Issues in Distributing USDA's State Level Net Farm Income Estimates to Counties

James M. Zavrel
Chief, Farm Income Section
Regional Economic Measurement Division
Bureau of Economic Analysis

Paper to be presented at the American Agricultural Economics Association Meeting, August 4-7, 1985
Iowa State University, Ames, Iowa

PERSONAL INCOME

The personal income of an area is defined as the income received by, or on behalf of, all the residents of that area. It consists of the income received by persons from all sources: from participation in production, from transfer payments from government and business and from government interest. Personal income is derived as the sum of wage and salary disbursements, other labor income, proprietors' income (including inventory valuation adjustment and capital consumption adjustments), personal dividend income, personal interest income, rental income of persons, and transfer payments, less personal contributions for social insurance.

INTRODUCTION

The primary mission of the Regional Economic Measurement Division (REMD), Bureau of Economic Analysis(BEA) as referred to by the act of Congress which established the Departments of Commerce and Labor (15 USC §175) is the compilation, publication and dissemination of annual estimates of total personal income for the counties, metropolitan areas, states and regions of the United States. These estimates, which are as comprehensive and consistent as the source data permit, constitute one of the most extensive bodies of economic information that is available for local areas and provide the basis for a broad range of economic analyses. The objectives underlying these estimates are to provide the depth of detail, geographic flexibility, and annual availability needed for economic decision making.

The local area personal income estimates have found wide use in both the public and private sectors. Legislation has been enacted which requires the use of personal income (or a derivative) as a variable in formulas for allocating Federal funds to States and local areas, and for determining the amount of matching funds for numerous Federal/State programs. At the present time, these programs include the National School Lunch Program, U.S. Public Health Service rehabilitation programs, the Medical Assistance program (Medicaid), and the Aid to Families with Dependent Children (AFDC) program.

Personal income is also one of the measures used in evaluating the socioeconomic impacts of numerous public and private sector initiatives. It is widely used in preparing environmental impact statements required by the National Environmental Policy Act of 1969 and the Federal Land Policy and Management Act of 1976. Other uses for the local area estimates include as an input to econometric forecasting models (for example the Food and Nutrition Service of the U.S. Department of Agriculture uses them to project the number

of persons eligible for domestic food programs). State and local government planners use the estimates to project tax revenues and future needs for public services. Legislation that limits a States expenditures or tax authority by the level of, or change in, personal income has been enacted, or is pending, in a number of states.

Use of the local area personal income estimates is not limited to government. Private businesses find them useful in evaluating additional or alternative market areas for established products, to forecast prospects for marketing new products, to determine areas for relocation or decentralization, and to analyze comparative production costs in relation to consumers' ability to pay.

This wide spectrum of application is possible because of the reliability of the personal income estimates which are almost entirely based on administrative records. The exception to this general statement are the estimates of farm proprietors' net income which are based on census and USDA survey material. Because of the lack of administrative records, farm labor and proprietors' income for local areas is one of the more difficult components of personal income to estimate. The paucity of annual sub-state level data, along with the inherent year-to-year volatility of local farm economies make it an especially challenging estimate. For the U.S as a whole, and for most States, farm labor and proprietorship income is not a large percentage of total personal income. Farm income is however, a critical component of income for a great number of counties. This can be illustrated by the fact that while farm income represents less than one percent of the total personal income in the U.S. (.94 percent in 1983, the latest data published); and no more than ten percent of total personal income in any given State (9.7 percent in North

Dakota, also 1983); that in BEA's latest series of local area estimates there were more than two hundred counties nationwide in which farm income comprised greater than one-third of total labor and proprietors' income. And according to a recent study prepared by the Economic Research Service of U.S.D.A. approximately seven hundred counties nationwide were classified as "farming dependent", which is defined as any county in which at least twenty percent of labor and proprietors' income is derived from farming.[1]

Because farm activity is a significant source of personal income in almost one out of every four counties, BEA is attempting to improve these estimates through the systematic search for new or improved sources of input data, as well as the more effective use of existing source data through the development of better estimating techniques. To that end, this paper will briefly explain the current estimation procedures for county farm income (with emphasis on how they relate to the USDA State level farm income accounts); look at several of the problems associated with the undertaking of this task, and finally touch on current efforts to improve them.

RELATIONSHIP OF BEA ESTIMATES TO USDA STATE FARM INCOME ESTIMATES

BEA's county level estimates of farm labor and proprietors' income are closely linked, both statistically and conceptually, with the State Farm Income accounts prepared by the Economic Research Service(ERS) of USDA. After adjustments are made to account for definitional differences between the National Income and Product Accounts and USDA's farm income accounting standards, the component detail of the ERS State level estimates are allocated to the counties in proportion to each county's share of a related economic series. This use of the ERS State estimates as control totals in conjunction with the allocation procedure imports additional reliability to the county estimates because, as with most components of personal income, farm income can be estimated more reliably for States than for smaller geographic areas. It also permits, where necessary, the use of a different allocator, in each State, to distribute an estimate to the counties without impairing the interstate comparability of the estimates.

The major definitinal difference between the two sets of data relates to corporate farms. USDA Total Net Farm Income includes corporate farm income, whereas BEA, in its personal income series, measures farm proprietors' income, which, by definition, excludes corporate farms. BEA also classifies the salaries of officers of corporate farms as part of farm wages and salaries; USDA treats the corporate salaries as returns to corporate ownership and part of total returns to farm operators. This adjustment to exclude the net farm income of corporate farms (including officers salaries) is made for each State based on the proportional divi-

sion of the market value of sales between corporate and non-corporate farms reported in the census of agriculture, and is shown as an explicit line in the BEA Farm Income and Expenditures table in order to aid in the comparison of the BEA and USDA estimates.

A further difference between the two sets of estimates is the national capital consumption allowance for noncorporate farms. BEA adjusts the USDA estimates from a declining balance type of depreciation (used by USDA) to a straight-line depreciation (consistent with other components of the National Income and Product Accounts).

The final adjustment which is made to the ERS State Net Farm Income accounts is known as the Interfarm sales adjustment. This is perhaps the most noted but least understood difference between the two data series. Because interfarm, intra-State transfers are compensating items when the State accounts for both income and expenses are aggregated, the ERS excludes these transactions in its estimates of cash receipts from marketing livestock and expenses of livestock purchased. However, such transactions are not necessarily between farms within a county, and estimates of both income and expenses (equal at the State level) are made by BEA and distributed among counties by their respective county series. It is this adjustment which accounts for the difference in the levels of livestock cash receipts between BEA and ERS which raises so many questions.

The use of the ERS State Net Farm income accounts as a basis for the BEA county estimates of farm proprietors' net income is not without problems. The issue of excluding the net income of corporate farming from the ERS estimates is most troublesome. Currently, intercensal data on the legal

form of ownership of farms is, at best, hard to find.

Another problem BEA experiences in the use of the ERS estimates is the difference in the timing of the estimates. The State estimates of Total Personal Income, the farm income component of which become the State totals of the county estimates of farm income, are published in the Survey of Current Business prior to the publication of the ERS State Net Farm Income accounts in Economic Indicators of the Farm Sector: State Income and Balance Sheet Accounts. This often forces BEA to base its State estimates on provisional or partial ERS data. Since the availability of the different components of the farm income accounts varies from year to year, BEA is required to estimate the missing components using the previous year's State estimates. This places on BEA the additional burden of independently verifying questionable State estimates. Fortunately, the ERS staff members, and in some cases the individual State statisticians of the Crop and Livestock Reporting Service, are usually helpful in answering specific questions posed by BEA. The BEA State estimates of farm proprietors' net income are revised whenever possible to reflect the final ERS State farm income estimates prior to their use as controls for county estimates. Revision schedules can create additional problems. The Local Area Personal Income estimates are revised in relation to revisions in the National Income and Product Accounts, rather than in response to revisions in individual input data series. For example, in the current estimating cycle, ERS is revising its data in order to benchmark on the 1982 Census of Agriculture, whereas BEA must wait to incorporate census data until the comprehensive revision of the National Income and Product Accounts is completed later this year. Until then BEA's estimates for its most current year group must be considered preliminary.

SOURCES AND METHODS OF ESTIMATION

The methods used to estimate farm proprietors' net income at the county level rely primarily on data obtained from the periodic censuses of agriculture to distribute the component detail of the USDA State farm income accounts, after definitional adjustment. These data are used either directly as elements in the allocation procedure as described earlier, or indirectly as benchmark distributions for other sources of sub-state level data that are available. When direct use is made of the census data, intercensal distributions are obtained through the use of straight-line interpolation between census benchmarks. For the postcensal years, the most recent benchmark distributions are used to allocate the State totals for each year.

BEA obtains over one hundred different county data series representing approximately one-half million records of data from each census. These data are processed, analyzed and compared to data from previous censuses to ensure consistency of the data base over time. A major limitation in using census data in the county farm income estimates is the lack of timeliness. From the time the census is actually taken, through the Bureau of Census data entry, verification, processing and publication procedures and BEA's independent preparation of its estimates, there is a three and one-half to four year lag from the year of reference before these data are actually incorporated into the personal income series. During this period it is possible that major distributional changes have occurred, seriously undermining the usefulness of the census data for BEA's purposes.

While the census of agriculture is the most comprehensive source of county level farm data available, cutbacks in the last two censuses have sharply

reduced their usefulness for BEA's purposes. The most noteworthy of these reductions in data has occurred in the area of production expenses. Since the census began collecting information on selected current operating expenses only, BEA has been forced to rely on indirect data series to distribute the remaining detailed components of production expenses. The reliability of this procedure is further weakened by the lack of a measure of total production expenses which could serve as a ceiling for the sum of the estimated component detail in each county. The loss of adequate production expense data has seriously weakened the quality of BEA's county estimates of production expenses and by extension the estimates of net farm income. Other shortcomings in the census data, such as the lack of receipts data for small but locally important commodities such as rice, barley and forest products further limit its usefulness in the estimation of county net farm income.

Sub-state level data which is available from other sources is incorporated into the estimation procedures wherever possible. The Agricultural Stabilization and Conservation Service (ASCS) of USDA provides BEA with the administrative records of total program payments to farmers by county on an annual basis, as well as special tabulations of payments to farmers under the Payment-in-Kind (PIK) program for the past two years. Select annual county data on crop production by commodity and livestock stocks are obtained from the Statistical Reporting Service of USDA and used in the estimation of value of inventory change by county. The comprehensive nature of this data along with its quality and annual availability make it attractive for expanded use in the future. The State statistical offices of the Crop and Livestock Reporting Service in eighteen States[2] independently estimate some measure of cash receipts from marketings or value of production by county. These data are

invaluable in the calculation of the cash receipts components of gross farm income. Unfortunately, the number of States making these estimates varies on a year-to-year basis, usually dependent upon budgetary resources. BEA encourages the collection of these data wherever possible. Finally, BEA acquires wage and salary data by county from the federal FS-202 tabulations which represent administrative records from each State's unemployment insurance (UI) program. While the UI coverage of firms in agricultural production is generally quite poor, in six States the coverage is judged to be relatively complete.[3] The wage and salary data from these States is incorporated into BEA's county estimates of farm wage and salary income.

ONGOING RESEARCH

The methods used to estimate farm proprietors' net income at the county level are conceptually straightforward. It is the lack of annual sub-State level data that is the problem. In an effort to compensate for this scarcity of data, BEA maintains an on-going research effort to identify and evaluate new data sources and develop methods which improve the utility of existing data. Currently BEA is working with the Bureau of the Census to improve the content of the 1987 Census of Agriculture for our needs. Initial indications are that BEA has had some success in reinstituting the collection of some crucial data items in the 1987 Census in the areas of total production expenses and farm related income. However, final determination of which of these questions will be included will not be made by the Bureau of the Census until a later date.

BEA has also followed closely the development of the Farm Cost and Return Survey conducted jointly by ERS and SRS each year. We are especially supportive of the need to expand the survey sample to allow for the stratification of data by State. In particular, State information on the legal form of ownership of farms would permit BEA to make a major improvement in its estimates of corporate farm income, perenially one of our most serious estimating problems.

Although a substantial amount of farm data is reported to the Internal Revenue Service, it has been of limited use for county income estimation. However, in the face of continuing reductions of source data, interest in testing these IRS data as intercensal indicators of farm income and expenditure levels has resurfaced. As an outgrowth of an interagency cooperative agreement with IRS, BEA tabulates annual data from Form 1040, Schedule F on farm income and expenses. If time and resources permit, a comparison of IRS data with other existing data series could be undertaken to evaluate its usefulness in

the estimation of specific components of production expenses, similar to the research conducted at ERS by Richard Simunek and others.[4] Serious obstacles in the areas of accounting methods and coverage of small farmers would have to be overcome prior to any substantial research. Furthermore the tax concepts of income and deductions are not comparable with national income accounting concepts, making this data, at best, a long shot for incorporation into BEA's estimation methodology.

One other area in which BEA attempts to compensate for the lack of sub-State agricultural data is in the encouragement of external evaluation of our estimates of farm income and expenditures. By requesting the help of interested individuals, BEA hopes to obtain review and constructive criticism of its estimates, but more importantly, some insight into the geographic and structural changes in agriculture that effect farm income at the county level. As part of a Federal/State cooperative effort, the estimates of personal income and related series are distributed by BEA to a group of 187 universities and State agencies officially designated as BEA users. The group, which was created by congressional directive, receives a set of standard tabulations of BEA's data on a no-cost basis. The user, in turn, agrees to distribute the estimates within its State. These state agencies and university bureaus of business and economic research, including such agriculturally oriented groups as the Departments of Agricultural Economics at North Dakota State and Oregon State Universities, use personal income and related estimates, such as farm proprietor' net income, in carrying out a wide range of regional economic research. Their feedback is invaluable in providing assessments of BEA's sources and methods of estimation.

It is hoped that the membership of the AAEA working in the area of community or rural development would likewise provide a forum for the evaluation of BEA's

farm income and expenditure estimates. By presenting information on the sources and methods used to develop these estimates to interested groups such as the AAEA, BEA seeks to assist users in evaluating the usefulness of these data for their specific purposes, while at the same time expanding our outreach program to include agricultural data users whose observations can be incorporated into later revisions of the data. BEA is currently making available to AAEA members a set of farm income and expenditure tables for their use and comment.

BEA's FARM INCOME AND EXPENDITURES TABLE

In order to provide as much information as possible on the components of net farm income and at the same time provide the user of BEA's farm income estimates with a basis for assessing the data , BEA makes available by request, a fairly detailed farm income and expenditure table for each State and county in the nation (see table). This table is prepared to show the derivation, and underlying component detail of farm labor and proprietors' income in such a way as to provide a context against which the summary estimates of farm income, and, by extension total personal income can be evaluated. At the same time, by providing an array of data for each State and county rather than just a single estimate, BEA allows the user to select that data item (or items) which are most appropriate for their particular use.

The level of component detail which is made available in the Farm Income and Expenditures Table is determined by the detail provided by the census of agriculture, the primary source of agricultural data at the county level. At the present time, eight individual components of cash receipts, along with the total livestock and total crops aggregates, are available. Additional detail for cash receipts will become available upon the incorporation of the 1982 Census of Agriculture. Total government payments and other farm income, including imputed income items such as gross rental value of dwellings and home consumption, make up the remainder of gross farm income. In the area of production expenditures, several of the major current operating expenses are delineated, however the greater part of expenses, including depreciation, interest expense and taxes are aggregated into an "all other" category. Estimates of value of inventory

19-169) STORY, IOWA

FARM INCOME AND EXPENDITURES
(THOUSANDS OF DOLLARS)

ITEM	1978	1979	1980	1981	1982	1983
CASH RECEIPTS FROM MARKETINGS	84,661	93,696	111,297	111,256	106,189	96,433
TOTAL LIVESTOCK AND PRODUCTS	40,498	40,795	40,685	42,545	45,311	40,565
MEAT ANIMALS AND OTHER LIVESTOCK	36,392	36,550	36,162	37,549	40,443	35,748
DAIRY PRODUCTS	1,318	1,469	1,680	1,864	1,859	1,857
POULTRY AND POULTRY PRODUCTS	2,788	2,776	2,843	3,132	3,029	2,960
TOTAL CROPS	44,163	52,901	70,612	68,711	60,878	55,928
TRUCK CROPS AND MELONS	59	67	59	65	66	62
FRUITS, NUTS, AND BERRIES	(L)	(L)	(L)	51	57	59
GREENHOUSE AND NURSERY PRODUCTS	127	153	152	122	124	136
FOREST PRODUCTS	(L)	(L)	(L)	(L)	(L)	(L)
ALL OTHER CROPS	43,935	52,640	70,331	68,441	60,599	55,638
OTHER INCOME	21,656	11,565	13,738	15,594	18,167	24,618
GOVERNMENT PAYMENTS	12,355	792	562	565	3,159	11,805
IMPUTED INCOME AND RENT RECEIVED	9,301	10,773	13,176	15,029	15,008	12,813
PRODUCTION EXPENSES	89,796	96,915	108,642	113,772	113,415	103,324
FEED PURCHASED	11,068	10,709	11,599	12,376	11,153	11,930
LIVESTOCK PURCHASED	12,027	12,806	11,305	8,326	8,614	7,093
SEED PURCHASED	3,081	3,224	3,677	4,152	4,105	3,358
FERTILIZER AND LIME PURCHASED	6,073	6,971	9,215	9,723	8,045	5,624
PETROLEUM PRODUCTS PURCHASED	3,006	3,805	4,846	5,571	5,139	4,703
HIRED FARM LABOR EXCL. CONTRACT LABOR	3,366	4,024	3,342	3,873	4,485	3,769
CONTR. LABOR, MACHINE HIRE + CUSTOM WORK	1,544	1,826	1,835	2,294	2,298	1,739
ALL OTHER PRODUCTION EXPENSES 1/	49,631	53,550	62,823	67,457	69,577	65,108
VALUE OF INVENTORY CHANGE	6,736	8,873	-10,237	8,018	-5,151	-25,922
LIVESTOCK	-562	477	381	-755	-1,213	-601
CROPS	7,298	8,396	-10,618	8,773	-3,938	-25,321
DERIVATION OF FARM LABOR AND PROPRIETORS' INCOME:						
TOTAL CASH RECEIPTS AND OTHER INCOME	106,317	105,261	125,035	126,850	124,356	121,051
LESS: TOTAL PRODUCTION EXPENSES	89,796	96,915	108,642	113,772	113,415	103,324
REALIZED NET INCOME	16,521	8,346	16,393	13,078	10,941	17,727
PLUS: VALUE OF INVENTORY CHANGE	6,736	8,873	-10,237	8,018	-5,151	-25,922
TOTAL NET INCOME INCL. CORPORATE FARMS	23,257	17,219	6,156	21,096	5,790	-8,195
LESS: CORPORATE FARMS	2,596	2,130	322	2,390	240	-1,823
PLUS: STATISTICAL ADJUSTMENT	0	0	0	0	0	0
TOTAL NET FARM PROPRIETORS' INCOME	20,661	15,089	5,834	18,706	5,550	-6,372
PLUS: FARM WAGES AND PERQUISITES	4,035	5,048	4,314	4,935	5,716	5,057
PLUS: FARM OTHER LABOR INCOME	99	107	93	119	142	127
TOTAL FARM LABOR AND PROPRIETORS' INCOME	24,795	20,244	10,241	23,711	11,408	-1,128

/ INCLUDES REPAIR AND OPERATION OF CAPITAL ITEMS; DEPRECIATION, INTEREST, RENT AND TAXES; AND OTHER MISCELLANEOUS EXPENSES.
L) LESS THAN $50,000. ESTIMATES ARE INCLUDED IN TOTALS.

REGIONAL ECONOMIC INFORMATION SYSTEM
BUREAU OF ECONOMIC ANALYSIS

APRIL 1985

change are shown for total livestock and total crops. The remainder of the table is made up of summary components derived from the underlying detail and presented in such a way as to enable the user to follow the calculation of the total farm labor and proprietors' income estimate. These sub-totals include realized net farm income (also known as net farm income before inventory adjustment), total net farm income including corporate farms, farm proprietors' net income, farm wages and salaries and farm other labor income. Each of these items individually provides the user with a unique focus for analysis. When combined together on the farm income and expenditure table with the underlying detailed components, they are meant to present a statistical profile of the farm economy for each respective State and county.

The BEA State and county farm income estimates are available in the income and expenditure table format as a consistent time series from 1969 forward to 1983 (with estimates of 1984 currently underway). These data are provided over an extended time period to enable users to observe the changing patterns of economic activity of the farm sector in a given geographic area. Likewise, since the sources and methods which go into the estimates are consistent across the nation, these estimates provide a base from which inter-county comparisons of farm activity can be made in a timely fashion,an analysis that could not be made if only a single summary estimate of net farm income were presented.

CONCLUSION

The wide use of BEA's annual estimates of Total Personal Income for the States and counties of the nation dictate that we make the most reasonable, accurate measure possible of all of the components which make up personal income, including farm proprietors' net income. While we recognize the need for more and better annual county farm data, we believe that our current method yields an acceptable measure of non-corporate farm economic activity at the county level. While there can be no argument that these estimates can be improved, BEA is taking the initiative to identify the areas needing improvement, and to attempt to resolve the problems. However, the users of farm income data must do their part as well. A symposium was held at the AAEA meetings in Ithaca, New York last year on the role of users in improving federal statistics. The theme of that meeting was that the federal agencies that produce statistical data need a continual flow of feedback from users in order to provide the most valuable product possible. BEA is no exception to this rule. We attempt to aid the users of our data by making available the most detailed estimates of farm economic activity available at the county level. In return we ask for their help in advising us how to make these estimates better.

NOTES

[1] Green, Bernal L., and Thomas A. Carlin. Agricultural Policy, Rural Counties, and Political Geography. Economic Development Division, Economic Research Service, U.S. Department of Agriculture. May 1985. ERS Staff Report No. AGES850429.

[2] Alabama, Arizona, California, Delaware, Hawaii, Illinois, Kansas, Kentucky, Nebraska, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Utah and Wisconsin.

[3] Arizona, California, Delaware, Florida, New Hampshire and Rhode Island.

[4] Simunek, Richard W. and Lise Poirier. Comparing IRS Farm Data Trends With USDA Measures of Farm Income. National Economics Division, Economic Research Service, U.S. Department of Agriculture. May 1983. Publication No. ECIFS2-1.