course, limited to those which can be detected by the programmed computer routines. It is quite possible that there are others which go undetected and which can only be found by checking each entry of the original data form.

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UNIVERSITY OF HAWAII

OPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO MARCH SUMMARY
ISLAND OAHU FARM NO. 6 YEAR ,1965

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 1
ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 3
ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 7
ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE -0
ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 28
CLASS CODE OF ENTRY IS MISSING

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 28
ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 28
CLASS CODE OF ENTRY IS GREATER THAN 31

ERROR ON DATA CARD ISLAND NO. 5 FARM NO. 6 MONTH 6 DATE 29
ENTRY SHOULD NOT HAVE 1 OR 2 IN C-COLUMN

Exhibit 8: Error messages resulting from processing input data of sample farm No. 6 (Quarterly Summary)

Potential Future Refinements

For a more complete evaluation of financial progress on the farm it is necessary to maintain a detailed record of inventories at the beginning of the year as well as inventory changes, depreciation and efficiency factors throughout the year. In designing a computer program for this purpose there is no limit on the degree of conceptual refinement. Of course, each additional refinement increases the cost of computations, is likely to make coding procedures more complex and thereby increases the probability of errors. A compromise solution is proposed here.

A fairly simple system for inventory, depreciation and efficiency analyses can be readily incorporated with the previous input format and coding procedures by: 1) adding a subclass code, and by 2) elaborating on the computational code. The class code, used earlier, consisted of receipt classes 1 to 10, expense classes 10 to 20, and classes 30 and 31 for bank loans and repayments, non-farm income and expenses. By adding another two digit code, each class code can be further subdivided. For example, the present class code No. 1 refers to receipts from cattle sales. Additional code numbers, e.g., 01, 02, 03, 04, 05, permit a further breakdown into calves, steers, heifers, cows, bulls, and if desired into age groups. The same can be done for other receipt and expense classes. These additional code classes require additional computer storage space. If, for example, 20 subclasses are added to each main class, storage requirements of the original three dimensional arrays increase twenty-fold. With a large scale computer, this does not pose a problem. Also, the code numbers of the subclasses can be readily accommodated on the present computer farm accounting form (see earlier Exhibits 1 and 2) by inserting them in the column between the present code number and the expense column and thereby replacing the abbreviated class description which merely served as a secondary check on the more detailed description of the data entry. By use of such a subclass code, each expense and each receipt item can be described in monthly, quarterly and annual computer summaries similar to those of the present net cash accounting system but in much greater detail. More importantly, however, this subclass code, in combination with a computational code, allows for a system of inventory, depreciation and efficiency analysis.

For inventory analysis the beginning of the year values are described in words, by class code, subclass code, dollar value, quantity, and by the computational code number 3 in the C-column. Exhibit 9 illustrates the method of description. The first entry refers to 20 steers on hand on January 1, 1965, classified under mainclass Code No. 1, subclass Code No. 2, and valued at \$100 per animal or \$2000 in total. The second entry refers to 8 calves, classified under mainclass Code No. 1 and subclass Code No. 1 and valued at \$50 per animal or \$400 in total. The third entry represents 200 bags of feed concentrates coded under mainclass Code No. 11 and subclass Code No. 3. Thus each inventory item is coded twice, by mainclass and subclass, and quantified twice, in dollars and the number of units, e.g., No., lbs., bags, etc. The double code is employed to make identification and valuation of smaller inventory categories possible, e.g., evaluation and enumeration of cows, calves, bulls, etc., instead of cattle in total. Items are quantified twice, in dollars and number of units, to maintain accounting prices per unit at constant levels if so desired. In addition, each of the items is identified as an inventory entry by adding the code number 3 in the C-column.

Month: January, 19__

Date	Details	Main-class	Sub-class	\$-Value	Number	C
1	Steers	1	2	2000.-	20	3
1	Calves	1	1	400.-	8	3
1	Feed concentrates	11	3	1000.-	200 bags	3

Exhibit 9: Description of inventory items at the beginning of the year

Month: January, 19__

Date	Details	Main-class	Sub-class	\$-Value	Depreciation	C
1	Real estate	10	24	50,000.-		3
1	Tractor	10	1	2,000.-	500.-	3
1	Cows (breeding stock)	10	14	2,500.-	150.-	3
1	Truck	10	2	4,500.-	450.-	3

Exhibit 10: Description of capital investment and expected annual depreciation at the beginning of the year

Month: June, 19__

Date	Details	Code		Expenses (\$-Value)	Receipts Number (Depreciation)	C
		Main-class	Sub-class			
1	Cattle sale (cash payment)	1	2		2000.-	
3	Payment on market hogs sold in May	2	8		118.50	2
4	Tractor from Joe (will pay him later)	10	1	500.-		1
	Tractor depreciation (from now to December)	10	1	500.-	50.-	3
7	Tractor repairs	20	1	64.50		
31	Feed concentrates on hand	11	3	75.-	15 bags	3
31	Steers on hand	1	2	750.-	5	3

Exhibit 11: Description of receipts, expenses, capital investment, depreciation and inventory items during the year

Description of capital investment and depreciation at the beginning of the year is illustrated in Exhibit 10. All capital investments are classified under the mainclass Code No. 10 and then further identified by subclass code numbers. The latter code numbers, i.e., 24, 1, 14, and 2 for real estate, tractor, cows, and truck in Exhibit 10, are arbitrarily assigned here and would need to be put into an orderly classification scheme as used, for example, in many farm account books. Each entry is accompanied by estimates of investment value and expected annual depreciation. The real estate value is assumed to remain constant, the others depreciate at varying rates, ranging from \$150 for breeding stock to \$500 for a tractor. As before, each entry is "tagged" with the code number 3 in the C-column to differentiate it from capital sales or purchases. Depreciation charges are a unique characteristic of capital investment items in code class 10 and are thereby differentiated from quantity entries of other inventory items in the same column.

At times it may be necessary to record capital investments, depreciation, and inventory items during the year. Examples of such entries are shown in Exhibit 11. According to these, a tractor (secondhand) was purchased on June 4, the corresponding depreciation for the remainder of the year entered in the next line in the same manner as at the beginning of the year except for a smaller depreciation allowance, e.g., \$50 instead of \$100. Also a note on feed and livestock inventories at the end of the month is added. The mode of entry is here again the same as the inventory description at the beginning of the year. Thus all inventory, investment and depreciation items are entered in the same manner by double code, double entry, and number 3 in the C-column. Moreover, they all can be entered together with expenses and receipts on the same computer accounting form which could have exactly the same format as the accounting form depicted in Exhibit 1 at the outset of this report. Also the format of the data cards remains essentially unchanged. The code numbers of subclasses can be punched in the first two columns of the 8-column spaces currently provided for expenses and receipts (see earlier Exhibit 3), and the computational code 3 can be punched in the same column as the 1 and 2 values of the code for credit transactions and payments mentioned earlier.

This more refined system of computer farm accounting has some basic advantages over net cash income accounting. First, it can provide at the end of each year a complete print-out of initial inventory values, depreciation charges, capital purchases and sales^{9/} during the year, and the depreciated end-of-year values, an essential feature for evaluating the financial progress of a farm over the years. Secondly, and perhaps more importantly, it is possible to maintain inventory records and estimate critical farm efficiency ratios. For example, a record of initial feed and livestock inventories, purchases, sales and end-of-period inventories will permit estimation of "livestock output per dollar of feed input" ratios.^{10/} This estimation process can be computerized and farm efficiency analyses can be provided to farmers at regular intervals at low cost, an invaluable service for better farm management. Finally, the additional information on input and output data, obtained by more detailed coding procedures, can be extremely useful for economic analysis of agricultural adjustment problems at the state, regional and national levels.

^{9/} Capital sales could be entered on the computer forms and data cards by adding a minus sign to the depreciation figure indicating thereby that depreciation has been reduced by this amount.

^{10/} At present no provision is made for farm-produced additions to the feed and livestock inventories but this could be done quite readily by adding a new code number, say 4, in the C-column.

APPENDIX I

FORTRAN IV program for Monthly Summary of Farm Account

```
DIMENSION NDATE(5),NCLASS(5),NCOLXR(5),AMOUNT(5),NCLC(5),ACOUNT(4
1,2,32),TOTALS(4,2),SUMACT(4,2,32)
1 FORMAT(I10,5(2I2,I1,F8.2,I1))
100 FORMAT(1H1)
101 FORMAT(3X,12HCONFIDENTIAL,/13X,56HCOMPUTER FARM ACCOUNTING, COOPER
1ATIVE EXTENSION SERVICE /22X,36HDEPARTMENT OF AGRICULTURAL ECONOMI
2CS,/30X,20HUNIVERSITY OF HAWAII,//15X,50HOPTION 1 NET CASH INCOME
3 ACCOUNT, MONTHLY SUMMARY)
201 FORMAT(17X,22HISLAND HAWAII FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
202 FORMAT(17X,22HISLAND MAUI FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
203 FORMAT(17X,22HISLAND LANAI FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
204 FORMAT(17X,22HISLAND MOLOKAI FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
205 FORMAT(17X,22HISLAND OAHU FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
206 FORMAT(17X,22HISLAND KAUAI FARM NO,13,7H MONTH,13,6H YEAR,15,/
1/)
301 FORMAT(17X,22HISLAND HAWAII FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
302 FORMAT(17X,22HISLAND MAUI FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
303 FORMAT(17X,22HISLAND LANAI FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
304 FORMAT(17X,22HISLAND MOLOKAI FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
305 FORMAT(17X,22HISLAND OAHU FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
306 FORMAT(17X,22HISLAND KAUAI FARM NO,13,7H MONTH,13,6H YEAR,15,
131H, CONTINUED FROM PREVIOUS PAGE,/)
401 FORMAT(3X,6HDAY OF,1X,17HCLASS DESCRIPTION,19X,4HCASH,6X,4HCASH,4X
1,8HACCCUNTS,3X,8HACCOUNTS/3X,5HMONTH,3X,4HCODE,29X,8HEXPENSES,2X,
28HRECEIPTS,1X,10HTC BE PAID,1X,10HRECEIVABLE,20X,7HREMARKS)
421 FORMAT(1X,22HNEXT ENTRY HAS NO DATE)
422 FORMAT(1X,66HNEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUM
1BER IS WRONG )
423 FORMAT(1X,66HNEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUM
1BER IS WRONG )
424 FORMAT(1X,78HNEXT ENTRY SHOULD NOT HAVE HAD 1 OR 2 IN C-COLUMN AND
1 HAS BEEN CHANGED TO ZERO)
425 FORMAT(1X,71HCLASS CODE OF NEXT ENTRY WAS GREATER THAN 31 AND HAS
1BEEN CHANGED TO 32)
426 FORMAT(1X,60HCLASS CODE OF NEXT ENTRY WAS ZERO AND HAS BEEN CHANGE
1D TO 32)
427 FORMAT(1X,74HEXPENSE OR RECEIPT CODE OF NEXT ENTRY WAS MISSING AND
1HAS BEEN ENTERED AS 1)
501 FORMAT(5X,12,4X,30H( 1) CATTLE ,4F10.2)
502 FORMAT(5X,12,4X,30H( 2) HOGS ,4F10.2)
503 FORMAT(5X,12,4X,30H( 3) POULTRY ,4F10.2)
504 FORMAT(5X,12,4X,30H( 4) LIVESTOCK PRODUCTS ,4F10.2)
505 FORMAT(5X,12,4X,30H( 5) VEGETABLES AND MELONS ,4F10.2)
506 FORMAT(5X,12,4X,30H( 6) FRUITS AND NUTS ,4F10.2)
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APPENDIX I
(continued)

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507 FORMAT(5X,12,4X,30H( 7) FIELD CROPS ,4F10.2)
508 FORMAT(5X,12,4X,30H( 8) OTHER CROPS ,4F10.2)
509 FORMAT(5X,12,4X,30H( 9) MISCELLANEOUS RECEIPTS ,4F10.2)
510 FORMAT(5X,12,4X,30H(10) CAPITAL PURCHASE OR SALE ,4F10.2)
511 FORMAT(5X,12,4X,30H(11) FGED PURCHASES ,4F10.2)
512 FORMAT(5X,12,4X,30H(12) VETERINARY AND MEDICINE ,4F10.2)
513 FORMAT(5X,12,4X,30H(13) FEEDER LIVESTOCK PURCHASE,4F10.2)
514 FORMAT(5X,12,4X,30H(14) FERTILIZER AND PLANTS ,4F10.2)
515 FORMAT(5X,12,4X,30H(15) PEST AND DISEASE CONTROL ,4F10.2)
516 FORMAT(5X,12,4X,30H(16) HIRED LABOR ,4F10.2)
517 FORMAT(5X,12,4X,30H(17) MACHINE HIRE ,4F10.2)
518 FORMAT(5X,12,4X,30H(18) MARKETING CHARGES ,4F10.2)
519 FORMAT(5X,12,4X,30H(19) FARM FUELS AND LUBRICANTS,4F10.2)
520 FORMAT(5X,12,4X,30H(20) TRACTOR,TRUCK,CAR SHARES ,4F10.2)
521 FORMAT(5X,12,4X,30H(21) SUPPLIES PURCHASED ,4F10.2)
522 FORMAT(5X,12,4X,30H(22) FARM UTILITIES ,4F10.2)
523 FORMAT(5X,12,4X,30H(23) REPAIRS AND MAINTENANCE ,4F10.2)
524 FORMAT(5X,12,4X,30H(24) FARM RENT ,4F10.2)
525 FORMAT(5X,12,4X,30H(25) MISC. FARM EXPENSES ,4F10.2)
526 FORMAT(5X,12,4X,30H(26) FARM ORGANIZATION DUES ,4F10.2)
527 FORMAT(5X,12,4X,30H(27) FARM INSURANCE ,4F10.2)
528 FORMAT(5X,12,4X,30H(28) FARM TAXES ,4F10.2)
529 FORMAT(5X,12,4X,30H(29) INTEREST ON FARM LOANS ,4F10.2)
530 FORMAT(5X,12,4X,30H(30) BANK LOANS OR REPAYMENTS ,2F10.2)
531 FORMAT(5X,12,4X,30H(31) NONFARM EXPENSE OR INCOME,4F10.2)
532 FORMAT(5X,12,4X,30H(32) $-ERROR IN CLASS CODING ,4F10.2)
601 FORMAT(15HMONTHLY SUMMARY,/1X,3H1. ,6HTOTALS,31X,4F10.2)
602 FORMAT(1X,37H2. NONFARM EXPENSES AND RECEIPTS (31),3X,4F10.2)
603 FORMAT(1X,30H3. LOANS REPAYED, RECEIVED (30) ,10X,2F10.2)
604 FORMAT(1X,29H4. FARM EXPENSES AND RECEIPTS,11X,4F10.2)
605 FORMAT(1X,37H5. FARM NET CASH INCOME (EXCL. LOANS),13X,F10.2)
606 FORMAT(1X,32H6. TOTAL OF CAPITAL ACCOUNT (10),8X,4F10.2)
607 FORMAT(1X,40H7. TOTAL $-ERROR DUE TO MISCODING (32) ,4F10.2)
IDFARM=0
20 IF(IDFARM)150,21,150
C NDATE(J)=DAY OF MONTH,COLUMNS 11-12,25-26,39-40,53-54,67-68
C NCLASS(J)=NO. OF CLASS,COLUMNS 13-14,27-28,41-42,55-56,69-70
C NCOLXR(J)=EXPENSE(2) OR RECEIPTS(2) COLUMNS 15,29,43,57,71
C AMOUNT(J) COLUMNS 16-23,30-37,44-51,58-65,72-79
C NCOLC(J)=CASH(0), ACCOUNT NOT PAID (1), ACCOUNT PAID (2),
C 1COLUMNS 24,38,52,66,80
21 READ(5,1)ID,(NDATE(J),NCLASS(J),NCOLXR(J),AMOUNT(J),NCOLC(J),J=1,5
1)
150 WRITE(6,100)
151 WRITE(6,101)
I1=ID/100
JYEAR=ID-I1*100+1900
I2=I1/100
MONTH=I1-I2*100
I3=I2/100
NOFARM=I2-I3*100
ISLAND=I3/100
LINENO=0
LINENO=1
GO TO (251,252,253,254,255,256),ISLAND

```

APPENDIX I
(continued)

```
251 WRITE(6,201)NOFARM,MONTH,JYEAR
GO TO 451
252 WRITE(6,202)NOFARM,MONTH,JYEAR
GO TO 451
253 WRITE(6,203)NOFARM,MONTH,JYEAR
GO TO 451
254 WRITE(6,204)NOFARM,MONTH,JYEAR
GO TO 451
255 WRITE(6,205)NOFARM,MONTH,JYEAR
GO TO 451
256 WRITE(6,206) NOFARM, MONTH, JYEAR
451 WRITE(6,401)
22 DO 28 J=1,5
JDATE=NDATE(J)
JCLASS=NCLASS(J)
JCOLC=NCOLC(J)+1
JCOLXR=NCOLXR(J)
IF(JDATE+JCLASS+JCOLC+JCOLXR.EQ.1)GO TO 28
471 IF(JDATE.EQ.0) JDATE=+0
IF(JDATE.EQ.0)WRITE(6,421)
IF(JDATE.EQ.0) LINENO=LINENO+1
476 IF(JCLASS.EQ.0) WRITE(6,426)
IF(JCLASS.EQ.0) LINENO=LINENO+1
IF(JCLASS.EQ.0) JCLASS=32
477 IF(JCOLXR.EQ.0) WRITE(6,427)
IF(JCOLXR.EQ.0) LINENO=LINENO+1
IF(JCOLXR.EQ.0) JCOLXR=1
IF(JCLASS-10)472,24,23
472 IF(JCOLXR.EQ.1)WRITE(6,422)
IF(JCOLXR.EQ.1) LINENO=LINENO+1
GO TO 24
23 IF(JCLASS-30)473,474,475
473 IF(JCOLXR.EQ.2)WRITE(6,423)
IF(JCOLXR.EQ.2) LINENO=LINENO+1
GO TO 24
474 IF(JCOLC.GT.1)WRITE(6,424)
IF(JCOLC.GT.1) LINENO=LINENO+1
IF(JCOLC.GT.1) JCOLC=1
GO TO 24
475 IF(JCLASS.EQ.32) GO TO 24
IF(JCLASS.GT.31) WRITE(6,425)
IF(JCLASS.GT.31) LINENO=LINENO+1
IF(JCLASS.GT.31) JCLASS=32
24 ACCOUNT(1,1,JCLASS)=0.0
ACCOUNT(1,2,JCLASS)=0.0
ACCOUNT(2,1,JCLASS)=0.0
ACCOUNT(2,2,JCLASS)=0.0
ACCOUNT(3,1,JCLASS)=0.0
ACCOUNT(3,2,JCLASS)=0.0
ACCOUNT(JCOLC,JCOLXR,JCLASS)=AMOUNT(J)
IF(JCOLC.EQ.3)ACCOUNT(1,JCOLXR,JCLASS)=ACCOUNT(3,JCOLXR,JCLASS)
IF(JCOLC.EQ.4)ACCOUNT(1,JCOLXR,JCLASS)=ACCOUNT(4,JCOLXR,JCLASS)
C CASHX=ACCOUNT(1,1,JCLASS)=CASH EXPENSE
C CASHRC=ACCOUNT(1,2,JCLASS)=CASH RECEIPTS
C ATOPAY=ACCOUNT(2,1,JCLASS)=ACCOUNTS TO BE PAID
```

APPENDIX I
(continued)

```
C   ATOREC=ACOUNT(2,2,JCLASS)=ACCOUNTS RECEIVABLE
    CASHEX=ACOUNT(1,1,JCLASS)
    CASHRC=ACOUNT(1,2,JCLASS)
    ATOPAY=ACOUNT(2,1,JCLASS)
    ATOREC=ACOUNT(2,2,JCLASS)
    LINENO=LINENO+1
    IF(LINENO-40)26,26,25
25  WRITE(6,100)
    LINENO=0
    GO TO (351,352,353,354,355,356),ISLAND
351 WRITE(6,301)NOFARM,MONTH,JYEAR
    GO TO 441
352 WRITE(6,302)NOFARM,MONTH,JYEAR
    GO TO 441
353 WRITE(6,303)NOFARM,MONTH,JYEAR
    GO TO 441
354 WRITE(6,304)NOFARM,MONTH,JYEAR
    GO TO 441
355 WRITE(6,305)NOFARM,MONTH,JYEAR
    GO TO 441
356 WRITE(6,306)NOFARM,MONTH,JYEAR
441 WRITE(6,401)
    26 GO TO (551,552,553,554,555,556,557,558,559,560,561,562,563,564,565
      1,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,5
      282),JCLASS
551 WRITE(6,501)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
552 WRITE(6,502)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
553 WRITE(6,503)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
554 WRITE(6,504)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
555 WRITE(6,505)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
556 WRITE(6,506)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
557 WRITE(6,507)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
558 WRITE(6,508)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
559 WRITE(6,509)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
560 WRITE(6,510)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
561 WRITE(6,511)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
562 WRITE(6,512)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
563 WRITE(6,513)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
564 WRITE(6,514)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
565 WRITE(6,515)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
    GO TO 27
```

APPENDIX I
(continued)

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566 WRITE(6,516)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
567 WRITE(6,517)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
568 WRITE(6,518)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
569 WRITE(6,519)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
570 WRITE(6,520)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
571 WRITE(6,521)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
572 WRITE(6,522)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
573 WRITE(6,523)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
574 WRITE(6,524)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
575 WRITE(6,525)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
576 WRITE(6,526)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
577 WRITE(6,527)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
578 WRITE(6,528)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
579 WRITE(6,529)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
580 WRITE(6,530)JDATE,CASHEX,CASHRC
GO TO 27
581 WRITE(6,531)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
GO TO 27
582 WRITE(6,532)JDATE,CASHEX,CASHRC,ATOPAY,ATOREC
27 TOTALS(JCOLC,JCOLXR)=TOTALS(JCOLC,JCOLXR)+ACOUNT(JCOLC,JCOLXR,JCLA
1SS)
SUMACT(JCOLC,JCOLXR,JCLASS)=SUMACT(JCOLC,JCOLXR,JCLASS)+ACOUNT(JCO
1LC,JCOLXR,JCLASS)
28 CONTINUE
IDFARM=ID
READ(5,1)ID,(NDATE(J),NCLASS(J),NCOLXR(J),AMOUNT(J),NCOLC(J),J=1,5
1)
IF(IDFARM-ID)29,22,29
29 TOTALS(1,1)=TOTALS(1,1)+TOTALS(3,1)
TOTALS(1,2)=TOTALS(1,2)+TOTALS(3,2)
C TCASHX=TOTAL CASH EXPENSES
C TCASHR=TOTAL CASH RECEIPTS
C TTOPAY=TOTAL ACCOUNTS TO BE PAID
C TTOREC=TOTAL ACCOUNTS RECEIVABLE
TCASHX=TOTALS(1,1)
TCASHR=TOTALS(1,2)
TTOPAY=TOTALS(2,1)
TTOREC=TOTALS(2,2)
WRITE(6,601)TCASHX,TCASHR,TTOPAY,TTOREC
C TNFARX=TOTAL NONFARM EXPENSES
C TNFARR=TOTAL NONFARM RECEIPTS
```

APPENDIX I
(continued)

```
C TNFOWE=TOTAL NONFARM ACCOUNTS TO BE PAID
C TNFRCV=TOTAL NONFARM ACCOUNTS RECEIVABLE
  TNFARX=SUMACT(1,1,31)
  TNFARR=SUMACT(1,2,31)
  TNFOWE=SUMACT(2,1,31)
  TNFRCV=SUMACT(2,2,31)
  WRITE(6,602)TNFARX,TNFARR,TNFOWE,TNFRCV
C PDLOAN=LOANS REPAID
C RCLOAN=LOANS RECEIVED
  PDLOAN=SUMACT(1,1,30)
  RCLOAN=SUMACT(1,2,30)
  WRITE(6,603)PDLOAN,RCLOAN
C FARMEX=FARM EXPENSES
C FARMRT=FARM RECEIPTS
C FTOPAY=FARM ACCOUNTS TO BE PAID
C FTOREC=FARM ACCOUNTS RECEIVABLE
  FARMEX=TOTALS(1,1)-SUMACT(1,1,31)-SUMACT(1,1,30)
  FARMRT=TOTALS(1,2)-SUMACT(1,2,31)-SUMACT(1,2,30)
  FTOPAY=TOTALS(2,1)-SUMACT(2,1,31)
  FTOREC=TOTALS(2,2)-SUMACT(2,2,31)
  WRITE(6,604)FARMEX,FARMRT,FTOPAY,FTOREC
C FARMNI=FARM NET CASH INCOME (EXCL. LOANS)
  FARMNI=FARMRT-FARMEX
  WRITE(6,605)FARMNI
  SUMACT(1,1,10)=SUMACT(1,1,10)+SUMACT(3,1,10)
  SUMACT(1,2,10)=SUMACT(1,2,10)+SUMACT(3,2,10)
C TCAPEX=TOTAL OF CAPITAL ACCOUNT (CASH EXPENSES)
C TCAPRT=TOTAL OF CAPITAL ACCOUNT (CASH RECEIPTS)
C TCTORC=TOTAL OF CAPITAL ACCOUNT (ACCOUNTS RECEIVABLE)
C TCTOPY=TOTAL OF CAPITAL ACCOUNT (ACCOUNTS TO BE PAID)
  TCAPEX=SUMACT(1,1,10)
  TCAPRT=SUMACT(1,2,10)
  TCTOPY=SUMACT(2,1,10)
  TCTORC=SUMACT(2,2,10)
  WRITE(6,606)TCAPEX,TCAPRT,TCTOPY,TCTORC
30 DO 31 I=1,4
  DO 31 JCOLXR=1,2
  TOTALS(I,JCOLXR)=0.0
  DO 31 J=1,31
31 SUMACT(I,JCOLXR,J)=0.0
  IF(ID -1111111111)150,32,150
32 STOP
END
```

APPENDIX II

FORTRAN IV Program for Quarterly and Annual Summaries of Farm Accounts

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DIMENSION NDATE(5),NCLASS(5),NCOLXR(5),AMOUNT(5),NCOLC(5),ACOUNT(2
1,4,31),MTEST(12),MSUM(12),CASHRC(1,2,31),ATOREC(4,2,31),ACRECD(3,2
2,31),CASHEX(1,1,31),ATOPAY(4,1,31),ACPAID(3,1,31),SUMACT(4,2,31)
1 FORMAT(I1)
2 FORMAT(5I2,5(2I2,I1,F8.2,I1))
100 FORMAT(1H1)
101 FORMAT(3X,12HCONFIDENTIAL,/38X,56HCOMPUTER FARM ACCOUNTING, COOPER
1ATIVE EXTENSION SERVICE /47X,36HDEPARTMENT OF AGRICULTURAL ECONOMI
2CS,/54X,20HUNIVERSITY OF HAWAII,/)
201 FORMAT(36X,59HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO MARCH
1SUMMARY)
202 FORMAT(36X,58HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO JUNE S
1UMMARY)
203 FORMAT(34X,63HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO SEPTEM
1BER SUMMARY)
204 FORMAT(41X,49HOPTION 1 NET CASH INCOME ACCOUNT, ANNUAL SUMMARY)
301 FORMAT(46X,24HISLAND HAWAII FARM NO. ,I2,8H YEAR ,I4,/)
302 FORMAT(46X,24HISLAND MAUI FARM NO. ,I2,8H YEAR ,I4,/)
303 FORMAT(46X,24HISLAND LANAI FARM NO. ,I2,8H YEAR ,I4,/)
304 FORMAT(46X,24HISLAND MOLOKAI FARM NO. ,I2,8H YEAR ,I4,/)
305 FORMAT(46X,24HISLAND OAHU FARM NO. ,I2,8H YEAR ,I4,/)
306 FORMAT(46X,24HISLAND KAUAI FARM NO. ,I2,8H YEAR ,I4,/)
420 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
1/11X,16HMONTH IS MISSING,/)
421 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
18H MONTH ,I2,7H DATE ,I2,/11X,30HCLASS CODE OF ENTRY IS MISSING,
2/)
422 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
18H MONTH ,I2,7H DATE ,I2,/11X,54HCODE NUMBER FOR EXPENSE OR RECE
2IPT OF ENTRY IS MISSING,/)
423 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
18H MONTH ,I2,7H DATE ,I2,/11X,60HENTRY HAS RECEIPT IN EXPENSE CO
2LUMN, CR CODE NUMBER IS WRONG,/)
424 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.-I2,
18H MONTH ,I2,7H DATE ,I2,/11X,60HENTRY HAS EXPENSE IN RECEIPT CO
2LUMN, OR CODE NUMBER IS WRONG,/)
425 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
18H MONTH ,I2,7H DATE ,I2,/11X,4CHENTRY SHOULD NOT HAVE 1 OR 2 IN
2 C-COLUMN,/)
426 FORMAT(11X,31HERROR ON DATA CARD ISLAND NO.,I2,10H FARM NO.,I2,
18H MONTH ,I2,7H DATE ,I2,/11X,38HCLASS CODE OF ENTRY IS GREATER
2THAN 31,/)
428 FORMAT(11X,45HTHERE IS A MONTH/MONTHS MISSING FROM ANALYSIS)
429 FORMAT(11X,42HTHERE IS AN EXTRA MONTH/MONTHS IN ANALYSIS)
401 FORMAT(10X,17HCLASS DESCRIPTION,/,11X,4HCODE,59X,4HCASH,18X,8HACCO
1UNTS,16X,8HACCOUNTS,/3X,8HRECEIPTS,61X,8HRECEIPTS,15X,10HRECEIVABL
2E,15X,8HRECEIVED,4X,7HREMARKS)
501 FORMAT(11X,29H( 1) CATTLE ,15X,3(12X,F12.2))
502 FORMAT(11X,29H( 2) HOGS ,15X,3(12X,F12.2))
503 FORMAT(11X,29H( 3) POULTRY ,15X,3(12X,F12.2))
504 FORMAT(11X,29H( 4) LIVESTOCK PRODUCTS ,15X,3(12X,F12.2))
505 FORMAT(11X,29H( 5) VEGETABLES AND MELONS ,15X,3(12X,F12.2))
506 FORMAT(11X,29H( 6) FRUITS AND NUTS ,15X,3(12X,F12.2))
507 FORMAT(11X,29H( 7) FIELD CROPS ,15X,3(12X,F12.2))

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APPENDIX II
(continued)

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508 FORMAT(11X,29H( 8) OTHER CROPS ,15X,3(12X,F12.2))
509 FORMAT(11X,29H( 9) MISCELLANEOUS RECEIPTS ,15X,3(12X,F12.2))
510 FORMAT(11X,29H(10) CAPITAL SALE ,15X,3(12X,F12.2))
530 FORMAT(11X,29H(30) BANK LOANS RECEIVED ,15X,3(12X,F12.2))
531 FORMAT(11X,29H(31) NON-FARM INCOME ,15X,3(12X,F12.2))
402 FORMAT(62X,4HCASH,18X,8HACCOUNTS,16X,8HACCOUNTS,73X,8HEXPENSES,49X
1,8HEXPENSES,15X,10HTO BE PAID,17X,4HPAID)
610 FORMAT(11X,32H(10) CAPITAL PURCHASE ,3(12X,F12.2))
611 FORMAT(11X,32H(11) FEED PURCHASES ,3(12X,F12.2))
612 FORMAT(11X,32H(12) VETERINARY AND MEDICINE ,3(12X,F12.2))
613 FORMAT(11X,32H(13) FEEDER LIVESTOCK PURCHASES ,3(12X,F12.2))
614 FORMAT(11X,32H(14) FERTILIZER AND PLANTS ,3(12X,F12.2))
615 FORMAT(11X,32H(15) PEST AND DISEASE CONTROL ,3(12X,F12.2))
616 FORMAT(11X,32H(16) HIRED LABOR ,3(12X,F12.2))
617 FORMAT(11X,32H(17) MACHINE HIRE ,3(12X,F12.2))
618 FORMAT(11X,32H(18) MARKETING CHARGES ,3(12X,F12.2))
619 FORMAT(11X,32H(19) FARM FUELS AND LUBRICANTS ,3(12X,F12.2))
620 FORMAT(11X,32H(20) TRACTOR, TRUCK, CAR SHARES ,3(12X,F12.2))
621 FORMAT(11X,32H(21) SUPPLIES PURCHASED ,3(12X,F12.2))
622 FORMAT(11X,32H(22) FARM UTILITIES ,3(12X,F12.2))
623 FORMAT(11X,32H(23) REPAIRS AND MAINTENANCE ,3(12X,F12.2))
624 FORMAT(11X,32H(24) FARM RENT ,3(12X,F12.2))
625 FORMAT(11X,32H(25) MISC. FARM EXPENSES ,3(12X,F12.2))
626 FORMAT(11X,32H(26) FARM ORGANIZATION DUES ,3(12X,F12.2))
627 FORMAT(11X,32H(27) FARM INSURANCE ,3(12X,F12.2))
628 FORMAT(11X,32H(28) FARM TAXES ,3(12X,F12.2))
629 FORMAT(11X,32H(29) INTEREST ON FARM LOANS ,3(12X,F12.2))
630 FORMAT(11X,32H(30) BANK LOAN REPAYMENTS ,3(12X,F12.2))
631 FORMAT(11X,32H(31) NON-FARM EXPENSES ,3(12X,F12.2))
601 FORMAT(3X,18HSUMMARY JANUARY 1,,I4,13H TO MARCH 31,,I4)
602 FORMAT(3X,18HSUMMARY JANUARY 1,,I4,12H TO JUNE 30,,I4)
603 FORMAT(3X,18HSUMMARY JANUARY 1,,I4,17H TO SEPTEMBER 30,,I4)
604 FORMAT(3X,18HSUMMARY JANUARY 1,,I4,16H TO DECEMBER 31,,I4)
701 FORMAT(3X,9H1. TOTALS,43X,6F12.2)
702 FORMAT(3X,37H2. NONFARM EXPENSES AND RECEIPTS (31),15X,6F12.2)
703 FORMAT(3X,30H3. LOANS repaid, RECEIVED (30),22X,2F12.2)
704 FORMAT(3X,29H4. FARM EXPENSES AND RECEIPTS,23X,6F12.2)
705 FORMAT(3X,37H5. FARM NET CASH INCOME (EXCL. LOANS),27X,F12.2)
706 FORMAT(3X,32H6. TOTAL OF CAPITAL ACCOUNT (10),20X,6F12.2)
C NQUART INDICATES WHETHER SUMMARY IS OF 3,6,9,OR 12 MONTHS
C NDATE(J)=DAY OF MONTH,COLUMNS 11-12,25-26,39-40,53-54,67-68
C NCLASS(J)=NO. OF CLASS,COLUMNS 13-14,27-28,41-42,55-56,69-70
C NCOLC(J)=CASH(0),ACCOUNT NOT PAID (1), ACCOUNT PAID (2), COLUMNS
C 24,38,52,66,80
C NCOLXR(J)=EXPENSE(1) OR RECEIPTS(2), COLUMNS 15,29,43,57,71
READ(5,1) NQUART
READ(5,2) ISLE1,NCROP1,NFARM1,MONTH1,JYEAR1,(NDATE(J),NCLASS(J),NCO
1LXR(J),AMOUNT(J),NCOLC(J),J=1,5)
150 WRITE(6,100)
ID1=ISLE1*100000000+NCROP1*1000000+NFARM1*10000+MONTH1*100+JYEAR1
IDEN1=ISLE1*100+NFARM1
IF(ISLE-11)151,44,151
151 WRITE(6,101)
GO TO (251,252,253,254),NQUART
251 WRITE(6,201)
```

APPENDIX II
(continued)

```
GO TO 19
252 WRITE(6,202)
GO TO 19
253 WRITE(6,203)
GO TO 19
254 WRITE(6,204)
19 JYEAR=JYEAR1+1900
GO TO (351,352,353,354,355,356),ISLE1
351 WRITE(6,301)NFARM1,JYEAR
GO TO 20
352 WRITE(6,302)NFARM1,JYEAR
GO TO 20
353 WRITE(6,303)NFARM1,JYEAR
GO TO 20
354 WRITE(6,304)NFARM1,JYEAR
GO TO 20
355 WRITE(6,305)NFARM1,JYEAR
GO TO 20
356 WRITE(6,306)NFARM1,JYEAR
C MONTHS=TOTAL NUMBER OF MONTHS PRESENT IN SUMMARY
20 MONTHS=0
DO 21 M=1,12
MTEST(M)=0
21 CONTINUE
DO 22 I=1,4
DO 22 J=1,2
DO 22 K=1,31
22 SUMACT(I,J,K)=0.0
C TCASHX=TOTAL CASH EXPENSES
C TCASHR=TOTAL CASH RECEIPTS
C TTOPAY=TOTAL ACCOUNTS TO BE PAID
C TTOREC=TOTAL ACCOUNTS RECEIVABLE
C TPAID=TOTAL ACCOUNTS PAID
C TRECVD=TOTAL ACCOUNTS RECEIVED
TCASHX=0.0
TCASHR=0.0
TTOPAY=0.0
TTOREC=0.0
TPAID=C.0
TRECVD=0.0
ERROR=C.0
ERRORS=0.0
470 IF(MONTH1.EQ.0) WRITE(6,420)ISLE1,NFARM1
DO 50 J=1,5
IF(NDATE(J)+NCLASS(J)+NCOLXR(J)+NCOLC(J).EQ.0) GO TO 24
471 IF(NCLASS(J).EQ.0) WRITE(6,421) ISLE1,NFARM1,MCNTH1,NDATE(J)
IF(NCLASS(J).EQ.0) ERROR=5.0
472 IF(NCOLXR(J).EQ.0) WRITE(6,422) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCOLXR(J).EQ.0) ERROR=5.0
IF(NCLASS(J)-10)473,24,23
473 IF(NCOLXR(J).EQ.1) WRITE(6,423) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCOLXR(J).EQ.1) ERROR=5.0
GO TO 24
23 IF(NCLASS(J)-30)474,475,476
474 IF(NCOLXR(J).EQ.2) WRITE(6,424) ISLE1,NFARM1,MONTH1,NDATE(J)
```

APPENDIX II
(continued)

```
IF(NCOLXR(J).EQ.2) ERROR=5.0
GO TO 24
475 IF(NCOLC(J).GT.0) WRITE(6,425) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCOLC(J).GT.0) ERROR=5.0
GO TO 24
476 IF(NCLASS(J).GT.31) WRITE(6,426) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCLASS(J).GT.31) ERROR=5.0
24 IF(MONTH1.EQ.0) GO TO 51
50 CONTINUE
IF(ERRCR.EQ.5.0) GO TO 51
IF(ERRCR.EQ.5.0) ERROR=0.0
IF(ERRORS-100.0)53,51,53
51 READ(5,2) ISLE3,NCROP3,NFARM3,MONTH3,JYEAR3,(NDATE(J),NCLASS(J),NCO
1LXR(J),AMOUNT(J),NCOLC(J),J=1,5)
ID3=ISLE3*100000000+NCROP3*1000000+NFARM3*10000+MONTH3*100+JYEAR3
IDEN3=ISLE3*100+NFARM3
ERROR=C.0
ERRORS=0.0
IF(IDEN3.EQ.IDEN1) ERRORS=100.0
ISLE1=ISLE3
NCROP1=NCROP3
NFARM1=NFARM3
JYEAR1=JYEAR3
MONTH1=MONTH3
IF(ERRORS-100.0)150,470,150
53 MTEST(MONTH1)=1
ERROR=0.0
ERRORS=0.0
25 DO 28 J=1,5
JCOLXR=NCOLXR(J)
JCOLC=NCOLC(J)+1
JCLASS=NCLASS(J)
27 IF(JCOLXR+JCOLC+JCLASS.EQ.1)GO TO 28
SUMACT(JCOLC,JCOLXR,JCLASS)=SUMACT(JCOLC,JCOLXR,JCLASS)+AMOUNT(J)
28 CONTINUE
READ(5,2) ISLE2,NCROP2,NFARM2,MONTH2,JYEAR2,(NDATE(J),NCLASS(J),NCO
1LXR(J),AMOUNT(J),NCOLC(J),J=1,5)
ID2=ISLE2*100000000+NCROP2*1000000+NFARM2*10000+MONTH2*100+JYEAR2
IDEN2=ISLE2*100+NFARM2
ISLE1=ISLE2
NFARM1=NFARM2
NCROP1=NCROP2
JYEAR1=JYEAR2
MONTH1=MONTH2
IF(ID2-ID1)29,470,29
29 IF(IDEN2-IDEN1)30,470,30
30 DO 99 M=1,12
99 MONTHS=MONTHS+MTEST(M)
IF(MONTHS-(NQUART*3))478,451,479
478 WRITE(6,428)
GO TO 451
479 WRITE(6,429)
451 WRITE(6,401)
C ACCOUNTS RECEIVABLE (JCOLC=4) = ACCOUNTS RECEIVABLE (JCOLC=2) -
C ACCOUNTS RECEIVED (JCOLC=3)
```

APPENDIX II
(continued)

```
C CASH RECEIPTS (JCOLC=0) = CASH RECEIPTS (JCOLC=0) + ACCOUNTS
C RECEIVED (JCOLC=3)
DO 34 I=1,10
SUMACT(4,2,I)=SUMACT(2,2,I)-SUMACT(3,2,I)
34 SUMACT(1,2,I)=SUMACT(1,2,I)+SUMACT(3,2,I)
C CASHEX (JCOLC=1) = CASHEX (JCOLC=1) + ACCOUNTS PAID (JCOLC=3)
DO 35 I=10,31
SUMACT(4,1,I)=SUMACT(2,1,I)-SUMACT(3,1,I)
35 SUMACT(1,1,I)=SUMACT(1,1,I)+SUMACT(3,1,I)
C ACCOUNTS TO BE PAID (JCOLC=4) = ACCOUNTS TO BE PAID (JCOLC=2)
C ACCOUNTS PAID (JCOLC=3)
C RCLOAN=LOANS RECEIVED
C TNFARR=TOTAL NONFARM RECEIPTS
C TNFRCV=TOTAL NONFARM ACCOUNTS RECEIVABLE
C TNRECD=TOTAL NONFARM ACCOUNTS RECEIVED
RCLOAN=SUMACT(1,2,30)
TNFARR=SUMACT(1,2,31)
TNFRCV=SUMACT(4,2,31)
TNRECD=SUMACT(3,2,31)
TNFRCV=SUMACT(2,2,31)-TNRECD
TNFARR=TNFARR+TNRECD
C PDLOAN=LOANS REPAYED
C TNFARX=TOTAL NONFARM EXPENSES
C TNFOWE=TOTAL NONFARM ACCOUNTS TO BE PAID
C TNPAID=TOTAL NONFARM ACCOUNTS PAID
PDLOAN=SUMACT(1,1,30)
TNFARX=SUMACT(1,1,31)
TNFOWE=SUMACT(4,1,31)
TNPAID=SUMACT(3,1,31)
TNFOWE=SUMACT(2,1,31)-TNPAID
C CASHRC = CASH RECEIPTS
C ATOREC = ACCOUNTS RECEIVABLE
C ACRECD = ACCOUNTS RECEIVED
DO 36 I=1,10
CASHRC(1,2,I)=SUMACT(1,2,I)
ATOREC(4,2,I)=SUMACT(4,2,I)
36 ACRECD(3,2,I)=SUMACT(3,2,I)
C CASHEX = CASH EXPENSES
C ATOPAY = ACCOUNTS TO BE PAID
C ACPAID = ACCOUNTS PAID
DO 37 I=10,29
CASHEX(1,1,I)=SUMACT(1,1,I)
ATOPAY(4,1,I)=SUMACT(4,1,I)
37 ACPAID(3,1,I)=SUMACT(3,1,I)
WRITE(6,501) CASHRC(1,2, 1),ATOREC(4,2, 1),ACRECD(3,2, 1)
WRITE(6,502) CASHRC(1,2, 2),ATOREC(4,2, 2),ACRECD(3,2, 2)
WRITE(6,503) CASHRC(1,2, 3),ATOREC(4,2, 3),ACRECD(3,2, 3)
WRITE(6,504) CASHRC(1,2, 4),ATOREC(4,2, 4),ACRECD(3,2, 4)
WRITE(6,505) CASHRC(1,2, 5),ATOREC(4,2, 5),ACRECD(3,2, 5)
WRITE(6,506) CASHRC(1,2, 6),ATOREC(4,2, 6),ACRECD(3,2, 6)
WRITE(6,507) CASHRC(1,2, 7),ATOREC(4,2, 7),ACRECD(3,2, 7)
WRITE(6,508) CASHRC(1,2, 8),ATOREC(4,2, 8),ACRECD(3,2, 8)
WRITE(6,509) CASHRC(1,2, 9),ATOREC(4,2, 9),ACRECD(3,2, 9)
WRITE(6,510) CASHRC(1,2,10),ATOREC(4,2,10),ACRECD(3,2,10)
WRITE(6,530) RCLOAN
```

APPENDIX II
(continued)

```
WRITE(6,531) TNFARR,TNFRCV,TNRECD
WRITE(6,402)
WRITE(6,610) CASHEX(1,1,10),ATOPAY(4,1,10),ACPAID(3,1,10)
WRITE(6,611) CASHEX(1,1,11),ATOPAY(4,1,11),ACPAID(3,1,11)
WRITE(6,612) CASHEX(1,1,12),ATOPAY(4,1,12),ACPAID(3,1,12)
WRITE(6,613) CASHEX(1,1,13),ATOPAY(4,1,13),ACPAID(3,1,13)
WRITE(6,614) CASHEX(1,1,14),ATOPAY(4,1,14),ACPAID(3,1,14)
WRITE(6,615) CASHEX(1,1,15),ATOPAY(4,1,15),ACPAID(3,1,15)
WRITE(6,616) CASHEX(1,1,16),ATOPAY(4,1,16),ACPAID(3,1,16)
WRITE(6,617) CASHEX(1,1,17),ATOPAY(4,1,17),ACPAID(3,1,17)
WRITE(6,618) CASHEX(1,1,18),ATOPAY(4,1,18),ACPAID(3,1,18)
WRITE(6,619) CASHEX(1,1,19),ATOPAY(4,1,19),ACPAID(3,1,19)
WRITE(6,620) CASHEX(1,1,20),ATOPAY(4,1,20),ACPAID(3,1,20)
WRITE(6,621) CASHEX(1,1,21),ATOPAY(4,1,21),ACPAID(3,1,21)
WRITE(6,622) CASHEX(1,1,22),ATOPAY(4,1,22),ACPAID(3,1,22)
WRITE(6,623) CASHEX(1,1,23),ATOPAY(4,1,23),ACPAID(3,1,23)
WRITE(6,624) CASHEX(1,1,24),ATOPAY(4,1,24),ACPAID(3,1,24)
WRITE(6,625) CASHEX(1,1,25),ATOPAY(4,1,25),ACPAID(3,1,25)
WRITE(6,626) CASHEX(1,1,26),ATOPAY(4,1,26),ACPAID(3,1,26)
WRITE(6,627) CASHEX(1,1,27),ATOPAY(4,1,27),ACPAID(3,1,27)
WRITE(6,628) CASHEX(1,1,28),ATOPAY(4,1,28),ACPAID(3,1,28)
WRITE(6,629) CASHEX(1,1,29),ATOPAY(4,1,29),ACPAID(3,1,29)
WRITE(6,630) PDLOAN
WRITE(6,631) TNFARX,TNFOWE,TNPAID
GO TO (651,652,653,654),NQUART
651 WRITE(6,601) JYEAR,JYEAR
GO TO 38
652 WRITE(6,602) JYEAR,JYEAR
GO TO 38
653 WRITE(6,603) JYEAR,JYEAR
GO TO 38
654 WRITE(6,604) JYEAR,JYEAR
38 DO 39 I=1,10
TCASHR=TCASHR+CASHRC(1,2,I)
39 TTOREC=TTOREC+ATOREC(4,2,I)
TCASHR=TCASHR+RCLOAN
TCASHR=TCASHR+TNFARR
TTOREC=TTOREC+TNFRCV
DO 40 I=10,29
TCASHX=TCASHX+CASHEX(1,1,I)
40 TTOPAY=TTOPAY+ATOPAY(4,1,I)
TCASHX=TCASHX+PDLOAN
TCASHX=TCASHX+TNFARX
TTOPAY=TTOPAY+TNFOWE
DO 41 I=1,10
41 TRECVD=TRECVD+ACRECD(3,2,I)
TRECVD=TRECVD+TNRECD
DO 42 I=10,29
42 TPAID=TPAID+ACPAID(3,1,I)
TPAID=TPAID+TNPAID
751 WRITE(6,701)TCASHX,TCASHR,TTOPAY,TTOREC,TPAID,TRECVD
752 WRITE(6,702)TNFARX,TNFARR,TNFOWE,TNFRCV,TNPAID,TNRECD
753 WRITE(6,703)PDLOAN,RCLOAN
C FARMEX=FARM EXPENSES
C FARMRT=FARM RECEIPTS
```

APPENDIX II
(continued)

```
C   FTOPAY=FARM ACCOUNTS TO BE PAID
C   FTOREC=FARM ACCOUNTS RECEIVABLE
C   FPAID=FARM ACCOUNTS PAID
C   FRECV D=FARM ACCOUNTS RECEIVED
      FARMEX=TCASHX-TNFARX-PDLOAN
      FARMRT=TCASHR-TNFARR-RCLOAN
      FTOPAY=TTOPAY-TNFOWE
      FTOREC=TTOREC-TNFRCV
      FPAID=TPAID-TNPAID
      FRECV D=TRECV D-TNRECD
754 WRITE(6,704)FARMEX,FARMRT,FTOPAY,FTOREC,FPAID,FRECV D
C   FARMNI=FARM NET CASH INCOME (EXCL. LOANS)
      FARMNI=FARMRT-FARMEX
755 WRITE(6,705)FARMNI
C   TCAPEX=TOTAL OF CAPITAL ACCOUNT (CASH EXPENSES)
C   TCAPRT=TOTAL OF CAPITAL ACCOUNT (CASH RECEIPTS)
C   TCTOPY=TOTAL OF CAPITAL ACCOUNTS TO BE PAID
C   TCTORC=TOTAL OF CAPITAL ACCOUNTS RECEIVABLE
C   TCPAID=TOTAL OF CAPITAL ACCOUNTS PAID
C   TCRCVD=TOTAL OF CAPITAL ACCOUNTS RECEIVED
      TCAPEX=CASHEX(1,1,10)
      TCAPRT=CASHRC(1,2,10)
      TCTOPY=ATOPAY(4,1,10)
      TCTORC=ATOREC(4,2,10)
      TCPAID=ACPAID(3,1,10)
      TCRCVD=ACRECD(3,2,10)
756 WRITE(6,706)TCAPEX,TCAPRT,TCTOPY,TCTORC,TCPAID,TCRCVD
      IF(ISLE2-11)43,44,43
43  ISLE1=ISLE2
      NCROP1=NCROP2
      NFARM1=NFARM2
      MONTH1=MONTH2
      JYEAR1=JYEAR2
      GO TO 150
44  STOP
      END
```

APPENDIX III

Summary of Alternative Cost Estimates for Processing Costs
of Computer Farm Accounts Per Farm and Year

A. 1. Computer costs at reduced rate of \$160 per hour or \$2.67 per minute		
a) Twelve monthly summaries at the rate of <u>five</u> farms per minute (30.5 entries per month)	12 x .534 =	6.41
b) Four quarterly summaries at <u>ten</u> months per minute		
3 months summary	3 x .267 =	.80
6 " "	6 x .267 =	1.60
9 " "	9 x .267 =	2.40
12 " "	12 x .267 =	<u>3.20</u>
		8.00
Total computer costs	a) 12 monthly summaries	6.41
	b) 4 quarterly summaries	<u>8.00</u>
		14.41
2. Keypunch and verify at 50 cards per hour and \$1.50/hour		
	72 cards	2.16
3. Mailing and handling		
a) postage	12 x .08 =	.96
b) computer form	12 x .05 =	.60
c) 2 envelopes (including return envelope)	12 x .06 =	.72
d) addressing, stuffing, and other handling	12 x .10 =	1.20
		3.48
Total Costs (excluding research and building depreciation costs)		<u>\$20.05</u>
B. 1. Computer costs as before but:		
a) Twelve monthly summaries at the rate of <u>ten</u> per minute (30.5 entries per month)	12 x .267 =	3.20
b) Four quarterly summaries at <u>twenty</u> months per minute		
3 months summary	3 x .134 =	.40
6 " "	6 x .134 =	.80
9 " "	9 x .134 =	1.21
12 " "	12 x .134 =	<u>1.61</u>
		4.02
Total computer costs	a) 12 monthly summaries	3.20
	b) 4 quarterly summaries	<u>4.02</u>
		\$ 7.22
2. Keypunch and verify		2.16
3. Mailing and handling		<u>3.48</u>
		<u>\$12.86</u>

APPENDIX III
(continued)

C. 1. Computer costs as before but:

a) Twelve monthly summaries at the rate of 15 farms per minute
(30.5 entries per month) $12 \times .178 = 2.14$

b) Four quarterly summaries at 40 months per minute

3 months summary	3 x .667 =	.20
6 " "	6 x .667 =	.40
9 " "	9 x .667 =	.60
12 " "	12 x .667 =	<u>.80</u>
		2.00

Total computer costs	a) 12 monthly summaries	2.14
	b) 4 quarterly summaries	<u>2.00</u>
		\$ <u>4.14</u>

2. Key punch and verify 2.16

3. Mailing and handling 3.48

\$ 9.78

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