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## THE USDA FIRM ENTERPRISE DATA SYSTEM: CAPABILITIES AND APPLICATIONS

Ronald D. Krenz

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The Economic Research Service of USDA has initiated a systematic approach to the development and maintenance of farm enterprise budgets. This paper will describe this system, our expectations for it, and planned uses of the data.

### BACKGROUND

Many are familiar with regional adjustment studies such as S-42 or GP-5, where the objective was to estimate supply functions using linear programming on representative farms. Those who worked on these projects recall the tremendous effort needed to develop enterprise budget data.

Many are also familiar with the National Model work during the 1960s in ERS. [2] In that project, estimates were made of year to year changes in crop production, using an LP model.

These efforts illustrated that: (1) our farm enterprise data have not been comparable across commodities or regions, and (2) these data have not been maintained or updated in a comparable manner over time. There are reasons for these deficiencies. Because of large numbers of different farm resource situations and varieties of production techniques found on farms, the number of enterprise budgets needed to give broad coverage of even one commodity is very large. In the past, time required to build an enterprise budget has been quite high; hence, a large number of analysts were needed to obtain broad geographic coverage. More analysts added to the problem the element of differences in analytical approach.

This need for enterprise data on a comparable basis and updated overtime was the major reason for establishment of a budget system.

Impetus for this data system also resulted from a clause in the Agricultural and Consumer Protec-

tion Act of 1973 which requires estimates by USDA of the cost of production of certain commodities. Also, inflation can be credited for renewed interest in cost-of-production data. Recent increases in farm production costs have stimulated a sudden and tremendous interest in costs of production on the part of researchers, policy makers, and farmers.

### COMPONENTS OF THE FED SYSTEM

Main components of the ERS Firm Enterprise Data System (FEDS) will include the following:

- (1) Farm and ranch enterprise budgets
- (2) Whole farm budgets
- (3) Processing and distribution firm budgets

#### Farm and Ranch Enterprise Budgets —

The enterprise budget system will utilize the Oklahoma Budget Generator for building and maintaining budgets. [3] This is a method designed to utilize a computer to process input data into completed enterprise budgets and to facilitate storage, modification and updating of these budgets. Table 1 presents an example of the output format that will be used for enterprise budgets.

Our first step is to establish a set of budgets that will represent the average current technology for major crops and livestock enterprises, by production region, across the United States. Production regions were delineated for the United States with the help of various commodity specialists in CED (see Figure 1). These production regions will be used for all commodities. At later dates, additional budgets can be developed for other levels of technology and farm sizes, or for less important enterprises.

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**Table 1. SAMPLE BUDGET OUTPUT FORMAT**

TITLE: OATS FOR SOUTHEASTERN SOUTH DAKOTA

1973

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST PER ACRE	COST PER UNIT OF PRODUCTION
<b>1. GROSS RECEIPTS FROM PRODUCTION:</b>					
OATS	BU.	1.000	49.460	49.46	
TOTAL RECEIPTS				49.46	
<b>2. VARIABLE COSTS:</b>					
PREHARVEST:					
GRAIN SEED	BU.	1.090	2.600	2.83	0.06
NITROGEN	LBS.	0.086	14.000	1.20	0.02
PHOSPHORUS	LBS.	0.225	6.000	1.35	0.03
POTASSIUM	LBS.	0.065	2.000	0.13	0.00
HERBICIDE	ACRE	1.470	0.320	0.47	0.01
HERBICIDE APPL.	ACRE	1.270	0.060	0.08	0.00
CROP INSURANCE	DOL.	0.290	1.000	0.29	0.01
TRACTOR FUEL & LUBE	ACRE			0.58	0.01
TRACTOR REPAIRS	ACRE			0.40	0.01
EQUIP FUEL & LUBE	ACRE			0.57	0.01
EQUIP REPAIRS	ACRE			1.24	0.03
MACHINERY LABOR	HRS	1.860	1.549	2.88	0.06
INTEREST ON OP. CAP.	DOLS	0.080	3.617	0.29	0.01
TOTAL PREHARVEST				12.31	0.25
HARVEST:					
CUSTOM COMBINING	ACRE	4.960	0.260	1.29	0.03
CUSTOM HAULING	BU.	0.052	13.850	0.72	0.01
EQUIP FUEL & LUBE	ACRE			0.80	0.02
EQUIP REPAIRS	ACRE			0.81	0.02
MACHINERY LABOR	HRS	1.860	0.628	1.17	0.02
INTEREST ON OP. CAP.	DOLS	0.080	1.754	0.14	0.00
TOTAL HARVEST				4.92	0.10
TOTAL VARIABLE COSTS				17.23	0.35
<b>3. INCOME ABOVE VARIABLE COSTS</b>				32.23	0.65
<b>4. OWNERSHIP COSTS (DEPRECIATION, TAXES, INTEREST, INS.)</b>					
TRACTORS				1.29	0.03
MACHINERY & EQUIP				7.83	0.16
TOTAL OWNERSHIP COSTS				9.13	0.18
<b>5. RETURN TO LAND, OVERHEAD, RISK &amp; MANAGEMENT</b>				23.10	0.47
<b>6. LAND CHARGE (SHARE RENT)</b>				17.41	0.35
<b>7. MANAGEMENT CHARGE ( 5.0% OF GROSS RECEIPTS)</b>				2.47	0.05
<b>8. TOTAL OF ABOVE COSTS</b>				46.24	0.93
<b>9. RETURN TO OVERHEAD &amp; RISK</b>				3.22	0.07

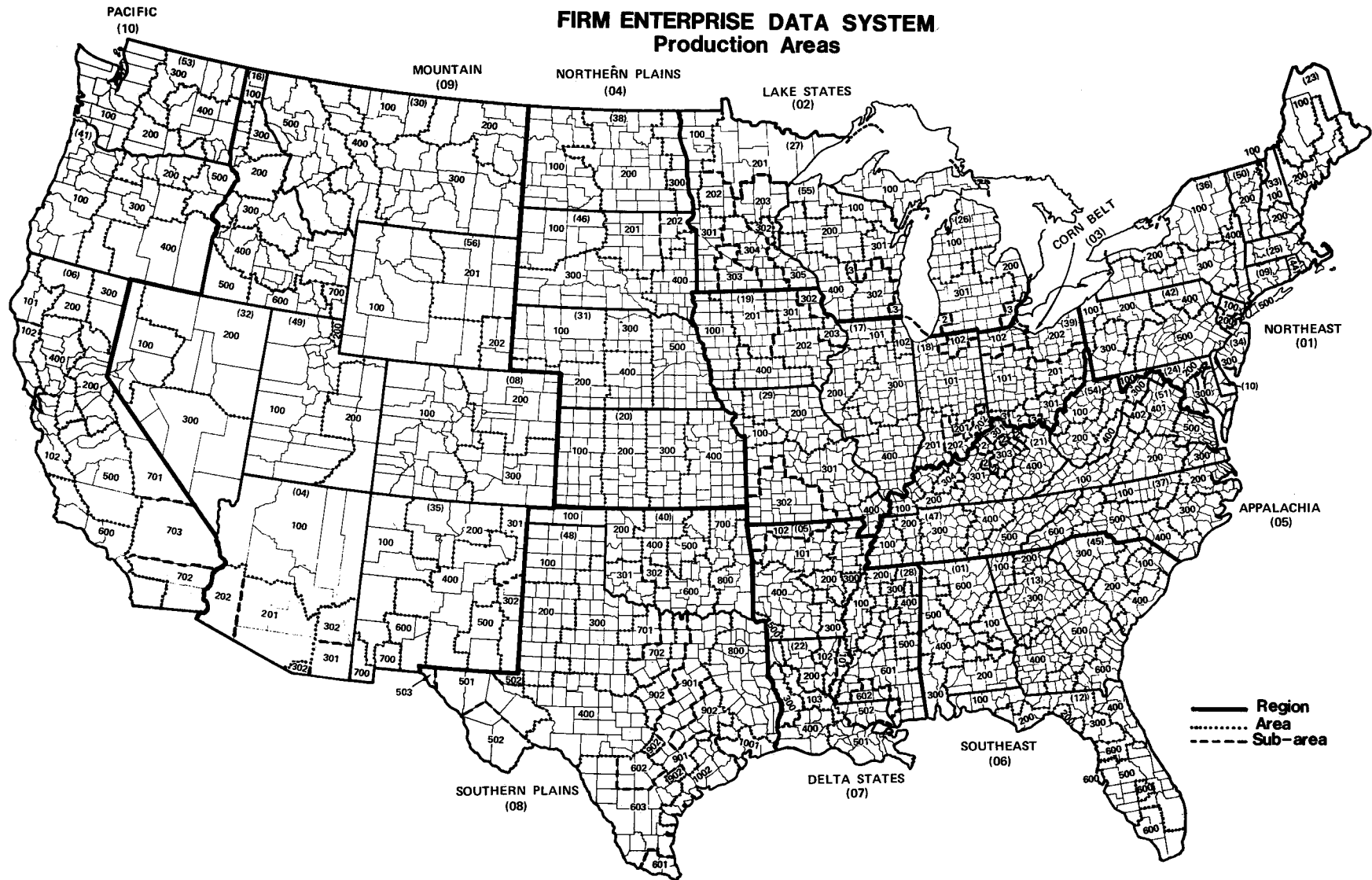
FOOTNOTES: HARVESTING COSTS REFLECT 28 PERCENT CUSTOM COMBINED AND HAULED AND 72 PERCENT COMBINED AND HAULED WITH OWNED EQUIPMENT. ROTATION APAT  
INCLUDES FALLOW BUT NO FALLOW COSTS ARE CHARGED TO THIS 09/30/74

ENTERPRISE CODE: 740004115  
 AREA CODE: 5/56/5/0  
 FILE NO. 88  
 ACRES REP. BY BUDGET: 1079.0 (000) ACRES  
 ANNUAL CAPITAL MONTH: 7

MACHINERY COMPLEMENT NO. 18  
 NAME SET: 1  
 PARAMETER SET: 46  
 HARVESTED ACREAGE AS PERCENT PLANTED: 93.00  
 EDITION NO. 0

DATE PRINTED: 09/30/74

Figure 1.



Initial budgets will represent current average technology, because their major anticipated use will be dealing with aggregate supply questions in response to government supply management policies and programs. Questions of interregional supply and competition will be included.

An estimate of the total acreage or head of livestock associated with each budget in the system will be made and stored in the computer. These estimates have two purposes (1) to show the relative importance of that budget, and (2) as an aggregation factor for computing weighed average costs, or for determining aggregate estimates of input use. For instance, if a complete set of livestock budgets is available, and if the number of head of cattle represented by each budget is known, we can then determine aggregate estimates of feed use by months, states, and type of livestock. Totals for the United States can be provided.

Data used in development of these budgets will come from a variety of sources. Since the budgets are to reflect average production technology for relatively large areas, data can be obtained from SRS (Statistical Reporting Service) on yields, acreages, use of some inputs, and on some production practices. SRS can also be relied upon for input and product prices. Surveys are now being conducted by ERS to estimate costs of producing wheat, feed grains, cotton and dairy products as required by the 1973 Agricultural and Consumer Protection Act. The first of these surveys was made in January 1975. Data from these surveys will show machinery sizes and types, and give operations performed. State experiment station and extension service staffs will be called on to provide a variety of other miscellaneous data items.

Prices and yields in the budgets will be updated annually. It is anticipated that technological coefficients will be updated approximately every three to five years, primarily by using cost-of-production surveys.

The basic set of crop and livestock budgets will likely include about 1,000 crop budgets and 500 livestock budgets. The exact number will depend primarily upon demand and data availability in commodity groups in CED. This is expected to grow over time.

The FEDS staff is not a large group. However, we do not plan to do the entire job of building all enterprise budgets. Our task is primarily that of processing budget data supplied by others and concentrating on updating and comparability.

The main task of building these budgets will fall on ERS Economists in various commodity groups in CED.

Completed budgets will be considered as public property, available to any and all users. Currently, we are printing 100 copies of each completed budget. Fifty copies are automatically distributed within ERS, and 25 - 30 to state research and extension staff. The remainder is kept to fill special requests. Updated versions will be distributed as they become available.

State or USDA researchers who want complete sets may want to have them put directly on a data tape. This service will be available upon request.

Use of remote computer terminals may be developed in the future, particularly in Washington, D. C., to provide fast access for budget modification and other analysis. We are currently trying to handle communication and distribution to Washington via telephone and Xerox Telecopier.

Discussion is continuing on a formal cooperative program with the Federal Extension Service. Although this program is still in formative stages, under the proposed arrangement ERS would provide completed budgets in exchange for some input data supplied by state and area extension workers.

### **Typical Whole Farm Budget Series**

A proposed series of typical whole-farm budgets is expected to number approximately 40 - 50 typical farms. These farms will represent major types of farming situations scattered throughout the United States for the major commodities.

This series is designed to fill two needs: (1) provide estimates of current net incomes of farmers as influenced by prices, yields and costs, and (2) provide ready access to a set of data on farm resources and costs which can be used for quick analyses — to show impacts on net incomes on typical farms under various price and agricultural policy alternatives.

The first need was previously met by the now discontinued cost-and-return series. This series, much in demand by members of the general public, provided economic information on selected farm types. It did not provide data for analytical purposes and was not intended to do so.

Annual publication of the typical whole-farm budget series is currently anticipated. Enterprise data for typical farms will be taken from the enterprise budget system. Hence, it will resemble a computerized cost-and-return series. Additional

data on farm resources, enterprise mix, and overhead costs will be provided annually by appropriate commodity groups in CED. Additional whole-farm analyses could also be performed with this system, including cash flow analysis, tax implications, debt analyses and many others.

### **Budgets of Processing and Distribution Firms**

Although the Oklahoma Budget Generator is designed for on-farm enterprise situations, the same type computer methodology can be used in the processing sector. With revised budget generator programs, we could budget enterprises such as rice dryers, grain elevators, flour mills, feed mills, canneries, dairy plants, etc. These new budget generators need to be built so they can give us the same advantages in regard to updating, automatic weighing, comparability and machine computations that we have in the farm enterprise system.

Data on processing and distribution costs is badly needed in ERS for marketing margins work, since ERS now has responsibility for estimating makeup of cost and profit components on 14 selected commodities and for all food in the aggregate. [4].

### **CURRENT STATUS**

The data system's farm enterprise budget component is currently being developed. By July 1, 1975, we hope to have seven to eight hundred crop budgets and one to two hundred livestock budgets on the system. These budgets will be for major crops such as wheat, feed grains, cotton and soybeans. Livestock budgets will be primarily for hogs and beef cattle. During 1975, we will be working on conceptual problems, design, and programs for the typical farm series.

Recently, base budgets currently on the system were used to develop some projections of production costs for 1975 for the seven major crops. It is anticipated that such projection work will continue as an ongoing task of the system.

With recently developed computer programs generating aggregate estimates of input use, we can develop weighted average production cost by crops, by region, or for the nation. Another probable use of this routine will be generating estimates of energy used in producing crops in the United States.

### **LONGER RANGE PLANS**

Within the next year or two, we hope to have

a fairly complete set of farm enterprise budgets for major farm commodities such as food grains, feed grains, oil seeds, cotton, beef, pork, and sheep, for all major producing areas in the United States. We will also begin to process budgets for tobacco, horticultural crops and poultry. Within a year we also hope to have the series of whole farm budgets operational.

It is anticipated that, in a few years, the FED System will be called on to produce cost-of-production estimates mandated in the 1973 Farm Bill. To do this, we must first get a fairly completed set of budgets on the system. Finally, we hope to begin developing budgets for processing and marketing firms within a year or two.

### **METHODOLOGICAL AND DATA PROBLEMS**

Data will always be one of our major problems. Planned ERS cost-of-production surveys will not obtain data on some of the minor crops. Basically, we need uniform data across regions, regarding sizes and types of machinery being used and operations performed in crop production. Relying on hit or miss procedures and a large number of different data sources poses problems from the comparability standpoint.

Use of the budget generator procedure does simplify data problems. Instead of asking farmers for a lot of detailed information regarding fuel use, hours per acre, repair costs, length of life of machines, etc., we can estimate many of the machinery cost items if we simply know the machinery inventory and list of operations performed. The farm management research staff at North Dakota State University has demonstrated that they could get satisfactory data for the budget generator through use of mail questionnaires [1]. This procedure shows great promise.

Some of the more difficult data problem areas for crops are prices paid for farm machinery, extent of use of used farm machinery, expenditures for pesticides by enterprise, costs of crop and hail insurance, and the usual arrangements under share leases.

Livestock production costs are considerably more difficult to estimate than those for crops. In comparison, most crop production is highly mechanized and more routine. A budget generator has not yet been developed that would provide estimates of labor use for livestock budgets. With livestock, too, we have a wide variety of production techniques being used and very poor data

available on how many farmers use, or how much production occurs, with each technique.

### SUMMARY

In conclusion, at least three points should be stressed. First, we do not regard this budget enterprise data system as the sole property and responsibility of ERS. This is a system that can be useful to the entire profession. With it, we can develop data that are useful to everyone in the profession, data of a type and quality to which we have never had access in the past. Others can assist us with this system by helping plan data — gathering methods, appraising completed budgets for accuracy and comparability, and in being understanding of our mistakes as we proceed in this developmental stage.

Secondly, with the current shift away from parity concepts towards target prices and possibly

towards cost-of-production as a basis for setting target prices, there is great need to present a uniform and consistent set of cost-of-production estimates. If the USDA presents one cost-of-production estimate and state people present different ones, we will be caught in a cross-fire by commodity interest groups in estimating correct and proper target prices for our commodity programs. It behooves us to work together in presenting data that will be our combined best estimates.

Finally, we are trying to develop in this project a system of budgets, not just a group of individual budgets. We expect to heavily emphasize comparability of data across commodities and regions, and keeping budgets updated over time. I think this effort will be rewarded through better analysis and answers to our research and policy questions.

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