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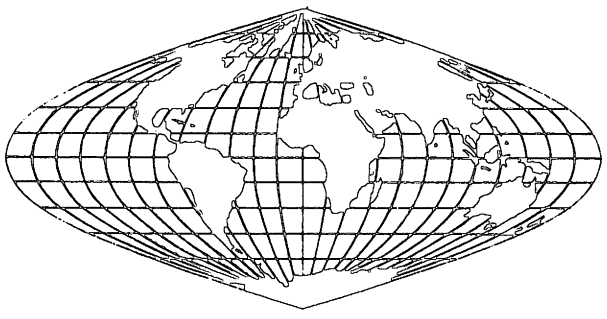

DEPARTMENT OF AGRICULTURAL ECONOMICS
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Introduction

Statistical surveys of household consumption behavior and its determinants figure among the most relevant information-gathering activities in which governments of developing countries can engage in their attempts to create the data base they need for policy planning. The objective of development policy is to enhance society's welfare through gradual removal of the constraints to well-being at the level of social groups and individual families. The identification of these constraints requires analysis of microdata regarding household income and the processes and causes underlying it on the one hand and on expenditures and consumption on the other.

From the economist's point of view, welfare levels are ultimately judged and goals defined in terms of consumption objectives. These may be expressed as a lump sum minimum income figure, a minimum basket of consumer articles, including food, or (appropriately in developing countries where the incidence of undernutrition is high) nutritional requirements. To understand how given, measurable welfare or consumption levels are attained by social groups and their household constituents, it is necessary to study the relationships between these levels and their determinants. The latter are chiefly income and family size, but income itself is a

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*A synthesis of thoughts regarding the problems of collection of expenditure data which are peculiar to partial subsistence economies, this paper is based on the author's experience in survey design and constitutes a reformulation and expansion of earlier reports on the subject. (Ferroni 1978, 79, 80).

"dependent" variable subject to variation due to changes in labor use in various activities and household resources. Family budget and consumption surveys must be designed to permit a causal analysis of the household economy. On the basis of a single, one-year data collection effort, it is then possible to obtain a comprehensive view of how households adapt their income and consumption activities to constraints and opportunities and to evaluate and predict quantitatively the welfare (consumption) effects of changes in household resources and market prices.

The use of household budget surveys thus designed exceeds the confines of demand analysis and the development of weighting factors for the various components of consumer baskets which are needed for construction and updating of consumer price indices. (These are the commonly cited objectives of household budget surveys.) A survey of household income and expenditures permits testing of numerous hypotheses concerning the nature and effects of socioeconomic change in a country or region. Population can be approximated closely by appropriate statistical design. The technical knowledge for data processing and criteria for evaluation of relative merits of alternative observation methods exist, and international experience in field observation of household income and expenditures is growing.

Nevertheless, questions remain regarding how best to enumerate these concepts. The literature on methodology of food consumption and expenditure surveys is voluminous and can be traced back several decades.[1/] However, the large majority of these writings limit themselves to the discussion of methods of collecting data on expenditures and consumption, paying little attention to the problems inherent in defining and observing household income. They also typically (if implicitly) endorse the traditional textbook separation of household production and consumption.

According to neoclassical utility theory, consumers purchase combinations of goods and services such that the marginal satisfaction derived from a dollar spent on any commodity is equal to that from any other commodity, while total expenditures add to income minus savings. Income is implicitly assumed to be wage income earned through the sale of labor in a competitive labor market. It is considered analytically exogenous. The theory of consumer behavior does not address the process of income formation.

In a fully monetized economy, employment patterns tend to be influenced by the organization of corporate production as much as the employees' income needs and the exchange of goods and services between producers and consumers is regulated by the market. The assumption of independence between production and consumption decisions and the treatment of income as an exogenous determinant of consumption are, therefore, justified in this situation. In partial subsistence economies, however, subsistence production equals subsistence consumption and (as argued, among others, by Chayanov, 1966) the intensity of peasant work is primarily a function of "sociophysiological" consumption needs. Hence, the assumption of independence between production and consumption decisions and the treatment of income as an exogenous variable are unfortunate in the analysis of partial subsistence family budgets. The survey design implication of this conclusion is that it is necessary to tackle the difficult task of observing and measuring income determinants so as to make possible analysis which goes beyond the evaluation of the somewhat tautological relationships between total expenditures and commodity consumption.

This paper constitutes a review of alternative methods for large-scale enumeration of income, expenditures and consumption of rural partial subsistence households. Many of the ideas formed here are a reaction to the

limited analytical potential, which is a result of the particular survey design employed, of the rural portion of the 1971/72 Peruvian National Food Consumption Survey (Encuesta Nacional de Consumo de Alimentos: ENCA). In the course of the analysis of this expensive large-sample survey it was concluded that, first, the length of the food-weighing period per family (7 days) was probably excessive, given the available evidence on the correlation between data reliability and survey duration and given the need to dedicate field time to the collection of information regarding income determinants. Second, the method used to obtain employment data (12-month recall) did not produce reliable results and third, attempts to measure family income failed because the family endowment of productive resources and agricultural production were ignored.[2/] Thus, this paper pays attention to the need to strike a better balance between enumeration of consumption and that of its determinants. However, no preferred enumeration method is singled out for recommendation, since that requires implementation and comparative analysis of methodological pilot field surveys.

The survey type under consideration is a large-sample, combined household budget, consumption and nutrition (BCN) study based on a single observation period not exceeding one week. In such a survey the potential to obtain data regarding family labor use and on-farm production is limited relative to that of small-sample, frequent-visit, studies in which investigators observe the same farmer's work during an entire agricultural cycle. In BCN surveys, cost considerations normally preclude observation periods exceeding seven days and multiple visits in different seasons which would afford researchers more time for questioning respondents regarding the annual makeup of their income. On the other hand, in BCN studies which last up to one week researchers dispose of considerably more field time

than they do in agricultural censuses in which complex information regarding farm production is typically solicited in an hour or less. Therefore, and because large-sample BCN surveys are needed for country-wide statistical inferences, it is worthwhile to discuss ways to enhance the potential of rural BCN surveys for economic analysis by adding variables related to the process of family income formation.

The Peasant Family Expenditure System

If income is more appropriately viewed as endogenous in the analysis of partial subsistence household budgets, it is necessary to specify on what variables it depends. Figure 1, a flow chart of the peasant family expenditure system, represents income (net production for subsistence and sale, off-farm wage earnings, rents) in functional dependence of farm assets, the family labor force and prices in the markets for inputs, outputs, consumer goods and labor.

This pictorial model applies to much of the population of so-called developing countries in both rural and urban areas, if these are delineated according to spatial density-of-agglomeration instead of type of economic-activity criteria. In Latin American cities, for example, it is not uncommon to find rural migrants who receive food from family plots tilled with or without the seasonal help of the migrants. Seasonal and permanent rural out-migration and hence the subsistence proportion of total income rise and fall with, among other factors, the business cycles in the monetary economy. More precisely, cycles in the industrial sector contribute to the level of agricultural and nonagricultural labor demand, as well as to the prices of principal wage goods. The responsiveness of peasant labor to macroeconomic exogenous price variables, which manifests itself in the variation of the proportion of on-farm to total work, has important

implications for the structure of demand, food consumption patterns and their nutritional welfare consequences. For empirical estimation of labor supply patterns and consumption consequences of changes in exogenous policy variables it is necessary to observe all of the components of the model in Figure 1 for a statistical sample of families.

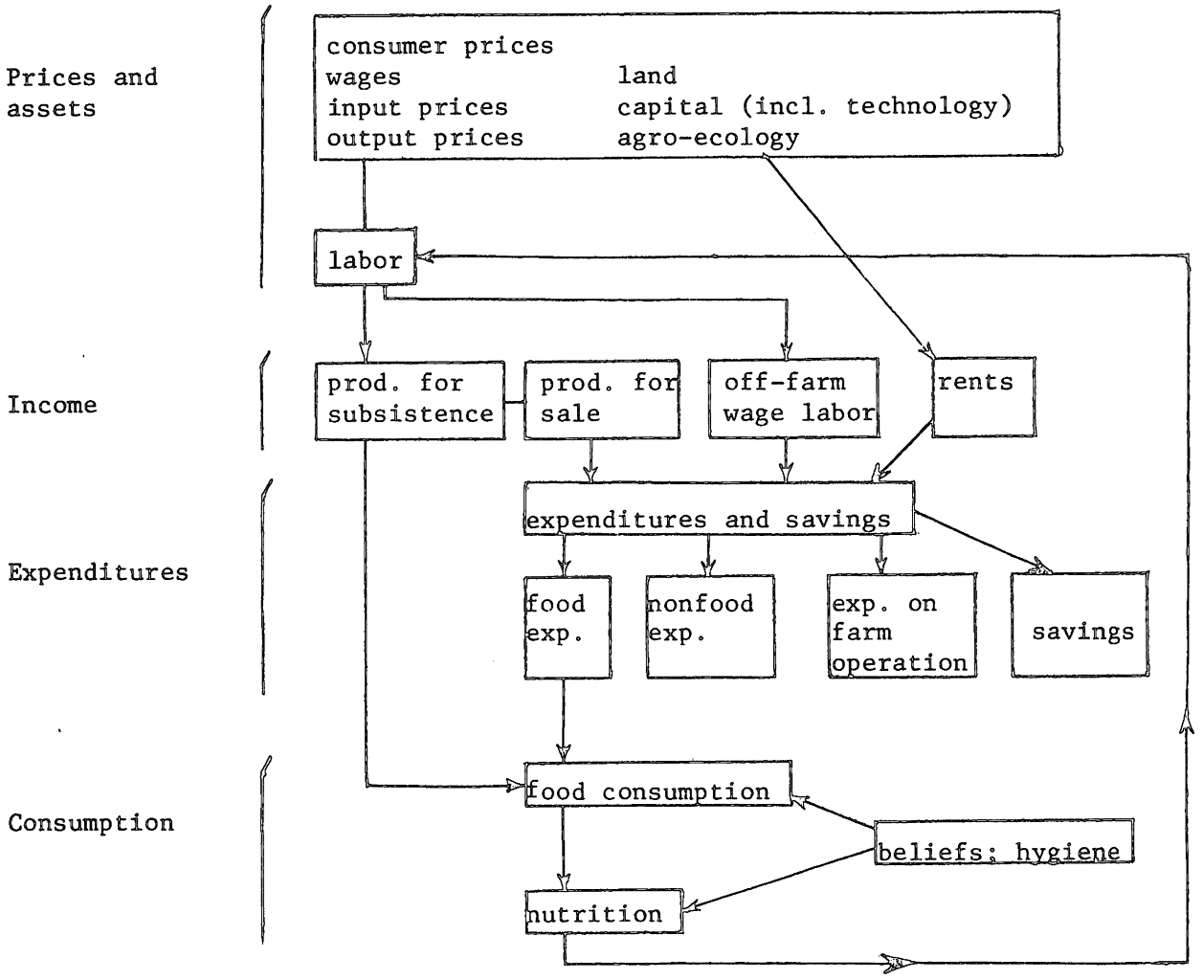
In the past, household budget surveys carried out in rural areas of developing countries have not been designed to cover on-farm employment and production. Labor use and production studies, on the other hand, have offered scant data on consumption. In this tradition, the Peruvian ENCA (total sample size, 8000 families) did not cover farm production and offered only limited information regarding on-farm and off-farm labor supply. Broad classificatory analysis of ENCA in terms of employment characteristics is possible, but the number of observations for which these data are missing or subject to ambiguous interpretation is large. Continuous quantitative analysis is therefore obviated. As concluded from interviews with a number of ENCA's enumerators, neither they nor the respondents had the stamina for in-depth covering of the employment and income part of the ENCA questionnaire which followed the monitoring of expenditures and consumption. Also, information on year-round employment of active family members was sought by means of seemingly straightforward questions regarding the place and type of jobs, as well as the income earned in each activity. Such questions, asked once, can hardly result in reliable information, since memory limitations and the fact that respondents have no particular interest in revealing their income sources lead to hedging the question, inventing answers and inadequate reporting of productive activities.

The ENCA survey contains an impressive amount of descriptive, quantitative information on the nature and extent of nutritional deficiencies in Peru and food consumption patterns and their variability across regions and social strata. But it hardly permits the development of typologies of target populations in terms of causal policy variables.[3/] The labor and production information summarized in Figure 1 can be collected in BCN surveys at roughly the same real cost which was incurred in connection with the ENCA survey.

Discussion of the problem of estimating meaningful income elasticities may suffice to illustrate the point that BCN surveys in which the full household model of Figure 1 is taken into account permit greater analytical depth than ENCA-type studies which focus essentially on expenditures and consumption. The latter type of household budget survey usually leads to the calculation of expenditure elasticities and there are theoretical reasons which apply in fully monetized economies and practical reasons which apply in all cases for substituting income by total expenditures in demand and consumption function analysis. The expenditure elasticity denotes the percentage change in purchases or consumption (whichever dependent variable is specified) of a particular commodity or commodity group, in response to a one-percent change in total household expenditures. If procedures which ensure additivity of marginal propensities to consume are followed in budget analysis, the distribution over all budget components of a change in total expenditures can be assessed for fully monetized households.

Expenditure elasticities calculated for partial subsistence households may lead to erroneous conclusions because of the implicit and usually unrealistic assumption that the expenditure or income subsistence ratio remains constant as total expenditures change. An increase in total expenditures may be due to an increase in subsistence production, cash transfers or

Figure 1. The Peasant Family Expenditure System



both. If total "expenditures" are raised in the form of added subsistence production, the following consumption adjustments are expected. All of the increment in subsistence production is by definition consumed. Consumption of certain other budget components may remain constant and that of substitutes of the subsistence commodities is likely to decline. In response to the increase in total "expenditures," conventional budget analysis based on expenditure elasticities will, however, show an illogical marginal propensity to consume subsistence commodities of less than one and an increase in the consumption of all noninferior budget components. Similarly calamitous conclusions are drawn from conventional budget analysis when total expenditures are raised in cash terms or in terms of both cash and kind in proportions different from those before the change.

To avoid these problems it is necessary to build on-farm production and wage labor behavior into the analysis of partial subsistence household budgets. Subsistence consumption is a function of on-farm production possibilities, wage labor opportunities, prices of purchased consumer goods and possibilities to sell farm produce. The consumption of purchased consumables depends on cash income, the level of subsistence consumption and, in the case of commodities not producible on the farm, prices. To accommodate the dynamics of these determinants, budget analysis under partial subsistence must be based on an integrated household production-consumption model in which constrained utility maximization is postulated to be subject not only to income, but also to restrictions on labor time and the household production function, the arguments of which include farm assets and levels of variable inputs determined by their market prices. The author is currently engaged in research directed at operationalizing this approach. To this day, few theoretical and (due to the data constraints discussed above) even fewer empirical analyses of partial subsistence family budgets have been

carried out. Lau et al. (1975) and Barnum and Squire (1977) are among the basic references. In the remainder of this paper methodological considerations pertaining to the collection of data needed for partial subsistence budget analysis are discussed.

Monitoring Expenditures, Consumption and Nutrition

The main dependent variables in BCN surveys are purchases, consumption of food and nutritional status.[4/] Purchases are defined as expenditures on food and nonfood commodities and services incurred by members of the household or otherwise designated persons during a specified period of time. Nonfood outlays include expenditures on farm operation and maintenance. In order to permit evaluation of actual demand, purchases of food are monitored not only in monetary but also in physical quantity (kg.) terms. Food "purchases" include subsistence or home-grown produce, as well as food obtained through barter. Subsistence and barter produce is valued at locally and seasonally prevailing market prices. Thus, food can enter the household through a variety of avenues. True purchases, subsistence (including scavenging) and barter constitute the three major food sources in the rural household. Gifts and donations sometimes form a fourth source which is, however, not counted among "purchases," since the inflow of donated food into the household is not associated with a commemsurate outflow of money or produce or the application of labor and other inputs to family farm land. Donated food is not an analytical category in the analysis of household budgets. But the quantities of it which enter the household must be measured because of their impact on consumption and nutrition.

Consumption is the use made by the members of the houshold of commodities purchased or otherwise obtained. Rigorously, food consumption

is ingestion, i.e., purchases (including subsistence and bartered produce) plus donations minus waste, inedible portions and leftovers. The weight "as purchased" of a food item is its gross weight which includes both edible and inedible parts of the commodity. The edible portion (net weight) equals the weight "as purchased" minus inedible or customarily uneaten components (bones, peels, excess fat). The actual intake (ingestion) equals the edible portion minus waste and leftovers.

Whereas physical quantities of purchases and consumption are both observed in the field, nutritional intake is calculated ex post as the sum of the food energy and nutrients contained in the consumed quantity of individual food items.[5/] The contribution of each food commodity to total nutritional intake is assessed via the multiplication of the quantity consumed of the commodity by its unit energy and nutrient content, where the latter is derived from direct chemical analysis of an aliquot or (more frequently) from published food composition tables. Nutritionists are interested in both the relative contribution of key commodities to total nutritional intake and apparent nutritional status (as well as the incidence of nutritional deficiencies) determined by means of the qualified comparison between total intake of calories and nutrients on the one hand and "requirements" for these nutritional principles on the other.

Purchases and consumption can be self-enumerated (diary keeping) or recorded by an interviewer. However, the former method is not usually practical in developing countries because of high prevalence of illiteracy and undeveloped communications networks.

With either type of enumeration, purchases and consumption can furthermore be monitored by recall (past purchases and consumption) or by direct observation and recording.[6/] Nutritionists distinguish between the

quantitative and the qualitative recall. In the first type of recall interview an attempt is made to obtain actual quantities of foods purchased and/or consumed. Respondents are usually asked to express quantities in terms of common household measures (spoons, cups, etc.) of known volume. Another approach is to derive physical amounts on the basis of expenditures and unit prices. Average, published coefficients are used to convert total food to the edible portion. In the second type of recall interview, qualitative information regarding diet composition and the frequency of consumption of various food commodities is sought. This information is adequate to test certain hypotheses regarding family or community food behavior but does not permit evaluation of purchases, consumption and nutritional status. Hence, only the quantitative recall is of interest as a potential data collection method in BCN surveys.

Direct recording may take the form of rigorous weighing of gross and net quantities or it may consist of the quantification of purchases and consumption by estimation, for all foods, of the number of household measures of known volume filled.

Decisions regarding (a) recall versus direct observation, (b) the length of the observation period in direct-observation surveys and of the reference period in recall surveys, and (c) weighing versus use of household measures in direct-observation studies depend on the comparative reliability and validity of the measurements obtained by these enumeration methods, the burden on respondents, costs of field work and data processing and appropriate data accuracy for given analytical needs. Reliability refers to reproducibility of measurements obtained by a given method, whereas validity is the degree to which the actual measurements respond to the analytical concepts which investigators attempt to quantify (Burk and Pao, 1976: 15-16).

The reliability of a method to enumerate any variable of interest in BCN surveys is evaluated by comparing means, ranges and percentage standard errors (i.e., 100 times the quotient of the standard error to the mean) calculated from successive measurements on a sample using the same or different methods, depending on whether the objective is to validate a method against itself or against other methods. However, within household variation between assessments cannot be controlled and the portion of variance owed to it is indistinguishable from that introduced by measurement unreliability or response error. The reliability of a method can therefore be quantified only approximately.

Appropriate data reliability varies with the analytical use to which investigators intend to put survey information. Maximum reliability is desired for econometric and sophisticated quantitative analysis. Cost considerations permitting, the measurement method which produces the least respondent error component of total sample variance is appropriate in this case. On the other hand, if researchers are mainly interested in sample means, variance measures need not be considered in evaluating the relative reliability of measurement methods, and the cheapest method which produces reliable means can be chosen. For example, different measurement periods of the same method to quantify food consumption may produce the same sample means, but variances are expected to decline as the measurement period (and hence survey costs) grow. If consumption is observed and averaged over a number of days it is likely that a "normal" pattern of intake will emerge.

Validity criteria in monitoring purchases and consumption include whether or not respondents alter their expenditure/consumption patterns

for the sake of the survey, to what extent it is possible to weigh or otherwise enumerate actual quantities purchased or ingested, and to what extent it is possible to quantitatively disaggregate mixed dishes into their components. There are several approaches to evaluating the validity of a method relative to that of others. One is to compare the results obtained with those derived by alternative methods as is done in the case of relability. Another is to test for consistency, as when the intake of food energy measured by a certain method is compared with energy expenditures. A third, applicable in the case of consumption estimates, is to relate the estimates of levels of dependent variables to socioeconomic factors and verify whether or not the data bear out hypothesized relationships such as Engel's or Bennett's laws.[7/]

The length of the enumeration period affects data reliability and/or validity because households may have irregular buying habits or people may change their normal behavior during the first days of the study. One reported reason for the latter phenomenon is the desire to avoid burdensome enumeration by simplifying consumption patterns (Pekkarinen, 1970, p. 154). One-day BCN surveys are therefore not considered reliable or valid. Data accuracy increases with survey duration up to a certain point beyond which it begins to decline because of faltering respondent patience with the survey and the presence of the enumerator. For given buying and consumption patterns, there is also a point beyond which the marginal return in terms of information derived from further enumeration is low or zero.

In interviewer-enumerated BCN surveys, the seven days observation period is generally considered a reasonable compromise between cost considerations, the need to avoid excessive taxing of respondent readiness to cooperate, and the desire to cover budget allocation patterns adequately.

Large-sample, seven-day surveys have in the 1970s been carried out in Brazil, Peru, Liberia and several other developing countries. However, for the purpose of evaluating dietary nutritional adequacy, the seven-day period may be more appropriate for observing purchases than for monitoring actual ingestion because purchases tend to be more irregular than consumption.

The reliability of intake data improves as the enumeration period is extended beyond one day. In their review article on dietary methodology, Lechtig et. al. (1976, p. 243) conclude that the one-day quantitative recall method is "valid and reliable to estimate mean dietary calorie and protein intake in population groups. Its reliability to estimate individual intake, however, is low and similar to that of other more complicated (i.e., direct-observation weighing) dietary survey techniques." This implies that several days of surveying are needed to reliably estimate normal intake patterns of individuals and, presumably, households. Trulson (1955) reached the same conclusion from her study of individual dietary records (direct observation) for one, three and seven days. But differences between means, standard deviations and coefficients of variation of intake of the two nutrients (protein and vitamin A) and the one food (milk) which the author studied were significantly greater between the one- and three-day than between the three- and seven-day surveys. In other words, the statistical accuracy of intake data grows appreciably as the original one-day observation period is extended by one or two days, but it is not greatly improved by extending enumeration to seven days. On the other hand, the statistical accuracy of data on food purchases and other expenditures is likely to be significantly greater for seven-day than for three-day surveys, because purchases are made on a weekly basis in many areas, particularly where they are tied to weekly markets and fairs.

The relative accuracy of intake data obtained by different methods during the same period is less well researched. Lechtig et al. (1976, p. 247) conclude that there are "no significant differences in the mean calorie and protein intake of the population as calculated by the recall and the record (direct observation) techniques, respectively." However, the evidence cited by these authors does not address data accuracy at the individual and household levels, nor does it include variance measures which would permit evaluation of the significance of the differences between means to which the authors refer. In surveys of individuals and households, the direct observation method is ideally preferred to recall enumeration, because there are limits to human memory which make it desirable that the enumerator be able to verify respondent information. Direct-observation weighing of food intake is the commonly accepted intake-measuring method against which recall (usually relative to the past 24 hours) and direct-observation estimating of quantities by household measures are validated. However, weighing takes more time, is more costly and places a greater burden than recall on both enumerators and respondents.

The enumeration methods which emerge from this discussion as worthy of scrutiny in BCN survey design are alternative durations (one to seven days) of (1) direct-observation weighing of both purchases and consumption, (2) direct-observation weighing of purchases and recall assessment of consumption during one day using household measures, (3) direct-observation of both purchases and consumption by means of household measures and (4) recall assessment of both purchases and consumption using household measures. The objective of a pilot survey is to identify from this list the "least time and cost" alternative which is compatible with specified reliability and validity. It is also advisable to experiment with different time

periods for the observation of purchases and actual consumption. And, although this section has been written under the assumption that researchers/ survey planners desire explicit measures of food intake, it should be remembered that significant and, for some policy purposes, sufficient conclusions regarding nutritional status can also be obtained by the simpler route of anthropometry by which the laborious assessment of consumption can be avoided.

Monitoring Income and its Determinants

"Explanatory" variables are family size and composition, and income and its determinants, assets and productive activities. While the above mentioned criteria for choosing between alternative observation methods apply in the case of these variables, the range of methodological options is narrower in this case, since the possibility of direct observation applies only to a limited number of variables (certain assets and types of labor use) in BCN surveys. This is unfortunate, because unreliability due to limitations to respondent memory is in the context of questions regarding income compounded by reluctance on the part of respondents to reveal their economic position. Because of fear of taxation, farmers are, as a rule, more reluctant to provide information regarding income and income-generating assets than regarding expenditures. Many components of household wealth (dwelling, furniture, appliances) as well as working capital (tools) are easily inventoried in the field through questioning of respondents and through direct observation. However, information regarding income-generating assets such as livestock and land owned and farmed is notoriously difficult to obtain, as is information on agricultural production. A prerequisite for reliable collection of income-related data is disaggregation

of concepts and activities by uses and by time and space. Acreage farmed, for example, might be researched by crops and fallow portions and/or by type of ownership, and surface measures might be obtained more reliably on the basis of the amount of seed used than by direct questioning of informants.

The components of income under partial subsistence are agricultural and business output (the latter including arts and crafts), wage earnings, the value of labor time invested in home production (estimated by imputation of labor opportunity costs), and rents. With the exception of labor time devoted to home production, these concepts can only be investigated by recall questions in BCN surveys. Direct observation of activities away from the home is hampered by the demands placed on enumerator time if they are to follow the subjects around. The appropriate reference period for agricultural output is, analytically, the year preceding the survey, but there are practical difficulties since agricultural production may be continuous and seasons for various crops may not coincide. For each crop, questions regarding output and its distribution to various uses might best refer to the most recent harvest preceding the survey.

The subsistence portion of production will usually be monitored under consumption in BCN surveys in which direct observation is practiced to the extent possible. To determine total production of a commodity, the consumed amount is added to the amounts devoted to other uses (sale, seed, feed). These categories are often easier to enumerate by recall than consumption. Consistency checks of the relative and absolute magnitudes of the uses of production should be performed for each unit of observation.

The need to rely on recall for agricultural production information and, generally, income information in BCN surveys by asking systematic, crop by crop

questions regarding inputs and their prices, output and uses, including their monetary values (opportunity cost of subsistence consumption, market value of sales), implies that the capacity of enumerators to judge answers and to probe accordingly is a prime determinant of data reliability and validity. The enumerator's educational level appropriate for observation of income is therefore higher than that which might be considered adequate for the more mechanical collection of data on purchases and consumption. Some professional social science training would seem to be a prerequisite for successful collection of income data in one-time surveys of partial subsistence households.

The estimation of labor income requires the construction of labor time budgets for all productive household members and the valuation of time on the basis of wage rates and labor opportunity costs. Labor time is classified and recorded as wage labor, on-farm agricultural labor and work in livestock production, home activities (cooking, fetching firewood and water, child care), school attendance, marketing activities and, residually, leisure. Information regarding wage rates is not normally difficult to obtain from survey respondents and can be easily verified through other sources. The difficulty in employment surveys resides in the measurement of time worked.

Data reliability and validity can be assumed to increase progressively as one moves from the short interview to the multiple interview (cost-route approach) and to direct-observation measurement of labor use. Since only the first of these three methods is feasible in BCN surveys, the key decision issue in labor survey planning is the length of the reference period. Due to limitations to recall capacity, the twelve-month reference period is unrealistically long for labor allocation research. The most recent month, two weeks, and one week preceding the BCN survey during which work was performed are realistic alternative reference times which should be weighed in survey planning, preferably by assessing the comparative reliability of

pilot data referring to these alternative periods. The two-weeks and perhaps the one-month reference period are expected to yield more reliable information than the one-week alternative.

Year-round labor allocation to the activity classes mentioned above can be studied by extrapolation of case-level information referring to periods shorter than the twelve months preceding the survey, as long as data are collected from an appropriately stratified statistical sample spread over twelve months. However, in BCN surveys, the potential problem associated with case-level collection of labor use data regarding only one point in time is that both the level and composition (subsistence and cash) of the income derived from the particular, observed labor use pattern may be more transitory than consumption patterns. This income measure would then constitute a poorer predictor of consumption than annual income derived from repeated (for example, monthly) labor use information from the same household.

In the light of Friedman's permanent income hypothesis, a theoretical reason for using total consumption expenditures as an income proxy is that the former is likely to be less dependent on transitory components than the latter, derived from one-time monitoring of family labor use. But independence between consumption and the income measure used for analysis (or at least the non-subsistence proportion of it) is particularly desirable in microeconomic studies of partial subsistence families. An attempt at estimating annual labor use and labor income should, therefore, be made in BCN surveys by complementing questions regarding time allocation and wages during the particular reference period by questions regarding "normal" time allocation to, and, in the case of wage employment, income from, specified activities during the year. This information is likely to be less

valid and reliable than that which can be developed by means of repeated surveys of the same family. But skillful probing by enumerators throughout the duration of the BCN survey may result in useful data, since farmers can be expected to know (a) the approximate number of person-days of family and hired labor needed to carry out the principal components of on-farm agricultural work by crop and (b) the incidence of other work which is planned around the climatological and agronomic dictates of subsistence farming.[8/]

Perspective

The objective above was to spell out criteria for the selection of data collection methods through which observational error in specified exogenous and endogenous variables can be kept low, while field time spent on the observation of expenditure and consumption variables is minimized. Implicitly, the discussion focused on individual family units of observation and largely disregarded statistical (sampling) sources of error. To reduce the sampling error, one typically raises the sample size and/or devises appropriate sampling procedures (eg., stratification). However, the sampling error does not decrease to the same extent for all variables as the sample size increases or a more sophisticated sample design is adopted. It is therefore necessary in survey planning to select decision variables and associated desired degrees of data accuracy prior to determination of sample size and sampling procedure.

To arrive at overall "minimization" of observational error, it is likely that during the survey at the family level different data collection methods (alternative periods of recall; direct observation) must be employed for different variables. This requires great flexibility on the part of

survey planners (design of questionnaire(s) and field work) and enumerators, as well as considerable resources to carry out pilot surveys. But effort spent planning and executing the collection of the data is rewarded by the resulting enhanced understanding of household decision-making under partial subsistence.

Footnotes

1. See for example, Reh (1962), Trulson (1955), Burk and Pao (1976), McWhinney and Champion (1974), Ferber (1974).
2. See Ferroni (1980) for description of survey design and for an analysis of ENCA.
3. See Joy and Payne (1975) for a classical methodological document on how to identify target groups (in this case nutritionally deprived population strata) in terms applicable to policy.
4. Other dependent characteristics which may be, and often are, observed in BCN surveys include demographic variables (fertility, mortailty, migration), anthropometry and other nutrition and public health related information.
5. In the case of household budget surveys in which only purchases are recorded, nutrient values are sometimes calculated for these data after transforming food "as purchased" into "edible portions" on the basis of average, published conversion coefficients.
6. For methodological purposes, a distinction is in order between purchases of durables and nondurables (food and everyday consumer articles). The choice between direct observation and recall exists only with respect to the latter which are frequently purchased. Expenditures on durables are necessarily enumerated by recall and questions must refer to the 12 months preceding enumeration if a complete picture of yearly expenditures is to be constructed.
7. Bennett's law, less widely known than Engel's law, states that the ratio of calories derived from starchy staples to total calories declines as income grows. See Bennett (1954).

8. Flinn (1976, p. 110) states that "Farmers appear to have little difficulty in specifying what they regard as 'normal' labor inputs for a given plot over time, who performs each operation and how much is family labor and hired labor." Enumerators, however, must carefully see to it that informants relate their own behavior rather than their perception of typical behavior in the area. Collinson (1972, p. 229-230) argues as Flinn does and stresses the need for "enterprise-oriented" (as opposed to time-oriented) questioning "to give the respondent a clearly defined focus for his experience."

References

Barnum, M.N. and L. Squire. "An Econometric Application of the Theory of the Farm Household." Unpublished paper, 1977.

Bennett, M.K. The World's Food. New York: Harper and Row, 1954.

Burk, M.C. and E.M. Pao. "Methodology for Large-Scale Surveys of Household and Individual Diets." Home Economics Research Report No. 40, Washington: USDA-ARA, 1976.

Chayanov, A.V. The Theory of Peasant Economy. Homewood, Illinois: American Economic Association Translation Series, 1966.

Collinson, M.P. Farm Management in Peasant Agriculture: A Handbook for Rural Development in Africa. New York: Praeger, 1972.

Ferber, R. "Consumer Expenditure and Price Data: An Overview." Annals of Economic and Social Measurement, 3:2, 1974

Ferroni, M. "Consultation on Bolivian Rural Household and Food Consumption Survey." Report submitted to Nutrition Economics Group, OICD/USDA, August 1978 (mimeo).

-- "The 1979-81 Bolivian Rural Household Survey." Report submitted to Nutrition Economics Group, OICD/USDA, August 1979 (mimeo)

-- The Urban Bias of Peruvian Food Policy: Consequences and Alternatives. Ph.D. Dissertation, Dept. of Agricultural Economics, Cornell University, Ithaca, N.Y., January 1980 (mimeo).

Flinn in Kearle, B. (ed.) Field Data Collection in the Social Sciences. New York: Agricultural Development Council, 1976.

Joy, L. and P. Payne. "Food and Nutrition Planning." Nutrition Consultant Report Series No. 35. Rome: FAO, 1975.

Lau, L.J., W.L. Lin and P.A. Yotopoulos. "The Linear Logarithmic Expenditure System: An Application to Consumption-Leisure Choice of Agricultural Households in the Province of Taiwan." Stanford: Food Research Institute Discussion Paper No. 1975-1, 1975.

Lechtig, A., C. Yarbrough, R. Martorell, H. Delgado, R. Klein. "The One-Day Dietary Survey: A review of its usefulness to estimate protein calorie intake." Archivos Latinoamericanos de Nutricion, 26:3, 1976.

McWhinney, I. and H.E. Champion. "The Canadian Experience with Recall and Diary Methods in Consumer Expenditure Surveys." Annals of Economic and Social Measurement, 3:2, 1974.

Pekkarinen, M. "Methodology in the Collection of Food Consumption Data." World Review of Nutrition and Dietetics, 12, 1970.

Reh, E. Manual of Food Consumption Surveys. Rome: FAO, 1962.

Trulson, M. "Assessment of Dietary Study Methods: II." Journal of the American Dietetic Association, 31:8, 1955.