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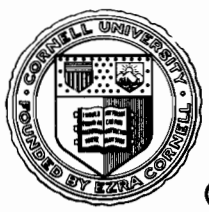
Rural Household Data Collection in Developing Countries:

Designing Instruments and Methods for Collecting Consumption and Expenditure Data

Carol Levin



DEPARTMENT OF AGRICULTURAL ECONOMICS AND
CORNELL FOOD AND NUTRITION POLICY PROGRAM

RURAL HOUSEHOLD DATA COLLECTION IN DEVELOPING COUNTRIES: DESIGNING INSTRUMENTS AND METHODS FOR COLLECTING CONSUMPTION AND EXPENDITURE DATA

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ABSTRACT

This working paper is a practical guide for collecting consumption and expenditure data in household studies in developing countries. The definitions, uses, and conceptual issues associated with rural household consumption and expenditures are briefly explored. The heart of the paper focuses on direct methods for gathering such information, including household records, 30-day list-recall and 24-hour recall techniques. A section on organizational issues and practical tips using these methods based on real field experiences highlights potential problems that are difficult to foresee before the data collection begins.

FOREWORD

This paper is one in a series of seven working papers on collecting rural household data in developing countries. Between late 1986 and early 1988, six Ph.D. candidates from Cornell's Department of Agricultural Economics left to do the fieldwork in developing countries for their dissertations. Upon returning to Cornell in 1989, they discovered that they shared common experiences and frustrations while collecting household-level data for analyzing applied economic problems in developing countries. This series of working papers is the result of their collective effort to help other researchers avoid common pitfalls and build upon their experiences.

The working papers provide a practical field guide – for use together or separately – for individuals collecting a wide range of household information in developing countries. Each paper introduces the conceptual and practical difficulties involved in making different types of measurements or collecting different types of information. The guide is intended to provide readers with enough information about various methods so that those best suited to an individual's needs can be selected. Therefore, a variety of methods for collecting data are reviewed and the consequences of choosing one method or another are discussed.

Each working paper is organized into a section on conceptual issues, followed by a section on methods and organization. Conceptual issues address problems that researchers encounter when they move from a discipline's theory to empirical investigation. Often these include defining or measuring dynamic concepts or institutions such as the household, farm unit, time, or the valuation of goods. Related to this is evaluating whether or not to use certain variables in measuring rural lifestyles. In attempting to quantify particular aspects of rural economies, researchers realize that their definitions of selected variables do not always suit the reality of village economies. Thus, the sections on conceptual issues address the need to reconcile the researcher's theory and preconceived ideals with the realities of the survey site.

Although the related literature is reviewed in each working paper, the primary source of information has been the collective research experience of the authors. Examples of field experiences illustrate points made in each working paper. Many items that the authors felt they would have benefited from are included as well.

The target audiences are graduate students and other researchers, academicians, consultants, government employees, members of private voluntary organizations, etc., who are interested in collecting high quality socioeconomic, nutrition, and health data related to rural households in developing countries. In particular, the guide is for individuals who may not have had much prior experience in collecting this type of data, who may not have access to other current written material on data collection methods, or who may have some experience, but may not be aware of recent developments in data collection methodology.

One unique aspect of the series of working papers is its attempt to provide many examples of survey forms that have actually been used in field projects. Each working paper is built around the following question: How can survey forms and record keeping instruments be designed to assist the researcher in collecting high quality, nondistorted, less systematically error-filled data? Frequently, two or more forms that were used in different surveys (or in different rounds of the same survey) are discussed. The author has tried to be frank and honest, frequently providing criticisms of forms or tables that they used, but with which they failed to achieve the intended results.

Finally, a brief word on the use of 'he' and 'she' throughout the collection of working papers. Since the group of authors was equally divided into three men and three women, as a convention, generic third person pronouns and possessives (he, she, him, her) were consistent with the author's gender and should not be interpreted as a violation of political correctness.

The working paper series includes:

Paper Subject	Series Number	Author	Author's Country of Study*
Collecting General Household Information Data	91-13	Krishna P. Belbase	Nepal
Collecting Consumption and Expenditure Data	91-14	Carol Levin	Indonesia
Collecting Health and Nutrition Data	91-15	Jan Low	Northern Malawi
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Preparing the Data for Analysis	91-19	Tom Randolph	Southern Malawi

* Each paper includes examples from other studies along with those from the author's country of study.

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Carol Levin and Scott Rozelle
Series Coordinators

1. INTRODUCTION

DEFINITIONS AND USES OF CONSUMPTION AND EXPENDITURE DATA

A glance through the literature reveals a profusion of consumption and expenditure surveys and methods, each with their own terminology and set of definitions. The terminology is often confusing and controversial from one study to the next because consumption and expenditure data can be defined to measure the use of resources at any point between the national, household, and individual level (Simmons 1981; Martorell 1982; Sanjur 1982; O'Brien and Frankenberger 1988).

In the broadest definition of the term, household consumption refers to all goods and services consumed by the household. Total consumption is then measured as the total expenditures on food and nonfood (including durables) goods and services. Presented in this way, total consumption can be interpreted as either the quantities of goods and services used up in final consumption, or as the total value of money, time, and assets spent on those goods and services ("expenditures"). For practical purposes it is assumed that total household consumption and total expenditure are terms that can be used together or interchanged to explain a household's level of resource use.

One of the most important components of total consumption, especially in rural household studies, is food consumption. The researcher is faced with a multiplicity of definitions associated with the term food consumption and its counterpart, food expenditures. In microstudies of food consumption, the economic definition of household food consumption often used can be termed *household food acquisition* or *household food availability* (Garcia and Pinstrup-Andersen 1987; Bouis and Haddad 1988), which measures all food obtained by the household, whether for family, nonfamily, animal use, or wastage, measured in physical quantities and monetary value. Meanwhile, the nutritional definition of household food consumption usually refers to *household food intake*, which is measured by the quantities or caloric value of food physically ingested by household members (Gibson 1990; Cameron and van Staveren 1988).

The first step in deciding what to collect and how to collect it will depend on the specific focus and objectives of the research project at hand. More specifically, the method chosen will depend on whether the data will be used for aggregate economic analysis of expenditures, for disaggregate analysis of demand patterns, or for nutritional purposes. Consumption and expenditure data are used in a broad range of both studies for economic and nutritional studies.

In economics, a large body of research focuses on the measurement of welfare and the analysis of household expenditures. A brief list of topics includes the effects of household composition on demand patterns, the relationship between sex composition of households and consumption, the "costs" of children, the relationship between prices and welfare, and the construction of price indices (Deaton 1980; Deaton and Case 1987).

Among the different types of socioeconomic studies, the most popular have focused on consumer demand and food policy analysis. More specifically, food consumption and expenditure data can be used to estimate empirically the following relationships, or parameters in demand analysis, derived from economic theory: Engel curves; the relationship between food expenditures and household income; price elasticities; income elasticities; and income and substitution effects (see Poleman 1981; Timmer et al. 1983; Greer and Thorbecke 1986; and Deaton and Case 1987).

In addition to studies whose primary concern is demand analysis, the recently popular agricultural household models combine consumption and production parameters to examine the profit effect on commodity demand (both food and agricultural inputs for production), labor supply, and marketed surplus of agricultural crops (Singh, Squire, and Strauss 1986).

Another important use of expenditure data is for studies that require a total income measure but focus on other aspects of the rural household. Consumer demand, time allocation, or nutritional studies may use total household expenditures as a proxy for total household income. Compared to total income, total expenditure is considered a more reliable indicator of a household's long-term well-being for important reasons. First, total expenditure is less variable than income, especially in rural areas where agricultural production and nonfarm employment opportunities are highly seasonal. Total expenditure reflects a household's ability to smooth out fluctuations in short-run income through saving, dissaving, and borrowing. Furthermore, expenditure data are easier to collect and tend to exhibit less measurement error than income data. For example, a wealthier household's declared income may underestimate true income for fear of incurring higher taxes, while a poorer household may over-declare income out of pride. See Anand and Harris (1985) for a discussion of the advantages and disadvantages of three possible measures of welfare: the per capita income of a household, per capita total household expenditure, and household per capita food expenditure.

Finally, a number of health and nutrition studies focus specifically on the relationship between socioeconomic indicators, such as income, expenditures, food expenditures, and physical indicators of nutritional status, such as caloric intake and weight and height of individual household members. While total expenditure is used in these studies as an economic indicator, more disaggregated food consumption data can also be employed to estimate quantities of food and individual nutrients consumed by the household (or individual). This is used to evaluate the adequacy of dietary intakes of population groups, to investigate the relationship of diet to health and nutritional status, to study the relationship of diet to income and other socioeconomic factors, and to evaluate the impact of

nutrition education, nutrition intervention, and food fortification programs (Edirisinghe 1987).

METHODOLOGIES USED IN COLLECTING CONSUMPTION AND EXPENDITURE DATA

With the exception of certain types of food consumption studies concerned with nutrition, consumption and expenditure are generally measured in terms of value. The primary objective of any consumption or expenditure questionnaire is therefore to collect information about the value of all the various goods and services used by the household for a specified period of time. In addition, the researcher may be interested in information about the associated quantities and prices, which can be collected directly or derived indirectly using the relation price times quantity equals value. Quantities are of particular interest in food and nutrition studies because they permit estimation of caloric values. Prices are often required for economic analysis of consumption patterns. It is probably not an overgeneralization therefore to describe a consumption and expenditure questionnaire as simply the establishment of a list of goods and services consumed, with information about their value, quantity, and price, or some combination of those three.

Traditionally, household budget surveys were used to collect information on the value of all food and nonfood purchases made over a specific period, but they did not include information on the quantities purchased or on the goods consumed from nonmarket sources. In developed countries, household budget surveys relied primarily on market transactions since this captured most consumption and expenditures. In developing countries, however, this strategy would miss a large proportion of total consumption, namely, that derived from home production. More recently, "expenditure" (or "consumption") surveys have been designed to collect quantities, as well as values for all items consumed in the household – purchased or produced.

Regardless of whether these surveys are called expenditure or consumption surveys, the methods used in data collection are essentially similar and can be divided into two general categories: direct and indirect.

Direct methods of collecting consumption and expenditure data include recording and interviewing techniques. Recording techniques involve collecting data on all food and nonfood consumption for a period of three to seven days and include records kept by a household member or by an enumerator present during the survey period. Interviewing techniques involve collecting data about goods and services consumed in the immediate, recent, or distant past and include flexible or fixed list-recall methods. Interview techniques specifically designed for household food consumption also include 24-hour recall, dietary history, and food consumption frequency. An alternative approach to direct measurement of consumption applicable to studies of food availability and food intake is to monitor household food inventories. Using accounting techniques, food intake is indirectly measured as the disappearance of stocks unaccounted for by extra-household transactions.

In general, one or more of these techniques will be used to collect household consumption and expenditure data, depending on the focus of the study and the operational definition used for consumption. As indicated by the review of applications for consumption data, operational definitions range from viewing consumption as a purely socioeconomic measure of total expenditures to a nutritional measure of household food intake. For instance, researchers that are only interested in total expenditures as a measure of total consumption may choose to use the flexible list-recall method, collecting data on broad categories such as food, health, transport, and household goods from the same questionnaire over different survey rounds. Others interested in changes in food consumption patterns over time or across socioeconomic groups may choose a fixed monthly list-recall method for frequently consumed food items, combined with a flexible list-recall method for capturing less frequently consumed nonfood goods and services. Finally, those interested in estimating household food intake may collect food consumption data using the 24-hour food recall method.

Additional criteria contribute to the choice of method, including available research resources, assessibility and characteristics of the survey areas, the level of detail desired, and the amount of effort required for alternative methods.

CHAPTER ORGANIZATION

In the following section conceptual issues related to the design of the survey instrument for collecting expenditure and consumption data are reviewed. Specifically dealt with are quantifying total consumption (including both market and nonmarket transactions) and valuation of nonmarket transactions. A section on practical and organizational issues pertaining to the collection of food and nonfood consumption and expenditures elaborates on specific practical issues for each method, including a more detailed discussion of the trade-offs between the alternative methodologies. Examples of questionnaire forms are given in Appendix Tables A.1 - A.13.

2. CONCEPTUAL ISSUES

The two most pressing conceptual concerns pertaining to data collection for total household consumption and expenditures are quantification of both market and nonmarket transactions, and decisions on how to value, in particular, nonmarket quantities.

QUANTIFYING TOTAL HOUSEHOLD CONSUMPTION

It cannot be stressed enough that total consumption is not limited to consumption of goods obtained through market transactions and cash purchases, but it also includes consumption of goods obtained from the household's own production and from the surrounding environment. Although it is well accepted that semisubsistence households provide a large share of their food consumption needs from their own production of food crops, such as rice, maize, and cassava, researchers often neglect to value consumption of fruits and vegetables from home gardens, or nuts and berries, leaves, firewood, and other items gathered by household members and used in daily household life. This is partly because researchers may not know how to measure the quantities or value of such items, but more importantly, researchers may be unaware of the scope of activities related to fulfilling household consumption needs.

For instance, in Indonesia, firewood was gathered daily from the surrounding woods and fields, as was material for building houses and weaving mats and baskets during certain times of the year. Respondents could easily recall how much of their time was spent searching for and gathering these items. It was more difficult estimating the quantity of firewood or other materials and assigning them a value. The burden of capturing these items and including them in the survey falls upon the researcher, who must be aware of the different activities of household members and the implications of these for household consumption.

If an activity takes up much of the respondent's time and contributes largely to household consumption, then the researcher must find a way to accurately measure and value the good. If the activity represents an insignificant portion of total consumption, the good may be left out without harming the analysis. For instance, collecting firewood for fuel or fodder for animal feed are important daily activities, while fishing in a nearby pond may be an occasional leisure activity, with little significance to overall household consumption.

PRICES AND THE VALUATION OF NONPURCHASED QUANTITIES

Many researchers, especially the authors in this series, have wondered at one time or another about the origin and validity of prices used in rural household studies, particularly in countries with an abundance of semisubsistence farmers and of markets that function poorly or are incomplete. A common omission from analyses based on primary data is a description of how price data are collected or derived. Two common problems occur for researchers collecting price data in rural areas. One is how to value nonmarketed commodities for which a market exists versus how to value commodities for which there is no market. For the former, nonmarketed consumption can be valued by applying information from market transactions to home produced goods. The latter "missing market" problem is a separate problem since there is no direct information for valuing goods like wild plants or other indigenous foods not sold in the market place.

This discussion deals primarily with the valuation of nonmarketed consumption of food for which some type of market exists. It can be extended to other nonfood goods and services that can be home-produced or gathered, but that might also be purchased.

To derive an aggregate value for food consumption, a value must be assigned to food commodities produced and consumed directly by the household. Consider the typical situation where a farm household produces rice. Some of the rice is sold at different prices over several months. The remainder is stored and used for consumption over a six-month period. How should the researcher assign a value to the portion of own-produced rice which is stored and consumed?

The decision of which price to use for the valuation of nonpurchased commodities is still fairly subjective, and many different approaches are found in the literature (compare, for example, Gittenger 1982; Wood and Knight 1985; Low 1986; Singh, Squire, and Strauss 1986; and Deaton 1988). In practice, the three basic choices for valuing consumption of own-produced goods are: (1) derive what is termed a household specific "unit value" by dividing total cash expenditures for each commodity by the total quantity purchased, and then apply the same value to any nonmarket sources of the good consumed; (2) use the consumer, or local market/retail, price; or (3) use the producer, or farmgate price. The producer price is the price the farmer receives for her product at the time of sale. The consumer price for the same good (unless subsidized) is usually higher than the producer price. The difference between the consumer and producer price may be attributable to transaction costs, transport and storage costs, time lag between selling and purchasing, or retail markup. Given these choices, how then does one decide which price to use? Each of these choices is discussed below.

In surveys that collect information on both cash expenditures and physical quantities, the *unit value* can be derived by a simple calculation. The respondent is asked how much of an item (or class of items) was purchased for the household during the past recall period. She is also asked how much was spent on the reported quantity, which is the total expenditure on the item. To derive

the unit value, the total expenditure for the item (or class of items) is divided by the total quantity purchased.

The unit value is an average household price for a particular item or class of items, rather than a specific market price. Although the unit value depends on the market price, it also captures both quality differences and spatial variations in prices specific to each household. The unit value is only equal to the market price when the reported expenditure is for a single undifferentiated item.

A particular item may not be a homogenous product for a number of reasons. Consider the case of rice. A household may purchase different qualities of rice, or they may purchase rice from varying sources over a given recall period, such as the local market, a trader, or directly from the mill. Any of these factors can affect the purchase price of the commodity. If a household consumed a total of 10 kilograms of rice at $5.00, the unit value would be 50 cents per kilogram. However, if 5 kilograms of high quality rice were purchased at 60 cents per kilogram and 5 kilograms of cheaper quality rice were bought at 40 cents per kilogram, the unit value is not a specific market price but an average of the prices of the two different qualities of rice.

A practical problem in deriving unit values occurs if the good consumed was not purchased by the household prior to the survey or if no market exists for a particular food item such as wild plants (see Rozelle's paper on farm production for a discussion of goods without markets). Without purchased quantities or expenditures, it would be impossible to come up with the unit value.

A more serious problem is the use of unit values in lieu of market prices in economic analyses. It is not theoretically correct to directly substitute unit values for true market prices in demand analysis, because parameter estimates may be biased. Three sources of bias are described by Deaton (1988): (1) price variation is indistinguishable from the observed variation in unit values; (2) unit values reflect quality as well as price differences; and (3) measurement error in the collection of expenditures and quantities is captured in the unit value. Deaton also presents a methodology for correcting unit values for quality effects and measurement error. However, these techniques are somewhat restrictive for food policy analysis.

An alternative method for valuing the consumption of home-production or other nonpurchased sources is to use the retail prices currently observed by the interviewer at the closest local market. If a particular food item is unavailable in the market at the time of the interview, the price of the closest item in the same commodity group is then substituted. Expenditure for the item is then recorded as the quantity reported multiplied by the local market price. This method is used by Indonesia's National Socio-Economic Survey (SUSENAS) and described by van de Walle (1988).

Such a method is said to reduce the possibility of a quality-price bias, as the quality variation, while still reflected in the physical consumption data, is no longer reflected in the prices. By using market-level prices, the price

effect will not be distorted by individual household behavior. Thus, the quality variation leads to error in the dependent variable (food quantity consumed or expenditures), but not in the independent variables (prices) when estimating conventional demand functions.

In a national-level study, such as SUSENAS, it may be appropriate to use such an approach, because both urban and rural areas are included in a large sample (54,000 households). However, for rural household surveys, where households are likely to produce the majority of their food needs and especially for data used to estimate agricultural household models, it is argued that the appropriate price for valuing food consumed from home production is the producer price (Barnum and Squire 1979; and Singh, Squire, and Strauss 1986).

Finally, an approach for valuing consumption from home production that uses both the selling and purchasing price is described by Low (1986). The appropriate price is determined by whether or not the household is a net surplus producer or deficit producer of a given commodity. For producers who are able to meet all of their household's consumption needs, it is assumed that they sell all their produce and are then allowed to buy back what they require at the selling price. Thus, at the margin, the opportunity cost for a net surplus producer is the producer price, and all consumption from home production is valued at the farmgate price. However, Low argues, households that need to buy more than they produce face the purchase price. Thus, the opportunity cost for a net deficit producer is the consumer price, and the retail market price is used to value consumption from both market sources and home production.

For example, in the Indonesian case study, the majority of farm households sampled were only able to meet a share of their total rice consumption from their own production. The remainder of rice consumption needs were then purchased. However, as expected, this pattern was seasonal, with almost all households purchasing rice in February, the preharvest period, and most consuming rice exclusively from home production in April, the postharvest period.

If the approach by Low is used, the monthly data would be aggregated to derive an annual figure for rice production net consumption requirements to determine whether or not the farm household was a surplus or deficit producer. Then, based on the farm household status, the producer price is used to value consumption from home production in surplus-producing households, and the consumer price is used in deficit households.

While this approach makes good sense, operationalizing it in a survey instrument is more difficult. If this method is used, producer prices and consumer prices for each agricultural household in every period are required. Furthermore, researchers interested in consumption aspects only would be forced to collect additional information on production and marketed sales of staple food items.

The choice of which price to use will ultimately depend on the research objectives, market conditions, and production environment of the research area, and the cost and availability of price data from secondary sources such as local

or regional markets and government statistics. It is important to decide ahead of time which method to use to avoid being "caught" at the end of the data collection period without appropriate price information.

3. METHODS AND ORGANIZATION

In general, the methods used for collecting information on food versus nonfood expenditures are similar, except in the case of collecting food consumption data for nutritional purposes, such as 24-hour food recall. Certain techniques are better for collecting information on food expenditures than nonfood expenditures, while other techniques are equally applicable to the collection of both categories. The household record method, the list-recall method, and the 24-hour food recall survey are described, including a discussion of the pros and cons of the different approaches with respect to accuracy, respondent and enumerator burden, and cost. Each method is presented with a stronger focus on collecting food consumption and expenditure data because the measurement of these kind of data is generally more problematic.

HOUSEHOLD RECORD METHOD

The household record method can be used for both food and nonfood consumption and expenditures; however, it is most frequently used for collecting data on food consumption. Although the following discussion is couched in terms of food consumption, it is possible to include all goods and services when using the household record method.

Household food records capture the amount of food consumed daily, on a meal to meal basis. Food records are completed by a household member or enumerator over the period of observation, say one week. All food prepared and consumed by household members is weighed. Weights are often estimated by converting household measures, i.e., the containers that households use when purchasing or preparing food, into standard weight measures. All raw ingredients used in composite dishes and final dishes themselves must be weighed or the weight estimated. Adjustments are made for plate waste, food eaten by nonhousehold members, and food eaten outside the home. Appendix A gives an example of a household food record form used by enumerators for collecting food consumption and expenditure data.

The advantage of this method is that it is the most accurate for collecting household food consumption. It is most useful in areas where the diet is fairly monotonous, with a limited variety of foods eaten. The disadvantages are that it is time-consuming and extremely invasive, placing a burden on either household members or the enumerator. It requires that someone in the household be literate to complete the record or that an enumerator be present at all times to observe all consumption. Clearly this is expensive, especially in larger samples. The household record method is more practical for smaller samples. Other disadvantages are a low response rate, foods eaten away from home are hard to

identify, and normal food consumption patterns may be altered by the presence of an outsider during meals.

LIST-RECALL METHOD

An alternative technique that can be used easily to determine both food and nonfood consumption is the list-recall method. A trained enumerator asks a household member to recall the quantity, price, and value of all items used by the household over a specified period of time. The enumerator can use either a structured questionnaire that contains an explicit list of the major food items likely to be consumed in that region or an open format questionnaire that relies on the respondent to list verbally all the items consumed during the specified period.

If the focus is on food consumption in particular, the quantities are weighed or household measures are converted into standard weight measures. In most list-recall surveys, no account is taken of food wasted, spoiled or fed to animals, which may lead to overestimation of household food intake. However, the list-recall questionnaire can be designed to subtract out food given to others and to include food eaten away from home by household members to gain a more accurate measure of household food intake.

For the list-recall method, either a fixed recall period or a flexible recall period can be used. A fixed recall period is generally used when collecting data periodically over multiple rounds. Keep in mind, the longer the reference period, the less accurate the information because of memory lapses and respondent fatigue (Lynch 1980).

In the southern Malawi case study, expenditure data were collected monthly using a combination of a four-day recall period to sample regular, small-value expenditures, and a one-month recall period to capture large-value, "lumpy" expenditures. Appendix B illustrates the fixed list-recall method using an open format for listing both food and nonfood goods and services. In the Indonesian study, data were also collected monthly; however, food consumption and expenditure data were collected separately from nonfood goods and services data. Appendices C and D show the questionnaire forms used in the Indonesian case study. Both forms are examples of the fixed recall for the past 30 days and relied on a structured list-recall format.

The flexible recall period is often used when data are collected less frequently, or when a single visit survey is used. The questionnaire form may be more complicated, requiring extra information and additional computational time to derive food consumption quantities and expenditures, but including the frequency may yield more accurate consumption and expenditure estimates. A column for frequency is included in the form, allowing for the number of times an item is purchased or consumed during the reference period, or alternatively, whether it was consumed daily, weekly, monthly, or annually. So, for example, a household might report purchasing fish twice a week, but a tin of cooking oil only once a month. In the Nepalese study, expenditure data were collected over

five rounds in one year, using a flexible list-recall method with a "prompt" format for selected items and an "open" format for an "other" category (Appendix E). Appendix H and J provide additional examples of the flexible recall form.

The advantages of the list-recall method are that it only requires a single interview for each survey round because it is based on recall, the field survey costs are lower than for other methods, a larger sample can be covered, the response rate is high, and a flexible recall period can be used to capture infrequent, "lumpy" purchases. The disadvantages are that it does not account for waste loss in food consumption and other uses, and it may not capture the correct number of *de facto* household members eating meals during that period. For these reasons, the list-recall method tends to overestimate household food consumption.

24-HOUR FOOD RECALL SURVEY

The more direct interview technique for measuring household food intake is the 24-hour food recall method. This method relies on an interview with the household member responsible for meal preparation on the actual food consumed by all household members in the past 24 hours. Each meal is described, including the names of all dishes prepared and all raw ingredients used in each recipe. Information is collected on quantities, actual weight or an estimate using household measures, and the number of individuals present at the meal. Ideally, the shares of each individual are also recorded. Examples of the 24-hour food recall method are given in Appendices F, G, I, and L.

The 24-hour recall is easier to use than the household record method because household members need not record information themselves – an impossible task for households whose members are illiterate. This method requires only 20 to 30 minutes of the enumerator's time and is unlikely to distort the household's eating habits. The 24-hour food recall is a more accurate method for estimating actual consumption for the household than the list-recall method. Because of the shorter recall period, household members remember with greater accuracy foods consumed the previous day, and thus response rates are fairly high.

However, there are also disadvantages. First, there may be large intrahousehold or day-to-day variations in diet. In rural areas where daily variations in the diet are less common, this problem may be mitigated. However, seasonal changes in diet cannot be captured accurately by a single interview based on the past 24 hours. Thus, the 24-hour recall method may not be as representative of food consumption over longer periods as the list-recall method. For this reason, it may be necessary to repeat 24-hour recalls over a period of one year during each distinct season.

Furthermore, although respondents generally remember what they ate, they may have trouble recalling details such as all the ingredients in a certain dish or how much was served to the family. It may also be difficult for the cooks to distinguish between what was prepared on a given day versus what was actually consumed and by which household members. Whether this is a problem depends on

(1) eating customs and habits and whether meals are shared from the same dish, as in many African countries, or if meals are served as individual helpings; (2) whether all members eat together at the same sitting or at different times; (3) whether leftovers are retained for later consumption; and (4) whether snack foods and meals are eaten outside of the home, especially if some members are away from home at interview time.

The northern Malawi case study illustrates additional problems in using the 24-hour recall survey in polygamous households. The time needed to conduct the interviews varied depending on the number of cooks in a household. In some polygamous households, one wife was responsible for cooking the noon meal, while a different wife was responsible for cooking the evening meal. In others, wives traded off from one day to the next. In some, several wives cooked at all meals, each making a representative portion. In order to get a complete picture of the past 24 hours, several wives would have to be interviewed. New practical difficulties must be resolved, such as how to interview the different cooks, i.e., together or separately, and whether one wife should speak on behalf of an absent wife.

Finally, in many countries the cultural identification of food is only associated with certain staple foods. In Malawi, for example, respondents easily recall food eaten with the principal maize dish, *nsima*, but ignore snacks such as fruits and even complete meals when *nsima* is not served.

COMBINING METHODS: AN EXAMPLE FROM INDONESIA

The research objectives of the Indonesia study were to analyze the effects of seasonality on household food security and nutritional status. To meet these objectives, the questionnaire was designed to collect comprehensive food consumption and expenditure data on a monthly basis over a one-year period. More specifically, the questionnaire forms were devised to collect measures of household food consumption (both availability and intake), food expenditures, and total expenditure using a 30 day list-recall method for collecting food consumption and expenditures (Appendix C); a 30-day list-recall for collecting nonfood expenditures (Appendix D); and a 24-hour food recall survey for household food intake (Appendix F). The following discussion describes 1) why data from the 24-hour recall were not used to measure household food intake; and 2) how data from the 30-day list-recall method were ultimately used to derive both an estimate of food availability and an approximation of household food intake.

The 24-hour food recall had problems from the first month that the survey was implemented. The questionnaire form was poorly designed and confusing, leading to poor training of the enumerators and inconsistencies in collecting the data. The enumerators were often confused as whether to enter the raw uncooked quantity or the cooked quantity. They recorded some foods in their raw forms and others in their cooked form, and the researcher had no way of knowing which was recorded. The unit of measure was entered using local household measures, and although enumerators were instructed to weigh the food, in many cases enumerators failed to collect the information, either because they forgot to bring the scale

to the interview, or the scale was broken, or the food item from the previous day's meal was not available. Finally, no effort was made to capture food that was wasted or left over after the meal.

Despite efforts to revise the 24-hour food recall form and retrain the enumerators, the data did not improve over the course of the survey. In fact, revisions introduced new inconsistencies into the data from one period to the next. The 24-hour food recall data were collected and entered into the computer, but because of persistent problems the data were never cleaned or used to derive estimates of household food intake. Instead of using the 24-hour food recall data, the 30-day list-recall food consumption data were used to approximate household food intake.

Although there was no way of knowing ahead of time that the data from the 24-hour food recall would be "useless," the 30-day list-recall was designed so as to get a rough estimate of household food intake. Food consumption and expenditure data were collected from the same form, yielding both a physical and monetary measure of household food availability (Appendix C). Special efforts were made to approximate direct consumption by household members from that measure of food availability. To derive the nutritional definition of household food consumption, all food given to others for payment in kind, or as gifts, or other transfers out of the household (not including sales or other depletions from stocks unrelated to consumption purposes) were subtracted from food availability. The remainder, representing food consumed exclusively by household members, served as a close approximation of household food consumption (intake).

In retrospect, study resources were wasted by using two techniques to capture the same type of information. The amount of time needed to collect both the 30-day recall food consumption and expenditure data and 24-hour food recall data placed an extra burden on the respondents and the enumerators. Furthermore, additional costs were involved in printing both questionnaire forms, editing the data, entering the data into computers, and storing the data.

Household food availability and household food intake are measured differently, but neither is free from measurement error (Pinstrup-Andersen and Garcia 1984; Bouis and Haddad 1988). Furthermore, food consumption data collected from the list-recall method can closely approximate household food intake if special precautions are made to get measures of food given to others, food obtained by all household members outside of the household, and the number and composition of household members sharing meals for the given period. Thus, there is some choice as to which measurement is more appropriate, given objectives and available resources for a particular study.

It is not possible to review all the practical and technical issues involved in collecting food consumption data. However, examples of questionnaires using some methods can alert the reader to some of the most pressing problems, which are often ignored in the standard reference texts. The appendices give samples of questionnaire forms for the household record method, the list-recall method, and the 24-hour food recall method. For more information on the techniques involved in collecting data specific to food consumption using these and other

methods, the reader is directed to chapters 5-7 in Cameron and Van Staveren (1988) who describe, in detail, food weighing records, estimated records, and recall methods.

4. ORGANIZATIONAL ISSUES

Collecting consumption and expenditure data can be a demanding and difficult task. First, there is the sheer volume and diversity of the data being collected. Variables on physical quantities, as well as monetary values of all goods and services consumed, will eventually be derived from a single questionnaire. The goal is to make the postdata collection tasks, such as data checking, coding, cleaning, aggregation, and variable creation, as simple as possible. This is best done by ensuring that food consumption and expenditure data are collected and organized efficiently, and that measurement error at the respondent, enumerator, and data entry level is minimized.

In deciding how to design the consumption and expenditure questionnaire, the researcher must first decide whether or not to collect total household expenditures from a single form, or collect certain types of consumption and expenditure data from separate forms. One very common division is between food consumption (expenditures) and nonfood expenditures. Researchers often may desire more detail for food consumption and expenditures than for nonfood expenditures, in which case two forms may be more appropriate than one single form. After the data are collected and entered into the computer, the value of total food expenditures and the value of total nonfood expenditures can be summed together for a measure of total expenditure.

CORRECTLY RECORDING OR LISTING GOODS AND SERVICES

When using the list-recall method, the questionnaire is structured using either a "prompt" format, which gives a near-complete list of all goods and services, or an "open" format, in which the enumerator fills in responses as offered by household member(s). The open format gives the most flexibility in recording respondents' answers, and it requires no previous knowledge of the types of goods and services used in daily life. On the other hand, it may result in an underestimate of expenditures because respondents tend to remember habitual items used daily but have more difficulty recalling infrequent purchases or uses of goods and services. Also, coding the commodities for data entry becomes more demanding, because an open format cannot be precoded directly on the form.

For instance, in the northern Malawi case study, total household food expenditures (both food and nonfood expenditures) were collected from a single form given in Appendix B, using the open-list format. One major problem in collecting the expenditure data was with the coding accuracy of the enumerators. Enumerators recorded the expenditure transaction by writing in the household member's response and coding it from a list of codes provided to each enumerator. The coding scheme was structured in a very "academic" format that confused the

enumerators. The coding scheme was first divided into purchase of crops, purchase of processed and prepared foods, household goods, agricultural inputs, etc. Within those divisions, the individual item would be listed. The enumerators, however, often would locate the individual item without realizing that it was under the wrong category. Because the enumerators also filled out the expenditure made in writing, some of these coding errors were caught. Better enumerator training might have prevented these errors; however, an alternative would be to restructure a code sheet so that it was based on the individual items, listed in alphabetical order, with the use of the item being the subdivision. Table 1 provides an example. The approach would make the code sheet longer, but it might result in fewer coding errors.

Table 1 – Codes for How the Item is Used

Item	Purchased as Raw Crop	Processed as Flour	Processed as Biscuits	Paid for Services	Given as Gift
Local maize	001	200	210	460	830

Alternatively, the prompt format provides a checklist of detailed items under major categories such as food, housing, fuel and light, clothing and textiles, nondurable household goods, personal effects, semidurable household goods (dishes, baskets, furniture), household services (servants), personal care, health expenses, transportation, communications, recreation and entertainment, education, festivals and ceremonies, gifts, and taxes. These categories and specific items within them can be precoded directly on the form. Precoded forms reduce errors and free the researcher from the task of coding the data after collection. In the Indonesia study, the two separate forms used to collect food expenditures (Appendix C) and nonfood expenditures (Appendix D), were both designed using the prompt format.

The presurvey period is the time to find out the range of household goods and services used in the research site. The list should appropriately reflect the type and level of expenditures for the sample households.

RECORDING NONFOOD ITEMS

Nonfood expenditures should reflect the value of all services purchased or produced and consumed by the household, such as health and education. The expenditures should include both formal and informal sources of health care and education, for instance local midwives, traditional doctors, and religious education. However, some categories of nonfood expenditures, such as health, education, agricultural inputs, and business activities, might be captured

elsewhere in the survey. For instance, if there is a separate form on health and schooling that asks the amount of school fees or doctor fees and medicine purchased, then questions about these expenditures shouldn't be asked again, unless the researcher is interested in duplicating information for verification purposes.

Agricultural production costs for seed, fertilizer, pesticides, and hired labor are often not included in the nonfood expenditure category because these costs are generally entered on a separate form used to collect information on farm income and agricultural production practices (see Rozelle's paper in this series for a description of how these data are collected).

When the questionnaire is designed, try to distinguish between purchases for consumption and for investment. For instance, gold is acquired in Indonesia as an investment instrument in Indonesia. Households bought gold following the harvest and then sold it back at planting time to cover production costs for the next agricultural cycle. More confusing was the case in southern Malawi, where many households engaged in petty trading of commodities such as grains and dried fish. If a quantity of millet was purchased, for example, part may end up being consumed, part resold, and part used to brew beer for sale.

It is advisable to record the household's intention for acquiring such commodities especially when larger purchases are involved. This would be appropriate mostly for items where the quantity is greater than what might be expected for direct consumption by the household, or if the value of the item, such as gold, is significantly higher than the value of ordinary consumption items. This would allow the researcher to distinguish between purchases made for consumptive versus productive purposes.

Livestock, which are consumption and investment goods, are usually covered in a separate form for livestock production or under household assets (see the paper by Belbase in this series). Animal products produced and consumed by the household, such as eggs and meat, are entered as food expenditures from own production.

Taxes, nonfood gifts, and interest paid on loans are included among nonfood expenditures. Religious and cultural factors will influence both traditional and nontraditional expenditures. In cultures where gift giving plays an important role, or where religious taxes are mandatory, it is important to capture these expenses.

RECORDING FOOD ITEMS

Both the "open" format, where the enumerator enters the list of foods consumed, and the "prompt" format, which gives a near-complete list of foods eaten, require a detailed description of each food item. For rural household studies, these details usually refer to the condition or quality of foods: whether staple foods are milled or unmilled grain; whole grain, or processed into flour, bread, or other form; whether fruits, vegetables, and fish are fresh,

dried, salted, pickled, shelled, or skinned; for meats, the kind and part of the animal; for types of prepared foods, those local to the region; for milk, whether canned or fresh, and from what type of animal; for commercially prepared food to snack foods, and meals frequently purchased outside of the home.

For the *list-recall method* when using a prompt format, it is a good idea to create the list using the Food Composition Tables (FCT) prepared for the research country. Food Composition Tables are used to convert food consumption data into energy and other nutrients, and generally include the most comprehensive list of raw and prepared foods consumed in a particular country or area of the world.

In addition to using food composition tables, information on the variety of foods eaten should be obtained during the presurvey and then used to modify the original list. For some categories, such as fruits, vegetables and fish, it is wise to combine an open format with the prompt format, because many commodities may be seasonally available. The open format provides flexibility to allow for later additions or inclusions to the list of goods and the code list. It is often impossible to capture the variety of indigenous foods eaten using only the prompt format. An example of the list-recall method using a prompt format is found in Appendix C for the Indonesian case study.

For the *household record method* and for the *24-hour recall method*, all ingredients used in preparing specific dishes should be included; for instance, salt, garlic, onions, oil, or coconut milk used in cooking meats or vegetables. In order to aid the respondent in describing meals and specific dishes, both enumerators and supervisors should be familiar with local recipes.

MEASURING CONSUMPTION FROM DIFFERENT SOURCES OF ACQUISITION

To measure total consumption for the household, all the various sources of goods and services must be considered. These sources can be identified by using an operational definition, such as the following used in the Indonesia study:

own production	+	purchased items	+	wages in kind	+	gifts, loans, and other transfers.

"Own production" is produced at home for the household's own consumption, or that of others (guests or relatives), or for payment in kind to others for the specified reference period. It is not the total amount available in storage or current production at the time of the survey.

"Purchased" is bought by the household from the market, traders, a local mill, or other outlet and used by the household for their own consumption, or that of others (guests or relatives), or for payment in kind to others. Meals and snacks purchased from restaurants or street vendors should be included.

"Wages in kind" is received as payment for labor and used by the household for their own consumption, or that of others (guests or relatives), or for

payment in kind to others. It may be in the form of meals received or actual bulk of a staple commodity.

"Gifts, loans, and other transfers" is received from friends, neighbors, family, or government as a gift, loan, or subsidy. Included are foods received at communal events such as funerals, weddings, and other ceremonial, religious, or festive occasions.

The food consumption measurement includes food eaten outside of the home, such as snack foods and meals received as a guest or laborer eaten away from home, food purchased from street vendors, or foods received at community events.

For direct methods such as the *household record method* and the *list-recall method*, there may be confusion as to what quantities to record under the different sources of acquisition and how to assign the quantities consumed to appropriate sources for a given reference period. If the data are recorded correctly by source of acquisition, it will help provide both better overall estimates of household food consumption in terms of quantity, and total household expenditures. Obviously, it is particularly critical in studies that intend to explicitly analyze the sources of food consumption and expenditure.

Two points are important for correctly recording quantities consumed to appropriate sources. First, depending on the recall or reference period, the amount measured is what was consumed by the household or given to others by the household, not the absolute total available to the household from current production, purchases, or carry-over stocks. Over a long period, say one year, total food availability would include estimates of own production, purchases, and other sources. However, if the recall period were one week or one month, estimates of total production, purchases and carry-over stocks would likely overestimate the household's own consumption. This is especially true for wealthier households or surplus food producers, who may produce and store large amounts of food to be consumed over a long period of time.

Second, if food from carry-over stocks is consumed, this amount is listed under the original source of acquisition. For example, in April, 500 kilograms of rice was harvested, 400 of which was stored and 100 of which was consumed in April. One hundred kilograms is recorded under own production for the commodity rice. In the following month, 100 kilograms is consumed, 50 kilograms is sold, and 250 kilograms remains in storage. One hundred kilograms is listed under own production for rice because own production was the original source of acquisition. Since the value of rice consumption from own production may differ from the expenditures on purchased rice, it is important to accurately record the consumption quantities under their original source of acquisition.

If carry-over food stocks are composed of several sources of acquisition, say purchased and home-produced rice, the researcher will have to provide a consistent rule of thumb to enter the data accurately. For instance, the respondent can be asked for an estimate of the share from purchased and the share from home-production. If the total amount of rice consumed was 100 kilograms,

with 40 percent from purchases and 60 percent from own production, the enumerator would fill in 40 kilograms under purchases and 60 kilograms under own production.

Coordination of the questionnaire design, clarity of language used on the form, and enumerator training can help the researcher collect accurate data from multiple sources of acquisition. The food expenditure and consumption form for the Indonesia case study given in Appendix C was explicitly designed to capture total food consumption by the four sources described above. The form also differentiates between the total quantity and value of cash purchases and the actual amount consumed (or given to others) from those purchases.

An earlier version of the form had only a single section for recording the quantity, price, and value of purchased commodities. However, since the language was vague, it was difficult to determine whether the amount purchased was just equal to the amount consumed for the recall period, or whether there was carry-over into the next recall period. If the total purchased quantity for the particular item was greater than what the household actually consumed, household food consumption for that recall period would be overestimated. The questionnaire was revised to distinguish between the total amount purchased and the amount actually used by the household during the recall period. The last column, total own-household consumption, was then the sum of consumption from purchases, own production, wages in kind, gifts, loans, and other transfers minus the quantity of food given or lent to others.

Proper training of the enumerators is also critical in reducing the confusion which might arise in asking about household consumption from various sources. Enumerators must understand what is being asked for in the questionnaire. They must understand the distinction between purchased and nonpurchased foods, the components of nonpurchased foods, and the difference between total available food from various sources versus the actual amount of food consumed by the household.

In addition to understanding the questionnaire form, the enumerator should be trained on how to elicit the required information. For each item consumed by the household the enumerator should be taught the proper sequence of questions to ask. Using the Indonesia example in Appendix C, the enumerator would first ask about rice purchases, "Was any rice purchased?" If the response is yes, the enumerator enters the quantity, price, and value of rice purchases, then follows up with, "How much of that rice was consumed by the household or given away to others?" For nonpurchased sources, the enumerator would simply ask, "Was any rice consumed from home production?" If yes, the respondent would ask, "How much rice was consumed from home production?" The enumerator would continue to ask these questions for each nonpurchased source and then move on to the next item on the list.

ESTIMATING QUANTITIES AND QUANTITY STANDARDS

For the purposes of determining the value of home-produced consumption and for deriving calorie estimates of food quantities consumed, it is important to

get a final measure of grams or kilograms for most items consumed in the household. This section describes several methods for estimating quantities, and for converting typical household measures into grams or kilograms.

There are generally four ways to record quantities: 1) Foods can be weighed or estimated and recorded directly in grams or kilograms. 2) Food items can be recorded as weight measures based on 1 ounce = 28 grams. 3) Food items can be recorded using a unit measurement, i.e., 1 egg, 1 apple, 1 small coconut, based on a reference weight for the unit. 4) Food items can be recorded using volumetric estimates which are used together with density conversion factors.

Whenever possible, the unit measures most common in the research area should be recorded. For instance, in Indonesia, household members were familiar with kilograms, grams, and liters, and it was easy to record the consumption of rice in standard measures. However, for most nonstaple foods, respondents were more comfortable using local measures, such as bottles, cups, spoons, glasses, bags, sacks, bundles, and bunches.

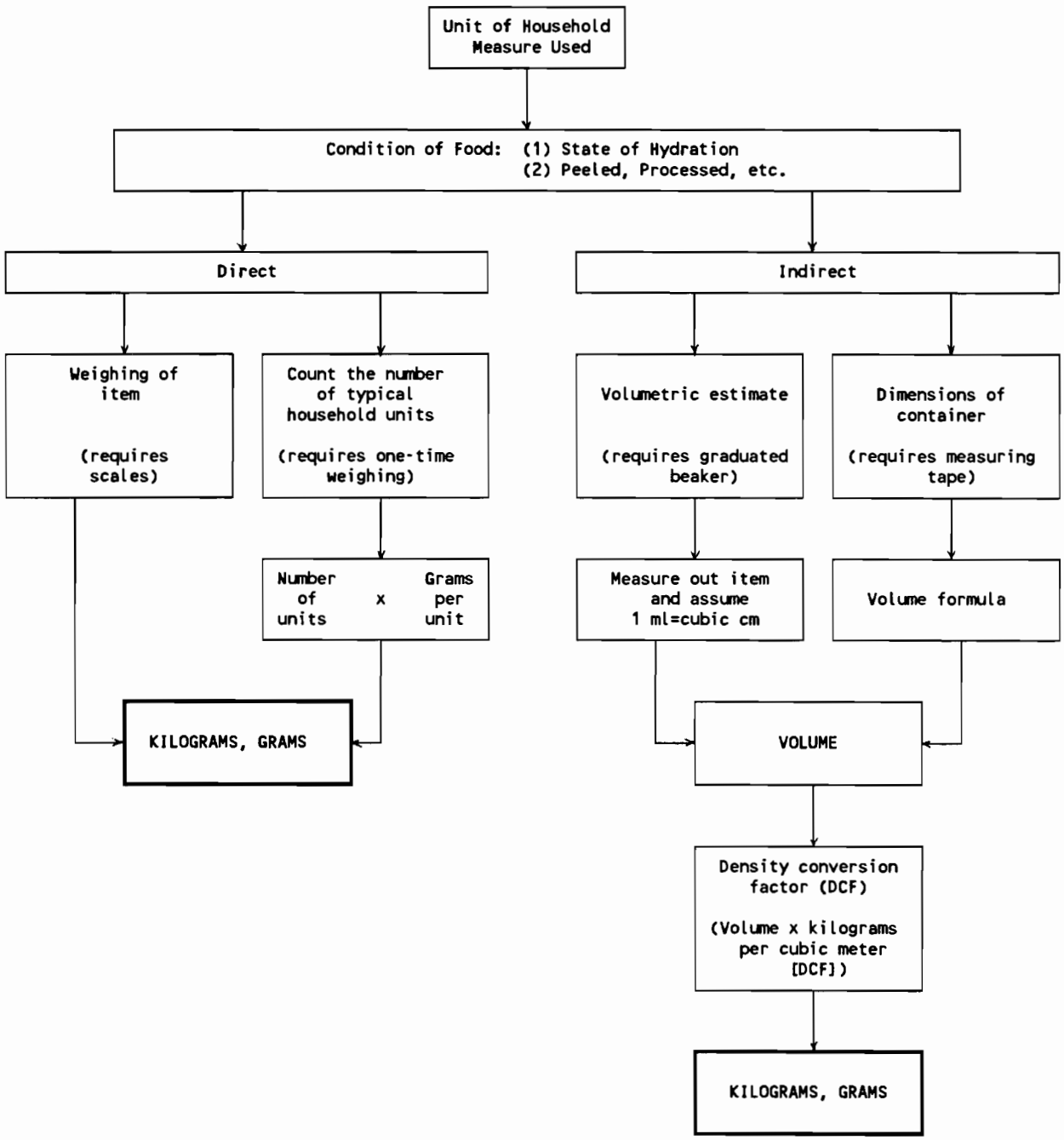
Table 2 shows the various methods for getting from household measures to grams or kilograms using direct and indirect methods. Direct methods include weighing the item at each interview. For some types of household units, the weight of the unit filled with a particular item is measured once and then used as the reference weight for that particular item. Indirect methods for estimating quantities include estimating volume or measuring the dimensions of each household container. The enumerator should not leave the household without either a measure of weight, the number of common or household units (with a known reference weight), the volume of the item used, or the dimension of container.

In some cases, one measurement of household units is sufficient to get a standard conversion rate. For instance, 1 cup may usually approximate 8 ounces. Then the household measure can be coded as cup = "A" and the enumerator would record the number of cups consumed. After the data are collected, the quantity is then converted to a standard measure, such as kilograms or grams. Similarly, for common standards like eggs or commercial bread, the enumerator would simply enter the number of eggs or loaves of bread. The quantity would then be converted to grams per unit using the appropriate reference weight for that food item.

In other cases, the household measure may be a bunch of some vegetable, a basket of beans, or fruits of different sizes. In this case, the portion size must be estimated by weighing the closest food available, either the food item available at the respondent's home at the time of the interview, or weighing a similar bundle at the local market. Direct methods are the quickest and easiest way to get grams or kilograms; however, required food scales may be too costly for some studies.

If a volumetric estimate is used, the enumerator carries a plastic container graduated in milliliters to each interview. The enumerator asks to see the household's measure of maize flour, for example, and then gets a volumetric measure in liters. Using known density factors, the maize flour is then

Table 2 – Getting from Household Measures and Common Measures to Kilograms



converted into kilograms or grams. The density factors are from published measurement-weight equivalent tables or calculated by the researcher herself. Alternatively, the enumerator can carry a measuring tape to each interview and record the dimensions of each container of food used by the household during the recall period. Using these dimensions, a formula is used to derive its volume (Selby 1972), which is then converted into kilograms.

In the Indonesia study, households used many of the same types and sizes of containers for measuring rice, sugar, oil, and salt. It was possible to measure those items in these containers once and use the same matrix of conversion factors for different households in the same village. For example, in Indonesia, most households measured rice using a *kobok*, a cup-like container holding approximately 500 grams. However, for other food items using a standard conversion factor did not always produce the most accurate estimates. For instance in West Timor, Indonesia, the household measure for consuming corn was called a *kuda*, which refers to 16 ears of corn tied together. The size of a *kuda* of corn could vary between different households or within the same household, depending on the size of the ears of corn. Yet when the respondent was asked how many *kudas* of corn were consumed, they were not asked about the size. Hence, the conversion factor used for 1 *kuda* was equal to an average weight of 8 kilograms, which most likely led to inaccurate weight estimates.

In northern Malawi, households used all different shapes and sizes of containers, and the study was too large to provide food scales to each enumerator. Reliance on a single set of volume conversions based on standardized shapes in this case would introduce considerable error. Researchers started out by getting only verbal estimates of quantity. Afterwards that was modified in an attempt to get greater accuracy. The researcher debated whether each container in the household should be initially measured, whether relevant containers should be measured each time the vessel is used, or whether the study should consider providing the household with containers of a known volume. Since maize or cassava flour was the major source of calories in the Malawian diet, she compromised by trying to get a volumetric estimate of flour by measuring the equivalent amount of flour used. For remaining food items, she measured the height and diameter of the container each time that it was used. Although this method was time consuming, it was less expensive than buying food scales for each enumerator or providing containers to each household. Appendix L provides an example of the form used in the northern Malawi study, and Appendix M provides an example of instructions for enumerators on how to use the volumetric system of measuring foods.

During the presurvey, making an inventory list of all possible local (household) measures is extremely important. Depending on the household's knowledge of standard measurement units, the range of containers used by different households and the study's resources, the researcher can decide which method, or combination of methods, is most suitable. For example, if food scales are affordable, the enumerators can directly weigh some or all food items. In studies with fewer resources, volumetric estimates, which require a graduated plastic beaker for each enumerator, may be more affordable. Most often a combination of methods is used, which will require advance planning and enough

time to purchase and test out food scales, beakers for measuring volume, or other utensils of various shapes and sizes before the first round of data collection begins.

CONVERSION FACTORS, CODING, AND WEIGHT RATIOS

When assorted weight and volume measures are used for various types of the same commodity, the researcher is faced with the task of converting them into a single measure. The researcher should anticipate the many different types of conversion factors, since when this is done for many food commodities, it might involve quite a large matrix of conversion factors.

First, as shown in Table 2, it is extremely important to know the condition of the food item. The easiest way to account for the different conditions of an item is to build them into the food list, as mentioned in the section on recording food items. For example, instead of having a single listing of corn, there might be four listings of corn for white on the cob, fresh; white on the cob, dried; white flour; yellow fresh; and yellow dried.[1] The condition of the commodity will determine which conversion factor is used to convert a typical household measure or volumetric measure into grams or kilograms.

Second, if direct weighing methods are used, conversion factors are recorded for those common measures or standard household units, which are measured once and then used throughout the survey to directly derive the weight in grams or kilograms (i.e., cup, glass, spoon, *kobok*, eggs, commercial bread or noodles). If indirect volumetric estimates are used, density conversion factors are collected to derive kilograms from volumetric estimates. Conversion factors for standard household units and density conversion factors vary depending on the condition of the food item.

For multiple-visit surveys, it is extremely important to collect appropriate conversion information in a timely fashion. A prolonged delay may result in not being able to get the conversion factor because the crop is no longer in season. In addition, the conversion rate for some home produced food crops will change as the level of hydration changes. For example, in the Indonesia study corn had a different weight at the time of harvest, when the water content is higher, than at the time of consumption several months later, after it has dried.

For every food item not in standard units, a conversion factor must be available. Unfortunately, this is easier said than done. In Indonesia, the final quantity entered on the form was the amount of each food consumed by the household. Enumerators and field coordinators were instructed to convert the

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[1] A detailed food list, giving the condition of the food item, will make the food list longer. However, for researchers interested in deriving calorie and other nutrient information from the quantity data, the descriptions will also be useful for assigning the correct nutrient conversion factors.

total quantity for each item into kilograms. However, when the data were entered into the computer, it was clear that hundreds of entries had not been converted into kilograms, costing extra money and time in postcollection cleaning.

Furthermore, the decision of whether to record all the units for the different sources of acquisition in the same unit should be made in advance. For instance, rice consumed from own production may be recorded as sacks, while rice consumed from wages in kind during the same period is recorded in cups. It is recommended that all entries be converted into the same unit before the data is entered into the computer, as this will facilitate summation across different sources for each food item.

The enumerator should be provided with a code list for recording the unit of measurement at each interview. The code list can either be part of the questionnaire form, with codes listed at the bottom of the page, or the enumerator can carry a list of codes provided in the instruction booklet. As with food item lists, code lists should provide flexibility for adding or including new measures that appear during the course of the survey. The household measure can often be written directly on the form, or if the code for "other" is used, a blank space should be provided so that the enumerator can describe the measure. For any new household measure added to the list, it is critical that the enumerator record its weight, volume, or dimension.

In addition to codes for the unit of measurement, the enumerator, field coordinator, or researcher should prepare a detailed list of conversion factors for each commodity by its condition and the unit of measurement listed on the code list. The list should be updated at each survey visit. After the survey is complete, the list (or lists) should be saved as part of the survey documentation. In the event that food items were not converted into kilograms, grams, or a volumetric measure at the time of the interview, this list will be crucial to the survival of the researcher at the time of data cleaning.

Finally, the researcher must also collect information (and document) weight ratios for different conditions of the same commodity. Weight ratios are conversion rates for getting from unmilled grain to milled grain; animals' live weight to dressed weight; and for other commodities (groundnuts, corn, other legumes) from unshelled to shelled and from husked to unhusked. Weight ratios are important for valuing home produced commodities that might be stored in one condition and consumed in another. For instance, if groundnuts are recorded as unshelled, but the only market price available is for shelled, then the researcher can use the weight ratio to derive the equivalent quantity and apply the price per shelled groundnuts to derive its expenditures.[2]

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[2] For similar reasons, weight ratios can be used in converting quantities into nutrient values. If a type of bean, for example, is recorded on the questionnaire as unshelled, yet the Food Composition Table (FCT) only lists calorie conversion factors for shelled, then the weight ratio can be used to make the recorded quantity compatible with the FCT listing.

FOOD WEIGHING AND ESTIMATION

The training of fieldworkers and the proper use of equipment (food scales) is essential if household food consumption is to be accurately captured and enumerator error is to be reduced.

1) Food scales should be of the best quality, durable, easy to carry, and protected by a carrying case to prevent unnecessary wear and tear. Respondents should not play with the equipment during the interview.

2) Scales should be provided for each fieldworker or team of fieldworkers. This will prevent guessing when scales are not readily available, especially when using the list-recall method.

3) The fieldworkers should be trained in proper use and care of the food scales. They should know how to measure foods directly on the scale and when using household containers.

4) Food scales should be working and calibrated before each household visit. Extra scales should be available in case scales are broken.

5) Fieldworkers should know the form of the food they are weighing or estimating. For fruits, vegetables, or meats, it should be noted whether they are with skin or peeled, in the shell or unshelled, with seeds or bones or without, etc. Guidelines for determining the form of these foods should be in accordance with the Food Composition Tables.

DETERMINING WHICH FAMILY MEMBERS ARE INCLUDED AT MEALS

Accurately capturing the number of family members included at meals can be difficult because not all household members are present during a given meal, day, week, or month, and guests may be present at meals.

For the *list-recall method*, the longer the recall period, the more difficult it is to determine who should be included in household food consumption. If the recall period is one month, as in Indonesia, household members often migrated for one to two weeks during the month, but were present at the time of the interview. Thus, the baseline information on family members (age and sex) did not always reflect the number of mouths that were fed in that month. Special care can be taken to account for household members not present or guests present during the recall period. This information is used to adjust the consumption data to reflect the true household composition.

For *24-hour recall*, the total number of persons, both family members and guests, should be recorded on the questionnaire form. Appendix K provides an example of how to collect data on household members and guests that ate during the past 24 hours. However, note that this information is insufficient for determining individual food consumption. The total figure for household food consumption, derived from 24-hour food recall data, divided by the number of

family members present, yields consumption per capita, but does not show intrahousehold food distribution. Researchers interested in intrahousehold distribution issues are advised to collect individual food intake (see Low's paper in this series).

RECORDING THE RECALL PERIOD

When data are collected over multiple rounds, delays in scheduling, missed interviews, or absent respondents all affect the length of the recall or reference period. If visits are made monthly and the reference period reflects the days between two survey rounds, respondents should be asked about consumption since the last visit to ensure coverage of the whole period with no overlap or gaps. The questionnaire should include the date of both the last interview and the current interview and the number of days in the actual recall period.

5. CONCLUSIONS

This paper focused on the collection of consumption and expenditure data for rural household studies. Such data can be applied to a wide variety of issues in both socioeconomic and nutritional studies. Definitions of consumption and expenditure are numerous and often confusing, thus clear research objectives are the first step in designing the data collection methodology. Additional criteria, such as project resources, assessibility and environment of the study sites, detail, and other alternatives will contribute to the final choice or combination of methods used.

The major direct methods used to collect consumption and expenditure data are household record method, list-recall method, and 24-hour recall. Table 3 summarizes the methods with respect to respondent and enumerator burden, accuracy, training, and cost. Of these methods, the household record method is the most accurate; however, it is also the most time consuming and expensive. Furthermore, it requires that household members be literate or that the enumerator be present to observe household consumption and purchases. The list-recall method is the most efficient, least expensive, and most manageable for large samples. The 24-hour recall is more accurate than the list-recall, it is easy to administer, and it can cover a moderate sample size; however, it may not accurately portray household consumption over longer periods of time.

Organizing the collection of consumption and expenditure data is critical to facilitating the tasks of data entry, cleaning, and analysis. Designing the questionnaire properly is the first step toward reducing frustrations. Proper design includes capturing the range of both food and nonfood goods and services consumed by the household, measuring these quantities and values correctly, and ensuring that they represent the consumption of the household members for the specified reference period. Finally, training enumerators on gathering information using interview techniques and measuring quantities is critical to obtaining high-quality data.

Table 3 – Comparison of Consumption and Expenditure Data Collection Methods

	Record	List-Recall	24-hour Recall
Researcher time	High	Moderate	Moderate
Respondent time	High	Moderate	Moderate
Accuracy of data	High	Moderate	High/ moderate
Manageable sample size	Smallest	Highest	Medium
Researcher or enumerator presence may cause bias	Yes	No	No
Infrequent purchases likely to be recorded	No	Yes	No
Captures snack foods and meals eaten away from home	No	Yes	No
Training time for enumerators	Highest	Lowest	Medium
Overall Cost	High	Low	Mod-Low

APPENDIX A

EXAMPLE OF A HOUSEHOLD FOOD RECORD

Household Food Record (Observation) I.D. | | | | | | 2. Date | | | | | | | | | | | | 3. | 1 | Morning | 3 | Evening | | 2 | Afternoon | 4 | Other |

4	5	6	7	8	9	10	11				12	13		14
Recipe Code (start with 1. cont. until evening	Menu	Ingredients	Describe Food	Amount/ Measure	Unit	Unit Code	Weight (select best method)					Cost		Source
							Direct		Estimated		Rupiah per unit	Unit	Unit Code	1=buy 2=own 3=wage 4=gift
							AP	EP	Raw	Cooked				

Source: Ralston (forthcoming).

APPENDIX B

EXAMPLE OF THE FIXED RECALL METHOD USING AN OPEN-LIST FORMAT: MALAWI CASE STUDY

C. EXPENDITURES - FOUR DAY RECALL

Kodi dzulo mwagula kanthu kapena kulipira kapena kumpatsa munthu ndalama? YES NO
- the preceding three days? YES NO

The last local market day was:

Kodi dzulo munasinthitsapo katundu (zinthu) kapena chakudya kwa anthu ena? YES NO
- the preceding three days? YES NO

PROMPT FOR EACH CATEGORY INDIVIDUALLY

1) Nanga munagula chakudya?
2) Nanga katundu wa m'nyumba?
3) Nanga mwagulapo za kumunda kapena za ziweto?
4) Kodi mwalipilapo a ntchito kapena a ganyu?
5) Kodi mwaonongapo ndalama pa transport kapena kulipira sukulu kapena kukhoma msonliko?
6) Kodi mwaptso aliyense ndalama?
7) Kodi mwabwezapo ngongole?

Cash or in-kind?		What did you spend money for or why did you give goods?	Expend. Code	Where was the expenditure made (or to whom)?	Code	Amount	Units	Price per unit	Total Value
Y	C	X							K____.__
E									
S	C	X							K____.__
T									
E	C	X							K____.__
R									
D	C	X							K____.__
A									
T	C	X							K____.__
	C	X							K____.__
O	C	X							K____.__
T									
H	C	X							K____.__
E									
R	C	X							K____.__
3	C	X							K____.__
D	C	X							K____.__
A									
Y	C	X							K____.__
S									
	C	X							K____.__
	C	X							K____.__

D. EXPENDITURES - ONE MONTH RECALL

Kodi nanga mwezi wathawu mwagulano zinthu kapena kulipera anthu ndalama zosachepera K3.00? YES NO

Kodi mwasinthitsapo katundu kapena chakudya choposera mtengo wa K3.00 kwa munthu wina aliyense? YES NO

Cash or in-kind?		What did you spend money for or why did you give goods?	Expend. Code	Where was the expenditure made (or to whom)?	Code	Amount	Units	Price per unit	Total Value
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__
	C	X							K____.__

APPENDIX C

FIXED LIST-RECALL METHOD: EXAMPLE FROM INDONESIA

FOOD EXPENDITURE AND FOOD CONSUMPTION SINCE THE LAST VISIT RECALL PERIOD from _____ to _____ HH I.D. |_|_|_|_|_|_|

		PURCHASED						NONPURCHASED								Given/Lent to others				Total Own Consumption	
No.	Commodity Item	Total Cash Purchases				Consumption from Purchases		Own Production		Wages in Kind		Gifts, Loans, Other Transfers		Price per Unit (Rp.)	Value (Rp.)						
		Quantity	Unit	Price per unit	Value (Rp.)	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit			Quantity	Unit	Price per unit	Value (Rp.)	Quantity ((7+9+11 +13-17)	Unit (kg)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100	GRAINS																				
101	Rice																				
102	Rice Products																				
103	Wet Fresh Corn																				
104	Dry Corn																				
105	Corn Flour																				
106	Wheat flour																				
200	ROOTS AND TUBERS																				
201	Cassava																				
202	Sweet Potatoe																				
203	Dried Cassava																				
204	Tapioca flour																				
205	Potatoes																				
206	Taloe																				
300	LEGUMES, BEANS																				
301	Soybeans																				
302	Peanuts																				
303	Green beans																				
304	Red beans																				

APPENDIX D

EXAMPLE OF LIST-RECALL METHOD FOR NONFOOD EXPENDITURES: INDONESIA CASE STUDY

H.H. ID | | | | | | |

NONFOOD EXPENDITURES

1. How much was spent on each of the nonfood items listed below since the last visit?

CODE	Type of Expenditure	Total Quantity (Units)	Value	
			Price/ Unit	Total (Rp.)
1	HOUSING			
1.1	Purchased			
1.2	Improvement costs			
1.3	Rent/contract			
	SUB-TOTAL 1			
2	FUEL AND LIGHT			
2.1	Firewood			
2.2	Coconut Fiber			
2.3	Coconut Husk			
2.4	Kerosene Oil			
2.5	Coal			
2.6	Battery			
2.7	Electricity			
2.8	Matches			
2.9	Gas/diesal/petrol			
2.10	Other, give name;			
2.11				
2.12				
	SUB-TOTAL 2			

Appendix D (continued)

HH I.D. | | | | | | |

Block O (Continued)

CODE	Type of Expenditure	Total Quantity (Units)	Value	
			Price/ Unit	Total (Rp.)
3	HOUSEHOLD GOODS/SUNDRIES			
3.1	Soap			
3.2	Laundry Soap			
3.3	Toothbrush and toothpaste			
3.4	Shampoo			
3.5	Beauty supplies			
3.6	Other, list items:			
3.7				
	SUB-TOTAL 3			
	TOTAL (1+2+3)			
4	CLOTHING (include textiles)			
4.1	Adult males			
4.2	Adult females			
4.3	Children			
	TOTAL (4)			
5	HEALTH			
5.1	Doctor's fees			
5.2	Nurse's, Midwife's fees			
5.3	Drugs			
5.4	Traditional Health Fees			
5.4	Birth Control			
5.5	Traditional medicines			
	TOTAL (5)			

Appendix D (continued)

HH I.D. | | | | | | |

Block O (Continued)

CODE	Type of Expenditure	Total Quantity (Units)	Value	
			Price/ Unit	Total (Rp.)
6	EDUCATION			
6.1	School fees			
6.2	Boarding fees			
6.3	Religous School fees			
6.4	Uniforms			
6.5	Books and supplies			
6.6	Allowance			
6.7	Others, list			
6.8				
	TOTAL (6)			
7	COMMUNICATION AND RECREATION			
7.1	Writing paper/pens/pencils			
7.2	Newspaper and magazines			
7.3	Sporting goods			
7.4	Cinema, other entertainmnet			
7.5	Musical events/instruments			
	SUM-TOTAL 7			
8	FESTIVALS AND CELEBRATIONS			
8.1	Weddings			
8.2	Funerals			
8.3	Births			
8.4	Religous festivals			
8.5	Other, list:			

Appendix D (continued)

HH I.D. | | | | | | |

Block O (Continued)

CODE	Type of Expenditure	Total Quantity (Units)	Value	
			Price/ Unit	Total (Rp.)
9	TRANSPORTATION			
9.1	Own-transport (petrol,maintenance supplies, horse feed)			
9.2	General Transport umum (for family)			
	SUB-TOTAL 9			
10	PURCHASES, IMPROVEMENTS AND RENTAL OF SEMI-DURABLES			
10.1	Land			
10.2	Kitchen goods (stove,etc.)			
10.3	Furniture (table, chairs, cabinet)			
10.4	Umbrella, hat,			
10.5	Gold			
	SUB-TOTAL 10			
11	TAXES AND INSURANCE			
11.1	Land Tax			
11.2	Livestock Tax			
11.3	Radio tax			
11.4	T.V. tax			
11.5	Transportation tax			
11.6	Other, list:			
	SUB-TOTAL 11			
12	GIFTS AND CONTRIBUTIONS			
13	KIRIMAN (CASH TRANSFER)			
14	RECEIVE LOAN			
15	REPAY LOAN			

APPENDIX E

FOOD AND NONFOOD EXPENDITURE SURVEY FROM NEPAL STUDY

FOOD FROM OFF OWN-FARM SOURCES:

Since the last visit, how much of the following food items did you (household) purchase, receive in kind as wages, borrow, or receive as gifts?

Item	Source	Quantity	Price	Total Value	Frequency of purchase in months	Remarks (note if purchased for festivals
"Open" format 1. Grains _____ 2. Lentils _____						

NONFOOD EXPENDITURES:

Since my last visit, what have you spent on the following items?

Items	Quantity (optional)	Total Value (cash and in-kind)	Frequency purchased in months
List of 32 items "prompt" format			

APPENDIX F

EXAMPLE OF 24-HOUR RECALL: INDONESIA CASE STUDY

Code: [ ][ ][ ][ ][ ][ ][ ][ ]

Date: [ ][ ][ ][ ][ ][ ]

BLOCK L

L.1 24-HOUR RECALL HOUSEHOLD FOOD CONSUMPTION

1. How many times did the family eat yesterday?

2. What foods, including snacks, were consumed by the family yesterday? For each meal, give the name of the recipe, the ingredients for each recipe, the source, the amount of the uncooked food in standard or household measures, the price unit, and weight in grams of each food item included. Ask the number of family members who ate during each meal.

No. item	Name of recipe	Code no. food/ recipe	Name of raw food ingred- ient	SOURCE	Uncooked Quantity		Price/ Unit (Rp.)	Weight (g)	Total number family members who ate
					QTY	UN- IT			
1	2	3	4	5	6	7	8	9	10

APPENDIX G

EXAMPLE OF 24-HOUR RECALL METHOD

BLOCK U: HOUSEHOLD FOOD INTAKE: 24-HOUR RECALL

Household ID # _____ Respondent Code _____ Interview Date _____
Date of Food Intake _____

MEAL	RECIPE	INGREDIENTS	DESCRIPTION	HOUSEHOLD UNITS OF MEASUREMENT	COST	WEIGHT		CONVER-SION TO GRAMS	FCT CODE	INTAKE # 1 HH Code	INTAKE # 2 HH Code	INTAKE etc. HH Code
						AP	EP					

Source: Bouis (1985).

Appendix G (continued)

DO NOT COLLECT DATA ON INDIVIDUAL INTAKES OF NONHOUSEHOLD MEMBERS PRESENT AT THE MEALS, BUT ASK:

1. Were any guests or workers present at any of the meals which we have just asked about who shared in the recipes which you described for us?

   Yes _____ No _____

   IF NO, GO TO QUESTION 2.
   IF YES, ASK: (FILL IN THE TABLE BELOW.)

   How many guests or workers were present at each meal? Were they adults or children, male or female?

MEAL	TOTAL NUMBER OF GUESTS	BREAKDOWN OF GUEST TYPES
BREAKFAST		Adult Males = Adult Females = Children =
LUNCH		Adult Males = Adult Females = Children =
DINNER		Adult Males = Adult Females = Children =
MERIENDA A.M. OR P.M.		Adult Males = Adult Females = Children =

2. Were any children breastfed during the day for which you have been recalling your food intake?

   Yes _____ No _____

   IF NO, GO TO NEXT BLOCK.
   IF YES, ASK:

   What is the child's name? _____

   How many times was he/she breastfed? _____

   What was the average feeding time? _____

APPENDIX H

EXAMPLE OF FLEXIBLE LIST-RECALL METHOD FOR FOOD EXPENDITURES

FOOD ITEM	NORMAL FREQUENCY OF PURCHASE FOR THIS SEASON	PURCHASED FOOD			NONPURCHASED FOOD CONSUMED							
		QUANTITY	PRICE	TOTAL EXPENDITURE	QUANTITY	OUT OF HOME PRODUCTION	FROM IN KIND WAGES	AS GIFTS	BORROWED	LENT	ESTIMATED PRICE	ESTIMATED TOTAL VALUE
CEREAL AND CEREAL PRODUCTS												
Rice												
Rice Products (bihon, rice flour, native delicacies)												
Corn Grits												
Corn Products (binatog, binaki, tilaog, puto, maja blanca)												
Bread and Other Cereal Products (noodles, misua, miki, pan products, biscuits, cakes, etc.)												
Starchy Roots and Tubers												
kamote												
potatoes												
cassava and products (suman, linupak)												
others (gabi, ubi)												
SUGARS												
Sugar												
(Panutsa)												
FATS AND OIL												
Cooking Oil												
Mantika ng Baboy												
FISH, MEAT, AND POULTRY												
Fresh Fish												
Dried Fish (tuyo, tinapa, etc.)												
Shrimps and Shellfish												

Source: Bouis (1985).

APPENDIX I

EXAMPLE OF PRECODED FORM FOR 24-HOUR FOOD RECALL METHOD

HOUSEHOLD FOOD INTAKE

H.H. No. [1 2 3] [4] Card No. [2 6] (5 6) Eating Unit [7 8] Round No. [9]

(1) Food Item	(2) Time	(3) Amount/ Measure	(4) Units	(5) RCC	(6) CMC	(7) Waste	(8) Leftover	(9) Srce	(10) Item Code
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30
____	10	11 12	13 14 15 . 16 17	18	19	20 21 . 22	23 24 . 25	26	27 28 29 30

Codes:

Time
1 = Breakfast
2 = Lunch
3 = Supper/Dinner
4 = Other

Amount/Measure
01 = 500 gram tin (KIMBO/cowboy)
02 = 1 kg tin
03 = 2 kg tin
05 = 4 oz dish
06 = 8 oz dish
07 = 16 oz dish
08 = 32 oz dish or kettle
09 = 20 liter tin
10 = liter
11 = milliliter
12 = 1 teaspoon
13 = 1 tablespoon
14 = kilogram
15 = treetop/800 ml
16 = actual count, '1'
17 = soda bottle
18 = packet
19 = shopping basket
20 = 50 kg sack
21 = 90 kg sack
22 = grams
23 = hand
24 = bunch
25 = 250 grams
98 = undetermined

Source
= Provided by EU
= Provided by other HH member
= Bought
= Other

Source: Kennedy (1984).

APPENDIX J

EXAMPLE OF PRECODED FORM FOR FLEXIBLE RECALL FOR FOOD EXPENDITURE DATA

FOOD EXPENDITURES

H.H. No. (1 2 3) (4) Card No. 3 0 (5 6) Eating Unit (7 8) Round No. (9)

CATEGORY NAME	ITEM NAME	ITEM CODE (10 11 12 13)	TOTAL PRICE (14 15 16 17 18)	PURCHASE Unit Code (19 20)	PURCHASE Quantity (21 22)	PURCHASE Time (23)	OWN PRODUCTION Unit Code (24 25)	OWN PRODUCTION Quantity (26 27)	OWN PRODUCTION Time (28)
A. FOODS CONSUMED AT HOME									
Cereals and Grains	Maize Flour	1 1 0 1	.						
	Maize	1 1 0 2	.						
	Millet	1 1 0 3	.						
	Rice	1 1 0 4	.						
	Wheat Products	1 1 0 5	.						
	Doughnuts/ Mandazi	1 1 0 6	.						
	Bread	1 1 0 7	.						
	Cake	1 1 0 8	.						
	Biscuits- Sweets	1 1 0 9	.						
	Biscuits- Cracker	1 1 1 0	.						
	Finger Millet	1 1 1 1	.						
	Sorghum	1 1 1 2	.						
	Grinder	1 1 1 3	.						
	Other	1 1 9 9	.						
Roots and Tubers	English Potatoes	1 2 0 1	.						
	Sweet Potatoes	1 2 0 2	.						
	Cassava	1 2 0 3	.						
	Yams	1 2 0 4	.						
	Taro	1 2 0 5	.						
	Cassava Flour	1 2 0 6	.						
	Other	1 2 0 7	.						
Pulses	Roscoco	1 3 0 1	.						
	Beans	1 3 0 2	.						
	Peas	1 3 0 3	.						
	Groundnuts	1 3 0 4	.						
	Cowpeas	1 3 0 5	.						
	Simsim	1 3 0 6	.						
	Other	1 3 9 9	.						
Vegetables	Tomatoes	1 4 0 1	.						
	Onions	1 4 0 2	.						

Unit Codes: Same as amount/measure from Card 26.

Time Codes: 1 = Daily; 2 = Twice a week; 3 = Three times a week; 5 = Weekly.

Source: Kennedy (1984).

APPENDIX K

EXAMPLE OF HOW TO COLLECT INFORMATION ON NUMBER OF HOUSEHOLD MEMBERS AND GUESTS PRESENT DURING PAST 24 HOURS

HOUSEHOLD FOOD CONSUMPTION

H.H. No. (1 2 3) (4)

Card No. (5 6)

Round No. (7)

D D M M Y Y

1. How many meals were prepared by you during the past 24 hours?

1a. Who is responsible for this eating unit? (PUT IN PERSON CODE)

2. How many persons ate at the following times? (CHILDREN ARE PERSONS 15 YEARS OF AGE OR LESS)

3. How many visitors were at each of the meals yesterday?

	Eating Unit	Men	Women	Children
	(8 9) (10 11) (12 13)			
Morning		(14 15)	(16 17)	(18 19)
Afternoon		(20 21)	(22 23)	(24 25)
Evening		(26 27)	(28 29)	(30 31)
Other		(32 33)	(34 35)	(36 37)
Morning		(38 39)	(40 41)	(42 43)
Afternoon		(44 45)	(46 47)	(48 49)
Evening		(50 51)	(52 53)	(54 55)
Other		(56 57)	(58 59)	(60 61)

	Eating Unit	Men	Women	Children
	(8 9) (10 11) (12 13)			
Morning		(14 15)	(16 17)	(18 19)
Afternoon		(20 21)	(22 23)	(24 25)
Evening		(26 27)	(28 29)	(30 31)
Other		(32 33)	(34 35)	(36 37)
Morning		(38 39)	(40 41)	(42 43)
Afternoon		(44 45)	(46 47)	(48 49)
Evening		(50 51)	(52 53)	(54 55)
Other		(56 57)	(58 59)	(60 61)

Source: Kennedy (1984).

APPENDIX L

EXAMPLE OF 24-HOUR FOOD RECALL USING VOLUMETRIC SYSTEM OF MEASURING: NORTHERN MALAWI STUDY

24-HOUR DIETARY RECALL Round No.: _____ Date _____ Super: _____ Office: _____

HHID: ___/_____/__/_____/_____/_____ Name of Eldest _____ ID No. of Eldest |_|_|_|_|_| Input: _____
Dist Cluster Vlg Compound HHld Study

Ask all persons in the home who prepared food, as well as anyone who consumed food outside the home.

1. Was any leftover food eaten yesterday? _____ 1=Yes 2=No
2. Did anyone from this household eat food that was not prepared at home? _____ 1=Yes 2=No
3. Please list all foods (and ingredients) that were consumed by family members yesterday. Include snacks and foods that were not eaten at home. DO NOT INCLUDE FOODS THAT WERE PREPARED BUT NOT EATEN BY FAMILY MEMBERS!!!

Time Eaten	ID No. of Cook	Type Food	Type Code	Ingre-dient	Ing. Code	Source	Sor. Code	Quantity	Unit1	Unit1 Code	Dimensions Diam CM x Depth CM	No. Eating U/5	5-13	Men	Wom	LO	Leftover	Unit2	Unit Code

PLEASE REMEMBER TO FILL ALL SPACES FOR MISSING INFORMATION AND FOR QUESTIONS WHICH DO NOT APPLY WITH "999"

APPENDIX M

EXAMPLE OF THE VOLUMETRIC SYSTEM OF MEASURING FOODS: TRAINING MATERIALS USED IN NORTHERN MALAWI FOR 24-HOUR FOOD RECALL

We are now going to measure the volume of certain foods in beakers. Each team will receive one 1-liter container that is marked at each 50 milliliters (ml), and a 100-ml container that is marked at each 10 milliliters. We want to measure certain foods that are easily placed in these containers and will give more accurate measurements. The foods we will measure are ones that contribute greatly to the protein and calories that the family is eating. These foods are:[3]

ufa, mugayiwa (maize flour)
cassava flour
rice
sugar
beans
milk (dry and fresh)
oil, lard, fat
groundnuts, groundnut powder
leftover **nsima**, beans, rice, and mixed dishes

Here's how it's done. When the cook tells you that she used a certain amount of ufa in the nsima the day before, ask her to show you, using **ufa**, the exact amount she remembers using. She will have to fill her basket with ufa just as she did the day before. You then measure that amount into your beaker and record the amount, in milliliters, that is present. For large families, you may have to fill the large beaker more than once. For sugar and oil, you may need only the small beaker.

Use the small beaker for small quantities, and the large beaker for large quantities. When measuring oil, use water as a "substitute." Have the cook show how much oil she used in her own container, BUT HAVE HER FILL IT WITH WATER, NOT OIL. Then you can measure the water in your beaker. If you do it this way No oil will be wasted and your beaker will be clean. Be sure to measure the oil that was used in cooking **last** so that the beaker will be wet after all the dry ingredients are measured. Always keep your containers very clean, so that food is not contaminated.

What if all of one food has been eaten the day before? For example, what if all the sugar has been consumed? Then substitute other foodstuffs. For sugar or groundnut powder, substitute ufa. For groundnuts and beans, substitute dry or pounded maize or pounded cassava.

If someone ate a plateful of food off of the compound the day before, you can use this volumetric system to measure the amount they ate. Have the person heap some beans or dry maize in the portions of the foods that he or she ate the day before off the compound. Then measure the amounts and record them on your dietary recall sheet.

---

[3] For most households, only maize and wheat flour were measured.

REFERENCES

Anand, S., and C. Harris. 1985. Living Standards in Sri Lanka, 1973-1981/82: An Analysis of Consumer Finance Survey Data. Washington, DC: World Bank. Photocopy.

Barnum, H., and L. Squire. 1979. "An Econometric Application of the Theory of the Farm-Household." *Journal of Development Economics*. 6: 79-102.

Bouis, H. 1985. *Philippine Cash Crop Study*. Washington, DC: International Food Policy Research Institute.

Bouis, H., and L. Haddad. 1988. *Comparing Calorie-Income Elasticities Using Calories Derived from Reported Food Purchases and a Twenty-four Hour Recall of Food Intakes: An Application Using Philippine Data*. Discussion Paper 88. Warwick, England: Development Economics Research Centre, University of Warwick.

Cameron, M. E., and W. A. Van Staveren (eds.). 1988. *Manual on Methodology for Food Consumption Studies*. Oxford, England: Oxford University Press.

Deaton, A. 1980. *The Measurement of Welfare*. Living Studies Measurement Study Working Paper No. 7. Washington, DC: The World Bank.

_____. 1988a. "Quality, Quantity and Spatial Variation of Price." *American Economic Review*. 78(3): 418-430.

_____. 1988b. *Price Elasticities From Survey Data: Extensions and Indonesian Results*. Discussion Paper No. 138. Princeton, NJ: Research Program in Development Studies, Princeton University.

Deaton, A., and A. Case. 1987. *Analysis of Household Expenditures*. Living Studies Measurement Study Working Paper No. 28. Washington, DC: The World Bank.

Edirisinghe, N. 1987. *The Food Stamp Scheme in Sri Lanka: Costs, Benefits and Options for Modification*. Research Report No. 58. Washington, DC: International Food Policy Research Institute.

Garcia, M., and P. Pinstrup-Andersen. 1987. *The Pilot Food Price Subsidy Scheme in the Philippines: Its Impact on Income, Food Consumption and Nutritional Status*. Research Report 61. Washington, DC: International Food Policy Research Institute.

Gibson, R. 1990. *Principles of Nutritional Assessment*. New York: Oxford University Press.

Gittenger, J. P. 1982. *Economic Analysis of Agricultural Projects*. Baltimore, MD: The Johns Hopkins University Press.

Greer, J., and E. Thorbecke. 1986. *Food Poverty and Consumption Patterns in Kenya*. Geneva: International Labour Office.

Kennedy, E. 1984. *Kenya Cash Crop Study*. Washington, DC: International Food Policy Research Institute.

Low, A. 1986. *Agricultural Development in Southern Africa: Farm-Household Economics and the Food Crisis*. Portsmouth, NH: Heinemann.

Lynch, S. G. 1980. *An Analysis of Interview Frequency and Reference Period in Rural Consumption Expenditure Surveys: A Case Study from Sierra Leone*. Working Paper for MSU Rural Development Series No. 10. East Lansing, MI: Michigan State University.

Martorell, Reynaldo. 1983. *Nutrition and Health Status Indicators: Suggestions for Surveys of the Standard of Living in Developing Countries*. Living Standards Measurement Study Working Paper No. 13. Washington, DC: The World Bank.

O'Brien-Place, P., and T. Frankenberger. 1988. *Food Availability and Consumption Indicators*. Nutrition in Agriculture Cooperative Agreement Report No. 3. The University of Arizona and the University of Kentucky.

Pinstrup-Andersen, P., and M. Garcia. 1984. "Household vs. Individual Food Consumption as Indicators of the Nutritional Impact of Food Policy." Paper prepared for Workshop on Methods of Measuring Intra-household Resource Allocation, International Food Policy Research Institute, Washington, DC.

Poleman, T. 1981. "Quantifying the Nutrition Situation in Developing Countries." *Food Research Institute Studies*. 18(1): 1-38.

Sanjur, D. 1982. *Social and Cultural Perspectives in Nutrition*. Englewood Cliffs, NJ: Prentice-Hall.

Selby, Samuel. 1972. *CRC Standard Mathematical Tables*. Cleveland, OH: The Chemical Rubber Company.

Simmons, Emmy. 1981. *Budget, Expenditure, and Consumption Surveys in Developing Countries: What, Why, and How*. Washington, DC: Office of International Cooperation and Development, United States Department of Agriculture.

Singhe, I., L. Squire, and J. Strauss. 1986. *Agricultural Household Models: Extensions, Applications, and Policy*. Baltimore, MD: The Johns Hopkins University Press.

Timmer, P. C., Walter P. Falcon, and S. R. Pearson. 1983. *Food Policy Analysis*. Baltimore, MD: The Johns Hopkins University Press.

Van de Walle, D. 1988. "On the Use of the SUSENAS for Modelling Consumer Behavior." *Bulletin of Indonesian Economic Studies*. 24(2): 107-122.

Wood, G.D., and Knight, J. 1985. *The Collection of Price Data for the Measurement of Living Standards*. Living Standard Measurement Study Working Paper No. 21. Washington, DC: The World Bank.

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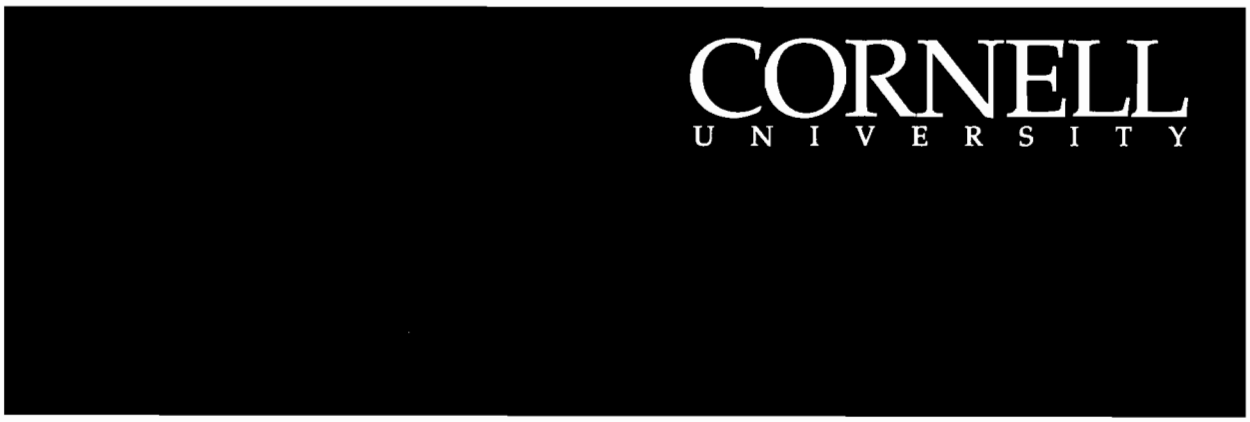

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