The 1965 Hawaii Computer Farm Accounting Program

Ludwig Auer

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## CONTENTS

<table>
<thead>
<tr>
<th>Summary</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>NET CASH INCOME ACCOUNTING</td>
<td>4</td>
</tr>
<tr>
<td>Major Receipt and Expense Classes</td>
<td>5</td>
</tr>
<tr>
<td>Monthly Reporting Form</td>
<td>6</td>
</tr>
<tr>
<td>Processing of the Reporting Forms</td>
<td>9</td>
</tr>
<tr>
<td>FORTRAN Computer Programs</td>
<td>9</td>
</tr>
<tr>
<td>FORTRAN Program for Monthly Summary</td>
<td>9</td>
</tr>
<tr>
<td>FORTRAN Program for Quarterly and Annual Summary</td>
<td>15</td>
</tr>
<tr>
<td>Processing Costs</td>
<td>21</td>
</tr>
<tr>
<td>Limitations</td>
<td>21</td>
</tr>
<tr>
<td>Potential Future Refinements</td>
<td>23</td>
</tr>
</tbody>
</table>

## FIGURES

Number

1. Flow chart of processing channels for monthly reporting forms | 10
2. Flow diagram of computer program for monthly summary of farm accounts | 12
3. Flow diagram of computer program for quarterly summary of farm accounts | 18

## EXHIBITS

1. Computer Farm Accounting Form | 7
2. Reverse side of computer farm accounting form | 8
3. Card layout for data input | 11
4. Computer print-out of January summary of sample farm No. 17 | 14
5. Input data of sample farm No. 6 containing errors | 16
6. Error messages resulting from processing input data of sample farm No. 6 (Monthly Summary) | 17
## EXHIBITS (continued)

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Computer print-out of January to March summary of sample farm No. 17</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>Error messages resulting from processing input data of sample farm No. 6 (Quarterly Summary)</td>
<td>22</td>
</tr>
<tr>
<td>9</td>
<td>Description of inventory items at the beginning of the year</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>Description of capital investment and expected annual depreciation at the beginning of the year</td>
<td>23</td>
</tr>
<tr>
<td>11</td>
<td>Description of receipts, expenses, capital investment, depreciation and inventory items during the year</td>
<td>24</td>
</tr>
</tbody>
</table>

## APPENDIX

I. FORTRAN IV Program for Monthly Summary of Farm Accounts ............................ 26

II. FORTRAN IV Program for Quarterly and Annual Summaries of Farm Accounts .................. 32

III. Summary of Alternative Cost Estimates for Processing Costs of Computer Farm Accounts Per Farm and Year .......................................................... 39
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:

<table>
<thead>
<tr>
<th>Major Receipt Classes</th>
<th>Code No.</th>
<th>Class</th>
<th>Major Expense Classes</th>
<th>Code No.</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cattle</td>
<td>10 Capital purchase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hogs</td>
<td>11 Feed purchases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Poultry</td>
<td>12 Veterinary and medicine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Livestock products</td>
<td>13 Feeder livestock purchases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Vegetables and melons</td>
<td>14 Fertilizer and plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fruits and nuts</td>
<td>15 Pest and disease control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Field crops</td>
<td>16 Hired labor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Other crops</td>
<td>17 Machine hire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Miscellaneous receipts</td>
<td>18 Marketing charges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Capital sale</td>
<td>19 Farm fuels and lubricants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Bank loans received</td>
<td>20 Tractor, truck, car shares</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Non-farm income</td>
<td>21 Supplies purchased</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 purchase 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.

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. 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 main­
tenance, 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. Inter­
est 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 1: Computer Farm Accounting Form 1

### Option 1. NET CASH INCOME ACCOUNT

<table>
<thead>
<tr>
<th>Farm No.</th>
<th>Hawaii</th>
<th>Maui</th>
<th>Lanai</th>
<th>Molokai</th>
<th>Oahu</th>
<th>Kauai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mailing Information

| NAME:     |        |
| ADDRESS:  |        |

### Description

<table>
<thead>
<tr>
<th>Date</th>
<th>Details of Transaction</th>
<th>CODE</th>
<th>CLASS</th>
<th>Expenses</th>
<th>Receipts</th>
<th>C*</th>
</tr>
</thead>
</table>

---
Exhibit 2: Reverse side of computer farm accounting form

IF YOU HAVE QUESTIONS, SEE YOUR COUNTY EXTENSION AGENT.

Please use these code numbers:

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Expenses</th>
<th>Code No.</th>
<th>Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Capital purchase</td>
<td>1</td>
<td>Cattle</td>
</tr>
<tr>
<td>11</td>
<td>Feed purchases</td>
<td>2</td>
<td>Hogs</td>
</tr>
<tr>
<td>12</td>
<td>Veterinary and medicine</td>
<td>3</td>
<td>Poultry</td>
</tr>
<tr>
<td>13</td>
<td>Feeder livestock purchases</td>
<td>4</td>
<td>Livestock products</td>
</tr>
<tr>
<td>14</td>
<td>Fertilizer and plants</td>
<td>5</td>
<td>Vegetables and melons</td>
</tr>
<tr>
<td>15</td>
<td>Pest and disease control</td>
<td>6</td>
<td>Fruits and nuts</td>
</tr>
<tr>
<td>16</td>
<td>Hired labor</td>
<td>7</td>
<td>Field crops</td>
</tr>
<tr>
<td>17</td>
<td>Machine hire</td>
<td>8</td>
<td>Other crops</td>
</tr>
<tr>
<td>18</td>
<td>Marketing charges</td>
<td>9</td>
<td>Miscellaneous receipts</td>
</tr>
<tr>
<td>19</td>
<td>Farm fuels and lubricants</td>
<td>10</td>
<td>Capital sale</td>
</tr>
<tr>
<td>20</td>
<td>Tractor, truck, car shares</td>
<td>30</td>
<td>Bank loans received</td>
</tr>
<tr>
<td>21</td>
<td>Supplies purchased</td>
<td>31</td>
<td>Non-farm expenses</td>
</tr>
<tr>
<td>22</td>
<td>Farm utilities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Computer Farm Accounting Form 1**

**Option 1. NET CASH INCOME ACCOUNT**

- **Name:** John Smith
- **Address:** 10 Farm Road
- **Mailing Information:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Details of Transaction</th>
<th>Code</th>
<th>Class</th>
<th>Expenses</th>
<th>Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Barbed wire 6 @ 100 Red rolls</td>
<td>23</td>
<td>Rep.</td>
<td>30.70</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Disinfectants</td>
<td>12</td>
<td>Vet.</td>
<td>45.31</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Payment on feed account (Albers)</td>
<td>11</td>
<td>Feed</td>
<td>150.00</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>Yearling bull - purchased from Jim North</td>
<td>10</td>
<td>Cap.</td>
<td>350.00</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>2 Truck tires</td>
<td>20</td>
<td>Truck</td>
<td>64.00</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Gross sales tax - 1%</td>
<td>28</td>
<td>Taxes</td>
<td>17.88</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Interest on bank loan</td>
<td>29</td>
<td>Int.</td>
<td>19.45</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rock salt and mineral mix (Waldrona)</td>
<td>11</td>
<td>Feed</td>
<td>48.65</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Partial payment on feeder calves from John Doe</td>
<td>1</td>
<td>Cattle</td>
<td>300.00</td>
<td>2</td>
</tr>
</tbody>
</table>

* 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 1-12, 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
<table>
<thead>
<tr>
<th>IDENTIF.</th>
<th>ENTRY</th>
<th>ENTRY</th>
<th>ENTRY</th>
<th>ENTRY</th>
<th>ENTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISLAND</td>
<td>FARM</td>
<td>MONTH</td>
<td>YEAR</td>
<td>DATE</td>
<td>CLASS</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>17</td>
<td>1965</td>
<td>2/23</td>
<td>1</td>
</tr>
</tbody>
</table>

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
```

Exhibit 3: Card layout for data input

Essential elements of the computer program for monthly summaries are depicted in the flow diagram of Figure 2. It begins with the "read-in" of the data cards (upper left-hand corner). For the first data card of the first farm, the heading of the monthly summary is printed out first. Then each of the five entries is immediately classified by class code numbers (1 to 31), by an expense or receipt code (1 or 2), and code numbers in the C-column for cash (0), non-cash, credit transactions (1), and payments on such credit accounts (2). During the process of classification, the code numbers are checked for errors (to be discussed later), and each of the dollar amounts is added up for monthly summary of cash expenses, cash receipts, accounts to be paid, accounts receivable, non-farm expenses and receipts, loans repaid or received, and the totals of the capital account. Each of the five entries is reproduced in a "5-entry print-out" by date, class code number, description of class, as expense or receipt, account payable or receivable. Then the next data card is read in, checked if it belongs to the same farm, classified, checked for errors, totals accumulated and reproduced in a 5-entry print-out, and so on. This procedure continues until all data cards of the first farm have been read in and the data card of the next farm is recognized by identification check. Before processing the data card of the next farm, the monthly summary of the previous farm is completed and printed out. Then the heading of the next farm is printed and the routine continued until the last card of the data deck is reached, and the summary of the last farm is printed out.
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. Three 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. 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. 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

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 alphabetic 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.

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

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.
CONFIDENTIAL
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 MONTH 1 YEAR 1965

<table>
<thead>
<tr>
<th>DAY OF CLASS</th>
<th>DESCRIPTION</th>
<th>CASH EXPENSES</th>
<th>CASH RECEIPTS</th>
<th>ACCOUNTS TO BE PAID</th>
<th>ACCOUNTS RECEIVABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>REPAIRS AND MAINTENANCE</td>
<td>80.70</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>16</td>
<td>VETERINARY AND MEDICINE</td>
<td>45.31</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>24</td>
<td>FEED PURCHASES</td>
<td>150.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>17</td>
<td>CATTLE</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>3076.48</td>
</tr>
<tr>
<td>25</td>
<td>CAPITAL PURCHASE OR SALE</td>
<td>350.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>12</td>
<td>TRACTOR, TRUCK, CAR SHARES</td>
<td>64.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>24</td>
<td>FARM TAXES</td>
<td>17.38</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>12</td>
<td>INTEREST ON FARM LOANS</td>
<td>19.45</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>FEED PURCHASES</td>
<td>48.65</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>30</td>
<td>CATTLE</td>
<td>0.00</td>
<td>300.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>REPAIRS AND MAINTENANCE</td>
<td>249.20</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>FEED PURCHASES</td>
<td>0.00</td>
<td>390.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>FARM RENT</td>
<td>365.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>13</td>
<td>CAPITAL PURCHASE OR SALE</td>
<td>0.00</td>
<td>1952.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>14</td>
<td>SUPPLIES PURCHASED</td>
<td>15.60</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>19</td>
<td>FARM FUELS AND LUBRICANTS</td>
<td>143.25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>27</td>
<td>MISCELLANEOUS FARM EXPENSES</td>
<td>25.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>30</td>
<td>HIRED LABOR</td>
<td>360.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>30</td>
<td>HIRED LABOR</td>
<td>180.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1</td>
<td>HIRED LABOR</td>
<td>46.75</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>TRACTOR, TRUCK, CAR SHARES</td>
<td>31.25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>MARKETING CHARGES</td>
<td>43.14</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>HOGS</td>
<td>0.00</td>
<td>986.12</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>MISCELLANEOUS FARM EXPENSES</td>
<td>20.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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 PAID, 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.

FORTAN 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

<table>
<thead>
<tr>
<th>DATE</th>
<th>DESCRIPTION</th>
<th>CODE</th>
<th>CLASS</th>
<th>EXPENSES</th>
<th>RECEIPTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cattle Sales (cash payment)</td>
<td>1</td>
<td>Cattle</td>
<td>1</td>
<td>2000.00</td>
</tr>
<tr>
<td>2</td>
<td>Hogs sold (will get cash later)</td>
<td>2</td>
<td>Hogs</td>
<td>1</td>
<td>118.00</td>
</tr>
<tr>
<td>3</td>
<td>Feeds purchased including salt</td>
<td>11</td>
<td>Feed</td>
<td>1</td>
<td>552.00</td>
</tr>
<tr>
<td>4</td>
<td>Broiler Sales</td>
<td>3</td>
<td>Poultry</td>
<td>1</td>
<td>119.00</td>
</tr>
<tr>
<td>5</td>
<td>Lettuce sold to Greenway Stores</td>
<td>5</td>
<td>Veg.</td>
<td>1</td>
<td>111.00</td>
</tr>
<tr>
<td>6</td>
<td>Paid to Dr. Sato, old bill for vaccination</td>
<td>12</td>
<td>Vet.</td>
<td>1</td>
<td>53.00</td>
</tr>
<tr>
<td>7</td>
<td>Aloha feeds (old bill)</td>
<td>11</td>
<td>Feed</td>
<td>1</td>
<td>617.00</td>
</tr>
<tr>
<td>8</td>
<td>Ointments</td>
<td>12</td>
<td>Vet.</td>
<td>1</td>
<td>18.00</td>
</tr>
<tr>
<td>9</td>
<td>Feeders bought, but not paid yet</td>
<td>13</td>
<td>Livestock</td>
<td>1</td>
<td>319.00</td>
</tr>
<tr>
<td>10</td>
<td>Fertilizer 10-10-10 (not paid yet)</td>
<td>14</td>
<td>Fert.</td>
<td>1</td>
<td>420.00</td>
</tr>
<tr>
<td>11</td>
<td>Honey sold to Manoa Groceries</td>
<td>8</td>
<td>Others</td>
<td>1</td>
<td>54.00</td>
</tr>
<tr>
<td>12</td>
<td>Lettuce and celery to Greenway Stores</td>
<td>5</td>
<td>Veg.</td>
<td>1</td>
<td>121.00</td>
</tr>
<tr>
<td>13</td>
<td>Combine Harvesting of Corn</td>
<td>17</td>
<td>Mach.</td>
<td>1</td>
<td>240.00</td>
</tr>
<tr>
<td>14</td>
<td>Custom work with tractor for John Doe</td>
<td>14</td>
<td>Misc.</td>
<td>1</td>
<td>55.00</td>
</tr>
<tr>
<td>15</td>
<td>Marketing charges for cattle</td>
<td>18</td>
<td>Market</td>
<td>1</td>
<td>25.00</td>
</tr>
<tr>
<td>16</td>
<td>Gasoline and oil from co-op</td>
<td>19</td>
<td>Fuel</td>
<td>1</td>
<td>226.00</td>
</tr>
<tr>
<td>17</td>
<td>Farm organization fees</td>
<td>26</td>
<td>Dues</td>
<td>1</td>
<td>34.00</td>
</tr>
<tr>
<td>18</td>
<td>Property taxes (final payment)</td>
<td>28</td>
<td>Tax</td>
<td>1</td>
<td>36.00</td>
</tr>
<tr>
<td>19</td>
<td>Electricity</td>
<td>52</td>
<td>Utility</td>
<td>1</td>
<td>41.00</td>
</tr>
<tr>
<td>20</td>
<td>Loan from State Bank</td>
<td>30</td>
<td>Loan</td>
<td>2</td>
<td>750.00</td>
</tr>
<tr>
<td>21</td>
<td>Interest payment on loan</td>
<td>29</td>
<td>Int.</td>
<td>2</td>
<td>25.00</td>
</tr>
</tbody>
</table>

**Mailing Information**

- **NAME:** L. Smith
- **ADDRESS:** 66 Volcano Road
- **Sunset Hill, Oahu**

---

**Exhibit 5:** Input data of sample form No. 6 containing errors
### Option 1 Net Cash Income Account, Monthly Summary

**Island Oahu Farm No. 6 Month 6 Year 1965**

<table>
<thead>
<tr>
<th>Day of Class Description</th>
<th>Cash Expenses</th>
<th>Cash Receipts to Be Paid</th>
<th>Accounts Receivable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Cattle</td>
<td>0.00</td>
<td>2000.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Cattle</td>
<td>0.00</td>
<td>551.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(2) Hogs</td>
<td>0.00</td>
<td>0.00</td>
<td>118.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11) Feed Purchases</td>
<td>0.00</td>
<td>552.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(3) Poultry</td>
<td>0.00</td>
<td>119.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(5) Vegetables and Melons</td>
<td>0.00</td>
<td>0.00</td>
<td>111.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY HAS EXPENSE IN RECEIPT COLUMN, OR CODE NUMBER IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12) Veterinary and Medicine</td>
<td>0.00</td>
<td>53.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(12) Veterinary and Medicine</td>
<td>617.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(13) Feeder Livestock Purchase</td>
<td>18.00</td>
<td>0.00</td>
<td>319.00</td>
</tr>
<tr>
<td>(14) Fertilizer and Plants</td>
<td>0.00</td>
<td>0.00</td>
<td>420.00</td>
</tr>
<tr>
<td>(8) Other Crops</td>
<td>0.00</td>
<td>54.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY HAS NO DATE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Vegetables and Melons</td>
<td>121.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY HAS RECEIPT IN EXPENSE COLUMN, OR CODE NUMBER IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(17) Machine Hire</td>
<td>240.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(9) Miscellaneous Receipts</td>
<td>0.00</td>
<td>0.00</td>
<td>55.00</td>
</tr>
<tr>
<td>(18) Marketing Charges</td>
<td>25.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(19) Farm Fuels and Lubricants</td>
<td>0.00</td>
<td>0.00</td>
<td>226.00</td>
</tr>
<tr>
<td>(26) Farm Organization Dues</td>
<td>34.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>CLASS CODE OF NEXT ENTRY WAS ZERO AND HAS BEEN CHANGED TO 32</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(32) $ERROR IN CLASS CODING</td>
<td>36.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>CLASS CODE OF NEXT ENTRY WAS GREATER THAN 31 AND HAS BEEN CHANGED TO 32</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(32) $ERROR IN CLASS CODING</td>
<td>41.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>NEXT ENTRY SHOULD NOT HAVE HAD 1 OR 2 IN C-COLUMN AND HAS BEEN CHANGED TO ZERO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30) Bank Loans or Repayments</td>
<td>0.00</td>
<td>750.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(29) Interest on Farm Loans</td>
<td>25.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**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 alphabetic 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.
### Option I: Net Cash Income Account, January to March Summary

**Island Hawaii Farm No. 17 Year 1965**

#### Class Description Code

<table>
<thead>
<tr>
<th>RECEIPTS</th>
<th>CASH RECEIPTS</th>
<th>ACCOUNTS RECEIVABLE</th>
<th>ACCOUNTS RECEIVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) CATTLE</td>
<td>300.00</td>
<td>3076.48</td>
<td>0.00</td>
</tr>
<tr>
<td>(2) HOGS</td>
<td>316.42</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(3) POULTRY</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(4) LIVESTOCK PRODUCTS</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(5) VEGETABLES AND FRUITS</td>
<td>102.11</td>
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<td>0.00</td>
</tr>
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<td>(6) FRUITS AND PLANTS</td>
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</tr>
<tr>
<td>(7) FIELD CROPS</td>
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<td>291.00</td>
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<td>(8) OTHER CROPS</td>
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<td>0.00</td>
</tr>
<tr>
<td>(9) MISCELLANEOUS RECEIPTS</td>
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<td>0.00</td>
</tr>
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<td>(10) CAPITAL SALE</td>
<td>1952.00</td>
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<td>0.00</td>
</tr>
<tr>
<td>(11) NON-FARM INCOME</td>
<td>125.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Expenses

<table>
<thead>
<tr>
<th>EXPENSES</th>
<th>CASH EXPENSES</th>
<th>ACCOUNTS EXPENSES TO BE PAID</th>
<th>ACCOUNTS PAID</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10) CAPITAL PURCHASE</td>
<td>612.00</td>
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</tr>
<tr>
<td>(11) FEED PURCHASES</td>
<td>1549.75</td>
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</tr>
<tr>
<td>(12) VETERINARY AND MEDICINE</td>
<td>75.31</td>
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<td>(13) FEEDER LIVESTOCK PURCHASES</td>
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<td>0.00</td>
</tr>
<tr>
<td>(14) FERTILIZER AND PLANTS</td>
<td>380.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(15) PEST AND DISEASE CONTROL</td>
<td>71.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(16) HIRE LABOR</td>
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<td>(17) MACHINE HIRE</td>
<td>75.00</td>
<td>75.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(18) MARKETING CHARGES</td>
<td>64.74</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(19) FARM FEEDS AND LUBRICANTS</td>
<td>376.65</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(20) TRACTOR, TRUCK, CAR SHARES</td>
<td>95.25</td>
<td>0.00</td>
<td>0.00</td>
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<td>(21) SUPPLIES PURCHASED</td>
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<tr>
<td>(22) FARM UTILITIES</td>
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<td>0.00</td>
</tr>
<tr>
<td>(23) REPAIRS AND MAINTENANCE</td>
<td>311.40</td>
<td>86.20</td>
<td>0.00</td>
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<tr>
<td>(24) FARM RENT</td>
<td>360.38</td>
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<td>0.00</td>
</tr>
<tr>
<td>(25) MISCELLANEOUS EXPENSES</td>
<td>196.91</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(26) FARM INSURANCE</td>
<td>196.91</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(27) FARM INSURANCE</td>
<td>0.00</td>
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<td>0.00</td>
</tr>
<tr>
<td>(28) FARM TAXES</td>
<td>17.38</td>
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</tr>
<tr>
<td>(29) INTEREST ON FARM LOANS</td>
<td>19.45</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(30) BANK LOAN REPAYMENTS</td>
<td>800.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(31) NON-FARM EXPENSES</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Summary:

<table>
<thead>
<tr>
<th>JANUARY 1, 1965 TO MARCH 31, 1965</th>
<th>CASH</th>
<th>ACCOUNTS</th>
<th>ACCOUNTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTALS</td>
<td>6375.47</td>
<td>6351.37</td>
<td>3737.48</td>
</tr>
<tr>
<td>NONFARM EXPENSES AND RECEIPTS</td>
<td>0.00</td>
<td>125.00</td>
<td>-0.00</td>
</tr>
<tr>
<td>LOANS REPAYED, RECEIVED</td>
<td>800.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>FARM EXPENSES AND RECEIPTS</td>
<td>5575.47</td>
<td>628.97</td>
<td>3737.48</td>
</tr>
<tr>
<td>FARM NET CASH INCOME (EXCL. LOANS)</td>
<td>652.90</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TOTAL OF CAPITAL ACCOUNT</td>
<td>612.00</td>
<td>1952.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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.

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.
CONFIDENTIAL

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 9
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_

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
<th>Main-class</th>
<th>Sub-class</th>
<th>$-Value</th>
<th>Number</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steers</td>
<td>1</td>
<td>2</td>
<td>2000.-</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Calves</td>
<td>1</td>
<td>1</td>
<td>400.-</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Feed concentrates</td>
<td>11</td>
<td>3</td>
<td>1000.-</td>
<td>200 bags</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Month: January, 19_

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
<th>Main-class</th>
<th>Sub-class</th>
<th>$-Value</th>
<th>Depreciation</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Real estate</td>
<td>10</td>
<td>24</td>
<td>50,000.-</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Tractor</td>
<td>10</td>
<td>1</td>
<td>2,000.-</td>
<td>500.-</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Cows (breeding stock)</td>
<td>10</td>
<td>14</td>
<td>2,500.-</td>
<td>150.-</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Truck</td>
<td>10</td>
<td>2</td>
<td>4,500.-</td>
<td>450.-</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Month: June, 19_

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

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 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. 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),NCOLUMN(5),AMOUNT(5),NCOLC(5),ACCOUNT(4,1,2,32),TOTALS(4,2),SUMACT(4,2,32)
1 FORMAT(10,5(2I2,11,F8.2,11))
100 FORMAT(1H1)
101 FORMAT(3X,12HCONFIDENTIAL,13X,56HCOMPUTER FARM ACCOUNTING, COOPERATIVE EXTENSION SERVICE /2X,36HDEPARTMENT OF AGRICULTURAL ECONOMY 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,1/)
302 FORMAT(17X,22HISLAND MAUI FARM NO,13,7H MONTH,13,6H YEAR,15,131H, CONTINUED FROM PREVIOUS PAGE,1/)
303 FORMAT(17X,22HISLAND LANAI FARM NO,13,7H MONTH,13,6H YEAR,15,131H, CONTINUED FROM PREVIOUS PAGE,1/)
304 FORMAT(17X,22HISLAND MOLOKAI FARM NO,13,7H MONTH,13,6H YEAR,15,131H, CONTINUED FROM PREVIOUS PAGE,1/)
305 FORMAT(17X,22HISLAND OAHU FARM NO,13,7H MONTH,13,6H YEAR,15,131H, CONTINUED FROM PREVIOUS PAGE,1/)
306 FORMAT(17X,22HISLAND KAUAI FARM NO,13,7H MONTH,13,6H YEAR,15,131H, CONTINUED FROM PREVIOUS PAGE,1/)
401 FORMAT(3X,6HDAY OF,IX,17HCLASS DESCRIPTION,19X,4HCASH,6X,4HCASH,4X 1,8HACTIONS,3X,8HACTIONS/3X,5MCNTH,3X,4HCODE,29X,8HEXPENSES,2X, 28RECEIPTS,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 1 BEEN 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)
### APPENDIX I (continued)

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>507</td>
<td>(5X,12,4X,30H( 7) FIELD CROPS</td>
</tr>
<tr>
<td>508</td>
<td>(5X,12,4X,30H( 8) OTHER CROPS</td>
</tr>
<tr>
<td>509</td>
<td>(5X,12,4X,30H( 9) MISCELLANEOUS RECEIPTS</td>
</tr>
<tr>
<td>510</td>
<td>(5X,12,4X,30H(10) CAPITAL PURCHASE OR SALE</td>
</tr>
<tr>
<td>511</td>
<td>(5X,12,4X,30H(11) SEED PURCHASES</td>
</tr>
<tr>
<td>512</td>
<td>(5X,12,4X,30H(12) VETERINARY AND MEDICINE</td>
</tr>
<tr>
<td>513</td>
<td>(5X,12,4X,30H(13) FEEDER LIVESTOCK PURCHASE</td>
</tr>
<tr>
<td>514</td>
<td>(5X,12,4X,30H(14) FERTILIZER AND PLANTS</td>
</tr>
<tr>
<td>515</td>
<td>(5X,12,4X,30H(15) PEST AND DISEASE CONTROL</td>
</tr>
<tr>
<td>516</td>
<td>(5X,12,4X,30H(16) HIRED LABOR</td>
</tr>
<tr>
<td>517</td>
<td>(5X,12,4X,30H(17) MACHINE HIRE</td>
</tr>
<tr>
<td>518</td>
<td>(5X,12,4X,30H(18) MARKETING CHARGES</td>
</tr>
<tr>
<td>519</td>
<td>(5X,12,4X,30H(19) FARM FUELS AND LUBRICANTS</td>
</tr>
<tr>
<td>520</td>
<td>(5X,12,4X,30H(20) TRACTOR, TRUCK, CAR SHARES</td>
</tr>
<tr>
<td>521</td>
<td>(5X,12,4X,30H(21) SUPPLIES PURCHASED</td>
</tr>
<tr>
<td>522</td>
<td>(5X,12,4X,30H(22) FARM UTILITIES</td>
</tr>
<tr>
<td>523</td>
<td>(5X,12,4X,30H(23) REPAIRS AND MAINTENANCE</td>
</tr>
<tr>
<td>524</td>
<td>(5X,12,4X,30H(24) FARM RENT</td>
</tr>
<tr>
<td>525</td>
<td>(5X,12,4X,30H(25) MISCELLANEOUS FARM EXPENSES</td>
</tr>
<tr>
<td>526</td>
<td>(5X,12,4X,30H(26) FARM ORGANIZATION DUES</td>
</tr>
<tr>
<td>527</td>
<td>(5X,12,4X,30H(27) FARM INSURANCE</td>
</tr>
<tr>
<td>528</td>
<td>(5X,12,4X,30H(28) FARM TAXES</td>
</tr>
<tr>
<td>529</td>
<td>(5X,12,4X,30H(29) INTEREST ON FARM LOANS</td>
</tr>
<tr>
<td>530</td>
<td>(5X,12,4X,30H(30) BANK LOANS OR REPAYMENTS</td>
</tr>
<tr>
<td>531</td>
<td>(5X,12,4X,30H(31) NONFARM EXPENSE OR INCOME</td>
</tr>
<tr>
<td>532</td>
<td>(5X,12,4X,30H(32) $-ERROR IN CLASS CODING</td>
</tr>
<tr>
<td>601</td>
<td>(1X,37H2. MONTHLY SUMMARY, 1X,1H1. ,6H TOTALS, 31X,4FIO.2)</td>
</tr>
<tr>
<td>602</td>
<td>(1X,37H2. NONFARM EXPENSES AND RECEIPTS (31), 3X,4FIO.2)</td>
</tr>
<tr>
<td>603</td>
<td>(1X,30H3. LOANS REPaid, RECEIVED (30), 10X,2FIO.2)</td>
</tr>
<tr>
<td>604</td>
<td>(1X,29H4. FARM EXPENSES AND RECEIPTS, 11X,4FIO.2)</td>
</tr>
<tr>
<td>605</td>
<td>(1X,37H5. FARM NET CASH INCOME (EXCL. LOANS), 13X,4FIO.2)</td>
</tr>
<tr>
<td>606</td>
<td>(1X,32H6. TOTAL OF CAPITAL ACCOUNT (10), 8X,4FIO.2)</td>
</tr>
<tr>
<td>607</td>
<td>(1X,40H7. TOTAL $-ERROR DUE TO MISCODING (32), 4FIO.2)</td>
</tr>
</tbody>
</table>

**Note:**
- NDAtE(J) = DAY OF MONTH, COLUMNS 11-12, 25-26, 39-40, 53-54, 67-68
- NCCLS(J) = NO. OF CLASS, COLUMNS 13-14, 27-28, 41-42, 55-56, 69-70
- NCOXr(J) = EXPENSE(2) OR RECEIPTS(2) COLUMNS 15, 29, 43, 57, 71
- AMOUNT(J) = TOTAL OF CLASS(1) OR ACCOUNT NOT PAID (1), ACCOUNT PAID (2),
- COLS = COLUMN 24, 38, 52, 66, 80
- READ(5,1)ID, ACCOUNT NOT PAID (1), ACCOUNT PAID (2),
- 21 READ(5,1)ID, NDAtE(J), NCCLS(J), NCOXr(J), AMOUNT(J), NCOXr(J), J=1,5

150 WRITE(6,100) 
151 WRITE(6,101) 
11 = ID/100 
12 = ID/100 
JYEAR = ID-11*100+1900 
12 = JYEAR 
MONTH = JYEAR/12 
13 = JYEAR 
NOFARM = JYEAR/13 
ISLAND = JYEAR/13 
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
GO TO 451
451 WRITE(6,401)
22 DO 28 J=1,5
   JDATE=JDATE(J)
   JCLASS=NCCLASS(J)
   JCOLC=NCOLC(J)+1
   JCOLXR=NCOLXR(J)
   IF(JDATE+JCLASS+JCOLC+JCOLXR.EQ.1)GO TO 28
471 IF(JDATE.Q.EQ.0) JDATE=40
   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
   GC 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) GC TO 24
   IF(JCLASS.GT.31) WRITE(6,425)
   IF(JCLASS.GT.31) LINENO=LINENC+1
   IF(JCLASS.GT.31) JCLASS=32
24 ACOUNT(1,1,JCLASS)=0.0
   ACOUNT(1,2,JCLASS)=0.0
   ACOUNT(2,1,JCLASS)=0.0
   ACOUNT(2,2,JCLASS)=0.0
   ACOUNT(3,1,JCLASS)=0.0
   ACOUNT(3,2,JCLASS)=0.0
   ACOUNT(JCOLC,JCOLXR,JCLASS)=AMOUNT(J)
   IF(JCOLC.EQ.3)ACOUNT(1,JCOLXR,JCLASS)=ACOUNT(3,JCOLXR,JCLASS)
   IF(JCOLC.EQ.4)ACOUNT(1,JCOLXR,JCLASS)=ACOUNT(4,JCOLXR,JCLASS)
C CASHEX=ACOUNT(1,1,JCLASS)=CASH EXPENSE
C CASHRC=ACOUNT(1,2,JCLASS)=CASH RECEIPTS
C ATOPAY=ACOUNT(2,1,JCLASS)=ACCOUNTS TO BE PAID
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
   GO TO 441
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
566 WRITE(6,516)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
567 WRITE(6,517)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
568 WRITE(6,518)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
569 WRITE(6,519)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
570 WRITE(6,520)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
571 WRITE(6,521)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
572 WRITE(6,522)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
573 WRITE(6,523)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
574 WRITE(6,524)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
575 WRITE(6,525)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
576 WRITE(6,526)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
577 WRITE(6,527)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
578 WRITE(6,528)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
579 WRITE(6,529)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
580 WRITE(6,530)JDATE,CASHX,CASHRC
GO TO 27
581 WRITE(6,531)JDATE,CASHX,CASHRC,ATOPAY,ATOREC
GO TO 27
582 WRITE(6,532)JDATE,CASHX,CASHRC,ATOPAY,ATOREC

27 TOTALS(JCOLC,JCOLXR)=TOTALS(JCOLC,JCOLXR)+ACOUNT(JCCLC,JCOLXR,JCLASS)
SUMACT(JCOLC,JCOLXR,JCLASS)=SUMACT(JCOLC,JCOLXR,JCLASS)+ACOUNT(JCCLC,JCOLXR,JCLASS)

28 CONTINUE
IDFARM=ID
READ(5,1)ID,(NDATE(J),NCLASS(J),NCOLXR(J),AMOUNT(J),NCOLC(J),J=1,5)
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 TNGFX=TOTAL NONFARM EXPENSES
C TNGFR=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)
TCTORC=SUMACT(2,1,10)
TCTOPY=SUMACT(2,2,10)
WRITE(6,606)TCAPEX, TCAPRT, TCTOPY, TCTORC

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 = -1111111111111111) 150, 32, 150
32 STOP
END
APPENDIX II

FORTRAN IV Program for Quarterly and Annual Summaries of Farm Accounts

DIMENSION NDATE(5), NCLASS(5), NCOLXR(5), AMOUNT(5), NCOLC(5), AACCOUNT(2
1,4,31), MTEST(12), MSUM(12), CASHRC(1, 2, 31), ATOREC(4, 2, 31), ACRED(3, 2
2, 31), CASHEX(1, 1, 31), ATOPAY(4, 1, 31), ACPCAID(3, 1, 31), SUMACT(4, 2, 31)
1 FORMAT(11)
2 FORMAT(5I2, 5I2, 11, 6F8.2, 11)
100 FORMAT(1H1)
101 FORMAT(3X, 12HCONFIDENTIAL, /38X, 56HCOMPUTER FARM ACCOUNTING, COOPER
ATIVE EXTENSION SERVICE /47X, 36HDAPARTMENT OF AGRICULTURAL ECONOMI
CS, /54X, 2OHUNIVERSITY OF HAWAII, //)
201 FORMAT(36X, 59HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO MARCH
SUMMARY)
202 FORMAT(36X, 58HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO JUNE SUM
MARY)
203 FORMAT(34X, 63HOPTION 1 NET CASH INCOME ACCOUNT, JANUARY TO SEPTEM
BER SUMMARY)
204 FORMAT(41X, 49HOPTION 1 NET CASH INCOME ACCOUNT, ANNUAL SUMMARY)
301 FORMAT(46X, 24HISLAND HAWAII FARM NO. , I2, 8H YEAR, 14, //)
302 FORMAT(46X, 24HISLAND MAUI FARM NO. , I2, 8H YEAR, 14, //)
303 FORMAT(46X, 24HISLAND LANAI FARM NO. , I2, 8H YEAR, 14, //)
304 FORMAT(46X, 24HISLAND MONOKAI FARM NO. , I2, 8H YEAR, 14, //)
305 FORMAT(46X, 24HISLAND OAHU FARM NO. , I2, 8H YEAR, 14, //)
306 FORMAT(46X, 24HISLAND KAUAI FARM NO. , I2, 8H YEAR, 14, //)
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, 30HCCLASS 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
2IP 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, OR 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 COLUMN, //)
426 FORMAT(11X, 31HERROR ON DATA CARD ISLAND NO., I2, 10H FARM NO., I2,
18H MONTH, I2, 7H DATE, I2, /11X, 38HCCLASS 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, 17HCCLASS DESCRIPTION, /11X, 4HCODE, 59X, 4HCASH, 18X, 8HACCO
UNTS, 16X, 8HACCOUNTS, /3X, 8HRECEIPTS, 61X, 8HRECEIPTS, 15X, 10HRECEIIVABL
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))
APPENDIX II

(continued)

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>508</td>
<td><code>FORMAT(11X,29H( 8) OTHER CROPS ,15X,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>509</td>
<td><code>FORMAT(11X,29H( 9) MISCELLANEOUS RECEIPTS ,15X,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>510</td>
<td><code>FORMAT(11X,29H(10) CAPITAL SALE ,15X,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>530</td>
<td><code>FORMAT(11X,29H(30) BANK LOANS RECEIVED ,15X,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>531</td>
<td><code>FORMAT(11X,29H(31) NON-FARM INCOME ,15X,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>402</td>
<td><code>FORMAT(62X,4HCASH, 18X,8HACCOUNTS,16X,8HACCOUNTS,73X,8HEXPENSES,49X,1,8HEXPENSES,15X,10HTO BE PAID,17X,4HPAI0)</code></td>
</tr>
<tr>
<td>610</td>
<td><code>FORMAT(11X,32H 10) CAPITAL PURCHASE ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>611</td>
<td><code>FORMAT(11X,32H 11) FEED PURCHASES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>612</td>
<td><code>FORMAT(11X,32H 12) VETERINARY AND MEDICINE ,3(12X,F12.2))</code></td>
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<td>613</td>
<td><code>FORMAT(11X,32H 13) FEEDER LIVESTOCK PURCHASES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>614</td>
<td><code>FORMAT(11X,32H 14) FERTILIZER AND PLANTS ,3(12X,F12.2))</code></td>
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<tr>
<td>615</td>
<td><code>FORMAT(11X,32H 15) PEST AND DISEASE CONTROL ,3(12X,F12.2))</code></td>
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<td>616</td>
<td><code>FORMAT(11X,32H 16) HIRED LABOR ,3(12X,F12.2))</code></td>
</tr>
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<td>617</td>
<td><code>FORMAT(11X,32H 17) MACHINE HIRE ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>618</td>
<td><code>FORMAT(11X,32H 18) MARKETING CHARGES ,3(12X,F12.2))</code></td>
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<td>619</td>
<td><code>FORMAT(11X,32H 19) FARM FUELS AND LUBRICANTS ,3(12X,F12.2))</code></td>
</tr>
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<td>620</td>
<td><code>FORMAT(11X,32H 20) TRACTOR, TRUCK, CAR SHARES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>621</td>
<td><code>FORMAT(11X,32H 21) SUPPLIES PURCHASED ,3(12X,F12.2))</code></td>
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<td><code>FORMAT(11X,32H 22) FARM UTILITIES ,3(12X,F12.2))</code></td>
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<td>623</td>
<td><code>FORMAT(11X,32H 23) REPAIRS AND MAINTENANCE ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>624</td>
<td><code>FORMAT(11X,32H 24) FARM RENT ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>625</td>
<td><code>FORMAT(11X,32H 25) Misc. FARM EXPENSES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>626</td>
<td><code>FORMAT(11X,32H 26) FARM ORGANIZATION DUES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>627</td>
<td><code>FORMAT(11X,32H 27) FARM INSURANCE ,3(12X,F12.2))</code></td>
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<tr>
<td>628</td>
<td><code>FORMAT(11X,32H 28) FARM TAXES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>629</td>
<td><code>FORMAT(11X,32H 29) INTEREST ON FARM LOANS ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>630</td>
<td><code>FORMAT(11X,32H 30) BANK LOAN REPAYMENTS ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>631</td>
<td><code>FORMAT(11X,32H 31) NON-FARM EXPENSES ,3(12X,F12.2))</code></td>
</tr>
<tr>
<td>601</td>
<td><code>FORMAT(3X,18H SUMMARY JANUARY 1,14,13H TO MARCH 31,14)</code></td>
</tr>
<tr>
<td>602</td>
<td><code>FORMAT(3X,18H SUMMARY JANUARY 1,14,12H TO JUNE 30,14)</code></td>
</tr>
<tr>
<td>603</td>
<td><code>FORMAT(3X,18H SUMMARY JANUARY 1,14,17H TO SEPTEMBER 30,14)</code></td>
</tr>
<tr>
<td>604</td>
<td><code>FORMAT(3X,18H SUMMARY JANUARY 1,14,16H TO DECEMBER 31,14)</code></td>
</tr>
<tr>
<td>701</td>
<td><code>FORMAT(3X,9H1. TOTALS,43X,6F12.2)</code></td>
</tr>
<tr>
<td>702</td>
<td><code>FORMAT(3X,37H2. NONFARM EXPENSES AND RECEIPTS 31),15X,6F12.2)</code></td>
</tr>
<tr>
<td>703</td>
<td><code>FORMAT(3X,30H3. LOANS REPaid, RECEIVED (30),22X,2F12.2)</code></td>
</tr>
<tr>
<td>704</td>
<td><code>FORMAT(3X,29H4. FARM EXPENSES AND RECEIPTS,23X,6F12.2)</code></td>
</tr>
<tr>
<td>705</td>
<td><code>FORMAT(3X,37H5. FARM NET CASH INCOME (EXCL. LOANS),27X,F12.2)</code></td>
</tr>
<tr>
<td>706</td>
<td><code>FORMAT(3X,32H6. TOTAL OF CAPITAL ACCOUNT (10),20X,6F12.2)</code></td>
</tr>
</tbody>
</table>

C NCLASS INDICATES WHETHER SUMMARY IS OF 3,6, 9, OR 12 MONTHS
C NCLASS(J)=NO. OF CLASS, COLUMNS 13-14, 27-28, 41-42, 55-56, 69-70
C NCOL(X,J)=CASH(0), ACCOUNT NOT PAID (1), ACCOUNT PAID (2), COLUMNS
C
C
C 150 WRITE(6,100)
C 151 WRITE(6,101)

GO TO (251,252,253,254), NQUART

251 WRITE(6,201)
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=0.0
TRECVD=0.0
ERROR=0.0
470 IF(MONTH1.EQ.0) WRITE(6,420)ISLE1,NFARM1
DO 50 J=1,5
IF(NCLASS(J).NE.0) WRITE(6,421) ISLE1,NFARM1,MONTH1,NDATE(J)
471 IF(NCLASS(J).NE.0) WRITE(6,421) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCLASS(J).NE.0) ERROR=5.0
472 IF(NCLASS(J).NE.0) WRITE(6,422) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCLASS(J).NE.0) ERROR=5.0
473 IF(NCLASS(J).NE.0) WRITE(6,423) ISLE1,NFARM1,MONTH1,NDATE(J)
IF(NCLASS(J).NE.0) ERROR=5.0
GO TO 24
23 IF(NCLASS(J).NE.0) WRITE(6,424) ISLE1,NFARM1,MONTH1,NDATE(J)
474 IF(NCLASS(J).NE.0) 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) GC TO 51
IF(ERRCR.EQ.5.0) ERROR=0.0
IF(ERROS=100.0) 53, 51,
51 READ (5, 2) ISLE3, NCROP3, NFARM3, MONTH3, JYEAR3, (NDATE(J), NCLASS(J), NCR
1LXR(J), AMOUNT(J), NCOLC(J), J=1, 5)
ID3=ISLE3*100000000+NCROP3*1000000+NFARM3*10000+MONTH3*100+JYEAR3
IDEN3=ISLE3*100+NFARM3
ERROR=0.0
ERRORS=0.0
IF(IDEN3.EQ.IDEN1) ERRORS=100.0
ISLE1=ISLE3
NCROP1=NCROP3
NFARM1=NFARM3
JYEAR1=JYEAR3
MONTH1=MONTH3
IF(ERRCRS=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=NCCLASS(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), NCR
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.IDEN2)=29, 470, 29
29 IF(IDEN2.IDEN1)=30, 470, 30
30 DC 99 M=1, 12
99 MMONTHS=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 CASH EX (JCOLC=1) = CASH EX (JCOLC=1) + ACCOUNTS PAID (JCOLC=3)
DO 35 I=10,31
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 T NFARR=TOTAL NONFARM RECEIPTS
C TNFRCV=TOTAL NONFARM ACCOUNTS RECEIVABLE
C TNRECVC=TOTAL NONFARM ACCOUNTS RECEIVED
RCLOAN=SUMACT(1,2,30)
TNFARR=SUMACT(1,2,31)
TNFRCV=SUMACT(4,2,31)
TNRECVC=SUMACT(3,2,31)
TNFARR=TNFARR+TNRECVC
C PDL!JAN=LOANS REPA IED
C T NFARX=TOTAL NONFARM EXPENSES
C TNFOWE=TOTAL NONFARM ACCOUNTS TO BE PAID
C TNPAID=TOTAL NONFARM ACCOUNTS PAID
PDL!JAN=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 CASH EX = CASH EXPENSES
C ATOPAY = ACCOUNTS TO BE PAID
C ACPAI D = ACCOUNTS PAID
DO 37 I=10,29
   CASHEX(1,1,1)=SUMACT(1,1,1)
   ATOPAY(4,1,1)=SUMACT(4,1,1)
37 ACPAI D(3,1,1)=SUMACT(3,1,1)
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
WRITE(6,531) TNFARR, TNFRCV, TNRECO
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) TNFARR, TNFRWE, 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(I,2,I)
39 TTORERC=TTORERC+ATOREC(I,2,I)
   TCASHR=TCASHR+RCLOAN
   TCASHR=TCASHR+TNFARR
   TTORERC=TTORERC+TNFRCV
DO 40 I=10,29
   TCASHX=TCASHX+CASHEX(I,1,I)
40 TTOPAY=TTOPAY+ATOPAY(I,1,I)
   TCASHX=TCASHX+PDLOAN
   TCASHX=TCASHX+TNFARR
   TTOPAY=TTOPAY+TNFRWE
DO 41 I=1,10
   TRECVD=TRECVD+ACRECD(I,2,I)
41 TRECVD=TRECVD+TNRECD
DO 42 I=10,29
   TPAID=TPAID+ACPAID(I,1,1)
   TPAID=TPAID+TNPAID
751 WRITE(6,701) TCASHX, TCASHR, TTOPAY, TTORERC, TPAID, TRECVD
752 WRITE(6,702) TNFARR, TNFRWE, TNFARR, 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 FRECVD=FARM ACCOUNTS RECEIVED
FARMEX=TCASHX-TNFARX-POLOAN
FARMRT=TCASHR-TNFARR-RCLOAN
FTOPAY=TTOPAY-TNFOWE
FTOREC=TTOREC-TNFRCV
FPAID=TPAID-TNPAID
FRECVD=TRECVD-TNRECD
754 WRITE(6,704)FARMEX,FARMRT,FTOPAY,FTOREC,FPAID,FRECVD
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 TCIORC=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)
TCIORC=ATOREC(4,2,10)
TCPAID=ACPAID(3,1,10)
TCRCVD=ACRECD(3,2,10)
756 WRITE(6,706)TCAPEX,TCAPRT,TCTOPY,TCIORC,TCPAID,TCRCVD
   IF(ISLE2-11)43,44,43
43 ISLE1=ISLE2
   NCRP01=NCRP02
   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 five farms per minute (30.5 entries per month) 12 x .534 = 6.41
   b) Four quarterly summaries at ten 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 = 3.20
      8.00
      Total computer costs a) 12 monthly summaries 6.41
      b) 4 quarterly summaries 8.00
      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) $20.05

B. 1. Computer costs as before but:
   a) Twelve monthly summaries at the rate of ten per minute (30.5 entries per month) 12 x .267 = 3.20
   b) Four quarterly summaries at twenty 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 = 1.61
      4.02
      Total computer costs a) 12 monthly summaries 3.20
      b) 4 quarterly summaries 4.02
      $ 7.22

2. Keypunch and verify 2.16
3. Mailing and handling 3.48
   $12.86
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

      \[
      \begin{align*}
      &3 \text{ months summary} \quad 3 \times .667 = .20 \\
      &6 \quad " \quad 6 \times .667 = .40 \\
      &9 \quad " \quad 9 \times .667 = .60 \\
      &12 \quad " \quad 12 \times .667 = .80 \\
      &= 2.00
      \end{align*}
      \]

   Total computer costs
   a) 12 monthly summaries  \( 2.14 \)
   b) 4 quarterly summaries  \( 2.00 \)
   \( \$ 4.14 \)

2. Keypunch and verify  \( 2.16 \)

3. Mailing and handling  \( 3.48 \)
\( \$ 9.78 \)
UNIVERSITY OF HAWAII
COLLEGE OF TROPICAL AGRICULTURE
HAWAII AGRICULTURAL EXPERIMENT STATION
HONOLULU, HAWAII

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