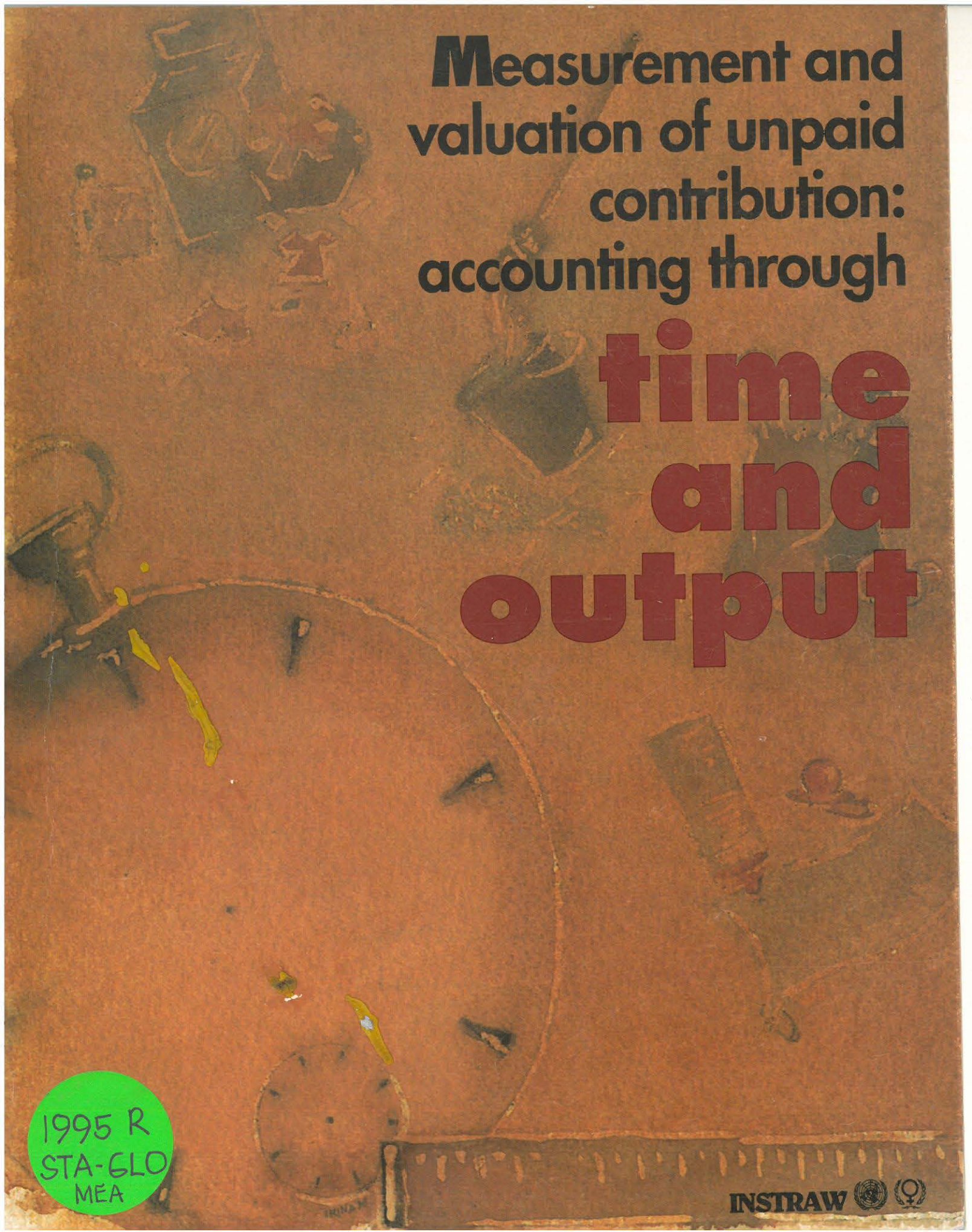
Measurement and valuation of unpaid contribution: accounting through time and output



INSTRAW

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Accounting through Time and Output

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INSTRAW
Santo Domingo, Dominican Republic, 1995

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Preface

Since its inception the International Research and Training Institute for the Advancement of Women (INSTRAW) has worked with other United Nations and international agencies to improve and supplement social and economic statistics so that they would properly reflect the contribution of women to society and to its development. INSTRAW's work has focused on exploring existing data with respect to its relevance for gender issues, providing training in the use of existing data for policy and research relevant to women, and identifying data gaps and needs. This document is the first product of a major research project designed to go beyond these tasks and take a more proactive role by facilitating and promoting the development of data required to fill a significant and well documented gap in existing statistics: the lack of information on unpaid household work. The study seeks to define total household production, delimit its significant components, and show how necessary data to capture them can be collected and valued.

In 1992, INSTRAW, in close collaboration with the Statistical Division of the United Nations Secretariat (UNSTAT) and other specialized agencies, first presented to the Joint INSTRAW/ECE Work Session on Statistics of Women, 27-29 April 1992 (Statistical Commission and Economic Commission for Europe, Working Paper No. 19, 1992) and the International Meeting of the Time-Use Research Association in Rome (15-18 June 1992) a draft of a project proposal to value and quantify the extent and structure of unpaid work. Following these presentations, substantive comments and suggestions emerging from discussions with individuals from the Food and Agricultural Organization (FAO), the International Labour Organization (ILO), The United Nations Children's Fund (UNICEF), and the World Bank were incorporated in the project design. The ultimate goal of the project is to develop cost-effective tools for measuring and valuing unpaid contributions to social and economic development and thus facilitate the unbiased measurement of women's contribution to productive activity.

This monograph presents a general framework for the classification of activities to facilitate activity measurement and its integration into the accounting framework. It also examines the current state of the art of collecting and valuing information on household production as a means of supplementing the existing System of National Accounts (SNA), through "satellite accounts", and identifies further steps to be taken in order to facilitate the ability of statistical bodies to collect the data necessary to cost-effectively develop national estimates of non-market production.

Application of valuation techniques in this monograph is exclusively focused on household maintenance activities which define the "household satellite accounts", covering activities such

as meal preparation, housework, shopping, caring, related travels, etc. Although according to the 1993 SNA manual, production of all goods was to be covered in GDP calculations, it is recognized in the monograph that in many developing countries GDP calculations were far from perfect and additional data and valuation techniques could be used to calculate GDP more accurately.

It is hoped that the views set forth in this monograph will help establish commonly agreed guidelines for defining satellite accounts that measure and value unpaid work.

The next steps will inevitably be a process of statistical trial and error. Any new techniques will require testing, refinement, and, to the extent possible, standardization. Finding a statistically valid formula for measuring and evaluating the data collected will require accounting for wide variations in local and national conditions. The procedure will be exacting and tedious, but ultimately, will put the long-range goal set two decades ago at Mexico City in reach: the heretofore invisible contributions of women will become visible —accepted, evaluated, and integrated into the world's economies.

Martha Dueñas-Loza
Acting Director

Acknowledgements

A number of individuals and organizations provided valuable contributions to the preparation of this monograph. Particular thanks must be given to the agencies and offices of the United Nations System that took part in the development of the research design and in the preparation of the document and revision of preliminary drafts. These included the Statistical Division of the United Nations Secretariat (UNSTAT), the International Labour Organization (ILO), and the Food and Agricultural Organization (FAO).

Special mention must be made of the financial support provided by the local office of the United Nations Population Fund (UNFPA) in the Dominican Republic which made it possible to carry out a pilot study in the Dominican Republic for inclusion in the research and, subsequently, into the report. To this end, thanks are also due to the National Statistics Office (ONE) of the Dominican Republic for their cooperation, and to Ms Gisela Quiterio, who served as local consultant for the pilot survey.

INSTRAW would also like to acknowledge with appreciation comments, suggestions, and support received from Iiris Niemi, Margaret Sanik, Margaret Dingley, Debbie Naugler-Haugen, Lorna Read, Donath Olomi, Judy Lipp, and Maria Elena Taylor.

Moral support and constructive observations provided by several colleagues in INSTRAW, specially from the Research and Training Unit, made the production of this document possible and interesting. Special thanks to Ms Margaret Shields, former Director of INSTRAW, who played a significant role at the initial stage of the project. Thanks to Ms Jeannette Canals who corrected the endless series of drafts and formatted the final version of the document.

Table of Contents

Abbreviations

CAPI	Computer Assisted Personal Interviewing
CASI	Computer Assisted Self Interviewing
CATI	Computer Assisted Telephone Interviewing
CEDA	Center for Economic Development and Administration (Nepal)
DIY	Do it Yourself
DOMA	Dimensions of Metropolitan Activity
ECE	United Nations Economic Commission for Europe
ESM	Experience Sampling Method
ESRC	Economic and Social Research Council (United Kingdom)
EUROSTAT	Statistical Office of the European Communities
FAO	Food and Agriculture Organization of the United Nations
FRG	Federal Republic of Germany
GDP	Gross Domestic Product
GED	General Educational Development
GFCS	Gender and Farm Commercialization Survey
GNP	Gross National Product
GSOEP	German Socio-economic Panel
HP	Household Production
ICSE	International Classification of Status of Employment
ILO	International Labour Organization
ISIC	International Standard Industrial Classification
MLTBA	Multinational Longitudinal Time Budget Data Archive
MPHBS	Multi-purpose Household Budget Survey (Nepal)
NFLS	Nairobi Forward-looking Strategies
NRB	Nepal Rastra Bank
PAPI	Paper and Pencil Interview
PRDAY	Per Day
PRMEAL	Per Meal
SNA	System of National Accounts
SVP	Specific Vocational Preparation
TIMS	Tanzanian Income Measurement Studies
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VAT	Value Added Tax
VHW	Value of Household Work

Definition of Terms

Some of the definitions applied or quoted in this monograph were derived from previous work or publications. These include terms as defined in: 1993 System of National Accounts; *Unpaid Work in the Household*, by Luisella Goldschmidt-Clermont (1982); *Paid and Unpaid Work in Hungary*, by Endre Sik (1993); *Issues in the Hidden Economy*, by Michael Carter (1984); *Analysis and Description of Time Budget Data*, by Andrew S. Harvey (1984); and *Time-Use Study for Leisure Analysis*, in Converse 68 (1990).

Activity: observable and reportable actions, acts, and functions of human beings which are of more or less direct behavioural and social relevance.

Activity list: list of activities for which respondents are asked to provide similar information on each listed item.

Activity log: a record of the sequence or duration of activities engaged in by an individual over a specific period.

Activity setting: the elements or context within which an individual act was conducted or carried out.

Closed interval diary: a diary where activity episodes are registered according to specific time intervals (i.e., 10 minutes, 30 minutes, etc.)

Context: the environmental, physical, social, and psychological dimensions attendant with an activity.

Designated day: date chosen by a purposeful selection method, such as a random draw which is unalterable.

Duration: 1) length of time for which a single occurrence of an activity may last; 2) the time allocated to all occurrences of a behaviour over a specified period.

Economically active: all persons of either sex who furnish the supply of labour for the production of economic goods and services as defined by the United Nations systems of national accounts and balances.

Economically inactive: comprises the following groups: a) students and who are not gainfully employed or actively seeking employment; b) homemakers: persons of either sex who are engaged in household duties in their own or relatives home responsible for the care of the home and children and

who do not receive any pay; c) income recipients: persons who receive income from property, investments, royalties or pensions; d) others: persons who receive public aid or private support; and other not falling into other categories such as children not attending school.

Episode: an unaggregated act reported on a diary and accompanied by act specific dimensions (i.e., with whom, where, etc.)

Event: behaviours or activities that can be approximated by points in time, where the salient feature is frequency of occurrence.

For whom: subject of the activity. (i.e., self, other household members, employer/paid job, self employ/household business, other individuals, households, or the community).

Formal sector: constituted by non-household institutional units defined in the SNA, and depending on national specific forms of national legislation.

Frequency of activity: the number of occurrences of a given behaviour per unit time.

Hidden economy: the total economic contribution of productive sectors that traditionally have not been taken into account in the National Accounts, because a) they do not fall under the definition of economic activity (informal sector); and b) they are not captured by present measurement techniques (underground economy).

Household output measure: measuring unpaid production using physical units of actual goods and services output (i.e., numbers of meals served, infants or handicapped persons cared for, weight of laundry washed, etc.)

Household input measure: measuring production through the quantification of labour inputs, that is, number of workers or number of work hours.

Informal sector: units engaged in the production of goods or services with the primary objective of generating employment and incomes to the persons concerned. These units typically operate at a low level of organization, with little or no division between labour and capital as factors of production and on a small scale. Labour relations—where they exist—are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees.

Labour cost: labour seen as an input or factor cost to production.

Leave behind diary: a diary left with a respondent to be completed for a specified reporting period (i.e., day, week, etc.)

Market cost method: transactions valued at the actual price agreed upon by the transactors.

Non-market activities: productive and non-productive household activities that satisfy human needs, without requiring monetary transactions.

Non-market sector: comprises producers that provide most of their output to others free or at prices which are not economically significant: that is, at prices which do not have a significant influence on the amounts the producers are willing to supply or on the amounts purchasers wish to buy.

Non-market productive activities: a) the production of all individual or collective goods or services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services; b) the own-account production of all goods that are retained by their producers for their own final consumption or gross capital formation; c) the own-account production of housing services by owner occupiers and of domestic and personal services produced by employing paid domestic staff.

Non-monetary activities: unremunerated activities that contribute to output in agriculture, food production, reproduction, and household activities.

Non-productive activities: activities that are not productive in an economic sense include basic human activities such as eating, drinking, sleeping, exercising, etc. These personal activities may be identified by the fact that they cannot be performed by a third person.

Observation method:

1. Random spot observation: observing individuals, randomly selected, at predetermined times during the day 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 visit.

2. Continual observation: observing subjects for a fixed period of time. (i.e., hour, morning, day, or longer.)

Open interval diary: a diary, where activity episodes are registered as they happen, without specific predetermined time intervals.

Opportunity cost valuation method: valuing time at what it would bring if occupied in the most remunerative alternative use (typically the market wage).

Participation duration: the average time devoted to a given activity: total time per person calculated over only the persons doing it. Total time/doers (participants).

Population duration: the average time devoted to a given activity per person calculated over the total population. Total activity time/population.

Production: is an activity in which an enterprise or household produces outputs that can be delivered or provided to other institutional units.

Productive activities: activities carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services, to produce outputs of goods or services.

Recall period: the length of the period between the doing and the reporting of an act.

Sequencing: relates the occurrence of a given activity relative to those activities that precede and follow it, allowing for a clear understanding of how the day is organized.

Subsistence production: household production of goods and services which are consumed without going through the market.

Third person criterion: method by which domestic productive activity is classified according to whether it can be performed by an economic unit other than the unit consuming it.

Time unconstrained: times reported in stylized questions are not constrained to a fixed constant control time.

Time constrained: reported times in stylized questions which are constrained to a total fixed control time (i.e., 1440 minutes per day).

Underground economy: economically measurable activities, that may or may not be legal, that are deliberately concealed from public authorities. Comprises illicit work, illegal activities (drug trafficking) or legal activities which for other reason (tax avoidance, avoiding payment of social contributions) are not reported.

Value of input: monetary value of inputs to production imputed on non-market goods and services.

Value of output: monetary value of goods and services produced.

Volume of output: amount of good or service produced measured using appropriate units (number of meals cooked, number of old age people and children care for, etc.)

Volume of input: amount of inputs, expressed either in time, labour or other units, used in producing non-market good and services.

Wage rate:

1. Global wage rate: wage of a substitute who would perform several domestic and related activities (i.e., housekeeper).

2. Specific wage rate: wage of a specialized substitute (i.e., cook, laundress, seamstress, etc.) who performs only specialized tasks.

Work: any activity which contributes to the production of goods or services within the production boundary as defined in the SNA.

Executive Summary

Economic change engenders both technological change within the productive sectors and sectoral change within the measured economy. Concomitant with these changes are major underlying changes in the fabric of the society. The nature of "work" shifts. However, while the changing nature of "work" has clear gender effects, the information base required to control, rather than leave uncontrolled, those effects is missing.

Productive activity may be undertaken within or outside the market sector. In essence, all output produced in the market sector is market output and hence is statistically included in economic indicators. Moreover, much productive activity also occurs in the household sector, part of which is deemed outside the market while another part generates value which may find its way into the market (i.e., meal preparation) or be the equivalent of market goods (i.e. agricultural production). By definition, these activities producing actual goods fall within the production boundary. In most developing countries, however, they have remained unaccounted for in the actual practice of measuring total economic production due to inadequate and inaccurate data available. On the other hand, all types of services produced within the household for own or household consumption are totally excluded from economic indicators. Women are believed to provide the majority of household production, particularly of those that do not find their way into the market.

The System of National Accounts (SNA, 1993) pays due attention to these issues and elaborates what is included and what is excluded within the production boundary of the SNA. A major conclusion is that all production of own account goods, whether destined for the market or not, is to be included in SNA while production of services for self and for the household members is still beyond the SNA-defined production boundary.

SNA revisions to date have been incorporated into the SNA itself. The next step, however, must be a big one, both in terms of the inputs required and in terms of the quantities estimated. The methodology required for any further progress is not that different from the methodology used in building the existing accounts but some methodological development is required.

Since the SNA is not designed as a measure of welfare, as far as welfare is concerned, the value of household services for own consumption must be measured as a supplement to GDP, in line with current thinking, by inclusion through "satellite accounts". In this way an additional national aggregate will be obtained which has been often referred to as the "augmented GDP" or "enhanced GDP", or more regularly and recently "extended GDP". A major advantage of satellite accounts is their flexibility.

The issues are how far to broaden the production boundary for satellite accounts, and how to do it? What are the possible methods of measurement and valuation of domestic production?

The challenge facing national accounts statisticians is the development of working definitions and measurement and valuation approaches for activities currently remaining outside the SNA.

Recognizing the importance of these issues, national and international statistical bodies and academic researchers have actively pursued the measurement and valuation of household production and non-market activity. This monograph reviews, evaluates, and extends the previous work.

Based on a review of the existing literature and careful consideration of the theoretically appropriate and practically achievable dimensions of a satellite account the following productive activities are recommended for inclusion in a household satellite account to appropriately reflect household productive activity:

- *Household Maintenance*—which includes all domestic and people-related (caring) activities carried out by the household;
- *Personal Development* or educational activities; and
- *Volunteerism*.

Personal maintenance and personal recreation activities would be excluded.

To date only a few countries—including Canada, Australia, New Zealand, Germany and Finland and the U.S.—have developed estimates of unpaid household work (heretofore referred as household maintenance not including personal development and volunteerism). In all cases the studies were based on time-use data. Existing work shows that the computed value of household production is sensitive to the mode of measurement. Regardless of the approach taken to measure it household production accounts for a very significant proportion of total economic output of the economy. Typically, estimates of household production amount to between 30 and 50 per cent of GDP; and it is clear that there is a significant gender difference between currently measured production and unmeasured production with women accounting for between 60 and 70 per cent of such production. While currently measured production captures virtually all of men's productive contributions that which is excluded tends to be done primarily, although by no means exclusively, by women.

There is general agreement among those researchers that have thoughtfully explored the issue of valuing non-market production and compared existing estimates. They have concluded that ideally one should value non-market production in terms of the market value of the outputs produced. By this approach products and services produced in the household are assigned a value equivalent to the price of similar market goods and services. Theoretically these market goods could replace the products generated in the household. The value thus generated, would give an imputed gross output value of household production. Intermediate inputs may be deducted from this value to derive the value added.

Output-based evaluation requires an estimate of the household output, an estimate of the intermediate consumption, and determination of the market prices to be used for the conversion of physical volumes of outputs and inputs. Output-based evaluation methods do not necessarily require time-use data. But estimating all the products and services generated at the household level is extremely difficult without an idea of such activities from some other source. The

availability of gender specific time-use would facilitate the measurement of the magnitude of work and production more accurately, assist in the establishment of productivity norms, and provide for an enhanced evaluation of women's and children's contribution to productive processes.

While it is technically possible to estimate the value of household output, there have been few attempts to do so. It will be necessary to identify household outputs and value each appropriately, which usually requires additional data. Measurement of products generated by domestic services and child care, for instance, can be generated only by survey or observation and therefore averages may have to be inferred on the basis of surveys or case studies covering households in various socio-economic situations. A proper format for collecting data from this kind of observation has to be developed.

Similarly, data on inputs that go into producing household services have rarely been collected in either developed or developing countries. These inputs should be classified and itemized among capital services, intermediate products and labour.

The valuation process would thus involve generating time-use data for all activities and assigning this input a market value which could be any of the following in order of preference as listed depending on data availability; output value derived from the price of equivalent market product; net return to labour, exclusive of intermediate inputs used; net return to labour in other comparable non-market productive activities; and the wages of polyvalent household workers.

In valuation, other crucial issues that need to be clarified relate to prices. SNA defines three kinds of prices for valuation of products and inputs, namely, basic price, producer's price, and purchaser's price. Appropriate choices must be made.

Activity data best measured in terms of time use can be captured with instruments which range from direct questions, through simple activity lists to time-diaries or even direct observation. There is not necessarily one approach which is best. The appropriate approach depends minimally on the type and accuracy of the data sought and the funds available for its collection.

Time-use studies can be exhaustive, in which case they account for all activities or time within the targeted time slot (hour, day, week, etc.) or they can be selective and record only time allocated to selected or targeted activities.

The use of direct questions, generally denoted the stylized approach, is the most widely used approach. Specific targeted activities for which one wants information are selected and respondents are asked about time allocations to those activities, ignoring non-targeted activities. The preferred approach, however, is the constrained approach, where the reported time allocations must exhaust a defined time period, i.e., 24 hours in the day or 168 hours in the week in terms of time or what amounts to the same thing. Alternative approaches include the use of activity lists, activity logs or activity matrices. Stylized questionnaires are highly dependent on the interpretations put on the terminology used regardless of their level of sophistication.

The tool of preference for capturing behavior is the time diary captures in succession, with starting and ending times, all activities, engaged in by the subject over some fixed period, typically 24 or 48 hours. The time diary is an exhaustive data collection approach, capturing all

activities within the target period. Time diary surveys are an important tool or technique to capture data on patterns and types of activities undertaken.

Most of the well-documented studies on time-use techniques come from the developed regions of the world where the methods have the longest traditions, most molded by the Multinational Time-use Project, and are increasingly becoming an important data-gathering technique. Several European countries, including Austria, Bulgaria, Denmark, Finland, Hungary, Norway, France and Poland have replicated studies since the 1970s, and further modifications and refinements of methodologies have been undertaken to fully adapt the materials to the objectives of the study and the socio-economic structure of the population. Very few time-use surveys have been conducted at the national level in developing countries.

Observation is the major alternative approach used to measure how people use their time. The approach is frequently used to capture information in restricted settings (hospitals, classrooms etc.) or for particular subgroup behavior (students, children). However, its use for capturing data on time-use for the general population has been somewhat circumscribed. There do not appear to be any actual time-use studies reported for developed countries where observation has been used as the main vehicle for capturing time-use data.

Based on the work carried out on behalf of the unpaid work valuation project, as highlighted in this report, it is recommended that:

- a framework defining activity classification for SNA and satellite accounts activities should be established;
- an internationally acceptable SNA Satellite Household Sector Account should be defined;
- the Household Satellite Account should include all activities associated with the maintenance and upkeep of households and families, all activities related to gaining an education, and volunteering;
- an output-based approach to valuing non-market production be developed;
- steps be taken to develop accurate and efficient time-use data collection approaches;
- data capture for the household satellite account should be carefully planned and undertaken using a range of instruments and approaches.

Benefits from the development of a household satellite account and the generation of data to service that account would be far-reaching. Such an effort would facilitate implementation of the 1993 SNA measurement requirements, provide time-use data for formulating policies on women, and facilitate increasing literacy, the assessment of the importance of the transportation sector, the accounting for time lost due to sickness, the measurement of children's work input and the human capital building process, the measurement of voluntary community services, the measurement of social and economic change, and informal sector measurement.

A number of agencies or international bodies have an interest and stake in developing practical methods for valuing household and domestic work in the informal and domestic subsistence sectors. These include, but are not restricted to, INSTRAW, the United Nations Statistical Commission, the ILO, the FAO, and UNICEF.

Chapter 1
Introduction

The existing System of National Accounts (SNA) provides a framework for measuring and organizing data on the market economy. Since the accounts were first established they have been undergoing refinement to better portray that which they were designed to portray, the market economy. Also, since national accounting was established, it has been recognized that the accounts designed to reflect the market economy, and have excluded most of the production which takes place outside the market (non-market productive activity produced primarily in households). The contrast in treatment has existed for both conceptual and measurement reasons. On one hand, non-market productive activity was seen as uninteresting or irrelevant. On the other, where interest existed, the perceived problems in delineating and measuring such activity were seen as virtually insurmountable. However, over the past decade the validity of both views has diminished. There has been both growing conceptual awareness and acceptance and growing recognition that there are workable techniques for capturing relevant data on non-market productive activity. Drawing on the growing literature and national case study reports, this report reviews existing views and knowledge of the measurement of non-market productive activity, recommends establishment of a satellite household account, provides a framework for its delineation and measurement and elucidates workable approaches for capturing necessary data and appropriately valuing non-market production.

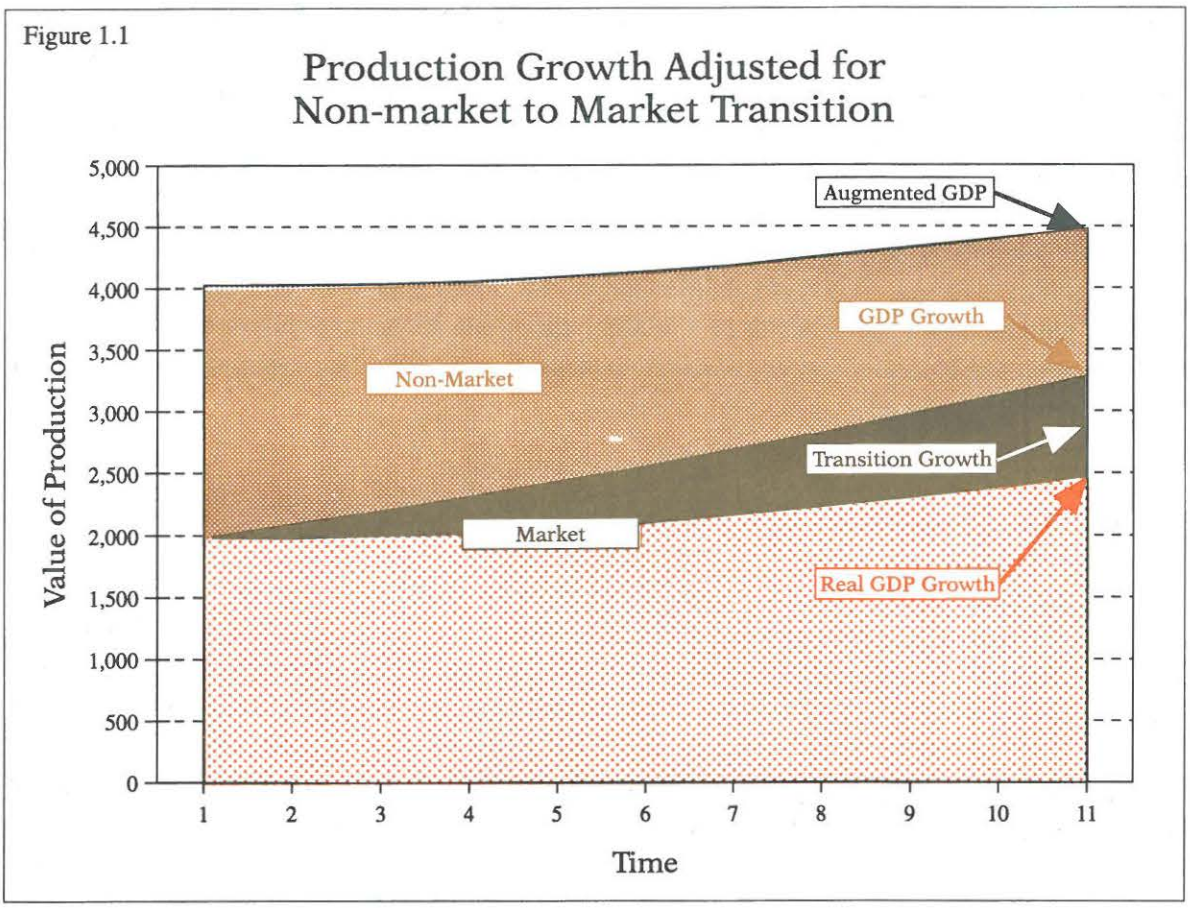
The Problem: One-eyed Decision-making

Government policy is designed either to maintain or to change the status quo. Knowledge of the need for change, what needs to be changed, what can or will be the object of change, and what will change, depends greatly upon the knowledge (data and information) base available to inform policy makers. If the knowledge base is inaccurate or is insufficient the resulting policy at best may have no effect, and at worst may have deleterious effects.

Economic change typically engenders several not unrelated major structural shifts. These include technological change within the productive sectors and sectoral change within the measured economy. Concomitant with these changes are major underlying changes in the fabric of the society. The nature of "work" shifts. While the changing nature of "work" has clear gender effects, the information base required to control, rather than leave uncontrolled, those effects is missing. Also, generally there is a shifting locus of "work" from rural to urban areas (FAO, 1990a). Concurrently, shifts occur between the "market" and the "non-market" sectors. Consequently, part of measured growth is illusory growth, the result of the shift of given

activities from a state of being unmeasured to a state of being measured, this growth is denoted *transition growth* in the characterization of growth pictured in Figure 1.1. There it can be seen that the *real growth in GDP* is somewhat less than the measured growth when account is taken of growth attributable to measuring the previously unmeasured. This kind of underestimation of household production has implications for the evaluation of development. In the process of modernization, many of the activities undertaken within the household get externalized and marketized and the products or services from there on start to be included in GDP. This is not a *real increase in GDP*; it appears only because earlier these products or services were left out of GDP accounts. This generates an illusion of development. An increased GDP figure implies an improvement in living standards, while in reality living standards may actually have grown much less slowly or remained the same as a result of marketization of activities and products as shown in Figure 1.1. A recent Finnish study states that "according to international studies the annual growth rate of GDP has been 0.2-0.3 percentage points lower than the official figures, if the value of household production is included."

Figure 1.1



The knowledge base needed to guide economic development is grossly inadequate if it fails to reflect the interplay of market and non-market forces. Specifically, many gender and spatial

shift effects of policy are invisible to policy analysts and policy makers, and yet "the first step in improving social choices is to measure progress correctly" (World Bank, 1992, p. 34). As stated in paragraph 120 of the Nairobi Forward-looking Strategies for the Advancement of Women,

> *The remunerated and, in particular, the unremunerated contributions of women to all aspects and sectors of development should be recognized, and appropriate efforts should be made to measure and reflect the contributions in national accounts and economic statistics and in the gross national product. Concrete steps should be taken to quantify the unremunerated contributions of women in agriculture, food production, reproduction and household activities* (NFLS, Par. 120, 1985).

If policy makers can see only one side of the economy, by viewing the economy with one eye covered, their decision-making cannot help but suffer. Currently, they see clearly (?) the market economy. In contrast, their vision of the non-market economy is limited or obscured by existing theory and practice since a portion of non-market production—domestic and personal services produced by members of household for consumption by themselves or other members of the same household (1993 SNA, 6.84, p.133)—is not included within the production boundary of the system. This activity must also be quantified and observed if policy makers are to have a full view of all productive activity.

In particular, women are believed to provide the majority of non-SNA activity, that is activity in the production of goods and services for one's own or conceptual consumption and unpaid community service. Considering only domestic activities, an analysis of evaluations in unpaid work in developing countries concluded that women's contribution ranged from two-and-a-half times to fourteen times that of men (Goldschmidt-Clermont, 1987b).

Evidence from some case studies suggests, for example, that street food production and its selling, *generally undertaken by women*, accounts for a very significant part of food for the poorer sections of urban areas in developing countries. Currently meal preparation falls outside the SNA unless it is sold. However, if a portion of such production—the portion sold—is included in the SNA while the unsold, self consumed portion is not, a misleading picture of production and changes in it will be provided. Similarly, the contributions of women's domestic work—including caring for the elderly and the young and "maintenance" of members of the household engaged in market sector activity—remain unaccounted for but constitute a significant contribution to productive work. Such work would otherwise need to be provided by purchase from the private sector or through public provision.

Momentum for Reform

Recognizing these problems, national and international statistical bodies and academic researchers have actively pursued the measurement and valuation of non-market activity. However, a great deal remains to be done in moving toward integration of market and non-market activity into a set of integrated economic accounts. At its twenty-fifth session, in 1989, the United Nations Statistical Commission affirmed the great value to countries of further work

in this area, particularly the development of technical reports on methods of compilation, valuation and analysis of women's contribution to development, in order to supplement the System of National Accounts.

International debates and research studies have recently brought to the fore many of the conceptual and methodological problems involved in capturing and valuing non-market production and employment. Relevant studies have examined measurement in terms of, among other issues, women's agricultural work (Dixon-Mueller, 1985), women's participation in the labour force (Anker, Khan & Gupta, 1988), women and development (Dixon-Mueller & Anker, 1989), and Third-world poverty (Birdsall, 1980). Such work has motivated and contributed to the recent extensive reviews and revisions of existing international standard definitions of concepts such as those set for the SNA and labour statistics, including the classification systems of occupation, industry and status of employment. In this context, it is important to note that attempts have been made and some agreements have been reached to redefine economic concepts and measurement practices that now tend to exclude non-market production activities in the whole process of data collection, production and analysis. The concept of production and the boundary set by the system of national accounts have been extended and their strict consistency with labour force concepts emphasized. This change should enable all "productive" activities except domestic subsistence work to be counted and reflected in the labour force and economic accounts systems, provided that the enumeration techniques are adequate.

Achievements to date, however, have not seemed to solve many of the problems relating men and women's unpaid work. While techniques more fully capturing the productive activity possibly favour women in some settings, they help assure almost complete coverage of men's activities and exclude a significant part of women's productive activity. Within the broad spectrum of non-market activities, the valuation of domestic maintenance and subsistence work and, most importantly, unpaid work, particularly in agriculture, have remained the most problematic. A consensus does not yet exist on the precise delimitations of activities under each category, nor are there useful methods of reflecting them in the macro-aggregates.

In 1989 the Ministry of Women's Affairs in New Zealand stated:

> *The Ministry is liaising with the Department of Statistics to develop a time-use survey to measure unpaid caring, household and community work. Among other things, this will be a first step towards including the productive value of unpaid work within the System of National Accounts.*
> *We need better information on the range and extent of unpaid work done by women and men. We also need to know how unpaid work differs for Maori, Pacific Island and people from other ethnic groups, different age groups, household types and so on.* (1989, p. 1).

This report will show that such an approach is possible, and indeed necessary, on a much broader scale. In particular the urgency is greatest in developing countries where currently much productive activity is outside the market. If an accounting structure compatible with the 1993 SNA but more fully reflecting the reality of production can be developed, policy makers will have a much more solid information base from which to guide policy.

Chapter 2
The Reality of Production

There are generally accepted definitions and conventions regarding what is, and what is not, production and what is, or what is not, an individual's labour force status. The 1993 SNA lays down basic guidelines for production and the ILO has done much to formulate broadly acceptable definitions of labour force status. However, actual definitions used in any particular instance often depend on the issue or question being addressed and/or on the jurisdiction for which the definition is being formulated. This situation is not totally inappropriate. It does, however, pose problems in interpreting economic behaviour. It also imposes on those talking about productive activity and labour force roles an obligation to draw their boundaries clearly. This chapter explores the definition of production and the classification of the labour force from two perspectives. One is the market-oriented perspective of the System of National Accounts (SNA), and the other is a broader economic perspective encompassing the functioning of both a *market economy* and a *household economy* (Ironmonger, 1989).

The Market Perspective: Production Boundary According to the 1993 SNA

The 1993 SNA defines economic production as follows:

> *Economic production may be defined as an activity carried out under the control and responsibility of an institutional unit that uses inputs of* ***labour, capital, and goods and services*** *to produce outputs of goods or services. There must be an institutional unit that assumes responsibility for the process and owns any goods produced as outputs or is entitled to be paid or otherwise compensated for the services provided.*[1]

The service is generally considered to be incorporated in some good, asset, or person. Since it may be difficult to isolate the service from the good, asset, or person in which it is

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- Goods are physical objects for which a demand exists over which ownership rights can be established and whose ownership can be transferred from one institutional unit to another by engaging in transactions on markets.
- Services are deemed to provide some improvement (or prevent a deterioration) in some condition relevant to consumers but are not separate entities over which ownership rights can be established (SNA, 1993, p. 123).

incorporated it is deemed difficult to define and measure service units. It is, however, recognized that services may last for varying periods of time and some services may, like producer durables, provide a flow of benefits over an extended period of time. Services may accrue to the benefit of single consumers or to groups of persons as a collective. Where individual benefits can be isolated and restricted to specific individuals or groups such individuals or groups can be expected to pay for the benefits they receive. However, some services, denoted collective services, accrue to the community at large, and individuals cannot easily be excluded from their benefits. Provision for military activity and law and order services are clear examples of such activity.

> *The economic analysis of production is mainly concerned with activities that produce outputs of a kind that can be delivered, or provided to other institutional units. This, according to the SNA, is the distinguishing characteristic between economic production and other activities. Unless outputs are produced that can be supplied to other units, either individually or collectively, there can be no division of labour, no specialization of production, and no gains from trading* (SNA, p. 121).

As the SNA defines it, productive units are those which contribute to the gross or net domestic or national product (GDP) or (GNP); that is, all units whose activities fall inside the production border set up by the SNA. But this production border excludes some productive activities primarily carried out in households which, according to estimates made in different countries, equal approximately one-fourth to one-third or more of the value of GDP as noted below in Chapter 3. These activities are primarily those performed in institutional units designated households for the use of the same household. There has been a growing recognition of the significance of these activities, and with each revision of the system of national accounts more and more of these activities have been drawn inside the production boundary.

The SNA recommends inclusion of all goods in GDP—for home consumption or for sale. The following types[2] of production by households are, therefore, included whether intended for own final consumption or not:

- *Production of all agricultural products and their subsequent storage, the gathering of berries or other uncultivated crops, forestry, wood cutting and the collection of firewood, hunting and fishing.*
- *Production of other primary products such as mining salt, cutting peat, the carrying of water, etc.*
- *The processing of all agricultural and forestry products for own use or market.*
- *Other kinds of processing such as weaving cloth, dress making, production of pottery, footwear, utensils, durables, etc.* (SNA, 1993, p. 125).

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[2] The SNA further clarifies that this is not an exhaustive list; items are presented only as illustrations, and when production is negligible they may be ignored in practice.

Only with a detailed account of activity and inputs and outputs and their value will it be possible to take account of all goods and services generated in the economy. For example, in Nepal, food processing within the household (not including cleaning before the cooking, etc.) was estimated to contribute about 15 per cent of the rural household income (Acharya and Bennett, 1981). Similarly, the SNA recommends that water carrying should be valued and its product included in the SNA. Without the measurement of time spent on these activities, it will not be possible to generate estimates of such products and services.

The System of National Accounts (SNA, 1993) pays due attention to these issues and elaborates what is included and what is excluded within the production boundary of the SNA. A major conclusion is that all production of own account goods, whether destined for the market or not, is to be included in SNA while *production of services for self and for the household members is still beyond the SNA-defined production boundary.*

The 1993 SNA specifies that, "although personal and domestic services produced for own consumption within households fall outside the boundary of production used in the System, it is nevertheless useful to give further guidance with respect to the treatment of certain kinds of household activities which may be particularly important in some developing countries."

Specifically excluded are minor "do it yourself" repairs and maintenance of consumer durables and dwellings carried out by members of the household. Major repairs, however, are included. The 1993 SNA recognizes that in most countries, a considerable amount of labour is devoted to production of domestic and personal services, while other consumption makes an important contribution to economic welfare. Activities deemed not to be productive in the economic sense are basic human activities such as eating, sleeping or taking exercise. Purely personal free time activities like games, sports, socializing and media use are similarly deemed not to be productive.

The production of household services can be organized on a market basis and household services are clearly produced as outputs from production processes. Moreover, the production and consumption of household services clearly has a considerable impact on the welfare of households. While in reality GDP is not meant to be a welfare measure, if the sole, or even primary purpose of the System were to compile one or two aggregate measures of production and consumption to be used as indicators of total welfare, there is no doubt that values should be imputed for household services produced for own consumption. Thus, for special analyses of changes in aggregate welfare over time, or differences of welfare between countries, GDP as defined in the System should be augmented by imputing values for the own-account production of household services.

This means that as far as welfare is concerned, the value of household services for own consumption must be measured as a supplement to GDP, in line with current thinking, by inclusion through *satellite accounts*. In this way an additional national aggregate will be obtained and though no name is given to the aggregate in the draft, it has been often referred to as the "augmented GDP" or "enhanced GDP" or, more regularly and recently, "extended."

Typically, individuals, especially women, are carrying out simultaneous productive activities across sectors, as demonstrated in Figure 2.1. However, the traditional data-gathering techniques do not and cannot capture these interactions. These interactions have to be recognized and

counted, either within traditional statistical aggregates or in satellite accounts. This requires a common system of data collection, analysis and presentation.

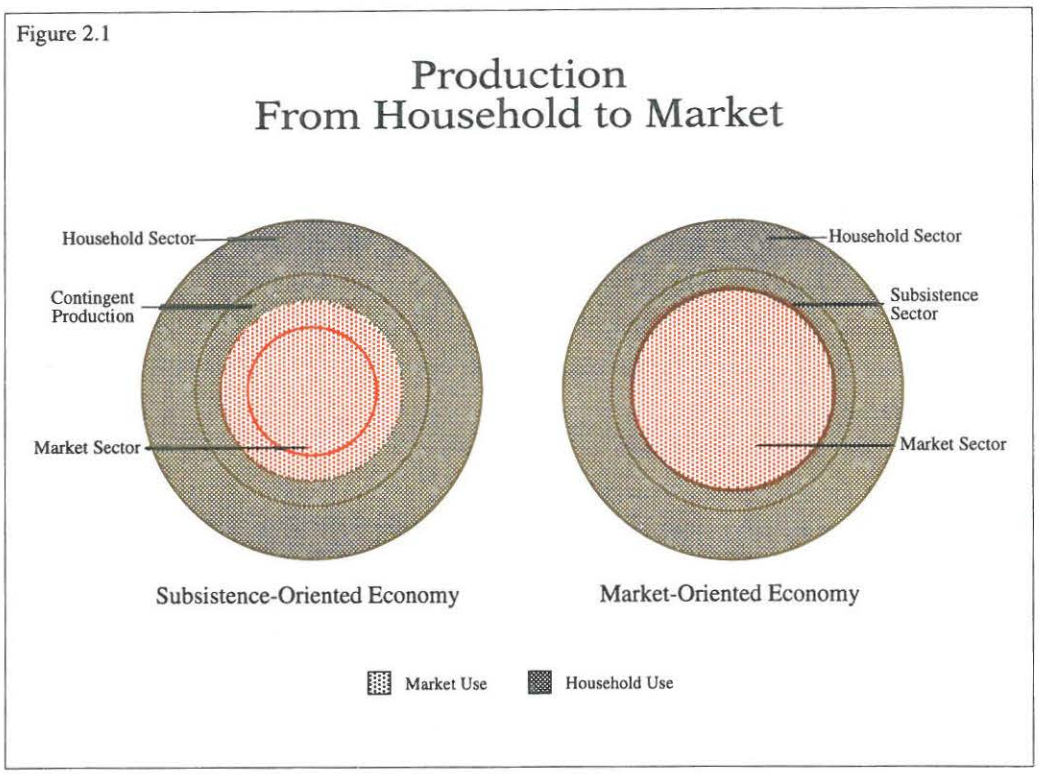
Activity may be undertaken in the market sector or in the household sector. In essence, all output produced in the market sector is market output and is included in the SNA. Additional productive activity occurs in the household sector. Part of such household production is deemed outside the market (i.e., meal preparation). Another part, however, generates value that may find its way into the market or be the equivalent of market goods (i.e., agricultural production) and thus by definitional within the SNA. Non-marketed goods production along with some household services constitute activity that provides for maintenance of the household and household members.

As indicated in Figure 2.1, the subsistence sector is composed of a purely household component, an SNA oriented component and no clear line between the two. The line can only be drawn *ex-post facto* if production can be appropriately allocated to one or the other of the sectors. The tasks ahead are to define what will constitute production to be counted in the household sector, how to measure and value that production and how to develop ways of allocating simultaneously produced output between the market and the household sectors.

The lack of data, and thus quantification, leads to an undervaluation of the economic contribution of women (Dixon, 1985). Problems are manifest in terms of both production, and employment. In particular, data fail to account properly for female labour force participation (Anker, 1983).

A major advantage of satellite accounts is their flexibility; they can include volume data. Volume of labour inputs, expressed in time units, can therefore be matched with values expressed in monetary units for SNA and non-SNA activities.

Figure 2.1



The 1993 System of National Accounts and the Tasks Ahead

The System of National Accounts (SNA, 1993) concludes that while all production of own account goods, whether destined for the market or not, is to be included in SNA, the production of services for self and for household members will still be beyond its production boundary. The arguments given to justify this conclusion are:

a) *Own account production of services is a completely self-contained activity with limited repercussion on the rest of the economy. The decision to produce in this case involves simultaneous decision to consume, while for goods these two decisions are separate.*
b) *In the vast majority of households, domestic and personnel services are not produced for sale and they have no market prices which can be used to value such services.*
c) *Imputed values have a different economic significance for monetary values. The imputed incomes generated by the imputed production would be difficult to tax in practice* (SNA, 1993, p. 124).

> *The reluctance of national accountants to impute values for the outputs, incomes, and expenditures associated with the production and consumption of domestic and personal services within households is explained by a combination of factors, namely the relative isolation and independence of these activities from markets, the extreme difficulty of making economically meaningful estimates of their values and the adverse effects it would have on the usefulness of the accounts...* (SNA, 1993, p. 125).

These arguments given for exclusion of most of the domestic activities are specious and not very convincing. For example, the contention that in many countries markets do not exist for services such as cooking, child care, etc. will apply equally to housing in rural areas; in Nepal's remote villages renting a living space is inconceivable. Similarly, markets do not exist for many by-products of agriculture (e.g., hay or compost fertilizer). That the production of services is self-contained in the sense that production and consumption decisions are simultaneous and do not affect other parts of the economy is also arguable. For example, if all women decided not to cook for the family members, the market will definitely be affected because cooking food will become a much larger industry. This is very evident from a comparison of the cooked food market in developed and developing countries.

Yet it is a fact that to measure domestic services in monetary terms is difficult, that production process of domestic services is qualitatively different from that of services in the market, and that lumping them together with other national accounting statistics might not be very useful for macro policy decisions at this stage.

The case for supplementing further the recent 1993 SNA is as strong as ever, and it is, at least intellectually, fairly widely accepted. What remains to be determined is the practicality of delineating, collecting and processing the data necessary to encompass those activities still to be included.

While it has been argued that the volume of such services is large, this should be a reason to take them into account and not to close one's eyes to them. It is not quite clear why it should be difficult to impute the value of the production of services for own consumption in a household, simply because the number is large. Estimates of this type have been made by now in many countries, as indicated below in Chapter 3. The inclusion of these services in the System does not mean that all the aggregates will have to be changed. The System establishes several different aggregates, each of which is intended for specific uses. The aggregates are composite values that measure the result of the activity of the entire economy considered from a particular point of view: for example, value added, income, consumption, savings, etc.

The inclusion of household services within the System would not mean that the corresponding imputations would obscure market activities. Activities in the market and outside the market must be systematically kept apart because their significance is quite different. In fact, when market activities increase sharply, non-market activities are apt to diminish, and vice versa, so they have to be shown separately. But in order to provide a "simplified but complete and rather detailed picture of complex economies" they must be shown. Otherwise, the picture is not complete.

Revisions to date have been incorporated into the SNA itself. This has been practical for at least two reasons. First, the magnitude of the additions has been sufficiently small so as not to overwhelm the present accounts in any way. Secondly, the methodology for data capture and valuation does not depart from that predominantly used for building the present accounts. Yet, there are cases under the 1993 SNA where measurement of items technically included in the SNA is difficult at best or impossible at worst with the traditional data-gathering approaches.

The next step, however, must be a big one, both in terms of the inputs required and in terms of the quantities estimated. The methodology required for any further progress is not that different from the methodology used in building the existing accounts but some methodological development is required.

Methodological development is needed for the extension of the production boundary to include household services, preferably through the establishment of a household satellite account. Because of the magnitude of the values involved, it is generally proposed that any further extensions take place in satellite accounts. This approach is reasonable, not only because it preserves the integrity of the existing accounts (Chadeau, 1992), but also because it will give form to what a number of writers claim actually exists, the "household economy" (Burns, 1975; Ironmonger, 1989). The SNA does not deny the usefulness and possibilities of such experimentation.

> *Satellite accounts, in general, stress the need to expand the analytical capacity of national accounting for selected areas of social concern in a flexible manner, without overburdening or disrupting the Central System* (SNA, 1993, p. 489).

Among others, satellite accounts or systems allow for the provision of additional information on particular concerns of a functional or cross-sector nature and the use of complementary or alternative concepts, including the one of complementary and alternative

classifications and accounting frameworks, when needed to introduce additional dimensions to the conceptual framework of national accounts (SNA, 1993, p. 489). Satellite accounts on unpaid production can be defined as a supplement to the existing standard system of national accounts that estimate the value of the critically important but currently invisible tasks, particularly domestic, volunteer and do-it-yourself activities. The issues now are how far to broaden the production boundary for satellite accounts, and how to do it? What are the possible methods of measurement and valuation of domestic production?

Collection of time-use data and its valuation is one of the ways in which the actual spectrum of human activities could be gauged. Time-use data can provide insight into various social and economic processes. The question here is how the time-use data can be used to capture the productive processes that are undertaken by the households as units of production and to present this in a format compatible with other SNA accounts.

The remaining challenge facing national accounts statisticians is the development of working definitions and measurement and valuation approaches for activities currently remaining outside the SNA.

The task, therefore, is to illustrate the possibility of constructing such an account. With standardized time-use data at hand for several countries, one could proceed to generate output variables and wages on a smaller sample in addition to the time-use data and test the difference in magnitude between the wage-based and output-based valuations as suggested by Goldschmidt-Clermont (1992). When data are generated on work plus other inputs and outputs for sample households, gross or net value added could be calculated for the households. This value added would indicate the productivity of household activities, which could be used to estimate the total value generated within the household sector. This method would be most compatible with SNA methodology. The process is discussed in the following paragraphs.

Production Revisited

According to Reid, household production is:

> ... *unpaid activities which are carried on by and for the members, which activities might be replaced by market goods, or paid services, if circumstances such as income, market conditions, and personal inclinations permit the services being relegated to someone outside the household group* (Reid, 1934, p. 11, quoted in Sanik and Stafford, 1983, p. 127).

While Reid (1934) put forth the foregoing definition of household production, most work addressing the definitional issue of household production and of its value in relation to GDP/GNP dates from the work of Hawrylyshyn (1977) and Adler and Hawrylyshyn (1978). Given the objective of measuring gender-specific economic contributions to society, the clear definition of what is productive is important. While most personal activities will enhance an individual's welfare, only productive activities are regarded as contributing to society's well-being. There is fairly broad agreement that a productive activity is one that can be done by an

economic unit other than the unit consuming it (Reid, 1934; Hill, 1977; Hawrylyshyn, 1976). This has come to be known as the *third person criterion*. Stated alternatively, productive activities are those that produce tradable goods or services, *a tradability criterion* (Cecora, 1991). Cecora's definition highlights what has been denoted the *market replaceability criterion* (Jackson, 1993b). Jackson also identifies what he denotes the *by and for members of the household criterion* of Reid. Jackson (1993b) explores other criteria as well and appears to conclude that the *third person criterion* offers the best guidance. He indicates that, although the criterion is fairly straightforward, its application can be tricky.

There are problems with the third person criterion. Whether the problems are inherent in it as a criterion or are encompassed in problems of implementation, they are sufficiently serious that the criterion cannot alone provide adequate guidance for the classification of activities independent of other rules. This point is made by Jackson (1993b).

Household activities can be undertaken by any member of the household and by any non-member in the absence of all other members. Personal activities cannot be undertaken in the absence of the recipient. Thus, certain activities—eating, sleeping and resting—are useful but non-productive activities because they cannot be done by an economic unit other than the one consuming them. However, some activities, such as body care and dressing, though normally done by the healthy adults benefiting from them, can also be done by another party. With the growth of safety and electric razors, shaving shifted out of the market into the home. In some areas of New York City there seems to be hardly a commercial block that does not house a shop that provides such services (i.e., barber shop, manicurist shop, etc.). Indeed, many personal services are provided commercially. Since there are practical difficulties in drawing a distinction between tradable and non-tradable personal care activities, it is necessary to make an exception to the tradability rule and consider all time allocated by an individual to producing and/or receiving personal maintenance activities as non-economic. Where personal care is provided in the market, the market component is recorded and included in the SNA. What is not recorded or counted is the time expended by the recipient of the service. This suggests an alternative criterion.

A more functional criterion is the *recipient criterion* which, simply put, states that activities which cannot be *received for another* are non-tradable and thus fall outside the market. This criterion is essentially that reflected in the Revised System of National Accounts, which states: "The kinds of activities which are not productive in an economic sense are basic human activities... that it is impossible for one person to obtain another person to perform instead" (SNA, 1993, p. 124). Hill used essentially the same terminology to define "non-service activities" when he indicated that they were activities for which an "individual cannot pay someone else to do on his behalf" (Hill, 1979). There is a fine distinction. Giving a shave is tradable; receiving one is not. This is not an ideal situation, since the time allocated by the recipient has an opportunity cost not reflected in measurement. When such activities enter the market, market activity is captured through normal market measurement channels. When such activity is provided to others outside the market it would be recorded as voluntary activity. Thus, personal services for oneself have to be distinguished from those provided to others at the data-collection stage. As Jackson (1993b) suggests, it is necessary to know "for whom" activities are done.

Conclusions

The realities outlined above suggest some of the problems attendant on attempts to lay down seamless rules. Ultimately, in the classification of activities as in virtually all classification schemes, definition will come by one or two overriding rules governing placement of the boundary and some agreed exceptions to those rules. It has been suggested, in one exercise valuing unpaid work, that while empirically the definition adopted for household work must permit classification of activities of households as either 'economic production' or 'other,' in practice the designation will be subjective and somewhat arbitrary (Castles, 1990). As Chadeau has noted, definition of household non-market activity in border cases is contingent on social norms, habits, and common sense. This, however, is the crux of the problem. Social norms can vary significantly cross-culturally. To what extent can cultural and societal norms be subjugated to SNA demands, and vice versa?

If broad-based progress is to be made in measuring and valuing all productive activities, it is necessary to have a framework for interpreting and organizing such data. The following chapter addresses this issue.

Chapter 3
Towards a Household Satellite Account

As indicated in the previous chapter, the preferred approach to accounting for non-SNA production is through a satellite household account. In order to establish such an account and to properly account for market and non-market production and the classification of workers, it is necessary to develop appropriate classifications of activities. While the ILO and other agencies have devoted considerable effort to elaborating and clarifying concepts related to the classification of workers and employment, only recently has attention been given to the importance of the classification of activities for purposes of extending or supplementing the SNA. In 1987 Dupre et al. examined the boundaries of activity with respect to the classification of the economically active population. Pyatt (1990) has addressed the question of activity classification in relation to the classification of people. The issue of an integrated approach to the measurement of work-related activity time has been well addressed by Mata-Greenwood (1992) while Harvey and Niemi (1993) explored issues related to the classification of all activities as a basis for coding time diary information.

Dupre et al (1987) were concerned with delimiting the boundary of economic activity, since it is considered central to the determination of the economically active population. Individuals producing 'economic goods and services' are considered the 'economically active population.' By implication other individuals are not economically active. And, as they note, the exact boundary between what is considered 'economic' and what is not is to a major extent determined by convention.

Thus, both the classification of activities and of labour must be considered with a view to providing an understanding of the nature of the data to be collected to extend the accounts to meaningfully reflect all productive activity, and not just activity which is currently—by convention—deemed productive.

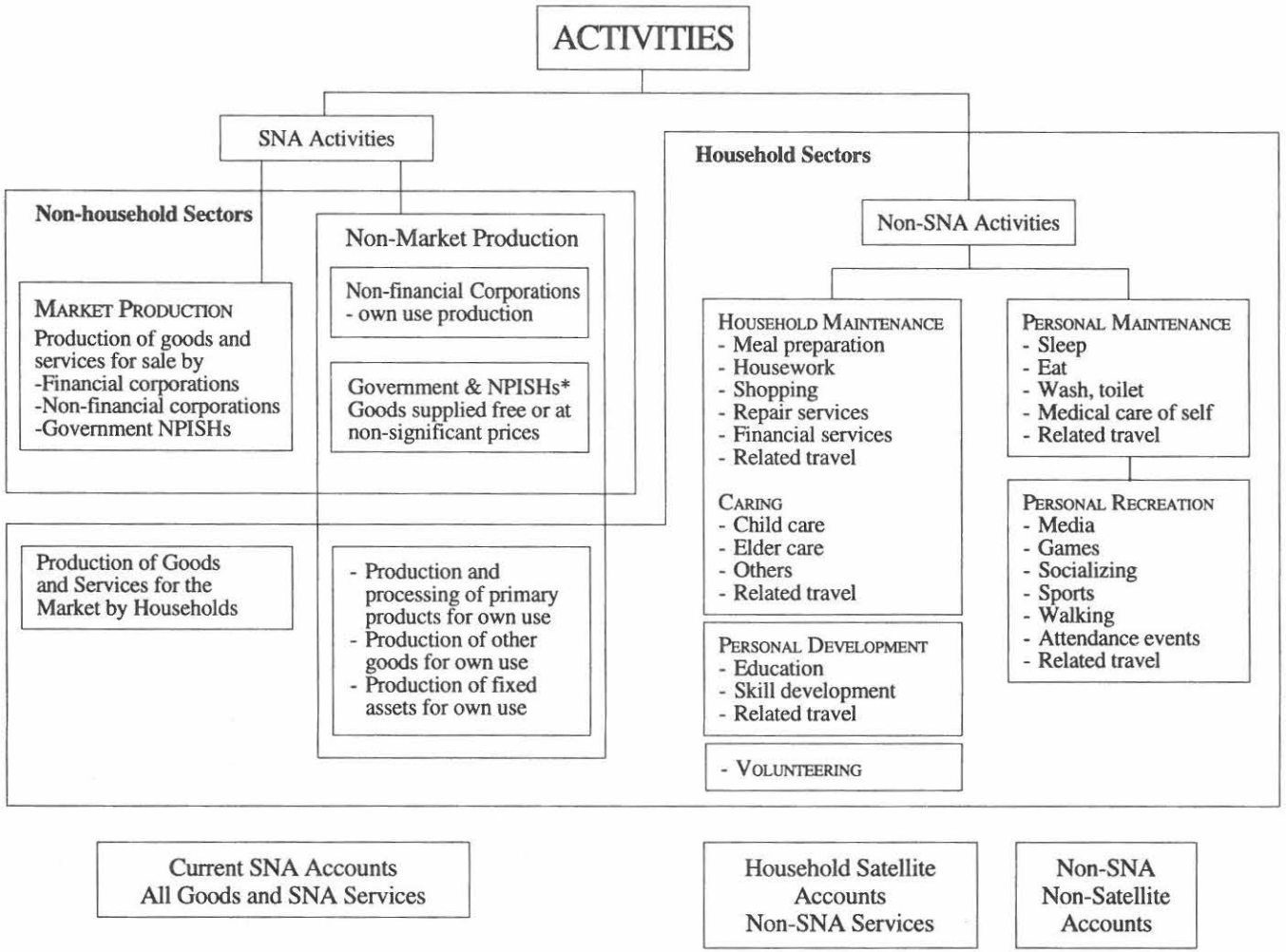
Activity Classification for SNA and Satellite

The foregoing discussion provides the basis for a framework for the classification of activities to facilitate activity measurement and its integration into the accounting framework. A proposed framework delimiting time allocation is presented in Figure 3.1. The diagrammed activity classification is structured as follows:

Figure 3.1

SNA Based Activity Classification Framework

INSTRAW, Time-Use Measurement and Unpaid Work Project



* Non-profit institutions serving households, based on Table 6.1, 1993 SNA

SNA activities

• *Market production*—shown in the left hand column of the diagram, includes all time used to produce goods and services for the market sector. The market sector is as defined in the SNA—all goods and services transacted in the market regardless of the institutional unit producing them. Thus, as can be noted, market output eminates from activities of non-financial and financial corporations, government, non-profit institutions serving households, and households themselves.

• *Non-market production*—indicated in the second column, reflects the non-market activity currently captured in the SNA. This includes goods and services produced for own use by non-financial corporations, governments and non-profit institutions. And it includes, from the household standpoint, the imputed value of home ownership, goods consumed in kind, etc. It also includes—as a result of the 1993 revision—all goods production whether or not sold on the market. It includes, for example, as earlier identified:

1. The production and storage of agricultural and related products; i.e., berry gathering, wood cutting, hunting, fishing.
2. The production of other primary products, such as mining salt, cutting peat, carrying water, etc.
3. Processing agricultural and related (i.e., #1) production; i.e., threshing, drying, curing, bottling, beer and wine making, weaving baskets or mats, etc.
4. Other kinds of processing, such as weaving cloth, dress making and tailoring, the production of footwear, the production of pottery and utensils, making furniture or furnishings.

Thus much of what Acharya (1981) identified as subsistent economic production is now included in the 1993 SNA. Major repairs to housing are included in the accounts, while small repairs, redecoration, etc. (DIY) fall outside the revised accounts. However, with most existing time-use data it is not possible to distinguish between the two types of household repair/construction activity. For current purposes it seems best to include all such activity under the non-market column rather than the domestic production column.

Under SNA Activities, columns 1 and 2, together, contain what is now in the 1993 SNA accounts. Part of the production in each of these columns is produced in the household sector and part is produced in the non-household sectors.

Non-SNA activities are likewise comprised of two distinct sets of activities, one with three groups and the other with two groups. One set consists of service activities that can be relegated to another person and thus can be traded in the market. The other set consists of services that cannot be relegated to others but must be done for oneself. The former should thus be accounted for in an overall accounts framework. Consequently, a household satellite account should include household maintenance activities, caring activities, personal development and volunteering. Remaining personal maintenance and personal recreation activities would fall outside both the SNA accounts and the proposed satellite account. This elaborates on the several activity groupings.

Satellite account activities

• *Household maintenance*—includes all domestic and people-related (caring) activities carried out by the household: meal preparation, cleaning up, child care and various other services. Repair services relates to fixing things or taking things to a repair shop to get them fixed, etc. Financial services includes banking, paying bills, legal services, etc. All of these items would be valued in a satellite account.

• *Personal development (education)*—should also be included in the household satellite accounts. Education clearly represents an individual's investment in 'human capital'. Education is considered a very special kind of activity. By the 'recipient criterion' one would not consider receiving education to be a productive activity. However, there are many reasons for considering it to be productive. Considering the 'tradability criterion', many educational activities, though not tradable themselves, lead to an accumulation of knowledge or skills which are themselves tradable. Such activities represent part of time invested in human capital (Harvey and Macdonald, 1976) and are therefore productive. Educational experiences that do not lead to tradable output would be deemed non-productive. It is, however, hard to imagine an educational process whose product is, theoretically speaking, not tradable because every trainee can in turn train others even when the actual skills are meant to benefit the individual. Education can be *formal* (taken in incorporated institutions governed by specific regulations) or *informal* through special interest study or on-the-job training. It can also be paid, as when employees are paid part or full salaries during the course of their studies, or, as it usually is, unpaid.

There is solid theoretical and practical support for the inclusion of education in proposed satellite household accounts. As Fabricant has argued (Fabricant, 1969), for many purposes it would be wrong to exclude students from estimates of manpower distribution or evaluation of current consumption and investment. Juster (1985), citing Becker and Schultz, argues that the earnings foregone as a result of school attendance can be seen as the most important single part of investment in educational attainment. Typically national accountants consider any activity whose benefits will be used up within a year as consumption. If the flow of benefits extends beyond one year the activity would be classed as investment. In any given year the consumption component of the activity would amount to its depreciation. With education it would be necessary to evaluate depreciation in terms of the rate at which the usefulness or value of acquired knowledge and skills deteriorate. In some fields, those that are new and changing rapidly, the decline may be very rapid as outmoded knowledge and skills are supplanted by new ones. Net investment in any period would amount to the difference between production and depreciation. Indeed, education can be a major determinant of the ability of an economy to produce, with increased education leading to increased production possibilities and deteriorating educational skills reducing production possibilities. To exclude the time allocated to education and thus the value of that time from computations of the costs and value of education does not appear logical. Additionally, analysis of time-use data argues strongly for considering students to be equivalent to workers. On a daily basis, students' time allocations are much more similar to the time allocations of workers than they are to those of any other group. On a longer-term basis, students are no more available to undertake paid work activities than are non-students regularly employed (Harvey, Elliott, & Macdonald, 1984).

Educational activities for the purpose of economic accounts should include the time spent by anybody in full-time and part-time classes, special lectures, laboratories, examinations, homework (course career and self development); meals, snacks and coffee at school; breaks or waiting for classes to begin; leisure and special interest classes; travel related to education; and all other forms of active study (Harvey, Marshall, Frederick, 1991). Distinctions should be drawn between three different types of educational activity. First are courses and study related to general educational development (GED); second, are courses related to specific vocational preparation (SVP); and third are courses taken as a part of general leisure interest. In valuing time allocated to education, it will be important to distinguish among various types of education and their income producing potential.

The time allocation to education will also be very important in understanding the activities of children in developing countries, particularly female children. Often their time gets allocated to market work and/or household production rather than to education. It is important to see the extent to which such activity impinges on their schooling. National accounting data, as they stand now, show how much money is being spent on education. While this is an important indicator, the outcome of these outlays depends on the effort made by those who are offered the education. The best approximation in measuring this effort, given the measuring tools presently available, is to record the time spent on this activity. In a similar way, job seekers who have to fill out a resume are usually asked how many years of education they possess, not how much money they have spent on their education.

There are two different entries concerned with education. One entry refers to education received, the other to education given. Time spent receiving education belongs in "Non-SNA activities: personal development" while time spent giving an education belongs to "SNA activities: market services".

• *Volunteering*—essentially involves activities undertaken with no or minimal pay for another institutional unit. In essence, volunteering is the household equivalent of government and non-profit institution outputs provided at an insignificant price.

Hawrylyshyn used the 'third person criterion' to delineate volunteer services. According to him:

> *Economic Volunteer Services are those activities which were done by a person outside the market but may have been accomplished by hiring a third person from the economic market; they are distinguished from household work by the fact that the benefits accrue to someone other than the volunteer or the volunteer's immediate family* (Hawrylyshyn, 1978; p.4).

Volunteer activities present the statistician with somewhat of a dilemma. On the one hand, who helps whom, and for how long, is of itself interesting and important. On the other hand, 'to help' is really more a motivation than an activity. If one helps another move their furniture from one place to another, were they 'moving furniture' or were they 'helping a friend'? There is no easy answer.

Volunteering exists both as formal and informal unpaid activity. Formal volunteering time is spent in registered charity institutions such as chambers of commerce, trade associations and unions, political parties, churches and religious societies, cultural foundations, social,

recreational and sports clubs, philanthropic and charitable institutions (ILO, 1992; Smith, 1992). Recent Canadian estimates placed the value, measured in terms of an estimated wage bill, of formal volunteer time allocation in 1987 at $12.0 billion dollars (Ross, 1990). This value includes only the time allocated by 5.3 million Canadians through formal organized agencies. In Canada, the estimated wage value of volunteer time for 1987 essentially exceeded total wages and salaries in the primary production sector (agriculture, forestry, fishing and mines and oil wells) and was approximately equal to total wages and salaries in the communications and utilities sectors.

Informal volunteering occurs independently or in institutions whose existence is clearly recognized by the community but which do not have any formal legal status. They are formed by groups of persons to engage in communal activities such as security patrols, construction and maintenance of buildings, roads, bridges, ditches or dykes, or other activities for the benefit or protection of the community (ILO, 1992). Generally, informal volunteering can be grouped into three categories: those which help other people directly (such as informal care of non-household children and adults); those which help the environment or wildlife; and those which help the local community or society in general (Duchesne, 1989). In 1987 13,222,000 Canadians provided informal volunteer assistance. Of that number, only 4,637,000 also provided volunteer services in the formal sector (Harvey, 1989).

Hawrylyshyn argues that, for the purpose of valuation to be incorporated into an economic accounting framework, "for practical and conceptual reasons we should limit ourselves to volunteer actions performed via organized groups or agencies" (Hawrylyshyn, 1978, p.4). He continued to explore in some depth the classification of volunteer work and to calculate the value of volunteer services for Canada in 1976.

Some volunteer activities, such as providing counselling and support, teaching and education, fund raising, etc., are frequently performed in jobs held by paid workers. (Duchesne, 1989). In such circumstances great care must be taken to avoid double counting (Harvey, 1989).

In a recent article Dalsimer (1989) argues for valuing the time donated by volunteers at the market value of a worker in an 'equivalent paid classification.' He recommends an approach developed by Karn (1982-83). While the approach he recommends closely resembles a 'replacement cost approach' it goes beyond that. It calls for looking at the task performed by the volunteer and finding an equivalent worker *somewhere*. Dalsimer argues further that the estimated value of a volunteer's time should relate to the nature of the job (i.e., a newsletter editor would be the equivalent of a public relations specialist or editor) and adjusted for experience and seniority. Additionally he argues that benefits should also be taken into account. Thus the volunteer value would be equivalent to the total compensation package of an equivalent worker (Dalsimer, 1989). Karn's approach presented by Dalsimer is more particularly directed at volunteer agency accountants for micro-accounting rather than at development of national account values. However, the development of national aggregate figures should not deviate too far from approaches used at the micro level.

Non-SNA, non-satellite activities are activities falling into two major groupings: personal maintenance and personal recreation. Personal maintenance and personal recreation are defined by the 'recipient criterion', which, simply put, says that activities that 'cannot be received for another' are non-tradable and thus should be considered consumption rather than productive

activity. Thus, getting a shave or haircut, watching TV, eating, etc., would fall outside the SNA and proposed satellite activity. Such activities can be classified into two groups: personal maintenance and personal recreation.

Non-SNA/Non-satellite activities

• *Personal maintenance*—includes activities that, as indicated above, cannot be undertaken by anyone other than the one who benefits from them and thus cannot be done for others. In essence these are the activities required in daily living to maintain and support biologic functions of individuals. Included are activities normally coded as personal activities, since they are done for personal maintenance and include personal cleanliness, dressing, taking meals and snacks at home, restaurant meals, sleeping, and other body care activities. Such activities must be engaged in by individuals themselves; there is no possibility of a proxy involvement. Personal time clearly represents a major block of time for individuals.

• *Personal recreation*—is the time left to an individual to allocate in a discretionary manner. An activity is discretionary if there is a greater degree of choice than constraint (Chapin, 1974). Such activities include: social visiting; reading papers, novels, and magazines; watching television and movies; listening to radio and music; leisure travel; having guests; social visiting; resting; cultural events; sports; relaxing, thinking, naps and incidental sleep; etc. (Szalai, 1972). It is important that any productive free time activities (i.e., knitting, carpentry, auto maintenance and grooming, painting, needlepoint, etc.) be captured as part of productive activity. The important coding requirement for developing accurate estimates of paid and unpaid work is that productive activity not get inexorably combined with non-productive activity.

Personal recreation activities cannot be done for an individual by someone else. They are activities that one must do for oneself but that one is basically free to do or not to do as one pleases: i.e., they are activities that the individual and no one else can do and that can be, to them, discretionary.

Proposed Application in Practice

The meaningfulness of the proposed classification system must be evaluated in terms of the information of value for policy purposes that it yields. In short, does it help turn data into information? In this context, Table 3.1 provides annualized estimates for several countries and periods of time allocated to the several categories outlined above and shown in Figure 3.1.

The most significant point highlighted by Table 3.1 is the fact that time allocated to non-SNA productive activity, activity that it is argued here should be included in a household satellite account, is approximately equal to and in some cases greater than time allocated to market SNA activities. Only in Hungary does there appear to be a time allocation to SNA productive activities that is considerably larger, approximately 50 per cent larger, than the time allocation to non-SNA productive activity.

The Bangladesh data represent rural Bangladesh, while the Venezuela data are urban data. While there undoubtedly would have been some non-market goods production in urban

Venezuela, the lack of accounting for it is primarily due to its relative insignificance. This insignificance contrasts sharply with the 963 hours spent on non-market goods production in rural Bangladesh. Thus, while essentially all SNA activity in urban Venezuela can be attributed to the market, in rural Bangladesh non-market SNA activity is double that of the market, Table 3.1.

TABLE 3.1
TIME ALLOCATIONS IN TERMS OF PROPOSED SNA SATELLITE ACCOUNTS
Selected Countries and Years

	Finland 1987	France 1985-86	Bulgaria 1988	Hungary 1976/77	Hungary 1986/87	Poland 1976	Poland 1984	Venezuela 1983	Bangladesh 1991
SNA:									
Market goods & services	1285	1113	1521	1453	1328	1156	1065	1393	607
Non-mkt goods production	189	298	234	358	393	572	365	N/A	993
TOTAL SNA	1474	1411	1754	1811	1720	1728	1430	1393	1600
NON-SNA SATELLITE:									
Household maintenance	957	1332	1415	1123	1070	1405	1618	1065	1246
Personal development	244	189	265	103	109	152	61	164	514
Volunteer work	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL SATELLITE	1201	1521	1680	1226	1180	1557	1679	1229	1760
NON-SNA/NON-SATELLITE:									
Personal maintenance	3695	4368	3664	4088	4076	3658	3731	3906	4622
Personal recreation	1900	1460	1663	1256	1415	1497	1643	2166	648
Travelling	462	N/A	N/A	384	376	310	268	67	N/A
TOTAL NON-SATELLITE	6057	5828	5327	5729	5867	5465	5641	6139	5270
TOTAL ANNUAL HOURS	**8732**	**8761**	**8761**	**8766**	**8767**	**8750**	**8750**	**8761**	**8630**

Source: Hamid (1993); Kordos (1987); Ministerio et al. (1983); Central Statistical Office of Bulgaria (1988); INSEE (1987); Adamczuk (1979); Babarczy et al. (1991); Central Statistical Office of Hungary (1976/77 & 1986/87).

Longitudinal data for Hungary and Poland provides an interesting picture of structural change in SNA activity, measured in terms of allocated time, in these two countries. Over the decade from the mid-1970s to the mid-1980s Hungary experienced a decline in paid (market) work time but an increase in its non-market time allocation. Similarly, Poland also registered a decline in market hours over a roughly similar period. However, in contrast to the situation in Hungary, in Poland there was a rather significant drop also in non-market goods production.

It is interesting that the modal allocation to non-SNA satellite activities is approximately 1200 hours—the equivalent of thirty 40-hour weeks. Another clustering, centered in Eastern Europe, occurs around 1600 hours—the equivalent of about forty 40-hour weeks per satellite year—which means that on average Eastern Europeans put in an extra two months a year in SNA activity.

Travelling is shown in Table 3.1 and Table 3.2 for the sake of completeness. Technically it should be incorporated in the separate activities to which it is related.

In short, Table 3.1 provides some interesting highlights with respect to productive activity in the several countries highlighted there. Differences in populations covered by the several

surveys on which the data in Table 3.1 are based undoubtedly play a role in some of the differences. However, full adjustment for such differences would do little to attenuate the value of the data presented here.

TABLE 3.2
TIME ALLOCATIONS IN TERMS OF PROPOSED SNA HOUSEHOLD SATELLITE
Selected Sites by Gender

	Tanzania		Nepal Mountain		Nepal Hill		Nepal Rural Terai		Nepal Urban Terai	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
SNA										
Market goods & services	123	1726	1303	1716	978	1537	621	1862	482	2154
Non-market goods	420	1392	887	657	927	588	679	347	402	124
TOTAL SNA	543	3118	2190	2373	1906	2125	1300	2208	884	2278
NON-SNA SATELLITE										
Household maintenance	2286	105	1909	799	1968	756	2132	653	2365	580
Personal development	N/A	N/A	110	394	77	369	113	303	274	515
Volunteer work	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL SATELLITE	2286	105	2019	1194	2044	1124	2245	956	2639	1095
NON-SNA/NON-SATELLITE										
Personal maintenance	5301	4521	3219	3193	3233	3219	3306	3255	3320	3256
Personal recreation	630	1016	883	1362	1102	1621	1453	1749	1446	1507
Travelling	N/A	N/A	449	639	475	672	456	591	471	624
TOTAL NON SATELLITE	5931	5537	4552	5193	4810	5511	5215	5595	5237	5387
TOTAL ANNUAL HOURS	**8760**	**8760**	**8760**	**8760**	**8760**	**8760**	**8760**	**8760**	**8760**	**8760**

Source: Derived from: NRB, MPHBS, 1988; Tanzanian Bureau of Statistics (1992)

Since a particular interest in this study is the gender division of productive activity, time allocations by gender in terms of the classification scheme proposed here are presented in Table 3.2. The most significant observation is that women in the hill and mountain areas of Nepal, while allocating about two hours for every one hour allocated by males to non-SNA satellite activities to be included in the household satellite, allocate time to SNA activities nearly hour for hour with men, Table 3.2.

In general, males dominate paid work and personal development while females dominate non-market SNA production and household maintenance. The major exception is the male dominance of non-market goods production in Tanzania. In fact, the Tanzanian data seem to present a very different picture than do the Nepal data. In particular there seems to be a much more rigidly drawn gender division of labour. The Tanzanian data are drawn from three low-income districts around Dar es Salaam. Additionally, the Tanzanian data are representative of couples rather than of the general population.

Gender comparisons in terms of the proposed productive classification of activities for urban areas in Tanzania and Nepal are presented in Figures 3.2 and 3.3. The male domination of paid work and non-market SNA work time, as discussed above, is clearly shown in Figure 3.2, as is the female dominance of household maintenance. In contrast, for Nepal—urban Terai—male

and female role are reversed between paid work and non-market SNA activity. Males dominate the former and females the latter.

Proposed Classification and Existing Activity Coding Schemes

It is instructive to cast existing activity classification schemes in terms of the activity framework proposed here. It seems most meaningful to do so in terms of three separate schemes. First is the Classification System used in the Multinational Time-use Research Project (Szalai, 1972), which has been widely copied in unmodified or modified form for the past 30 years; second, the classification proposed by EUROSTAT for the comparative work being planned in Europe and Scandinavia; and last, the Nepal and Dominican Republic classifications, which provide guidelines for developing country classification schemes. These schemes and their correspondence to the proposed SNA framework are included in the appendices.

Classification of Employment

The foregoing has focused on the classification of activities in relation to the SNA. However, there is a strong link between the work—production—that a person does and their measured employment status. Employment status is determined in line with the International Classification of Status of Employment.

The main characteristics of the ICSE-93 are:

1. It classifies jobs held by persons at a point in time. A job is classified with respect to the type of explicit or implicit contract of employment of the person with other persons or organizations.
2. It consists of 6 groups: employees, employers, own-account workers, members of producers' cooperatives, contributing family workers and workers not classifiable by status.
3. The groups are defined with reference to the distinction between "paid employment" jobs and "self employment" jobs.
4. In this classification, a "contributing family worker" is a worker who works in a market-oriented establishment operated by a related person living in the same household, but who cannot be regarded as a partner because her/his degree of commitment is not at a level comparable to that of the head of the establishment. It implies that all women who work on equal footing with male relatives are not included in this group, but are now considered under the "own account worker" category.
5. Section IV of ICSE refers to the statistical treatment of particular groups, which refers to those employment situations that are either borderline cases or new ones. Among them appears the case of "outworkers." Many women are in this situation. The recommendation is to treat them as being in "paid employment" or in "self-employment" according to the specific terms of their contract. The concept of "paid employment jobs" includes the following condition: "...Some or all of the tools, capital equipment, information systems

and/or premises used by the incumbents may be owned by others...." Then, and as a consequence, in situations when women work for others but receive neither equipment nor workspace (including electricity, cleaning storage, related to their work) and must provide these needs for themselves, items which are all of definite importance in any cost-structure of enterprises, they should be treated as "own account workers."

Figure 3.2

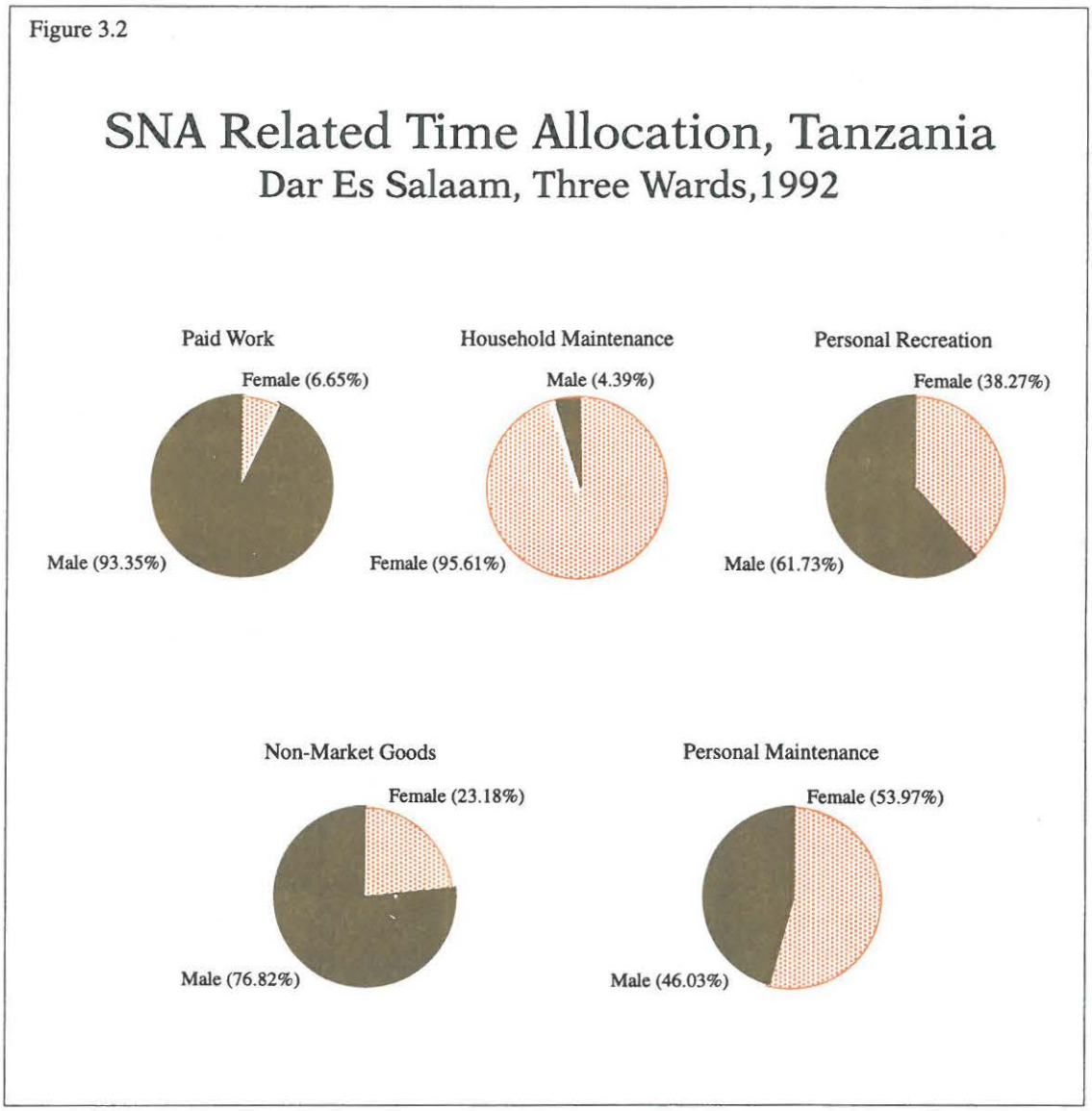
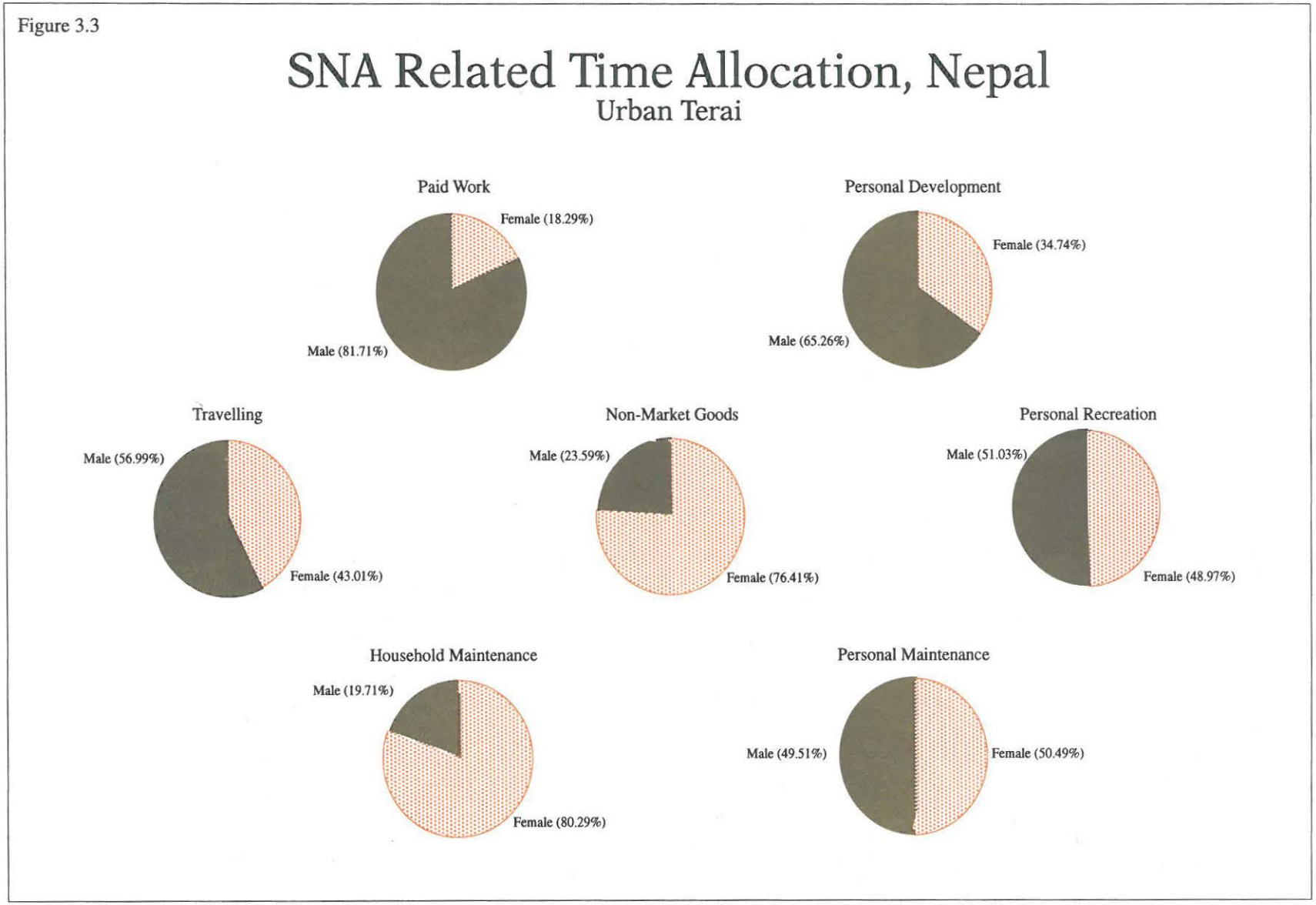


Figure 3.3


SNA Related Time Allocation, Nepal
Urban Terai
Paid Work
Female (18.29%)
Male (81.71%)
Personal Development
Female (34.74%)
Male (65.26%)
Travelling
Male (56.99%)
Female (43.01%)
Non-Market Goods
Male (23.59%)
Female (76.41%)
Personal Recreation
Male (51.03%)
Female (48.97%)
Household Maintenance
Male (19.71%)
Female (80.29%)
Personal Maintenance
Male (49.51%)
Female (50.49%)

Among these particular groups are also others that affect analysis of women's situation: "workers in precarious employment," "workers in seasonal employment", and "subsistence workers." The last group includes workers who hold a self-employment job and in this capacity produce goods or services that are predominantly consumed by their own household and constitute an important basis for its livelihood (ISCE, 1993).

Conclusions

Activities can be classified in many ways and based on many different criteria. If progress is to be made in measuring and valuing human activity it is important that statistical agencies and researchers take classification requirements and problems seriously. This paper presents a constructive approach to viewing several dimensions that play an integral part in the way activities relate to each other and to the market and household economies in which they are carried out. It is fairly clear that considerable detail is necessary in order to adequately specify the dimensions of the market and non-market economies and the domestic subsistence sectors. Given the improved cost effectiveness of existing technology, there is very little reason why human activity data cannot be captured in sufficient detail to provide a solid base for accounting for non-market and other unpaid production. Statistical bodies recognized a need for highly disaggregated coding schemes for production data and acted accordingly. Now the similar need with respect to human labour time allocation must be recognized and acted upon. There has never been a better opportunity for meaningful cooperative productive collaboration.

The 1993 SNA addresses the question of population and labour inputs in Chapter XVII. There it is suggested that labour inputs should be classified according to the International Standard Industrial Classification (ISIC) (SNA, 1993, p. 412). A further suggested breakdown is also proposed (SNA, 1993, p. 412-413). However, to fully reflect household labour inputs, greater attention needs to be given to reconciling the SNA and labour inputs in terms of the ISCE.

This chapter has outlined the current status of the SNA, has identified recent improvements and continued shortcomings and has made suggestions for further improvement. In essence the foregoing argues for the development of a satellite household account incorporating production related to household and family maintenance and personal development (education). The following chapter explores previous work estimating the value of omitted production and its contribution to GNP and GDP. It also provides some insights into the gender bias of the omitted production. Finally, it presents time allocations, for selected countries, structured in line with the activity structure proposed in Figure 3.1.

Chapter 4
Valuing Non-market Production: Existing Studies

Historical Background

The earliest study in the United States to address the issue of household production (Leeds, 1917) was aimed at gaining recognition for it (Sanik & Stafford, 1983). Mitchell et al. (1921) and Kuznets (1941) were the first authors to attempt to value household production. Some results of a number of more recent studies are presented in this chapter.

Goldschmidt-Clermont has published two excellent reviews of studies exploring the measurement and value of unpaid household work. The first (Goldschmidt-Clermont, 1982) examined such studies in more developed countries, while the second (Goldschmidt-Clermont, 1987b) looked at similar work in Africa, Asia, Latin America and Oceania. These works describe a vast range of studies and develop an excellent synthesis of the methods and findings, and provide a very useful typology of measurement methods. The works focused on unpaid work carried out for one's own household, thus excluding activities such as volunteering.

In addition, Chadeau's (1985) review of several macroeconomic approaches to the estimation of the value of unpaid work explores studies in terms of aims, reference population, activities covered, methods and data. Overall aims of studies measuring household production have been to improve national accounts aggregates and compare productive activities in the household and market sectors. Work being undertaken to improve national accounts aggregates has focused on several more specific issues: improving the accuracy of the measurement of economic wealth produced, measuring welfare, and measuring growth (Chadeau, 1985). More recently Quah (1993) has reviewed and summarized a number of empirical studies of household production.

Generally, the value of unpaid production has been developed in terms of labour inputs to various activities deemed to be part of household production. On one hand, these inputs have been valued in terms of the 'opportunity cost' of the time allocated to them and on the other, in terms of their 'replacement cost', the cost of obtaining them in the market. There are two separate streams to the 'replacement cost' approach, 'individual function' and 'housekeeper replacement.' The 'individual function' approach seeks to value each of the separate household tasks—cooking, cleaning, laundry, etc.—at what it would cost to replace them in the market. The 'housekeeper replacement' approach values household work at what it would cost to hire a polyvalent worker to do the work. Further considerations, once a particular approach has been chosen, relate to the choice of appropriate wages (e.g., minimum, average, skilled) and adjustments required (e.g., for taxes, costs of other inputs). These are considered by several authors (Goldschmidt-Clermont, 1982; Goldschmidt-Clermont, 1987b; Chadeau,1985).

The estimates from the several countries and years show that typically estimates of the value of unpaid housework run from one-third to one-half the currently measured gross domestic and/or gross national product (Table 4.1).

TABLE 4.1
INTERNATIONAL COMPARISON OF ESTIMATES OF UNPAID HOUSEHOLD PRODUCTION

Country	Reference year	Study	% of GDP	% of GNP
Housekeeper Replacement Cost				
France	1975	Chadeau & Fouquet (1981)		31
USA	1976	Murphy (1982)		32
Finland	1980	Suviranta (1982)		32
Canada	1961	Adler and Hawrylyshyn		39.5
	1971	(1978)	33	34
New Zealand	1991	New Zealand Dept. of Stats (1991)	43	
Individual Function Replacement Cost				
Canada	1981	Swinamer (1985)	35	36
Canada	1971	Adler and Hawrylyshyn (1978)	40	41
Canada	1992	Chandler (1994)	41	
USA	1960	Murphy (1978)		36.8
	1970			34.3
USA	1976	Murphy (1982)		44.1
Australia	1986/1987	Castles (1990)	57	
New Zealand	1991	New Zealand Dept. of Stats (1991)	52	
Opportunity Cost Net of Income Tax				
France	1975	Chadeau and Fouquet (1981)		44
USA	1976	Murphy (1982)		51
Canada	1992	Chandler (1994)	31	
Opportunity Cost Method				
Canada	1981	Swinamer (1985)	40	41
Canada	1992	Chandler (1994)	48	
USA	1976	Murphy (1982)		60

TABLE 4.1 CONTINUED

Country	Reference year	Study	% of GDP	% of GNP
Australia	1986/ 1987	Castles (1990)	62	
New Zealand	1991	New Zealand Dept. of Stats.(1991)	68	
Canada	1961	Adler and Hawrylyshyn		43.6
	1971	(1978)		40.0
USA	1958	Nordhaus/		53.5
	1965	Tobin (1973)		47.0
USA	1960	Murphy (1978)		37.6
	1970			37.1
FRG	1964	Schettkat (1985)		46.6
	1970			45.3
	1974			42.9
	1980			41.8
USA	1960	Weinrobe (1974)		34.1
	1961			33.5
	1964			31.6
	1965			30.5
	1966			28.7
	1970			31.1
Market Cost Method				
USA	1966	Kendrick (1979)		23.9
	1973			24.4
FRG	1964	Schettkat (1985)		33.5
	1970			33.1
	1974			32.4
	1980			31.9
Services (IFRC) Input & Goods Output				
Bangladesh	1989/ 1990	Hamid (1993)		25.7

In some cases, (e.g., Australia and New Zealand) the estimates run as high as two-thirds of the currently measured production. Kendrick's 1966 and 1979 estimates for the U.S. and Hamid's estimates for Bangladesh set a lower boundary at about one-quarter of currently measured production. It is clear from these estimates that the amount of economic production currently untracked in our economics accounts is anything but inconsequential. In the absence

of reasonably accurate and timely estimates of this currently unmeasured output it is difficult to understand fully cyclical behaviour in the economy or to understand the effects of structural change emanating from increased monitarization of economic activity.

Gender Division of Unpaid Work

In spite of the number of estimates provided in Table 4.1 and the studies mentioned above, there is an extreme dearth of similar estimates by gender. Table 4.2 provides some gender-based estimates drawn from the literature on Canada and the United States. Women's contribution, according to these estimates, is about twice as large as men's in Canada and about four times as great as men's in the United States. The noted difference between Canada and the United States is due to a far lower recorded contribution by males in Canada.

TABLE 4.2
UNPAID WORK AS PROPORTION OF GDP BY GENDER

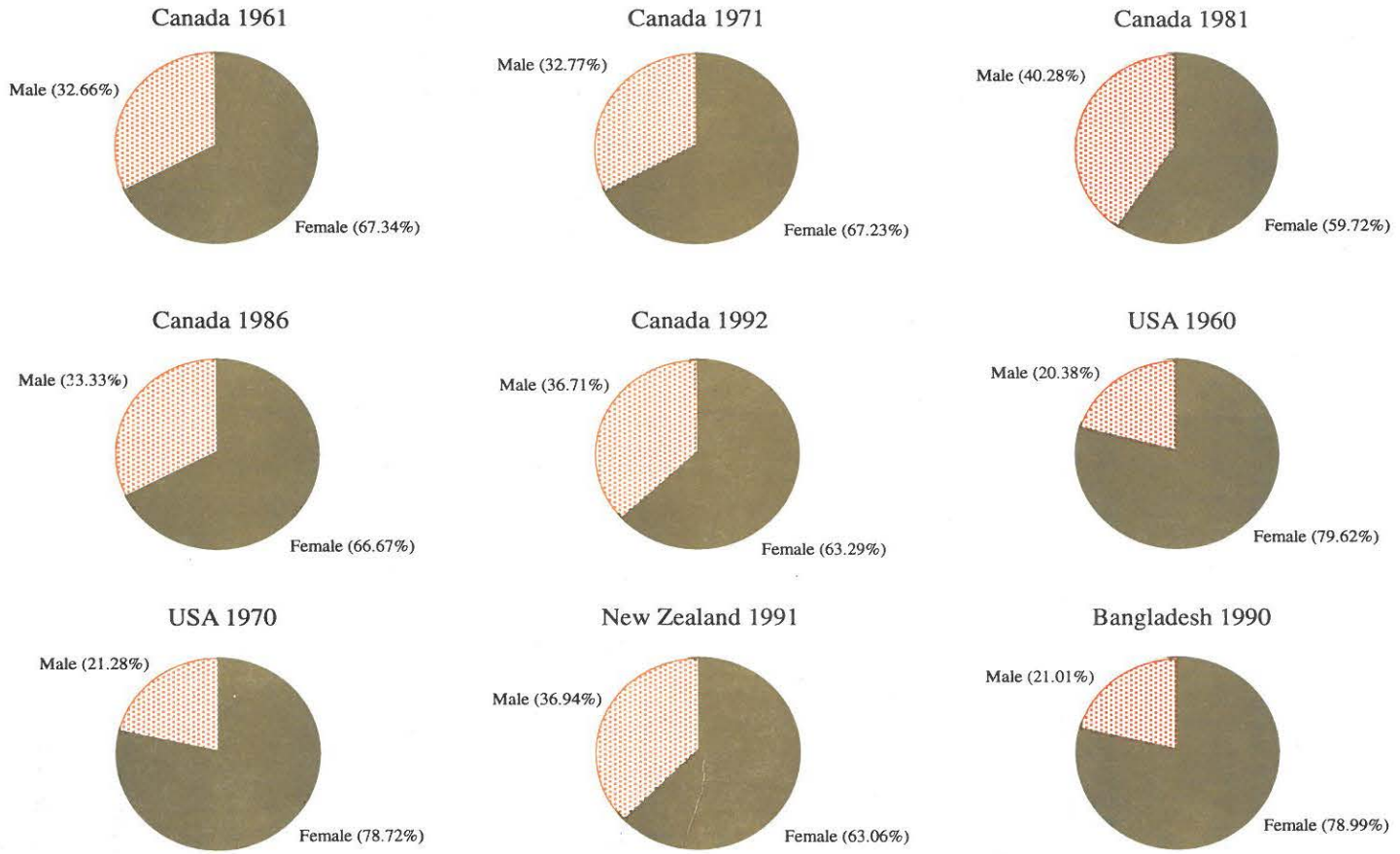
Method/Country	Year	Female	male	Total
Market Replacement				
Individual Function Replacement Cost:				
Canada	1961	26.6	12.9	39.5
Canada	1971	27.7	13.5	41.1
Canada	1981	21.5	14.5	36.0
Canada	1986	26.2	13.1	39.3
Canada	1992	26.2	15.2	41.4
USA	1960	29.3	7.5	36.8
USA	1970	27.0	7.3	34.3
New Zealand	1990/91	32.6	19.1	51.7
Opportunity cost				
Canada	1961	29.1	14.5	43.6
Canada	1971	27.2	12.8	40.0
Canada	1981	24.9	16.1	41.0
Canada	1986	19.9	11.6	31.5
Canada	1992	18.9	11.7	30.6
USA	1960	30.3	7.3	37.6
USA	1970	29.7	7.4	37.1
New Zealand (average wage)	1990/91	40.6	27.3	67.9
New Zealand (minimum wage)	1990/91	19.5	10.6	30.1
Services input/goods output				
Bangladesh	1989/90	20.3	5.4	25.7

Source: Derived from: Chandler, W. (1994); Jackson, C. (1993); Murphy, M. (1978); Dept. of Statistics, New Zealand (1992); Hamid, S. (1993).

Figure 4.1

Unpaid Work as Proportion of GDP

By Gender, Selected Countries/Years



New Zealand estimates of unpaid work as a proportion of GDP run much higher than the Canadian and United States estimates and show women's contribution to be 1.5 to 2 times that of men. The Bangladesh estimates, the lowest share in total, show women's contribution to be about four times that of men.

The data presented by Table 4.2 provides a good indication of the gender division of unpaid work. However, the picture is even more vividly seen in Figure 4.1. There it can be seen that the division is relatively comparable in New Zealand and Canada. Interestingly, Bangladesh and the United States have equally large female contributions.

National Progress Toward Valuing Non-market Production: Unpaid Work Valuations

To date only a few countries have ventured to develop estimates of unpaid household work. In all cases the studies were based on time-use data. Table 4.1 presents a number of existing estimates of unpaid household production as a proportion of GNP and GDP and shows the basis for estimates developed.

Industrialized country estimates

Australia

Experimental estimates of the value of unpaid work were constructed for Australia in 1986-87 (Castles, 1990). These estimates were based on data from a pilot time-use study collected in the Sydney Statistical Division. Valuation was initially based on the 'individual function replacement cost approach' using person wages rates rather than gender specific rates. Two sets of wages were used in developing estimates: award (minimum) wage rates and average wage rates. Additionally, estimates were made using an opportunity cost approach and housekeeper replacement cost estimates. An additional estimate was made using an adjusted award—minimum wage—rate for replacement cost estimates derived as the ratio of average to award rates for 'all occupations' (Castles, 1990). The Australian Bureau of Statistics has clearly affirmed its support for the development of satellite SNA accounts incorporating estimates of the value of unpaid work (Castles, 1990). It suggests that the timing, frequency and quality of such estimates depends both on the availability of adequate data and the resolution, internationally, of very difficult methodological issues.

Canada

Canada was a pioneer in the development of estimates of the value of unpaid work (Adler and Hawrylyshyn, 1978). Their initial estimates were prepared for 1971 and were based partly on general population time-use data collected in Halifax, 1971-72 (Elliott, Harvey and Procos, 1976). Subsequently, Canadian time-use data collected in 1981 and 1986 permitted the development of new estimates for those years (Swinamer, 1985; Jackson, 1991). More recently,

based on the pattern of household time use over the period 1971 to 1986, Jackson has estimated 1961 time use on which to develop a 1961 estimate of the value of unpaid household activity (Jackson, 1993a). Thus, for Canada, estimates have been developed using both the opportunity cost approach and the replacement cost approach for the years 1961, 1971, 1981 and 1986 (Table 4.3). Jackson developed estimates, as well, for the share of the value of household work. There are some clear and significant differences in the results achieved by the two approaches. First, over the period examined (1961-1986), based on the opportunity cost approach, the value of household work as a share of GDP dropped by about one-third. However, using the replacement cost approach, the share declined by about 12 per cent. The choice of approach also makes a difference in the measured share of household production undertaken by women. In particular, while the opportunity cost approach showed relatively little change in the female share, the replacement cost approach indicated a small decline (Table 4.3). It is clear from the results in Table 4.3 that choice of approach will significantly affect the results of household work measurement and thus its implications for policy.

TABLE 4.3
VALUE OF HOUSEHOLD WORK ESTIMATES, 1961-1986
CANADA

Year/Approach	Gross Domestic Product (millions$)	Value of Female Household Work (millions$)	VHW[1] As % of GDP	Female Share (%)
Opportunity Cost				
1961	40886	19918	48.7	62.7
1971	97290	38453	39.5	64.4
1981	355994	120038	33.7	61.4
1986	505666	159434	31.5	63.3
1992[2]	688514	210773	30.6	61.7
Replacement Cost				
1961	40886	18241	44.6	71.1
1971	97290	45618	46.9	69.1
1981	355994	146593	41.2	66.1
1986	505666	198889	39.3	66.6
1992[2]	688514	284862	41.4	63.4

[1] Value of Household Work
[2] Chandler (1994)

Source: Jackson (1993a).

New Zealand

In 1990, the New Zealand Department of Statistics conducted a pilot time-use survey. While that survey was only exploratory, it provided a base on which indicative estimates of unpaid work could be estimated (Department of Statistics New Zealand, 1991). The study used the 'third person criterion' to delineate what would be considered unpaid productive household work. The definition was extended to include voluntary unpaid community work. The report outlines alternative approaches to measuring household output. Four separate estimates were produced. Two estimates used the replacement cost approach: one based on worker replacement, and one based on task (individual function) replacement. The other two estimates used the opportunity cost approach, based on two separate wage estimates: the adult minimum wage, and the average weekly wage. Separate estimates were developed for men and women. Since for the replacement worker approach gender-neutral wage rates were used, differences between the sexes were totally attributable to differences in time inputs between the sexes. What is striking from the estimates developed is their very wide range. The highest, using the opportunity cost approach and average weekly wages, estimates unpaid work as being 2.25 times the level of the lowest estimate, based on opportunity cost using the adult minimum wage. The replacement cost estimates tended to fall between the two opportunity cost estimates. The worker replacement value was 1.41 times the lowest estimate and the individual function approach yielded an estimate 1.71 higher than the minimum figure.

Germany

Schettkat (1985) developed estimates of the value of household production for the Federal Republic of Germany for the period 1964 to 1980. His estimates were derived using both the opportunity cost approach and the market cost (replacement) method. Additionally, estimates were made assuming both the absence and presence of productivity increases in household production. Schettkat based his estimates on time-use data relating to the population of the FRG 14 years and over drawn from surveys carried out for German television stations. He argues that inferring a decline in household production from the observed decline in time inputs to household production over the period 1964 (3.08 hours per day for household work and shopping) to 1980 (2.53 hours per day) is misleading, and that households, like the formal economy, have experienced significant increases in technical inputs and thus, in productivity growth. Skettkat (1985) concludes that the market cost method appears to be the better approach for valuing output of household production.

German Statistical Office

Currently the German Federal Statistical Office is undertaking a project to establish a satellite system of household production (Schaefer, 1993). They have selected the 'third person criterion' as the decision criterion for identifying household production. They are also considering, for purposes of caring activities for children and adults, of including personal

supportive activities such as talks and telephone calls. Such a step, however, requires an ability to capture the content of conversations. After considering both input- and output-based approaches to quantifying household production, the German Statistical Office has opted to adopt an input-based approach (Schaefer, 1993). They argue, first, that only the input-related approach makes it possible to establish and value household production as defined by the third-person criterion, since an output-based valuation of person-related services seems almost impossible if the time spent on these services is not considered. Secondly, statistical requirements are not as great with the input approach. Thirdly, they argue that an output-related approach would require strict attention to be paid to the quality of services provided. Schaefer (1993) calls for more methodological research on the output-based approach and recognizes that it may slowly evolve as a measure in various individual spheres.

To date the German Statistical Office has focused on value input time in terms of market value approaches. Schaefer (1993) indicates that past research at the Federal Statistical Office has focused on market value approaches, especially the 'global replacement option'. He noted that, at least in Germany, the difference between a 'global replacement estimate' and an 'aggregated functional estimate' is not more than five per cent.

Developing country estimates

India

Some work on estimating the value of housework for women in India is evident in the literature. Malathy (1988) reports on a survey using stylized time measurement questions (hours per week) to attempt to quantify the value of housewives' services in India. The survey on which the estimates were based was small (705 households, 283 working women and 422 non-working women) and conducted totally in Madras. Household services used in the study included "housework such as house cleaning, cooking, serving meal, washing dishes and clothes, ironing, sewing, mending, kitchen gardening, shopping, domestic work, related travel time; child care activities like physical care, medical care, supervision, reading to children, taking them on outings, teaching children, playing with children" (Malathy, 1988, p. 104). Volunteer services do not appear to be included in her definition. She converts the time estimates obtained to value estimates by means of the opportunity cost approach by developing an estimated wage function based on the Mincer earnings function (Malathy, 1988). She concludes that the estimated value of output constitutes about 37 per cent of family income. The most recent Canadian estimates placed the value of non-market production, using a functional replacement cost approach, somewhat higher at 59.7 per cent of personal disposable income. Malathy indicates that, with the exception of work by Mukerjee (1987), she is unaware of any attempts in India to relate household production to national income (Malathy, 1988).

Bangladesh

Hamid (1989) reviewed some existing studies on non-market production and valuation processes and attempted to derive from secondary sources a gender-based valuation of the

contribution of the subsistence sector to the GDP of Bangladesh. Hamid stops short of evaluating domestic services. She sees a problem in trying to get these activities to fit into the present SNA, particularly given the production methods by which most of the Bangladesh estimates are made, since output from these activities is difficult to measure (Hamid, 1989). She presented a number of subsistence activities to be included in the accounts in terms of three major activity groups: (1) primary production; (2) processing primary production; and (3) fixed capital formation. She estimates subsistence production as 24 per cent of conventional GDP or 19 per cent of enhanced (GDP+subsistence income) GDP for 1983/84 (Hamid, 1989).

In more recent work based on time-use and other data, Hamid (1993) developed estimates of "enhanced GDP" such that:

Enhanced GDP = conventional GDP
+ subsistence goods
+ production
+ subsistence (household) services

She used a combined approach, what she called input-output, to develop the estimates of subsistence production. Subsistence goods were valued at "market price since most of the material collected had market equivalents" (Hamid, 1993). Subsistence services—household and family—were valued using the individual-function approach.

Hamid's findings support the rationale for the current project to promote the valuation of unpaid work. She found, as noted in Table 4.1, that subsistence production increased GDP by 25 per cent and constituted 20 per cent of the enhanced GDP estimate. Thus, subsistence production was second only to agriculture (29%) in its sectoral contribution to enhanced GDP (Hamid, 1993). Women accounted for 53 per cent of all work time and 89 per cent of all subsistence work time.

Valuation Sensitivity Testing

In developing estimates, the Australian Bureau of Statistics (Castles, 1990) undertook sensitivity tests of the estimates developed. One test showed sensitivity to estimates of working time. In general, changes in working time resulted in parallel changes in estimated value. However, in the case of the individual function replacement cost approach, the change depended on relative functional wages. Another test designed to test population factors showed that a five per cent increase in the female participation rate resulted in a decline in the value of unpaid work, using the individual function replacement cost approach, from $129.0 to $128.2 billion (Castles, 1990). While they concluded that "it is clear that the estimates are very sensitive to the assumptions and methods used" (Castles, 1990) it seems heartening to note the exceptionally small change in the estimated value of unpaid housework: less than .05 per cent with the 5 per cent difference in female labour force participation.

Chadeau (1992) presented an excellent overview of studies evaluating the value of household production in several countries. She observed, as have others, the great sensitivity of estimates to the methods used. She noted that the opportunity cost approach always gave the highest estimate, while the global replacement approach always gave the lowest (Chadeau, 1992). She concludes that the output approach is best, in that it values household goods and services in market terms (Chadeau, 1992).

The issues are whether a product-based valuation approach or a wage-based valuation system should be used to convert work-hours or work-days spent on domestic activities into monetary terms as a proxy for output of the services in the household sector and, if wage-based methods are to be used at all, then what wages should be used?

According to the 1993 SNA, if reliable prices cannot be determined for output produced for own use "such non-market output should be valued at production costs incurred, including consumption of fixed capital and any taxes (less subsidies) on production other than taxes or subsidies on products" (SNA, 1993, p. 153).

Thus, although where market prices do not exist wage-based evaluation methods are equally valid from the SNA point of view, imputing market prices to household output is preferable because: (a) they take into account the production circumstances in which households operate, and (b) they are compatible with SNA methodology in general. The main argument for not using the cost of production as approximation for output of the domestic work is that while the cost of production for the SNA categories is determined by market, for the production of domestic services both factor and product markets are undetermined.

Conclusions

First and foremost, regardless of the approach taken to measure household production, such production accounts for a very significant proportion of total economic output of the economy and thus should not go unquantified. Secondly, it is clear in the work done to date that there is a significant gender difference between currently measured production and unmeasured production. While currently measured production captures virtually all of men's productive contributions, that which is excluded tends to be done primarily, although by no means exclusively, by women. Thirdly, it is clear that the computed value of household production is sensitive to the mode of measurement. Certain measurement approaches, mostly all for developed countries, tend to yield higher values, while others tend to yield lower values. In particular, the opportunity cost approach tends to provide the highest values. Clearly, were this approach implemented cross-nationally among developed and less-developed countries one could possibly expect to impose even greater bias into the accounting for productive activity than currently exists. What is needed, is the development of measurement approaches for non-market production that most clearly mimic the approaches used to value market production. If an approach does make sense for the latter, it should make sense for the former. There is general agreement among those researchers that have thoughtfully explored the issue of valuing non-market production and compared existing estimates. They have concluded that ideally one should

value non-market production in terms of the market value of the outputs produced. This approach would be most faithful to the current SNA structure (see for example, Goldschmidt-Cleremont, 1983; Chadeau, 1985). Additionally, there appears to be general agreement that the estimates developed should be developed outside the existing gross product accounts in a satellite account faithful to the existing conventions in order that valid comparisons and extensions can be undertaken.

The following chapter explores briefly how measurements could be implemented.

Chapter 5
Valuation: Issues and Methods

The following examines the approaches required to bring estimates of work in the non-market sector into line with measurement approaches in the market sector. Following the review of the literature on the valuation of unpaid activity, presented in Chapter 4, it was concluded that, to the extent possible, non-market production must be measured in terms of the *value of its output*.

Product-based Valuation vs. Wage-based Valuation Methods

As the foregoing shows, various methods have been used in the past to measure the household production, both own account as defined by SNA and services generated by domestic activities, which have been reviewed by several authors. In the most comprehensive of these reviews, published in two volumes (1983; 1987a,b) and several articles, Goldschmidt-Clermont has classified the measurement methods in two broad categories, namely, volume-based and value-based, further breaking down the value-based ones in wage-based and output-based categories. Volume-based methods have only limited usefulness as they do not allow aggregation or overall comparisons. Only value-based methods are discussed briefly below. Unpaid work may be valued on the basis of product or services it generates or on the basis of some imputed wage rate for the input of time.

In the output-based valuation methods, generally products and services produced in the household are assigned a value equivalent to the price of similar goods and services in the market. The logic behind the method is that theoretically these market goods could replace the products generated in the household. The value thus generated would give an imputed gross output value of household production. Intermediate inputs may be deducted from this value to derive the value added.

Fundamentally, there are two conceptual advantages of product-based valuation methods. They measure product and not inputs and they are compatible with the overall SNA accounting system. Conceptually there should be no difference between value added by home cooking and food processing in the market. Both generate product; therefore as far as possible they should be valued as product. This would overcome problems of productivity differences, simultaneous activities and identification of boundary between work and leisure. In the case of services, if valued as product the outcome is comparable to the concept of household expenses foregone in the household accounts. The only disadvantage is the fact that probably it involves more work

and more expense to collect such type of data than collecting time-use data and valuing them at some imputed wage rate.

Wage-based valuation is simpler, probably easier to accomplish and less expensive once the time-use data are available, and in some cases is the only feasible method of valuation. But it has multiple disadvantages. By this method, one is measuring input and not output and hence it is difficult to lump together with other product accounts in SNA. In SNA, valuation at input cost is used only as a method of last resort in the case of government services, etc., and not as a preferred method. Moreover, as Goldschmidt-Clermont (1992) points out, in the case of such services the input prices are market determined, while in the case of subsistence/domestic work, labour input prices are undetermined. The productivity situations in the market and household are quite different, and imputing market wages to household labour is bound to distort the picture. The value generated by imputing market wages to household labour is very sensitive to the kind of wages, depending on whether one uses minimum wages, formal market wages, informal market wages, opportunity cost of labour, etc.

Commonly, wages of substitute household workers have been used to convert the work-input in domestic activities into monetary terms and this imputed value used as proxy for output consequent to the labour input. The wages can be that of a polyvalent substitute (domestic servant) who performs several domestic activities or that of a specialized substitute who will perform only specific tasks such as cooking, washing, sewing, etc. In the first case, data is required on total hours of domestic work and a market wage for the polyvalent worker in the market. In the second case, data on labour input classified by each task and wage rates of specialized workers are required.

Numerous other theoretically less satisfactory wage-based methods have been used in the past. Wages for equivalent market functions, whereby labour inputs into domestic activities are assigned an imputed value equal to the wage paid to workers performing similar activities in the market enterprises, is unsatisfactory because wages in the market enterprises do not reflect domestic work situation and productivity. They rather reflect the market situation, which will be quite different from that of the households in terms of capital input, skills of the workers, work environment, etc. Wages for market equivalent qualifications would impute a value to the domestic labour input on the basis of wages in occupations presenting similar characteristics rather than for those resulting in similar product. This method is subject to the same criticism as above.

The foregone opportunity cost method, on the other hand, would impute a value to the household work on the basis of the market wages of the household worker who actually spends the time in the household work, since this is his/her opportunity cost of not working in the market. When the worker does not work in the market, wages of workers with similar qualifications are used. This method, advocated by the school of New Household Economics, is based on several unrealistic assumptions about the utility maximization by the household, continuous substitutability of market and non-market work, etc. According to this method, the same activity may be assigned several values depending on who is doing it, which is totally unacceptable for the estimation of values for inclusion in a satellite account.

As mentioned above, all wage-based methods reflect the situations in the labour market, and values derived on the basis of wages are comparable to the factor payments in SNA. How-ever,

they do not reflect the product market situations and therefore are not comparable to the production side of the SNA. There are also problems delineating the boundaries between work and leisure, valuing simultaneous activities, problem of productivity of labour, etc.

Only in limited cases when product markets do not exist at all—e.g., cooked meals in remote rural areas—wages in kind or cash, may be used to impute value to the household services. If wage based methods are to be used at all in the developing country market situation, value is better approximated by polyvalent domestic workers. For developed countries also, Goldschmidt-Clermont (1992) argues that wages of municipal workers should be used for such conversion purposes because they approximate best the polyvalent domestic workers.

The SNA (1993, Chapter VI, p.25) recommends that "when reliable market prices cannot be obtained, a second best procedure must be used in which the value of the output of the goods or services produced for own use is deemed to be equal to the sum of their costs of production: that is, as the sum of intermediate capital and any taxes (less subsidies) incurred during the process of production". In the present case, the main argument for not using the cost of production as an approximation for output of the domestic work is that while the cost of production for the SNA categories are determined by the market, in the production of services, both factor and product markets are undetermined.

Table 5.1 shows in summary form the advantages and disadvantages of product-based and wage-based valuation approaches.

The Evaluation Process

Output-based evaluation requires:

a) an estimate of the household output,
b) an estimate of the intermediate consumption, and
c) determination of the market prices to be used for the conversion of physical volumes of outputs and inputs.

Steps for output-based evaluations in the current context that would provide approximate total figures of household production for comparison with what is included in the SNA and an estimate of the non-market contribution to the total productive process in the society would be:

- Estimating SNA-included output generated in the household; e.g., kilograms of paddy, vegetables, fruits, etc.; number of mats, carpets, etc.; kilograms of milk, meat, wool, etc. This is necessary as most of the food and other processing activities are continuous with a pre-cooking component of domestic processing. To distinguish such processing, careful recording is necessary at least to develop norms. Since the SNA still retains a caveat that if the products generated in the household are not important for a country's economy they may be ignored, it is important to collect data on all products so as to decide whether they are important or not. The precise process of deriving value added at the household level for SNA-included products and services has been elaborated in

TABLE 5.1
ADVANTAGES AND DISADVANTAGES OF PRODUCT-BASED AND WAGE-BASED VALUATION METHODS

Product-Based

Advantages

- Measures real output
- Products have wider market and substitutes
- Compatible with the main body of SNA
  a) Real product
  b) Expenses forgone at the household level
- Reflects household productivity situations
- Overcomes the problems of measuring productivity of time of various individuals, simultaneous activities, and delineation of boundary between leisure and work.

Disadvantages

- Requires more data and effort
- Difficult to apply in the case of services where no comparable services exist in the market
- Less experience available on this methodology

Wage-Based

Advantages

- Simple and easier to handle
- Requires less data once the time inputs are measured
- May be the only possible method for services in some situations

Disadvantages

- Measures input and not output
- Does not reflect the household productivity situation
- Not compatible with general methodology of output measurement in SNA
- A choice required among multiple wage-rates:
  - Polyvalent worker or specialized worker
  - Wage equivalent market function
  - Wage for equivalent market qualification
  - Wage foregone or opportunity cost of time
- Average wages
  - All workers
  - All female workers
  - Workers in service occupation, male, female, or children
- Value will depend on the particular wage rate chosen and has been found to vary widely
- Problems of productivity of time of various individuals, simultaneous activities, boundary between work and leisure require various assumptions for solution.

detail by Acharya and Bennett (1981). Situations in other countries will warrant variation in the details of activity and product listing, but the process remains the same. All products and activities have to be listed.

- Estimating the volume of household output in the various domestic activities: e.g., number and type of meals cooked, number of old age people and children cared for, quality and contents of the meals, quality and frequency of child care activities, etc.
- Valuing this product at the market price of products when they are also sold partially. When they are not sold, prices of products which are equivalents to the goods and services produced in the market may be used. Wherever this is not possible, wage-based methods of valuation may be used as discussed briefly below.
- Deducting intermediate consumption of both market-purchased and home-produced goods valued at market prices of equivalent goods to derive the value added within the household sector. One should be careful to avoid double counting. This process should be carried out for each product category separately. If outside labour is employed in the process of generating this, value added costs of employing such labour must be deducted at this stage to derive the value added by the household members. Payments to outside labour must also be disaggregated by gender, to permit derivation of gender disaggregated wage income from the household sector.
- Allocating the value, thus calculated, to various members of the household according to their respective labour inputs in production of various goods and services. This labour input must also include time devoted to management.

Data Needs

Output-based evaluation methods do not necessarily require time-use data. But estimating all the products and services generated at the household level is extremely difficult without an idea of such activities from some other source. Thus far, national accounts have basically been constructed independent of economic activity and labour force estimates. The definitions of economically active population and labour force are based on what is included in SNA. Only activities generating products or services that are included in SNA are defined as economic activities. Nevertheless, many of the activities, even within the economic categories, get left out in measurements because products generated thereby are perceived as unimportant.

Availability of time-use data would facilitate the measurement of the magnitude of work and production more accurately, specially in developing countries. The fact that when measurement of household production is left to national accounting offices dominated by experts equipped mostly with the tools of measuring production for the market and income streams mediated by the market, a large proportion of output generated in the household gets left out has been illustrated in Chapter 4. Although according to the new definition of SNA all goods produced in the economy irrespective of their end use, including food processing, are to be included in national accounts, it is not yet clear how to capture all production generated by the households for their own use. The problem that a major part of the products generated at the household level gets left out of the SNA because this production is generated by the *invisible* activities performed by women and children, still remains. There must be some other cross-checks to test the authenticity of such product estimates. Time-use data acquires importance in the national accounting context as a cross-check on the product-based measurements.

Further, it is argued here that the valuation of domestic services such as cooking, washing, child care, etc., should be recorded in satellite household accounts. For estimating services generated by these activities it is necessary to derive some norms for establishing their productivity. Such norms may be derived only on the basis of the time input of individual members to such activities and measurement of the product generated thereby. These norms have to be derived for various household productivity situations, e.g., with or without electricity and running water, with fuelwood or kerosene ovens, etc. in developing countries. For developed countries, domestic work situations may vary according to the degree of capital involved—with or without dishwashers, washing machines, etc. One approach to capturing the necessary situational data using activity logs is presented in Chapter 6.

Finally, as one of the major objectives of the current endeavour is to evaluate the contribution of women to national income, it is necessary to record the time input of each household member that goes to generate the household product. Division of work may be by product such as cash crop or food crop and house repair or cooking, or by processes, for example, rice planting, harvesting, storage, processing, etc., shopping, cleaning and cooking, etc. To evaluate women's and children's contribution to these productive processes it is necessary to generate data on relative male/female and children's time input into these productive processes.

Output

With careful design of the study it is possible to collect fairly accurate data for the goods included in the system of national accounts.

In developing countries the first priority should be to evaluate everything that is included in SNA. The SNA still has a snag that what is not important from a national economic point of view may be left out. The decision as to what is important and what is not important cannot be made on an ad hoc basis as is done today. Experimental studies are necessary. For example, in a country like Nepal, where per capita income is US$180 per year it is important to find out how people survive before their livelihood strategies can be dismissed as unimportant.

Where estimates of both the quantity and value of production, as in agriculture, are currently made by the national statistical offices, they should be used in conjunction with time allocation data to derive estimates of agricultural productivity. The prime objective of the current project is to develop viable estimation procedures for currently unestimated production. If as a by-product estimates of existing valuations are improved, which is likely in some cases, that is a bonus.

Measurement of products generated by domestic services and child care can be generated only by survey or observation and therefore averages may have to be inferred on the basis of series of case studies covering households in various socio-economic situations. A proper format for collecting data from this kind of observation has to be developed. The broad categories could be domestic work including cooked food (which should include description of what food and how much), housing space cleaned (what and how many times), shopping (from how far and how many times), care for the children and other members of the family (for how many children

and what quality of care), transportation services (number of family members and distance transported), etc. Accordingly, for satellite categories of activities, a tentative list of products for data collection is suggested below.

- *Domestic work*—pre-cooking processing (peeling of potatoes, washing for cooking, etc.) cooking/servicing, cleaning house/plastering/minor repairs, shopping, etc.
- *Child care*—child birth/recovery period, tending, feeding, bathing/cleaning, oiling and massaging, watching, etc.
- *Other care*—care of the other members of the household—sick or not—feeding, bathing/cleaning, watching, etc.
- *Education*—helping with the homework, teaching at home, etc.
- *Volunteer*—organizational duties, community/village work, etc.
- *Transportation*—to shop, to school (self and others), etc., should be attached to the related activity.

Collection of product data on the first group of activities that is domestic work should not be very difficult as identifiable products and services are generated by these activities. Product data on care of children and adults is a product of time input and number of children or adults cared for. While quality of care may vary, allowance for this must remain to be accounted for at another stage. For now, the crucial question is care for how many?

Units of measurement

Within the broad categories, described above, kinds of outputs on which the data have to be collected and units of measurement may differ from country to country, region to region within a country, etc. There is bound to be a big difference between urban and rural areas in each country.

Some simple forms for recording household maintenance activities were tried in Nepal in one urban household. This household had five members, no children and all household work was performed by paid servants. Recording outputs from meal preparation and its valuation presented no problem. But for services such as child care, unit of measurement has to be product of time spent and number of children, or time spent and number of elders cared for because these services are paid by time. In the case of this household, an additional problem arose because all household activities was performed by a *paid domestic servant* and so the output in this case would theoretically enter GDP and be valued as wages paid to the polyvalent worker. There is no market for the kinds of services provided by this servant. There are sophisticated laundry services provided to hotels or tourists or diplomats. The laundry done at home by the paid servant cannot be compared to the high technology shops which provide services by piece. In other countries (e.g., India) there would be comparable house to house laundry services provided by load or by piece.

Similarly, child care is not provided by the hour in Nepal. Children are cared for by live-in servants whose income would theoretically enter the GDP. In such situations *there are extensive*

market transactions for the polyvalent servants and it may be better to value all services, including cooking, at the wage rates paid to the polyvalent workers as well as by output method where possible.

This is because if performed by a polyvalent or specialized worker both meal preparation and other services do enter GDP at least conceptually as incomes of the paid servants. Value of such services should not be in the satellite account where work is shared between the householders and the servant and the product is a joint product, e.g., food wages paid to servant has to be deducted from total product to derive the *net product* attributable to the householders.

When these activities are performed for self or other household members and not paid, they fall outside the production boundary of SNA. For example, if the household under discussion had no servants, the meal preparation would have to be done by the household members and value added by this activity can be calculated as in this example. The services, on the other hand, will have to be valued otherwise. Nevertheless, the unit of output in this case will still be hours because these services are sold in time-units and not as products in many developing countries.

The choice here is, once again, either to calculate the total productivity of the household members as own account workers and impute this value to the hours of work as recommended above or value this time at wages paid to the polyvalent workers. Calculation of the total productivity of the household members as own account workers as recommended above would require data on total own account household production and work input of each individual member in this total.

Nepal, however, represents a very early stage of industrial development and urbanization. Formation of an urban elite class is just beginning. The market for processed food is limited to western nationals living in this country or a few highly westernized families. Both production and use of such goods are extremely limited. Its case has very limited validity for countries at more advanced levels of development where a substantial proportion of households have modernized life styles and access to many household amenities and limited availability of live-in maid services.

A more complicated example of product-based valuation of household services is presented by Fitzgerald and Wicks (1990). Their activity list consists of 57 items (Appendix 2). Although such a detailed list of activities is necessary to capture the time input in short duration activities, when it comes to valuation, they must be regrouped into categories comparable to market products (Table 5.2). For example, all child care or elder care may be valued as only one product. Moreover, child care may not be provided by hour or day in many countries. Similarly all house-cleaning (probably barring windows) may be subsumed in one category, house cleaning, in the market. All laundry except a few items should be valued only as one product in terms of machine loads when they are washed in washing machines, at prices of the items when washing services are provided by items (e.g., saree, shirt), or at monthly wages if all washing and ironing services are provided on hourly basis as in the Nepal example.

Fitzgerald and Wicks also provide examples of unit of measurement. All of this may not be applicable to many countries, but in general, the list could be adopted as a starting point. For

example, the concept of garbage bag is totally foreign in much of Nepal or India, but it is probably quite appropriate for urban situations in many South East Asian or Latin American countries. Similarly, the activity of floor mopping must be replaced by the activity of sweeping and mud-plastering in rural areas of Nepal or India.

Food production, the last category (F) in the Fitzgerald and Wicks list, is not actually part of household maintenance. According to the 1993 SNA, it falls inside the SNA. Production from these activities is easier to measure and value and is included in GDP (SNA, 1993).

TABLE 5.2
MEAN ANNUAL VALUES OF HOUSEHOLD PRODUCTION
ESTIMATED BY THE OUTPUT AND LABOUR VALUE APPROACHES

Output Category	Output Value	Labour Value	Output Divided by Labour Value	T test of Difference Between Mean Value	Hours Devoted to Household Production
A. Cleaning	$919	$840	1.1	2.1[b]	194
B. Child care	436	166	2.6	4.8[a]	46
C. Meal Preparation	2756	1666	1.7	7.9[a]	356
D. Clothing Care	718	416	1.7	7.4[a]	84
E. Repairs	204	150	1.4	3.1[a]	20
F. Home Produced Food	28	84	.3	3.6[a]	10
G. Miscellaneous	256	204	1.3	1.7	24
H. Output measured by hours	598	584	1.0		134
Total	**5915**	**4110**	**1.4**		**868**

Note: Sample of 896 adults in Missoula, Montana.
[a] Significantly different from zero at the 1 per cent level
[b] Significantly different from zero at the 5 per cent level

Source: Fitzgerald, J. & Wicks, J. (1990). "Measuring the value of household output: A comparison of direct and indirect approaches," *Review of Income and Wealth, 36*(2): 129-141.

Inputs

Conventions do exist for collecting data on inputs that go into production as far as SNA categories are concerned. Forms designed for Nepal and Pakistan may be taken as a starting point once again. But data on inputs that go into producing household services have rarely been collected for developing countries. These inputs should be classified and itemized among *capital services, intermediate products, and labour.* In developing countries very little capital is used in activities such as cooking, child care, washing and daily cleaning and maintenance of living quarters, etc. A sheet on the asset structure with detailed listing would enable one to evaluate

the contribution of capital services to domestic work also. These will be simple pots and pans, home-produced brooms, etc.

Intermediate inputs would be varied and often used in small amounts (such as salt, spices, etc.) and thus more difficult to capture. The list has to be designed so as to capture all kinds of products. Only some of the inputs may be relevant to a particular socio-cultural situation, but the classification of these items should be according to the product classification adopted, e.g., cooking rice, baking bread, making curry, etc.

Time-use data would provide estimates of the major input, that is labour, in household production.

The valuation process would thus involve:

- generating time-use data for all activities;
- assigning this input a market value which could be either of the following depending on data availability, but in order of preference as listed below:
  a) Output value derived from the price of equivalent market product. For example, the same food may be cooked for part sale and part domestic use. In such cases the domestically consumed part is to be valued at the price of the part which is sold.
  b) Net return to labour, exclusive of intermediate inputs used, in market-oriented activities performed by the household and similar or even identical to domestic activities; e.g., cooking for self and cooking for other households.
  c) Net return to labour in other comparable non-monetary productive activities for which output related valuations can be performed. For example, if a person devotes two hours to child care, which she does not do for other people, this time may be valued at net average returns to her input in other activities, the products of which are sold.
  d) The wages of polyvalent household workers (inclusive of income in kind) adjusted for skill level and managerial responsibilities.

A Mathematical Presentation

To formulate the steps involved mathematically:

Household production should be divided in 3 parts with m_1, m_2, and m_3 products to be identified by $i = 1,\ldots,m_1,m_1+1,\ldots,m_2,m_2+1,\ldots,m_3$ where i is the number of products generated in the household. Number of products goes from $i = 1\ldots m1$ for products and services included in SNA, $i = m1+1\ldots m2$ for non SNA activities for which identical products and services are sold, and from $i = m2+1\ldots m3$ for those activities for which identical products and services, destined for the market are not available. Correspondingly, the total household production Y is divided in three parts $y^{(1)}$, $y^{(2)}$, and $y^{(3)}$, where $y^{(1)}$ is total monetary value of all products that are included in SNA, $y^{(2)}$ is the value of those products that are not in SNA but for which product based valuation is possible and $y^{(3)}$ stands for total of those products for which indirect valuation methods have to be used.

For SNA-included categories:

1. Get physical production X of various goods. Value agricultural and other household products at basic price product by product (e.g., farm gate prices should be used for farm products).
2. Where product market does not exist take replacement cost for the product or nearest product (e.g., vegetable preserved to be used in the dry season may be valued at the cost of buying cheapest vegetable in the season as done in the Nepal *Status of Women* study).
3. Water collection (now within SNA) is to be valued at the cost of putting piped water to the house or the community.
4. House construction is also to be valued at replacement cost. This cost sometimes may be just the cost of hiring labour.
5. Post harvest food processing now goes into the SNA. Value added should be derived by taking the market price of the comparable marketed product (e.g., 1 kilogram of rice) and deducting all costs involved in getting one kilogram of rice by home-processing the domestically produced paddy (e.g., market value of the quantity of paddy necessary for getting one kilogram of rice, all cash costs, hired labour costs if any). This will yield an estimate of the value added by processing paddy at home.
6. Gate costs: Ci would equal to total of the cash expenditure plus the value of the home produced inputs, such as seeds in agricultural production. Inputs should be valued at purchaser's price.

$$C_i = C_a + C_b$$

where: C_a = value of purchased inputs (cash expenditure)
C_b = value of home produced inputs

7. Thus value added for product:

$$y_i^{(1)} = x_i\, p_i - c_i$$

where: y_i = (physical output of good$_i$ * market equivalent price of good$_i$ produced) minus value of inputs (purchased and produced).

8. Allocate y to household members j according to their labour input in product i. From this, contributions of men, women, and children to household production theoretically going into SNA, may easily be identified.

Total in-SNA output ascribed to member j:

$$Y_j^{(1)} = \sum_{j,i=1}^{ml} y_{ij}$$

where: Y_i = sum of the value added for products

and: i = (1, 2,...,m) is the number of products produced in the household which are included in SNA.

Monetary value of the total household production included in SNA:

$$Y^{(1)} = \sum_{i=1}^{m1} \sum_{j=1}^{n} y_{ij}^{(1)}$$

where: j = (1,2,...,n) is the number of members in the household.

For non-SNA categories where *product valuations are feasible*, methods described above for categories included in the SNA are equally applicable. For example, if part of the domestically cooked food is sold, the part consumed at home may be valued at the price at which the food is sold. If a mother teaches her own children along with neighbours' children and gets paid for teaching the neighbours' children, her time spent teaching her own children may be valued at her hourly tutoring salary for other children.

Costing of inputs and derivation of net value of services should follow methods as described above for SNA activities. The total value of such services ascribed to member j.

$$Y_j^{(2)} = \sum_{i=m1+1}^{m2} y_{ij}^{(2)}$$

- In the richer households even in the rural areas, *management* of the household is a major activity to which the *time devoted* is not visible. This should be kept in mind when calculating labour input in non-SNA household activities.
- For urban areas where there is a market for child care and cooked food, these products can be valued product by product.
- In developing countries there may not be a market for child care below four/five years of age even in urban areas. However, children may be cared for by the live-in housemaids, who are given food, clothing, medicare when needed, festival needs, and cash payments and work under the responsibility of the family members. These child-care activities should therefore be valued at the cost of hiring such workers.

Value of each person's labour input in the own account production and non-SNA household activities for which product based valuations are possible. Productivity of her labour l_j may be approximated as:

$$l_j = \frac{\sum_{z=1}^{2} y_j^{(z)}}{\sum_{z=1}^{2} \sum_{i=1}^{m2} h_{ij}^{(z)}}$$

Where:

$$\sum_{i=1}^{m2} h_{ij}^{(z)}$$

is the total hours of work of the individual j spent on the production of all products and services in the category Y^1 and Y^2.

For those services for which comparable products are not valued for SNA categories or otherwise, use average productivity of each member as given by the formula l_j. Thus total value of these remaining activities for individual j for which no product by product comparable valuation is possible where t_{ij} are time input in activity i,

$$y_j^{(3)} = \sum_{i=m2+1}^{m3} t_{ij}\, l_j$$

This procedure is based on the logic that households have to spend a minimum of time on services as well as producing goods. Theory of choice applies only beyond the minimum. If women did not have to spend *so much* time on domestic activities they could have spent time on producing marketable goods. This situation approximates the reality for rural areas in developing countries such as Nepal.

Alternatively, where even this sort of valuation is not possible for services, wages of a polyvalent domestic worker, who performs most household tasks may be used. Polyvalent domestic workers do exist in most developing countries. Some richer households do employ such workers. The wages and payments may be in kind or in cash, but these are fairly standardized at least on the local basis.

Total household income Y will be equal to:

$$Y_n = \sum_{i=1}^{m1} \sum_{j=1}^{n} y_{ij} + \sum_{i=m1+1}^{m2} \sum_{j=1}^{n} y_{ij}^{(2)} + \sum_{i=m_{2+1}}^{m3} \sum_{j=1}^{n} y_{ij}^{(3)} + \sum_{j=1}^{n} w_j$$

where w_j is direct monetary income (e.g., total salary or wages of individual j).

Total contribution (T.C.) of each individual member to the household income will be:

$$TC_j = \sum_{i=1}^{m1} y_{ij}^{(1)} + \sum_{i=m1+1}^{m2} y_{ij}^{(2)} + \sum_{i=m2+1}^{m3} y_{ij}^{(3)}$$

Valuation Prices

In valuation the second group of crucial issues that need to be clarified relate to prices. SNA defines three kinds of prices for valuation of products and inputs:

Basic price—is the price received by a producer for a unit of a good or service produced as output *excluding any tax payable or subsidy receivable* on the product and any delivery charge *invoiced separately*.

Producer's price—includes taxes or subsidies except VAT *invoiced* on the output. It

excludes any delivery charges invoiced separately by the producer. Thus, both the producer's and basic price exclude any VAT or similar deductible taxes *invoiced* on the output sold.

Purchaser's price—In addition to producer prices it *includes* any transport charges paid separately and *excludes* any VAT or similar deductible taxes. It is the *price* actually *paid* by the purchaser.

The purchaser's price may thus exceed the basic price by a margin equal to: a) the value of any non-deductible VAT payable by the purchaser, b) any delivery charges not included in the basic and the producer's price, and c) the value of any taxes less subsidies on the product.

SNA recommends that all output should be valued at basic prices because it is the actual price received by the producer. Producer prices should be used only when basic prices are not available. We should, therefore, *use basic prices for valuation of products within SNA categories*.

For products outside the SNA categories two sets of prices may be derived: one comparable to basic prices—that is, prices of the similar marketed products excluding taxes—and separately invoiced delivery charges. This will make the domestic-services production data comparable to other SNA categories. At the same time, as Goldschmidt-Clermont (1992) argues, these services should be valued at purchaser's price since savings made by the households for not buying the product in the market will be equal to the purchaser's price. If we are looking at women's contribution to the household resources, this is an important point and we should use the purchaser's price. It is also important to calculate the difference between the purchaser's price and basic price. The transaction costs involved in taking the product or services to the market is the cost of marketization of products and services and should not be counted as increased production when compared with production for household consumption.

All inputs should be valued at purchaser's prices when bought. But in the rural areas of many developing countries, much of the intermediate inputs used in further production of goods and services are home-produced. In cases such as agriculture, SNA advice is to use purchaser's prices. A similar method should be adopted in the present study.

As to the practical valuation methods regarding non-SNA categories, several variations may be offered. The products that are traded on a significant scale, e.g., teaching, cooked food to the extent of snacks, transportation of people (this does not have to be transport vehicle; it could be horse/bullock carts, horses or donkeys, or just porters), barber services, etc. may be valued at the market prices of the comparable products. For the major meals cooked, living quarters cleaned, and the care of the sick and the children, an alternative method has to be found.

Product Accounting Approach

While it is technically possible to estimate the value of household output, there have been few attempts to do so. Among the outputs for which some attempts have been made to directly measure and value household outputs are: meals (Chadeau and Fouquet, 1981; Suviranta, 1982; Sanik and Stafford, 1983; Fitzgerald and Wicks, 1990); laundry (Suviranta, 1982; Fitzgerald

and Wicks, 1990); and housecleaning (Chadeau and Fouquet, 1981; Suviranta and Kiplio, 1982; Fitzgerald and Wicks, 1990). Recently, Fitzgerald and Wicks (1990) went well beyond these few outputs to attempt to directly measure outputs for a large number (54) of household activities. Appendix 2 shows, in addition to the types of activities, the units used to measure them in an attempt to address what the authors believed to be the main measurement by output problem, "definition of meaningful output units". For three other activities "child sitting", "care of the elderly", and "care of the sick" hour was chosen as the unit of measurement.

By means of a household survey Fitzgerald and Wicks (1990) collected data on both time spent and amount produced. Using the data they collected and U.S. occupation and wage data, they estimated value by means of the functional cost approach. To value the output they used "the prices which firms charged for the item as equivalent as possible to the HP [household production] unit" (Fitzgerald and Wicks, 1990, p. 133). While some outputs could be directly priced (i.e., meals, laundry, electrical repairs) other outputs did not lend them themselves to direct valuation (i.e., housekeeping). In the case of housekeeping, it was necessary to pro rate the stimated total for the work across the several tasks encompassed in housework (see Table 5.2).

Fitzgerald and Wicks (1990) developed estimates of the value of household production using both the output approach and the labour input approach. For their limited sample of Montana households they calculated that the labour input approach typically understated the value. They found the understatement to be as high as 1 to 2.6, which occured in the case of child care, Table 5.2. Finnish work using the output method tended to yield lower values than the input method (1982). Further work is needed to sort out the relationship of the two approaches.

One example of output valuation is provided by the work of Sanik and Stafford (1983). In essence, home food production was valued "as the dollar value of an equal quantity of equivalent foods served by a high volume food vendor for profit" (Stafford, Sanik and Maudlin, 1984, p. 2) Sanik and Stafford used data from the 1977 New York Time Study which collected output data on food items served, number of meals, and number of people served for a two day period, supplemented by price data. No family served more than eight food items or eight meals or snacks per day. The estimated replacement cost for each meal (PRMEAL) is given by:

$$PRMEAL_i = S_i \left(\sum_{i=1}^{8} p_i\right)$$

where: s = number of people served
p = price of food item i

and the daily value of food prepared at home (PRDAY) averaged over the two days is given by:

$$PRDAY = \sum_{j=1}^{16} \frac{PRMEAL_j}{2}$$

Prices were determined from a price list provided by the Cornell University food service. The prices included the cost of equipment and labour required to provide the individual items. The authors believed that such a food service might more closely parallel home production than would restaurant meals.

A two-way analysis of variance for the average daily market price per serving of food prepared at home showed that place of residence and education were found to affect price of home prepared food. The price tended to be higher in rural areas and higher with higher education. Differences in the number of servings partially offset the rural/urban difference. Other results and interactions were also explored by Sanik and Stafford (1983).

Most significantly, Sanik and Stafford concluded that "the market cost of food prepared at home is less sensitive to changes in family characteristics than the income accounting approaches have been" (Sanik and Stafford, 1983, p. 226). And, as the authors noted, relative stability is a desirable feature for an estimate of the value of household production.

In later work this analysis was extended by comparing value and quantity measures of output for household food production (Stafford, Sanik and Maudlin, 1984) for various food preparation technologies. The technologies examined were (1) rangetop (2) conventional oven, (3) broiler, (4) microwave, (5) charcoal grill, and (6) small appliance. Output was measured in five ways: as the daily (1) number of meals, (2) number of items, (3) number of servings, (4) number of persons, and (5) dollar value of food. The input measure used with the quantity ratios (output/time) was daily minutes of all family members in food preparation and dishwashing. The dollar value of the family time input, based on the Gauger and Walker (1980) replacement cost wage rate approach, was used in the value ratio (value of food/value of time input). The authors found surprisingly few differences among the various quantity and value measures across the food preparation technologies used.

They found that the two ratios that had the most quality and quantity information embedded in them, servings per minute and food dollar per labour dollar, performed best (Stafford, Sanik and Maudlin, 1984). More importantly, for accounts related work they found that the crudest output measure, number of meals, performed worst and that crude output measures cannot detect differences in process efficiency.

Conclusions

Valuing non-market production in terms of the value of the output generated should be the goal of non-market valuation endeavours. It has been shown here that such a valuation process is feasible. In Chapter 6, suggestions are made for an appropriate data collection strategy to support output valuation methods. The task ahead is to implement and refine these tools.

Chapter 6
Activity and Time-use Measurement

Interest in a wide range of human activities is evidenced by a broad spectrum of attempts to measure, understand and describe human behaviour. While behaviour is multidimensional, its measurement starts with an understanding of, first, the existence of an act, and secondly, the time allocated to it. At one level, to measure and account for non-market production it is important to identify its existence, its volume as measured by time inputs, and how the time inputs are distributed across population sub-groups. At another level, as will be discussed below, it is necessary to attach monetary values to non-market production. This chapter explores, briefly, the measurement of behaviour, the nature and history of time-allocation studies, and issues related to the accurate and efficient measurement of time inputs to non-market production. The following chapter explores approaches to assigning monetary values to non-market production.

Measurement of Behaviour

Minimally, behaviour can be measured in terms of activity participation and can be captured by a binary measure which distinguishes 'participation' from 'non-participation'. However, often participation is qualified as to intensity along a time dimension which may range from 'minutes a day' to 'times a year'. Not infrequently, additional information relating to the activities—activity dimensions—is also captured, where it was done, with whom, etc. And, somewhat infrequently, participation is also qualified as to order along the additional time dimension of sequence: i.e., before, during, after. Such activity data can be captured with instruments which range from direct questions, through simple activity lists to time-diaries or even direct observation. Selection of the optimal data-collection technique is not easy, since there is not necessarily one approach that is best. The appropriate approach for capturing activity data depends minimally on the type and accuracy of the data sought and the funds available for its collection. Beyond these criteria, it will depend on the strengths and weaknesses of the several data-collection approaches. For this reason there is a need for more and deeper examination of the relative strengths and weaknesses of the several approaches to the collection of activity data.

Martin and Bateson (1986) provide an excellent overview of issues relevant to the measurement of behaviour. While their work is cast in terms of observational studies, much of it readily applies to the capture of time allocation behaviour by diary or log keeping, or by means of recall interviewing. They state that in describing behaviour, one can capture the structure of behaviour—how it appears or is manifest—or the consequences of behaviour. "For

example, 'turn light on' is a description in terms of consequences, while 'press switch down using index finger' is a structural description" (Martin and Bateson, 1986, p. 38).

In discussing types of measures they identify latency, frequency and duration. Latency is "the time from some specified event... to the onset of the first occurrence of the behaviour" (Martin and Bateson, 1986). For example, if one eats 30 minutes after getting up, the latency to eat breakfast is 30 minutes. Frequency is the number of occurrences of the behaviour per unit time. Duration is the length of time for which a single occurrence of the behaviour lasts. Duration can also be expressed in terms of the total time allocated to all occurrences of a behaviour over a specified period: e.g., minutes per day. Martin and Bateson suggest that the term total duration be used in this instance. The duration can also be expressed as a proportion of the time spent on a behaviour in the reference time period. Thus if one spent one hour eating per day, the duration would be 1/24=.04. As they note, the proportion of time is a dimensionless index with no units of measurement (Martin and Bateson, 1986).

"Frequency and duration, which are the most commonly used measures for describing behaviour, can give different and complementary pictures" (Martin and Bateson, 1986, p. 45). They suggest that it is probably best to collect both, since empirical studies have shown that frequency and duration measures of the same behaviour are not always highly correlated. This observation is given further support by findings presented below when discussing the comparative advantages of measurement approaches.

Martin and Bateson also draw a distinction between events and states. They suggest that events are behaviours which can be approximated by points in time, where the salient feature is frequency of occurrence. In contrast they see states as behaviour patterns of relatively long duration, for which the salient feature is duration. They do note, however, that the state itself can be viewed as an event and measured in terms of its frequency. These points are particularly relevant to sampling behaviour where 'states' may be highly relevant: e.g., agricultural areas as the crop, planting and climatic conditions change.

Exploring methods for recording behaviour, Martin and Bateson (1986) discuss sampling rules and recording rules. With *ad libitum sampling,* whatever is most notable and seems relevant is recorded. With *focal sampling*, one observes one individual or other unit for a fixed time period and records all instances of pre-specified behaviour. Logs, discussed below, accomplish this by the survey approach. Another approach, *scan sampling,* entails rapidly scanning a group and recording what each individual is doing at that instant. Behaviour sampling entails the capture of the occurrence and details of particular types, often rarely occurring, of activities (Martin and Bateson, 1986).

There are basically two different types of recording rules: continuous and time sampling (Martin and Bateson, 1986). With continuous sampling all behaviour over a pre-defined period is captured. Thus an observer would faithfully record all behaviour in terms of what was done and when it started and stopped for the chosen period, say a day; or a respondent would similarly record in a diary their behaviour during the specified period, say a day or a week. In contrast, observers or respondents could record behaviour for pre-defined points in time, what Martin and Bateson call time-sampling. This approach has frequently been used by anthropologists and ethnographers to capture time allocation data (Gross, 1984). With respect to time-sampling, they denote two dimensions: sample intervals, successive short periods of

time; and sample points, the instant of time at the end of each sample interval (Martin and Bateson, 1986). These distinctions are highly relevant to any discussion of open versus fixed interval diaries, an issue which, while having received some empirical attention, has not been carefully examined.

It is useful to think of time-use studies from a parallel standpoint. They can be **exhaustive**, in which case they account for, or are meant to account for, all activities or time within the targeted time slot (hour, day, week, etc.), which is equivalent to continuous sampling. Or they can be *selective* and record only time allocated to selected or targeted activities, which is the equivalent of behavioural sampling. While selective time-use studies provide useful data on participation in activities, the data will be an inferior measure relative to data collected by exhaustive time-use studies. While there is some correspondence between the form, exhaustive or selective, of the data sought and the nature of the collection instrument used, there is not an exclusive mapping of form and instrument.

An overview of data-collection instruments and approaches for the collection of time-allocation data is provided below. Where possible some examples of instruments and approaches are given. In reviewing material for this overview the authors could not help but note the vagueness of many survey descriptions, including some of their own. There is a strong need, in reporting results, for complete and accurate description of research methodology.

Prior to examining data-collection approaches it is useful to explore briefly the nature of time allocation studies, the descriptive measures available from them, and how the studies and measures are related to each other. Not all measures are provided by all methods. Thus it is paramount that one know which variables are needed when evaluating methodologies.

Time allocation studies

Time-allocation data can be used to measure unpaid activities performed in and by the household, to analyse the relationship between market and domestic subsistence labour, and to serve as a basis for quantifying domestic work in monetary terms comparable to production included in national accounts. Time-use data also offer the possibility for the development of international units of measurement for use in different cultures to measure the duration, sequence and timing of activities. Thus, time-use data is one of the potentially most useful sources for measuring changes in economic and social behaviours. Time-allocation data can be collected in a variety of ways. Each approach has its advantages and disadvantages. The task facing the national accounts statisticians and others attempting to measure behavioural inputs required to quantify unpaid work is to identify optimally efficient data-collection and application approaches. Time allocation studies flow out of two research traditions: on one hand the tradition of mass population surveys, and on the other the ethnographic tradition of more focused and intensive study of particular sub-populations, typically using an obstruction approach. The two traditions have developed side by side as there was a role for each given a diversity of research questions, resources and environments. Before providing some insight into the range of time-use studies that have been undertaken it is useful to explore the various methods that have been used.

The time-use survey is an important data-gathering tool or technique developed to provide required data on patterns and types of activities undertaken. It provides extensive and

intensive information about time spent on activities, simultaneous activities, sequences of activity, patterns of association among various categories of people, and the location of activities. Time-use surveys that are inherently sex-specific make possible examination of issues as varied as the measurement of labour input, the management and use of time and space, family organization, integration within society, and participation in societal networks. Data collected enable coverage of a full range of the various types of households and individuals, the time use of men and women working in agriculture, men and women living in an urban environment, and adolescent girls and boys. Time allocation statistics can be used to measure unpaid activities performed in the home, to analyse the relationship between market and domestic subsistence labour, and to serve as a basis for quantifying domestic work in monetary terms comparable to production included in national accounts.

Time-use surveys offer the possibility for the development of international units of measurement which could be used in different cultures to measure the duration, sequence and timing of activities. It can thus be considered as one of the potentially most useful techniques for measuring changes in social behaviours.

Descriptive measures

Harvey (Harvey et al., 1984) presents an overview of the descriptive measures provided by time-use studies. The following draws heavily on that overview. The primary measures—shown in Figure 6.1, which present data on meal-preparation drawn from the 1992 Canadian time-use study—are:

P = *population, the completed sample population*
D = *doers, participants who did a given activity*
O = *occurrences, events—a line on a diary*
T = *time (duration)*

Given these four basic measures six descriptive values can be calculated, thus providing considerable insight into behaviour. As noted by Harvey, the addition of each of these in turn adds both to the cost and the usefulness of the data gathered.

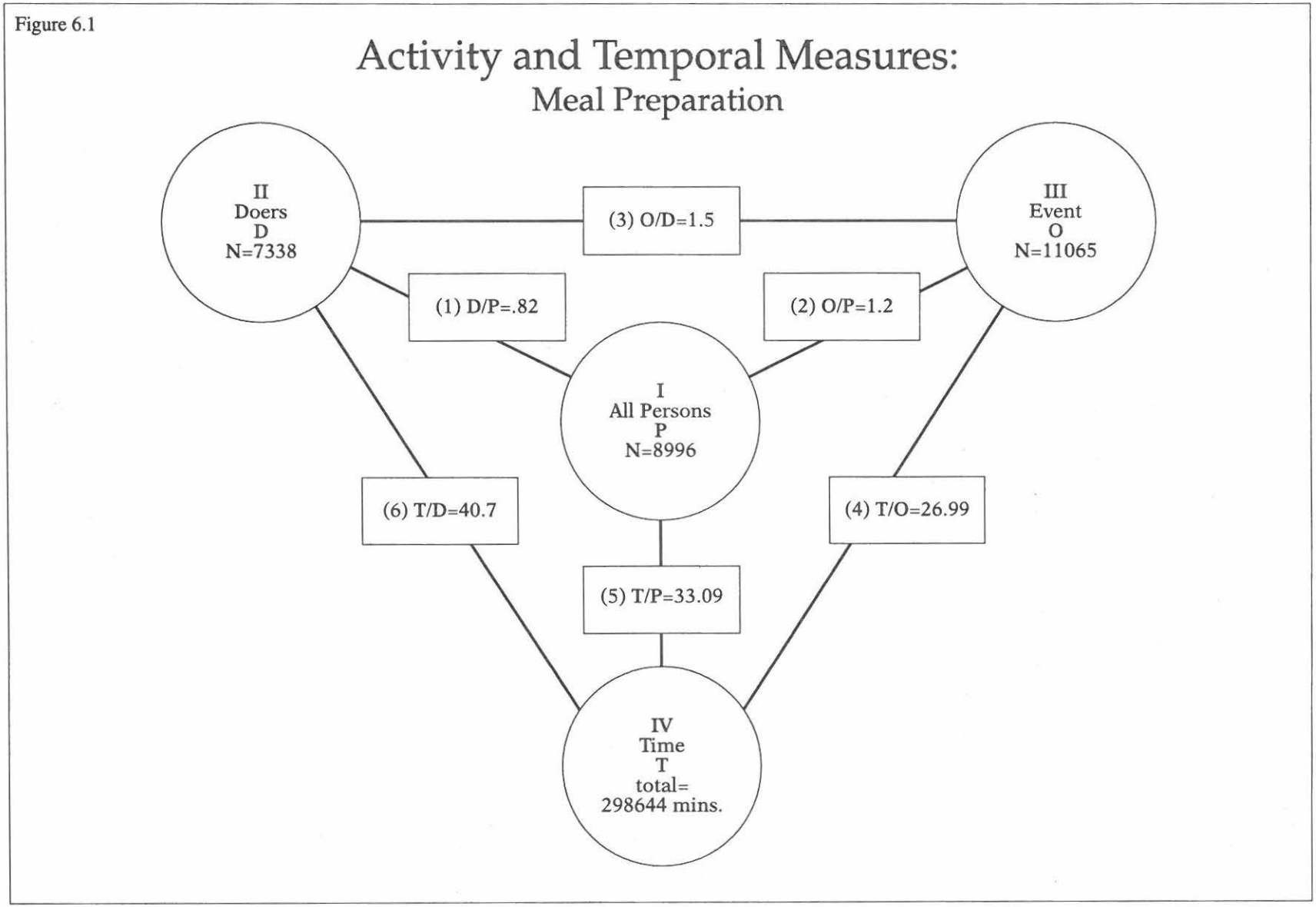
Having no information other than that members of a given population do, or do not do, a given activity, one can calculate:

(1) $$P_i = \frac{D}{P} = \frac{Doers}{All\ persons}$$

This is shown as D/P in Figure 6.1, which indicates that on an average day 82 per cent of all persons engaged in at least one meal preparation event.

P_i is, in fact, a composite of two factors: one indicating the propensity of individuals to participate or engage in activity "i", and the other indicating the probability of occurrence of "i" on diary day.

Figure 6.1


Activity and Temporal Measures:
Meal Preparation
II
Doers
D
N=7338
III
Event
O
N=11065
(3) O/D=1.5
(1) D/P=.82
(2) O/P=1.2
I
All Persons
P
N=8996
(6) T/D=40.7
(4) T/O=26.99
(5) T/P=33.09
IV
Time
T
total=
298644 mins.

Thus,

$$P_i = a_i * b_i$$

where:

$$a_i = \textit{population participation rate } 0 \geq a_i \leq 1;$$

$$b_i = \textit{periodicity, probability of occurrence on diary day;}$$

$$b_i = 1 \textit{ if activity occurs daily;}$$

and:

$$b_i < 1 \textit{ if activity occurs less often than daily.}$$

For example, if we assumed that everyone who prepares meals does so every day, then P_i is equal to a_i the population participation rate; that is:

$$P_i = a_i * b_i$$

then

$$P_i = .82 = a_i * 1 \qquad \textit{thus } a_1 = .82.$$

However, if it is assumed that people who prepare meals do so only six days a week and let someone else do it the other day, then on any given day only 85 per cent (b_i) of the persons who prepare meals will be doing so (6/7). With P_i and this information (b_i) one can calculate what proportion of the population ever prepare meals.

It is given by:

$$a_i = \frac{p_i}{b_i} = \frac{.82}{.85} = .95$$

The number of meals prepared per day averaged over the whole population, using the data in Figure 6.1, is given by:

(2)
$$\frac{O}{P} = \frac{\textit{Occurrences}}{\textit{Population}} = \frac{11065}{8996} = 1.2 \textit{ meals per day}$$

The number of meals prepared per day by those who do prepare them, using the data in Figure 6.1, is given by:

(3)
$$\frac{O}{D} = \frac{\textit{Occurrences}}{\textit{Doers}} = \frac{11065}{7338} = 1.6$$

Thus, on average, persons who prepare meals prepare 1.6 meals per day.

The foregoing measures do not involve time spent at the activity. If time (duration) is introduced, three additional measures can be calculated. First, it is possible to calculate the amount of time spent on each occurrence of the activity (i.e., preparation of a meal).

It would be given by:

$$(4) \qquad \frac{T}{O} = \frac{Duration}{Occurrence} = \frac{298644}{11065} = 26.99 \ minutes$$

Since individuals who prepare meals are likely to prepare more than 1 per day—it was noted they average 1.6 per day—their average meal preparation time will be greater than the time for a meal. This is given by:

$$(5) \qquad \frac{T}{D} = \frac{Duration}{Occurrences} = \frac{298644}{7338} = 40.7 \ minutes$$

Finally, it is possible to determine how long, on average over the whole population, people spend preparing meals. This is given by:

$$(6) \qquad \frac{T}{P} = \frac{Duration}{Population} = \frac{298644}{8996} = 33.09 \ minutes \ per \ day$$

The foregoing are only some of the ways of calculating the various measures. Given any two of the measures, a third can be calculated. Which measures are needed will depend on the task being undertaken. For purposes of valuing unpaid work, measures incorporating time are necessary.

Data-collection Instruments

Stylized questions

The use of direct questions, generally denoted the *stylized* approach, is the most widely used approach to obtaining data on time allocated to specific activities. The questions require the respondent to recall the amount of time they allocate, or have allocated, to specified activities over a specified period such as a day, week, year.

For example, any of the following might be used to capture time spent preparing meals.

1. Yesterday, how much time did you spend preparing meals?

   Hours ____ Minutes ____

2. How much time do you spend each day preparing meals?

   Hours ____ Minutes ____

3. During the past week, how much time have you spent preparing meals?

   Hours ____ Minutes ____

A recent variant was that asked in the Canadian Time-use survey, namely:

- Last week, did you spend any time doing housework including cooking, cleaning, grocery shopping, and laundry for your household?"

  Yes ___ For how many hours? _____.__ hours

  No ___

There are two variants of this approach. The foregoing, the *unconstrained* approach, means that selected time allocations need not total any fixed constant. Denoted the selective approach above, this is the usual approach. Specific targeted activities for which one wants information are selected and respondents are asked about time allocations to those activities, ignoring non-targeted activities. Consequently the respondent does not have to account for all activities or for all time. This approach is most typically used in surveys seeking but not focusing on time-use data. However, the unconstrained approach has been used where time use was central to the study. For example, one study of the time costs of rearing children used only a list of activities consisting of home work and employment work. While the list of activities was made as complete as possible to cover all possible activities that could fall under one or the other of these two types of work, the lists did not include personal or leisure activities (Ho, 1979). The respondents were asked how much time they had spent on each of the activities during the past week.

The preferred approach, however, is the *constrained* approach, where the reported time allocations must exhaust a defined time period, i.e., 24 hours in the day or 168 hours in the week in terms of time, or what amounts to the same thing, activities. This requires that individuals report time use for a rather extensive list of activities and thus argues against use of free-standing stylized questions such as those indicated above.

Stylized activity list

A second form of the stylized approach is the activity list, which seeks information from the respondents on selected dimensions for a list of designated activities. Essentially the activity list device consolidates a long list of stylized questions into a format which may be more manageable for all parties concerned in the collection process. It provides in tabular form a set of categories for which one seeks parallel responses. Such a list will typically be selective rather than exhaustive. It extracts from the total range of behaviour those elements of particular current concern.

A question from the Tanzanian TIMS survey provides an example of an unsuccessful activity list. The TIMS survey in Tanzania attempted to capture time-use data using an activity list approach and for the most part proxy reporting. Respondents were asked to report, for themselves and other household members, "How many hours on typical days is s/he engaged in ...?" Activities listed were: food preparation; fetching water; fetching firewood; sewing, weaving, etc.; other handicraft; agricultural gardening; tending livestock; attending to children; other (specify) ...?" This list was supplemented with two stylized questions: "At what time does

she get up in the morning?, and, "At what time does s/he go to bed in the evening?" Pilot results suggested that respondents had difficulty understanding the concepts used in the time allocation question framed in this manner.

The German Socio-Economic Panel (GSOEP) study also used a selective activity list to obtain time-use information on targeted market and non-market activities, Figure 6.2, including paid work, housework, child-rearing, DYI, education/learning, television/video and hobbies (Merz and Rauberger, 1993).

Merz and Rauberger (1993) report data for six waves of the panel. In general, based on the first wave response, the response rates in any activity were about 100 per cent. However, this was not the case for all activities. Male responses to housework and both male and female responses to DIY and hobbies were about 50 to 60 per cent. While the data based on this approach exhibit reasonable stability across waves, suggesting the question is a somewhat reliable measure, in the absence of evaluation of the data against other benchmarks or other validity testing it is not possible to evaluate the efficacy of the approach. In the absence of information to the contrary, however, one can expect that it is subject to identified problems inherent in stylized questions.

Figure 6.2

Example of a Stylized Questionnaire

- What does your actual day look like?
- How many hours per day do you spend usually upon the following activities?

Note: Please answer separately for weekdays —that means Monday to Friday, and Saturday/Sundays.

Activities	Monday-Friday	Saturday/Sunday
Housework and related errands		
Child care		
Occupation (time should include travel to work and secondary work)		
Training/Education		
Handiwork/repairs in the home and car		
Gardenwork		
Television/video		
Hobbies and other freetime activities		

Source: Merz, J. & Rauberger, T. K. (1994).

Stylized questionnaires are highly dependent on the interpretations put on the terminology used regardless of their level of sophistication. In one study Khan et al. argued that respondents had difficulty responding to questions seeking data such as 'main activity', 'secondary activity', 'earning', 'work', etc., thus creating a strong chance for misrepresentation (Khan, et al., 1992). In order to properly capture activity rates through the stylized—they call it key word—approach Dixon-Mueller and Anker (1988) found, in a pilot study in India, that three keyword questions were needed. They were, essentially:

1. What was your main activity?
2. What was your next most important activity?
3. Apart from those activities have you worked in the past season *for earnings*?

With these three questions it is possible to estimate activity rates with respect to both the market-oriented labour force and the new-standard labour force (Dixon-Mueller and Anker, 1988). However, the questions give no indication of the intensity of effort and thus provide no basis for developing production estimates. Additionally, Dixon-Mueller and Anker suggested that a broader labour force definition would require more key words. Thus attempts to capture market and non-market activity would require a broad range of keywords.

Stylized surveys present a clear problem when one is studying a non-time-conscious population. Asking people to evaluate in minutes and hours when they do not routinely consider such dimensions is fated to produce questionable results. This reality surfaced in a pilot time-use study in India. The pilot study in Jasapura, a small agricultural village in the District of Baroada, entailed a time-use survey of 25 households out of a total of 150 (Gunawardena, 1993). It was found that the majority of the respondents had no clocks, radios or watches and thus had no real sense of precise time. "They had no knowledge of duration of time for any activity, nor was there a need to be aware of time duration" (Gunawardena, 1993, p. 2).

In isolated rural areas in the Dominican Republic, where illiteracy is prevalent, time is widely considered an attribute of nature (i.e., position of the sun, when the cock crows, growing seasons, etc.) rather than an astronomical or mathematical division of seconds, minutes, hours, days, and weeks. For instance, people in the mountain areas have the notion that they usually wake-up at 6 o'clock in the morning, the time when the sun rises. Actual observation confirmed that they do wake up just before the sun shows up, which is around 8 o'clock in the morning, two hours later than what they reported. The sun shows up later due to high mountain ranges that surround the village (INSTRAW, 1993).

One approach for circumventing such a problem is described by Khan et al. (1992). For each subject activity respondents were asked to indicate one of five choices as to amount of time the activity took: small amount (59); less than half a day (164); about half a day (227); more than half a day (299); and full day (447). The time values—indicated by the (minutes) in brackets—were then assigned to permit estimation of time allocations.

Activity log

An activity log focuses on a particular type of behaviour. Such devices are frequently used in media, travel and shopping studies. Respondents are asked to record all occurrences of a particular activity (i.e., paid work, housework shopping, TV viewing, or travel) during some specified period ranging from a single day to a week, month or longer. And, generally, they are asked to provide selected information relating to the occurrence of the targeted activities.

It will be argued that the most appropriate approach for valuing unpaid work is the output approach. Thus it is not sufficient to capture only the time input to an activity; one also needs to know other inputs and the output of the activity. One main household task that lends itself to such measurement is food preparation. A log designed to capture food preparation details can

provide the detail necessary for valuing the activity. The food preparation log, Figure 6.3, above, provides an example relevant to the measurement and valuation of unpaid work.

Figure 6.3

Food Preparation Log

During the next three days, each time you prepare any food, or get or fix a drink please provide the following information:

Time Started _____
Time Ended _____

Purpose:
_____ morning meal
_____ midday meal
_____ evening meal
_____ snack
_____ box--take away--lunch
_____ storage, future use
_____ special event (i.e. holiday celebration)
_____ to give to others
_____ recreation
_____ other (please specify) _____

For how many people? _____
What were you preparing? _____
_____

What were the main ingredients?

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

What is the estimated value of the ingredients? _____
What was the main cooking method? _____
What appliances were used:

_____ _____
_____ _____

Comments: _____
_____
_____

With information from such a log it is possible to estimate the value of the food prepared and the cost of the intermediate inputs for various types of food preparation. This data can then be used in conjunction with diary data on food preparation to develop an aggregate value of food prepared at home.

Similar logs can be developed for other basic household activities such as child care, home repairs and renovations, yard work, etc.

It is possible to have such logs completed over a fixed period of time ranging from a day to several weeks. However, it would also be possible to implement such logs in conjunction with a time-use study. A procedure could be used to administer such a log each time a rarely occurring activity like home renovations occurred, or randomly, in the case of frequently occurring activities such as food preparation, where one would want to reduce both respondent and processing burden. In the case of meal preparation, as illustrated in Figure 6.1 above, there were over 11,000 episodes of meal preparation recorded for the approximately 9,000 respondents to the Canadian time-use study. Possibly half that number, or even less, would be sufficient to develop the necessary output estimates.

Drawing on Norwegian experience from analysis of shopping activities, Grønmo and Harvey (1982) examine the strengths and weaknesses of the relative merits of two special purpose trip-diaries or logs and time-diaries which record all activities undertaken in a given time period and suggest how they may best be used.

Stylized time-activity matrix

An activity matrix is closely related to the activity list, with an important difference and an important advantage; it is exhaustive. It constrains the data recorded to exhaust all activities and time in a fixed reference period. This implies that the activity list is a closed set with a category into which any behaviour can be placed. It also implies that all time in the reference period can be accounted for in terms of the identified activity categories. Assuming that the period of the matrix is one day (24 hours), a respondent would be asked to report for an exhaustive set of activity categories the amount of time allocated to each. This procedure thus constrains the total time allocated to add to 24 hours. Thus, by design, it requires greater attention to detail and presumably greater accuracy. An example of such an approach is offered in the Danish Time and Consumption Project Survey in 1988, Figure 6.4. Respondents were asked to answer separately for "normal week days" and "at weekends (Saturdays and Sundays together)". This is an exhaustive approach, since it is designed to capture all activity undertaken in the target periods.

An alternative time-activity matrix used in a German Study, while failing to offer the richness of a full time diary, can provide the typically used basic time-use measures (Harvey, Elliott and Stone, 1977), Figure 6.5. Respondents were asked to check off those activities that they had undertaken in each one-hour time slot.

Figure 6.4

Stylized Time-activity Matrix

1. To start with we should like to ask you to split the day's 24 hours into certain broad task categories. Indicate how many hours you think you typically use on the following:

	1.1 On normal week days	1.2 At weekends (Saturdays and Sundays together)
A. *Paid gainful employment*, including any overtime and secondary jobs, transport to and from work.	_____	_____
B. *Education* (including vocational training/school education - including transport to and from place of study).	_____	_____
C. Eating, sleep, personal hygiene, rest, everything that one could call *essential personal needs*.	_____	_____
D. *Domestic work*, shopping, cooking, cleaning, childcare, gardening, assisting others with similar domestic duties.	_____	_____
E. *Maintenance and repair* of home, including vehicle, together with sewing and knitting of clothes, curtains, etc. - everything that one could call do-it-yourself.	_____	_____
F. *Leisure* (time available when all other duties named above have been performed).	_____	_____
Total	24 hours	48 Hours

Source: Körmendi (1990).

Figure 6.5

Time Activity Matrix

Town: _____
Area where you live (X/Y/Z): _____
Interviewer Number: _____
Activities in Last Work Day _____
Date of the last work day: _____

Code Number | | | | | | | | |

(Mention Secondary Activities)

	Meal prep., cooking, washing dishes	Laundry, ironing, cleaning, sewing	Child care, playing, school work	Shopping / Errands			Paid work, inc. travel to and from	Reading, TV, radio	Eating, family recreation	Visitors to your home	Sleep, personal care	Visiting	Social visits with friends out of home	Cinema, concert, church, lecture	Walk	Family outings	Sport	Other hobbies
				In community	In town centre	In town												
Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5-6																		
6-7																		
7-8																		
8-9																		
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17-18																		
18-19																		
19-20																		
20-21																		
21-22																		
22-23																		
23-24																		
0-1																		

Time diary

The tool of preference for capturing behaviour is the time diary. A time diary captures in succession, with starting and ending times, all activities engaged in by the subject over some fixed period, typically 24 or 48 hours. The time diary is an exhaustive data-collection approach, capturing all activities within the target period. Typically, time diaries allow for the continuous description of behaviour in the vernacular of the respondent, thus leaving interpretation until at least the data-entry stage.

Time diary surveys are an important tool or technique to capture data on patterns and types of activities undertaken. They provide extensive and intensive information about time spent on activities, simultaneous activities, sequences of activity, patterns of association among various categories of people, and the location of activities. The delimitation of the study to the 24 hours means a sensitivity to exploring changes: time removed from one activity is necessarily transferred to some other activities. Selective approaches do not provide this possibility. A sample open interval diary is presented in Figure 6.6. This is known as an activity-based diary, since the time is registered in terms of the beginning and ending of each activity rather than pre-registered in terms of given time blocks, for example of 10, 15 or 30 minutes.

Population-based Time-use Studies

Early work on general population-based time budgets, prior to World War II, included pioneering work by the Soviet economist Stanislav Strumilin, work by the Bureau of Home Economics of the U.S. Department of Agriculture, and work by Sorokin and Berger in the United States. Notable work done after World War II includes studies by G.A. Prudensky in the Soviet Union, a 1960-61 study by the Japanese Radio and Television Culture Research Institute based on 170,000 "yesterday interviews", time-budget data collected as part of the 1963 Hungarian micro-census, and the Multinational Time-use Project (Szalai, 1972).

The Multinational Comparative Time Budget Research Project, sponsored by the Vienna Centre, was undertaken with three aims in view. Briefly, these aims were:

1. To study and to compare in different countries, in a concrete and systematic manner, the changes taking place in the nature and the distribution of the daily activities subjected in varying degrees to the influences and consequences of urbanization and industrialization in industrial agglomerations and their more or less immediate surrounding;
2. To develop methods of collecting and evaluating time-budget data which, apart from their theoretical interest, are of considerable practical importance for the organization of urban life and industrial work and for the creation of more satisfactory conditions for the use of free time and leisure; and
3. To promote cooperation, standardization of research techniques, and the exchange of quantitative data at an international level among investigators in the field of time-budget research who endeavour to achieve comparable results with a view to evaluating them in common.

Figure 6.6

Sample Time Diary

What were you doing?	Time Started	Time Ended	What else were you doing?	Where?	With whom?

Developed countries

Most of the well-documented studies on time-use techniques come from the developed regions of the world where the methods have the longest traditions, most molded by the Multinational Time-use Project, and are increasingly becoming an important data-gathering technique. Until the 1970s, time-use surveys were primarily carried out by academic researchers. In the last two decades, however, time-use techniques have gained wider recognition and application at the national level. Since the 1970s major studies have been conducted by national statistics authorities in Europe and elsewhere. Research materials have grown from samples of a few hundred to samples of thousands, representative of the major part of the population. Some developed countries with recent time-use studies include Australia (1992), Austria (1992), Canada (1992), Finland (1987/1988), France (1985/1986), Germany (1991/1992), New Zealand (1990/1991), Norway (1990/1991), Sweden (1990/1991), and Japan (1990) and (1991). In most of these countries the studies are being used to develop time estimates of unpaid/household work. Several European counties, including Austria, Bulgaria, Denmark, Finland, Hungary, Norway, France and Poland have replicated studies since the 1970s, and further modifications and refinements of methodologies have been undertaken to fully adapt the materials to the objectives of the study and the socio-economic structure of the population.

In New Zealand, following a wide recognition of the importance and the extent of women's unpaid work in the household and the voluntary sector, the women's machinery (i.e., the Ministry of Women's Affairs), in close collaboration with the Department of Statistics, designed a pilot time-use survey in 1990. The pilot survey carried out by the Department of Statistics was chiefly concerned with testing the feasibility of conducting a time-use survey involving a representative sample of the total population. The pilot survey confirmed the success of the methodology applied and extracted information that demonstrates a clear gender split in domestic activities. From the information collected, three main categories were closely analysed: unpaid work in the household, unpaid work in the community, and leisure activities. Preliminary results claimed that as well as measuring production within the household and the voluntary sector, time-use surveys provide other valuable information such as: child care arrangements and arrangements for caring for other dependants, for example, the dependent elderly; who does what work; variables affecting labour force participation; changing patterns of work hours; how leisure time is spent; how other discretionary time is used; how unemployed people use their time. Further-more, results suggested that time-use surveys give planners and policy makers a clearer picture of the interactions of the formal and informal activities and the relationships between households, the markets and government activity—or paid work vs. unpaid work. Based on the successful results of the pilot survey, a larger-scale survey that is more representative of the total population is anticipated. From then on the survey will be conducted at five-year intervals and valuations of unpaid work will be published as a supplement to the National Accounts if possible.

Hungary has a long tradition of time-use studies, with national studies in 1964, 1976/77, 1986/87, and 1993. Sample sizes over the last three surveys have grown from 6,946 (3,192 Males and 3,753 Females) in 1976/77 to 11,290 (4,339 M and 6,951 F) in 1993. Age ranges

on the sample have varied with each study. In 1993 the survey covered the population 18-79. In earlier years the lower age was 15 years. In the 1986/87 study each respondent provided diaries for four days, yielding a total of 36,490 diaries.

Over the period the depth of coding has grown from 25 activities, with four work-related and nine domestic work codes, to a scheme with 150 paid work-related codes and 142 domestic activity codes.

Developing countries

Very few time-use surveys have been conducted at the national level in developing countries.

India

Among the more statistically advanced developing countries, India has carried out a time-use survey with a sample that is representative of a relatively large part of the population. The survey results yielded important insights into women's work, particularly in the informal sector. A comparison of the estimates of women's economic activities derived from intensive time-use methods with those of the national sample survey using conventional methods has demonstrated interesting results, indicating the need for further investigation of the varying degrees of work and responsibilities between women and men. A recommendation was forwarded by the National Committee on Women's Work and Employment in India for time-use surveys to be designed and carried out based on a larger, more representative sample of the total population.

Bangladesh

Hamid briefly discusses a number of time allocation studies undertaken in Bangladesh (Hamid, 1989, pp. 18-19). Among those she discusses are the following. Mead Cain has used time allocation studies to explore both the economic activities of children (1977) and women's role in the rural economy (1979). Barket-e-Khuda (1982) studied the allocation of time (14 hour day) by age and sex for different land-holding groups. Farouk (1975) explored the allocation of 24 hours from the perspective of development economics and time scarcity. In 1980 Farouk explored the time allocation of women in rural areas. Protima P. Majumdar (1986) studied the time allocation of working and non-working women in urban Dahaka. Work by Rosie Majid Ahsan and others (1986) used an observation approach to explore the time use of women in agriculture.

More recently an extensive time-use survey, based on 30 villages throughout Bangladesh, was conducted during the period November 1991 to February 1992 (Hamid, 1993). The total sample selected consisted of 2653 persons 5 years and above. The sample was 53 per cent male and 47 per cent female and 34 per cent was children 5-9 years old. The survey collected recall data for the previous day. The data were supplemented by 24 hour observation for one adult household female, usually the wife of the household head. Activities which were coded at a very

disaggregated level were classified in 7 broad categories: (1) agriculture, (2) non-agriculture, (3) subsistence, (4) bazar, (5) study, (6) leisure, and (7) personal.

Nepal

Nepal has been the site of a number of time-use studies, typically using the observation approach. In 1976/77 time-use data were collected as part of a study on the status of women. The data were collected for 1,059 individuals in 192 households from 8 villages around Nepal. The study was conducted over a period of six months to a year, with visits to a household every other day allowing for 78 to 156 observations per person. The activity list consisted of 97 activities divided into 12 major categories. In 1984/85 a time-use component was included in the Multi-Purpose Household Budget Survey (MPHBS) undertaken by the Nepal Rastra Bank. The sample provides data for 5,323 households with data collected by recall. A stylized time-activity matrix form was used. In another Nepalese study, time-use data have been collected to study the effects of commercialization of farming on other activities. The data were collected for 24 randomly selected household from a total of 264 spread over 3 villages. Observations were made daily for one year, with approximately 63,000 observations recorded, of which 39,000 were for adults 15-59 years of age. Currently, a project "Women Development and Democracy" is in progress. Time-use data are being collected for a purposive sample of 420 households in 16 sites (5 urban and 11 rural) located in 15 districts, eight of which were in the Status of Women study. Time allocated to a detailed list of activities was recorded for one day (15 hours-5am to 8pm) for each household.

Tanzania

Several time allocation studies have been undertaken in Tanzania, primarily to explore issues related to the workload of women. However, some of the studies were more impressionistic than definitive, such as a joint study by the Tanzania Home Economics Association and the Tanzania Food and Nutrition Centre, which collected key-informant data on time spent on different activities (Rutahakana and Kisanga, 1987). The most rigorous study appears to be a study to describe the activity patterns and time allocation of women in Kikwawilla/Kapolo village during lean and post-harvest seasons (Lukmanji et al., 1993). This study used both observation and respondent recall methods to capture daily time allocations of 50 women who had children below 5 years of age. A major contribution of this study was the methodological evaluation of recall and observation approaches to time allocation measurement. Findings from the comparison are presented later in this report. The latest study, in the fall of 1992, was undertaken to explore time aspects of gender issues. It used a recall method requiring respondents to recall one or two days, depending on when they were interviewed (Muba, 1993). Activities were reported for 14 activities.

Venezuela

The only large scale population-based time-use study in Venezuela was conducted in November 1983 by the Ministerio de Estado para la Participación de la Mujer en el Desarrollo.

The study covered persons 18 years or older living in cities with a population of 100,000 or more. Interviews were completed in 960 households with 2655 persons, 1157 males and 1498 females. A one-day, 5:00 am to 4:59 am, yesterday interview was administered to each respondent. Results of the survey were published in a limited edition. Original data and a detailed methodology of the survey are not available.

Dominican Republic

Designed as part of the present project, INSTRAW, in collaboration with the National Statistics Office and the United Nations Population Fund (UNFPA) in the Dominican Republic, carried out a pilot time-use survey to test the applicability of a methodology developed to capture all the productive activities of women, men and children. The study included 100 households (300 individual cases from age 7 and above) divided between the rural and urban areas. Using time-constrained 24-hour diary with an accompanying one-page questionnaire on household characteristics, the survey was conducted for three weeks. An attempt was made to have all the days of the week equally represented in the survey. The survey was conducted in five different communities representing three different classes in urban areas (i.e., lower, middle, and upper class communities) and two agricultural areas (i.e., traditional agricultural farming areas, and a sugarcane plantation area).

The data-collection methodology involved a combination of activity recall and direct observation. Each interviewer was assigned two households each day which were visited alternately during the day. These alternate visits, with an average of 1 1/2 hour interval between the two households, involved recalls of the activities carried out the night before or during the time the interviewer was not around and a one-hour direct observation of the activities currently being undertaken by the respondents. This combination of activity recall and direct observation was found very effective in the rural areas, as it allowed the interviewers occasions to validate the accuracy of the people's concept of time and the quality of information being provided during direct observations. Additionally, short periods of direct observations relieved the respondents of long continuous hours of direct observation, as with some anthropological participatory approaches, which to a large extent compel the respondents to modify their activities for the day. In urban areas, however, direct observation seems to be extremely difficult, if not impossible, to apply. Activity recall at the end of the day seems to be the only acceptable approach, and the respondents had to be informed of the study ahead of time.

Activities were coded according to the major groups of activities developed by Szalai with minor modifications adapted to the local practices and traditions.

Observation Studies

Observation, is the major alternative approach used to measure how people use their time. The approach is frequently used to capture information in restricted settings (hospitals, classrooms, etc.) or for particular subgroup behaviour (students, children). However, its use for capturing data on time use for the general population has been somewhat circumscribed. Essentially, the use of observation to collect overall time-use information has been restricted to

settings and populations where self reporting, either through recall or diary keeping, is likely to produce highly questionable results; for example, in situations where respondents do not have a clear sense of time as one seeks to record it.

Continuous observation

Observation based time allocation studies have, as indicated, been widely used by anthropologists. Currently, some of these are being integrated into a series, *Cross-cultural Studies in Time Allocation*, edited by Allan Johnson and published by Human Relations Area Files Inc. The nine existing volumes cover the Peruvian Machiguenga Indians; the Venezuelan Yukpa; the Efe in Zaire; the Logoli (or Maragoli) of western Kenya; the Black Carib of southern Belize; the Samoan of ta'u village, Manu'a, in American Samoa; and the Brazilian 'Mekranoyi', a village of Kayapo-speaking Indians. Full data sets and documentation are currently available for nine studies. A variety of collection regimens were used across the studies, and the descriptions provided in the documentation yield considerable insight into the application of observation methodology.

Continuous observation entails an observer observing the respondent for a fixed period of time—hour, morning, day or longer—and recording each activity, with any sought contextual information, as it occurs. Continuous observation has been, typically, a key tool of ethnographers.

Direct continuous observation was used in a 1975-76 study of 97 households (291 observations) in Laguna, Philippines, in a study of time allocation to home production (King and Evenson, 1983). Resident researchers observed and recorded daily activities of household members for four twenty-four hour periods over a nine month survey. This data supplemented recall data for 376 households. A follow-up study in 1977 collected further time-use data by recall and observation. Messer used direct observation to study how mothers participating in agriculture, the cottage industry or trade, allocated time (Messer and Bloch, 1983). Observation served as the basis for time-allocation data in a study of the economic value of children in Java and Nepal (Nag, White, and Peet, 1977).

In a recent pilot study in India it was necessary to use direct observation due to the lack of time consciousness of the surveyed population (Gunawardena, 1993). However, it was found that direct observation was less than satisfactory for several reasons. It limited the survey, since the researcher could follow only one individual, thus constraining the number of days/or respondents. It was also believed that the presence of the observer interfered with accurate measurement (Gunawardena, 1993).

An observation study was carried out to explore the way of life in the Zambian village of Kefa, a village of 56 households, for 10 households selected at random (Skjonsberg, 1989). Only heads of households, seven couples and two single people, were observed over the period June 1977 to July 1978. Observation periods were randomly selected days, with an average observation period of 12.9 hours. Data reported for the study represented 498 days or 6424 hours of observation. The study collected, as relevant for each observation, information on what people did, for how long, what things they worked with, price paid if any, how they were acquired, for whom, with whom, who decided, and general remarks.

Prior to commencement of actual recording of observations in Kefa, a four-week trial

period provided an opportunity to refine what was to be collected. Observations were restricted to days when the subject spent most of his or her time in the village. Everything that people did was recorded. It was noted that the observers were not able to distinguish between time spent on cash crops and time spent on subsistence crops. While it would have been possible to do so for maize, the division of time allocated to groundnuts depended on need rather than the amount grown (Skjonsberg, 1989).

There do not appear to be any actual time-use studies reported for developed countries where observation has been used as the main vehicle for capturing time-use data. As part of the pilot work for a larger study, Ziegler and Michelson (1981) compared self reports of activities recorded on an open-interval time diary with data collected by observers covering the period for which diaries had been kept. The comparison was made for a period of approximately two to two and a half hours, usually in the evening. Some of the questions for which answers were sought in making the comparisons included the extent to which respondents (1) reported activities they did not do, or (2) did not report ones they did; whether incidents, or of over/under reporting were systematic; and finally the accuracy of conclusions drawn from self reports (Ziegler and Michelson, 1981). Their findings are discussed below when comparing observation and recall methodologies.

Messer and Bloch (1983) compare two approaches to collecting time-use data, spot vs. continuous observation. The authors present arguments for the observation approach from the work of Johnson (1975), Rogoff (1978), Minge-Kalman (1980) and Messer (1981). Arguments are made that spot observation overcomes impressionistic tendencies in participant and other non-random study approaches. It is also argued that random spot observation, with a high enough frequency, eliminates idiosyncratic variation which might be found in continuous approaches. However, Messer and Bloch argue that spots do not provide all of the information of more extended observations. Messer and Bloch found both methods of observation time-consuming. In their conclusion they argue that "spot observation can give accurate, 'thin descriptions' of how time is used...more detailed records provided by narrative observations of varying length ... are essential for going beyond this simple, though cross-culturally comparable schema of time use" (Messer and Bloch, 1983, p. 12).

Khan et al. (1992) indicate that studies they reviewed suggest observation can be useful where activities are unstructured and fractionated in very small time segments or where several activities are performed simultaneously and respondents cannot allocate their time disposition. Also they suggest that they can be helpful as a precursor to the development of tools and instruments for understanding the sequence in which activities are performed, or for evaluating time inputs into an activity simultaneously engaged in by several individuals (Khan et al., 1992). It is also argued that observation provides an opportunity for capturing a broader range of activity and social-interaction data than does recall (Messer and Bloch, 1983).

Rogoff (1978, cited in Bloch and Messer, 1983) argues that spot observations collected by a random method and with a high enough frequency eliminate possible bias from idiosyncratic variation which might occur with more intensive methods. Additionally, Rogoff argues, spot sampling, in many occasions, are less intrusive, and give standardized accurate information on people and activities at the moment of entry.

Continuous observation poses a number of problems as a data-collection tool. On one hand it makes extensive demands on both time and money resources; on the other, the presence of

an observer, unless there is sufficient opportunity for the presence of the observer to become relatively unobtrusive, may well alter behaviour. As one author suggested, this can be a problem even with spot observation, arguing that care has to be taken in the approach such that the reported activity is not "greeting anthropologist" (Scaglion, 1986).

Another problem of the observational approach is the truncated time period for which data can be collected, typically daylight or non-sleeping hours. Problems attendant with observation studies confined to daytime hours have been explored in a study among the Ableam people of Papua New Guinea (Scaglion, 1986). The village was familiar with the presence of an ethnographer and by custom villagers often visited at night, even when people were sleeping. The study suggested that by restricting observation times to daylight hours certain activities tended to be over-represented (gardening) and others under-represented (hunting, ritual, and visiting). Thus, Scaglion concludes that daytime-only observation studies may be subject to a selectivity bias, which will get reflected in any analyses done with such data. Bloch observed that in Senegal households engaged in cottage industry in her sample interruptions during the day for funerals and such social obligations led to transferring work far into the night (Messer and Bloch, 1983). Care must be taken not to lose such behaviour.

Other problems arise if locations are scattered and when specific seasonal activities are of interest (Leones, 1991, p.10). With random spot observation, persons will frequently not be found at an expected location and thus information is lost or their activities have to be captured by proxy. Also, in trying to keep to a schedule of random interview times there may be problems in predicting exact travel times.

Random observation

Alternatively, one can sample time and observe what the respondents are doing, along with all attendant information, at each time point sampled. Such sampling can take two forms, fixed-interval sampling or random-interval sampling. The popularity of random-time sampling for measuring population time use, typically known as the random spot check observations, is "currently one of the most popular techniques among anthropologists for collecting time-allocation data" (Leones, 1991, p. 9). Popularity dates from work by Johnson, who used this approach to study 13 households in a Machiguenga Community in the Amazon. The approach has been frequently and widely used and has received considerable support in methodological evaluations (Messer and Bloch, 1983; Altmann, 1974).

A key concern of the observational approach is the establishment of an appropriate sampling routine. The efficacy of 'spot sampling/observation' is given strong support by Altmann (1974), who in an excellent overview of observational sampling argues that instantaneous sampling readily provides data appropriate to estimating per cent of time spent in various activities. Leones (1991) observes, however, that great care must be taken to insure that the sample is representative of the study population. Sampling must be such that it captures a true cross-section of each respondent in each situation—location, time period, season—if it is to be generalizable.

The appropriate size of sample is a major concern in any sampling exercise: How large must the sample be to accurately represent the data sought? Thus, using random spot observation to measure time allocation, the objective is to obtain sufficient data points to accurately reflect

time allocations to the activities of interest. Bernard and Killworth provide some guidance on sample size as related to random spot observation (Bernard and Killworth, 1993). They report an exercise by Baksh (1990) in which, working with 4182 observations on men in 41 households using 12 activities and 9763 observations on women in 169 households using 15 activities, he attempted to identify an optimal sampling approach. Baksh did this by repeatedly sampling with ever smaller samples from his observations and comparing estimated times from the reduced samples with those derived from the full sample. Baksh (1990) concluded, after plotting the per cent sample size against the ranges of estimates of mean eating times, that a sample of about 150 observations was sufficient to estimate Embu women's time use (Bernard and Killworth, 1993). Bernard and Killworth, building on Baksh's exercise, undertook to develop an analytic solution to sample size estimation for spot observation and have developed formulae and tables that can be helpful in determining sample size (Bernard and Killworth, 1993).

Leones (1991) discusses an alternative to the random spot check approach, whereby one would sample activities rather than time. Thus one would monitor rice paddies, sweet potato fields, etc. However, as Leones points out, such data loses its randomness and presents problems in attempts to generalize it to larger groups or develop aggregate activity allocations.

Electronic Approaches to Time-use Data Collection

The emergence of miniaturized electronic devices over the past two decades has opened new horizons for the collection and processing of survey data. With the advent of electronic data devices the benefits were mainly reaped on the data entry and processing side. Due to their cumbersomeness and cost they did not offer any help on the collection side of the survey process. However, miniaturization, design and software developments have made it possible to reap benefits as early as the sampling stage in studies and in the interviewing stage.

Beeper studies

In 1975 Csikszentmihalyi initiated the "experience sampling method (ESM)" (Csikszentmihalyi and Larson, 1987). This facilitates electronically the possibility of collecting data similar to that which would be collected by random spot observation. When prompted by the beeper the respondent is asked to record specified objective and subjective information on what they were doing at the time the beeper sounded. Two methodological traditions that early reaped the benefits of this technology were time-use research and research measuring psychological reactions to everyday activities. Csikszentmihalyi and Larson (1987) explore the methodology, validity and reliability and discuss several aspects of the ESM approach. They argue that the ESM approach has proved viable and can be expected to be particularly useful in studying daily activity patterns. Among their findings are the following.

Procedurally, respondents receive a signalling device, which may range from a pager such as used by doctors to a programmed wrist watch. The device cues the respondents to report actions and/or thoughts at the time of the signal on a form with which they have been provided, designed to elicit the information sought. In the majority of studies reviewed respondents received 7 to 10 signals per day for 7 days (Csikszentmihalyi and Larson, 1987). At the outset

respondents are instructed on use of the device and the form. In a Chicago study, answers to "What were you doing?" were coded into 154 categories and then aggregated into 16 groups for most analyses. Coding reliability was high, with 88 per cent agreement between two coders at the 154 activity level and 96 per cent at the 16 group level (Csikszentmihalyi and Larson, 1987).

Reliability and validity checks appear to present very favourable results. It was observed that in comparison with time-diary data they seem to pick up more "idle time", something that is quite likely to be forgotten in a recall diary.

The device has been used across subgroups ranging in age from 10 to 85 and from low skilled through managerial level respondents. However, experience suggests a high level of non-response among the unskilled. Major causes of failure to respond to a beep include equipment malfunction, a left-behind beeper, and the nature of the activity or location at the time of the beep.

Computer Assisted Interviewing

Computers can be integrated into various interview situations, giving rise to a whole new set of acronyms. CAPI, indicates "Computer Assisted Personal Interviewing", where the interviewer conducts a personal interview from an interview schedule contained in a portable computer. CATI, indicates "Computer Assisted Telephone Interviewing", where the interviewer conducts the interview by telephone from a computerized interview schedule. Finally, CASI, "Computer Assisted Self Interviewing", eliminates the interviewer completely and the respondent completes a computerized interview schedule on their own at their own convenience.

Potentially, the use of computers can greatly increase the efficiency of the interviewing process. They can be programmed to guide the interviewer or respondent hierarchically through a maze of questions, continually carrying out edit checks and ultimately on completion of the interview produce a fully or nearly fully coded data set. This of course is the idyllic situation. However, while there is little doubt that computers can greatly facilitate data collection, to what extent and how is not yet fully clear. There are problems with any of the approaches.

One recent study explored the effectiveness of CATI, CASI and the normal "Paper and Pencil Interview" (PAPI) approaches for the collection of time-use data (Kalfs, 1993). As Kalfs indicates, a number of design parameters are associated with the choice of interviewing mode. These include the sampling procedure, questionnaire content, type of questions, pace of the interview, etc. and choices for each of these may differ depending on the interview mode selected. In exploring the validity of data generated by the several methods, she found different methods had different effects on the amount of time allocated to different activities. Thus the data-collection mode must be considered in the light of the particular data sought. A similar finding was made with respect to reliability. "High reliabilities were found for activities that are performed quite frequently on weekdays by certain respondents, and relatively low reliabilities were obtained for activities that occur relatively rarely on weekdays" (Kalfs, 1993, p. 159). This suggests that a different number of days need to be captured depending on the data sought. She suggests that for daily activities, a single day is sufficient. However, for rare activities she suggests that "it would be better to use a so-called 'stylized' or 'retrospective' questionnaire, rather than a diary" (Kalfs, 1993, p. 159). She concluded that PAPI achieved the highest

precision and reliability; however, each of the other approaches had other strengths. "Thus, none of the modes is best in all aspects" (Kalfs, 1993, p. 160).

Robinson (1992) reports success with computerised coding of time-diary data; however there are no reported studies on the efficacy of it.

Comparative Time-use Analysis and Methodology

Although shown to be feasible in the multinational time-use study undertaken in the mid 1960s, there have been very few attempts made to carry out international comparisons of time-use survey results, even for the surveys conducted in the ECE countries. The major efforts in comparative analysis have centered on work sponsored by the European Foundation for the Improvement of Living and Working Conditions under the direction of Jonathan Gershuny of the ESRC Research Centre on Micro-Social Change, University of Essex, using data deposited with the Multinational Longitudinal Time Budget Data Archive (MLTBA) at the University of Bath, and on comparative work undertaken by researchers at Statistics Finland and researchers in several other countries (Niemi et al., 1991a; Niemi et al., 1991b; Niemi and Anachkova, 1992).

Some comparative work has been undertaken in developing countries. About the earliest comparative study examined women's work load in some two dozen studies spanning developed market economies, centrally planned economies, and less developed economies using time-allocation data (Evenson, 1982). Leslie, Lycette and Buvinic (1986) used data from about 20 developing countries to examine the issue of women in health. An extensive effort was undertaken recently by the Statistical Division of the United Nations in compiling statistics and indicators on time-use of women and men in economic activity, unpaid housework, personal care, and free time, standardized to the extent possible from the published results of national and sub-national surveys taken between 1965 and 1986. The data presented show clearly the significant difference in the time allocation of women and men in selected activities (United Nations, 1991).

In all such comparisons the authors have noted problems stemming from the different time-use surveys carried out having applied different sampling methods, data-collection techniques, definition of concepts and tabulation systems. Further methodological comparative analysis is required to determine the possible commonalities of concepts and methods being applied, which would further lead to developing common measurement and imputation techniques to value the time expended on unpaid housework and related activities and greater security of comparison in efforts among countries.

Relatively little attention has been paid in the literature to standards for the collection of time-use data. Time-use measurement must not only satisfy standard survey practice but must address some additional special problems. An examination of methodological concerns by the International Association for Time-use Research has resulted in the preparation of guidelines, based on studies in developed countries, laying out acceptable methodological alternatives. The document suggests that within developed countries, differing methodological approaches can be expected to offer valid and reliable data. It notes, however, the almost urgent need to develop

an activity coding scheme sufficiently flexible and widely applicable to permit meaningful comparative analysis. That work needs to be expanded to encompass both the approaches and problems encountered in measuring activities in developing countries, and especially in agricultural areas. Using the experience and results of methodological and empirical works on time-use methodologies, more conclusive steps could be undertaken to design guidelines for reaching a common agreement on the most appropriate data-collection techniques and methods for imputing gender-specific values to unpaid work.

Standardization of data-collection techniques and commonality of measurements presupposes uniformity in the definition of concepts, classification systems and specific variables. As has been demonstrated by previous studies, a wide array of experiences, resources and facilities exist between and among countries, most particularly between the developed and developing countries. Moreover, mutual benefit and common agreements can only be derived from confronting the differences and similarities contained in completed studies and work in progress. Typically, initial analyses of time-use studies were carried out in a manner most appropriate to the socio-economic and cultural circumstance of each country, without concern for comparative analysis. Re-analysis of some existing time-use surveys could prove to be a cost-efficient way to provide some initial comparative information and guidance in developing new studies.

Stylized vs. diary collection of unpaid-work activity time

Cycle 7 of the Canadian General Social Survey collected data providing an opportunity to compare time-allocation data collected by means of a time diary with similar information collected by means of stylized questions. The diary, administered over the telephone, allowed respondents to report in sequence all of their primary activities for a selected day. It also asked for selected activities: "Last week did you spend any time doing housework, including cooking, cleaning, grocery shopping and laundry for your household? If yes: For how many hours?" A similar sequence was used for house maintenance and child care. Again, similar sequences were asked to elicit time allocated to individuals and households outside ones own: housework, house maintenance, babysitting, personal care assistance, transportation assistance, correspondence assistance, help with a business or a farm, and other volunteer work, other unpaid work. Paille (1994) recently completed an evaluation of the two collection approaches with mixed findings.

Based on the data presented by Paille for the total population and for women and men separately, the most notable differences were registered for child care activities where the stylized questions generated time allocations between two and a half and three and a half times larger than those based on the diary. However, this finding is not surprising given that the diaries did not collect secondary activities, which account for a considerable portion of child care (Harvey and Macdonald, 1976). The second notable observation in the data is that differences are consistent in sign by sex. Time allocations reported by stylized questions were higher for child care, house maintenance, and voluntary activities for both men and women. Housework reported by diaries was higher for both men and women. Perhaps most noteworthy is the fact that if all unpaid work activities, with the exception of child care, are considered

together, the time differences are in reality inconsequential. On the surface this finding would appear to be very good news to anyone attempting to collect data on time allocation to unpaid work. A few stylized questions and, bingo, the number appears. As for child care, it could be addressed separately. If the valuation approach chosen were based on either the 'opportunity cost criterion' or 'global replacement approach' the aggregated estimated time allocation to unpaid work would provide a reasonably adequate basis for the allocation. However, if a 'functional cost criterion' was used the resulting value could be quite distorted.

Paille, using the Canadian data, further examined differences in terms of education and age, finding that, between the stylized and diary estimates, the pattern of differences was inconsistent across various characteristics. For example, he found that according to the diary estimates, housework excluding shopping increases with age. However, a different pattern was indicated by the stylized questions (Paille, 1994).

Körmendi (1990) reports on a less direct comparison of stylized and diary time estimates using Danish data collected in the mid-1980s. She compared time allocations from the 1987 Danish time budget survey with data from stylized questions, noted above, on the 1988 'Time and Consumption' survey. In considering Körmendi's comparative analysis it must be noted that the Danish time budget survey deviates considerably from accepted practice by presenting a pre-classified list of activities, in at least one of which people must be engaged at any given moment. Differences in estimates were expected along three collection-related dimensions: seasonal differences, measuring differences and interpretation differences. In this respect the findings were not disappointing. Indeed, there were significant differences between the two approaches. Overall, unpaid work on a weekly basis was estimated in total about one-third higher using the stylized approach compared to the diary approach. For Canada, with child care included, the stylized estimate was about 20 per cent higher. Given the Canadian findings, one is led to suspect that separate treatment of child care on the Time and Consumption Survey might have resulted in findings more similar to Canada. However, close inspection of the Danish data shows only a 14 per cent discrepancy in the category that includes child care. The major discrepancy in the Danish data is in the area of DIY activities. The DIY estimates from stylized questions are roughly double the diary estimates on both weekdays and weekends. In reality, a major portion of the difference may be due to the fact noted by Körmendi that the maintenance and repair category was not explicitly defined in the time budget survey. This finding is consistent with Kalf's observation that diaries tend to be weaker than stylized questions in capturing infrequently occurring activities. Overall, Körmendi notes, the greatest deviations were apparent for weekdays. She also argues that although the two methods reveal systematic differences their structure is identical. In conclusion, Körmendi notes that in reality the two approaches may measure different things, with the pre-classified activities representing an essentially objective measure while the stylized questions represent a more subjective representation of time use.

Observation vs. time diary

Zeigler and Michelson (1981), comparing observation and time diary collection approaches, found no real instances of individuals reporting things they did not do. With respect to underreporting, they found that adult respondents reported only 41.4 per cent of the activities

reported by observers, but accurately accounted for 75 per cent of the time. By providing respondents with a checklist to review following completion of the diary the percentages of accurately reported activities and time increased to 55 and 80 per cent respectively.

Examination of observation and self reports indicated that there was high consistency for a number of activities and relatively low consistency for others. The researchers were interested in various levels of contact—direct, indirect, and available—between parents and children. Examination of times allocated to each of the three types by observers and time budgets found very strong correspondence both in terms of quantity and structure of time. Based on their comparison of the two approaches, Zeigler and Michelson concluded that while self-reports are inadequate in capturing the full flavour, texture and quality of time allocations they are quite effective for capturing people's time allocations to major activities, especially when the self-reports are supplemented with a check list. Table 6.1 shows the results based on recall only and recall aided by an activity checklist. It is clear that for some activities, i.e., eating, watching TV, the checklist makes little difference. For other activities, especially affective activities, the checklist greatly improves recall. After examining results for indications of a halo effect, the authors concluded that self-reports for the period of observation seemed neither richer nor poorer than the rest of their day (Zeigler and Michelson, 1981, p. 328).

Khan et al. (1992) report briefly on a comparison of time-use data collected by observation on a given day and then 'yesterday data' collected the following day. Their findings appear to parallel those of Zeigler and Michelson. They observed that considerable variance between the observation and self reported data, particularly for shorter duration activities. They claimed that a major problem "appeared to be their [the subjects] lack of time concept" (Khan et al., 1992, pp. 66-67). However, in light of the findings of Ziegler and Michelson, it would appear that the problem is endemic to the recall approach. Engle and Butz (1981), commenting on Michelson's work plus other studies comparing observation and recall, noted that what seems to be missed are "events of short duration, affectionate interaction with children, negative interactions with children, and passive activities" (Engle and Butz, 1981, p. 12).

The data presented in Table 6.2 casts some doubt on the efficiency of the random spot observation approach. It presents a comparison of the distribution of events such as would be collected via random spot observation and the distribution of time to the same activities. It can be seen that there are major discrepancies in terms of housework, child care and shopping, all key variables for the quantification of unpaid work. The lesson here is that event data *must* be supplemented with duration data if it is to be useful in valuation exercises.

Lukmanji et al. (1993) report a comparison undertaken in Tanzania of time allocations captured by observation with a stopwatch and time allocations reported by recall for the same day. They found that the total workday reported by recall of 354 minutes was significantly less than the 658 minutes reported by observation. Again, child-related tasks were frequently missed.

Three women were unable to recall anything they did, while others seemed to remember very little. Only cleaning the yard, getting water and cooking were reported by more than half of the respondents. The recall method used was not reported, but clearly there were serious problems either with the method or with the ability of women to recall activities undertaken yesterday.

TABLE 6.1
ACTIVITY REPORTING, WITH AND WITHOUT PROMPTING

	Unaided Recall %	Aided Recall %
Usually reported activities		
Eat with children	100	100
Talk with children-instructional	65	76
Talk with children-social	76	86
Playing games, giving instructions	60	70
Watching TV with children	85	90
Meal or food preparation	77	77
Clean-up after meals	81	81
Activities retrieved with check-list		
Joking with children	20	45
Listening to a child	0	31
Kissing, hugging, cuddling, etc.	10	44
Giving comfort, help, approval, etc.	3	39
Checking, keeping track of children	14	40
Disciplining children	5	37
Giving children orders	21	42
Expressing disapproval	10	35

Source: Zeigler and Michelson (1981).

TABLE 6.2
COMPARISON OF OBSERVATION AND TIME DISTRIBUTION
Canada, 1992

Label	Total Sample			20% Sample		
	% Distribution of Time	% Distribution of Event	Difference	% Distribution of Time	% Distribution of Event	Difference
Paid work	13.4	12.4	1.0	13.1	12.4	0.7
Housework	8.2	15.1	-6.8	8.2	14.8	-6.6
Childcare	9.9	5.8	4.1	9.8	5.8	4.0
Shopping	2.8	7.5	-4.7	2.8	7.6	-4.8
Personal	40.7	32.1	8.6	41.3	32.5	8.9
Education	2.2	2.6	-0.4	2.0	2.4	-0.4
Organizations	1.8	2.8	-1.1	1.6	2.7	-1.1
Attendance	5.7	7.1	-1.4	5.8	7.1	-1.3
Entertainment	3.8	3.9	-0.1	3.6	3.8	-0.2
Media	11.6	10.8	0.8	11.7	10.9	0.8

Engle and Butz (1981) identify and evaluate ten time-use studies undertaken in developing countries and rank them on 12 methodological issues. Their major focus is on studies related to children. They address four general issues of concern: reliability of the data (over time and inter-observer), validity of the data (recall/observation comparison, reasonableness of time estimates, time awareness of respondents, accuracy of proxy reports), method of coding time-use (justification for child age categories, work activity categories, using childtaking activities other than 'child care'; system of coding joint activities) and quality of coverage of the data (missing data/refusals, quality of time assessed) (Engle and Butz, 1981, p. 19). They then rate how the investigators handled each issue in terms of four criteria of adequacy: consideration or discussion of the issue, data collection to address the issue, analysis of data to address the issue, and methodological adjustment based on that analysis (Engle and Butz, 1981). They concluded that few issues had been adequately considered and that the lack of attention to methodological issues affects the value of results. More specifically, they conclude that "time-use data has not met the standards of other kinds of data collected in developing countries" (Engle and Butz, 1981, p.17).

A Comparative Analysis of Results

Acharya (1981) reviewed four time-use studies that have been undertaken in Nepal. Of the four studies reviewed the time-use data from GFCS (1992) was too limited in coverage and methodologically akin to the *Status of Women* study. Data from a recent study, Women Development and Democracy, were not available. A comparative analysis of the remaining two landmark studies on time-use, the *Status of Women* project (CEDA) and Multi-Purpose Household Budget Survey (MPHBS/NRB), was possible.

These two time-use data sets, collected in *two different years*, and for a *small* and a comparatively *large* population by using *two distinct methodologies*, are surprisingly consistent regarding the total hours of work for men and women (Table 6.3). In Nepal's rural areas women's total work load is more than 3 hours higher than those of men; women work about 9 to 11 hours per day, where men work from 7 to 8 hours.

However, average work hours distribution as between various groups of activities differ substantially between the two sets of data, probably reflecting the differences in the weights used, the locational differences in workload as between remote and non-remote areas, and the differing treatment of travel time. As described in the footnote to Table 6.3, in the MPHBS data national averages have been derived for men and women separately from the regional averages, using population proportions as weights. The figures in the case of the *Status of Women* data are simple averages for the eight villages covered. As women in the remote mountains and hills devote more time to labour force participation activities, the simple average would tend to overestimate such work input, given that a lower proportion of people live in these areas. Particularly, while only about 8.7 per cent of the population lives in the mountains, women's participation in regular labour force activities is quite high as compared to Hill or Tarai women. In simple averaging out, this will definitely pull up women's labour force participation rate computed as a population weighted average.

Further, there seems to be a problem in allocation of activities in each of the categories, market SNA, non-market SNA, and household maintenance. In the recall method, women and

men both are systematically reported to be devoting more time to domestic activities than what is recorded by observation, albeit for a different sample. MPHBS data give work load net of self-transportation time, while the data from *Status of Women* studies include travel time in the activities for which the travel was undertaken (Tables 6.3 - 6.6).

TABLE 6.3
COMPARISON OF WORK TIME ALLOCATION
IN RURAL HOUSEHOLDS FROM THE TWO DATA SETS
(15 yrs+ /in hours)

Activities	MPHB Survey[1]		Status of Women	
	Male	Female	Male	Female
1. Market SNA[2]	4.65	2.34	5.81	4.62
2. Non-market SNA[3]	1.34	2.23	0.91	2.16
3. Household maintenance[4]	1.94	5.58	0.79	4.03
Total Work Hours	7.93	10.15	7.51	10.81

Notes:
1. For deriving national average, 1981 Male/Female population distribution as between Mountains, Hills & Tarai have been used as weights. For Male the percentages are mountain 8.7, hills 47.0 and the Tarai 44.3. For Female the comparable percentages are 8.7; 48.4; 42.9.
2. Includes: Agriculture + production + trade and commence + services + construction. This category in MPHBS is approximately equal to conventional economic in Acharya and Bennett *Status of Women*, 1981.
3. Includes: Fuel, fodder collection and fetching water + house repair and construction + hunting and gathering + food processing.
4. Includes: Cooking + serving and cleaning dishes and pots + laundry and cleaning house + childcare + shopping and other domestic work.

Source: Acharya (1981).

TABLE 6.4
COMPARATIVE ANALYSIS OF WORK TIME ALLOCATION - MOUNTAINS
(In hours)

Activities	MPHBS		Status of Women					
			Pangma		Baragaun		Katarchi	
	Male	Female	Male	Female	Male	Female	Male	Female
1. Market SNA	4.70	3.57	4.47	3.64	6.40	4.99	6.33	5.80
2. Non-market SNA	1.80	2.43	1.58	1.38	1.11	3.20	0.80	1.17
3. Household maintenance	2.19	5.23	0.75	3.78	0.86	4.19	0.52	1.49
4. Volunteer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. Personal development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Work Burden	8.69	11.23	6.80	8.80	8.37	12.38	7.65	8.46

Source: Nepal Rastra Bank (1988); Acharya & Bennett (1981).

TABLE 6.6
COMPARATIVE ANALYSIS OF WORK TIME ALLOCATION - TARAI
(In hours)

Activities	MPHBS		Status of Women			
			Sukraware		Sirsia	
	Male	Female	Male	Female	Male	Female
1. Market SNA	5.10	1.70	7.84	3.39	5.93	2.36
2. Non-market SNA	0.95	1.86	1.75	2.51	0.47	2.02
3. Household maintenance	1.79	5.84	0.46	4.71	0.52	5.60
4. Volunteer	N/A	N/A	N/A	N/A	N/A	N/A
5. Personal development	N/A	N/A	N/A	N/A	N/A	N/A
Total Work Burden	7.84	9.40	10.05	10.61	6.92	9.98

Source: NRB, MPHBS, 1988, p. 141; Acharya & Bennett, 1981; Tables 3.6, 3.7, 3.11

TABLE 6.5
COMPARATIVE ANALYSIS OF WORK TIME ALLOCATION - HILLS
(In hours)

Activities	MPHBS		Status of Women					
			Bakundole		Butu		Thabang	
	Male	Female	Male	Female	Male	Female	Male	Female
1. Market SNA	4.21	2.68	6.38	5.51	6.40	4.99	6.33	5.80
	1.61	2.54	0.84	1.71	1.11	3.20	0.80	1.17
2. Non-market SNA	2.07	5.39	0.93	5.28	0.86	4.19	0.52	1.49
3. Household maintenance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4. Volunteer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. Personal development								
Total Work Burden	7.89	10.61	8.15	12.50	6.21	9.33	7.65	8.46

From this analysis, one is tempted to conclude that, in spite of the apprehensions about the rural population's non-time consciousness, the time-use data may be more accurate than many other kinds of statistics conventionally collected in developing countries. With careful attention to where to include what activity, a more consistent picture may emerge even as to the distribution of time among various categories of activities. The results need to be evaluated further.

Evaluation of Data-collection Approaches

Alternative approaches to data collection should be examined in terms of what they require and what they produce. These have been denoted input criteria and output criteria respectively (Harvey and Macdonald, 1976). Input criteria relate to what is required from the researcher and the respondents, while the output criteria represent the prospective return. Four input and four output criteria have been identified (Harvey and Macdonald, 1976). The input criteria are (l) respondent cooperation, (2) respondent knowledge, (3) cost in terms of time and money, and (4) processability. The output criteria are (l) validity, (2) reliability, (3) usability, and (4) flexibility.

A slightly different set of criteria was utilized by Lingsom in examining the advantages and disadvantages of alternative time-diary techniques in terms of (l) consequences for data, (2) interview situation, (3) non-response rate, (4) data-collection costs, (5) data processing, and (6) comparability with earlier studies (Lingsom, 1979). In fact these criteria closely parallel the foregoing. Her concern with the consequences for data parallels the output criteria outlined above. Concern with the interview situation and non-response rate parallel the criteria related to respondent knowledge and cooperation. The cost and data-processing criteria of the two frameworks are essentially the same. Because of the interest prompting Lingsom's work, comparability with other work was also deemed an important criterion. Often findings only take on meaning in relation to parallel observations. If related observations cannot be compared, an important dimension is missing.

Figure 6.7 presents a subjective evaluation of the several data-collection approaches discussed in this report. The evaluations are based on knowledge derived from experience and the literature, much of which has been discussed above. The evaluations, following Harvey and Mcdonald (1976), examine the data-collection approaches in terms of input and output criteria. There is no finite standard against which survey and attribute can be judged. The designations running from low to very high (+, as would be expected, simply designates that the characteristic is slightly more favourable than would be portrayed in its absence) are meant to portray the relative strengths and weaknesses of the various approaches.

In general, in terms of output criteria, approaches that depend on unaided and unconstrained recall are scored low. In contrast, approaches that require the respondent to complete a diary, log or activity matrix over the period they are reporting for and those that constrain the respondent, forcing them to account for all activity in sequence, are relatively highly rated.

Figure 6.7

Subjective Evaluation of Activity Collection Methodologies

Input Criteria

	Respondent Cooperation	Respondent Knowledge	Cost	Processability
Unconstrained				
Stylized questions	Medium-High	Variable	Medium	Medium
Activity list	Medium-High	Variable	Medium	Medium
Activity log	Medium	Medium	Medium	Medium
Constrained				
Interviewer Administered				
Activity matrix	Medium	Medium	Medium +	Medium +
Recall diary	High	Medium	High	Low-Médium
Respondent Completed				
Tomorrow Diary	Medium	High	Low-Medium	Low-Medium
Observation				
Continuous	Low-medium	N/A	Very High	Medium
Random Spot	Medium	N/A	High	Medium

Output Criteria

	Validity	Reliability	Usability	Flexibility
Unconstrained				
Stylized questions	Low	Low	Medium +	Low
Activity list	Low	Low	Medium +	Low
Activity log	High	High	High	Medium
Constrained				
Interviewer Administered				
Activity matrix	Medium +	Medium +	Medium +	Medium +
Stylized Questions	Medium +	Medium +	High	Medium
Recall diary	Medium	Medium	High	Very High
Respondent Completed				
Activity matrix	High	High	High	Medium +
Tomorrow Diary	High	High	Medium	Very High
Observation				
Continuous	Medium +	Medium +	Medium +	Very High
Random Spot	Very low	Medium	Medium	High

Special Problems and Needs

Simultaneous activities

Frequently individuals are doing more than one activity at a time. Such multiple activities are documented by most time-use studies. The 1981 Canadian time-use study captured up to four simultaneous activities at one time, although typically data collection has been limited to two simultaneous activities. The existence and nature of simultaneity in household production has been studied in some detail by Varjonen (1991). She has documented simultaneity across a broad range of household production tasks. She found that farm wives had daily, on the average 2.25 activity processes in progress simultaneously (Varjonen, 1991, p.128). Similarly, Williams (1988), in reporting data on the time budgets derived by observation of a small number of rural women in Nigeria, showed overlapping time of 3.96 hours for her sample in Anambra state, one of four states sampled. This appears to correspond to diary studies capturing both primary and secondary activities where the combined times frequently add 3 or 4 hours to the day.

Simultaneity has implications both for data collection and for the measurement and valuation of productive activity. Data collection must be designed to allow for the capture of simultaneous activity. A particularly significant activity in terms of simultaneity is child care (Harvey and Macdonald, 1976; Varjonen, 1991). Much child care time is spent tending children while carrying out other activities. Varjonen concluded "that the amount of simultaneity is so great that it should be taken into account in calculating the value of household work" (Varjonen, 1991, p.138). Thus, valuation procedures must allow for the appropriate valuation of simultaneously created household outputs.

Such simultaneity is not uncommon even in market production, where two or more products produced simultaneously are known as "joint production" (1993 SNA, 5.43, p. 118). Secondary activities are clearly recognized by the SNA, and it is observed that "most producer units produce at least some secondary products (1993 SNA, 5.8, p. 114). According to the SNA, joint products (by-products) "are often treated in the same way as secondary products in the input-output framework (1993 SNA, 15.19, p. 345).

Temporal variation

Time-use measurement in the agricultural sector is both important and difficult. A wide array of activities, crops, seasonal patterns, relevant non-regular events (e.g., droughts) and other factors greatly exacerbate many of the usual data-collection problems encountered. Because of such problems, it is particularly crucial to identify, test and evaluate innovative data-collection methodologies in this sector. At the same time, it will be important to ensure that any data collected is sufficiently consistent with data collected in other sectors to ensure that proper accounting and analysis can feasibly be carried out. Both Messer (in Mexico) and Bloch (in Senegal) found great temporal variation across observations (Messer and Bloch, 1983). Messer, with extensive observation, notes and briefly discusses great variation in activity within weekly, seasonal and ceremonial cycles, a rhythm also noted by Bloch with spot observation. These findings highlight the importance of sampling design taking significant societal rhythms into account.

Length of time interval

The Netherlands, Norway, Switzerland and the U.K. have used 15-minute blocks in their most recent studies while Finland used 10 minutes. Canada and the United States have used an open format. Lingsom (1979), in her study of alternative time-diary techniques, concluded that there was no substantive reason to choose between open and fixed-interval diaries. She believed that either would have adequately provided the general time-budget information sought. After testing the two methods in a pilot study in 1979, it was concluded that fixed-interval diaries were the preferred alternative based on the fact that the diaries were to be self-completed by the respondent (Lingsom, 1980). While the fixed-interval diaries resulted in fewer activities, and while open diaries were deemed to be better for general analysis purposes, it was concluded that open diaries were not better enough to offset the administration advantages of the fixed-interval diaries. An important factor in this decision appears to have been the belief that educational attainment affects open-ended diary quality. In the 1986 Canadian study, after pilot testing both open and fixed-interval diaries to determine if interview time could be saved with fixed-interval diaries, the conclusion was to use an open-interval diary since there was no significant time saving. Recent work has suggested that open-interval diaries may be more appropriate for yesterday studies and fixed-interval diaries more appropriate for tomorrow (self-completed) diaries. On the basis of the evidence, there would appear to be reason to conclude that valid and useful comparisons can be made between data sets using alternative methods (Andorka, Harcsa and Niemi, 1983; and Harvey and Gronmo, 1984). Choice of an open- or fixed-interval diary has implications for the first level unit of analysis. If an open diary format is used, the activity episode, be it 5 minutes or 2 hours, is the unit of analysis. However, if fixed intervals are used the time slot becomes the unit of analysis. Each, of course, can be converted into the other, but this process involes time, money and quality costs. While the work of Lingsom and Niemi suggests little difference between the open format and the fixed interval format, an analysis of open-interval data from the 1971 Halifax Study suggests there may be hidden problems. In that study 26 per cent of all episodes were 10 minutes or less (Harvey, Elliott and Stone, 1977). More important, the time slice may have differential effect on activities. In the Halifax study, most child assistance activities had a duration of less than 5 minutes. These may well be lost with a fixed-interval diary. However, most activities of 5 minutes or less were personal care episodes (Harvey, Elliott and Stone, 1977). Thus, it may make little difference at an aggregate level which approach is used, but any low level analysis must bear in mind the possible effects of the different methods. This is supported by the observation that United States methodology studies suggest that for short-time activities the open format is more reliable (Keller et al., 1982).

Factors in data quality

Early work based on the DOMA study in Halifax, Canada, indicated a number of correlates between interview-related factors and quality of diary response measured in terms of the number of episodes reported by respondents. Significantly more total episodes and more discrete episodes (different activities) were reported where the interviewers indicated that (1)

respondents had taken care in completing the diary, (2) respondents showed great interest in the survey, and (3) it was easy to get the respondent to be interviewed (Harvey, Elliott and Stone, 1977). Additionally, it was found that the more frequently respondents made entries in the diary, the greater the number of entries. If the diaries appeared to be filled out in one sitting the mean number of episodes was 23.3; however, if respondents recorded activities in the diary four or more times, the mean rose to 33.5 activities per diary (Harvey, Elliott and Stone, 1977).

Roveri, based on experience in the Italian survey, suggests that using household diaries may be an indirect means to obtaining lower non-response rates (Roveri, 1992). Her argument is that household members lend encouragement to each other. This runs against the view held by some researchers that it is more difficult to get all members of the household. The importance of getting multiple diaries, however, is suggested by Messer and Bloch (1983), who observe that in households with many children, particularly older girls, women's tasks become more cash-oriented and supervisory as girls take over household and child care duties. Household diaries may well be needed to capture, and are certainly needed to model, such behaviour. Further research on the effects of multiple diaries per household would be helpful.

For whom

For whom activities are undertaken is important in the development of time accounts reflecting productive activity. Although with whom activities were carried out has been widely collected since at least the execution of the Multinational Time-use Study (Szalai, 1972) in the mid 1960s, only recently have researchers developed any experience with 'for whom'. It is important to gain some insights into the feasibility of collecting 'for whom' data and of its meaningfulness, since there has been some unease among time-use researchers about the efficacy of 'with whom' data as a result of difficulties in clearly delineating its meaning and ensuring coincidence between the understandings of those who report and those who interpret the data.

German experience in pretesting 'for whom' appeared to be positive, at least in terms of voluntary work activities since, it is argued, these seemed to be consciously perceived and preformed as such (Blanke and Schafer, 1992). Activities 'for own household' also appeared not to present problems during the data-capture stage in the German pretest. What did appear to present problems was moral support and information sharing, since "activities in the emotional and informative sphere, however, often are no longer consciously perceived by the respondents among everyday activities." (Blanke and Schafer, 1992, p. 348)

Experience suggests, however, that the 'for whom' question or designation should be limited to activities to which it is relevant and which will provide data needed at the analysis level. It makes sense to ask 'for whom did you bake a cake?' but little sense to ask 'for whom did you watch TV?' Thus, 'for whom' information should be sought only for those activities which would be considered productive and could reasonably be expected to have been carried out for someone else.

In order to obtain the information necessary to classify activities and labour in accordance with the proposed classification-system data the following categories, minimally, should be captured.

'For Whom' Coding

1. Self
2. Other household members, including those not currently resident at home
3. Employer\paid job
4. Self employment\household business
5. Other individuals, households or the community

The indicated responses will serve both to locate the activity in the activity classifica system and the individual in the labour classification system.

Chapter 7
Expanding the SNA: Directions and Benefits

This chapter presents the recommendations arising from the case study investigation into the valuation of unpaid (non-market) work. Following the recommendations, attention is given to the broad range of policy areas for which an improved information base would be provided if progress is made in the collection of time-use data and in the development of a more regular estimation of non-market production.

Recommendations

An internationally acceptable SNA Satellite Household Sector Account should be established. In the absence of this there is an incomplete information base for the formulation of meaningful policy across a wide range of policy areas related to key areas such as economic development, education and women's issues. The expressed needs and the demonstrated feasibility of developing on an ad hoc basis a more accurate picture of the productive economy justify the allocation of greater effort to bring about techniques and procedures to improve the estimates and to streamline the process, raising it to a level that will allow, as do current estimates of GDP and GNP, continual monitoring of the productive landscape. Progress must be made on two fronts.

The Household Satellite Account should include all activities associated with the maintenance and upkeep of households and families, all activities related to gaining an education, and volunteering. Meal preparation, household work inside and out, shopping, household management, and all associated tasks should be counted in the satellite account. Additionally, personal development activities—education—should also be included.

An output-based approach to valuing non-market production needs to be developed. The existing literature clearly shows the shortcomings of the existing input-based measures and argues for an output-based approach. Estimates of value for certain activities will always be input-based, as is the case in current estimates incorporated in GDP and GNP. However, for many activities it will be possible to move toward greater use of, and dependence on, output-based valuations. Continued research must explore the appropriate approaches for quantifying each activity.

Steps must be taken to develop accurate and efficient time-use data-collection approaches. This means experimenting with instrument-design and collection approaches. A review of the literature clearly demonstrates that it is possible to obtain time-use data applicable to the estimation of non-market production. To date all meaningful estimates of non-market

output have been developed through the use of time-use data. There is no indication that there is a viable approach to the development of estimates of non-market output that does not incorporate time-use data. This being the case, it is crucial that improved time-use data collection approaches be developed. Diary-based yesterday or tomorrow time-use data must be sought. While observation approaches may be required in certain circumstances, there appears to be strong evidence that on their own they cannot provide data that is sufficiently accurate for measurement and valuation purposes. If observation approaches must be used, it will be necessary to improve their design to ensure that they provide valid and reliable data. An approach such as that used in the Dominican Republic case study, combining spot with continuous observation, may with further refinement and evaluation prove to be a viable approach.

Data capture for the household satellite account should be carefully planned and undertaken using a range of instruments and approaches. These should be well thought out and designed to elicit the information needed to build a household satellite account. Thus, diaries may be supplemented with activity logs, such as a meal preparation log, to provide extra data needed for valuing purposes.

Needs and Benefits of Time-use and Valuation Data

Benefits from the development of a household satellite account and the generation of data to service that account would be far-reaching. It is possible only to hint, here, at the many benefits which could be expected.

Facilitating 1993 SNA measurement requirements

As indicated above, the latest revision of the SNA provides for the inclusion of all goods production, whether or not it is marketed or even intended for market. This provision means that national accountants must have access to data on home production of foodstuffs, textile and clothing goods, wood and other craft products. As is well known to statisticians interested in measuring the arts and culture sectors, it is a formidable task. Time-use studies can provide the information needed to develop the necessary calculations to bring measurement in line with current definitions. The need related to this task is fully independent of any proposed extensions of the SNA. It is a task required by the SNA as now in place.

Time-use data for formulating policies on women

Raising the *status of women* has been declared as one of the important policy objectives in Nepal. For example, the Eighth Five Year Plan lays down that: "The Government is committed to equal and meaningful participation of women in the process of development by improving women's social and economic status." The plan also spells out how these changes are to be brought about, Table 7.1. However, these intentions have remained on paper in the past and will remain so in future unless these are backed by detailed planning and programmes.

To formulate realistic plans and programmes, the planning and implementing agencies need to know about the exact work, employment, and unemployment pattern of women in various areas. Scattered information about changes in women's workload and leisure patterns indicate that various development interventions undertaken with the assumption of unused labour in the rural households (e.g., livestock development) may have increased women's workload without compensating benefits to them, and hence made their lives worse.

TABLE 7.1
SEVENTH AND EIGHTH PLAN, NEPAL
POLICY DECLARATIONS ON WOMEN AND DEVELOPMENT

The Seventh Five Year Plan (1985/86 - 1989/90)	**The Eighth Five Year Plan (1992/93 - 1996/97)**
To enable women to participate actively in the development process by providing appropriate opportunities, to foster self-reliance among women by increasing their productive capacity, and to raise their social and economic status by this all-round development. This will be achieved through:	The Government is committed to equal and meaningful participation of women in the development process. This will be achieved through:
1. Additional programmes and quotas in training in agricultural extension, health and education.	1. Programmes designed to enhance women's participation in economic and social sectors (agriculture, forestry, industry, health and education).
2. More emphasis to development of cottage industries for providing work for women during the off-agricultural seasons. Special provisions for women in training facilities, credit, marketing services and other resource allocation decisions.	2. Credit, technical know-how, entrepreneurship training & marketing services.
3. Encouragement to women to get involved in forest protection and preservation.	3. Policies to raise employment opportunities for women in all sectors, specifically, to encourage the appointment of women in the government, semi-government and non-government sectors and to provide them opportunities for career development.
4. Facilities for participation in government and non-government organizations.	4. Reform of laws and by-laws which hinder the development of women.
5. Facilities to Nepal Women's Organization to conduct development activities.	5. Monitoring and documentation of information on gender discrimination at work.
6. Legal reforms to remove provisions hindering women's participation in national development.	6. Formulation of suitable organizational structure for coordination and monitoring activities relating to women.
7. Monitoring and documentation of information on gender discrimination at work.	
8. Formulation of suitable organizational structure for coordination and monitoring activities relating to women.	

So-called "domestic activities" are at the core of household survival, specially in developing countries where market options for such activities are non-existent. If women and

children cannot bring fuel and water, process food, and cook them for the family, other members may not be released to perform market or other visibly economic activities. Further, women perform a large proportion of activities leading to cost savings, income generation or production within the household, which is often ignored. A misunderstanding about women's available time and assumption about mass scale unemployment among women have tended to result in misallocation of resources and wastage in Nepal's planning process, besides increasing women's workload.

On the macro-economic level, when women as a whole are perceived to be economically not active, it is difficult to force planners to take women's issues seriously. This is amply exemplified by the Eighth Plan quoted above. While the plan has a separate chapter on women, in the objectives and priorities chapter there is not a single sentence about women. Poverty, and sustainable development, other priority areas however, do occupy separate sections in this chapter.

Reliable data on women's work patterns and workload are necessary to give teeth to the pious objectives of the plan regarding women's status. Without such data progress on improving or deteriorating women's status cannot be monitored and appropriate policies undertaken.

In relation to raising women's status, it is important to examine whether the division of labour between the sexes is changing towards a more equitable work sharing between the sexes or whether the social practice of allocating women to most menial jobs or downgrading some types of work, just because they are performed by women (e.g. domestic cooking, etc.) is being questioned at all. It is also important to examine what is happening to the time released from higher productivity of work consequent to development interventions. In some Nepalese villages, men seem to be misusing the leisure time obtained due to productivity increases in gambling and drinking, while women have reduced their leisure time to earn more income (Bhatt, Koirala, et al., 1993). In other villages (Paolisso & Regmi, 1992) introduction of vegetable farming has enabled the households to earn more income. However, this has resulted in greater differentiation in men and women's social life. Leisure is an important component of a person's well-being. Development interventions which worsen women's leisure time vs. men's leisure time cannot be justified on equity grounds.

Time-use data, if available for a national representative sample would enable policy makers to adopt corrective measures in time to prevent increasing confinement of women to the domestic arena while men are freed to participate in various social and training activities.

Increasing literacy

Increasing literacy is another priority of the plan. Nepal stands at the bottom of the list in South Asia regarding female literacy. Average literacy rate in Nepal is dragged down substantially because the majority of women and young girls (75%) are still illiterate. The majority of men (54%) on the other hand, are literate. For the next decade, therefore, increasing the girl child's schooling and female literacy is at the top of the policy agenda in the field of education. However, increasing development interventions in agriculture (livestock, multi-cropping, etc.) and the industrialization process (development of tourism and carpets) have

tended to induce parents to *withdraw their girl children* from school. Forty-three per cent of the girls in the age group 6-9 years are not going to school compared to 14 per cent of boys. In secondary schools and higher educational establishments, the gender disparity in attendance is much greater. Given the socio-economic conditions and cultural traditions in the country, because of which parents look upon their girl child's education as a wastage of resources (see UNICEF, 1992), the girl-child education programme needs to find ways to fit into their working schedules. Similarly, poorer families need their children to work for survival. A proper schooling schedule can be developed only if location-specific data are available on the work patterns of the girls and also boys in the poorer households.

Assessing the importance of transportation sector

In Nepal a large part of human time is wasted on transportation because many of the areas are still unapproachable by modern means of transportation. A major priority for the local population, specially in the hills, are roads. But at the macro-economic level, in line with international fashion on economic thinking, Nepal has tried to minimize expenditure on development of transportation since the early eighties. This has resulted in retarding agricultural development due to the lack of market linkages, made government supervision extremely difficult and development administration ineffective in many hilly areas, and slowed down development of an integrated national labour and product market by hindering mobility of people for short-term employment and sale of products within the country. Transportation in Nepal needs to be examined with a new perspective of its contribution to mobility of products and labour and evolution of a Nepalese integrated national market. While Nepalese men go to India for army recruitment and domestic service for long periods, the labourers from India are taking over all newly created jobs in the industrial construction and service sectors in Nepal. The economic flows of goods, services, and labour in Nepal are across north-south corridors into India rather than an overflow of exports from integrated labour, capital and product markets. The time factor in transportation, therefore, acquires extreme importance in relation to evaluation of the transportation sector in resource allocation decisions in the country. Time-use data will provide the basis for such an evaluation.

Accounting for time due to sickness

Sickness and morbidity is a major cause of poverty in the poor households. As the able-bodied persons get sick, the poverty deepens. This aspect has received little attention in poverty alleviation programmes so far. Account of time wasted in sickness will allow an estimation of productivity and income lost on account of sickness, and help in formulating appropriate health policies in relation to poverty alleviation. Currently, spending on health is seen as a one-way expenditure on welfare, the economic returns on such expenditure being not measured at all. Availability of time-use data would enable the planners to evaluate the return on expenditure in the health sector and formulate appropriate resource allocation policies.

Measuring children's work input and human capital building process

For capturing children's work patterns and how they are changing, it is important to collect time-use data. Other sources of data on child labour seem to grossly under-estimate children's labour due to various social reasons. While increasing involvement of children in schools would tend to decrease the work time of children, increasing pressure of export-oriented industrialization based on availability of cheap labour may also result in withdrawal of children from school, either to work in manufacturing or to release adults by taking over responsibilities for agricultural work and other household chores. Such a situation will hamper growth in the long range as it will not be conducive to human capital building. This situation will also hinder exports, as people in developed countries are getting organized to boycott products involving child labour. Time-use data will facilitate monitoring of the real situation on child labour and enable policy makers to adopt corrective measures.

Measuring voluntary community services

Voluntary allocation of time to community services is an important part of traditional societies. In many of the inaccessible areas in Nepal the government services are grossly inadequate and the private sector non-existent. Community organizations are fulfilling many of the individual needs such as education, health, and managing community assets on a large scale. All this is done on the basis of voluntary contribution of time. At the same time, increased population and contact with the outside world is putting pressure on community organizations and they are breaking down (see IIDS, 1992). Loss of well-being to the community due to the withdrawal of such voluntary time and resource contributions is neither recorded nor measured. The services provided free by the community are not reflected in GDP. The value of such services is immediately reflected in GDP if replaced by the government or the private sector. Net gain or loss from such replacement in terms of well-being is unclear. Time-use data will enable the policy makers to value such services, evaluate comparative advantages and disadvantages of community, private sector, and government agencies as service delivery agents, and adopt appropriate policy measures. Since the Government of Nepal expects to achieve a great deal in resource mobilization and delivery of services (such as irrigation, roads, health, education, etc.) in rural areas by activating community groups (see the Eighth Plan) a mechanism to evaluate comparative advantages and disadvantages of various organizational possibilities in service delivery will greatly assist the government in its policy-making process.

Social and economic change: the Hungarian case

In Hungary, in the seventies and in the eighties, the process of the doubling of the economy intensified. Besides the first or formal economy, the second economy—and joining it, the household economy—were gradually gaining ground. By traditional statistical methods, these structural changes could be monitored only with great difficulty, or could not be monitored at all. Thus, among others, information with regard to changes in the earnings and incomes of the population made it possible to draw only limited conclusions.

In Hungary—as in other countries—family income has been used for a long time as the basic source of information for the characterization of the financial situation of the families. To measure the incomes of the families, beginning with 1963, regular data collections were conducted every five years. However, as a consequence of the limits of the statistical methods, data collected in this manner provided accurate information, in most cases, only about incomes from the first economy and, understandably, with regard to incomes from the second economy only a tentative picture could be formed.

In the sixties, when the second economy was relatively less extended, these measuring methods could be used with certain reliability in presenting the changes in family incomes. However, the more extended the second economy became, the higher was the proportion of those additional incomes about which, as a consequence of the limitations of the statistical methods, no accurate information could be obtained.

Data about the population's accumulation (housing construction) and consumption (consumer durables) also called attention to the significant difference which existed between the incomes, which can be recorded by statistical methods (input), and the material goods appearing in accumulation and consumption (output). Concretely, the goods in the possession of families could not be financed from the statistically measured incomes. The inconsistency between the data on incomes and consumption is well illustrated by the figures on the level of supply of consumer durables in households living under the official subsistence minimum. The respective data series reveal that, although the level of supply in the households that live under the subsistence minimum is behind the national average, the lag is considerably less than could be justified. The explanation of the relatively smaller-size difference is that, when designing the income categories, only statistically measurable incomes could be taken into consideration.

Facts indicate that, by traditional statistical methods, only the incomes from the main working place can be counted in most cases. According to various statistical calculations, between 1975 and 1985, the proportion of incomes from the main workplace fell from 77 to 73 per cent. Nevertheless, even these calculations did not reflect the tendencies shown by calculations based on the time-budget survey: namely, that, within the time spent on all kinds of earning and producing activities, the time spent in the second economy had increased significantly. On the other hand, incomes from these activities could not be counted, or could be counted only very inaccurately, by traditional statistical methods. The studies revealed also that the expansion of the second economy was often the strongest in those social strata whose incomes from the main working places were lagging behind the average.

The growing difference between the statistically measurable incomes (input) and the use of incomes (output) could be best observed in the case of housing construction. From the mid-seventies until the late eighties, self-executed housing construction increased rather dramatically in rural and in smaller urban areas. On the basis of calculations, it could be demonstrated that the population could not have built the respective dwellings from their incomes from the main working places and, consequently, it is only the second economy which could serve as the source of financing the self-executed housing construction.

Under such conditions, it was understandable that the income policy, based mostly on centrally conceived considerations, was inappropriate. In turn, the impossibility of directing the income conditions shattered the foundations of the consumer price system, which was based on

subsidies from the central budget, and even the systems of social provision. A deeper analysis of these processes would already go beyond the framework of the present study.

These observations provide only a hint of the possible use of the time-budget data in presenting income conditions. On the basis of the evaluation of information from different sources, it could be demonstrated that time-budget surveys provide relatively good background information about the composition and size of the earning and producing activities which determine income conditions and, on this basis, a more accurate picture can be obtained about the major characteristics of the income conditions than by traditional statistical procedures.

Informal sector measurement

When formulating long-term and short-term development policies, it is indispensable to create a relatively accurate picture about the production capacity of a given national sector and, respectively, about the former's composition. Here, from the point of view of the usability of time-budget data, only the time fund of the given national sector is considered, since it is undoubtedly one important indicator of production capacity.

In the case of two national industry sectors, agriculture and housing construction, relatively reliable calculations could be carried out with regard to the time fund performed in the formal sector (i.e., in the 'big organizations') and also in the informal sector (i.e., in the 'small organizations'). The performance of the formal sector could be assessed on the basis of, partly, the number of those employed and, partly, the production value created by them. In the case of the informal sector, one of the most important pieces of information were the data provided by the time-budget survey, and the production value created in this sector could be established subsequently on the basis of evaluations.

On the basis of the calculation results, it was possible to show the total time funds of the two sectors, which had not been quantified formerly in the official statistics. Thus, among others, it came out that, within the agriculture sector as a whole, the number of working hours performed in the informal sector is approximately double the respective value in the formal sector, i.e., in the state-owned and in the cooperative agriculture (by people of manual occupations). Calculations with regard to the number of participants corroborated the relationship, known also from previous surveys, that the role of agriculture in the Hungarian economy is much greater than what can be shown on the basis of traditional statistics.

On the basis of the production value created in the two sectors of agriculture, certain calculations relating to economic efficiency could also be performed. Calculations indicate that, behind the rather huge labour input in the informal sector, the yield is rather low: namely, taking per capita production for basis, it was 74,000 forints in the formal sector and only 17,000 forints in the informal sector.

The difference is big, but for a more accurate assessment several other factors must also be taken into consideration; among others, that these calculations, in spite of being completely correct, cannot fully take into account the fact that the formal sector disposed of 86 per cent of the total agricultural land area and, further, that, in the case of machinery and equipment, the share of the formal sector was, presumably, even higher. Approaching the performance of the two sectors from the point of view of output, similar difficulties arise. In this case again, the

size of incomes from the formal sector must be compared with data relating to consumption and investment and, within that, to housing construction. From this it becomes clear that, in the rural areas, housing construction (and the subsequent provision of the dwellings with household equipment) could be financed only from incomes from the informal sector.

On the basis of the above, it is thought that the time-budget data received from the informal sector of agriculture provided great help in elucidating the real flows, and in getting acquainted with the actual performance of agriculture as a national branch.

Researchers performed similar calculations with regard to the time fund and performance of the housing industry. The calculations published indicated also in this case that the yearly time allocation to the informal sector hugely surpassed that to the formal sector. Further, evaluations with regard to the number of participants also corroborated the assertion, which though well-known, had been formerly quantified only in part, that the housing division merits being regarded as the second greatest "undertaking" of the Hungarian society.

Benefiting Agencies

A number of agencies have an interest and stake in developing practical methods for valuing household and domestic work in the informal and domestic subsistence sectors.

INSTRAW, in collaboration with the Statistical Division of the United Nations Secretariat and other United Nations agencies, is attempting to address the problems associated with the definition and measurement of non-market activity through complementary research and training activities. Initial activities of INSTRAW involved development of methods and training for compiling available statistics and indicators on women, and reviewing concepts and methods being used in aggregates such as national accounts and labour statistics. From that work, problems and issues that require further attention were identified. These have been given special focus under the statistics programme of the Institute during the past several years. Indeed, the invisibility of women in economic statistics was identified as one of the most important issues that needed to be addressed and hence has been a major concern within the Institute's research and training programme.

In approaching the problems relevant to making women's contribution and participation in the economy visible, the Institute recognizes the prevailing situations that indicate (1) the under-utilization of existing statistics and data, and (2) the inaccuracy and inadequacy of available statistics and data on women. INSTRAW has undertaken interlocking research and training activities geared toward developing techniques and methods of utilizing available data. Developing new statistical methods to collect and analyse a new set of data for valuing women's productive work seems indispensable to fully recognize women's contribution.

The ***United Nations Statistical Commission***, at its twenty-fifth session, in 1989, affirmed the great value to countries of further work in the development of technical reports on methods of compilation, valuation, and analysis of women's contribution to development, to supplement the System of National Accounts.

The ***ILO*** continues to show significant concern with the definition and measurement of labour force and employment and with assessment of the economic role of women. Its concern

arises partly from the fact that "the most visible indicator of women's contribution to development is their labour force participation." However, as can easily be seen and understood, labour force participation reflects only one, and maybe a minor, aspect of the contribution of women. One study emanating from the ILO, examining a time-allocation approach to labour measurement, provided several significant insights into people's labour activities: (1) they show considerable variations in activity patterns among population subgroups in the same areas; (2) they raise questions about how much of women's contribution is disregarded in official records; and (3) they shed light on the extent of women's contribution to overall family welfare. The study concluded that there was a need for both improved labour force definitions and a more refined and standardized measurement methodology to fully capture women's true economic contribution to society.

The ***FAO***, in discussing the re-orientation of government policy to reduce many debilitating constraints on women, argues that: "An important step...will be to improve the statistical data base of the role of women in food and agricultural production, in income earning activities, including wage labour and activities in the informal sector. Design of policy interventions for women should take into account the economic role of men and women in the various activities and provide information on resource endowments, activity patterns, income sources, cropping patterns and husbandry patterns of households in different socio-economic groups in the target area (FAO, 1990b)."

UNICEF, with its focus on issues and problems related to the well-being of children, has an important stake in properly accounting for time allocation, particularly that of mothers and children. As indicated above, time-allocation can be a key determinant shaping both the health and education of children. Unless there is an adequate awareness of the inter-relationships among alternate time-uses, specific policies may have counter-productive secondary effects. It is stated that UNICEF should:

> *...actively advocate those policies and programme approaches that protect children and vulnerable groups in times of economic hardship. It is essential to ensure that any restructuring of the economy does not neglect the interests of children whose survival and development cannot be postponed without causing irreparable damage.*

In summary, a broad range of policy concerns of interest to a number of agencies would benefit from, and indeed need, solid data on personal activity in the market/non-market interface. The challenge facing statisticians and researchers is to obtain that data. Full knowledge of the structure of the productive system and the role of women and children in it will make a crucial contribution to providing the understanding necessary to meet this challenge.

Appendixes

Appendix 1
Classification of Activities According to INSTRAW Framework

Szalai	Eurostat	Nepal	Dominican Republic
Market SNA	*Market SNA*	*Market SNA*	*Market SNA*
-Regular work -Work at home -Overtime -Travel for job -Waiting, delays -Second job -Meals at work -Other remunerated work -Work breaks -Travel to job	-Regular work -Training at home -Coffee/other breaks -Travel at work -Other remunerated job -Job-seeking -Other time connected with employment (e.g. waiting to start work; packing papers at home; etc.)	-Wage labour (agriculture, construction, animal husbandry, portering, fuel gathering, etc.) -Trade (sale of food grains, dairy products and other food stuffs, livestock or manufactured goods) -Government service -Entertainment (for wages) -Other work -Lending/borrowing -Medical and religious services (paid) -Hotel, tea-shop, beer house, stores -Army service	-Paid work -Trips related to work
Non-market SNA	*Non-market SNA*	*Non-market SNA*	*Non-market SNA*
-Gardening, animal care -Hobbies	-Preserving -Making clothes -Knitting, needlework -Tending edible plants -House construction -Production of equipment -Producing textiles -Handicrafts -Tending edible plants -Production of household goods -Hunting -Fishing -Picking berries, mushrooms	-Irrigation -Weeding -Shearing -Milking -Butchering -Castration/breeding -Herding -Care and feeding of animals within compound -Fodder collection -Collecting and preparing organic fertilizer -Carting and spreading organic chemical fertilizer -Planting operations (seed bed preparation, sowing, transplanting) -Terrace upkeep and routine repair of irrigation channels -Land preparation (ploughing, use of hoe, harrowing, beating clods, slash and burn) -Husking/drying grains, post husking, winnowing, roasting, grinding, chiura making (beaten rice) -Oil pressing -Fishing	-Care of garden & animals -Hand craft works -Help in agricultural activities -Help in commercial activities -Fetching water

Classification of Activities

Szalai	Eurostat	Nepal	Dominican Republic
		-Hunting wild animals, birds, etc. -Liquor making -Food preservation (drying of meat and vegetables, pickle making) -Preparation of dairy products (gee, curds, cheese, etc.) -Gathering agricultural products (mushrooms, fruits, tobaccos, nettles, etc.) -Gathering of materials for craft production (hemp, nettles, bamboo, leaves, etc.) -Collection of medical herbs (juniper, Jaributi) -Textile (including from cleaning wool or cotton, through spinning, setting up loom, dyeing, weaving) -Leather work -Sewing (in own home) -Basketry (grass mats, ropes, fish-nets, baskets, etc.) -Making and repair of tools and utensils (plough, spades, dhiki, pots, etc.) -Kitchen gardening -Horticulture -Guarding/protection of crops (in field and harvested) -Seed selection and storage -Threshing and cleaning grain -Harvesting (bundling, drying crop residue, storing bagging grain)	
Household Maintenance (Satellite SNA) -Prepare food -Meal cleanup -Clean house -Outdoor chores -Laundry, ironing -Clothes upkeep -Other upkeep -Heat, water -Baby care -Child care -Help on homework -Talk to children -Indoor playing	*Household Maintenance* (Satellite SNA) -Preparing meal -Preparing snacks/drinks -Setting the table -Meal, cleanup, dish washing -Baking -Preserving, freezing, canning -Unspecified food preparation -Cleaning dwelling -Cleaning cellar, garage, shed	*Household Maintenance* (Satellite SNA) -Well-digging -Shopping -Construction and repair of compound or field fences, animal sheds and shelters in field or in yard -Building and repairing house (living quarters) -Cooking/serving -Washing clothes and bedding -Cleaning house/mud plastering	*Household Maintenance* (Satellite SNA) -Prepare, serve meals -To clean (to mop, sweep, wash walls, wash bathroom) -To wash -To iron -Home maintenance (repairs to home) -To wash the dishes -Care of the kids -Drive children to and from school or to the doctors clinic

Classification of Activities

Szalai	Eurostat	Nepal	Dominican Republic
-Outdoor playing	-Cleaning yard, pavement, shovelling snow	-Cleaning dishes and pots	-Take care of the elderly, other persons
-Baby sitting	-Separating/disposal of waste	-Construction of dhiki, mills, grinding stones, etc.	-Shopping, making errands like pay light, water and other bills
-Travel with child	-Forestry, woodcutting and collecting of firewood	-Fetching or preparing fuel	-Maintenance of the clothes (sewing, mending, dyeing, etc.)
-Marketing	-Heating/water supply	-Fetching water	-Domestic work - Give and receive caresses to children, husband, wife, etc.
-Shopping	-Other household upkeep (e.g. packing for trip, move, etc.; looking for lost items)		-Errands related to shopping or other places
-Administrative service	-Unspecified household upkeep		-To take care of the sick
-Waiting in line	-Laundry		-Giving birth
-Other service	-Ironing		-Breastfeeding
-Travel, service	-Mending/care of clothes and shoes		
-Other caring activities	-Unspecified making/care of textiles		
	-Tending ornamental plants (also graves), flowers, mowing the lawn		
	-Tending domestic animals		
	-Feeding/caring for pets		
	-Walking the dog		
	-Unspecified gardening/pet care		
	-House construction/ renovation		
	-Repairs to dwelling		
	-Repairing household equipment/appliances		
	-Vehicle maintenance		
	-Other construction, repairs and maintenance		
	-Unspecified construction, repairs and maintenance		
	-Purchasing everyday consumer goods		
	-Purchasing durable consumer goods		
	-Administrative services		
	-Shoemaking		
	-Medical, dental services		
	-Personal services		
	-Other services		
	-Unspecified shopping and services		
	-Household management (e.g. planning and arranging, budgeting, paperwork, making shopping lists, etc.)		
	-Physical care of children		
	-Supervision of children		
	-Reading or playing with children		
	-Talking to children		
	-Learning with children		
	-Outdoors with children		

Classification of Activities

Szalai	Eurostat	Nepal	Dominican Republic
	-Accompanying children at their clubs -Visiting school/nursery -Unspecified child care -Adult care (e.g. physical care of a sick or elderly adult; visits to hospital; washing, cutting hair, massaging; help with another person's gainful employment, mental help, etc.) -Unspecified household and family care		
Personal Development (Satellite SNA)	*Personal Development* (Satellite SNA)	*Personal Development* (Satellite SNA)	*Personal Development* (Satellite SNA)
-Attend school -Other classes -Special lecture -Political courses -Homework -Read to learn -Other study -Travel related to study	-Regular classes and lectures -Breaks at school/university -Homework, study in library -Unspecified school/ university courses -Attend courses	-Non-formal (in village) -Academic (in village) -Other educational activities	-Attend, receive classes -Do homework, study -Other school activities (to pray, sing national anthem, etc.) -Self education -Trips related to school or any other educational centre
Volunteer	*Volunteer*	*Volunteer*	*Volunteer*
	-Work for the organization itself -Work for people via organizations -Unspecified work for organization -Meetings for civic-oriented activities		
Personal Maintenance	*Personal Maintenance*	*Personal Maintenance*	*Personal Maintenance*
-Personal care -Medical care -Personal hygiene -Meals, snacks -Restaurant meals -Night sleep -Daytime sleep -Resting -Private, other -Travel, personal	-Sleep -Sick in bed -Eat meal -Snack and drink -Unspecified eating -Wash, dress, toilet -Medical care -Other personal (including sex; haircuts at home; etc.) -Unspecified personal	-Childbirth/recovery period -Sleeping -Eating -Drinking of alcoholic beverages -Bathing/cleaning -Feeding -Oiling and massaging -Grooming and personal hygiene -Sickness/treatment	-Sleep -Eat meal -Care of private necessities (bath, etc.) -Make love -Other necessities (bathe, comb hair, get dressed, etc.) -To wake and get up -To lay down -Visit a doctor -Take medicine -Trips related to health activities

Classification of Activities

Szalai

Personal Recreation

-Union, politics
-Civic activities
-Religious organization
-Religious practice
-Factory council
-Misc. organization
-Other organization
-Travel, organization
-Sports events
-Mass cultural activities
-Movies
-Theatre
-Museums
-Visiting with friends
-Party, meals
-Cafe, pubs
-Other social
-Travel, social
-Active sports
-Fishing, hiking
-Taking a walk
-Art work
-Making music
-Parlor games
-Other pastime
-Travel, pastime/leisure
-Radio
-TV
-Play records
-Read book
-Read magazine
-Read paper
-Conversation
-Letters, private
-Relax, think

Eurostat

Personal Recreation

-Religious practice
-Unspecified participative activities
-Socializing and conversation
-Telephone conversation
-Correspondence
-Unspecified social life and entertainment
-Cinema
-Theatre, ballet, concert
-Art exhibitions, museums
-Library
-Sports events
-Excursions, sight-seeing, tours, amusement parks
-Other entertainment or culture
-Unspecified entertainment and culture
-Passive leisure
-Sports participation
-Outdoor recreation
-Other nature-related recreation
-Unspecified nature-related recreation
-Organized sports
-Jogging, running
-Biking
-Skiing
-Swimming
-Gymnastics at home
-Ball games
-Rowing, sailing, windsurfing
-Other unorganized sports
-Unspecified unorganized sports
-Other sports related (e.g. assembling and readying sports equipment at the sports centre)
-Unspecified sports participation
-Visual arts
-Performing arts
-Literary arts
-Unspecified arts
-Collecting
-Computing as a hobby
-Other technical hobbies
-Unspecified technical hobbies
-Playing
-Parlour games
-Computer games
-Solo games

Nepal

Personal Recreation

-Inter-village visiting
-Other visits
-Visiting parents, in-laws or grandparents
-Other
-Voluntary community service (school committee, youth organizations, women's organization, etc.)
-Other
-Political service (Panchayat, etc.)
-Ritual (for self or neighbour without pay)
-Voluntary labour
-Gambling/card playing
-In-village visiting

Dominican Republic

Personal Recreation

-Trips for pleasure or recreation
-Trips for social participation
-Children games
-Gambling
-Religion
-Politics
-Movie, theater
-Sports events
-Visits
-Cafeterias, bars, restaurants, discoteques, etc.
-Social life - talking
-Drink alcoholic beverages
-Accompany children in sports activities, cultural or recreational
-sports activities
-Walk or do physical exercises
-Play guitar or any other instrument
-Painting
-Writing
-Reading
-Listen to the radio
-Watch T.V. or video
-Record
-Talk on the phone, talk with the children, husband or other relatives
-Hobbies - other

Classification of Activities

Szalai	Eurostat	Nepal	Dominican Republic
	-Gambling		
	-Unspecified games		
	-Other hobbies		
	-Unspecified hobbies		
	-Reading newspapers		
	-Reading magazines		
	-Reading books		
	-Other reading		
	-Unspecified reading		
	-Watching TV		
	-Watching video		
	-Listening to radio		
	-Listening to recordings		
	-Unspecified listening		
	-Travel		
	-Filling in diary		
	-Unspecified time use		

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1. Activities were defined according to and adapted from established classification schemes (Szalai and EUROSTAT) and country studies (Nepal and the Dominican Republic).

a) Szalai, A. (1972). *The use of time: Daily activities of urban and suburban populations in twelve countries*. The Hague: Mouton.

b) Niemi, I. (n.d.). *European Time Use Survey: Proposal for the Diary Coding*. Luxemburg: EUROSTAT.

c) Acharya, M. and Bennett, L. (1982). Women and the subsistence sector: Economic participation and household decision making in Nepal. World Bank Staff *Working Papers*, Number 526. Washington, D.C.: The World Bank.

d) Dominican Republic Time Use Study.

Appendix 2
Types of Household Production

Activity	*Unit Definition*
A. Cleaning	
1. Garbage disposal	bag
2. Vacuuming	room (each time)
3. General pick-up	room
4. Kitchen floor mopping	floor
5. Other kitchen surfaces	kitchen
6. Bathroom floor mopping	bathroom
7. Bathroom, other surfase cleaning	bathroom
8. Basin, tub, tile, commode cleanning	bathroom
9. Bedroom other surface cleaning	bedroom
10. Bedmaking	bed
11. Bed linen changing	bed
12. Other rooms floor cleaning	floor
13. Other rooms surface cleaning	room
14. Lawn mowing	lawn
15. Window cleaning	window
16. Refrigerator or freezer defrosting	refrigerator
17. Stove cleaning	stove
18. Cupboard cleaning	cupboard
19. Garage cleaning	garage
20. Patio cleaning	patio
21. Snow shovelling	sidewalk/driveway
22. Yard raking	yard
23. Yard litter pick-up	yard
B. Child Care	
24. Child feeding	child/each time
25. Child changing	child
26. Child bathing	child
27. Child transporting	mile
C. Meals	
28. Meal preparation and cleanup	meal for 1 person
D. Care of Clothing	
29. Washing and drying	machine load
30. Ironing	article of clothing
31. Mending	article
32. Alteration	article

Activity	*Unit Definition*
E. Repair and Maintenance	
33. Chimney sweeping	chimney
34. Electrical repair	job
35. Plumbing repair	job
36. Interior painting	room
37. Exterior painting	room
38. Structural repair	value of job
39. Landscaping	job
40. Vehicle cleaning, washing	car
41. Vehicle tune-up	job
42. Vehicle lubrication	job
43. Vehicle tire changing	tire
44. Other vehicle repair	job
45. Other appliance and equipment repair	job
F. Food Production	
46. Homegrown food	market value
47. Livestock	market value
48. Hunting harvest	pounds
49. Fishing harvest	pounds
50. Berry gathering	pounds
G. Miscellaneous	
51. House upgrading	Market value of particular job
52. Yard upgrading	job
53. Tax preparation	Federal/State return
54. Household furnishings and Hobby production	Market value of particular job
H. Activities for Which Output is Hour	
55. Child sitting	hour
56. Care of elderly	hour
57. Care of sick	hour

Source: Firtzgerald, J. & Wicks, J. (1990). "Measuring the value of household output: A comparison of direct and indirect approaches," *Review of Income and Wealth*, 36(2): 129-141.

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