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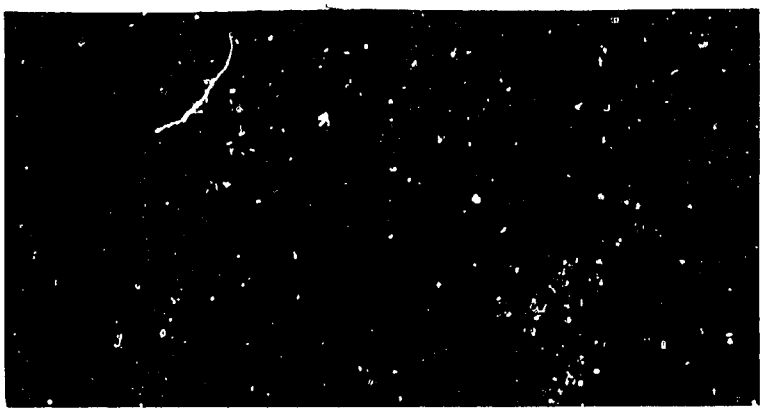

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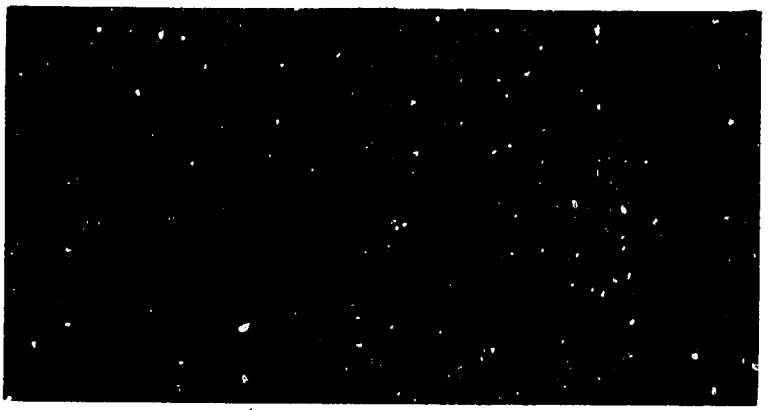

NUTRITION ECONOMICS GROUP

The Nutrition Economics Group was created in 1977 with funding from AID under Project 931 "Nutrition: Economic Analysis of Agricultural Policies." The Group's full-time staff of economists and other social scientists is available to assist AID and developing country agricultural planners and analysts develop, implement and evaluate their food and nutrition programs and to evaluate the impacts of their agricultural policies and programs on people's food consumption and nutrition. With its location within the Technical Assistance Division of the U.S. Department of Agriculture, the Group is able to draw upon a wide variety of other agricultural specialists to complement its work.

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BUDGET, EXPENDITURE AND CONSUMPTION SURVEYS IN DEVELOPING COUNTRIES: WHAT, WHY AND HOW

by Emmy Simmons

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FOREWORD

The development of better methods for determining in advance the probable impacts that various economic policy choices will have on people's food consumption patterns and nutrient intakes will be one of the major outputs of the "Consumption Effects of Agricultural Policies" (CEAP) project. This project was initiated in FY80 by the Office of Nutrition, Bureau of Science and Technology as a major element of AID's strategy to help meet the basic needs of the poor and to improve the quality of life in the developing countries. The specific purpose of the project is to encourage developing countries to develop national agricultural planning systems which are conducive to improved national levels of consumption and nutrition.

Most government economic policies are formulated, implemented and changed with little consideration for their ultimate impacts on people's consumption and nutrition. To remedy this, developing country planners and policy makers need to be encouraged to start thinking of improved consumption and nutrition as legitimate goals of their agricultural sectors and ones which need to be considered when evaluating policy alternatives. Developing country planners also need help in obtaining the means for incorporating consumption and nutrition goals into their planning processes by gaining better analytical methods, data and the knowledge of how to use both.

The planning methods that will be developed under the auspices of the CEAP project will have to help analysts trace and at least partially quantify the linkages between agricultural polices and the food consumption patterns and implied nutrient intakes of groups likely to be at risk of malnutrition in developing countries -- the urban poor, landless laborers, and subsistence oriented farmers. The first step in making this link is to determine how particular policies are likely to affect food output, prices and the incomes of groups likely to be at risk. The second step is to estimate how the food consumption patterns of these groups will change when their incomes and prices change.

Unless some basic information on household food consumption is available in a country, it is nearly impossible to talk even in a general way about (a) what households at nutritional risk consume and (b) how changes in development policies and programs might affect this consumption. Although some planners have suggested using food balance sheets to help understand the above relationships, they are not sufficient for this purpose. Food balance sheets provide information on average, per capita food availability. The key question from the nutrition point of view however, is how the consumption patterns of

malnourished households change; not how the aggregate output of nutrients in a country is affected or what the average household response is. The total aggregate consumption figures on which the per capita figures in food balance sheets are based are also subject to substantial error since they represent the figure which remains when estimates of food production, imports, exports and allowances for seed and other non-food uses are taken into account.

The budget, expenditure and consumption surveys which are discussed in this paper, written when Emmy Simmons was a member of the Nutrition Economics Group, represent a major source of information on household incomes and/or total expenditures and their expenditures on food and/or quantities of food consumed. The paper is designed to brief the non-technical person on the basic nature of these surveys, the reasons why they are undertaken and the design options available to those responsible for such surveys. Examples of how such data can be analyzed are listed in Appendix A. Several basic texts which describe the theoretical underpinnings for such analyses are listed in Appendix B, and several compendiums of budget, expenditure and consumption surveys are listed in Appendix C.

The information in these surveys is collected directly from households and can be disaggregated by various categories of households depending on the size of the sample and the amount and type of socio-economic data collected on each household. With such information available, the amounts of different kinds of food consumed by households at different income/expenditure levels or other socio-economic category can be calculated. Coefficients relating quantities of food demanded given household's incomes/expenditures, size, composition and other socio-economic factors can also be calculated. Such data can also be used to construct a matrix of income and price elasticities for households at different income/expenditure levels for all foods which relates percentage changes in expenditures on different foods or quantities of food consumed to percentage changes in incomes and/or expenditures.

Helping developing countries build a capacity to undertake consumption impact analyses into their existing agricultural planning systems is one of the long-term objectives of the CEAP project. Many countries will have to make improvements in their data base before this objective can be achieved, however. Fortunately most developing countries already undertake some type of budget, expenditure and/or consumption survey. In many countries, the data already collected may

be adequate for analyzing the consumption/nutrition impacts of agricultural policies but no one has thought of using it for this purpose or knows how. In these countries, some encouragement and assistance with the task of analyzing the data may be all that is needed. Assistance of this sort is available from the CEAP project.

In other cases, countries may need help to reprocess and then analyze the data from a recent budget, expenditure and/or consumption survey or help in designing a new budget, expenditure and/or consumption survey which will provide the type information needed. Some assistance for these type activities has been made available out of the Nutrition Economics RSSA which the Office of Nutrition has with the U.S. Department of Agriculture. Countries which have received such assistance include Bolivia, Cameroon and the Dominican Republic.

Roberta van Haeften
Leader, Nutrition Economics Group
July, 1981

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INTRODUCTION

A short discussion of terminology is perhaps an appropriate beginning point. Family budget enquiries and household expenditure surveys are primary data collection activities in which information is gathered regarding spending activities of a defined group of persons. Information on income-earning activities which support spending behavior is also sometimes given attention. Food consumption surveys are particularly concerned with information pertaining to food, although data on expenditures made for other goods and services and income are also frequently collected. As FAO's Programme of Food Consumption Surveys states, "the term . . . should refer preferably to surveys in which special attention is paid to the collection of information on quantities of food consumed (i.e., as it enters the kitchen or is used for the preparation of meals), and in sufficient detail to permit the calculation of the nutritive value of the diet."*

There may be a greater or lesser degree of overlap between food consumption surveys and budget or expenditure surveys for two reasons: (1) expenditure on food does constitute an important proportion of family budgets, particularly among low-income groups, and (2) in subsistence societies, it is necessary to estimate quantities of home-produced food consumed simply in order to compute an "imputed" level of expenditure. An additional semantic complication is that "consumption" is also frequently used in the relevant literature to refer to consumption of all goods and services and not only to food consumption. For the purposes of this paper, household surveys involving budgets, expenditures, and food consumption will be called "b/e/c" surveys.

Dietary and nutrition surveys should also be mentioned. These terms apply to data collection activities which focus on foods consumed and their relation to personal nutritional status (as determined by clinical examinations and biochemical data). Dietary or nutrition surveys thus involve activities which are quite distinct from those included in b/e/c/ surveys. Individual food intakes are measured (rather than household food availability), food is weighed and supplementary nutrition status indicators are measured. Some socio-economic data on households and/or individuals may also be collected but usually not enough to be used for other than broad descriptions.

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* Food and Agriculture Organization, Programme of Food Consumption Surveys, Rome, Italy, 1964 p. 10.

Dietary and nutrition status surveys will not be discussed further in this paper. They do not provide adequate information for economic planning. Because of the costs of the techniques employed, they are also rarely done with sample sizes large enough to calculate national estimates.

Given these definitions, this short paper will (1) review the various objectives of budget/expenditure/consumption surveys; and (2) compare options available for b/e/c/ survey design and implementation.

OBJECTIVES OF HOUSEHOLD b/e/c/ SURVEYS

Information on private consumption of goods and services at the household level is a critical input for:

1. Constructing weights for estimating the cost-of-living indices which are used to monitor the impact of price changes on levels of living;

2. Describing and evaluating the socio-economic "quality of life", including the distribution of income and expenditure;

3. Estimating quantitative commodity demand (particularly for food commodities) and investigating the economic determinants of consumption and expenditure; and

4. A wide variety of planning activities, especially those concerning the impacts of inflation, wage adjustments, import/export adjustments, subsidization programs for food, and the evaluation of the potentials for agricultural and industrial development.

In order to collect such information, some sort of primary data gathering activities at the household level are essential. The importance of the use to which the information is to be put generally justifies the scale of household survey activity undertaken.

The use of household information to calculate cost-of-living index weights is the most common objective of expenditure or budget surveys. The "weights" are, in fact, budget shares; if 20 percent of total expenditure is devoted to rice, for example, the changing price of rice will be "weighted" by 20 in calculating the average rise or fall in the total cost (weight=100) of living. The commodity weights which can be applied to current prices to determine the consumer impact of price changes are developed from survey data on budget

allocations to various commodities or commodity groups. "Cost of living" surveys are typically done under the auspices of financial institutions such as Central Banks. These institutions are responsible for monitoring inflation, price changes and the balance of payments. They have an immediate and perceived need for this survey information at least once every ten years.

Using household information for descriptive purposes is perhaps the oldest used. A British study in 1797 was among the first to systematically collect household information. It resulted in a publication entitled "The State of the Poor: or, an History of the Labouring Classes in England." Engel's work in Belgium was undertaken for similar reasons. This kind of rationale is most easily applied to studies in which the "quality of life" of various "target groups", such as the "poorest of the poor", is an important analytical output.

The growth of development planning has led to more emphasis being placed on the third and fourth objectives -- demand analysis and a wide variety of planning activities. As econometric techniques based on computer calculation and modelling facilities have developed, the ability of planners to process and analyze the mass of detail normally collected in a household expenditure survey has increased. Because they can retain this detail for fairly sophisticated analyses, planners are more eager to have good quality information for a wide range of well-defined commodities and services. The cost of obtaining such data with survey techniques has not been reduced as rapidly as the cost of processing the data, however. Therefore, these b/e/c surveys still tend to get funded only when there is a strong interest in using the survey data for multiple purposes, including constructing cost-of-living indices.

A CHECK LIST OF SURVEY OPTIONS

Once the need to carry out a b/e/c survey has been determined, and the uses to which the information will be directed have been translated into specific objectives, a host of decisions must be made with regard to eleven different aspects of survey development. Cost considerations, of course, are fundamental to all decisions. Decision areas are:

1. Population coverage
2. Scope of survey in terms of informational content
3. Design of survey sample
4. Methods of enumeration/interviewing
5. Time coverage of survey fieldwork
6. Organization of fieldwork

7. Methods of analysis
8. Arrangements for data processing
9. Evaluation of survey results
10. Uses of other surveys to improve the survey being planned
11. Tabulation and presentation of data

There is a substantial degree of interdependence among decisions, so the order in which these areas are listed above should not be interpreted as sequential in any hard and fast way. If the budget permits only ten enumerators to be hired for a survey to represent a country of one million households, for example, clearly the population coverage will have to be reconsidered and possibly restricted to a small sub-set of the total population. Similarly, if no computer facilities are available, analysis will have to be done with a greater degree of aggregation and in a more streamlined fashion. Alternatively, detailed analysis could be done, but the sample would have to be smaller.

Each of these aspects is discussed separately below to give an indication of the options available to the survey planner and funding agency.

Population Coverage

A random sample of the total household population of a nation is not the most efficient way to develop national expenditure or consumption estimates. Even when national coverage is desired, it would never be feasible, for cost or administrative reasons, to choose a simple random sample. Stratification of the household population on some basis which has meaning in terms of the survey objectives or in terms of survey administration and organization is a logical starting point. Using this stratification system, those strata to be covered are designated and population sampling frames for selected strata compiled for sample selection.

A major decision for most b/e/c survey planners is whether both rural and urban populations are to be covered. This choice is closely related to the survey objectives. If data on cost-of-living, quality of life, demand, and other factors for policy or project planning are needed, coverage of both strata is indicated. If objectives are more limited, then either rural or urban strata or even substrata within these broad groups might be sufficient.

Selection of only major cities from among possible urban areas, for instance, is a common decision if cost-of-living outputs are the primary need. The majority of wage-earning populations are generally included in a major-city sample in most developing countries. Methods

of enumeration, sample selection and data processing are greatly simplified and costs are substantially reduced. For these reasons, the first b/e/c survey experience in developing countries tends to be of the "major city" variety. The results of these surveys have recognized limitations as far as objectives other than cost-of-living information are concerned. However, the experience and limited urban data obtained are valuable. If the survey objectives specify that information on demand for transport services is needed, for example, a "major cities" approach would not be sufficient. Some stratification of rural areas based on current levels of transport services (roads. bridges, buses, taxis) would be necessary.

Either national or sub-national stratification on the basis of income is often desirable. This is because expenditures are closely related to income and because sampling efficiency can be improved, with concurrent cost reductions, when sample sizes are determined on a stratified basis. In developing countries, however, income stratification before sample selection nearly always proves unworkable. If a large proportion of households do not earn regular incomes in cash, it is difficult to get sufficiently reliable income estimates from which a sampling frame can be constructed even through a significant presurvey enumeration effort. Even when cash incomes are earned regularly, there may be considerable over or under-reporting of incomes for social, cultural or tax evasion reasons. Income stratification is therefore most often done on a post-hoc basis for analytical purposes and not in the determination of b/e/c sample population coverage.

Limiting survey coverage to regional populations or populations with particular characteristics (such as "landless laborers," "plantation workers," or "migrants") is another option. This option is usually taken when detailed information is necessary for specific project or policy planning or evaluation. Progress or success of an integrated rural development project, for example, may be monitored by periodic b/e/c surveys. Total expenditures reflect income directly and serve as a good surrogate for the more-difficult-to-measure statistic. Allocation of expenditures among commodities also reflects income changes in predictable ways. Such limited population coverage can also provide useful information between large-scale national surveys. Care must be taken, to assure compatibility with national estimates.

A final option, and one which appears to be rare, is to establish a permanent b/e/c survey capacity and focus survey efforts on a different stratum every year. This is politically unacceptable in most countries.

Scope of Survey

Establishing operational definitions and concepts for survey terms and specifying the informational content of the survey variables are the initial steps in survey design. These steps determine the analytical potential of the final results. Common decision points in delineating the scope of the survey are:

1. Whether to record "purchases" or "consumption";
2. Whether to take account of stores or accumulated wealth;
3. How to handle transfer payments, including credit and gifts;
4. Which variables to record for individuals, which for groups;
5. How to evaluate home-produced consumption, including "rent" on owner-occupied structures;
6. Whether to weigh food commodities;
7. When to weigh or measure food - as it comes into the household or as it is consumed;
8. Whether to attempt to get an income estimate or to rely on total expenditure as a proxy;
9. How to deal with culturally sensitive variables;
10. How to treat non-responses and respondent refusals; and
11. How to handle missing data.

Once decisions have been taken on these questions, choices with respect to methods of enumeration, time coverage of the survey, and tabulation/editing plans are more clearly indicated. Consistency is important to avoid utter analytical confusion later on.

In countries which are almost totally monetized, recording of cash expenditures will provide adequate descriptors of total household expenditures. Weighing food at the household level may complicate the field work and add little information. Recording the total value of products either consumed or purchased (depending on the decisions taken under #1 above) will produce analyzable data.

In countries in which a large percentage of the population produces a substantial proportion of the food it consumes, it is generally necessary to estimate total expenditure as a combination of

cash purchases and the imputed cost of home-produced commodities. Quantity information and price data must be combined to impute costs. Recording is more complex and consistent handling of the purchase, consumption, and storage question is extremely important. The collection of price information (retail? farmgate?) is also indicated.

Sample Survey Design

Complete enumeration of every household in a specified population is rare unless the population is extremely small. Most b/e/c surveys are sample surveys. The specifications of the population coverage and the scope of informational content to be gathered provide the basic set of conditions for sampling design. Certain sampling questions are fundamental:

1. Specifying the elementary sampling unit -- definitions, numbers, locations;

2. Specifying other sampling stages to achieve the population coverage desired;

3. Drawing up or validating sampling frames for all sampling stages;

4. Determining whether sampling efficiency can be improved by use of prior information; and

5. Developing a work plan for the sampling procedure -- mapping, household enumeration or listing (if needed), selection of respondents, informing respondents of selection, political clearance, etc.

If "households" or "families" are to be the elementary units of analysis, as they normally are, an acceptable definition of "household" or "family" is of primary concern. Formulating this definition can be a complex task, particularly when families are not nuclear. This occurs when many different groupings of people share common housing facilities, a polygynous husband eats with each of several wives in turn and shares housing with none of them, certain incomes are pooled and others are individually held, several income-earners share cooking facilities but have separate sleeping quarters, etc. The definition of "household" that is selected is analytically critical and not merely a technical sampling choice.

In general, the sampling design should not be completely delegated to persons who have no connection with the plans for analysis and the intended uses of the data. However, the skills of sampling technicians must certainly be employed so that the results are valid statistically and the inferences scientifically based.

Methods of Enumeration

Literacy, personal accessibility, recall abilities, transport facilities, language skills and the scope and coverage of the survey are among the factors which affect the methods of enumeration adopted. The methodologies for enumeration involve three sets of decisions:

1. What role(s) should the interviewers or enumerators play?

2. How should the interview forms, recording forms or questionnaires be designed?

3. What schedules for completion of forms are desirable or feasible? In short, what should be done about enumerators, forms and scheduling?

Interviewers/Enumerators

The job descriptions for enumerators must reflect the range of cultural factors which will govern the interview situtation, the physical accessibility of the respondents and the qualifications that candidates for enumerator positions are likely to have. If it is culturally unacceptable for women to interview men privately (and money matters are private!), then men must be hired as enumerators. On the other hand, if a decision has been made to weigh food as it is prepared for consumption, and women who prepare the food are kept in seclusion, then women must be hired as enumerators. If the respondents are difficult to meet (having farms or jobs which are far from their homes and arriving at irregular times), then enumerators who are able to work at odd hours and willing to be patient are critical to successful interview completions.

If respondents are illiterate, enumerators must be literate and the enumerator-respondent ratio fairly small. If the pay scale established for enumerators is such that barely literate sixth-grade leavers are likely to be the only candidates for the jobs, then the forms have to be simple and straight-forward enough for their comprehension. If, however, the respondents and the enumerators are both expected to be fully literate, the role of enumerator can be considerably different.

Questionnaire Design

Preliminary versions of the survey forms should reflect the choices made on the scope of the survey. Later versions will be more closely attuned to respondents' abilities (literacy and recall are primary skills), interviewer schedules and abilities and the accuracy of the responses achieved in pretesting. Pretesting and retesting are essential interim steps.

Scheduling

The scheduling of interviewer visits to respondent households must be linked to the design of the forms and questionnaires. The interviewer schedule* should also reflect the period of recall over which the respondents are able to be accurate, whether weighings of food commodities are to be made and when during the day, and the desired reference period for responses to various questions on information dealt with on the interview forms.

Experience from other surveys and data-gathering exercises in similar sample sites or with similar content should be taken into account in determining the methods of enumeration to be used. A good sampling design will help reduce sampling errors, but unless appropriate methods of interviewing are adopted, the non-sampling errors may become so large as to make the results of a survey useless. A completed form is not the mark of a successful "interview"; only a completed form which accurately reflects the situation of those being interviewed.

Time Coverage of Survey Fieldwork

To determine appropriate time coverage for a household b/e/c survey, it is necessary to evaluate the importance of seasonal variations in consumption or expenditure, how accurate the household estimates should be, and when the results are needed. The latter may be the determining factor. It takes, at a minimum, approximately twice as long to process and analyze information as to gather it. If seasonal influences are very strong (large price swings or substantial variation in availabilities of major commodities would indicate this),

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* In British terminology, a "schedule" is a form or questionnaire. In this paper, "schedule" refers to timing of contacts with respondent.

then a b/e/c survey should be spread over a year or a price cycle. If fairly accurate average annual estimates of expenditures/consumption at the household level are important (for demand analysis, for example), then the sample households or strata should be revisited in major seasons. This will necessitate a trade-off between increased total sample size and reduced variance of household estimates. If one wishes to link consumption and production of agricultural commodities, then it may be better to key the survey year to a crop rather than a calender or fiscal year.

There are considerations regarding time coverage for particular households apart from overall survey timing. Attention needs to be directed to the optimum number of consecutive days for which a household's expenditures or consumption should be recorded. Seven consecutive days of recording is conceptually simple; a "survey week" is also statistically fairly simple to handle. Weekly estimates can be blown up to provide reasonable accuracy but cost levels may be high. Three or four consecutive days have been shown to provide reasonable accuracy at reduced cost. This shorter recording period permits use of larger sample sizes which improve total sample estimates. However, household estimates are not as accurate.

The decision on recording period thus is based on considerations of interview scheduling, analytical ease and accuracy, sample size and time coverage. If a set of accurate commodity weights for a cost of living index are desired, the need for a larger sample size may weigh most heavily in the decision. If demand analyses based on household incomes and total expenditures are the objective, then the decision will be weighted toward accuracy at the household level.

Organization of Fieldwork

The administrative, supervisory, and logistic support which the funding and/or implementing agency can supply to its field staff must be carefully and realistically evaluated before decisions on sample design, coverage, scope, etc. are firmly fixed. Depending on the quality of field enumerators' skills and the accessibility of the field sample sites, it may be necessary to have one or two levels of supervisors with independent transport facilities for every five to ten enumerators. If public mail and telephone facilities are excellent, it may be possible to spread field supervisors more thinly and still maintain effective communication between field and central offices. In most developing countries, these facilities are not available and field supervision has to be fairly concentrated in order to provide continuous checks on the accuracy of the interviewing work and to respond to questions from the field staff.

Rural surveys appear at first glance to require more supervision and logistic support as the distances over which communications (forms, questions, edit/recheck requests) must flow are greater. Urban surveys, however, present greater problems of non-response, enumerator avoidance, a wider variety of questions, and, in some cases, greater movements of sample populations within the survey time period. The latter is important if revisits over time are scheduled.

Issues which must be settled with respect to organization of fieldwork are:

1. Will the field enumerators reside in sample sites or elsewhere?

2. How many respondents can one field enumerator handle in a day or in the survey time period?

3. How much freedom should be given to the enumerator to determine his/her own work schedule?

4. How many supervisors with what qualifications are needed to provide adequate supervision for a specified number of enumerators?

5. How will supervisors carry out supervisory visits (vehicles, public transport, walk, etc.)?

6. How often should supervisors visit the enumerators?

7. How should the document flow from the central office to field staff and back to the central office be managed?

8. At what stages should editing of data occur? Who should do it? Should any tabulations be done in the field?

9. What are appropriate job descriptions for central office and field staff?

Methods of Analysis

Additional definitions and concepts to be employed in the analysis should also be sketched out as decisions on the scope of the survey are made, even if no apparent sampling questions are involved. Otherwise data crucial for the analysis could be forgotten or collected in such a way that it proves useless. If one intends to analyze expenditures by conditions of employment (wage-earning, self-employed, unemployed or some combinations thereof) for example, and no questions are asked on employment status at some time during

the course of field enumeration, the intended analysis will be impossible. If one intends to analyze rural population consumption in terms of rural production but no comparability check is made between the "production unit" and the "consumption unit", such an analysis may prove to be impossible or subject to erroneous assumptions later on.

Coding plans, when carefully drawn up, permit systematic ordering of raw data for manual or computer processing. This ordering makes the data accessible for possible users to evaluate whether or not their data needs are being met. Tabulation plans lay out the kinds of cross-tabulations which will display or summarize the raw data. Based on these documents, the scope of possible analytical methods which can be used can be determined. Tabulation should not be confused with analysis.

If specialized analyses are to be done (e.g., calculating the nutritive content of foods consumed), special methods may have to be worked out for the processing and displaying of quantity data. Specific data inputs from other sources may also be needed. Even when enumerators are relatively vigilant, it is often not possible to weigh every single item consumed and some methods of estimating quantities from local measures may be needed to fill the gap.

The methods for analyzing even well-ordered b/e/c data are not completely cut and dried. The most well established analytical methods are those for calculating the cost of living index commodity weights. Fairly straightforward arithmetic procedures are applied to determine the budget proportions allocated to various goods and services. Other sorts of analysis still depend to a large extent on the creative talents of the analyst. There is, however, a substantial literature to draw upon from developed country experience. A growing number of developing country analyses are also contributing new insights into methods which are appropriate to different socio-cultural settings. (See appendices A and B for examples.)

"Standard' analytical methods for empirical analysis of consumer behavior common to both types of countries are:

1. Use of cross-tabulations and ordinary parametric statistics -- means, modes, medians, and variance

2. Correlation techniques -- regressions, chi-squares

3. Various kinds of indexing procedures -- particularly involving prices and seasonal variations.

In such broad terms, these "methods" could be equally well applied to an analysis of the effectiveness of fertilizer use as to beer

consumption. Some examples of how they are commonly used with respect to b/e/c data might be more enlightening.

Compiling large books of tables, in which every possible survey variable is crossed by every other survey variable, is a common way for results of b/e/c surveys to be presented. "Analysis" is largely descriptive; the contents of the tables are interpretively summarized in prose. These compendia of survey data are invaluable as source books for a wide variety of planners (education, health, industry as well as general economic) and businessmen. They should contain as much information as can be reliably set forth.

Correlation techniques provide the basis for in-depth analysis of consumer behavior. The mathematical formulations which are used and the interpretation of the results computed are the subjects of most of the current methodological work going on. Just exactly how one can best compute an elasticity of expenditure (or income or price) is a major theoretical and methodological challenge. There are standard formulations of double-log and semi-log regressions which permit elasticities to be calculated. However, "fit" and predictive power can generally be improved by more sophisticated mathematical formulations. Inclusion of other factors in the regression (such as household size, own-farm production levels, tribe, access to transport) may complicate the calculations still further. In countries with large semi-subsistence sectors though, such factors may be more important determinants of consumer behavior than income alone.

The references listed in Appendices A and B provide more details on the technical aspects of various methods which can be used to analyze b/e/c survey data. Some decisions can wait; others should be made early on in the survey. The following options are among those that should be considered early on:

1. Whether it is desirable to compute income or total expenditure elasticities and, if so, for the sample as a whole or for strata;

2. Whether elasticities with respect to other factors are important, e.g., household size, caloric content, etc; and

3. Whether price elasticities would be useful and how can they be computed.

The commodities, services, or goods/services groupings which are of interest should also be determined so that the data processing plan can be appropriately designed.

Arrangements for Data Processing

There are lots of completed questionnaires gathering dust in store rooms of statistical offices because insufficient attention was given to such data processing requirements as the sample size, questionnaire design, and/or analysis plan, when administrative and clerical requirements were being drawn up. The mass of detail which flows from daily questionnaires boggles the mind. Even a household with a monotonous diet will probably report at least twenty separate items of food consumption in a survey week.

The fundamental decision regarding data processing involves the determination of the degree to which the data are to be computerized. As computer technology improves (larger memories, smaller machines, faster processing time) and is spread more widely, it is unlikely that any b/e/c survey will be processed entirely by hand. Still, computer capacity and time are limited with keypunching and editing time in even shorter supply. Programming skills for file creation, maintenance, and manipulation also are relatively scarce in many developing countries.

Therefore, some balance between manual operations and those which are computerized should be determined on the basis of an evaluation:

1. How much editing of raw information from questionnaires is required - filling in missing data, sending enquiries back to the field, correcting handwriting, etc.?

2. How much coding of data is to be done? Will it be done in the field or in the office?

3. Does a data aggregation process carried on simultaneously with a manual editing process make sense? (In b/e/c surveys, summarizing daily records over the period of consecutive days or recording into "weekly" or "four-day" totals can reduce machine processing requirements by 75 percent or more).

4. Can machine editing rules be devised which will successfully weed out wrong or unlikely responses and bad coding -- for which variables? Which variables must be edited by hand?

5. If a single record is compiled from all information from one household, how long will that record be? Can it be handled manually? If not, is it too long for efficient computer use? If it is, what kinds of multiple data files need to be set up for each household and how can access between files be facilitated? Is necessary hardware available?

6. Is a full-time programming staff with considerable experience to be assigned to the b/e/c survey? Are "canned" programs or analysis systems such as SPSS to be used?

Once these questions are answered, the degree to which computerization is possible should be fairly clear. If no full-time programming staff is available to concentrate on the b/e/c survey, an efficient manual operation up to the point of complete edited records for each questionnaire or household should be constructed. Tabulations done with standard programs can then be effectively used to complete the analysis. If programming assistance, key punchers and computer time are available on a full-time basis, a greater degree of computerization would be justified.

Evaluation of Survey Results

The critical evaluation of data quality should be a part of the survey implementation plan. Questionnaires should be edited as they come in from the field (with feedback to field staff) and as they pass through the coders' hands. Editing procedures should also be designed into the data processing system for identifying obvious errors. Preliminary results should also be carefully considered to catch the more subtle errors and field omissions. At times an adjustment of field methods may be necessary, even though an inconsistency is created in the data set.

Uses of Other Surveys

Evaluation of survey results needs to be done on a comparative basis as well. The evaluator's own experience in other b/e/c surveys, the intuitive knowledge of planners who have worked with similar information, and relevant published studies and statistics can be used as checks. If average per capita expenditure is five times average per capita GNP, for example, or food consumed accounts for only 20 percent of total expenditures, something must be wrong and an investigation should be launched immediately. Establishing external as well as internal checks is an important part of the evaluation. Most of the external check material should be developed before the survey design is finalized to make sure that desirable check points are established.

Tabulations and Presentation of Data

The objectives of the survey can only be achieved when all of the hurdles mentioned above have been overcome and reliable results have been tabulated and distributed to interested persons. If the tabulation plan has been agreed upon by potential users, no problems may arise when the results are published.

Frequently, however, the users who were around when the survey was designed will not be the most concerned users by the time the results are published. To satisfy this "future" demand, the data should be tabulated and presented in the most easily accessible, most readable, most summarized form possible. Because the efforts and expense involved in large scale b/e/c surveys are so enormous, most are unlikely to be repeated for a decade. In the interim scores of persons not involved in the original design will request access to the data. It is important, therefore, to make provisions for possible retabulations of the data for alternative presentations at a later date.

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Appendix C

Selected Compendiums of b/e/c Surveys

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