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Working Papers in
**Agricultural
Economics**

**Rural Household Data
Collection in Developing
Countries:**

Designing Instruments and
Methods for Collecting Time
Allocation Data

Julie P. Leones



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**RURAL HOUSEHOLD DATA COLLECTION IN DEVELOPING COUNTRIES:
DESIGNING INSTRUMENTS AND METHODS FOR COLLECTING
TIME ALLOCATION DATA**

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I would like to thank the authors of the other papers presented in this series for the examples they provided from their field work and for their valuable contributions to the organization and content of this paper. I would also like to thank Michael Paolisso of the International Center for Research on Women for sharing his insights on collecting time allocation data.

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ABSTRACT

Time allocation data are used to provide information on labor allocation, energy expenditure, cultural and gender-based time use patterns, and other issues in economics, geography, anthropology, sociology, and nutrition. The most common methods for collecting time allocation data include observation, such as participant observation, intensive observation, and random spot checks and recall, such as recordkeeping and interviews.

The most difficult conceptual problems related to collecting time allocation data are how to gauge the quality of work performed over time when the researcher is using time allocation to measure labor output or energy expenditure, accounting for simultaneous and interspersed activities, handling different cultural concepts of time, reconciling differences in respondent and enumerator perception of events, and choosing a sample.

Intensive observation and participant observation provide the greatest detail on time allocation but are time-consuming methods to use and to record data from. Random spot check observation provides less detail but is less time consuming while providing a statistically robust sample of activity. However, random spot checks do not work well when the focus of the study is a particular type of activity, especially when this activity is performed in distant locations. Interviews depend on respondent's recall and perception of activity and can be easily collected along with other data. Interview data quality depends on how selectively respondents recall and interviewers record activities and on the length of the recall period. Recordkeeping can provide detailed information, is easy to monitor, and can be combined with collection of other data but can only be used effectively in areas with high literacy rates and where respondents are willing to keep records for extended periods of time.

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 B. 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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Collecting Off-Farm Income Data	91-18	Leones & Rozelle	Philippines, China
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.

October 1991

Carol Levin and Scott Rozelle
Series Coordinators

1. INTRODUCTION

Time allocation data win hands down as the most time consuming and tedious household information to collect, organize, and analyze. Because of these endearing characteristics it is also likely to be the most underutilized of any information collected by a researcher. Yet time allocation data is essential in household studies from a wide range of disciplines, including anthropology, sociology, geography, economics, and nutrition. Time allocation data provide information on topics ranging from caloric expenditure to labor supply issues. Because of the broad range of uses, the design of a time allocation data collection instrument varies tremendously.

In economics, for example, work on an economic theory of the household (Becker 1965, Gronau 1973) led to increased interest in how household members, particularly women, allocate their time (Hart 1978, Deere 1982, Khandker 1988). In fact, increased use of the household model has led to greater recognition of household members' time as both a consumption good and a productive resource or factor of production (Evenson 1978).

The economic role of women and the sexual division of labor in different societies has been analyzed largely based on time allocation data (Boserup 1970, Deere 1982, King and Evenson 1983). Differences in the involvement of rural households in nonagricultural activities have been identified through time allocation studies (Spiro 1987, Shand 1986). The effect of new technologies on household time use has been useful in explaining adoption rates for different technologies (McSweeney 1979). Likewise, time allocation is helpful for identifying potential need for labor saving technologies.

Cross-cultural and historical comparisons of time allocation are important in the testing of theories of cultural and economic change (Gross 1984). In the field of nutrition, time allocation data supplemented with data on caloric expenditure by task have been used to analyze caloric intake and energy expenditures in different settings (see, for example, Montgomery and Johnson 1976).

Other uses of time allocation data include collection of improved labor data for calculating returns per day of labor, the identification of periods and causes of peak and slack labor use, and the identification of the most time consuming or labor intensive tasks in a production process. Additional uses are reviewed in Gross (1984).

The definition of "time allocation" differs among disciplines. The first distinction is whether the study is focused on a specific activity in what anthropologists might call a "time-frame analysis" or includes a broad range of

activities and the allocation of time between these activities (Gross 1984, Grossman 1984). The distinction is somewhat artificial, since most studies focus on a range of activities but certainly not all activities engaged in by individuals. For example, often only "productive" activities are recorded. The definition of what constitutes productive activity has changed over time with increasing awareness of women's contributions to the household through housework, child care, and other household production activities, which are often referred to as "reproductive activities." Grossman (1984) argues that time allocation studies in which data are collected only on productive activities have serious limitations, especially when the allocation of labor between productive and leisure time is a potential issue.

Regardless of the range of activities to be included as part of the study, two basic techniques are used in time allocation studies: observation and recall. Observation is conducted by intensively observing one individual or household over a period of eight hours or longer, through participant observation, or through random spot checks on the activities of families. Recall techniques range from structured interviews of individuals concerning their activities over a period of a day to as long as a month, to diaries kept by the respondents themselves.

The most appropriate technique and length of time to sample depends on the precision of data required. For example, if the data are used to describe what a typical day's activities might entail for different groups of households, less intensive data collection techniques and a shorter sample period are adequate; however, if a researcher is interested in amounts of time spent on specific activities and the amount of seasonal variation in the time spent, more intensive techniques and a longer sample period may be required.

The advantages and disadvantages of each of the methods are presented after a short discussion of conceptual issues related to differences in the nature of recall and observation data, differing cultural time concepts, and differing intensity and location of activity. Once the methods used in collecting time allocation data are described and compared, organizational issues relating to time allocation data are discussed.

2. CONCEPTUAL ISSUES

Most of the conceptual issues associated with collecting time allocation data arise because we are largely interested in a measure of *labor* allocation and typically only measure the *duration* of activities in time units. Measuring the duration of activity in time units provides a standard measure of labor allocation; however, it is only one dimension of the labor input and fails to provide information on the intensity with which an individual is working. Second, it assumes that activities are separable into distinct units of time, when actually activities may overlap or be conducted simultaneously. Third, different cultural concepts of time can create problems in choosing appropriate units of measure and methods for measuring them. Finally, the boundaries of an activity may not be the same for all individuals or for a respondent versus an enumerator.

QUALITY OF WORK OVER TIME

One important conceptual issue relevant in the study of calorie or energy intake and expenditure, or when the quality of labor is important, is the differing intensities of effort exerted, across individuals and across time, in performing the same task. Gross (1984) discusses mechanical devices used to measure metabolic rates. Without using such devices to "calibrate" the level of exertion for different tasks, respondents could be asked how hard they worked at various tasks, or the researcher observing their work could subjectively evaluate the level of exertion. As Wollenberg (1988) points out, time allocation data does not necessarily provide a good measure of the labor input, only the amount of time spent on a task. However, time allocation data is often used to derive information on labor inputs.

Using a mechanical device to measure work intensity also presents problems. In a Kenyan study, Paolisso and co-researchers used a cardio-cassette to monitor heart rate and activity for 15 seconds a sample at random intervals during the day and asked respondents to speak into the cassette when they began a new activity so that it would be possible to easily match activities with the EKG readings. However, in many cases, the EKG reading was taken in the seconds before the respondent actually began the task, making it difficult to match the two sources of information (Paolisso, personal communication). An alternative method might be to combine observation with cardio-cassettes. However, the arrival or presence of the researcher may affect the activity level of the respondent, thus affecting the reading.

Unfortunately, for those interested in differences in labor quality beyond exertion of energy, no device can yet measure the level of mental exertion in

tasks which have an important managerial component. These labor quality differences are difficult to measure objectively. Indicators of differences in labor quality are keenly sought by businesses, however, and time and motion studies from business and industrial engineering offer a range of techniques for monitoring managerial work time, some of which may be useful in rural household studies (see Mundel 1978).

The problem of differing intensities of labor occurs both for the same task across different individuals and across different tasks. For example, if two men do essentially the same amount of weeding but one completes the task in two hours while the other completes it in six hours, we would like to record that the labor input was the same in both cases, but that one man was more efficient than the other. Time allocation data, however, leads us to believe that different amounts of labor input (i.e., two hours versus six hours) were used. Similarly, one hour of weeding is not equivalent in energy expenditures to one hour of guarding a field from foraging monkeys. Yet, unless the energy requirement for each task or alternatively the wage rate for each task is later determined and used to weight these activities differently, they may be considered equivalent tasks.

ACCOUNTING FOR SIMULTANEOUS AND INTERSPERSED ACTIVITIES

Another difficulty is in dividing time between simultaneous and interspersed activities, such as in distinguishing and properly identifying leisure and productive time in cultures where the two activities may be interspersed or even conducted simultaneously (Hart 1978). Gross uses the example of a worker listening to the radio while ironing. Men drinking palm wine while planting a field together and women exchanging news as they wash at a common faucet are a few Philippine examples.

The simultaneous or interspersed activities may both be productive, such as when a woman is hoeing a field while carrying a baby or holding a child while cooking. Another common problem, especially in intercropped plots, is when a man may be weeding as he harvests a crop, interspersing the two activities.

An extension of the problem exists when absences involve multiple activities, such as a farmer going to town to sell some produce, buy some food and inputs, and take his daughter to the health clinic.

DIFFERING CULTURAL CONCEPTS OF TIME

Another issue long associated with time allocation studies is the difference in cultural concepts of time. Although different values, uses, and measures of time exist, time allocation researchers have generally used a western concept of time as measured by clocks and calendars in time budgets and not as measured by local people. This is mostly to facilitate comparisons across studies and because of the researchers' own cultural concept of time. Most researchers have learned to live with this ethnocentricity of time allocation studies.

Differences in cultural concepts of time can be critical, however, if respondent recall provides the primary source of time allocation data.

Terms used for time in indigenous languages may provide the researcher with an indication of whether such discrepancies exist in her research area. In Swahili, for example, the day is usually divided into three parts: morning, midday, and late afternoon. The terms for these times are used much more frequently than clock time and thus provide an alternative native division of time that could be utilized in collecting time allocation information. The researcher can easily design a ministudy to determine how the indigenous time units correspond to clock times.

Hart (1978) argues that distinguishing between cultures where activities are task oriented versus time oriented affects peoples' concept of time and is key to deciding whether recall or observation methods are most appropriate. However, in many contemporary rural cultures, task and time orientations coexist. For example, much of the housework and agricultural work conducted on a family's own farm tends to be task oriented, whereas work off of the farm tends to be more time oriented.

In the Philippine study, family members often clearly recalled how many hours or days were required to accomplish certain agricultural activities when hired laborers were involved, but had a difficult time estimating how much time a task took when only family labor or other unpaid labor was used. Another indication of this problem is when individuals can describe the quantity of work accomplished but not the time it took to complete. In Malawi, a field worker would sometimes be hard-pressed to tell you how many hours she had worked, but could easily tell you that she had done "30 lines" of weeding.

DIFFERENCES IN RESPONDENT AND ENUMERATOR PERCEPTION OF EVENTS

Another serious conceptual issue confronting a researcher wishing to collect time allocation data is the difference in the nature of recall versus observational data. The issue is most critical when the researcher wishes to collect very specific descriptions of activities. For example, if the researcher is interested not only in the task, but the specific location and technology used; or in whether the task was performed in a continuous fashion or interspersed with other activities; or in whether the pace of work was fast or slow.

Researchers such as Michael Paolisso at the International Center for Women's Studies in Washington, DC, are concerned about the lack of work on systematically evaluating, testing, and comparing the methodologies. In his field research, he has noted discrepancies in the respondents' perception of when a task has begun or ended and the researchers' perception of the same event.

Recall data is further complicated if someone other than the person who actually performed certain tasks reports on them. Ideally, all members being monitored will provide information on their own activities. Realistically, one member will often assume responsibility for reporting on activities of other

family members. In the Philippine study, women were usually able to report on the activities of their husbands with a fair amount of accuracy; however, men often underreported or inaccurately reported the activities of their wives. In one household, the wife contributed a substantial amount to household income through tailoring activities, and she could be observed working at her sewing machine when the household was visited. However, it was only when the researcher specifically asked for information on time spent sewing did the husband remember to include this activity in his record of his wife's work. The wife's limited literacy kept her from keeping her own record on a regular basis.

On the other hand, if observation is used, the tendency is to observe in the vicinity of the homestead. If some members' work is located many miles away, the researcher may walk to where they work and record their activity. Usually, the researcher will rely on recall information or ask other members where the other people are and what they are doing. Unfortunately, the activities of the absent members may be the research focus.

Realistically, even a researcher using the spot check observation method will not have the time to personally check all members' activities if some commute long distances. Although the researcher can gather information on what the absent person set out to do, she cannot be sure that the person is actually engaged in that activity or in some other, such as traveling to the site, preparing tools, resting, eating, at the time the researcher asks about that person's activity. Thus, interview data on the absent person's activity is distinctly different from the direct observations of other household members (Paolisso, personal communication).

CHOICE OF SAMPLE

A final important conceptual issue relates to sampling decisions. This is less an issue for some time allocation data collection techniques than others, but the choice of respondents from a family, the number of families monitored, the number of days, weeks, or months they are monitored, and how absences are handled will affect data quality.

These decisions will depend on the objectives of the study. For example, if the objective of the study is to gather data on income earning activities, it might exclude young children. In the Indonesian study, the researchers observed that it was common for children age 10 and older to work in the fields and in other household activities. However, time allocation information on younger children was dropped from the time allocation sample, because the adults who provided information on the activities of family members rarely remembered what household or farm related work had been done by younger children. This problem relates directly to the problem discussed in the last subsection of who is providing the recall information.

Mundel (1978) provides some advice on sample size for time allocation studies, however, the size the researcher chooses will depend on logistic considerations, such as the distance between homesteads, the number of

enumerators working on the project, the choice of time allocation data collection techniques, and the time required to collect other data. This is not to dismiss the issue of how many observations are enough or the choice of whom to observe, but just to indicate that location, research objective, and research budget affect these choices.

3. METHODS AND ORGANIZATION

As discussed in the introduction, the major types of time allocation data collection methods are recall and observation and include such techniques as long-term observation, random spot check observation, structured interviews, and diaries or recordkeeping. As with all the data collection methods discussed in this manual, the choice of method depends largely on how the data will be used. Data required to determine labor input into productive activities is quite different than that required to describe the daily routine of the household or to determine the energy expenditure of household members.

INTENSIVE OBSERVATION

Intensive observation is the hallmark of traditional ethnography and provides a richness of detail or texture, difficult to achieve with other methods (for examples, see Bergman 1980 and Ruddle 1974). Subjects of the study generally are observed over the course of a day several times during the year.

Spradley (1980) provides a thorough guide to using one form of observation, known as participant observation. In participant observation, the researcher also participates in the activity as she observes it. This technique, however, is more appropriate for studying specific events rather than for use in long-term time allocation studies.

Once a specific event is chosen (for example, planting upland rice), the researcher describes the participants, setting, implements used, other objects present, single actions used, processes, interactions between participants, pace, length and sequence of activity, what people are trying to accomplish, and the feelings or emotions expressed by the participants. In other words, the kind of information a thorough newspaper reporter would be looking for (but on a routine rather than a newsworthy event)! The participant observer joins in the activity while making observations. Some observers alternate between taking notes and participating, while others prefer to participate throughout the event and write up their notes afterwards. The intent is to try to record as much detail as possible on the event, but to also try to approximate the perspective of a participant.

Wollenberg (1988) successfully combined participant observation with intensive observations, 24-hour recall, and 1-week recall. She highly recommends participant observation as a means of gaining a comprehensive understanding of time allocation, but noted its limitations as a source of quantitative time allocation data.

Time allocation data collected through intensive observation require considerable researcher time both to collect and later to organize, but may provide important new insights and frequently suggest areas for further research. The data can also yield information on the sexual division of labor and, more importantly, on how behavior deviates from cultural norms or ideals or individual plans. For example, in Gillespie's (1979) study of Nicaraguan women, she describes how a woman in one household was considered the accountant for her father's vegetable business. However, through observation of this woman, Gillespie discovered that a significant portion of her time was spent working in the vegetable fields. In this case, a woman's allocation of time to agricultural field work was not accurately revealed through interviews (Gillespie 1979).

Other advantages of continuous observation are that the researcher can observe technologies used and individual differences in management of time and other inputs (Gillespie 1979). The researcher also notes the intensity and sequencing of work, and multiple activities. This information may be difficult to gain through other techniques.

On the other hand, some researchers argue that the continual presence of the researcher might cause respondents to modify their behavior, at least over the short observation period (Grossman 1984). Other researchers dislike the intrusiveness of the technique, whether or not family members modify their behavior. They point out that intensive observation is exhausting for both researcher and respondents (Wollenberg 1988).

In addition, deciding when one activity has ended and another has begun may be difficult (Gross 1984). Using the intensive observation method, the researcher must make this determination; if recall methods are employed, the respondents decide. If the researcher decides, she is likely to be more consistent across individuals and households. No guarantee of consistency exists if respondents make the choice.

A serious disadvantage of the method is that it is time consuming for the researcher. Further, only a few individuals can be observed, hence, choosing representative families or individuals is a critical part of the study. An example of a form and code sheet used in recording time allocation data collected through observation in Malawi is presented in Appendix A.

RANDOM SPOT CHECK OBSERVATIONS

Currently, one of the most popular techniques among anthropologists for collecting time allocation data is the random spot check approach to observation. The method involves finding individuals or members of different households at certain predetermined times during the day at different times of the year and recording what they are doing. Random numbers can be used to pick the days and the families to be visited in advance of the actual visits. For a given individual, dividing the number of observations of a particular activity by the total number of observations yields the percentage of time (within the time sampled, usually the daylight hours) spent on an activity.

This technique is described in Johnson (1975), Grossman (1984), Acharya and Bennett (1982), and Acharya (1982). Erasmus (1955) used spot checks of individual activity. However, Johnson has done the most to popularize the technique since using it in his study of a Machiguenga community in southeastern Peru. The method has been used since then by numerous researchers, many of them Johnson's students. Baksh (1989) presents a critical appraisal of the technique. An example of a record sheet for random spot checks is provided in Table 1.

The advantage of this technique is that it is much less labor intensive than long-term observation and eliminates most of the bias introduced by the researcher's constant presence. An additional advantage is that spatial patterns of time use and, at least theoretically, time spent traveling to activities is recorded. Time spent traveling is critical in studies that examine commuting patterns. It can also allow the researcher to observe whom different individuals are with at the time their activity is recorded. This information is of interest to sociologists concerned with social relationships and others concerned with reciprocal labor and familial networks (Grossman 1984). In addition, Johnson (1975) claimed that the spot checks could easily be combined with other data collecting activities, such as interviews of household members, and brought the researchers into regular contact with a large number of respondents.

Problems with using the random spot check technique arise when the location of activity for family members is widely scattered and when specific seasonal activities are of interest. For example, one reason this approach was not adopted in the Philippine study was because specific plot and activity level agricultural data were needed. In addition, many of the agricultural plots were located a long distance from the homestead. A half-day hike would have been necessary to observe the activities of some of the household members, which was impractical given that other data were also being collected. Although plot activity data was desired, asking another household member where the absent member was and what he was doing might not have provided sufficiently detailed information for this study, especially for the many households which had distant adjacent plots, or who worked in several different subplots or on different crops when they were at their plot.

An important modification of the random spot check method is to sample activities of interest in the study rather than sampling across time. For example, if a study was focused on sweet potato production, instead of monitoring houses, the researcher monitors sweet potato fields. When a person is observed working in a sweet potato plot, the researcher returns several times over the course of the day to make spot checks on activity, recognizing that family members do not spend time every day in the sweet potato plot. However, such a sample is no longer random and poses problems for the researcher when attempts are made to extend the results from activity sampling of a few individuals to larger groups and when estimating total amounts of time spent in certain activities (Paolisso, personal communications).

Another serious problem with the random spot check method is insuring that the sample is representative of the study population. To insure a good sample, spot observations must be made consistently over all seasons and individuals in

the study. This may require the researcher to limit travel outside of the study community or at least limit length of absences. If other data are being collected, which is probably the case, the logistics of consistently sampling households' time allocation can be very complex.

INTERVIEW

Interviews are the most popular recall method for collecting time allocation data over a period of time ranging from a day to a month. Such interviews may be structured by event or by time. Activity structured interviews use a list of prompts or a complete list of activities, while more open interviews rely on the respondent to classify activities. A time-structured interview for 24-hour recall might begin by asking the respondent what s(he) did from the time s(he) got up in the morning until breakfast time, then what s(he) did between breakfast and lunch, all in order of events. An example of forms used in a time structured 24-hour recall interview and an activity structured 1-month recall interview are provided in Tables 2 and 3 and Appendix B.

An advantage is that the researcher can collect information at the homestead when she collects other data. However, depending on the culture and the activities being monitored, the recall period should be kept as short as possible. The main advantages of this technique are that more geographically dispersed households can be monitored and the researcher need not live in the community or hire a full time research assistant to live in the community to observe families or to monitor records, but may visit the community or several communities periodically during the study. This in turn allows for a larger sample size with the same research budget and personnel. Since many studies, especially in economics, involve large samples, this method has been very popular despite its weaknesses.

One of the most serious disadvantages of interviewing is that not only is the time allocation selectively recalled by the respondent, but it may be selectively recorded by the enumerator. The respondent may make decisions about what is an important activity to tell the enumerator about and what can go unmentioned. The enumerator, in turn, may tend to record only those activities listed on the code sheet, and thus, some of the richness of detail about activities may be lost. Alternatively, the enumerator may assume that the same task will take the same amount of time across households or on different days and thus not bother to ask about it again, but simply record the same time from the previous household or day.

In addition, it can be difficult to capture multiple activities or activities which only take a few minutes to perform daily. The choice of the recall period also affects data quality. In 24-hour recall interviews, activities that are not performed daily may be missed (for example, marketing, firewood collection, weeding). However, 30-day recall may be too long to get accurate and complete data. Interviewing and recordkeeping methods share several disadvantages which are discussed in the next section.

Table 3 – Individual Time Allocation (one-month recall)

HH I.D.

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Date : _____

Recall Period : _____ s/d _____.

INDIVIDUAL TIME ALLOCATION (Continued)

2. What activities were performed by the Husband/Wife/Family for the previous day and since the last 30 days?

DETAILED ACTIVITIES BY CLASSIFICATION:

	Activity	One Day Recall		30 Day Recall				
		Hour	Min.	TIME			INCOME	
				Day/ Month	hour /day	TOT-AL	Cash	In-kind (Value)
	1	2	3	4	5	6	7	8
1.	HOUSEHOLD ACTIVITIES							
1.1	Cooking ¹⁾							
1.2	Fetching Water							
1.3	Child care ²⁾							
1.4	Shopping/to Market							
1.5	Gather Firewood ³⁾							
1.6	Food Preparation							
	SUB-TOTAL 1							

NOTE:

1. Include household cleaning/dishes/housekeeping
2. Direct activities such as bathing, nursing, feeding, etc.
3. Gathered from surroundings

FOR ALL ACTIVITIES INCLUDE TRAVEL TIME TO AND FROM ACTIVITIES

DIARIES OR RECORDKEEPING

A second recall method for collecting time allocation data is through diaries or structured records of time used. These records can be open-ended, allowing the respondents to describe their activities, or they may be structured with predefined activities or times of the day listed. The method is useful in cultural contexts where people value their privacy, or when the locations of activities are scattered and observation is not practical. In addition, the recall period for recording data is kept short.

One final advantage of this technique is that it can be combined with other production records (farm records, for example). Data from production records by enterprise or crop can then be cross-checked with the time allocation record. For example, in the Philippine study, if a respondent recorded in his time allocation record that he planted rice for wages for two days, this information was used to check if the amount of these wages had been recorded in his off-farm income record. If a carabao was used by a farmer to plow one of his fields and this work was recorded in the carabao work record, this record was used to check for plowing activities on these dates in the man's labor records. Based on this cross-checking system, inconsistencies could be identified and discussed with individuals keeping the records, thus improving the quality of the time allocation data and the income, plot input, animal input, and output data.

As with interviewing, structured recordkeeping forms that include a list of activities have the advantage that respondents are less likely to forget to record events included on the list. However, if the list is not complete, some activities may be missed entirely. In other words, using a list of activities requires excellent knowledge of the range of activities in the community and a thorough understanding of how the researcher wishes to aggregate and use the time allocation data in her analysis.

Using more flexible recordkeeping forms or diaries, such as the example in Table 4, may be appropriate when conducting exploratory studies, when the researcher does not know the whole range of local activities, or when it is important how the respondents describe and categorize their activities. The main problem with more open recordkeeping forms is that respondents may forget some activities if no list of activities is included on the form. Organizing the data for analysis is also more time consuming.

Whether structured or open recordkeeping forms are used, the method does require some degree of literacy among respondents and frequent monitoring by the researcher. The quality of self-kept records tends to vary in direct proportion to the frequency and quality of monitoring (J. S. Fujisaka, personal communication). Respondent fatigue is a serious problem, even with frequent monitoring.

The quality of time allocation data from records depends not only on the quality of monitoring but on the ability of individual respondents to keep records. Some people keep better records than others. Researchers tend to rely more heavily on the good records, sometimes discarding poorly kept records

altogether. However, good recordkeepers may not be representative of the population under study.

In addition, usually only one person will keep all household records. While the records they keep on their own activities may be very accurate, the records they keep on other family members may be less accurate. Such a situation was described earlier in the section on conceptual issues.

PROBLEMS COMMON TO INTERVIEWING AND RECORDKEEPING AND STRATEGIES FOR OVERCOMING THESE PROBLEMS

All of the conceptual problems discussed in the previous section affect recall data gathered either through interviews or through records. In addition, numerous studies reviewed in Bernard et al. (1984) raise serious questions about the accuracy of respondent recall data. One of their most salient criticisms of recall is that researchers often ask people to recall information that is of little interest to them. Although respondents may be willing to provide this information, their estimates may be very poor.

The best ways to minimize inaccuracy in recall are to ask for information about specific activities performed recently by specific individuals, preferably over a short period of time. Another important way to improve recall is to explain to respondents in advance of collection what information you need and why you need it. Many respondents are more willing to make a greater effort to recall information if they have some understanding of how this information will be used.

Perhaps the biggest disadvantage of any recall method is a tendency for respondents to present or enumerators to record ideal, rather than the actual, information about activities. For example, in the Philippine study, one man recorded that his work on his plots always took the same amount of time, even though he had been observed spending different amounts of time. Respondents seem particularly likely to use average time estimates for routine tasks involved in house work, personal hygiene and animal husbandry. If these activities are not the focus of the study, this may not be a problem. However, if the researcher is particularly concerned about picking up information on seasonal variation in time spent on personal hygiene, child care, cooking, or caring for animals. This could be a critical problem.

Another difficulty is that not only do cultural differences in the perception of time cause problems, but variation in individuals' perception of time can affect data quality. As mentioned earlier, how different respondents mark the beginning and end of an activity may vary. For example, what constitutes "child care" is often problematic. For some mothers, only the time spent feeding, bathing, clothing, or holding a child were included, while other mothers considered watching the children play or performing other tasks with the child nearby as a form of child care.

If recall methods are used, it is important to define activities for research assistants and respondents. Using lots of examples and role playing can be very useful in clarifying definitions. In addition, if you can convey to respondents that you are interested in actual, not average, time spent performing tasks, it may help counter the tendency to give average times. Again, respondents are more likely to try to provide actual time if they understand its importance. Finally, structured interviews or records could be combined with intensive observation. The time the researcher observes the respondents spending on different tasks could be compared to the amount of time respondents state they spend on different tasks. Recall data can then be adjusted accordingly.

Although respondent fatigue is a more serious problem in recordkeeping than interviewing, it is a problem common to both methods. Fatigue among record-keepers can be helped somehow by compensating their families. In the Philippine study, a small monthly honorarium was given to each family. In addition, two meetings were held with respondents to give examples of how the information they were providing was being used and to recognize individuals who had kept outstanding records. In other contexts, other forms of motivation or compensation might be more appropriate. Providing compensation is not without disadvantages, the greatest being that respondents may come to expect payment whenever they are interviewed or keep records.

COMPARISON OF METHODS

Observational techniques provide the researcher with data as the researcher perceives time allocation, while recall data are based on the respondent's perception of time allocation. Some argue that observation is more "objective" because the researcher does not condition data based on "ideals" of time use (at least in theory) and as an "outside" observer is not both acting and providing a record of action.

Until the recent popularization of random spot check observations, the use of observation was too time-consuming for the purposes of many studies. Random spot checks may still be inconvenient when family activities are scattered over large geographic areas, when more detailed allocation data is needed for specific activities, or when it is not possible for a researcher to live in the community. However, the random spot check technique is highly recommended by researchers who have used it (Gross 1984, Grossman 1984, Acharya 1982).

Interview techniques, on the other hand, provide less accurate time allocation data, but they are less time intensive and often allow for larger sample sizes over a wider geographic area. In communities where at least some household members are literate, self-monitoring techniques, such as record-keeping, can provide good data and can serve as a useful cross-check to other information on productive activities also being collected.

The best strategy for collecting high quality time allocation data is to use several methods which are appropriate given the end uses of the data and given available resources to collect the data. In particular, intensive observation

or participant observation are helpful in developing an understanding of the sequencing, combinations, and intensity of work, while random spot checks can be used to collect a larger, less biased sample of activities in a community. If the study focuses on specific activities, intensive observation or spot checks of those activities can be combined with records or interviews. Another way to approach gathering time allocation data is to choose one main method and then use one or more other methods on a small subsample for purposes of verification or calibration. For example, participant observation of a few individuals may be useful to verify that the amount of time they recall spending on particular activities is similar to the amount of time that enumerators observed them performing those activities.

4. ORGANIZATION

Regardless of the method or methods chosen, the researcher should think about how she will organize and code the data collected before beginning the study. In particular, it is useful to develop a code book of activities with clear definitions of what actions these activities include.

DEVELOPING A LIST OF ACTIVITIES OR CODE BOOK

A simple example code sheet is presented in Table 5. In many situations, the researcher will not know beforehand the whole range of relevant activities that people perform. In that case, preliminary observation and interviewing are necessary to develop the code book. Also, it is wise to develop a flexible coding system to allow for later additions to the codes.

The organization of the code book will depend on the focus of the study. In general, activities are often divided first into three classes: productive, reproductive, and leisure activities (Ellis 1988). Within productive activities, subcategories might include production for household use or for the market. These subcategories are problematic when some items are produced for both uses. Alternatively, subcategories might include crop, animal husbandry, and off-farm and nonfarm tasks. Further subcategories within these might include types of off-farm and nonfarm tasks (self employment or wage labor, or by specific type of task, weeding or palm wine collection), animal tasks by animal type, crop tasks by crop, by location, and by specific activity such as land preparation, planting, and weeding.

The researcher will have to make decisions about how travel time to activities off of the homestead will be handled: will it be a separate category or included as part of the time devoted to the activity to be performed on arrival? If travel time is recorded separately, will there be different categories of travel? For example, will the destination be included, adding a spatial dimension to the data?

One category of activity that is often neglected is work off of the farm that is not done for remuneration, for example, helping a father-in-law build his house. A related problem is how to distinguish between self-employment, home employment, service, and wage labor activities. For example, a carpenter may help his children construct their homes, build an extension of his own home, work for wages, or make cabinets to sell in the market.

Table 5 – A Time Allocation Activity Coding Sheet

Code	Activity
	I) Reproductive activities
1001	Food preparation - cooking, dishwashing
1002	Cleaning - outside and inside
1003	Laundry - washing, bleaching, drying, ironing
1004	Fuel collection
1005	Milling, grinding, drying foods
1006	Purchasing food, shopping
1007	Travel related to household maintenance
1008	Child care - grooming, feeding, holding
1009	Household repairs - house, furniture, other
1010	Tending sick, injured members
1011	Other housework
	II) Productive activities
	A) Animal husbandry
2001	Poultry feeding and care
2002	Hog feeding and care
2003	Cattle feeding and care
2004	Water buffalo feeding and care
2005	Other animal feeding and care
	B) Crop production
	Rice
3001	Land preparation
3002	Seedbed preparation, planting, and transplanting
3003	Weeding
3004	Fertilizing, spraying, and water management
3005	Harvesting and threshing
3006	Postharvest - winnowing, drying, and storage
3007	Travel to rice plots
3008	Other activities related to rice production (Similar codes would be developed for other crops such as corn, sweet potato, cassava, coconut, etc.)
	C) Off-farm activity
4001	Agricultural wage labor
4002	Contract labor in rice
4003	Contract labor in coconut
4004	Palm wine production
4005	Travel to off-farm activities
	D) Nonfarm activity
5001	Fishing
5002	Logging
5003	Carpentry
5004	Storekeeping
5005	Trading
5006	Travel related to nonfarm activities

FREQUENCY OF ACTIVITIES

Regardless of how the researcher codes or classifies a particular activity, several general types of activity will quickly become apparent. The first are activities that are performed daily or weekly. Many daily tasks, such as cooking, cleaning, caring for children, caring for and feeding livestock, and most permanent wage labor are routine tasks.

A second class of activities are performed only at certain times during the year, for example, most cropping activities follow a set cycle over the year, fish may only be caught at certain times of the year or month depending on the local fishing resource and technologies, and logging and construction can follow a seasonal pattern.

A final set of activities occur sporadically and do not necessarily follow a daily, weekly, monthly, or seasonal pattern. For example, trading activities and craft production may not be seasonal activities. In addition, participation in special government projects or in certain social events, such as funerals or baptisms, may not follow a seasonal pattern.

Different problems arise in gathering information on routine, seasonal, and sporadic activities. If recall is used in recording routine activities, the biggest problem seems to be that people tend to give average time spent on these activities. Hence, seasonal changes in labor allocation to housework and animal husbandry may be difficult to detect. If differences in allocation between the wet and dry season or between peak and slack agricultural seasons are important, random spot checks or intensive observation would be the most sensible technique to use.

On the other hand, some activities that are both seasonal and relatively easily performed, such as some forms of trapping and the collection of certain fruits or wild plants, the activity might go undetected entirely using the random spot check approach. If such activities are important in the study, then either more intensive observation during the season of these activities or prompted recall methods would be more appropriate.

LOCAL AND RELIGIOUS CALENDARS

Because many rural activities do follow agricultural, religious, and social calendars, most time allocation studies are conducted for at least one cycle, often for the duration of one year. Some advance knowledge about the local agricultural, religious, and social calendars can help the researcher choose the appropriate time to begin the study. For example, studies with an agricultural production focus often try to start at the beginning of plot preparation for the rainy season planting or at the time considered locally to be the start of the agricultural year. Alternatively, a consumption study might start at harvest time so that time allocation can be studied in conjunction with the household's management of food stocks.

HANDLING MULTIPLE ACTIVITIES

One difficulty mentioned earlier is determining the time allocated to two tasks that are performed simultaneously, interspersed, or for two purposes. Different researchers devise their own rules for handling this problem. For example, Acharya (1982), suggests that if a productive activity is involved, it should be considered the primary activity, but that some of the total time also be recorded under the secondary activities. For example, in a trip to town to sell produce, take a child to a clinic, and buy clothes, travel to town might be relegated to nonfarm activity, as would the selling of the produce. A small amount of the total time might also be recorded as leisure and reproductive activities.

In the northern Malawi study, the researchers were particularly interested in the amount of time devoted to child care, both when the mother was involved in simultaneous productive activities and when she was not. An example of the form they used in order to record time spent caring for children was presented in Table 2.

In other studies, some simultaneous activities were simply ignored. The most appropriate approach once again depends on the focus of the study and the use of the time allocation data.

TRAVEL TIME AND ABSENCES

Two types of activity that are often missed or go uncoded in time allocation studies are travel time and absences. How travel and absences are handled will again depend on the nature of the study. Some researchers have a separate code for absence and one for general travel. Others collect recall data on specific activities performed during absences and the purpose of travel, and they record these activities accordingly. For example, one researcher might code travel to a rice plot as a type of activity in rice production, and another researcher may code it as general travel.

Although one of the supposed advantages of the random spot check method is the possibility of more accurately recording time spent traveling, the possibility of under-reporting travel time also exists with this method. It is much easier to find a person and record her activity once she has reached her destination than while she is in transit. Unless the absent member is on a long journey, remaining members may not describe her as traveling if the researcher asks about her location.

The problem of not recording travel time or absences is particularly acute when interviews are conducted at infrequent intervals, say, every two to three months. Even with frequent interviews, it is logistically difficult for enumerators to remember to collect data from a person on his or her return to the household on all that s(he) has done. After short absences, a day to several weeks, recall may not be so difficult. However, absences of several months at

a time can be very problematic. A good example of how time away was coded in an interview form is provided by Randolph from his Malawi study (Table 6).

CHOICE OF TIME UNITS

Choice of time units will depend on the needs of the researcher in her analysis and on the ability of the respondent to provide information at this level of disaggregation. Increased precision of time data may not always provide more accurate data, particularly if the time units used are not ones commonly used by respondents. One approach taken by Levin in Indonesia to deal with this problem was to break the day into time modules by asking what activities occurred in between the significant events of the day like sunrise, waking, meals, sunset. In this case, the time between the five daily prayers provided a good break between time modules. Time allocation questions based on these divisions of time are more likely to yield accurate data than questions based on less familiar clock time.

Whether indigenous time units or clock time are used, the data are more precise if input in hours as opposed to days. Although analysis based on the data may be later described in terms of work days (with a definition of how many hours constitute such a day), work days are an ambiguous measure because they can vary by location, respondent, and season.

One way some researchers try to improve respondent estimates of time spent in activities is to provide wrist watches. A wrist watch that would also allow the individual to punch in his activity at given times and would monitor his metabolic rate would be the high-technology way to do time allocation data collection. This essentially self-monitored observation method would provide information not only on the time and type of activity, but also on the level of exertion involved. The cardio-cassette combined with a tape recorded message at the beginning of new activities is a technique that is already being used in the field. The cost of the technology may, however, be beyond the budget of many researchers interested in collecting time allocation data, and other methods for ensuring accuracy do exist.

One method is to try to evaluate the accuracy of the time units used. This evaluation provides the researcher with a sense of the expected error associated with the time allocation data collected. In some studies, it is important to know how accurately respondents can identify the time of day and the length of time spent on any one activity. In southern Malawi, a simple evaluation was conducted by asking interview respondents for the time at the beginning of the interview and then asking at the end of the interview, how long the interview had taken. Another method is to compare time allocation data from observation and recall techniques as was suggested earlier.

Table 6 – Codes Used for Travel, Absences, and Special Circumstances in Malawi

81	=	away for business/work related to own crop production; cultivating rice fields in distant scheme, selling tobacco on auction floor
82	=	away for self-employment production activities: buying supplies, marketing production
83	=	away (elsewhere in Malawi) for reasons related to agricultural employment
84	=	away (elsewhere in Malawi) for reasons related to nonagricultural employment
85	=	away (outside of Malawi) for work: T.E.B.A. in South Africa
86	=	away for family matters: visiting family, staying with spouse who is working elsewhere
87	=	away for personal medical care: at maternity for childbirth, hospitalized, or seeking treatment
88	=	away staying with another wife
89	=	other: purpose of absence unknown

SPECIAL CATEGORIES

75	=	respondent is not currently considered a household member, hence no interview was conducted
76	=	no interview was conducted with respondent due to enumerator oversight/error
77	=	interview was reported to have been conducted with respondent, but questionnaire is missing
78	=	all members of the household, including the respondent, have moved away from the study area
0 or 98	=	i) small time blocks (<12 hours): no information collected for this time period due to enumerator error
		ii) complete round (3 days): respondent is deceased

AGGREGATION OF DATA

When designing a time allocation survey it is very easy to create a large number of different codes for activities and tempting to use highly disaggregated measures of time. The more disaggregated the data by activity and time, the more time consuming it will be to process, clean, input, and analyze. The level of aggregation for activity and time will depend on the study. However, it is important to emphasize that even using the month as the unit of time aggregation, with 60 different activity codes creates a mountain of data. For 50 families keeping records, this is the equivalent of 36,000 potential bits of information for a year. If the information is coded by individual as well, and on average there are four individuals per household, then the observations increase to as many as 144,000.

One strategy for keeping the amount of data manageable is to use more aggregated codes for activities that are not the focus of the study and more detailed codes for focus activities. Another strategy discussed earlier is to monitor only a few individuals within the family who are the focus of the study. Finally, the researcher must make decisions about whether the time of day, week, month, and year tasks are performed are all-important pieces of information, or whether the time dimensions of the data can be limited to just one or two time categories (for example, time of the day and month).

5. CONCLUSIONS

Time allocation data are critical in the study of issues ranging from caloric intake versus expenditure, to differences in returns per day of labor in alternative economic enterprises, to the understanding of women's contributions to household livelihood and well-being in different cultural contexts.

The major methods currently used to collect time allocation data are observation (intensive observation, participant observation, random spot check observations), and recall (structured interviews and diaries or record-keeping). A comparison of some of the characteristics of the different methods is presented in Table 7.

The most sensible approach is to choose the technique most appropriate to the type of study and to use several methods, say one as a primary method and one or more to check the accuracy of the primary method, using a small subsample. For example, a limited amount of intensive observation combined with random spot checks, intensive observation together with interviews. Finally, improvements in technology may eventually lead to greater use of self-monitored observational techniques in time allocation studies.

Regardless of technique, time allocation studies provide large amounts of data. To keep the amount of data manageable, the researcher constructs a coding sheet and decides on the level of aggregation of data by activity, persons, and time period in advance.

Table 7 – Comparison of Time Allocation Data Collection Methods

	Observational: Intensive Observation	Spot Check	Recall: Structured Interviews	Record/Diary
Researcher time	highest	moderate	moderate	moderate
Respondent time	low	low	moderate	high
Manageable sample size	smallest	small	largest	medium
Researcher must live in village	yes	yes	no	yes
Researcher presence may cause bias	yes	no	maybe	maybe
Ideal rather than real time use may be collected	maybe	no	yes	yes
Infrequent activities likely to be recorded	yes	no	maybe	yes

APPENDIX A

CODES AND RECORD FOR OBSERVING TIME ALLOCATION IN MALAWI

Code of Activities for Observation
of Primary Caretakers of Children

- | | |
|---------------------------------|-------------------------------------|
| 1. Food preparation | 8. Household maintenance |
| 2. Food processing | 9. Child care |
| 3. Food gathering | 10. Care of other household members |
| 4. Water/fuel collection | 11. Self-maintenance |
| 5. Garden labor | 12. Resting/sleeping |
| 6. Animal care | 13. Social activities |
| 7. Income-generating activities | 14. Clothing activities |

Definitions of Activity Codes

- | | |
|---------------------------------|--|
| 1. Food preparation | - preparation (chopping/cutting/peeling/cooking, etc.) of foods, serving food, washing up, and storing utensils. |
| 2. Food processing | - preparation of food for future use; processing maize (shelling and pounding maize, going to maize mill, gathering equipment, setting up, and storing equipment); peeling cassava; drying and storing vegetables, groundnuts, legumes, fish, etc. |
| 3. Food gathering | - collecting vegetables from the garden, shopping for food items. |
| 4. Water/fuel collection | - collecting water and firewood, chopping firewood. |
| 5. Garden labor | - weeding, fertilizer application, ridging, harvesting, etc. |
| 6. Animal care | - grazing cattle, goats; feeding fowl, goats, cattle; preparing feed; cleaning up and maintenance of animal shelters. |
| 7. Income-generating activities | - gathering, making and selling goods, casual labor; formal employment. |

Appendix A (continued)

- 8. Household maintenance - cleaning/tidying of house and surroundings; building or repairing housing, food stores, fences, garden tools, furniture, or equipment.
- 9. Child care - feeding, bathing, punishing, teaching, playing with children five years of age and under; tending to their health care (tend to sick at home, take to health center, clinic, hospital, or fetching medicine).
- 10. Care of other family members - care (as number 9 above) of family members that are older than five years of age.
- 11. Self-maintenance - care of self, including bathing, eating, attending to appearance.
- 12. Resting/sleeping
- 13. Social activities - time spent in leisure pursuits, cultural activities, sports, and artistic endeavors.
- 14. Clothing activities - washing, sorting; mending, or making family clothing.

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