

at this distance were almost simultaneous with the operation of the pump.

Figure 4 charts the hydrograph of recorder No. 9 which was located 1800 feet east of the first pumped well. The rapid rise of the water table in April 1960 and April 1961, and the sharp drop in September 1960 coincide with the beginning and the end of the irrigation season. The fluctuations of the curve indicate the influence of irrigations in the immediate vicinity of the recorder. In comparing Fig. 4 to Fig. 3 it is obvious that the pumped well had no influence on the water table at the site of recorder No. 9.

The water levels in both deep and shallow piezometers were the same in all observations. This indicated there was no perched water table condition, no vertical hydraulic gradient, and that the aquifers were all interconnected.

Results of a pump test on the second well showed that the water table was lowered a distance of about 700 feet in a west and east direction and 400 feet in a north and south direction. This area also was elliptical in shape, about 20 acres in area and had no vertical hydraulic gradients. The average discharge during the study was 175 gpm which compared favorably with the discharge and area affected by the first well. The pumping lift from this second well was 25 feet. This water was reusable for irrigation, and such wells may be an economical means of drainage.

The study indicates that the bulk of the contributing water causing the drainage problem is from local irrigation losses due to deep percolation. Since the water level in both deep and shallow piezometers was the same around the first well, a confined water table condition seems to be nonexistent. Numerous test well drillings may be needed to find the shallow aquifers for successful drainage by pumped wells on the west side of the San Joaquin Valley. Local control of water application losses from irrigation may help minimize the number and extent of drainage pumps. Research is continuing on multi-well systems and cost of drilling and operating these systems.

J. L. Meyer is Farm Advisor, Stanislaus County; L. Werenfels is Extension Irrigation Technologist, University of California, Davis; V. H. Scott and J. N. Luthin are Professors of Irrigation, U. C., Davis; Mahmoud Abu-Zied is a graduate student, U. C., Davis. J. Yoshino, Laboratory Technician, Stanislaus County, assisted with field work.

FARM ENTERPRISE

Accounting and Management

ARTHUR SHULTIS

Enterprise accounting is a system providing a separate profit statement and cost analysis for each crop and kind of livestock in the total farm business. These statements show the contribution of profit or loss each enterprise makes toward the total farm profit. But more important, the detailed information made available on production, income, inputs and costs allows the analysis and study of each enterprise with the possibility for discovering changes to make it more profitable. As part of this analysis, comparisons can be made with the sample schedules of inputs and costs on important crops that are available at local Agricultural Extension offices.

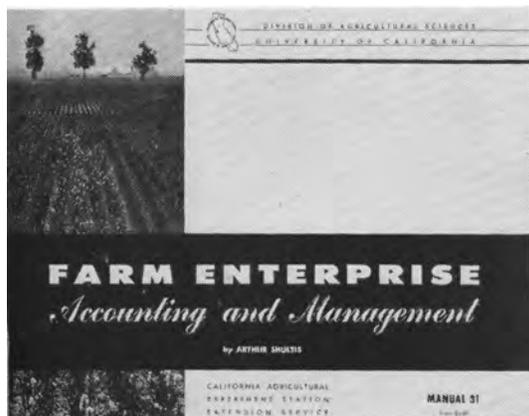
ENTERPRISE ACCOUNTING is supplemental to, and need not disturb, a satisfactory accounting system for the total farm business for a calendar year. The same income and expense segregations and income tax reporting can continue. Such total farm profit figures are valuable for comparison with previous years and in financial management. But they are of little value in making the many important decisions such as how much of what to grow—or what methods to use where there is more than one enterprise in the farm business. A record year for the total farm business may include the start of some enterprises and the closing of others.

An enterprise covers a production cycle of a single crop or type of livestock produced to earn a profit. With a crop, it starts with land preparation and ends after harvest and marketing. A barley crop starts one year and ends the next, or with a fallow year may cover two years. A continuous livestock enterprise, like a milking herd or beef cow herd, will usually be figured for the calendar or fiscal year. A nonbearing orchard can also be handled as an enterprise to learn its yearly development costs. Different variety, or age or treatment blocks of an orchard can be handled as separate enterprises to compare results.

Enterprise accounting involves the allocation of all farm incomes and expenses to the several enterprises. This can best

be done at different times. Incomes and single expenditures for a specific enterprise can be credited or charged to the enterprise sheets or accounts at the time the transaction is recorded in the total farm accounting system. Cost of labor, work by farm machinery, and irrigation water can best be figured and charged to enterprises at the end of each month. Thus, each enterprise account will show the major part of the costs to date after completing routine month-end accounting. Administration and overhead costs can be charged by suitable methods at the end of the year.

Information and help on farm enterprise accounting is available in a recent publication that treats the entire subject and discusses and illustrates the work sheet and accounting methods. Records and forms are illustrated. The transmitting of information to a city office is discussed. The possibilities and limitations of mechanical and electronic methods are also considered. Write for "FARM ENTERPRISE ACCOUNTING AND MANAGEMENT," by Arthur Shultis, Manual 31, Price \$1, Agricultural Publications, 207 University Hall, University of California, Berkeley 4, California.



Farms with feed crops and livestock need enterprise accounting for valid managerial information—even where all off-farm sales are from a single livestock enterprise. Each feed crop and type of pasture is a separate enterprise. Records of harvestings and pasture use provide the quantity to charge to the livestock enterprise and credit to each feed enterprise. These interenterprise charges and credits are made at local prevailing farm values per ton or animal unit month of pasture. Farm value is market value less marketing cost or the net amount receivable for the feed or pasture if sold on the farm. These charges can be made monthly or at the end of the year. The range, irrigated pasture, hay, and silage enterprises have income credited for their production or use and receive their share of costs so profit or loss is determined. Such information often indicates changes in land and feed use to improve production efficiency and total farm profit.

Labor costs

The allocation of labor costs to enterprises requires some records. Recommended and almost universally used are time cards by pay periods to show the hours of each employee's work by jobs and enterprises. These time cards, kept by supervisory personnel on workers in their charge, are completed in the office at the end of the pay period and become the basis of the wage payment and the distribution of that cost to enterprises. A multicolumnar payroll record is a convenient means of listing each wage payment with social security and other deductions and also distributing the cost to enterprise and operation or job columns.

Machinery costs and work are most conveniently handled through a farm machinery service unit. This unit could receive all costs for fuel, lubricants, repairs, supplies, and sometimes a shop and mechanic or foreman. Records on hours of

work by each major machine for each enterprise can be kept or taken from employee time cards, which can also show by number the machine used. These hours of use are converted to cost by appropriate hourly rates. Tractor rates can be set to include the disk or other drawn equipment. Depreciation on farm machinery may also be charged to this unit. Hourly rates can be estimated to about cover the cost of the machine and its share of the service unit overhead, so that the total charges for all work for the year would about equal the total year's costs. For example, rates for a 60 hp crawler tractor might be \$5 an hour, a 20 hp wheel tractor \$1.25, and a 2-ton truck \$2. Charges for work can be made to enterprises at the end of each month. When total charges do not about equal total costs in the service unit, an adjustment may be made in the charges previously made to enterprises.

Other service units can be handled the same way. Irrigation water costs can be charged to enterprises at an estimated cost per acre-foot during the year. Employees' housing and other labor overhead costs can be held in a service unit and charged as an adjustment to labor costs already charged. Additional service units such as packing houses, feed mills, and others can be used as needed. Service unit costs in themselves are important management information.

There are many variations and methods by which enterprise accounting can produce valid and useful information. Two main methods are suggested as alternatives—by supplemental work sheets and by accounting methods using a supplementary enterprise and service unit account ledger. The farm operator who keeps his own records can supplement his record book with work sheets on which he distributes items to columns currently, monthly, or at the end of the year. The trained bookkeeper, using accounting methods, will usually post items to the supplementary ledger accounts from his general cash and other journals and the payroll and farm machinery records at the end of each month. Enterprise income and expense accounts will then show accumulated income and costs to date. This will be useful information, particularly as decisions on marketing or further inputs must be made.

Essential to enterprise accounting, by any method, is a complete, adequate set of financial records on the farm business as a whole—including records of cash received and paid, capital and deprecia-

tion records and inventories. Supplemental records and information are needed for valid allocation of costs to enterprises and for accurate interenterprise charges and credits on livestock farms and ranches. The operator and supervisory personnel must assume the responsibility of developing this information and transmitting it to the person or office where the accounting is done. Additional clerical work in the office is also required, but this is seldom as great a problem as getting the information.

Best place

The best place to do enterprise accounting is in the farm office where the information can readily be obtained from fellow workers and by observation. A full-time clerk-bookkeeper keeping the basic total farm records and accounts can also do enterprise accounting with little additional time and cost. Where accounting for the farm is done in a company or public accountant's office in a city, then a system of forwarding time cards and other records and reports becomes highly important. The preparation of records and reports on the farm requires considerable time and a competent person. The operator or manager may have the competence but will seldom have the time.

Mechanical and electronic machines in central offices may facilitate farm accounting and enterprise accounting in the future. Machines may replace much hand clerical work and do some of the calculations. A clerk or accountant of high competence will still be required on the farm to record and transmit the needed data to where it can be put on tapes or punch cards for electronic processing and later to properly assemble and portray the results in a form usable by management.

Enterprise accounting is a worthwhile supplement to accounting for the farm business as a whole for any commercial farm business with several enterprises. Its value to administration from day to day and in helping management to more profitable methods, equipment and enterprises will generally exceed the additional effort and costs involved. For any business large or small, there is a way it can be done within the cost limitations of the net income available. The small farm operator can do it himself. The big company can well stand the additional cost.

Arthur Shultis is an Extension Economist (Farm Management) and Associate on the Giannini Foundation, University of California, Berkeley.