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# Whole Farm Survey Data for Economic Indicators and Performance Measures

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## Abstract

The aggregate economic indicators and statistical series published by the U.S. Department of Agriculture provide insufficient information for decisionmakers requesting disaggregated analyses of farm industries, farm types, or farm sizes. However, this information can be obtained through the annual probability-based Farm Costs and Returns Survey, which uses integrated replicate sampling.

## Keywords

Economic indicators, Farm Costs and Returns Survey

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## INTRODUCTION

Users of agricultural data have become accustomed to a long history of published aggregate agricultural statistics. The Bureau of the Census, through the quinquennial *Census of Agriculture*, and the U.S. Department of Agriculture (USDA), through periodic surveys conducted by the National Agricultural Statistics Service (NASS)<sup>1</sup>, have provided most aggregate farm sector data on the number of farms, the characteristics of farms and their operators, land use, commodity production, disposition and value, inventories, certain purchased inputs and other resource use, prices paid and received, and limited data on labor hours and wages (2)<sup>2</sup>.

Although a variety of primary and secondary data series is available for economic analysis, the agricultural data base continues to contain major inadequacies. Little attention has been given to "our . . . investment in the conceptualization of agricultural data systems and to developing the entirely new systems of data needed to contend with problems of a rapidly changing economy and way of life" (1). The technical, financial, and managerial organization of farming is undergoing dramatic changes. Yet, the economic data base for agriculture remains focused

largely on the concept of a homogeneous farming sector. Information about the economic performance and well-being of different types and sizes of farms and other distributional issues may, therefore, not be reliable when derived from aggregate statistics (13).

A second, more practical problem is the lack of appropriate data to implement current aggregate economic indicator concepts and distributional indicators either now developed or under development. For example, a large number of the components of the farm income and balance sheet statistics published by the Economic Research Service (ERS) are benchmarked to socioeconomic data collected through the *Census of Agriculture* and specialized Census followup surveys, many of which have been discontinued. Thus, portions of our agricultural economic statistics series have been either without a benchmark data source, such as off-farm income, or with a benchmark that, at best, will soon be more than a decade old.

Two important issues relate to our inability to fully use survey data to develop and improve research related to the well-being and performance of agricultural subsectors. First, although existing published data are useful, even critical, to most economic analyses, these cross-tabulations are often inadequate to meet specialized analytical needs or to create new or nontraditional economic indicators. This inadequacy occurs because many of the policy or research problems to be addressed focus on micro-economic issues and require data that focus on sub-

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<sup>1</sup>Formerly the Statistical Reporting Service.

<sup>2</sup>Italicized numbers in parentheses refer to items in the References at the end of this article.

sets of the farm-sector population with particular characteristics. And, although data are published for major farm subsectors and by major farm characteristics, similar data are not available giving joint distributions of these and other characteristics such as size of farm, financial structure of the business, and socioeconomic characteristics of the operator (10)

We are also unable to match data from multiple survey sources to provide an integrated perspective on the economic performance of the farm sector. Surveys are conducted at different times and by different organizations for different purposes. The population to be surveyed also changes. Moreover, if surveys are conducted with different sampling procedures, analytical questions may be raised about the use of multi-source, multi-time-frame data either to develop economic performance measures or to analyze changes in economic structure or behavior.

Over the last decade, and especially over the last 3 years, ERS has been reviewing the conceptual foundations and empirical procedures in the published income, cost of production, balance sheet, and productivity accounts. We have also been reviewing the primary surveys conducted by ERS and NASS to support enterprise costs, productivity, farm income, and balance sheet accounts. Over the last several years, USDA has revised enterprise (cost-of-production) and whole-farm (income) survey questionnaires, sampling methodology, and sample sizes. These revisions will provide a data base sufficient to allow disaggregation of the national accounts to provide statistically reliable data on farms by type, size, and region. USDA has also designed modular questionnaires to easily accept data changes in income, finance, or cost concepts so that future changes in data needs will not cause major changes in survey design.

## A Historical Perspective

The quality and use of agricultural data embrace both conceptual development and empirical measurement. The research community, both within and outside USDA, has focused considerable attention for many decades on the quality and potential analytical usefulness of a national agricultural data system for the farm sector to support policy, production, finance, and farm management research.

## Conceptual Development

The Committee on Economic Statistics of the American Agricultural Economics Association stated in 1972 that, with continued structural transformations in agriculture and rural life, "theoretical concepts around which we have constructed our data systems grow progressively more obsolete—so obsolete that minor tinkering with each Census or survey no longer seems to bridge the basic inadequacy of the ideas being quantified" (1). The Committee left the profession with an ambitious agenda of topics focused on reducing data collection obsolescence. As Lee noted, however, the Committee did not go beyond listing issues that established "the dimensions of social data needs" (6). However, several years later, in his presidential address, Bonnen moved the profession well beyond listing data needs by providing insight into conceptual obsolescence in data and by developing a paradigm for an agricultural information system (3).

During the sixties and seventies, USDA economists also studied conceptual and empirical data system issues, the latter through statistical redesign of sampling frames for crops and livestock. "The cornerstone for a new farm statistical structure in the United States was laid in 1966 when the Statistical Reporting Service of the USDA put a probability sampling scheme into operation in the 48 contiguous States" (14). Beginning in 1970, NASS used list sampling frames to supplement area sampling frames, thus retaining a probability survey design while introducing the "multiframe" sampling procedure into USDA surveys. In 1976, the "multiframe" survey approach was extended to surveys used to collect economic data.

ERS staff has researched the economic concepts and accounting procedures underlying the cost and income accounts published by the Agency. Weeks reviewed aggregate data series published for agriculture and explored alternative approaches to shift the conceptual emphasis in agricultural data toward the same procedures and rationale as the national income and product accounts published by the U.S. Department of Commerce (17). A task force on Farm Income and Capital Accounting was established in 1972 and again in 1974 to inventory the basic income and accounting work done in ERS, appraise

conceptual content and estimation procedures, and provide recommendations for program improvement (15, 16)

Among the 1974 task force conclusions was a recommendation that "net income of farms" be substituted for "net income of farm operations." This recommendation entailed a conceptual shift in the agricultural accounts, meaning that the farm would be measured as a business enterprise or establishment, rather than as a family household or consuming unit.

ERS has also moved toward implementing the conceptual arguments advanced during the previous decade. Revised income accounts first published in 1980 were based on "the concept of separating the measurement of the economic viability of the production units of the farm sector from the well-being of the farm operator families" (11). ERS developed a farm production transaction account to measure the income from production establishments so that the value added by the farm production sector can be distributed to the institutions or individuals who control the sector's resources. In this account, the residual is a return to operators. In 1983, ERS also revised cost-of-production accounts by implementing a conceptually stronger methodology and presentation format. The revised cost-of-production budgets measure cash receipts, cash and economic costs of production, and cash-flow measures for enterprises, and they provide a basis for determining the longrun return to farm assets.

### **Data Problems and the Economic Indicator Accounts**

The current data series are increasingly recognized as inadequate for analyzing industry-specific or distributional issues. As Kallek stated in 1981, "There is a growing realization that farms are increasingly different, they have different resource characteristics, needs, and goals. Part-time farms differ from full-time farms as do dairy farms from cash grain farms" (5).

We do not discuss all the data voids or inadequacies that exist for the various indicator accounts in this article. These problems must eventually be addressed, however, either through primary surveys or from secondary data sources, such as administrative data provided by other USDA agencies, including the

Farmers Home Administration, or other institutions, such as the Farm Credit System. We will highlight a few specific conceptual and empirical data issues to illustrate why ERS is concerned with the appropriateness of its own data collection efforts (9).

First, ERS uses production, marketing, and price data obtained from NASS to estimate most components of gross receipts for the farm sector as a whole for most commodities. We are concerned about coverage, however, and we have discussed with NASS ways to improve aggregate estimates of "minor" or specialty crop marketings important to a particular locality, but perhaps less important either to an individual commodity or on a national basis. If these commodities are not properly included in the accounts, gross receipts can be understated.

Second, we include an estimate of the value of home consumption of commodities produced on farms in estimates of net income to help fully account for the use of inputs that are included in sector expenses. Reliable home consumption data exist for livestock, but data for fruits, vegetables, and other crops have not been available for several years. A benchmark has simply been adjusted to reflect changes that could affect consumption. We revised our 1985 surveys to collect consumption value estimates, and we will evaluate these data to determine their usefulness in estimating these accounts.

Third, estimates of the value of the change in inventories are of critical concern. To estimate sector net income from production activities during a specified calendar year, we either add to or subtract from gross income an estimate of the value of the change in physical quantity. We estimate the change in physical quantity stored by subtracting marketings and onfarm use from production. Data have not been collected on the quantity of feed, hay, and other output fed on farms where produced, and benchmark estimates are several years old. Meanwhile, changes in the operating characteristics of the feed-livestock subsector influence estimates of the quantity of grain sold versus the quantity fed, and these changes affect the overall estimates of cash receipts. To address these data problems, USDA added questions to sector surveys conducted for 1984 and 1985. The results from these questions will be used to determine the use of farm-produced feed and to derive a more reliable estimate of inventory adjustments and cash receipts.

Fourth, we have also begun to research and review the gross receipts accounts to determine if additional income sources have been inadvertently omitted. For example, we now charge interest paid on machinery and real estate as an expense, but we do not treat the sale of machinery as capital account transactions or as an income source to the business. Similarly, wages paid to family members are counted as expenses, which is proper for the business, but these wages are not also counted as income when total family income is being measured. Any measure of family well-being is probably understated without consideration of these wages, which amounted to about \$3 billion in 1984.

Fifth, we still have not addressed several conceptual and empirical problems. While most expense estimates may have an adequate underlying data base for any particular item at an aggregate level, we do not know how expenses differ for different types of farm businesses. One conceptual issue we are studying is the need to separate livestock purchased for capital account uses from livestock purchased for resale. This separation would prevent overstating production expenses and understating capital expenditures. Survey data from 1984 indicate that about 34 percent of livestock purchases were for breeding stock.

Sixth, interest expense estimates obtained through sector surveys, including the Census of Agriculture, differ significantly from estimates developed from the use of institutional debt and a calculated average interest rate. Survey data, including the 1982 Census of Agriculture, suggest that cash interest expenses may be overstated in the USDA accounts. Moreover, the accounts should distinguish short-term production loans from longer term loans and farm versus household shares. Financial data which more clearly distinguish between operator and landlord debt holdings and debt for farm and nonfarm business purposes (even if the debt were secured by farm collateral, especially real estate) would greatly improve the accuracy and usefulness of both the income and balance sheet accounts.

Seventh, purchased but unused fuel, seed, fertilizer, and feed are expense items that probably should be included in an operating input inventory because many farmers prepurchase and stock these items for later use. To the extent that inputs are purchased but not consumed, income and balance sheet ac-

counts could be incorrectly estimated and net income would be understated during the year of purchase and overstated during the year of use. We collected data to provide an operating input inventory estimate the first time for 1984. Our initial estimate indicated that farmers spent about \$1.6 billion on inputs still on hand at the end of the calendar year.

Because we do not know the year of purchase, we will need additional data to track annual changes so that the change in input inventories can be measured and added to or subtracted from gross income and assets measures. We are also collecting data to improve estimates of the costs associated with marketing, hiring, machinery, and custom-work services. These expense items were probably not too significant when the income accounts were being developed many years ago, but they have become far more significant during the past decade.

Finally, we need additional data to improve the cost-of-production (COP) estimates. Specialized farm COP surveys have been used since 1974 to determine application rates, machinery operations, buildings, and other technical information. Because these commodity-specific surveys were taken every 4-5 years, cost estimates are primarily updated between survey years only for changes in input prices. USDA economists derive labor, fuel, lubrication, and repair costs of machinery using engineering equations and relationships derived in the sixties. We should ideally collect data to update all enterprise cost items annually based on a combination of quantity and price changes instead of input price changes only. A more important shortcoming of previous (pre-1984) crop COP surveys is that they were conducted with a non-probability sampling design. We have consequently not been able to use these data to conduct analyses of enterprise costs concerning the portion of production at certain cost levels, farm size, commodity specialization, and other operating characteristics useful in understanding differences in farm efficiency, costs, and returns. Many of these enterprise cost relationships will be addressed with data collected in subsequent surveys.

## **Data Needs and Survey Plans**

Prior to 1984, ERS and NASS jointly conducted two independent national surveys: the Farm Production Expenditures Survey (FPES) and the Cost-of-Produ-

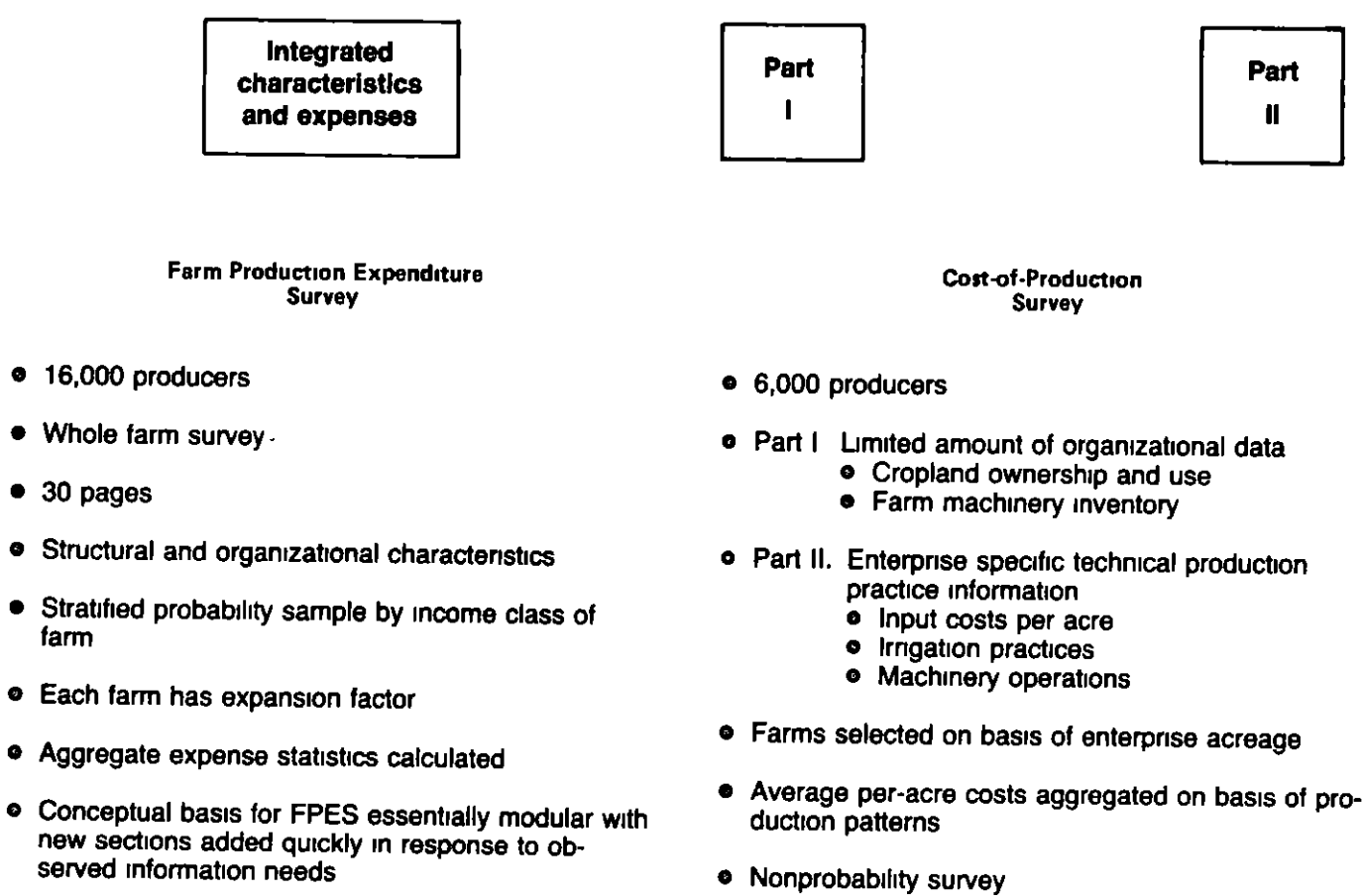
tion Survey (COPS) ERS has spent about \$2.2 million on the FPES and COPS, allowing a survey sample sufficient to yield 3,000-4,000 usable COP questionnaires and 7,000-8,000 usable FPES questionnaires annually. The FPES was a probability-based, whole-farm survey collecting total farm expense and receipt data used in preparing national economic indicator series. The COPS collected enterprise-specific technical data by selecting farms proportional to the acreage of selected enterprises. Although similar information was gathered from both surveys, the COPS data could not be used to supplement the FPES, and the FPES could not be used to supplement COPS data (fig. 1). Thus, from the perspective of either survey, much information

was irrelevant, from the perspective of distributional analysis, only a portion of the farm business information base needed was available. Because the surveys' data could not be merged, neither survey provided a very reliable source of cross-tabulated data. Even at the national level, some of the data had relatively large measures of dispersion (coefficients of variation for the 1981 FPES ranged from 82-150 percent, for example).

Maintaining this dual-track enterprise and whole farm survey system caused several other major problems. First, conducting two independent surveys increased overhead costs for survey schools and costs for data collection on those farms in both surveys.

Figure 1

**FY 1978-79 Surveys**



Second, when the same farm is covered in both surveys, the two surveys competed for producers' time in supplying information, enumerators made multiple visits asking for some of the same data. Third, we were unable to establish data relationships between enterprise activities and the farm business. Finally, we were also unable to answer questions about data reliability, dispersion, and variance of economic indicator measures for different types and sizes of farms by ownership, region, and other characteristics.

Thus, beginning in 1982, ERS and NASS discussed ways to merge the FPES and COPS into a probability-based Farm Costs and Returns Survey (FCRS). This completely integrated whole-farm and commodity-specific survey uses replicated samples for specific detailed (technical or critical problem) information. The FCRS addresses five objectives: (1) estimating COP budget items on a probability basis, (2) redesigning the COPS questionnaires to include whole-farm data, thus providing a link to the previously conducted FPES, (3) enhancing farm financial data, (4) enhancing data collection, editing, and review procedures to reduce overhead costs, and (5) increasing the involvement and technical support

for the survey from various data collection and analysis units within ERS and NASS. The newly structured survey is expected to have a sample size of about 24,000 farm operators annually and to have coefficients of variation (CV) less than 4 percent for major expense categories and 10 percent for others.

Because the new FCRS survey is probability-based and has a relatively large sample, we can conduct distributional analyses of operating costs, returns, and financial characteristics by size and type of farm by major producing regions (tables 1 and 2). The CV's for total expenses were dropped to 2 percent in the 1984 survey. Even major components of expenses now carry a CV of about 4 percent or less. More important, the last column of table 1 shows the effect of the survey merger on the quality of the aggregate expense data used to estimate farm income. CV's were substantially reduced; the CV for total expenses dropped from 20 percent to 17 percent. Another major effect is the ability to develop more statistically reliable cross-tabulations (table 2). Estimated CV's for major data items for any of the farm size classes are about 6 percent or less. Those items with CV's greater than 5-6 percent are items that occur sporadically and would not be expected on a large

**Table 1—1984 Farm Costs and Returns Survey: Multiple-frame expansions and coefficients of variation, selected items, expenditure version and all versions**

Expense	Multiple-frame expansions		Coefficients of variation	
	Expenditure version	All versions	Expenditure version	All versions
	<i>Million dollars</i>		<i>Percent</i>	
Total	129,001	131,514	2.0	1.7
Livestock and poultry	33,272	34,325	3.6	3.4
Farm services	25,411	25,796	2.5	1.9
Feed	18,145	18,341	4.1	3.5
Wages and contract labor	11,125	11,542	3.6	3.3
Fertilizer	8,817	9,144	2.5	2.1
Interest	13,474	13,559	2.5	2.0
Fuels and energy	6,996	6,951	2.3	1.8

**Table 2—Farm financial information by acres operated, 1984<sup>1</sup>**

Item	Up to 100 acres			101 to 250 acres			251 to 500 acres			500 to 1,000 acres		
	Total	Average per farm	Coefficient of variation	Total	Average per farm	Coefficient of variation	Total	Average per farm	Coefficient of variation	Total	Average per farm	Coefficient of variation
	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>
Gross farm income	14,705,311	22,908	5 30	15,824,779	41,229	4 46	21,891,850	74,096	3 79	27,186,532	137,981	4 40
Livestock and crop marketings	13,565,228	21,132	5 58	14,621,430	38,094	4 63	20,553,396	69,565	3 88	25,264,880	128,228	4 40
All Government farm payments	87,985	137	15 14	215,292	561	10 79	427,451	1,447	7 88	766,071	3,888	6 91
Other farm income	1,052,098	1,639	10 52	988,057	2,574	11 50	911,003	3,083	8 39	1,155,581	5,865	16 11
Operating expense less interest	13,355,793	20,806	5 19	12,597,440	32,821	4 59	17,099,690	57,876	4 04	19,867,383	100,834	4 10
Interest paid on real estate debt	1,119,804	1,744	6 26	893,952	2,329	5 83	1,350,134	4,570	5 90	1,593,421	8,087	5 26
Interest paid on operating loans	373,041	581	8 41	582,772	1,518	6 61	1,057,922	3,581	5 59	1,413,695	7,175	4 74
Net cash income	-143,326	-223	229 03	1,750,615	4,561	14 81	2,384,104	8,069	15 54	4,312,033	21,885	13 98
Off-farm income	12,237,494	19,064	6 07	5,203,618	13,557	6 13	5,281,335	17,875	29 62	1,862,346	9,452	9 54
Farm family income	12,094,167	18,841	6 10	6,954,233	18,118	5 88	7,665,439	25,945	20 28	6,174,380	31,337	10 20
Total farm debt	13,017,852	20,279	5 41	13,947,859	36,339	5 81	22,504,627	76,170	5 12	26,710,272	135,563	4 41
Total farm assets	90,697,745	141,291	4 31	81,456,714	212,224	3 70	96,739,018	327,424	3 56	99,762,757	506,329	4 12
							<i>Percent</i>					
Debt/asset ratio	na	14	4 55	na	17	5 46	na	23	4 14	na	27	3 68
Asset turnover ratio	na	15	5 34	na	16	4 33	na	21	3 20	na	25	3 84
Fixed asset turnover ratio	na	16	5 46	na	20	4 57	na	25	3 44	na	30	4 09
Ratio of interest to total cash expense	na	10	5 18	na	10	4 38	na	12	3 51	na	13	3 28
Ratio of off-farm income to net cash income	na	-8,538	198 47	na	297	15 96	na	222	35 84	na	43	16 91

See footnotes at end of table

Continued



Table 2—Farm financial information by acres operated, 1984<sup>1</sup>—Continued

Item	1,001 to 2,000 acres			Over 2,000 acres			All acreage classes		
	Total	Average per farm	Coefficient of variation	Total	Average per farm	Coefficient of variation	Total	Average per farm	Coefficient of variation
	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Percent</i>
Gross farm income	19,589,235	189,871	5.21	20,800,828	286,769	4.79	119,998,536	70,840	1.86
Livestock and crop marketings	17,987,172	174,343	5.46	18,819,729	259,457	4.99	110,811,835	65,417	1.91
All Government farm payments	907,894	8,800	6.51	953,018	13,139	7.73	3,357,712	1,982	3.39
Other farm income	694,169	6,728	12.44	1,028,082	14,174	8.54	5,828,989	3,441	4.87
Operating expense less interest	15,176,157	147,097	6.23	16,735,312	230,720	4.40	94,831,773	55,983	1.88
Interest paid on real estate debt	1,166,896	11,308	6.82	1,437,319	19,816	6.15	7,561,326	4,464	2.43
Interest paid on operating loans	1,151,771	11,164	5.98	1,398,366	19,279	5.91	5,977,568	3,529	2.44
Net cash income	2,094,610	20,302	20.39	1,229,831	16,955	41.87	11,627,866	6,864	9.14
Off-farm income	1,525,204	14,783	27.02	1,084,065	14,945	9.12	27,194,061	16,054	6.77
Farm family income	3,619,814	35,086	16.71	2,313,896	31,900	22.92	38,821,929	22,918	5.29
Total farm debt	20,368,531	197,425	5.46	23,528,990	324,381	5.31	120,078,131	70,887	2.11
Total farm assets	73,620,076	713,572	5.15	104,411,599	1,439,464	5.18	546,687,910	322,732	1.83
					<i>Percent</i>				
Debt/asset ratio	na	28	4.13	na	23	5.80	na	22	1.95
Asset turnover ratio	na	24	3.97	na	18	5.21	na	20	1.81
Fixed asset turnover ratio	na	29	4.38	na	21	5.63	na	23	1.94
Ratio of interest to total cash expense	na	13	5.12	na	14	4.05	na	12	1.71
Ratio of off-farm income to net cash income	na	73	33.25	na	88	31.56	na	234	11.51

na = not applicable

<sup>1</sup>Average per farm represents the mean per reporting farm in the sample except for the case of ratios where they are sectoral averages. The coefficient of variation is defined as the standard deviation divided by the mean.

Source (8)

number of farm operations. The probability-based FCRS provides the opportunity to state the accuracy of estimates and to examine and evaluate the sample size. By comparison, in the nonprobability COPS, USDA chose sample sizes using subjective criteria, the sample was drawn from a core of cooperative farmers, and statistical accuracy could not be objectively measured.

The physical and investment characteristics of the farm operation are also included in the FCRS (fig. 2). In part I, for example, enumerators ask each farm respondent for information on general farm characteristics. Farm expenses and income items are recorded in part II and include: whole farm expenses by type or category, land use; crop acreages and yields, livestock inventory, sales, purchases, and feed use, crop receipts, inventory, and so forth, and farm business and financial characteristics. Part III represents the modular sections that are used to obtain specific detailed technical and other farm- or household-related information. This detailed information can then be related to general farm characteristics because of the subsampling procedures which are based on preselection with known probabilities. Such detailed data collection procedures provide primary survey data on particular types or categories of farm business and farm households, their organizational characteristics, and their operating or technical practices.

Several repercussions will occur with the new survey approach. We will have more rigid, formal, and complex procedures both when conducting the survey and when using the data. We will also be able to evaluate and report on the accuracy of the data so that data users can evaluate their reliability for other analytical purposes.

### **Distributional Indicator Data Series: Enhancing the Aggregate Perspective**

The ability to focus analyses on certain types and kinds of operations was perhaps unimportant when the farm sector was composed of several million farms, mostly small and reliant on agriculture for family income. Relative homogeneity within the sector meant aggregate measures could be used to discuss economic well-being of the component subsectors.

However, agriculture has become increasingly and noticeably heterogeneous. As a result, aggregate economic accounts and data series, constructed in the absence of distributional considerations, have become increasingly ineffective in providing insight into the well-being of various farm subpopulations. Sundquist illustrated this point in 1970 by arguing that "there seems to be little merit in speaking of average income, average problems, or average anything for units classified as farms" (12).

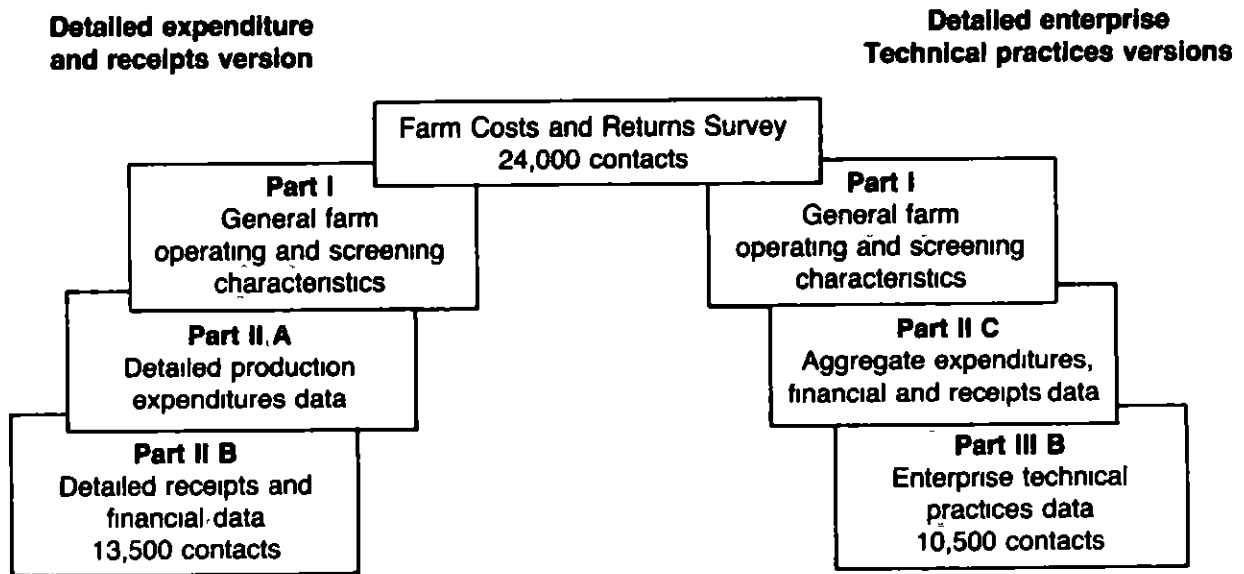
The difficulty of using averages to represent commercial and noncommercial operations, various legal organizations, tenure groups, or commodity subsectors becomes particularly acute when the analyses are focused on the distributional consequences of agricultural and economic policy and on financial conditions (7). Johnson and Short have suggested that "using aggregate sales or production data to assess distribution of information requires a strong assumption, often untenable, about class composition" (4). This viewpoint will probably become increasingly important for future agricultural policy and research efforts.

USDA designed the 1984 FCRS to provide financial characteristics of the farm business, sales, operator occupation and off-farm income, production, capital expenditure, and Government-program participation in addition to the usual expense data. For example, the data in table 2 were derived from the 1984 FCRS and demonstrate conclusively that producers in the differing acreage classes varied substantially with regard to every operating characteristic shown. Even a superficial analysis of these data strongly suggests that conclusions reached using just aggregate data for policy or program purposes would probably be misleading or incorrect.

This point is made even more emphatically by the data on the sources and uses of cash income of farms producing corn (table 3). Corn farmers' level and sources of gross cash income vary considerably by region. Expenses, especially interest paid, also vary considerably by region. Farmers growing corn show net operating margins ranging from a large positive to a large negative. Moreover, the level of farm business leverage and off-farm income varies considerably. This variation illustrates the difficulty in using aggregate sector data to estimate either the

Figure 2

## The Farm Costs and Returns Survey: FY 1985



**Part I** Screening and general farm operating characteristics

- Land use
- Crop acreages, yields, and so forth
- Farm business and financial organization

**Part II** Farm production expenditures, receipts, and financial data, including items such as

- Whole-farm expenses by type or category
- Livestock inventory, sales, and purchases
- Crop receipts, inventory, and so forth
- The farm business balance sheet

**Part III** Modular sections for specific detail

- A Detailed information needs for special and key variables and data items relating to production activities and whole farm expenses
- B Data on particular types or categories of farm organizational characteristics and technical practices used in crop and livestock production

Table 3—Sources and uses of cash income on farms producing corn, by region, 1984<sup>1</sup>

Item	Northeast	Lake States	Corn Belt	Northern Plains	Appalachia	Southeast	Delta	Southern Plains	Mountain States	Pacific States	All regions
	<i>Number</i>										
Sample size	610	997	1,450	427	748	258	92	81	342	174	5,179
Expanded number of farms	59,104	140,733	227,522	62,159	81,569	29,017	6,716	8,171	10,051	4,354	629,396
Expanded share of all farms (percent)	9	22	36	10	13	5	1	1	2	1	100
	<i>Dollars per farm</i>										
Livestock sales	74,977	54,029	43,756	65,459	37,857	26,545	32,776	66,536	129,774	302,493	52,912
+ Crop sales	16,065	25,127	49,093	54,979	32,009	53,637	31,550	83,440	60,211	257,412	41,087
= Cash sales	91,042	79,156	92,850	120,438	69,866	80,182	64,326	149,976	189,985	559,906	93,999
+ Government payments	985	2,290	1,739	4,667	806	1,386	2,233	4,683	3,361	8,053	2,056
+ Other cash income	1,923	2,566	2,746	6,885	2,269	1,665	788	5,907	9,598	19,961	3,174
= Gross cash income	93,949	84,012	97,335	131,990	72,940	83,232	67,348	160,566	202,944	587,920	99,230
- Interest paid	6,852	11,676	11,696	16,454	6,180	7,913	8,262	18,638	26,851	61,060	11,454
- Other operating expenses	72,775	62,624	67,947	99,099	53,884	77,089	61,760	162,850	186,566	478,423	74,785
= Net operating margin	14,323	9,712	17,692	16,436	12,876	1,770	2,674	-20,922	10,472	48,437	12,990
+ Off-farm income	7,773	11,943	12,452	4,563	12,721	11,248	11,045	13,370	4,170	10,237	10,949
= Total cash available	22,095	21,655	30,144	21,000	25,597	9,478	8,372	7,551	-6,303	58,674	23,939
- Family living expenses	12,950	12,950	12,950	12,950	12,950	12,950	12,950	12,950	12,950	12,950	12,950
- Principal payments	5,718	9,431	9,226	11,404	4,385	5,825	7,153	15,264	18,185	45,494	8,823
= Cash balance	3,427	726	7,969	3,355	8,262	9,297	11,731	35,765	37,437	230	2,165
Total value of owned assets	345,531	352,885	364,383	457,304	274,629	314,489	302,005	548,960	911,793	1,384,211	372,813
Total value of debt	66,492	109,663	107,275	132,606	50,988	67,734	83,174	177,488	211,452	528,998	102,598
	<i>Percent</i>										
Debt/asset ratio	19.24	31.08	29.44	29.00	18.57	21.54	27.54	32.33	23.19	38.22	27.52
Debt as a share of U.S. debt	6.09	23.90	37.80	12.77	6.44	3.04	0.87	2.25	3.29	3.57	100.00
Assets as a share of U.S. assets	8.70	21.17	35.33	12.11	9.55	3.89	0.86	1.91	3.91	2.57	100.00
Balance as a share of cash sales	3.76	na	8.58	na	11.83	na	na	na	na	0.4	2.30
Balance as a share of total assets	99	na	2.19	na	3.01	na	na	na	na	0.2	58
Share of farms with negative or zero cash balance	58.01	48.50	47.04	55.51	45.60	57.63	77.92	70.78	58.86	45.79	50.35
Share of farms participating in Government programs	16.53	37.03	37.17	55.82	23.21	19.22	18.30	15.65	29.44	31.74	33.77

na = not applicable, because cash balance is negative

<sup>1</sup>Data may not add because of rounding

solvency, liquidity, or profitability of a business or the probable effects of policy adjustments on a particular segment of the industry

Other cross-classifications can be developed from the FCRS to enhance financial analyses of the farm business establishments. Because these data are based on a multiframe probability sample of nearly 24,000 farms, reliable national and regional estimates are easily obtained. Other distributionally related microeconomic indicators can be organized by size (such as acreage or sales class), occupation, tenure, or farm business organization. Of course, when the data are disaggregated to provide a disaggregated perspective, thin data in a specific individual cell are possible. When this situation occurs, thin data estimates should be used only as a guide to the characteristics of farms in the subpopulation rather than as a precise estimate.

To reduce the incidence of thin data cells, USDA has recommended an increase in funding. This funding would also allow USDA to expand the FCRS sample size so that reliable aggregate data can be obtained at the State level. These aggregate data would allow multiple-dimension cross-tabulations at the national and regional levels. Moreover, the expanded survey would provide sample data that can be used to develop more disaggregated national perspectives of changing conditions in the farm sector by type, size, and other characteristics.

## Conclusions

Aggregate agricultural statistics and indicators have long served as measures of economic well-being of the farm sector. In the future, economic indicators will need to be disaggregated to be useful for policy and program analysis. To meet this demand for different farm-sector data and for information better describing changing economic conditions, USDA merged the previously conducted FPES and COPS into a new and broader economic survey, the FCRS.

The FCRS is an integrated, probability-based, annual national whole farm survey conducted to improve both aggregate and disaggregate economic indicators needed by Government officials as well as by farmers and others who make decisions that affect the farm sector. The resulting data set includes detailed information on financial characteristics, expenses,

receipts, resource base, and production practices on farms. To be even more useful, the FCRS will also provide other socioeconomic data such as age, education, and off-farm income. These data will allow not only more accurate estimates of farm-sector income but also a better grasp of income distribution among sector participants, while contributing to our goals of maintaining conceptual clarity, flexibility, and progressive adaptability for the future.

## References

- (1) American Agricultural Economics Association, Committee on Economic Statistics. "Our Obsolete Data Systems: New Directions and Opportunities," *American Journal of Agricultural Economics*, Vol. 54, No. 5, Dec. 1972, pp. 867-74.
- (2) Bell, Carolyn Shaw. "The Erosion of Federal Statistics," *Challenge*, Vol. 26, No. 1, Mar./Apr. 1983, pp. 48-50.
- (3) Bonnen, James T. "Improving Information on Agriculture and Rural Life," *American Journal of Agricultural Economics*, Vol. 57, No. 5, Dec. 1975, pp. 753-63.
- (4) Johnson, James D., and Sara D. Short. "Commodity Programs: Who Has Received the Benefits?" *American Journal of Agricultural Economics*, Vol. 65, No. 5, Dec. 1983, pp. 912-21.
- (5) Kallek, Shirley. "Census of Agriculture," *Economic Statistics for Agriculture. Current Directions, Changes and Concerns*. In a symposium presented at the annual meeting of the American Agricultural Economics Association, Clemson, SC, Aug. 1981.
- (6) Lee, John E., Jr. "Our Obsolete Data Systems: New Directions and Opportunities: Discussion," *American Journal of Agricultural Economics*, Vol. 54, No. 5, Dec. 1972, pp. 875-77.
- (7) Mayer, Leo V., and Dawson Ahalt. "Public Policy Demands and Statistical Measures of Agriculture," *American Journal of Agricultural Economics*, Vol. 56, No. 5, Dec. 1974, pp. 984-87.
- (8) Morehart, M., and Richard Prescott. *Farm Operating and Financial Characteristics*,

January 1, 1985 ERS Staff Report  
AGES860521. U S Dept of Agr., Econ. Res  
Serv , June 1986

- (9) Nicols, Ken "Data Collection, Use and Improvement for the Farm Sector Economic Indicators " ESCS Staff Report U.S Dept of Agr , Econ Stat. Coop Serv., Aug 1980.
- (10) Schertz, Lyle P. "Households and Farm Establishment in the 1980's. Implications for Data," *American Journal of Agricultural Economics*, Vol 64, No 1, Feb 1982, pp 115-18
- (11) Smith, Allen "New Farm Sector Accounts," *Outlook 81*. U S Dept. of Agr , World Agr Outlook Board, Nov. 1980
- (12) Sundquist, W B "Changing Structure of Agriculture and Resulting Statistical Needs," *American Journal of Agricultural Economics*, Vol 52, No 3, May 1970, pp 315-20
- (13) Trelogan, Harry C "Cybernetics and Agriculture," *Agricultural Economics Research*, Vol 20, No 3, July 1968, pp 77-81
- (14) \_\_\_\_\_ "Toward More Accurate Farming Data," *Agricultural Economics Research*, Vol 28, No 2, Apr 1976, pp 79-81
- (15) U S. Department of Agriculture, Economic Research Service "Farm Income and Capital Accounting-Findings and Recommendations of a 1972 ERS Task Force." Unpublished report, July 1972
- (16) \_\_\_\_\_ "Task Force on Farm Income Estimates " Unpublished report, Jan 1975
- (17) Weeks, Eldon E *Aggregate National Agricultural Data—Status and Alternatives: A Current Progress Report* U S Dept of Agr , Econ Res. Serv , Mar 1971

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Over the years, the price of human time has risen greatly relative to that of the services of natural resources. Real hourly wages in the United States were more than five times as high in 1972 as they were in 1900, whereas the real price of the commodities most dependent on natural resources tended not to rise.

*Theodore W. Schultz*  
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