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CHAPTER 12

OF THE HANDBOOK ON RURAL HOUSEHOLD, LIVELIHOOD AND WELL-BEING: STATISTICS ON RURAL DEVELOPMENT AND AGRICULTURE HOUSEHOLD INCOME.

Paper submitted by the Task Force
on Statistics for Rural Development and Agriculture Household Income**

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XII MEASUREMENT AND COMPOSITION OF FARM HOUSEHOLD WEALTH

XII.1 Introduction

Wealth and the means by which farmers accumulate it have been of interest to policy officials, farmers, lenders, academics, and those with an interest in farming and rural affairs for many decades. In a 1923 American Economic Review paper, Gray reported an estimate of the net worth of farmers (Gray). This paper, prepared over eight decades ago, employed the traditional balance sheet accounting formulation: assets equal liabilities plus owner equity. Gray prepared an assessment of farm assets and liabilities to estimate net worth as the difference between assets and debt. Included in the measurement of assets were farm real estate, livestock, implements, crops on hand on January 1, the value of growing crops, and other items of farm capital such as supplies on hand and cash needed to run the farm. Farmer liabilities included the farm mortgage and debts other than those secured by real estate. Making this paper relevant to current considerations of household wealth measurement, Gray recognized that a complete accounting of wealth required an estimate of non-farm assets, and personal loans for such items as food and clothing. To estimate the net worth of farmers, Gray moved beyond the farm business to recognize personal and household assets and liabilities.

In the United States balance sheet accounts were established for the farm sector in 1945 (USDA, 1945). Like Gray, the USDA balance sheet highlighted the need to include information for both farms and farm households. Thus, a consolidated balance sheet that included both farm and household items was developed. In 1980, USDA created a new balance sheet account that separated the farm business and operator households. The balance sheet created in the 1940's treated the household and the farm business as a single entity. By 1980, USDA recognized that many farmers were less dependent on farm income than previously. Likewise, household assets and income were influenced by factors outside the farm sector.

In this chapter, we discuss uses made of wealth measures for farms and farm households. We then highlight why estimates of net worth for farms are not synonymous with estimates of net worth for households that control farms. This is followed by a discussion of what is included in wealth measures developed for farm households. The chapter concludes with a discussion of some added insights gained from wealth measurement as a companion indicator to household and business income statistics.

XII.2 Selected uses of farm and household wealth measures

With wealth estimates for farmers dating to the early 1900's, a key question becomes "why the long-standing interest in the development of measures of wealth for both the farm business and the farm household?" A summary of uses made of wealth measures for farms and farm households helps respond to this question.

There are at least three main uses of farm-level net worth information. The first addresses questions about asset ownership and management. Who owns physical assets, particularly land, and who is farming the land? This reflects the issue of who owns or controls agricultural resources and is important to assessment of changes in farm structure. A variety of public policy issues may arise from trends in asset ownership, including potential barriers to entry for farmers. Many of the benefits and costs of government policies are tied to asset ownership or control. Links between public programs and asset ownership raise issues about the distributive effects of government policies. A second use centers on the financial position, or solvency, of businesses and, when combined with income, establishing measures of business profitability and liquidity. When farms confront eroded asset values relative to debts or when they have insufficient funds to meet debt service commitments, farm failures may arise and erode the quality of lender portfolios. Spill-over of farm problems into the lending sector can affect rural communities more broadly, especially if banks begin to close or if they are unable to meet commitments to non-farm customers. A third use of farm wealth data focuses on access to credit. Of interest in the U.S. is the availability of credit and financial services to small and beginning farm businesses. Information about the farm balance sheet, particularly lender market shares among sizes of farming operations, and net worth helps inform this issue.

Measures of farm household net worth have several uses in estimation and analyses of household economic status and wealth management issues. These include: (1) providing information about assets which are an income source and debt which requires an expenditure from the household; (2) giving a measure of economic resiliency or the ability to withstand unanticipated financial shocks, including a potential source of funds to support consumption; (3) providing insight, based on the composition and accumulation of holdings, into how farmers build wealth ; (4) establishing a capital stock to underpin decisions about retirement, financial security in later life, and the transfer of assets to a new generation of farmers; and (5) giving a basis for deriving more comprehensive measures of household economic well-being than can be attained through use of an income indicator alone.

As a source of income and expenditure of the household, assets and debts affect both the credit and debit sides of the household income statement. Assets are a source of property income in the form of interest, dividends, and rents. Assets may also be a source of service-related earnings of the farm holding that are in addition to income from production of agricultural commodities. Interest paid on debt is an expense, which may belong to the farm or to the household depending upon where debt is held. Taking into account the debt position and income level of the household may dramatically alter perspectives about the debt service capability of a farm business. Off-farm incomes of households, including property income, may make debt service commitments look less problematic than they would if made on the basis of farm earnings alone (McElroy et al. 2002). But, household debt for nonfarm purposes may also expose farm businesses to potential financial difficulty. Moreover, if a large share of household income is devoted to debt service, households have fewer resources for purchasing goods and services (Dynan et al. 2003). Knowledge of the full set of assets and debts at both the farm and household levels, and total income

from all sources is necessary to accurately evaluate business and household solvency and to assess the ability of each to meet its financial commitments.

In addition to providing a potential source of property income and influencing debt status, measures of net worth provide a portrait of the economic resources available to households at a given point in time (U.S. Bureau of the Census 2003, Dept. of Comm. 1994).

Wealth is a measure of the level of financial or economic resources that a household and its members have available at a given point in time.

Wealth provides a capacity to draw down assets to generate an infusion of funds to sustain consumption response to an unanticipated economic or financial shock or to respond to a new business opportunity. Given that farm households, on average, spend a large portion of available work time and other resources participating in off-farm activities, shocks can emanate from either the non-farm or farm sectors of the economy, as well as from a wide variety of household events. The ability of a household to adjust to a financial or economic shock may be enhanced by the ability to sell, lease, or re-deploy assets such as land or other capital.

Composition of a household's portfolio may affect how it responds to changes in government policy or some other event. For example, a household that owns only machinery and equipment and leases land would not benefit from rising land values. In fact, if rents rise because of higher land values, the household may face higher costs and lower incomes. Meanwhile, households that own land may see their net worth rise. Of course, it is also possible, as the widespread U.S. farm financial crisis of the 1980's illustrated, for land values to erode leaving farms and their controlling or ownership households in a difficult financial position, if not bankrupt. Knowledge of the composition of household net worth provides a basis for evaluating how effects of public policy or changes in the farm economy may be transmitted throughout the farm sector and rural areas.

In addition to accumulating wealth as a precaution against financial shocks, households also save to support financial security in retirement. Information about net worth and its composition may help identify segments of the farm community that may encounter difficulty in sustaining consumption and meeting basic needs without significant on-going sources of income from earnings or from transfers from government or other sources.

Wealth measures are also important to understand household economic well-being. Aside from using assets or wealth in current production or to generate income in the form of interest, dividends or rents, a household can also realize gains or losses from the sale of assets. Even if not sold, household wealth could be converted to an annuity value and combined with income to provide a more robust estimate of consumption that household resources could support if assets were converted to cash.

Hathaway makes this point by noting that, "changes in real wealth due to changes in asset values have much the same characteristics as current income in that they can be saved (i.e., used to increase net worth) or they can be consumed (via sale or borrowing) without decreasing net worth Hathaway,1963). Whether taking stock of performance or debt service capability, examining the ability to sustain consumption and provide for basic living needs, or deriving indicators of economic well-being, household wealth measures improve the perspective gained from use of income measures by themselves or from use of farm business measures alone to examine the economic status of farm households and their members.

XII.3 Differences in wealth measurement for farms and farm operator households

Farm households can be defined in a wide variety of ways. For example, in the U.S., a farm household is defined as the domicile of the primary operator of the surveyed farm establishment. This includes individuals living in the operator's residence who share financial resources of the farm operator. A shortcoming of U.S. farm household wealth collection through the Agricultural Resource Management Survey (ARMS) is that data are collected only for the primary operators of U.S. farms and their households. Ideally, data used to construct household wealth estimates would provide coverage for all households contributing assets and sharing in production risks. To provide the flexibility needed to classify households, data regarding the characteristics of households, household members, and the farms they operate are also collected. This enables households to be categorized into groups needed to address specific questions.

XII.4 Connection between farms and households in wealth measurement

Farm households accumulate wealth through a variety of avenues. One way is to consume less than is earned during a period of time. Another is through increasing asset values, due to changes in the conditions governing supply and demand for the asset or the goods and changes in the services associated directly or indirectly with the asset. A third way is through gifts, transfers or inheritances. The concept underlying the collection of data to measure wealth and wealth accumulation of farm households is that the farm can be separated from the households associated with farming. The farm business is viewed as an establishment, or an economic unit, that produces agricultural output or other goods and services. Operators of farms use assets acquired from households and other legal entities to generate output and contribute to value added within the economy (Figure 1). As business establishments, farms utilize assets provided by multiple legal entities, including households and other businesses. Likewise, farm households may decide to allocate their assets in a variety of outlets. The farm business may be only one component of the household portfolio.

Business linkages are not only important in establishing the flow of resources to the farm, but are also valuable in helping understand the distribution of farm

income and wealth. For example, of the 2.1 million U. S. farms in 2002, 209,000 rented land under a share-rent arrangement. Under typical share rent arrangements, this means that landlords also provided a share of operating inputs in addition to land. Yet, other farms are organized as partnerships or family corporations and over 50,000 grew commodities under a contract arrangement with another entity. The variety of business organizations and arrangements being used by farmers suggests that net worth of either the farm sector or farm businesses cannot be assumed to belong entirely to farm households. Data collection must discern whether all farm assets and liabilities accrue to a single, or primary operator's household (Figure 2). Meanwhile, households allocate their own resources to multiple uses. This means that measures of farm household wealth need to reflect portfolio decisions that reflect assets and/or liabilities outside the farm (Figure 3).

XII.5 Data to support estimates of household net worth

Farm households use a wide variety of livelihood strategies, saving, and investment choices. This means that both farm and non-farm sources of wealth should be considered in constructing estimates of household net worth. Each segment of the household balance sheet has its own challenges and can be inherently difficult to measure. Work with data for all U.S. households has demonstrated that wealth is not simple to measure (Bowles and Bosworth, Fries, et al.). Households typically have a list of assets and multiple sources of both business and personal debt (Table 1).

The Handbook recognizes that farm households may have multiple sources of farm and non-farm assets and/or liabilities. To help ensure accuracy and completeness of estimates, net worth measures should take into account both farm and non-farm sources of wealth. Estimates of net worth should also recognize that farm wealth may not be entirely owned by farm households.

Estimates of net worth for U.S. farm households can be developed from two major surveys: The Survey of Consumer Finances (SCF) and the Agricultural Resource Management Survey. The SCF is a cross-section survey conducted every three years by the Federal Reserve (Kennickell). Since the focus of the SCF is on household wealth, it contains detailed questions on financial assets, non-financial assets, and debts. The SCF contains limited information about linkages between farm businesses and their households. Sample size also limits its use in examining wealth for farm households. In 2001, the latest year available, fewer than 300 farm households were included.

The ARMS is an annual cross-section survey that contains information about the farm, the farm operator and his or her household. Income, consumption, and wealth are collected concurrently from the same sample unit. Estimates of farm household wealth produced by USDA rely on the ARMS since all types and sizes of

business operations are included along with the households of the primary or senior farm operator. SCF results provide a basis for comparing estimates of wealth for farm households derived from ARMS with estimates for all U.S. households.

To construct estimates of household net worth, data collection starts with the farm business. The goal is to measure the value of business assets by component, to identify liabilities, and to establish ownership and control of assets used in production. The largest and most important component of farm business assets, land, is valued by asking for the values of component parts. This is done for two reasons. One, dwelling values, especially the operator dwelling, are used to impute an annual rental value that becomes a part of estimates of income. Second, the value of land and buildings rented to, and rented from, others helps determine the amount of assets controlled in the business operation. The farm business balance sheet is completed by asking about other assets used in the business. Beginning and end of year values are determined for crops, livestock, production inputs, costs sunk into growing crops, and accounts owed the business. End of year values are collected for items such as tractors, machinery, trucks and cars owned by the operation. For trucks and cars, an effort is made to obtain the share of their value that is associated with the farm. End of year values of assets are used in constructing the business balance sheet. Change in value from beginning to end of year contributes to value added and to the development of an accrual-based measure of business income.

Farm debt is collected next, following the organization of a standard balance sheet. First, we ask about loans taken and repaid during a calendar year. Not all farms have loan balances. A large share of farmers use loan funds during the year, but repay them by year-end. Collecting information about intra-year production loans helps put interest expense reported for the farm into perspective. For the five largest loans, sufficient data are collected to estimate the amount of debt service on the loan. We also ask about the purpose of the loan, including the percent for farm purposes. These questions help align the estimate of farm debt with asset values and with business net income.

Once farm asset values and debt have been established, farm net worth is calculated by subtracting debt owed by the farm from total farm assets. When there are multiple farm households associated with a business, farm net worth is allocated among households to avoid overstating wealth estimates for any one household.

To complete an estimate of net worth for the household the values of non-farm assets and debts are collected. As with the farm business, the ARMS is designed to first ask about household non-farm assets. Non-farm assets are grouped into four categories: financial assets, business holdings, real estate, and other assets not reported elsewhere.

Asset values are followed by household debt owed outside the business. Like assets, debt is collected in four parts. ARMS obtains information about mortgages on the operator's dwelling. Dwelling values are included in the farm balance sheet if the dwelling is owned by the farm. If not a part of the farm, the dwelling is included in household assets and debt is reported as a part of household debt. The remaining debt questions ask about other real estate loans, debt associated with other businesses that

are not part of the farm, and personal loans such as credit cards, automobile loans, or any other household debts. Non-farm asset values combined with non-farm debt give an estimate of farm household net worth from non-farm sources. Household net worth is the summation of farm and non-farm components.

To facilitate collection of non-farm assets and debt, the respondent is not asked to report specific dollar amounts. Instead, respondents are asked to select from among 31 codes that reflect a dollar range. Codes for dollar categories have been used to report off-farm income, assets and debt, and consumption expenditures in ARMS since 1986. Experience suggests that reporting codes have made questions viewed as personal less intrusive to respondents and enumerators. As a result, there is little non-response on these items. Refusal codes also help distinguish between a valid zero and a known positive (but missing) value thereby improving estimates of household wealth. Codes for dollar categories have also been used in other data collections to help facilitate reporting of household wealth data (Jappelli and Pistaferri).

The Handbook recognizes that household net worth is the summation of farm net worth (assets minus debts) and non-farm net worth (assets minus debts).

XII.6 Extending analyses of household economic status and well-being

Measures of wealth can complement use of money or other income measures for evaluating business or household economic or financial performance. This section provides a discussion of how household wealth estimates can help extend analyses of household economic well-being based on income measures.

Capital Gains as Income. Household incomes may include income from property and transfers. Realized property income has typically been included in measures of household income as interest and dividends. Household assets, whether associated with their farm or in other forms, may be subject to gains or losses in value from a variety of macro- and micro- economic events, policies, or programs. Whether or how capital gains should be considered in measurement of farm or household income is open to discussion (Hottel and Gardner, Brinkman, Hill, Canberra Group).

At the household level, if net worth increases during an accounting period, the increase results from household savings, receipt of transfers, or changes in the marketable value of holdings. Given a similar starting point, households with increases in net worth are likely to be in a better longer-term financial position than are households with static or declining net worth. In examining well-being or longer-term variability of households, it may also be helpful to know whether a drawdown in

wealth levels was planned (making use of resources accumulated in an earlier period) or involuntary (the result of some shock).

While "The Expert Group on Household Income Statistics" (The Canberra Group) did not include the value of unrealized asset gains in either the ideal or practical measure of disposable income advanced in its report and recommendations, it did recognize that such gains could have a significant impact on household economic well-being (The Canberra Group). The Canberra Group noted that including an imputed income stream from these gains would provide additional perspective of the household's command over resources. The group also noted, however, that if the interest is in whether a household can meet its everyday needs, the relevant approach is to include only realized gains and losses on holdings. The Group recognized that collecting data needed to estimate capital gains through surveys would be difficult and would increase respondent burden. They recommended reporting of income estimates that included measures of capital gain in a satellite account.

The U.S. Census Bureau recently released a satellite account that extends money estimates of income for all U.S.households to include realized gains and losses (Denavas et al.). The Census Bureau has also begun recognizing the effect of including unrealized capital gains in measures of income, at least to the extent that including an annuity based on equity held in home ownership is reflective of property holdings.

Household Savings. Farming, as a predominately self-employment industry, faces a variety of business and financial risks. Business risk arises from changes in production or prices, while financial risk emerges from the fixed financial commitments of the farm. Savings help add to household wealth and provide a buffer or cushion to manage either planned expenditures, such as educating children, or unplanned events, such as crop failure or a medical problem confronting a household member. For both planned and unplanned events, savings provide a source of household liquidity. Also accumulated savings provide a source of financial security in later life when earned income typically is lower.

Savings are a flow measure over a defined period in contrast to wealth, which is a stock measure defined at a point in time. Savings can be measured in several ways (Juster et al. 1999, Mishra and Morehart, 1998). One way is to take the difference between household income and expenditures, establishing a direct link between household earnings and wealth accumulation. A second method is to sum new funds put into household assets with the amount of debt that has been repaid. Or, alternatively, savings can be measured as the difference in net worth during a period of time, revised to reflect gains or losses in asset values and transfers received by the household. Considerable difficulties have been recognized for use of both the second and third measurement methods in survey use (Juster et al. 1999).

Measures of Household Well-Being. An individual's economic status has been defined as command over the potential to consume goods and services (Hill). Measures of economic well-being that include all potential sources of income from the use of labor and owned assets have been calculated for households (Chase and

Lerohl; Carlin and Reinsel; Wolff, Zacharias, and Caner, May 2004; Wolff, Zacharias and Caner February 2004; Salant et al.). In this case, the ability to acquire goods and services is viewed as being reflected not only in the money income available to the household but also by the money that could be raised by converting the household's stock of assets to income. This could be accomplished in a variety of ways, including drawing down savings, selling assets, or borrowing with assets as collateral.

The ARMS has been used to jointly consider income and wealth in assessing the economic well-being of U.S. farm households. One approach involves qualitative categorizing of household income and wealth based on median non-farm household levels of income and wealth (McElroy at al. 2002, Mishra et al. 2002). Farm households were grouped depending on whether they had higher or lower amounts of income and wealth when compared with the non-farm household medians.

Another approach yields a quantitative measure whereby estimates of wealth are converted to an annuity and the annual equivalents of annuity payments are summed with estimates of annual money income. Challenges in determining an annuity value of wealth include decisions about what life expectancy, rate of interest, and measure of net worth to use. One problem in determining life expectancy for households is that when assets are owned by operators and another person or persons, it is difficult to decide whose life expectancy to use.

For example, in the U.S. information about farm household money income and wealth has been used to produce an index based on a two-dimensional measure of economic well-being. This is achieved through use of a formula such as the following:

Economic Well-Being Indicator = Household Income + Annuity Value of Net Worth

Formulas used to generate an annuity typically require the choice of a finite time horizon. One option is to assume that no household would consume assets at a rate that leaves household members in an impoverished state. The measure of net worth to use is also an important consideration. Farm households, like other self-employed households, own assets that provide the basis for generating current money income. To avoid double-counting, farm production assets and household durable goods are generally excluded from measures of net worth used in constructing composite well being indicators.

Farm Household Portfolio Composition and Liquidity. Liquidity is concerned with the ability of households to generate enough funds to meet financial obligations as they come due. It is measured by examining the farm and household balance sheets to determine whether current assets, if sold, would be sufficient to pay current liabilities. Financial analysts usually use the term "current" to mean some

relatively short period of time of up to a year. The relationship between current assets and liabilities provides an indication of the amount of internal capital farm households have available for business and household operation. With households allocating financial resources to farm and non-farm uses, an accurate perspective of the amount of funds available to the business to acquire a needed input, to handle an emergency, or to repay a short-term debt may require information about both farm and household sources of assets and liabilities.

Farm households maintain a varied portfolio of assets, however, farm assets, and particularly farmland, still dominate their balance sheets. With diversified household portfolios, the degree of solvency of farm businesses that can draw on household assets or liquidity may be under estimated by looking solely at farm business balance sheets. Non-farm net worth may be used to relieve farm liquidity constraints. The opposite situation can arise when farm equity is used as collateral for consumption or to fund non-farm enterprises. Moving from a business to a household perspective, composition of the portfolio indicates household's use of funds and funding priorities, particularly as they move through stages of the farm-family lifecycle.

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Wolfe, Edward N. and Ajit, Zacharias, and Asena Caner. Levy Institute Measure of Economic Well-Being Concept, Measurement, and Findings: United States, 1989, 1995, 2000 and 2001, The Levey Economic Inst. Of Bard College. May 2004.

Table 1. Average wealth of farm operator households by farm typology group, 1999

Item	Limited-resources	Retirement	Residential /lifestyle	Farming occupation /lower-sales	Farming occupation /higher-sales	Large	Very large	
Number of farms	127,738	297,566	931,259	479,925	175,370	77,314	58,403	2,147
Percent of farms	5.9	13.9	43.4	22.3	8.2	3.6	2.7	
Farm total assets	84,147	347,772	299,934	512,282	810,706	1,230,336	2,212,028	468
Farm total debt	6,590	7,002	28,398	32,561	109,313	205,558	442,800	49
Farm net worth	77,557	340,770	271,536	479,720	701,392	1,024,778	1,769,229	419
Operator household share of farm assets	83,600	336,644	290,023	485,049	747,020	1,103,458	1,799,418	435
Operator household share of farm debt	6,534	6,913	27,938	31,683	104,470	190,427	368,129	45
Operator household share of farm net worth	77,066	329,731	262,085	453,366	642,551	913,031	1,431,288	389
Operator household off-farm assets	66,752	218,860	236,907	161,769	132,167	199,793	259,502	198
Cash, money market accounts, etc	17,542	61,028	36,898	46,193	32,556	38,343	49,228	41
IRAs, Keough, 401K, etc	11,969	50,939	67,447	38,539	27,555	39,439	50,138	50
Corporate stock, mutual funds, etc	12,590	50,838	48,774	36,126	35,830	61,065	70,145	44
Other nonfarm assets	*24,650	56,055	83,788	40,912	36,225	60,945	89,993	62
Operator household off-farm debt	5,872	12,151	37,248	17,558	13,004	27,644	32,919	25
Operator household off-farm net worth	60,880	206,709	199,659	144,212	119,162	172,149	226,584	173
Operator household net worth	137,945	536,440	461,744	597,577	761,713	1,085,180	1,657,872	562

Source: 1999 USDA Agricultural Resource Management Survey.
* indicates that the standard error of the estimate is greater than 25 percent and less than or equal to 50 percent. 1

Figure 1. Modern Farms Use Inputs From a Variety of Sources Who in Return Share in Output and Income

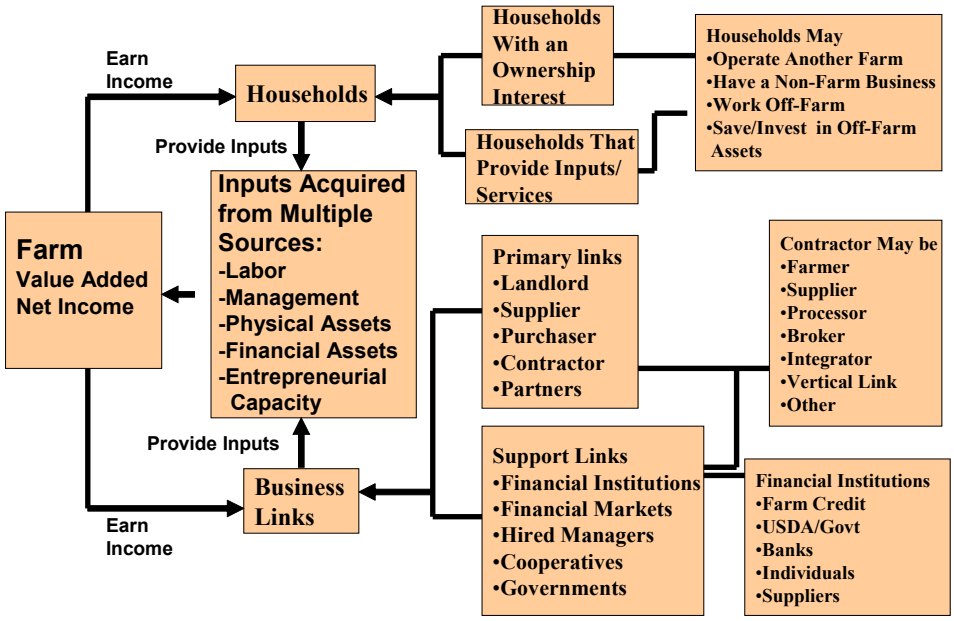


Figure 2. Households Share Farm Net Worth With Other Providing Inputs

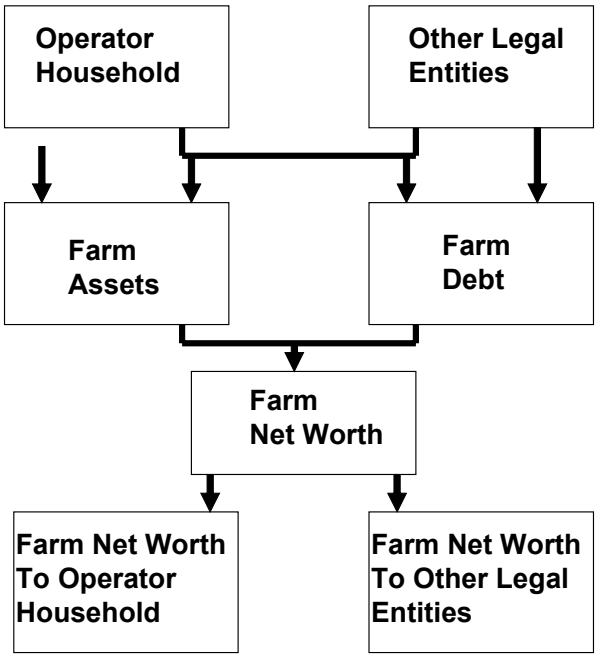
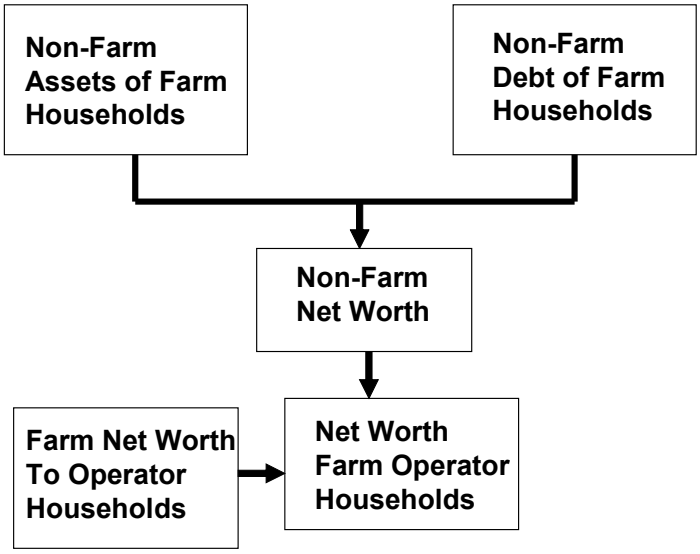


Figure 3. Operator Households' Net Worth Originates From Farm and Non-Farm Assets and Liabilities



XII.7 Measurement and composition of farm household wealth in developing countries

Household Enterprises

In most Living Standards Measurement Study (LSMS) questionnaires there is a module exploring the dynamics and activities of **non-agricultural household enterprises** (which, for simplicity, are referred to in chapter 18 in (Grosh and Glewwe 2000a) as "household enterprises"). This module gathers information on the portion of a household's income and employment derived from nonagricultural self-employment. More extensive versions of the module have also collected information on the involvement of household enterprises with credit (Vijverberg and Mead 2000).

Business assets are an important determinant of enterprise performance. Enterprise performance can be measured not only by labor productivity or by the absolute amount of income generated but also in terms of the percentage return to investments in the enterprise. And an enterprise's start-up and subsequent performance depend heavily on the entrepreneur's ability to acquire the assets needed to be competitive in the sector. If one of the purposes of a particular survey is to investigate the credit needs of small-scale private enterprises, it is important to collect information about business assets.

Business assets come in two forms: fixed assets and inventories. **Fixed assets** include land, buildings, tools, machinery, furniture, and vehicles used by the labor force. **Inventories** consist of raw materials, intermediate goods that need to be further processed, and finished products ready for sale. Current enterprise performance is determined by the business assets in use at the moment. Recent enterprise income can be analyzed using the current value of business assets. To analyze income over the past 12 months, more information is needed: the value of current business assets as well as sales and purchases during the past 12 months. Assuming that sales and purchases took place on average a half year ago, the typical **value of business assets** in use over the past 12 months may approximated by

[current value of assets] + [value of assets sold]/2 – [value of assets purchased]/2.

For land and buildings, one might also ask whether the enterprise made any expenditures on improvements; these may be counted as assets purchased. The usual quantity of inventories is difficult if not impossible to measure, hence the LSMS questionnaires ask only for current values.

For many purposes, the most important question about **fixed assets** is not so much what assets are owned by the enterprise but rather what assets it uses. An entrepreneur may rent, own, or borrow assets from a neighbor or relative or from another enterprise operating in the household. Experience with previous LSMS data sets indicates that a significant proportion (about one-fourth) of household enterprise owners report owning no assets, and those that do own assets often share them with household members or with

other household enterprises; this is particularly the case with vehicles. If an asset is shared, it contributes not only to the income of the enterprise that owns it but also to the income of other enterprises or to general household welfare. In light of this fact it is necessary to devise a way to account for the complex sources and uses of business assets (Vijverberg and Mead 2000).

The **China** Living Standard Survey (CLSS), 1995-97, gathers data on household non-farm businesses for the three most important enterprises operated by the household. It collects data on the ownership, type of business, investment and its sources for each enterprise. It also contains information on **assets** and inventory.

The **Côte d'Ivoire** Living Standards Survey (CILSS), 1985-88, collects information on the three most important businesses per household. Information on **the value of productive assets and stocks** is recorded.

The **Ghana** Living Standards Survey round four (GLSS 4) 1998/99 gathers information on **assets** of the non-farm enterprise and solicits information on 'net income and inventory of enterprise.'

The **Moroccan** Living Standards Survey (MLSS), 1990-1991, provides information on the identification of home enterprises; on fixed-place (home or shop) enterprises expenses; ambulatory enterprises expenses; enterprises with formal accounting procedures receipts; enterprises without formal accounting procedures receipts; capital and loans.

The **South Africa** Integrated Household Survey (SAIHS), 1994, asks about whether any member of the household own other property or a share of other property (e.g. business property); how much it is worth; and whether any rent is being received.

The **Vietnam**'s Living Standards Survey (VLSS), 1997-1998, collects information on ownership, sales and purchases of **assets** and other durable goods.

The **Zambia** Living Conditions Monitoring Survey (ZLCMS), 1996, asks about what assets the household own. This refers to **household assets** that are in good working condition and are used by the household in the production of goods services. In the event an individual is running more than three activities the respondent is asked to specify up to three of the most important business activities.

Agriculture

The agriculture module in the LSMS surveys includes only the activities of the farm that involve crop (annuals and perennials) and livestock production. It omits hunting, fishing, and gathering activities as well as the processing of agricultural products. Those activities can be treated as non-farm enterprise activities and should be included in the previously referred to household enterprise module of an LSMS.

The agricultural module has generally had several objectives: measuring **net income** from the household's production of crops and livestock; and measuring **the value of household agricultural assets** such as land, animals, and equipment etc. (Reardon and Glewwe 2000).

China provides information on different **agricultural inputs and agricultural assets,** e.g., farm machines and equipment.

Côte d'Ivoire records for each type of livestock the number of and value of **livestock** currently owned, the number of and value of livestock sold, purchased and lost over the past year and. It asks for a list of the main small **tools** used and owned by Ivorian farmers. It also asks for each type of **farm equipment** (not tools) such as tractors, carts, vehicles and draft animals, questions are asked about the value of the current stock.

Ghana covers **agricultural assets** such as land, livestock and equipment. The land referred to covers all **land owned** by the household whether for agricultural or non-agricultural purpose. This includes land rented out to other persons.

The **India** - Uttar Pradesh and Bihar - Survey of Living Conditions (ISLC), 1997-1998, provides information on livestock owned and **farming assets** owned.

Morocco asks about the size and current value of the land plots; the ownership and income of livestock; and agricultural equipment and loans.

Peru asks about whether any **agricultural equipment owned** and current sale or market value of equipment.

South Africa asks about the persons in the household having the right to use (have access to) any land for arable farming or for stock farming. It also asks whether the household own or farm with any **animals** or poultry of any kind. Furthermore, it asks both whether household own mechanised farm equipment or non-mechanical farm tools.

Vietnam collects information on household's control over different plots of **land of different tenures**. It collects information on **livestock, poultry and other animals** that are either consumed by a household or generate income. It collects information on **hand tools**, and information on **implements and farm machinery** owned by the household, and any rental revenues obtained from them.

Savings

The savings module is an essential part of a multi-topic household survey like the LSMS surveys. This module gathers data on **the value of the household's stock of financial assets**. Such data are necessary to accurately estimate **household wealth**. And the savings module can collect information on both the types of financial assets held by households and recent transactions in such assets during the period of the survey information that is directly relevant for analyzing household savings (Kochar 2000).

The savings modules in most multipurpose household surveys (including many LSMS surveys) typically collect information only on **financial assets and liabilities**. The data set generally includes information on the household's **non-financial assets** in other modules of the survey (Kochar 2000).

It is widely believed that **the low return on assets** in developing economies partly reflects the fragmented nature of capital markets and, hence, the inability of households to hold the assets that yield the highest rates of return. The level and especially the forms in which households save affect household incomes, particularly in countries where agricultural or non-farm enterprises constitute a major source of household income (This is the case in most developing economies).

Income from agricultural or non-farm enterprises reflects, in part, the household's **ownership of physical capital or "productive" assets** such as the machinery and tools

used in such enterprises. Investment in such assets represents an act of saving, thereby linking savings and portfolio choices to household income (Kochar 2000).

There are two alternative **ways to measure savings**: by subtracting consumption from household income and by observing changes in stocks of individual assets. Data on financial assets are best collected in the savings module. **There are difficulties inherent in each of the two ways of measuring savings.** A lack of data on important assets is a problem when measuring savings using data on asset transactions. And the difference between income and consumption does not always provide a reasonable estimate of savings, often because of weaknesses in the design of the income and consumption modules (Kochar 2000).

Data on stocks of assets are also necessary to estimate **household wealth**. Experience has shown that the accuracy of estimates of household wealth can be improved if households are asked about the value of different types of assets rather than being asked to provide an estimate of their total wealth (Kochar 2000).

China asks the household to to list different places (e.g., banks, credit union, loan to enterprises) to put away money which is not being used for a while, and to estimate maximum amount of money that can be taken from own assets in facing of some kind of disaster or need to build a new house.

Côte d'Ivoire records the total value of all savings.

Ghana collects information on loans, assets and savings information about the household's savings account and the current value of savings is collected.

The **Jamaica** Survey of Living Conditions (JSLC), 1997, included questions about how often the respondent saved, financial assets, and other assets.

Vietnam asks households to list different **types of savings**, if any. The respondent is also asked to total current value of all savings forms.

Credit

Not covering all of the sources and types of credit in a multi-topic household survey can lead to serious mis-measurement of credit use. Thus it is essential for surveys to ask questions about every conceivable source and variety of credit to ensure that the **full extent of credit use** is accurately measured. How well have previous LSMS surveys succeeded in covering all credit sources? Not very well. While basic **information on borrowing** has been collected in many past LSMS surveys, few surveys have included detailed questions about credit sources or even general questions about using supplier credit for productive purposes. Questions on the use of supplier credit have most frequently been found in inquiries about agricultural enterprises, but even in these cases very few questions were included (Scott 2000).

Another critical omission in most previous LSMS questionnaires was the purchase of **food on credit**, which is an important dimension of the analysis of not only credit but also consumption. Only the Pakistan questionnaire and, to some extent, the South Africa questionnaire included direct questions about this.

Analysis of the data from the few surveys that have addressed this issue in depth have shown that it is vital to include explicit questions about **the sources and types of credit** and about the purposes to which credit is put. Only when these questions are included will surveys yield enough data to give an accurate picture of total credit use (Scott 2000).

In past LSMS surveys it has been more difficult to assess the distribution of credit in a particular sector. Another drawback of past LSMS surveys is that they did not collect data on **credit use at the individual level**. This is a serious flaw in these data sets in terms of the analysis of credit issues (Scott 2000).

China collects general information on the number of different sources the household has ever borrowed money from; the amount of the loan, interest, collateral requirement, repayment schedule, reason for each time of borrowing, etc. The survey further gathers information on enterprise **debt and its structure** (e.g., bank loan, loan from collective or cooperative foundation, and private loan).

Côte d'Ivoire records the total amount of **loans** provided by the household to others, total amount **borrowed** from institutions or from other people.

Ghana obtains information on loans contracted or negotiated by the household in terms of money or goods.

India aims at ascertaining **the net debt position of the household**. The total amount currently outstanding that the household owes to others is also recorded.

Morocco asks questions about borrowing; lending; and savings.

Peru asks about the financial transaction undertaken in last 12 months; the amount of **loan** remaining to be paid.

South Africa asks whether any member of the household **owe cash or goods** to any institution or to an individual who is not a household member; the amount owed; and the monthly payment.

Vietnam collects information on the amount of **indebtedness** of household members to people or institutions outside of the household. If money or goods have been borrowed, or borrowed and repaid by any household member in the last twelve months, information is collected on those loans, including the source and amount of loan, interest, side payments, collateral, repayment schedule, reason for borrowing, and number of loans from the same source. It also collects similar information on the amount household members have lent to people outside of the household.

Conclusion

Notwithstanding some of the non-sampling measurement error problems, the descriptive presentation in this sub-section of the already existing measurement of rural household assets and liabilities, as captured by the multi-topic Living Standards Measurement Study household surveys carried out in a non-randomly selected small sample of developing countries, indicates that it is indeed feasible to construct an all encompassing rural household balance sheet (see table 2).

Table 1
Types of Credit Information Obtained by Selected LSMS Surveys

	Loans					Trade credit				
				By source			Non-agricultural		Other	
Country	Mortgage	All loans	Specific loans	Implicit	Explicit	Agriculture	enterprises	Food	consumption	Service
Ecuador 1994	○		●[a]	●						
Ghana 1987/8	○	●	●	●		●				
Ivory Coast 1985	○	●	●	●		●				
Kyrgyz Rep. 1996	○	●	●	●		●	●		●	
Peru 1985	○	●		●						
Pakistan 1991	○	●	●	●		●	●	●		
South Africa 1994	○	●		●	●			○	○	
Vietnam 1992/3	○	●	●	●		●				

● Indicates that the questionnaire contained thorough questions on this topic.
○ Indicates that the questionnaire partially covered this topic.
a. Only agricultural loan information was collected.

Note: This table only shows whether each questionnaire included questions asking if the household had obtained credit of a specific type. The table does not show whether the design of the questionnaire would yield the data necessary to calculate the size of the loan, the total cost of credit, or other loan terms.
Source: Relevant LSMS questionnaires.

Table 2
Rural Household Balance Sheet

Assets	**Liabilities and Total Networth (Owner's Equity)**
Current (liquid) Assets:	*Current Liabilities:*
Financial assets	Accounts Payable
The current value of all savings forms	
Cash / Currency	Sales Taxes Payable
Accounts Receivable	
Money or good lent to other institutions or people (outside household)	
Value of the crop output retained as seed (stock of grain)	Payroll Taxes Payable
Total Current Assets	Accrued Wages Payable
Inventories	Dividends payable
raw materials	Unearned Revenues
intermediate goods / products	Short-Term Notes Payable
	Short-Term Bank / Credit Union / Cooperative / Moneylender Loan Payable
(value of) unsold (finished) goods	
Total Investory	***Total Current Liabilities***
NON-FARM ASSETS	
Fixed (long-term / productive) Assets:	
land	***Long-Term Liabilities:***
buildings (business or commercial property)	Long-Term Notes Payable
tools	Mortgage Payable
machinery	Long-term bank loan
furniture	
vehicles	
Equipment	
Depreciation (Machinery)	
Durable (consumer) goods	
Housing	
Other durable consumer good items	
Total Long-term Non-Farm Assets	***Total Liabilities***

Table 2
Rural Household Balance Sheet (Concluded)

Assets	Liabilities and Total Networth (Owner's Equity)
FARM (Agricultural) ASSETS	Owner's Equity (net worth)
Agricultural inputs	Capital
fertilizers	Net Profit
herbicide and pesticide	Retained Earnings
diesel and gas	**Total Networth**
Agricultural land	
owned	
sales	
mortgaged	
rented/sharecropped	
rented out	
communal	
(value) quality of land	
Animals	
value of livestock	
value of poultry	
drafts animals	
Farm equipment	
tractors	
carts	
vehicles	
mechanical plough	
pump	
mill	
food processor	
trailer for truck / tractor	
bullocks	
tresher	
trolley	
fodder cutting machine	
generator	
Non-mechanical farm tools (implements)	
hoe	
spade	
Durable equipment for storage	
Total Long-term Farm Assets	
TOTAL ASSETS	**TOTAL LIABILITIES + TOTAL NETWORTH**

Source: UNECE.

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