Using Time Use Data

A history of time use surveys and uses of time use data

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The opinions presented in this report are those of the authors and do not necessarily represent an official view of Statistics New Zealand.

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Introduction

New Zealand's first time use survey is in the field for the year July 1998 to July 1999. The Ministry of Women's Affairs is sponsoring the survey, and Statistics New Zealand is collecting and analysing the data under contract to the Ministry. A key interest of the Ministry is obtaining detailed information on unpaid work.

New Zealand is joining the large group of countries where time use statistics are viewed as an essential part of the national statistical programme. The popularity of time use data is related to its versatility and its wide range of uses. New Zealanders' awareness of the value of time use information is only beginning with the prospect of time use data being available at the end of 1999. This publication is intended to help fill this information gap. It examines the research- and policy-based applications of time use data in those countries where it is available, and discusses the results. It suggests areas where time use information will contribute to better policy development, implementation and evaluation across a wide range of policy portfolios, and will also enrich our understanding of New Zealand society. Its objective is to help build an information resource about how the New Zealand time use data can be used to best effect.

Information on how people use their time is collected by time use or time budget surveys. People are either asked to keep a diary accounting for everything they do during a specified day or days, or they are asked to recall their activities during the previous day. The information is recorded in specified time intervals, every five or 15 minutes for example, so that the amount of time spent on a given activity can be analysed. Survey results show how many hours people in a given population or population sub-group spend on different kinds of activity, such as work, leisure, sleep, personal care and so on.

Time use data has a multitude of uses, and new applications are constantly emerging. Giles Provonost, discussing time use data for Quebec, comments that few if any countries which undertake time use surveys do not decide to update them regularly (Provonost, 1988: 41). The richness and diversity of the information produced and the range of analyses that are possible mean that time use surveys become an expected part of the regular statistical survey programme.

The value of time use information lies in the fact that time is the ultimate resource and, unlike other resources, time is shared equally by everyone. There are 24 hours in everyone's day, so comparative analysis of time use begins with the same starting point for everyone. Time can be converted into money, goods and services through work. Time is also required for the consumption of goods and services. Analysis of time use therefore offers an overview of both production and consumption. Looked at another way, time may be spent in the labour market where its value is measured in monetary terms, but it is also the resource which enables voluntary work in the community and domestic work to be undertaken, activities which produce a wide range of essential services for which few measures currently exist. In addition, time is the basic resource for leisure activities. The amount of free time available for rest and recreation is an important aspect of personal well-being, and is one measure of the standard of living of a given population.

Although each of these areas may be studied through conventional research methods, only a time use survey provides an integrated picture of how the various paid, voluntary, domestic and leisure activities are integrated in the lives of different sections of the population. This integrated picture not only leads to a better understanding of social life, but also gives a more complete overview of a national economy as it enables the measurement of goods and services produced outside the labour market which are not captured by conventional measures of production.

Chapter 1 of this publication gives a brief history of time use surveys and reviews economic arguments for including domestic and voluntary work in measures of economic production. Chapter 2 reviews some of the earlier uses of time use data. Chapter 3 outlines policy applications that have become important in the 1990s with moves to include unpaid production in economic measures such as the System of National Accounts and an international focus on improving the status of women. Chapter 4 gives an account of the contribution of time use data to research in a number of specific areas and chapter 5 explores some potential uses of time use data in New Zealand. An appendix provides a comparative discussion of time use survey methodologies including a summary of the methodology chosen for the 1998/99 New Zealand Time Use Survey.

It will be seen that the uses made of the data not only differ according to the policy concerns of governments and the particular interests of academic commentators but they also vary in response to the information requirements of international organisations. Time use data records differences in the life styles and economies of industrial, socialist and developing countries, and the way it is used reflects differences between social concerns of the past and the present. The versatility of the applications described in this publication illustrates the flexibility of the data produced by time use surveys, and demonstrates how new uses emerge as times and information requirements change.

Chapter 1:
The history of time use surveys

This chapter reviews the history of time use surveys and gives an account of the link between time use surveys and international moves to include unpaid work in national accounts.

Early developments

According to Finnish time use expert Iiris Niemi, time use surveys have their origins in studies of family budgets. The accounting method used for research on living conditions among working class families in England and France at the end of the nineteenth century developed into a time budget or time use research tradition in which people's behaviour is measured in terms of their use of time in hours and minutes (Niemi, 1995: 2).

The countries with the longest traditions of time use studies are the countries of the former Soviet Union, the United Kingdom and the USA where some time use surveys were carried out before World War II (Niemi, 1995: 2). For example, in the USA during the 1920s and 1930s, diaries were used to investigate the non-market activities of farm families, urban living patterns, and the life-styles of the unemployed (Gershuny, 1995: 530).

Time use surveys were undertaken sporadically until the late 1960s, when a comparative time use study involving 12 countries was initiated. This was the Multinational Comparative Time-Budget Research Project, undertaken under the direction of Alexander Szalai (Szalai, 1972). The project included countries with both market economies and centrally planned economies, and was supported by the European Centre for Coordination of Research and Documentation in the Social Sciences in Vienna.

This project established a number of conventions in time use survey methodology which have helped to ensure that time use surveys undertaken subsequently are comparable. Another outcome of the 12-country study was the establishment of the time use researchers group. Researchers who had worked on the 12-country study continued to cooperate after the project had finished. The group they initiated has now become the *International Association for Time Use Research* and its members are drawn from nearly every part of the world (Niemi, 1995: 1). It continues to provide information on the methodology and application of time use research, and sponsor frequent conferences, for example in Vienna in 1996, Stockholm in 1997 and Montreal in 1998.

Work continues on the refinement of survey methods for international use. An international conference was held in Rome in 1992 on the theme *Time Use Methodology: Towards Consensus*. This was an opportunity for international time use survey experts to share their views on state-of-the-art methodology (Istituto Nazionale di Statistica, 1993). The current Eurostat initiative on time use surveys is an attempt to extend the convergence of national statistics in the European Community to time use surveys. The purpose is to harmonise the collection of time use data across the European Community for the development of more detailed social indicators than those currently available, especially in the field of equal opportunities for women and family policies (Knauth, 1993, Rydenstam 1996, University of Lüneburg, 1998: 8 and Sturgis and Lynn, 1998).

Another international initiative is the Multinational Longitudinal Time-Budget Archive which is held at the University of Bath. The Archive contains a multinational time-budget dataset covering about 30 countries from the 1960s to the 1980s, and serves as a basis for comparative research (Niemi, 1995: 1).

Until the late 1960s, time use information was used mainly by academic researchers. Since the 1970s, however, there has been a growing recognition of the value of time use information to policy makers and economic analysts. Debate on the invisibility of unpaid domestic work and the desirability of reflecting domestic production in national accounts has stimulated greater interest in time use surveys in a number of national statistical offices.

Using time use data to measure unpaid productive work

From the 1960s, there has been a growing recognition of the importance of time use in economic analysis. In classical economic analysis, the household is regarded as a consumer of goods and services. However, economist Jacob Mincer suggested broadening the economic model to include unpaid work in addition to paid work and leisure. Gary Becker extended Mincer's work to develop an economics of the family that recognised the productive elements of unpaid household activities (in Edwards, 1980: 7). The "new household economics" as it was called, recognised that, as well as consuming goods and services produced in the market, households produce goods and services through the unpaid work of their members. If household production is omitted, the picture of the economic welfare of the population does not include all goods and services and is therefore incomplete (Bonke, 1993).

While Mincer and his colleagues focused on household production, a large amount of unpaid work also takes place in the community, producing a range of important goods and services. People run sports clubs, administer schools, care for the older people or those with disabilities, and transport those who are unable to transport themselves. In rural areas people produce food for their own subsistence and assist each other with farm labour on a communal basis. This work too is part of the national production which is not included in traditional measures of the economy. Work of this kind may shift between the paid and unpaid sectors. For example, in New Zealand a policy shift saw the administration of schools move from a state-provided service to the responsibility of elected boards of trustees. If the unpaid work of school trustees in administering their schools is not reflected in national accounts it could appear that the productivity of the country has declined accordingly.

There is continuing debate on the equivalence of market work and household (or voluntary) production. Some analysts still question whether household work should come within the economic definition of "work". The problem of measuring simultaneous activities (such as caring for children while cooking a meal) raises difficulties (Birks, 1994), and the issue of whether the quality of the outputs remains consistent when there is no work supervision is sometimes raised.

Another issue is that household work incorporates some qualities that are not present in market work. Caring for people we love can be self-fulfilling. Some suggest that equating domestic work with wage work is reductionism as it omits the dimension of love and fulfilment (Himmelweit, 1995). Other analysts accept that household work has a monetary value and propose that the household work of wives who are not in paid employment should be given an estimated value in the assessment of economic well-being (Bonke, 1993).

However, while these issues require consideration, it is now generally accepted that unpaid work in the home and in the community is productive. Most of the goods and services produced can also be purchased in the market. One can cook a meal or eat out for example, do one's own laundry or use a laundry service. Child-care too can be purchased. Older people can be assisted by their neighbours or by paid helpers. It is these equivalent work activities which, it is argued, should be included in accounts of a country's productivity.

The System of National Accounts according to which countries calculate their economic production measures goods and services produced in the labour market. Since the 1970s, there has been increasing pressure internationally for household production to be included in the National Accounts. Marilyn Waring's discussion of the invisibility of women's economic contribution worldwide contributed to this debate (Waring, 1996 and 1988).

Unpaid work and economic statistics

The growing awareness of the economic value of unpaid work resulted in the development of methodologies for measuring and imputing a value to work done outside the labour market. These methodologies developed during the last twenty years all begin with time use data, and so time use surveys have come to be associated with efforts to measure and evaluate unpaid household and voluntary work. Progress in developing these methods will be discussed below. However, it must be remembered that time use surveys predate the debate on household production, and, as shown in the following chapters, their applications go well beyond this use in measuring unpaid work.

Several international agencies have become involved in moves to include unpaid production in national economic statistics. To some extent, these initiatives have been inspired by a need to improve statistics on women's lives. In both industrial and developing countries, women are responsible for a significantly larger share of the unpaid work than men, and women's work is not accurately reflected if unpaid work remains invisible. The need to recognise and measure women's contributions to development has been a continuing theme of the World Conferences on Women. Demands for statistics on women's work made by the Nairobi and Beijing conferences are discussed in chapter 3.

The United Nations Statistical Commission, which is the body responsible for establishing and revising the System of National Accounts (SNA), has responded to demands that national accounts should include domestic and informal sector production by making some adjustments to the SNA. The 1993 SNA recommends the inclusion of all goods in the GDP, which means that goods produced by households, whether for their own consumption or for sale, come within the "production boundary". However, services produced by households for use by household members (such as cooking meals and looking after children) are not included, and the recommendation is that these services be measured as a supplement to the GDP by inclusion through "satellite accounts" (Inter-Secretariat Working Group on National Accounts, 1993: 4, 5, 51, 123-127). National accountants are reluctant to include imputed values for the outputs, incomes and expenditures associated with domestic and personal services in core national accounts because household services are usually produced simultaneously with a decision to consume the service and therefore they have limited implications for the rest of the economy, particularly on disequilibria such as unemployment and inflation. Also, an accepted and rigorous methodology for estimating such values does not yet exist (INSTRAW, 1995: 9). Many look on the production boundary of the current SNA as temporary. However, major methodological advances are needed to allow extension of the production boundary to include household and voluntary sector services.

The greatest challenge facing those who wish to see voluntary work and domestic production reflected in national accounts is the development of an appropriate methodology for ascribing monetary value to unpaid work. While time use data can quantify unpaid work in hours and minutes, this work time must be given a monetary value if it is to be a part of national economic production. A number of methods have been explored. Those which currently have most acceptance are methods which value time worked according to the wages of similar workers in the labour market. Some debate continues as to the most appropriate wage to use as a measure:

- some use the wage of a worker who might do the whole range of household work, (such as a housekeeper);
- others use the wages of specialists in each household task (cook, launderer, driver etc); and
- others use the wage the home worker might have earned had she or he been in the paid workforce.

These and other valuation methods will be discussed more fully in chapter 3. As there is no agreement as to which of these methods is preferable, and as there is a considerable difference in the figures produced by each method, some statistical offices produce more than one set of figures for the value of "domestic production."

Countries undertaking time use surveys and extended national accounts

Despite the methodological problems, some national statistical offices are producing "extended national accounts" which include satellite accounts of domestic production based on time use data. An OECD booklet *Household Production in OECD Countries* (OECD, 1995) lists eight member countries which have produced estimates of household production. They are: Australia, Canada, Denmark, Finland, France, Germany, New Zealand and Norway. The New Zealand estimates were constructed using data from the 1991 Time Use Pilot Survey.

Within the last decade, time use surveys have been completed in the following developed countries: Australia (1992 and 1997); Canada (1992 and 1998); Finland (1987 / 88); France (1985 / 86); Germany (1991 / 92); Italy (1988 / 89) New Zealand (1990 pilot and 1998 / 99 survey); Norway (1990 / 91); Sweden (1990 / 91); and Japan (1990 and 1991). In addition, a number of European countries have replicated studies since the 1970s. They include Austria, Bulgaria, Denmark, Finland, Hungary, Netherlands, Norway, France and Poland. Hungary has a long tradition of time use surveys, with national surveys in 1964, 1976 / 77, 1986 / 87 and 1993 (OECD, 1995; INSTRAW, 1995). In 1996 / 97, 18 European countries[1] conducted pilot time use surveys through the European Community's statistical office, Eurostat. In 1998, Eurostat evaluated these pilot surveys and has drafted guidelines for harmonised European time use surveys.

Fewer countries in the developing world have carried out time use surveys on a national level. The UN Human Development Report 1995 refers to time use data from 13 surveys in 9 developing countries including Colombia, Indonesia, Kenya, Nepal, Venezuela, Bangladesh, Guatemala, Kenya, Philippines and Korea. The majority of these are not national surveys. Time use surveys are often used in combination with observation methods for studying life in specific populations in developing countries (INSTRAW, 1995).

Summary

Time use surveys emerged prior to the Second World War as a statistical tool for social research and the development of social indicators. As their value became more widely recognised, international comparative studies were undertaken and conventions for a consistent methodology were established. Since the 1970s, there has been a growing recognition that unpaid work in the home and community represents a large but invisible part of a country's economy, and efforts have been made to develop methods for measuring the value of this work and including unpaid production in national accounting systems. One aspect of these initiatives has been a growing awareness of the need to address gender inequality and improve the status of women worldwide. The distribution of paid and unpaid work is weighted according to gender, with women contributing the larger share of the unpaid work and men involved in more of the paid work, so demands for better statistics on women's lives and women's economic contribution to national economies involve statistics on unpaid work. Time use surveys are recognised as the best way of measuring unpaid work, and are the starting point for methodologies for estimating its value. Time use surveys are now part of the statistical programmes in a number of countries.

However, while the focus on gender is currently topical, time use data can also be used to describe differences in the lives and work of other groups in a population, differences between ethnic groups for example or between people of different ages. Current applications do not reflect the full range of possible applications. In the following chapters, the many uses of time use surveys will be discussed in more detail.

[1] Albania, Bulgaria, Estonia, Finland, FYROM, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Slovenia, Spain, Sweden, United Kingdom.

Chapter 2:
Traditional uses for time use data

Introduction

Time use data has a variety of applications quite apart from its use in estimating the value of unpaid work. Iiris Niemi of Statistics Finland sees time use studies as providing a data base for a variety of questions on everyday life (communication to the Ministry of Women's Affairs from Niemi, 1993). The questions that will be topical may not be known when the survey is initiated although methodological restrictions may impose some limitations on the way the data is used.

Time use data provides information on the activities of a population. It has the advantage of integrating a broad range of related information, placing the performance of a specific activity within the context of other activities, as well as relating it to the demographic and socio-economic position of the performer. It is possible to include in time use surveys activities carried out simultaneously and other interpretive data such as where and with whom the activity occurred. Information on how the activity is valued by the performer is sometimes also collected, which helps to locate that activity within a personal life style. It is not surprising that data of this kind is open to a multitude of uses. This chapter discusses in detail three traditional uses for time use data and outlines several more which are, in turn, discussed in more detail in chapters 3 and 4.

Studies of population trends

From the beginning, time use surveys have been used to study trends and changes in populations and to assess life styles and well-being. The general consistency in methods and analytical categories introduced with the 12-country study in the 1960s enables comparisons to be made between time use studies carried out at different times and in different countries. Time use has proved to be a very useful component in the comparison of life styles, as time is a universal resource which is not subject to variation according to culture or economy: "Time measurement offers an international unit of measurement which can be used in different cultures to measure the duration, sequence and timing of activities." (Niemi, 1995: 20)

Comparisons are based on the relationship between the four broad categories of paid work, unpaid work, leisure or free time, and personal care including sleep. The amount of time spent on each category is assessed for the population as a whole, and for different groups within the population. Each category can be broken down into sub-categories, for example paid work can be divided into first and second jobs, unpaid work into different tasks and so on. Reports of time use surveys usually present aggregate data in hours and minutes spent on a selected list of activities.

The value of replicating studies of time use in a given population is demonstrated by Niemi and Paakkonen's account of changes in time use in Finland in the 1980s (Niemi and Paakkonen, 1990). The study compares data from the first Finnish time use survey in 1979 with data from a subsequent survey in 1988/89. The analysis explored Finnish experience in a number of areas, including the impact of new regulations on hours of paid work, a possible reduction in housework with the introduction of new technologies, changes in the division of domestic work between men and women, and leisure activities.

The study provided useful details of the time spent on full-time and part-time jobs and work-related travel by men and women. It showed that in spite of regulations which reduced time in paid work by extending compulsory holidays and limiting work shifts, hours spent in paid employment by both men and women had increased, demonstrating the value of time use surveys for assessing the impact of regulatory change on people's life styles.

Overall, the value of the study was its ability to show changes in living patterns in all sections of the community, and to enable comparisons to be made between different groups. The data allowed an analysis of the life style of one segment of the population in comparison with the whole, and provided for an examination of trends in different kinds of activity. For example, the study found that women with young children were moving into paid employment and doing less domestic work, that their partners were doing more household work, and that these couples enjoyed less free time than people in the general population. Findings such as this have implications for public health policies and planning. Similar information for New Zealand could make an important contribution to the policy debate.

The Netherlands Social and Cultural Planning Office (1996) has conducted five-yearly national time budget surveys since 1975. Respondents complete a time diary for a week in the October of the survey year. The analysis focuses on time spent in 'commitments' (employment, household work and education), leisure pursuits and cultural participation. The surveys between 1975 and 1990 showed that the distribution of commitments and leisure time across age and social class had become more uneven. However, the 1995 survey showed that since 1990 all age groups, except the youngest, had devoted more time to commitments. For men, the time spent on commitments has continued to rise, while for women it has barely changed. Men have devoted more time to domestic activities, but women still undertake most of this work.

Other time series studies examine similar issues. A study of time use in a Siberian town compared the results of three time use surveys carried out in 1972, 1980 and 1990, covering a period of economic reform and the introduction of the market economy (Artiomov and Gvozdeva, 1993 and University of Lüneburg, 1998: 9-10). The studies indicated a reduction in men's paid working time, a flow of work from the public to the private economy as people put more time into working on their own plots of land, and an increase in self-employment. The writers concluded that economic depression in the public sector had led to the "subsistencisation" of work. As food prices increased, people produced more food for their own use.

A study of time use in Japan draws on time use surveys that have been carried out every five years since 1941 (Suzuki, 1994). Some of the changes in Japanese use of time are very similar to changes recorded in European countries, including a trend to go to bed later and sleep less (often related to television viewing), and for women to do less housework. Issues specific to Japan include evidence that families are not eating meals together and that some children have no breakfast. Very low levels of participation in leisure activities were also recorded, with most Japanese spending their spare time watching television.

Sociologists Jonathan Gershuny and Michael Bittman have used time series data on time use to test theories of social change. Gershuny (1993) examines Veblen's theory of the "leisure class" according to which society comprises an upper class with leisure time supported by the non-leisured working class. Gershuny analysed British time use surveys from the 1930s to the 1960s to show that middle class women had less leisure time as servants ceased to be available, suggesting that Veblen's theory was no longer applicable.

Michael Bittman looked at Australians' changing uses of time in relation to several theories of social change: the idea that the family is becoming increasingly "symmetrical" with husbands and wives sharing both paid and unpaid work; the theory of the "leisure revolution" with less time spent on paid work and more time available for recreation; and the theory that working time is decreasing. His analysis challenges all these theories, locating the issue in the relationship between paid work, unpaid work and gender. As Australian men gain more free time through fewer paid work hours they are not taking up more of the unpaid work at home, even though women are increasingly involved in paid employment. In a later paper, Bittman goes so far as to describe changes in men's domestic participation over the last two decades as a "stalled revolution". Women may be moving into the labour market, but Australian men are not making complementary moves into domestic work. He concludes that the family is not becoming symmetrical, work time is not decreasing and leisure time is not significantly greater, although the distribution of paid work, unpaid work and leisure between men and women may have shifted (Bittman, 1993 and 1995).

Bittman's findings on men's participation in household work differ from those in European countries, such as the Finnish and Netherlands studies described above, which record some increase in male domestic contributions. However, even where men are doing more, their contributions, measured in time, lag behind women's increased involvement in paid work.

Taking a different approach, a study of time use in Latvia emphasised the impact of education level on life style (Eglite and Zarina, 1993a). People with higher educational levels did less housework and were involved in more public services and social activities.

Studies of living patterns and standards within and between countries

Cross-national comparisons of time use have also proved to be fruitful areas for study. Because of the long traditions of time use surveys in the countries of the former Soviet Union and other eastern European countries, a number of cross-national studies involve countries from that part of the world.

Many of these are studies in the "way of life" tradition. "Way of life" is defined as the "system of activities regularly performed in order to satisfy the different demands of individuals and families" (Andorka and Harcsa, 1986). Time use information is used to measure differences in the time committed to paid work, household work and free time as a measure of comparative living standards. Several studies have used indicators of this kind to compare life under market and planned economies as well as changes in response to economic development. For example, Andorka and Falussy (1981) describe differences between the life styles of various social groups in Hungary using "total committed time" and "free time" as indicators of living standards.

Andorka and Harcsa (1986) compared life in Hungary, Poland and Finland. Common and divergent features of the use of time were interpreted in terms of the similarities and differences of the modernisation processes in these societies. They concluded that Hungary was in a phase of economic and social modernisation which demanded extraordinary efforts from certain sectors of the population in terms of working time and way of life, that Poland was in an earlier phase of modernisation and that Finland had attained a level where social differences had diminished and people had a more varied use of time whatever their place in the social strata.

Another study by Barbarczy *et al* (1991) compares changes from the 1970s through the 1980s in the "way of life" of the populations of Finland and Hungary, which, like the study by Andorka and Harcsa, revealed the mounting effects of Hungary's change from a planned to a market economy and demonstrated the value of time use in comparing the effects of very different histories of social and economic organisation. The study found that in Finland there was a decrease in time spent on personal needs and education and a slight increase in time spent on gainful employment. In Hungary, however, time spent on gainful employment decreased, although it remained greater than in Finland, and more time was spent on personal needs and education. Differences in the economic situations of the two countries were reflected in the greater time spent on household work and food preparation in Hungary due to a lack of resources such as prepared foods and labour-saving household technology, and in the greater involvement of women in paid employment in Finland. It showed that people in Finland worked fewer hours in paid jobs, but could still earn enough to live on while people in Hungary worked longer hours in their primary employment and increasingly took on extra work to supplement their incomes.

Patruschev compared life in soviet and capitalist countries in the early 1970s, and found differences in the details of time spent by women on paid and domestic work, which he related to high levels of childcare provision in the USSR, but a surprising similarity in time spent on the main activities by employed men and women in both countries (Patruschev, 1974).

Another major study compared changes over time in Finland, Latvia, Lithuania and Russia (Niemi *et al* 1991). Again, free time is used as an indicator of well-being: "Free time is one of the most significant conditions affecting the welfare of the population. The more free time a person has in a year, in a week or in a day, the greater the opportunities he or she has to relax and restore the ability to work, as well as to exercise freedom of choice and further his or her personal improvement." (Niemi, 1991: 21)

The study identified several trends which appear to be occurring to a greater or lesser extent in all industrial countries:

- a reduction in time committed to paid work;
- a reduction in the time spent on housework by women;
- women continuing to do the greater share of domestic work even when they are in full time paid jobs;
- a decrease in the time spent on sleep, and changes in leisure activities with increased time spent watching television.

Cross-national studies are also used to compare the status of women. A recent United Nations publication analyses the time use of women in Europe and North America (Niemi (ed), 1995). This study, which is discussed in the following chapter, uses a cross-national overview of time use data collected over a number of years to describe trends in women's paid employment, unpaid work and leisure.

As well as offering indicators of national development or women's status as reflected in life style, time use studies can offer indicators of individual well-being within a given population. Statistics Canada has included time use surveys within its general social survey. The data was analysed to examine time use of people at different stages of their lives and assess their quality of life not only by measures of time spent on different activities, but by responses to questions on perceptions of time pressure (Statistics Canada, 1995: 59).

Manfred Garhammer, University of Bamberg, Germany, has analysed time use data from Germany, Spain and Sweden to illustrate differences in leisure and work patterns between northern, central and southern Europe (University of Lüneburg, 1998: 11-13).

Studies of quality of life

In addition to these broad comparative analyses, there are a number of more focused studies which use time use data to examine specific aspects of quality of life in different countries. Harvey and Grønmo (1986) compared social contact in Canada and Norway, using time use data qualified by indications of "with whom" each activity was done. No significant differences were found in time allocated to total paid work, unpaid work, personal care and leisure, but disaggregated data revealed differences in the ways Canadians and Norwegians organised their lives.

Fox and Nichols (1983) used small-sample time use surveys in North America to examine patterns of time spent by wives on household work and on paid employment. They concluded that increases in wives' paid work hours had little effect on the household work done by husbands and children, resulting in a "time crunch" for the women, to the detriment of their well-being. Their finding, like that of Bittman in Australia, challenged assumptions that paid and unpaid work are becoming more equally divided within couples.

Hendrix (1986) uses comparative time use data to examine whether Americans are becoming more "harried" through having to fit too many activities into their day. He develops a measure of "harriedness" from a longitudinal time use panel study.

Douthitt (1984) proposes that time should be a component in poverty measures. Sole-parent families have half the time available in two-parent families to divide between earning an income and providing unpaid domestic services. Douthitt developed a poverty measure which included time as well as income. When this measure was applied he found that time-poverty rates exceed poverty rates based solely on income for all the family types studied except unemployed single mothers who have low income but high available time in comparison with employed single parents and two-parent families. The proposal that time use should be included in poverty measures is also supported by Bonke (1993).

A similar proposal is made by Maria Sagrario Floro (1995a) who reviews the lives of women in a

number of countries including some developing states. She proposes that women's high work intensity should be considered as a dimension of their well-being: "The seriousness of the effects of work intensity particularly on women's health and children's well-being strongly suggests that the qualitative dimension of time use deserves urgent attention." (Floro, 1995a: 1)

Other traditional uses

The following summary lists a further set of some of the most common areas for which time use data is used and illustrates the diversity and value of this kind of information. The majority of the applications for time use data referred to in this brief overview will be examined in more detail in the following chapters.

The distribution of paid work and household activities

As noted in chapter 1, time use data is used to analyse the distribution of paid and unpaid work among different groups in the population such as men and women, or people of different ages or ethnicity. It is the basis for estimates of the value of unpaid production.

People who provide care

Time use data is used to analyse the distribution of responsibility for the care of children and people who are sick or have disabilities and is used to study the impact of providing care on the lives of care-givers. It is useful in documenting the balance between parallel formal and informal service provision, and the impact that providing care makes on the carer's ability to undertake paid work, and on her or his standard of living.

Voluntary work

Participation in voluntary work of various kinds and the connections between voluntary and market services are investigated through time use data. In New Zealand, information of this kind would make a valuable contribution to policy development in a range of areas, such as education and health.

Labour market participation

As well as revealing unpaid work, time use data has been found useful in providing more accurate statistics on actual time spent in paid employment, multiple job-holding, and unusual patterns of paid employment.

Activity patterns of specific population groups

Time use data offers information on the living patterns of specific population groups. For example, it is used to study the activities of older people which can assist in the provision of appropriate services and leisure opportunities, the lives of children and young people, or the activities of unemployed people. It could provide important information for the development of policies aimed at assisting unemployed people to return to paid work.

Urban planning

Time use data can describe the distribution of activities between homes and public spaces, and the use of transport. Because it shows where people are and what they are doing at various times of the day, it can be analysed to provide information on energy demand and environmental pollution. Integrated information on work hours and service use assists in planning in such areas as the location and opening hours of shops, recreational facilities and urban transport.

Time use data can also be useful for civil defence and emergency planning. In Finland, for example, the Centre for Radiation and Nuclear Safety used time use data to provide information on where to reach people in times of emergency.

Leisure activities

There is a long tradition of using time use data to study leisure activities, such as the rates of participation in cultural or sports events and health maintenance activities such as exercise. It can help identify what groups are participating in activities of this kind for the better targeting of health promotion programmes or the marketing of leisure goods and services. Time use surveys are also useful for the detailed study of media use and analysis of the impact of the mass media on other leisure activities.

National development issues

Time use surveys are particularly useful for gaining information on economic activity in developing countries where large sectors of the population live by subsistence farming and home production. This information is important for the appropriate targeting of aid and development programmes. The value of information of this kind is not limited to developing countries, however, as non-market production occurs to some extent in all economies, including New Zealand's.

Summary

One of the main uses of time use data to date has been for the development of social indicators for comparative studies of the quality of life. Consistency of data collection allows comparisons to be made between countries as well as between different groups within the same population. Repeat surveys enable the identification of trends over time. Comparative time use studies reveal a number of trends in the lives of people in industrial countries. Economic development results in men working fewer hours and having more time for leisure. Married women are increasingly involved in paid work, but the evidence is that men are taking up unpaid work only slowly or, in some countries, hardly at all, resulting in a double burden for working women. New domestic technology has not necessarily led to a reduction in hours of domestic work. Rather, there has been a redistribution of domestic activities with more time spent on child-care and shopping. The introduction of television has resulted in people going to bed later.

Overall, the use of time use data for the study of living standards emphasises the importance of leisure time as an aspect of well-being.

Chapter 3:
The importance of time use data in the 1990s

Introduction

In the late 1980s and 1990s interest in applying time use data has shifted from academic analysis of life style to policy-related analysis of unpaid production. The uses of time use data in the 1990s have been influenced by the international debate on including unpaid production in national economic accounts reviewed in chapter 1, and by recognition of the desirability of making visible women's unpaid contributions in the home and community as a step towards gender equality. This chapter opens with an account of the international policy context, and then discusses two lines of research that have developed in response to that context, those involving methodologies for measuring and valuing unpaid work, and those which use time use data to examine the distribution of paid and unpaid work between men and women.

The policy context

The measurement of unpaid household production has a high profile in the work of several international organisations and features in several international policy platforms or charters. The theme of this international focus is gender equality. It is recognised that in both the developing and the industrial world women do the greater share of unpaid work, and men do the greater share of paid work. This imbalance has been identified as a major factor in women's lower status, lack of access to resources and increasing poverty. The 1995 Human Development Report of the United Nations concludes: "A major index of neglect is that many of women's economic contributions are grossly undervalued or not valued at all - on the order of 11 trillion a year." (United Nations 1995: 6)

The 1995 Human Development Report focused on women's status worldwide. Time use data from 31 countries - 14 industrialised countries, 9 developing countries and 8 countries in eastern Europe and the Commonwealth of Independent States - was used to measure women's economic contributions. The analysis demonstrates that if unpaid and paid work are considered together, women are found to do a larger share of the work in both developing and developed countries, and the larger share of women's work is unpaid and outside the System of National Accounts (SNA) production boundary. "Much of women's work remains unrecognised and unvalued. This has an impact on the status of women in society, their opportunities in public life and the gender blindness of development policy." (United Nations, 1995: 87)

Analysis of this kind at an international level sets a climate in which it is increasingly difficult to ignore issues related to gender and unpaid work at the national level. Several other international organisations have contributed to this climate.

For example, Convention Number 156 of the International Labour Organisation is concerned with equal opportunities and equal treatment for men and women workers. Recognising that the demands of family life may be a barrier to paid employment, Convention 156 encourages member countries to develop policies to ensure that workers with family responsibilities are not discriminated against, and to reduce conflict between family life and employment. The Federal Government of Australia has developed a policy in response to this convention which encourages a more equal sharing of domestic work between husbands and wives. A New Zealand response was the project to promote "family friendly" workplaces. For projects of this kind, time use data provides empirical evidence of unequal sharing within households and the barriers to participation in paid work presented by caring responsibilities.

The United Nations has produced a series of publications addressing the improvement and use of statistics and indicators on the situation of women (United Nations, 1990:2). These publications support the use of time use surveys as well as conventional statistics for better measures of women's economic contribution and for indicators of women's situation in both developed and developing countries.

The United Nations International Research and Training Institute for the Advancement of Women (INSTRAW) promotes improvement in statistics and indicators on women worldwide. In the view of INSTRAW researchers, statistics on women are essential to the advancement of women in all countries: "Sound statistical information has an important role to play in efforts to review the economic and social position of women and to measure their contribution to development." (INSTRAW, 1989: 1)

Since 1992, INSTRAW has been involved in an initiative to improve statistics on unpaid work. As a first step in this project, INSTRAW published in 1995 a major report on the measurement and valuation of unpaid contributions which offers information on the latest developments in time use methods and methods for attributing value to unpaid productive activities measured by time use surveys. The introduction to this report states that the reason for developing better statistics on unpaid work is the improvement of government policy through the provision of better data. In particular, the problem of monitoring shifts in the locus of work between the market and non-market sectors can only be measured if work in the non-market sector is measured and valued. Including both market and non-market work in economic statistics gives a more accurate measure of economic growth (INSTRAW, 1995: 1).

While INSTRAW's focus is on women's work, this analysis moves beyond gender to include differences in the economic activities of a number of different sectors of the community, including different ethnic groups or people at different ages and life stages.

The OECD is also active in promoting the measurement of household production in recent years. An *Information Network on Non-market Household Production* was established for the collection and dissemination of information on efforts to measure unpaid household work, and work has proceeded on the valuation of household service production for the national accounts (Chadeau, 1994). A recent OECD publication, *Household Production in OECD Countries*, reviewed data sources and measurement methods of household production within the OECD (OECD, 1995). The OECD is currently working on setting up a satellite account for the household sector (University of Lüneburg, 1998: 6-7).

Within the OECD, the Working Party on the Role of Women in the Economy promotes the measurement of women's unpaid work as a key to the understanding of women's economic contribution. The working party has been responsible for developments in methods for evaluating unpaid work. Recently, it was suggested that the Working Party work on a policy framework for evaluating the policy implications of unpaid work.

The United Nations Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) requires ratifying countries to make periodic reports on progress on eliminating discrimination against women. While it does not specifically address unpaid work, time use data would assist countries in giving the CEDAW committee a more accurate and detailed response on issues such as Article 5: Sex Roles and Stereotyping and Article 11: Employment (Ministry of Women's Affairs, 1998).

As noted in chapter 1, the World Conferences on Women have produced more specific requirements regarding the measurement of unpaid work. The Nairobi Forward Looking Strategies for the Advancement of Women, which resulted from the World Conference on Women in 1985, states: "the remunerated and, in particular, the unremunerated contributions of women to all aspects and sectors of development should be recognised, 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)

A decade later, in 1995, the issue was debated again at the Fourth World Conference on Women in Beijing. The Beijing Platform for Action was accepted by consensus by the Conference. The statement on measuring unpaid work in the Platform for Action reflects a recognition of the complexity of the task which had developed in the intervening years. Actions to be taken under strategic objective H3 include:

> "f. Develop a more comprehensive knowledge of all forms of work and employment by:
>
> (i) Improving data collection on the unremunerated work which is already included in the United Nations System of National Accounts, such as agriculture, particularly subsistence griculture, and other non market activities:" and
>
> "(iii) Developing methods, in the appropriate forums, for assessing the value, in quantitative terms, of unremunerated work that is outside national accounts, such as caring for dependents and preparing food, for possible reflection in satellite or other official accounts that may be produced separately from but are consistent with core national accounts, with a view to recognising the economic contribution of women and making visible the unequal distribution and remunerated and unremunerated work between women and men."

The 1998 CEDAW report highlights the 1998/99 Time Use Survey in the context of New Zealand's progress in implementing the Beijing Platform for Action (Ministry of Women's Affairs, 1998: 3).

International actions of this kind provide a context within which it is becoming increasingly difficult for governments not to take measures to collect statistics on unpaid work. Statistics are, however, only the first step. The overall aim is to ensure that policy decisions take account of the reality of women's lives, including their greater responsibility for unpaid caring and household work. Lack of information about the unremunerated economy may result in distorted or inaccurate policy analysis. Policy changes which result in the reduction of productivity in one sector of the economy, such as the government-funded care of the chronically ill for example, may in fact represent a transfer of this productivity from the paid to the unpaid sector. Without data on work in the unpaid sector an accurate assessment cannot be made of the impact and long-term costs and benefits of that policy change.

Gender analysis of public policies is increasingly recognised as an essential component of policy advice. Strategic objective H2 of the Beijing Platform for Action demands that gender perspectives are integrated in legislation, public policies, programmes and projects. The objective requires that governments: "seek to ensure that, before policy decisions are taken, an analysis of their impact on women and men, respectively, is carried out."

Because of the unequal distribution of paid and unpaid work between men and women, data on time spent in household and caring work is an essential component of gender analysis. Time use data can therefore be expected to be used increasingly as a tool for policy analysis.

A commitment to applying gender analysis to policy advice at the national level is beginning to emerge in New Zealand. The former New Zealand Minister of Women's Affairs, Rt Hon Jenny Shipley, identified mainstreaming a gender perspective in the development of all policies and programmes as one of five areas in a national strategy of response to the Beijing Platform for Action. The intention is to ensure that gender analysis is included routinely in the policy development process in mainstream policy agencies. The Ministry of Women's Affairs has published a booklet explaining the purpose and techniques of gender analysis which is used as the basis for training seminars and exercises in policy agencies (Ministry of Women's Affairs, 1996a). Because time use surveys offer detailed information on the differences between the lives of men and women, as well as in the lives of different groups of women, they are an essential component for the gender analysis of policy.

The Canadian Government, with the assistance of Status of Women Canada, has begun to include gender analysis in the policy development process, the first example being the gender analysis of the impacts of a new employment insurance act (Human Resources Development Canada, 1996). In correspondence to the Ministry of Women's Affairs, Status of Women Canada outlined a number of policy areas where time use data has been used recently to contribute to gender analysis, including the areas of child support and retirement income. Lorna Baillie of Statistics Canada (Baillie, 1997) explains further how time use data links to polices on economic growth, human resource development and social cohesion. Statistics Canada conducts a separate survey of giving and volunteering which enables study of the links between time availability, capacity and desire to volunteer, and social capital.

An Australian example of analysis which makes visible women's contribution in an area which encompasses both the paid and the unpaid sector is *The Price of Care* (Office of Women's Affairs, Victoria, 1994). This publication reviews the provision of care for people with disabilities and older people, and the disadvantages suffered by those providing care, and suggests policy strategies for alleviating these disadvantages. Time use data provides a measure of the unpaid provision of such care.

While an awareness of gender inequality has been a driving force in the creation of this policy climate, it should be noted that valuing the unpaid sector of the economy would reveal a lot more than differences in the contributions of men and women. Time use data measures the contributions of all sectors of the community, and unpaid work could be analysed according to age, ethnic group, and even region if the survey was so designed. Analysis would reveal not only differences in paid and unpaid work patterns of men and women and age and ethnic groups, but, because women are not a homogeneous group, it would also reveal differences between different groups of women.

It is clear from this overview of national and international policy debate that the measurement and valuation of unpaid work is a response to the understanding that better information on the domestic sector of the economy contributes to more accurate economic analysis and improved policies in both developing and developed countries.

Measuring non-market production

In response to this growing climate of recognition of the need for better data on the domestic sector of the economy, a body of research has developed. The research follows the two main themes of the debate. One line of study, which has its origins in the work of economists Mincer and Becker, is concerned with providing a more accurate description of a national economy by including household production in traditional measures of economic status or progress; the other line of study, which has its origins in feminist analysis of the nature of work, has the agenda of improving the status of women by making their economic contribution visible and valued. Both strands of the debate are in fact ways of considering the same issue.

A more accurate description of a national economy

Economists of domestic production argue that domestic and market production should not be conceptually separated. Luisella Goldschmidt-Clermont of the Université Libre de Bruxelles is a leading authority on measuring domestic production. She points out the arbitrary distinction that is made between what is in fact a continuum of productive work: "Production processes occur without discontinuity through the market and household non-market sectors of the economy. The transformation of natural resources, eg agricultural products, into goods ready to satisfy human needs is a chain of successive production processes which do not change nature when passing the borderline of monetary exchanges. Unpaid work in the household still transforms and distributes, ie adds "value" to, products bought on the market before they are physically consumed. The borderline between production and consumption, as drawn in economics, is only a conventional line, convenient for distinguishing between relatively easy to measure money transactions on the one hand, and non-monetary production for exchange or self consumption on the other." (Goldschmidt-Clermont, 1982: 1)

There is overlap and interaction between the market and non-market sectors which according to Goldschmidt-Clermont is not fully understood, and she insists that "one prerequisite for the analysis of economic interactions between the market and the household ... would be the existence of common units of measurement." (Goldschmidt-Clermont, 1982: 1)

While market units are usually measured in money, household work is measured in time units, which are translated into money units by economists assessing the money value of unpaid household work. Goldschmidt-Clermont has made a major contribution to the development of methodologies for ascribing value to non-market work, and to applying these methods to the assessment of the economic value of household work in various countries (Goldschmidt-Clermont, 1987, 1994 and 1995).

Australian Duncan Ironmonger has also made a major contribution to the debate on household work as a sector of the economy. He drew attention to the issue of household production in his publication, *Households Work* (Ironmonger, 1989), producing input-output tables for household production based on a valuation of time use data, to set beside the input-output tables produced for the market economy (Ministry of Women's Affairs, 1990).

Ironmonger argues that there are two economies, the market economy and the domestic economy, and that accurate national accounting should include comparable figures on both economies. Ironmonger has proposed the introduction of National Time Accounts, a "set of estimates of our total income and expenditure of time" which would be prepared for each country on a continuous up-to-date basis to show how households in each country allocate time between paid work, unpaid work and leisure. The advantage of time accounts would be: "a more complete perspective and understanding of the role of households in the total economy, not only in regard to household productive activities, but also in relation to leisure activities and interactions between the household and the market." (Ironmonger, 1993: 375) Ironmonger presented his proposal for National Time Accounts to the 1992 Rome conference on time use methodology. He expands on it in his paper for the 1996 conference of the International Association for Research on Income and Wealth (Ironmonger, 1996 and 1993).

Ironmonger presented a cogent argument for the measurement and valuing of unpaid work to the International Conference on the Measurement and Valuation of Unpaid Work in Canada in 1993, and also to the 1997 conference in Washington DC on Time-Use, Non-Market Work and Family Well-being. Stating that economic accounting which ignores household production is essentially one-eyed, he emphasised the extent of production in the household sector: "What we are talking about ... is making visible, in the most useful way possible, about one half of all valuable economic activity." (Ironmonger, 1994: 35) Both halves of the economy need to be considered if it is to be fully understood: "The total economy is a two-legged animal with a market leg and a household leg. Both are necessary to run." (Ironmonger, 1994: 35)

Ironmonger's argument is that the domestic half of the economy must be included in analysis of economic change and trends. He cites evidence that productive activity may be shifting back from the market into the household in the post-industrial society, and says there is a need for data to measure changes of this kind. He draws an interesting parallel between the development of the System of National Accounts in the years following the Second World War, and the development of awareness and action on measuring unpaid work, which he sees as following a similar path at a later point in history, moving towards international acceptance of the need to collect statistics on domestic production according to internationally agreed standards. Ironmonger concludes that time use surveys provide the most reliable measures of the magnitude of household production.

Activities carried out in the household are not all work. They include leisure and recreational pursuits and personal care. The boundary between work and non-work in the household is drawn according to what is known as the "third person criterion". An activity is deemed to be productive if it might be performed by someone other than the person benefiting from it, that is, if it can be delegated to someone else while achieving the desired result (Goldschmidt-Clermont, 1994: 69).

Ironmonger extends this definition to describe what he calls the "household industries", that is, productive activities conducted by households, using household capital and the unpaid labour of household members to provide goods and services for the household's own use. He groups household productive activities into the following categories, all of which have equivalents in the market:

- preparation of food and meals;
- laundry and house cleaning;
- shopping;
- child-care;
- gardening;
- repairs and maintenance;
- other household tasks; and
- voluntary and community work.

The size of these industries is measured by the total hours spent on each. For example, Ironmonger reports that in 1992 Australian adults spent 74 million hours a week on meal preparation, 70 million on cleaning and laundry and 69 million on shopping, which makes these household industries comparable with the three largest market-sector industries: wholesale and retail trade, community services and manufacturing. These involve 55, 47 and 42 million hours per week respectively.

Analysing by sex, Ironmonger concludes that in 1992, women did 65 per cent of the unpaid work in household industries and men did 65 percent of the paid work in market industries (Ironmonger, 1996: 2).

Methods of valuation

It is one thing to accept the importance of measuring the value of household work, and another thing to do it. While production in the market is valued according to prices for goods and services, assigning value to goods and services that are not paid for requires more complex methods and an agreed set of definitions and standards.

While Ironmonger compares the market and household economies by comparing hours of work, setting up satellite accounts for household production for comparison with national accounts requires the expression of household production in money values. A considerable amount of work has been done on arriving at an appropriate valuation methodology for household work, and, as pointed out in chapter 1, several methods are currently used.

Goldschmidt-Clermont provided an overview of these methods in her presentation to the International Conference on the Measurement and Valuation of Unpaid Work in Canada in 1993. She pointed out that there are two unknown quantities: the value of unpaid work and the value of household output. Two basic approaches to the monetary valuation of unpaid work are available. The first is to borrow from the market a value (price) for household output and derive from it the value of labour, that is, to make an "output-based valuation". The second is to borrow from the market a value (wage) for labour and to derive from it the value of the output, that is, to make a "wage-based" valuation. The problem is that these methods produce different results. Wage-based valuations are complicated by debate as to which wages are most appropriate to be used in such valuations. As noted in chapter 1, in some cases, the wage of a substitute household worker is used. These may be a general replacement worker such as a housekeeper, or the wages of specialists may be used to evaluate work in different kinds of household production (cooks, laundry workers, child-care workers and so on). Another approach is to measure the "opportunity costs" of the time, that is, the wage forgone by the individual providing the unpaid work. Decisions have to be made as to whether this cost should be calculated as equivalent to the average wage of all workers, all female workers or another group of workers.

None of these methods is without problems. Goldschmidt-Clermont concludes that the valuation method chosen will depend on the end-use to be made of the information. Wage-based methods are the easiest methods to use, but economic analysis requires the actual value of the returns to labour derived from output-based calculations. However, output-based valuations require price data and data on the volume of household output. While price statistics are widely available, data on the volume of household output is not yet collected at a national level in most countries. The feasibility of collecting data on household output has been demonstrated in Finland where a nationally representative survey covering all household productive activities was carried out. However, until such surveys become an accepted part of national statistical collections this method of valuation is not feasible (Goldschmidt-Clermont, 1994: 74-75).

There is sufficient agreement on methods, however, for some countries to take up the challenge of producing valuations of household work in extended national accounts. Lutzel (1989) describes the methodology for drawing up satellite accounts on household production for the Federal Republic of Germany. He notes that the most important prerequisite for drawing up such accounts are detailed and representative time budget surveys, so that data on time use can be estimated for all households and broken down for all fields of activity by households and by groups of people and gender. The third-person criterion is used to define those activities to be included, and the hourly wage rate of people who perform similar activities in the paid workforce will be used to estimate the value of the household work performed to obtain the net value added from household work. In order to obtain the gross value added, depreciation of consumer durables and paid taxes on production, where applicable, have to be added. The value of the goods and services produced, that is the output, is computed according to the input approach by adding to the gross value added the goods and services used during production (Lutzel, 1989).

Canada is among the countries whose national statistical offices are making efforts to extend measures of production. The National Income and Expenditure Accounts for Canada, quarterly estimates fourth quarter 1993, include a section on the valuation of household work based on time use information collected during the General Social Survey in 1992. Three methods were used to value household activities: opportunity costs based on net (after tax) and gross (before tax) hourly earnings, and replacement cost, based on specialist wages rather than a general replacement person. According to the net opportunity cost method, the value of household work represented 30.6 per cent of GDP; according to the gross opportunity cost method the value was 46.3 percent of GDP; and the replacement cost estimate of the value of household work was 41.4 percent of GDP (Statistics Canada, 1993: xxix-xl). A more recent Canadian publication develops a system of Total Work Accounts, which integrates information about time spent doing both paid work and unpaid work for use in public policy (Stone, 1996).

Differences in methods used and in the details of how each method is applied make international comparisons problematic. A 1995 OECD publication summarises monetary estimates of household production for those member countries where the information is available. Most of the countries included present their valuations according to more than one method. The wide range of figures produced both within and between countries suggests that a great deal of work must be done on standardising valuation methods before meaningful comparisons can be made (OECD, 1995).

The OECD's National Accounts Division is continuing to develop methodologies for satellite accounts for the household sector. According to Ann Chadeau, this includes methodologies to measure the value of intermediate consumption and consumption of fixed capital during the household production process (University of Lüneburg, 1998: 6-7).

Studies of the distribution of household work

The second line of enquiry into household work is that of making women's contribution to the economy visible and valued. Because unpaid household work is done predominantly by women, its visibility is important to those concerned with the analysis of women's lives, both academically and in relation to policy.

In her opening address to the International Conference on the Measurement and Valuation of Unpaid Work in Ottawa in 1993, the Honourable Mary Collins, Minister Responsible for the Status of Women in Canada, made the connection between women's status and the invisibility of their economic contribution. She quoted the United Nations analysis that women are "half the world's population but put in two thirds of the working hours, grow half the food, but receive one tenth of the wages and own only one percent of the world's property", and claimed that women's invisibility in National Accounts "belittles our role in the economy and society, chips away at our self-esteem, leads policy makers to overlook the impact of decisions on women's lives, and makes it difficult for women to achieve equality in our society" (Collins, 1994: 3)

It is not surprising, therefore, that women's policy units are often major clients for time use data. Women's policy agencies in Australian, Canada and New Zealand have worked with their national statistical offices on the development of time use surveys, and have made extensive use of the results. The New Zealand December 1996 Coalition Agreement identified a time use survey as a key initiative under its women's issues policy statement.

From the earliest time use surveys, time use data has provided useful indicators of women's status relative to men's by providing measures of paid and unpaid work by gender. The previous chapter showed how data from repeated time use surveys has been used to analyse life styles, including differences in the work patterns of men and women. Researchers with an interest in the changing roles of men and women have carried out more detailed studies of shifts in paid and unpaid work. An example is the study by Iiris Niemi and Hanna Paakkonen which describes changes in time use in Finland in the 1980s. They found that actual time spent on housework remained constant but men's share of the household work increased (Niemi and Paakkonen, 1990).

Kirjavainen *et al* (1992) compare the gender distribution of housework time in Finland and Bulgaria, countries which have both carried out more than one time use survey. Their study shows the influence of different social and economic environments on women's lives. They found that time spent by women in paid employment was similar in both countries. In Finland, men have taken over some housework in recent years, while Bulgarian women continue to do nearly all the household work. Finnish women have more free time than Bulgarian women. These differences can be accounted for by history and economic development. Bulgaria is a previously socialist state where policies have involved women being in the paid work force and public services such as child-care centres. In Finland, a country with a market economy, debate on women's status has been widespread, breaking down the gender division of work in the household.

A particularly thorough exploration of housework was made by Eila Kilpio, Riitta Santti and Ritva-Anneh Otva (1981 and 1982). This study provides an extensive theoretical overview of reasons for the study of housework and reviews European time use data collected prior to 1980. The pre-1980 studies demonstrate consistently that women did the greater share of the housework. For example, early Finnish studies showed that less than 10 percent of the total time for housework activities was accounted for by family members other than the wife (Kilpio, 1981: 20). Quoting results of the Szalai 12-country study, Kilpio concludes that men's participation in unpaid housework was at that time greater in socialist countries than in the capitalist countries, a result which conflicts with the more recent study in Finland and Bulgaria referred to above (Kilpio, 1981: 21).

The United Nations publication on the time use of women in Europe and North America, mentioned briefly in the previous chapter (Niemi (ed), 1995), gives a cross-national overview of time use data to describe changes in paid and unpaid work and leisure time from the 1960s to the present. A number of trends are identified. Until the 1960s, the household division of labour was established. Men were in paid work and married women did the housework. The working week for employed people was reduced in the years after the war, with the introduction of the 40-hour week in most European countries.

During the 1960s, the introduction of new labour-saving technologies made an impact on household work. But, contrary to expectations, washing machines, vacuum cleaners and cooking aids did not reduce hours spent on household work so much as rearrange them. Women spent less time cooking, more on cleaning and errands. Time spent on laundry remained constant and standards of cleanliness increased, with more frequent changes of clothing and linen (Niemi (ed), 1995: 4). More recent studies bear out this trend, with women spending less time on housework itself, and more time on shopping and child-care with little diminution of their total unpaid work.

During the 1970s and 1980s, married women's participation in paid work increased, as did part-time work. Between one-third and one-quarter of women in the study were in part-time employment. However, the amount of time spent on household work remained constant in many countries, although the gender distribution altered, with men doing more and women doing less, as social norms changed. For example, in the 1970s, there was a marked increase in men's involvement in housework measured by time use studies in Canada, Norway and the United Kingdom. This trend has been described as the "post-industrial convergence" in gender roles, as it is evident in a number of countries (Gershuny, 1993). As noted in the previous chapter, Bittman's analyses of Australian time use data would suggest that this convergence is occurring more slowly in Australia (Bittman, 1993). Men have not moved into household work at the same rate that women have taken up paid work and a gender imbalance remains, with men doing about one-quarter of the total unpaid work in the studies reviewed. Closer examination of time spent on each activity reveals that men are taking on some of the shopping and child-care, while women continue to do most of the food preparation.

In addition to these cross-national overviews, a number of local studies relating household work to women's status have been published. Yannick Lemel has used time use data to study household activities in France. Lemel's purpose in studying household activities is to gain more information on the place of household activities in individual and social life, not only to set household work in a broader economic context but also to explore the gender division of labour. Analysis of time use over the lifespan shows that once they become part of a couple, women continue to service the needs of men through their unpaid work (Lemel, 1984: 38). Lemel and Caroline Roy take this analysis further, making an assessment of women's status based on the perceived value of all activities (Lemel and Roy, 1991). They develop a methodology for stratifying activities according to the meaning and value actors attach to them. The issue is to define where the occupation "housewife" sits in the hierarchy of professions.

The results of national time use surveys traditionally present the distribution of household work according to gender. For example Provonost's analysis of time use in Quebec found that women did twice the housework men did, and three times the child-care (Provonost 1988). However, interest in women's status has led to more detailed analysis of national time use data. One fruitful course of analysis has been to break the data down according to the life-cycle stages of households, as was done with data from the 1992 Canadian time use survey which focuses on discovering which groups in the community experience excessive time pressure in their lives (Statistics Canada, 1995). It was found that the group currently caring for young families - the baby boomers born just after the war - were particularly stressed for time, as typically families had two parents in paid work and were also caring for children. Canada stands out in the cross-national comparison of women's time use in that the peak time spent by women in both paid and unpaid work occurs in the same age group, whereas in other countries they tend to occur at different times in the life cycle, suggesting that Canadian families may suffer particularly high stress peaks (Lingsom, in Niemi (ed), 1995: 58).

The United Nations publication on the time use of women in Europe and North America includes a chapter on women's time use over the life cycle (Lingsom, in Niemi (ed), 1995: 55). Family life-cycle stage "explains" more of the variations in women's time use than age alone, although the two are closely connected. A peak in time spent on unpaid work occurs at the time of family formation. Several studies confirm that the most marked increase in women's unpaid domestic work occurs at the birth of the first child, and that domestic work increases with family size (see for example Bittman, 1992). Although Lingsom's analysis focused on women's unpaid work at different life stages, her analysis demonstrates the broader value of analysing time use according to cohorts or age groups. A similar technique could be used to describe changes over the lifespan in the activities of other population groups.

The conclusion that can be drawn from the analysis of household work by gender is that, although there have been changes in the time women spend on paid and unpaid work, women in all countries continue to do more of the combined paid and unpaid work than men, and that this is particularly marked for women combining paid work with responsibility for young children. If free time is taken as an indicator of well-being, this conclusion suggests that there may be differences in standard of living for men and women not only in the same country but in the same household.

Summary

The importance of time use surveys in the 1990s has been enhanced by international moves to include unpaid production in the System of National Accounts, and the recognition by a range of international agencies, including the United Nations, that measuring and valuing unpaid work is an essential step in improving the status of women worldwide. Statements emerging from the World Conferences on Women include requests for national governments to collect statistics on unpaid work, the latest being a very specific demand in the Platform for Action from the Beijing Conference.

In this context of international awareness, studies of unpaid work have proliferated. These studies follow two themes. Some focus on the development of accurate methodologies for measuring and valuing unpaid work as part of the national economy, while others use time use data to provide detailed analysis of the distribution of unpaid work between the genders and over the lifespan, and trends of change in this distribution.

While the focus on gender reflects the current emphasis on women's status as an international issue, these analyses demonstrate the way time use data could be used to describe the different living patterns of other groups within a population, contributing to a better understanding of life in a multicultural or complex society.

Chapter 4:
Using time use data to research specific areas

Introduction

As well as providing information for the analysis of activities in the population as a whole, time use data is also valuable for research on the lives of sub-groups within the population, and for the examination of specific issues and areas of enquiry. This chapter describes how time use data has been used in areas such as labour market research, research on older people, children and people caring for the chronically ill or people with disabilities, unemployment and for leisure studies and town planning. The value of time use data for legal issues is also outlined. The chapter finishes with an account of the use of time use data in developing countries.

Time use data and labour market research

Several writers describe the value of time use information for enhancing data provided by traditional labour force surveys. This is because time use surveys record the actual time spent on labour market activities both in the workplace and elsewhere. They record not only time worked, but also time spent on official and unofficial breaks, time spent on work-related travel, and time spent on paid work outside working hours.

The importance of time use data for the measurement of employment, unemployment and underemployment was recognised by the Thirteenth International Conference of Labour Statisticians in 1982, which encouraged the collection of time use data to measure these aspects of the labour force. (Mata-Greenwood, 1993: 390).

The INSTRAW publication on the statistical classification of women's activities emphasises that the accurate measurement of labour market participation is important for women: "To accurately assess the labour market conditions of a country it is important to identify employment and under-employment and to take into account that not all economic activity occurs in the marketplace." (INSTRAW, 1989: 3)

According to Jonathan Gershuny: "Time budget diary collections cover all the activities undertaken by respondents during their diary keeping period. They are, as a result, multi-purpose research tools which can be used to study paid work time, the various sorts of unpaid work, leisure, recreation, personal care and the distribution of these across various groups in society." (Gershuny, 1995: 518)

Adriana Mata-Greenwood of the International Labour Organisation proposed to the Rome Conference on Time Use Methodology that time use surveys should be used to account for the time spent in the paid job plus time spent on paid work not done in the workplace. She suggests that conventional labour force surveys are not able to give a proper measure of time dedicated to paid work activities for all workers. Iiris Niemi has shown that time use surveys give better estimates of time actually worked than conventional labour force surveys (Mata-Greenwood, 1993: 390).

Time use data is valuable for recording the relationship between paid and unpaid work, which is a key to the understanding of women's labour force status. Bittman, Bryson and Donath (1993), for example, used data from the 1987 Australian time use survey to explore factors affecting the household allocation of time to paid work and the determinants of unpaid domestic labour. They found that women's labour force participation did not conform to the theories of labour economics which related to households adjusting their income through women's labour market involvement: "For women, there is a trade off between time spent on child-care and other domestic responsibilities and paid work." (Bittman *et al*, 1993: 78).

They found that women's unpaid work input relates strongly to their marital status, the number and age of their children and whether they were caring for an aged or frail spouse. In other words, the amount of unpaid work they did related to their obligations to care for others (Bittman *et al*, 1993: 76). The conclusion was that women's obligations to care for other family members constrained their labour market participation: "Time use data shows that barriers to women's labour market participation in Australia are ascriptive, so that these barriers flow directly from the fact of being a woman." (Bittman *et al*, 1993: 76)

Lewis and Shorten also use time use information to address the gender pay gap. They explain men's labour market advantage in terms of women's lower and interrupted labour market involvement, which they relate to the division of labour in the household and women's greater responsibility for the household work and child-care. As men's advantage means that they earn more, men continue to put their time into paid work, leaving the women to do the unpaid work, creating a vicious circle which perpetuates women's disadvantages in the labour market and lower pay (Lewis and Shorten, 1987).

As well as providing information about the interrelationship of paid and unpaid work, time use data has been used to interpret patterns or involvement in the labour market at different ages. Silver and Goldscheider (1994) recorded an interesting difference in the work-related behaviour of different age groups: "While all women clearly adjust the time they spend in domestic tasks to the demands of both family and the workplace, younger women are more responsive to the demands of the workplace." The young women reduce their domestic hours more than older women as their time in paid work increases (Silver and Goldscheider, 1994: 1116).

In an essay in the United Nations publication on the time use of women in Europe and North America (Niemi (ed) 1995), Gershuny examines patterns of men's and women's participation in paid employment throughout life. Figures from 18 countries are used to show changes that have occurred from the 1960s to the late 1980s in lifetime employment patterns. Gershuny then uses time use data from each country to examine the relationship between employment status and the full range of men's and women's activities. Gender differences in work responsibilities in the home are found to explain women's patterns of labour market participation in a wide range of countries. Employed women, even full-time employed women, maintain their extra work in the home though to a reduced degree.

Time use studies can also provide useful information on labour market issues at the workplace and household level. An example is the study by Fox and Nikols (1983), referred to earlier, of the "time crunch" experienced by working wives who continued to do most of the unpaid household work in addition to their paid jobs. Here too, time use data is used to examine the interaction between paid and unpaid work, this time at the level of the family. In a study of a different kind, Breedveld (1995) uses time use survey methodology to measure flexible working time in Holland. A study of the lives of small business owners in Czechoslovakia included a time diary with other data collection methods (Viteckova and Gatnar, 1993). These studies used specially designed, small-scale surveys rather than national time use surveys.

These examples demonstrate the value of time use data in extending and explaining traditional labour force statistics, and in particular providing empirical evidence for gender differences in employment. Time use data has also been found to be useful in research into the so called secondary or "shadow" economy, as it can record secondary and unpaid employment activities, and unpaid do-it-yourself activities such as building maintenance.

Studies of ageing and the lives of older people

Several studies have used time use data to examine the lives of older people and the process of ageing. K Victor Ujimoto (1989) reviews the uses of time diary methodology in gerontological research, including both specifically designed surveys and studies based on national time use datasets. He finds that longitudinal studies reveal changes in activity patterns which can provide meaningful information on the well-being of older people for use in developing suitable social environments for them. In a later study, Ujimoto supports the use of time budget methodology for caregiving and eldercare research to ensure the continuous improvement of services (Ujimoto, 1993).

Harvey and Singleton (1989) use time use data enriched with the questions "where?" and "with whom?" to study changing patterns of activity across the lifespan. They find that time use methods are particularly useful in studies of the lives of older adults as they indicate the variety of life styles among this population, how people of different levels of competence in different settings use their time, and how changes in environmental or personal situations can initiate a shift in time use. Time use data can be used to examine the lives of different groups of older people, such as those with handicaps, or ethnic minorities. Their study indicates that as people grow older, they spend less time on paid work and more time on unpaid work. As they age, people spend more time alone.

In another study of ageing, Elliott, Harvey and Macdonald (1986) use time use data to carry out a longitudinal analysis of behavioural changes over the life cycle, and reveal how the use of time is reallocated as a behavioural consequence of individual change.

However, the use of time diary methods with older subjects is not without its problems. At the Canadian Conference on the measurement and Valuation of Unpaid Work, Regula Herzog discussed some of the methodological challenges including accuracy of recall. This problem may become more acute with age.

Carers and volunteers

Time use methods are also useful in studying the lives of those involved in the care of people with chronic illness or disability. Workshops at the Canadian Conference on the Measurement and Valuation of Unpaid Work in 1992 discussed caregiving for seniors, and the need to measure voluntary work. They concluded that there is a need to measure the contribution seniors make to the economy and the community through their voluntary and caring work. At the same conference, Betty Havens discussed caregiving in an ageing society, and concluded that "increasingly we will see the elderly caring for the elderly" (Havens, 1994: 112).

While some studies of the lives of carers use conventional survey methods (for example Wolf and Sold, 1994), time use methodologies are valuable in this area as they record caring or voluntary work in the context of the other activities of people's lives. It can be expected that time use surveys will be used increasingly for studies of this kind in the future as countries develop policies for an ageing population.

Children and young people

Several recent studies have demonstrated the value of time diary methods in studies of the lives of children and young people. National time use surveys do not usually include data on children under 15 or 12 years of age, but specially designed surveys have been used in studies of childhood. Several of these studies were reported on at the Rome Conference on Time Use Methodology in 1992.

One country which has included children in a national time use survey is Bulgaria. The Bulgarian Time Use Survey in 1988 included all ages, from birth to 99 years. The study provided diary material for 2,266 children under the age of six, which were compiled by the children's primary carers. Maria Raikova (1993) reported on the analysis of the data on these children. In her view, the study of children's time use is important for investigating and solving the problems of childhood and outlining the responsibilities of society for the future generation. She found time use added to the understanding of children's growth and development, and their acquisition of essential skills.

Buratta and Sabbadini (1993) reported on a study which used time diary methods to research children's lives from the perspective of psychology and sociology. They commented that children are often invisible in conventional statistics, or are treated as little adults. They examined the structure of the day for both boys and girls, and concluded that children's time use is largely decided by adults. Their methodology allowed respondents to record activities in their own words in their diaries for the qualitative analysis of children's concepts. They concluded: "It looks like there are two different worlds: the younger children's world where free time is first and foremost ... and the older children's world where free time is partitioned and more distinctly categorised: organised sports, non-organised sports, television, reading, where play is substituted, at least partially, by 'educational free time'." (Buratta and Sabbadini, 1993: 56).

Belloni (1993) also used diary methods to reconstruct the way children's time is structured. Using time use methods for a more policy-focused study, Valerie Moller (1993) examined where young black people in a South African township spent their leisure time as a basis for service development.

The 1997 International Association of Time Use Research conference in Stockholm included a presentation on developing time-diary-based measures of investment in young children.

Time use and leisure studies

We have already seen how writers using time use to analyse standard of living used leisure time as an indicator of well-being (see chapter 2). Time diary methods are also valuable for a more focused study of the activities people do in their leisure time. Some of the leisure-related issues that can be explored through time use data are participation in sport, attendance at sporting or cultural events, passive or active leisure and media use. This information is valuable for organisations providing or marketing leisure services, but is also important for policy development and sociological analysis.

Gershuny (1986) addresses the broad issue of leisure in developed industrial societies. He traces two seemingly contradictory theories, one that "we must face up to a continuing and perhaps increasing level of involuntary leisure in the form of unemployment", and the second that the "dominant characteristic of a developed society is its attempt to fit too many consumption activities into too little time", that is, we have too little leisure time for all we want to do in it (Gershuny, 1986: 431).

Gershuny's view is that unemployment is not so much a source of leisure as "empty time". Leisure, as he sees it, involves the consumption of leisure services, and with greater productivity leisure services appear to be overcrowding available leisure time, which in turn appears to be getting shorter for those in paid work: "Social scientists have long suspected that economic development may bring about loss of leisure" (Gershuny, 1986: 432). Gershuny analyses British time use data over two decades to explore these theories. His conclusion describes a dual society where the "harried havers" are without sufficient leisure time to enjoy the leisure services available to them, while the "have nots" have time, but not the resources for leisure consumption (Gershuny, 1986: 451).

Harvey too uses time use data to analyse what leisure means in modern society: "As the understanding of leisure changes it is necessary to ensure that the measurement techniques are capable of capturing the nuances in activity required to operationalise the concept." (Harvey, 1990: 310)

Harvey promotes the use of time use data to examine leisure activities in the context of all activities of participants' lives. Like Gershuny, he is concerned to document trends where the proportion of older people is increasing and where unemployment leaves a large section of the population with enforced free time. He discusses using time use data for understanding behaviour, claiming that one has to account for the potential for all activities to be both work and leisure, depending on their setting and the attitudes of those involved (Harvey, 1990: 332).

Eglite and Zarina (1994) further develop the time use survey as a method for leisure study. Recognising as Harvey does that activities can be either work or leisure, they emphasise that the issue of satisfaction is important in the definition of leisure activities, and they propose qualitative input to assist in the interpretation of survey data.

In an earlier study, Szybillo, Binstok and Buchanan (1979) addressed the need for some subjective or qualitative input into the measurement of leisure time activities by developing a methodology which combines time use data and psychographics for reliable measurement techniques. They propose this methodology for consumer studies.

John Robinson, University of Maryland-Park, (Robinson, Levin and Hak, 1998) found that, based on 1995 and 1997 US time use surveys, leisure time spent on home computers was strongly related to age and income, but not to sex. Leisure computer time seemed not to displace other leisure activities.

Psycho-social studies

In a study of a different kind, Glorieux (1993) used time diary methods to examine the issues of isolation and alienation in certain sectors of the population. He explored the theory that there is a decline in committed relationships in modern society and examined the social meanings of relationships through time diaries which included questions on the meanings people gave to their time use. This technique enabled Glorieux to describe socially isolated groups within the population for whom time use was low in social meaning. He concluded that a household is the most important context for moral commitment and solidarity (Glorieux, 1993: 170).

Housing and town planning

An understanding of daily patterns of activity of a given population can be useful input into town planning or housing planning. William Michelson (1993) used time use data to document the extent of differences in everyday behaviour which are attributable to the presence of specific arrangements of residential space. He used time diary methods to examine the activities of residents in specially designed Swedish housing arrangements to measure such things as contact with neighbours and ease of child-care.

Bishop and Syme (1985) used time use data to assess attitudes to housing density. In traditional attitude surveys, people in Australia were found to oppose high-density housing. However, when people were asked to estimate their weekly time allocation and how they would like it to change, it was found that location and type of housing did not effect quality of life as measured by time use indicators. Both this study and the preceding one used specifically designed, small-scale time use surveys.

Time use data is also useful in planning city transport systems and the location of services such as shopping centres. As noted earlier, it can also be useful for emergency relief planning, as it provides information on where people are at different times of the day.

Sustainable consumption within households

Martin Wenke of the Fachhochschule, Niederrhein, Germany, (University of Lüneburg, 1998: 29-31) has used national accounts and time use data to help develop indicators on German households' sustainable consumption behaviour. These indicators will take account of the complex production processes within households. For example, wider use of micro-wave ovens may have implications for concepts of sustainable consumption. It reduces time spent in meal preparation, but increases ownership of capital goods, and relates to substituting time spent in paid employment for time spent on home production.

Legal uses

Once the measurement and valuation of unpaid domestic work becomes accepted as statistical information, it can be used as evidence in litigation. Lawyer Jamie Cassels outlined some of the legal uses of time use data to the Canadian Conference on the Measurement and Valuation of Unpaid Work in 1993. These uses included arriving at sums for damages when a husband sued for economic loss on the accidental death of his wife, in personal injury claims by household workers, in claims for awards for disability and in estimating the division of property on separation for unmarried couples. In the past, the courts tended to evaluate women's unpaid work at the minimum wage or lower, but the valuation of household work that has recently become available through Statistics Canada offers a more equitable measure (Cassels, 1993).

While some of these issues are covered by accident compensation in New Zealand, the availability of time use data and accepted valuations of domestic production in this country might enable a more accurate assessment of the value of women's unpaid work within the accident compensation system as well as in litigation.

Time use surveys in developing countries

While the measurement of unpaid work in developing countries is not directly relevant to New Zealand interests in the uses of time use data, it is important to recognise the global nature of the issue, and to place the New Zealand situation in a wider international context. An understanding of gender differences in economic production in developing countries is also essential if aid and economic assistance are to be effective, so a brief overview is included here.

The measurement of unpaid work by time use surveys is even more important for assessing economic activity in developing countries than it is in industrial countries. In most developing countries, subsistence agriculture and related activities are a main source of economic support for large sections of the population and consequently they represent a large section of the economy which is not recorded, or not fully recorded, in national economic statistics. The omission of unpaid production from economic statistics for developing countries may result in a serious underestimation of wealth or productivity. In developing countries, time use statistics can be used to derive more meaningful and accurate measures of economic activity, employment, unemployment and under-employment. As the following studies demonstrate, a large share of the non-market work in these countries is done by women.

In 1987, Goldschmidt-Clermont followed her earlier monograph on evaluation methods for unpaid work in the household (Goldschmidt-Clermont, 1982) with a monograph reviewing economic evaluations of unpaid household work in Africa, Asia, Latin America and Oceania (Goldschmidt-Clermont, 1987.) As in her earlier work, Goldschmidt-Clermont's interest is methodological, the main purpose being an assessment of the valuation methods used. She reviews 40 studies which estimate the value of unpaid or subsistence work in a wide range of developing countries. Despite some methodological inconsistencies, certain themes emerge. The high value of women's economic input is clear in all studies which record differences in men's and women's work. Women's household and subsistence work is a consistently large part of national economies, on average estimated at 40 per cent of GDP.

Maria Sagrario Floro (1995) examines the impacts of economic restructuring on women's use of time. Her conclusion is that changes in the structure of an economy can affect well-being by affecting the level and quality of home production. She proposes that assessment of the welfare impact of economic reforms requires evaluation of changes in market and non-market goods and services. Floro emphasises the need to reflect overlapping activities which may result from economic changes, as these can lead to long hours of work for women: "There are serious negative implications when a woman is compelled by economic necessity to combine tasks over extended periods of time, thereby intensifying the work." (Floro, 1995b: 1921)

Studies describing the time use in specific developing countries all indicate the importance of unpaid work to subsistence. Acharya (1985) examines the time input of all household members in the subsistence economy of six Nepalese villages. She finds women's economic contribution to household survival is very high, irrespective of the economic stratum of the family, and she notes that children too make a large contribution. She cautions that the policy assumption that there is a labour surplus in rural areas in Nepal needs to be clarified to take account of the age and sex distributions of work, of different household types, different technological levels and seasonal and hourly variations.

Ann-Jaqueline Bério draws on material from the Ivory Coast Time Use Dataset to examine patterns of market and subsistence activities on the Ivory Coast. The Ivory Coast Time Use Dataset is part of the National Food Consumption and Budgeting Survey which evaluated households' food consumption and internal functioning and the nutritional adequacy of food consumption patterns. Time use surveys were included in this study with a view to attributing value to non-market economic activities.

The United Nations is developing a classification of time use activities which aims to provide a structure consistent with the System of National Accounts and comparable with existing time use classifications. Time use statistics so classified aim to be useful and comparable across both developing and developed countries (UN Secretariat, 1997 and University of Lüneburg, 1998: 24-26).

Perhaps more relevant to New Zealand because of geographical proximity and social and political ties would be time use data from Pacific Islands countries. Unfortunately, little is available. Goldschmidt-Clermont refers to the collection of time use data for the rural areas of five islands in Kiribati and Tuvalu (then the Gilbert and Ellice Islands). This information was collected as part of a government sponsored Rural Socio-Economic Survey and was undertaken in 1972-74. The information was used in making estimates of non-monetary productive activities. A study of time use in Fiji is referred to by Suzuki in a paper to the 1992 Rome Conference on Time Use Methodology. The study was carried out by the Japanese broadcasting organisation (NHK) for the Fiji Broadcasting Commission in 1987, and focuses on time spent listening to the radio.

Corner (1996: 27) refers to the difficulty of time use data collection, in third world countries of Asia and the Pacific, for developing macro-economic policies which are awake to gender issues.

The evidence reviewed does suggest that economic changes in developing countries which do not take account of patterns of paid and unpaid work and women's role in subsistence activities can have seriously detrimental effects on the well-being of women and children.

Summary

The studies reviewed in this chapter give some idea of the diversity of applications of time use data. They demonstrate how time use data can contribute to the understanding of the lives of various groups in the population. Although the focus of the studies discussed here has been on older people, caregivers and children, the methodology could be used to record the activities of other groups, such as people of different ethnicities, unemployed people, people with disabilities, rural and urban people and so on. The value of time use data for various kinds of planning and in litigation was also reviewed.

Time use data has the advantage of placing a particular activity in the context of all the other things a person does, so that time spent on that activity is analysed in relation to other aspects of that person's life. While specific studies of this kind may use specially designed, small-scale surveys, it is sometimes possible for a national time use survey to be designed to include material on a particular population group, as was demonstrated by the Bulgarian example which included data on children's time use.

Time use studies have particular importance in developing countries where a large proportion of the goods and services required for survival are produced outside the formal economy, and where changes in the formal economy made by development initiatives may have a negative impact on those involved in the informal economy.

The topics discussed in this chapter demonstrate just some of the ways data from national time use datasets or specially designed time use surveys can be used to research a range of different topics, or to assist in planning or development. The issues and topics that can be researched by this means are not limited to those listed. Experience in other countries has shown that, when it is available, time use data is open to numerous and unexpected uses. Once users understand the richness and versatility of such datasets the applications expand.

Chapter 5:
New Zealand interest in time use information

Introduction

This chapter reviews the information on time use available in New Zealand as at 1998, and the demand for time use information among Government agencies and other organisations, including information gaps which will be filled by data from the 1998/99 Time Use Survey.

The 1990 New Zealand Pilot Time Use Survey

In 1990, the then New Zealand Department of Statistics carried out a pilot time use survey. The results were published in *Testing Time* in 1991. This pilot survey was the first general focus national time use survey to be undertaken in New Zealand. A nationwide survey on leisure time had been undertaken as part of the New Zealand Recreation Survey of 1974/75, but other New Zealand studies documenting people's activities or the division of labour in the household have used conventional survey methods (eg Koopman-Boyden and Abbott, 1985, Abbott and Koopman-Boyden, 1981, and Hillary Commission, 1990). Some surveys used diary methods to record the incidence and timing of specific activities, for example media-use surveys undertaken for programme planning and advertising, or consumption diaries in which people were asked to record what they ate or drank (Hillary Commission, 1990). Broadly speaking, however, surveys based on diary methods are not well known in New Zealand, and as a result their value is not well understood.

The impetus for the pilot time use survey came, in the first instance, from the Ministry of Women's Affairs. The Ministry's demand for time use information was associated with its role of informing the Government of the impact on women of policy developments. Empirical information on women's involvement in the domestic and voluntary sectors was required for the development of this advice, and this information was not available from any other source. The Ministry was also committed to promoting the recognition and valuing of women's unpaid work and a time use survey was the first step in having the value of unpaid work reflected in satellite National Accounts.

In addition to the Ministry of Women's Affairs, nine other government agencies sponsored the pilot survey. They included the Departments of Statistics, Social Welfare, Justice, Internal Affairs and Labour, and the Ministries of Education, Maori Affairs and Youth Affairs and the Treasury. The information these agencies required varied according to their portfolios, but several sponsors shared an interest in information on unpaid work and the activities of people doing voluntary work.

The purpose of the pilot survey was to test the feasibility of time use survey methods in the New Zealand context. It aimed to evaluate the survey instruments and methodology, to assess respondent reaction and to provide information to assist in determining the cost of a substantive survey. The method used involved respondents recording time use during two diary days, and activities were recorded at five-minute intervals. Computer-assisted coding was trialed, and was found to enhance the consistency of coding. The sample for the pilot included 627 households, and the response rate was 45 per cent.

The pilot survey recorded simultaneous activities. People often carry out more than one activity at the same time. This is particularly true of domestic activities. A woman may be supervising children's play while cooking, or ironing while she watches television. The pilot survey asked respondents to record not only what they were doing, but what else they were doing at the same time. Space for up to four simultaneous activities was allowed in the diary. This method was successful in obtaining a more accurate picture of the nature of domestic activities. The importance of including secondary activities is reflected in the difference recorded between caring for children and other household members as a first activity (one per cent) and as a proportion of the time spent of all activities (11 per cent).

While some indicative information on the uses of time was produced, the survey was not designed to produce precise statistical estimates which could be applied to the population with a reasonable level of confidence (Department of Statistics, 1991: 12). The categories under which the information is presented reflect the interests of the client agencies. They include unpaid work in the community as well as domestic work, and they separate caring for children and other household members from domestic work. Unpaid work in the community (voluntary work) accounted for two per cent of all first activities.

Gender differences in the distribution of paid and unpaid work were similar to those recorded in studies in other countries, with paid work accounting for more of an average 24-hour day for men than for women, and unpaid work accounting for more of a 24-hour day for women than for men. The expected gender difference in the allocation of household tasks was recorded, with women spending more time doing cooking, cleaning and laundry and men doing repairs, maintenance and gardening.

Valuing unpaid work in New Zealand

In response to the interest in valuing the domestic work, the National Accounts Branch of the then Department of Statistics estimated the value of the unpaid work recorded in the Pilot Time Use Survey. Four valuation methods were used. Market replacement cost with a global substitute using the average wage of a housekeeper; market replacement cost with specialised substitutes; opportunity cost based on the legal minimum wage; and opportunity cost based on the average ordinary time wage. The value of unpaid work, as a percentage of GDP, was estimated as follows:

Opportunity cost, legal minimum wage:	29 per cent
Opportunity cost, average ordinary time wage:	66 per cent
Market replacement cost, global substitute:	42 per cent
Market replacement, specialised substitutes	51 per cent

Women's share of the unpaid work, assessed by the above methods, represented 65 per cent, 60 per cent, 65 per cent and 63 per cent respectively of the values given above (Department of Statistics, National Accounts Branch, 1992).

The 1998/99 Time Use Survey

Through the early and mid 1990s, the Ministry of Women's Affairs and other government agencies explored various avenues for funding a full time use survey. A group of 10 government agencies pledged financial support, but the pledged funds did not cover the cost of the proposed survey. Additional funding was not forthcoming because of other priorities at the time. However, a major time use survey was signalled in the December 1996 Coalition Agreement in its Women's Issues policy area. Funding through Vote: Women's Affairs was later approved for the Time Use Survey for the three financial years 1997/98, 1998/99 and 1999/2000. The Ministry of Women's Affairs contracted Statistics New Zealand to undertake the survey and analyse the data.

The survey will provide time use information which identifies the time commitments of population groups such as men, women, Maori, non-Maori, the employed, the unemployed, urban or rural dwellers. It will also identify differences in the amounts of time that different population groups spend on different activities. The survey will provide data on men's and women's unpaid productive activities, such as household work, caring for family members and other people, and voluntary work in the community. In addition, the data will cover men's and women's participation in paid work, education and training, leisure and personal care. More detail on the methodology appears in the appendix.

Time use information needs

Data from the 1998/99 Time Use Survey will assist the work of a number of agencies by filling information gaps where no empirical data is currently available. The information required differs from agency to agency, but common themes provided a focus for developing the survey. The examples that follow illustrate some uses for data on time use and identify alternative information sources where these are available.

The Ministry of Women's Affairs has an ongoing need for accurate information on the activities of men and women to improve the precision and accuracy of the gender analysis of policy. As noted earlier, it is the Ministry's policy to encourage the application of gender analysis as part of mainstream policy analysis. This initiative is supported by the former Minister of Women's Affairs' response to the Beijing Platform for Action (Shipley, 1996) which includes support for analysis of the impact of all policy changes on men and women.

As responsibility for gender analysis becomes accepted by mainstream policy agencies, all policy analysts will need accurate and detailed information on differences in the lives and activities of men and women. Time use data will provide background and contextual meaning for policy issues such as childcare provision, the relationship between income support and employment incentives, equal employment opportunities, and participation in education and training. As we have seen from the analysis of overseas studies, time use surveys provide a rich source of this data.

In addition, the Ministry is concerned, as it was in 1990, to see that women's unpaid contribution to the economy is recognised and valued. Without time use data, information on the different roles of men and women in the labour market and the domestic sector is based on labour market statistics, and on small-scale surveys of domestic roles such as Koopman-Boyden and Abbott (1985) which reflect what people say they do rather than measure what they actually do.

Time use data will complement labour force statistics from Statistics New Zealand's Household Labour Force Survey, Quarterly Employment Survey and the Population Census. It will provide information about new patterns of employment such as multiple part-time jobs, people working from home, overtime done at home at night, as well as actual hours of paid work. The Department of Labour and the Social Policy Agency of the Department of Social Welfare, in particular, would like information which illuminates the links between labour force status, unpaid work and other activities.

There are also gaps in the information available to the Ministry of Health which might be filled by time use data. For example, information is needed on the lives and activities of people with disabilities and on people who care for them to assist in the monitoring and development of policy for this group. While small-scale studies offer a great deal of information on the lives and responsibilities of people who care for family members with disabilities (Munford, 1992 and Opie, 1993), the number and characteristics of all people with caring responsibilities is not known, which makes it difficult to assess whether the present population of carers will be sustained and be able to respond to increasing demands as the population ages.

Another gap is information on how different population groups respond to illness, and the time involved in accessing primary care. This includes the time that elapses before the decision to seek help is made, time taken in travel, waiting times, and time involved in providing care at home. Information on health-related activities such as involvement in various kinds of exercise is another Ministry of Health information gap. Time use data will complement information on these issues from the two recent health surveys and the disability survey.

Existing sources of information on education tend to focus on institutions and the numbers and characteristics of students. Other data sources, such as the Census or the Household Labour Force Survey which do focus on individuals, tend to identify only whether a person is studying or what their highest qualification is. Time use data will provide insight into combinations of education with other activities such as part-time employment, transitions from education and training to employment, and times of the day when education takes place.

The Department of Internal Affairs is involved in promoting community development, and for this information on voluntary work is needed. While recent Population Censuses have provided some data on the extent of voluntary work in the community, the census information is not sufficiently detailed to meet all requirements. Information on the amount of time individuals spent on voluntary work, what work they do, and whether they combine voluntary work with other activities such as child-care will enrich the information base.

The Department of Corrections requires information on a specific group of volunteers. Each year the Community Corrections Service purchases programmes to meet the needs of those sentenced to parole or supervision, and administers funds to assist community organisations set up and maintain these programmes. The services funded include self-help programmes, recovery from abuse programmes, men for non-violence programmes, education and addiction programmes, and the majority have a substantial volunteer component. Offenders may also be sentenced to do community work. A community organisation gains from their work and provides voluntary supervision. While the number of people sentenced and the hours of work they do is known, the time voluntary sponsors put in is not known, although it is recognised that the volunteers may contribute considerable time towards the rehabilitation of the offenders. The demographic characteristics of those who carry out this productive unpaid work are not known. Possibly, a special survey of this group would be needed to obtain this information rather than a national survey.

The Time Use Survey is designed to produce outputs for Maori in all of the major activity groups cross-classified with other variables such as sex, age etc. This will provide information to compare differences between the lives of Maori and non-Maori - for example the level of voluntary work for Maori organisations, whether activities only or mostly undertaken by Maori are typically combined with other specific activities or patterns of time use. This will be useful for the Ministry of Maori Development.

The new department, Work and Income New Zealand (WINZ), delivers income support, including the community wage, and employment assistance services. WINZ monitors the income from paid work that recipients of income support earn, but not the time spent on paid work. Statistics on hours worked in paid employment, time spent on community work and other activities of people receiving benefits, including the community wage, would contribute to better understanding of the employment-related activities of WINZ clients. They would also help understand barriers to entering the labour market, or taking up more hours of paid work.

The Community Funding Agency (CFA) of the Department of Social Welfare contracts with organisations to provide community services. Providers must demonstrate that they indeed can provide the goods and services they are contracting for, and in making funding decisions the CFA takes account of all the resources available to the organisation concerned, including the work of volunteers. Time use data would provide valuable background to this role.

The Ministry of Cultural Affairs seeks information on a different range of activities to support cultural policy development. Little data is available on the consumption of cultural services. While there are several ways of improving the available data, the Ministry is interested in information on consumer participation across the broadest range of cultural activities including not only the visual and performing arts, but also heritage services, libraries, Maori cultural activities and community arts. Here too, time use information will enrich and expand existing data sources.

The Policy Information and Regions Division of the Ministry of Agriculture and Forestry uses knowledge of rural society as an information base for policy advice. Information on rural life is difficult to obtain, as small population size means that conventional surveys such as the Household Labour Force Survey do not produce sufficiently robust data on the rural population. The Ministry of Agriculture and Forestry needs information on family relationships which impact on farm viability and the ability of farm families to manage their farms in a sustainable way. Also required is information on linkages between farming and the wider economy, in particular information on off-farm employment, and non-agricultural on-farm activities. The Policy Information and Regions Division's resources include two masters theses which used time diary methods to document farming life (Shaw, 1993 and Anderson, 1993). A national time use survey with sufficient rural representation will assist in filling more of these information gaps.

Time use data captures information on mode of transport and the time spent travelling. This will help planning for improvements in mass transit, targeting and running traffic safety campaigns, and fuel conservation policies.

Information on where people are and what they are doing at particular times of the day will be helpful for civil defence organisations. Old assumptions about the daily patterns of people's lives are no longer valid. Information will be available on when, on average, people are at work or in town, when people are at home and here people spend their leisure.

Voluntary organisations themselves are also interested in gaining a better information base on those who participate in their work. The National Council of Women (NCW) is one example. The NCW is a large, national organisation resourced mainly by the voluntary work of its members. Its aim is to advance the status of women. The NCW monitors legislation for its impact on women and makes frequent submissions to select committees. As women become increasingly involved in paid work, issues facing the NCW include using voluntary time efficiently and attracting busy younger women to give their volunteer input. These issues require a better understanding of why people volunteer, how volunteers spend their time, who the volunteers are, and what they get from their volunteer work. Information on hours of voluntary work and skills involved help to quantify and document voluntary activity.

Other organisations which use volunteers and which have expressed interest in using time use data include: Age Concern, NZCCS, and the EEO Trust. There is clearly an unmet need for information on volunteers of all kinds. Whether in the area of health, education, or justice, assumptions are made about the capacity of volunteers in the community or in families to provide care or to staff services, and yet little is known about who the volunteers are and how the service they provide fits into the pattern of their lives. The 1998 / 99 Time Use Survey will fill this information gap except for detailed information on very specific types of volunteer or organisation using volunteers.

The Hillary Commission for Sport, Fitness and Leisure is also interested in information on activities related to fitness, health and leisure. The Hillary Commission uses surveys to obtain some of the information it requires. The Life in New Zealand Survey (Hillary Commission, 1990) covered a range of life-style information, including fitness and health, leisure and physical activity, and another survey of physical activities is planned. A Sport and Physical Exercise Survey was done in 1996 and another is planned for 1999. Time use information will supplement the available data by providing data on time spent on leisure activities.

One area where time diary methods were used on a regular basis was the monitoring of media use. Viewer or listener preferences are an important part of television or radio programme planning, and are also a key to the placing of advertisements. In the past, panels of radio listeners or television viewers were given diaries in which they recorded the programmes they listened to or watched. Since 1990, however, the time diary method for recording television viewing has been replaced by electronic monitoring. The service is provided by a private research company which supplies a panel of 440 households with "peoplemeters", electronic devices which record the viewing patterns of each household member. The sample is selected to represent the New Zealand population and involves approximately 1,000 individuals. While the demographic details of viewers are known, this form of monitoring does not record other activities occurring at the same time or any other contextual data which might impact on viewers' choices. Time use surveys in other countries have been found to contribute useful additional information for media planning.

Summary

These examples illustrate some of the information gaps which can be filled by time use surveys. While most of the needs identified will be met by the 1998/99 Time Use Survey, those requiring detailed activity data on small population groups might require specifically planned surveys. However, a national time use survey will provide a benchmark against which subsequent small-scale surveys can be compared.

Other information needs are likely to emerge as agencies and organisations begin to recognise the potential of the time use survey methodology. Because people in New Zealand have little experience of using time use data, the applications that have been identified are likely to be just the beginning of the uses that would be made were the material available. Finnish experience shows that the more familiar people are with time use survey information, the more applications emerge. What is clear from the examples discussed is that there are a number of information gaps to which time use information will fill, and a very wide range of areas where time use information will help enrich existing data by providing a broader, contextual information base.

Appendix: Time use methodologies

Introduction

Many countries around the world conduct time use surveys. Because of similar survey objectives and the desire to compare one country's results with another's, there have been several moves to standardise the collection of time use data. Most surveys, however, have country-specific features which reflect, among other things, various methodological choices made by each collection agency. These differences are summarised below in the section which details the characteristics of the most recent time use surveys in 13 countries, including the 1998/99 New Zealand Time Use Survey. This appendix discusses the major methodological decisions which must be made in developing a time use survey, and the advantages and disadvantages associated with each methodological choice. A final section provides some detail on the methodology chosen for the 1998/99 Time Use Survey during the development phase in 1997/98.

General methodological issues

Some methodological issues are common to all surveys. These are best summarised as a list of questions which need to be answered as part of the survey design decision-making process. These questions include:

- What are the key questions that need to be answered by the survey?
- How is the information going to be used?
- What is the collection unit?
- What types of people need to take part and is information required for particular groups in the population (eg women, an ethnic group, a geographical region)?
- What questions need to be asked of respondents?
- What is the best method of data collection?
- Over what period of time will the survey be conducted?
- How much burden will be placed on respondents?
- What is the required level of accuracy of the results?
- How large a sample is required and how should it be selected?
- How can response be maximised and data quality assured?
- How will the data be captured, coded, processed and analysed?
- What outputs are required, in what form and to what level of detail?
- How will the survey results be presented and published?
- How much will the total exercise cost?

In any good survey, the methodology will be driven by the survey objectives. This is because the way in which a survey is conducted affects both the quality and quantity of data able to be collected, the types of analysis able to be carried out on the data and the ways in which the resulting information can be used. Finalising a methodology which ensures the objectives are met is by no means a simple task. A sample must be drawn which is representative of the target population and large enough to produce results for any smaller groups of interest. Questions need to be asked which not only unambiguously elicit the required information but also maximise the level of response while minimising respondent burden. The resulting information must be coded, classified and processed so as to produce reliable statistics, and these need to be presented in a clear manner geared to the needs of the target audience. On top of all of that, these things generally need to be achieved within a pre-determined budget.

Time use methodologies

Like any other surveys, time use surveys need to meet all these general requirements but because of the nature of time use data, certain methodological issues are particularly important. These include considering:

- various methods of data collection;
- the use of a diary as a specific data collection method;
- aspects of diary design;
- the population of interest;
- sample size and sample selection;
- coding of activities;
- survey period.

Methods of data collection

Time use data can be collected by observation, that is where participants' time use is observed and recorded by a third party, either continuously or on a random spot basis. This approach is frequently used to capture information in restricted settings (such as hospitals or classrooms) or situations when self-reporting is likely to produce highly questionable results (for example, when respondents do not have a clear sense of time). However, while observation may be suitable for small specialised populations or situations where activities are unstructured and fractionated in very small time segments, it is not suitable for large population-based surveys. The main disadvantages of this approach are problems with respondent co-operation, high demands on both time and money resources, the truncated time period for which data can be collected, the likelihood of the observer's presence altering behaviour patterns, and the inability of researchers to generalise the survey results to the total population.

A variety of self-reporting methods exist where respondents report their own time use. There are two main approaches: simultaneous collection (where time use is recorded as or just after it occurs) and recall (where previous time use is remembered and recorded from memory). Time use reporting can be done verbally to another person in an interview situation, or it can involve recording time use details in writing and passing this written record on. A number of instruments are available, including:

- ***stylised questions*** (which ask respondents to recall the amount of time they allocate, or have allocated, to specified activities over a specified period such as a day, week or year). An example is: "Yesterday, how much time did you spend preparing meals?"
- ***stylised activity lists*** (which seek information on selected dimensions of time use using a list of stylised questions). This might consist of a list of four selected items (eg housework, child-care, television, hobbies) along with a question such as: "How many hours per day do you spend usually on the following activities? .....Monday-Friday?.....Saturday / Sunday?"

- ***activity logs*** (which make respondents record all occurrences of a particular activity during some specified period, which can range from one day to several weeks). For example, a food preparation log would contain start and finish times for all episodes of food preparation during the reference period. It may also include some or all of the following: the purpose for which the food was being prepared, the number of people about to be fed, what was being prepared, the main ingredients, the value of the ingredients, the cooking method or the appliances used.
- ***stylised time-activity matrices*** (which ask respondents to report the time allocated to each activity on an exhaustive list, ie all time in the reference period is accounted for in terms of the identified activity categories). A stylised time-activity matrix may consist of a small number of broad activity groups (such as paid employment, education, personal needs, domestic work, maintenance, and leisure) or it may contain a longer list of more detailed activity tasks (such as meal preparation, cooking, washing dishes; laundry, ironing, cleaning, sewing; shopping; paid work including travel; etc).
- ***beeper studies*** (in which respondents are prompted by a beeper to record specified objective information, and possibly subjective information as well, on what they were doing at the time the beeper sounded).
- ***time diaries*** (which respondents use to record in succession all activities undertaken over a prescribed period of time). Diaries can be current (recording activities on the day they happen) or they can be retrospective (recording activities for a reconstructed day).

All these methods of time use data collection have their advantages and disadvantages. Some elicit high respondent co-operation while others are burdensome and less likely to produce good response. Some are very expensive to administer while others are comparatively cheap. Some produce data of low reliability while others have higher accuracy levels. The value of each method can be determined by examining what is required as input from both the researcher and the respondents, and what is to be produced as output (the prospective return from the survey). These have been denoted as:

- **input criteria** (such things as likely respondent co-operation, respondent knowledge, cost in terms of time and money, and "processability"); and
- **output criteria** (the validity, reliability, usability and flexibility of the resulting data).

An evaluation of the data collection methods listed above appears in chapter 6 of the publication *Measurement and valuation of unpaid contribution: accounting through time and output* (INSTRAW, 1995). Although subjective, the evaluations are based on knowledge derived from experience and the literature. They examine the data collection approaches in terms of four input and four output criteria, ranking each to portray relative strengths and weaknesses.

Stylised questions, stylised activity lists and activity logs all rate a "medium" assessment against the input criteria of respondent co-operation, respondent knowledge, cost and processability. This means that these data collection methods tend to be viewed reasonably positively by respondents, they are generally not seen as too burdensome and respondents can usually provide their answers with little or minimal difficulty. These particular survey vehicles are not overly expensive to put into the field and the information collected is not extremely difficult to process.

On the output side, however, stylised questions and activity lists do not rate as highly. Because they require respondents to **estimate** how much time was spent at various tasks, data validity and reliability is rated as "low". Respondents cannot possibly recall to the last minute how much time they spent on a particular activity so their answers will always contain an element of guesswork. The time spent on some activities will be overestimated while the time spent on others will be underestimated. If detailed data with a high level of accuracy is wanted out of the survey, stylised questions and activity lists will be unsuitable. These methods of collection also limit the usefulness of the data. There is no knowledge of either activity sequence or simultaneous activities so the resulting data sheds no light on activity inter-relationships.

Activity logs, on the other hand, rate much better against output criteria. Data gathered in this way has a higher level of validity and reliability because it is obtained from respondents recording start and finish times for each episode of a particular activity. If respondents record this information as they perform each activity, it will be more accurate than merely guessing the total time spent. Activity log information is more detailed than that from stylised questions or activity lists. Activities are recorded in sequence, providing information on each episode of activity rather than just a total for the period. Other information can also be recorded (eg for whom the activity was done), bringing a social context to the data and permitting more analysis than just information on time spent.

Activity logs do, however, focus on one particular type of activity. They are frequently used in media, travel and shopping studies, for instance, and can be useful in data collection on rarely occurring activities (such as home renovations). For rare activities, logs can be administered each time the activity occurs over a period such as several weeks. They can also be used in conjunction with other time use data gathering methods, such as diaries, to gather information on more frequently occurring activities.

Activity matrices score a medium ranking on all input and output criteria. They require greater attention to detail and greater accuracy than the collection methods discussed above because they constrain total time allocated each day to add to 24 hours. Completion is not too onerous a task for respondents because the lists of activities are short and pre-determined. On the output side, the data is judged to be reasonably reliable, however there are limitations on data usefulness because in a stylised time-activity matrix the information provided is simply a total time against each type of activity. As with the data collection methods already discussed, there is no activity sequence or duration and no information on how each activity relates to another. One version of a time activity matrix asks respondents to indicate which types of activity were undertaken during each one-hour time slot. This provides information on sequence but still lacks details of the exact amount of time spent and whether activities were carried out simultaneously.

Beeper studies ask relatively little of either the researcher or the respondent. The cost of collecting the data is not excessive nor is processing particularly complicated, although the free activity descriptions do require coding. Given that the majority of beeper studies involve seven to 10 signals per day for seven days, respondent burden is comparatively small. However non-response occurs for three distinct reasons: equipment malfunctions, forgotten beepers and the nature or location of the activity at the time of the beep. On the output side, reliability and validity checks on beeper data overseas have presented favourable results and, in fact, in comparison with some other data collection methods, beeper studies have been shown to pick up more “idle time”. This is something that is quite likely to be forgotten if data collection is dependent on recall.

In evaluating different data collection methods, the INSTRAW publication concludes that in terms of output criteria, approaches which depend on unaided and unconstrained recall generally score poorly. Data based on recall only, unaided by the prompting of activity checklists, is likely to be of comparatively low quality and reliability. In contrast, approaches which require the respondent to complete a diary, log or activity matrix over the reporting period and those that constrain respondents, forcing them to account for all activities in sequence, are relatively highly rated.

These latter types of data collection methods often do less well when rated against input criteria. For example, maintaining a diary or log is likely to be viewed by respondents as quite onerous, especially if the diary runs for a lengthy period (eg a week). This may make respondents reluctant to participate in the survey. Also, because of the nature of the information collected, processing costs are likely to be high. If, for example, respondents are free to describe their activities in their own words, the information will need to be coded before it can be processed. This raises the cost of processing because of the input required.

On the output side, however, diaries and logs rate very well. With the collection of start and finish times for each activity, data accuracy is likely to be high but this is dependent on the literacy of respondents and on their completing the diary at the time of the activity or very soon after. The flexibility and usefulness of the data is also likely to be high because of the sequential nature of a diary or log and the collection of all activities undertaken during the prescribed period. A full picture of time use is provided.

The time diary approach

National surveys of time use, and in particular those conducted by official statistical agencies, tend to have similar objectives. They generally focus on investigating one or two of the following issues: the resources and outputs of unremunerated productive activity, the determinants of unremunerated activities, the relationship between people's remunerated and unremunerated activities, the intra-household allocation of time, or life-style differences between households and individuals. Collecting time use data in a way which will meet any of this variety of objectives requires a versatile tool, and around the world the time diary has proved to be most countries' preference.

Time diaries have been used and are still being used in countries as diverse as Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway and Sweden. In 1990 a diary was trialled in the New Zealand Pilot Time Use Survey and was found to be successful.

The time diary achieves more than other collection methods because the range of information collected in the diary and associated instruments is able to provide contextual dimensions to the data. These are vital for time use analysis if the complexity of people's daily activities is to be fully understood. Examples include:

- primary activity (the main thing being done at any one time);
- secondary activities (others things being done simultaneously);
- time of activity (the time at which different activities occur);
- activity sequence (how different activities relate to one another);
- activity duration (time spent on each main activity);
- activity location (where the respondent was); and
- social contacts (who else was present at the time).

Using the time diary approach, decisions on specific methodology involve several inter-related choices:

- face-to-face or telephone interview;
- self-completed "tomorrow" diary or interviewer-administered "yesterday" questionnaire;
- number of days the diary should cover;
- which days of the week to choose;
- time interval for activity recording;
- number of activities to record; and
- the collection of additional information, such as where the respondent was during each activity, mode of travel, who was there at the same time, for whom the activity was being done, and whether the respondent was being paid.

Face-to-face or telephone interview

Although by no means the most common method used around the world, some countries conduct their time use surveys by telephone. Denmark used telephone collection in 1987 and Canada has run a series of time use surveys this way including 1992 and 1998.

The Canadian surveys have been conducted as part of the General Social Survey (GSS), a programme established to gather data regularly on a broad range of social trends and to provide information on specific social policy issues. When the GSS was established, a mode of data collection was needed which had a reasonable cost per interview, a high response rate, was suitable for a multi-purpose survey and which produced data which was not too difficult to analyse. Telephone interviewing was felt to meet all those criteria, costing less than personal interviewing, achieving higher response rates than self-completed mail-back questionnaires, and allowing for a sampling technique (near simple random sampling) which makes analysis of the resulting data easier.

The Canadians have found telephone interviewing to be a valid and cost-effective method of gathering time use information but they do acknowledge the well-known disadvantages of this form of data collection: non-coverage of some households, lower response rates than from interviewer-administered surveys, and some limitations in the data collected. Cost is the single biggest advantage of telephone interviewing. Random digit dialling has reduced the sample design costs of the GSS, and collection costs are considerably lower than having interviewers visit dwellings. Neither travelling time nor travel expenses have to be paid and because interviewers take less time to complete an interview over the phone, a smaller field force is required for the same achieved sample size.

Statistics Canada acknowledges that less than 2 percent of Canadian households do not have a telephone. The 1996 Census shows that in New Zealand the figure is 5 percent. Although these percentages are low, households without phones are likely to be concentrated in certain population groups so excluding them from the survey may impact on the representativeness of the results. Households without phones are more than likely to have below-average incomes. They may contain people who have English as a second language, recent immigrants, isolated rural dwellers, or people with disabilities which preclude the use of a phone. Depending on the objectives of the survey, alternative means of contact may need to be found for these groups of people.

Another drawback of telephone interviewing using random digit dialling is the fact that interviewers have no information about the household before contact is made. Also, phone numbers derived from a telephone company's listings cannot be precisely assigned to Statistics New Zealand's geographical areas. This means that knowledge of the characteristics of an area's population (for example, ethnicity) can only with difficulty be used to design over-samples of populations of interest. In contrast, for the 1998/99 Time Use Survey, Statistics New Zealand is over-sampling Maori to obtain robust estimates of the time use of Maori people. This is based on 1996 Census data on proportions of Maori in the relevant small geographical areas.

Response rates for telephone interviews tend to be lower than for face-to-face interviewing. Statistics Canada puts this down to two things: the fact that respondents seem to find it easier to refuse to participate over the phone, and new technologies, such as answering machines, which enable people to screen their incoming calls.

The 1992 General Social Survey on Time Use was conducted over the entire 12 months of 1992. It yielded a sample of around 9,000 respondents across Canada's ten provinces and achieved a 77 percent response rate. Statistics Canada was pleased with its success in achieving an adequate random sample representative of the target population (the non-institutionalised population aged 15 and over). It was also satisfied with the quantity and quality of the time use data. Statistics Canada is repeating the survey in 1998 aiming for a sample of 10,000 individuals.

This issue of data quality is probably the most critical point in the debate over telephone collection of time use information. However, it must always be remembered that data quality relates back to the survey objectives. Of necessity, gathering time use data over the phone must involve asking respondents about a day which has already passed. In order to maximise recall on the part of the respondent, usually no more than one day is asked about and this tends to be the day just prior to the interview. That was the case in the Canadian survey. It used a 24-hour "yesterday" recall diary of daily activities starting at 4 am. Issues surrounding the use of this type of instrument are detailed in the following section.

"Tomorrow" diary versus "yesterday" recall

In addition to the issue of lower response, the data quality arguments voiced against telephone collection of time use information centre around the issue of recall. These include the likelihood of respondents forgetting some of the things they did during the reference period, being restricted to specifying only primary activities, providing less detailed descriptions of activities, and supplying only one day's data. The potential undercount of activities and loss of detail lead many researchers to believe that data gathered in a "tomorrow" diary (ie one left behind for respondent completion) is measurably better than the data gathered through recall of a day's activities.

One study that attempted to quantify the difference in data quality involved the analysis of data collected in two United States time use surveys (Juster, 1986). The first survey was based on a diary that was left behind for respondents to fill in and then picked up the following day by the interviewer. In the other survey, respondents were asked to specify the details of activities during the preceding day.

As far as tests of data quality were concerned, it was noted that no direct measures exist. Instead, five indirect measures were constructed on the basis that, other things being equal, a less valid diary will tend to have:

- fewer activities reported;
- a smaller variety of activities reported;
- fewer secondary activities reported;
- more diary time reported as "not ascertained";
- more activities reported as beginning exactly on the hour or half-hour.

When measuring data differences between the two surveys, Juster noted that the first two quality proxies (number and variety of primary activities reported) showed similar patterns. If one was statistically significant, the other usually was as well. The other three variables (non-ascertained minutes per day, the proportion of time for which secondary activities were reported and the proportion of rounded start times) were far less important. However, when differences did exist they were generally consistent with the results of the two main quality variables.

Juster found that assessment of data quality using number and variety of activities was complicated by the presence of other influences not related to quality. For example, the number of activities people undertake during a day can be related to their sex, age, marital status, participation in the workforce or the presence of children. Time use data had to be standardised against these types of variables for meaningful comparisons to be made.

The results of Juster's study suggested a number of conclusions:

- one survey design is not unambiguously superior to any other alternative;
- trade-offs have to be made in choosing a particular survey design;
- leave-behind diaries are of somewhat higher quality than recall questionnaires, but the difference is something in the order of only 10 percent (when measured by number of activities reported). Survey sponsors and designers need to decide whether this justifies a cost difference which may be of the order of three- or four-to-one;
- advances have been made in interviewing techniques over the last couple of decades. (For example, interviewer "feedback" techniques give respondents positive reinforcement when they report activities with the appropriate level of detail and context, and negative reinforcement when activities are reported without an appropriate level of detail. Also, interviewers can probe for further information about activities, allowing for better coding.) These advances represent a substantial improvement over the original recall methods of interviewing and may produce better quality data than leave-behind diaries.

Diary length

There are basically two schools of thought on the topic of diary length, both centring around the issues of respondent burden and data quality. The first is that diary-keeping is a relatively onerous task and that data quality is likely to worsen as time goes on. The second is that the first 24-hour period acts as practice and that respondents actually improve the quality of their record-keeping during the second and subsequent days. While there are differing opinions over the maximum length of a time use diary, there is general agreement by researchers over the minimum bound. A time diary needs to be at least 24 hours so that data can be obtained on the respondent's minimum sleep-work-leisure cycle.

As with any aspect of methodology, the choice of diary length depends on survey objectives and on other inter-related features of survey design (eg a diary collected by telephone being limited to one day in order to minimise recall problems). While some surveys in various parts of the world have been reported as using a diary period as long as one week, countries' official surveys now all appear to use either a one- or two-day diary.

In fact, countries appear to be almost equally divided in their practice. In a recent review of national experiences of time use surveys in OECD member states, seven countries used two-day diaries and five used one day (OECD, 1995). This is confirmed in the section below which lists characteristics of the latest time use surveys in 13 countries. As well as Canada and Denmark (which used 24-hour recall through their choice of telephone interviewing), Austria, France and Italy also used one-day diaries. Two-day diaries were the choice of Australia, Finland, Germany, Japan, Netherlands, Norway and Sweden.

It was decided when the 1990 pilot survey was designed that diary length should be tested as one of the outcomes of the survey. After practice overseas was reviewed, it was thought that any diary keeping beyond two days would be too burdensome on New Zealand respondents. The choice then became comparing one day's data with two, the objective being to confirm (or otherwise) the validity of collecting twice as much time use information for only a small marginal cost.

Respondents were asked to complete a two-day diary and the information supplied on each day was then compared. No significant difference was found between the pattern of time use reported on the first diary day and the second. While the number of activities reported on the second day decreased, respondents still reported for the full 24-hour period. Differences could be explained by the differences in time patterns between weekdays and weekends and by the labour force status of those completing the diaries on specific days. This led to the conclusion that in New Zealand two-day diaries do not give data that is inferior to one-day diaries, and that in a full time use survey two-day diaries could be used without concern for a decline in data quality.

Selection of days

If respondents are completing time diaries for only one or two days out of seven, it is important to achieve across the entire sample an even representation of the days of the week. The easiest way to do this is to assign each household specific days on which to record their diaries. This approach was taken in the New Zealand time use pilot survey in 1990 and it is used around the world as part of normal sample design practice.

This allocation of days raises a problem, however. If households are to start their diary keeping on a particular day, they must be contacted by interviewers close to that date. The Australian time use pilot survey allowed interviewers only three days in which to establish contact with each household prior to the designated days. This restriction was imposed for two reasons: the speed with which respondents are likely to lose interest and motivation as the time between receiving their diaries and commencing diary-keeping increases; and the over-reliance placed on the respondent's memory (in terms of instructions) if the diaries are not delivered shortly before diary-keeping is due to commence. In the event that a household could not be contacted before or on their first designated day, interviewers were able to reallocate the designated days to the two consecutive days immediately following the one on which contact was eventually made.

Instructions over non-contact before the selected diary days vary around the world but the overriding objective is always the same. Interviewers need to follow procedures which will maintain the integrity of the sample. The sample design team behind each survey needs to be guaranteed an adequate spread across days to ensure that information gathered truly represents the activity patterns of the population. For example, in the 1987 / 88 Finnish time use survey, each person was allocated a starting day for diary keeping based on an even spread of the days of the year over the people in the sample. If an interviewer could not trace the respondent before their specified diary start-date, that date could be postponed but by no more than three weeks and the diary days had to stay the same days of the week as those originally selected.

Some of the analysis of the Finnish survey clearly shows that if measuring trends in time use is important, weekend days must be adequately represented in a time use sample. The 1987 / 88 data was compared with results of an earlier survey to detect changes in time use since 1979. Weekday rhythms were analysed and found to show changes in TV watching, bed times, wake-up times, work start, shopping and domestic work. An analysis of Saturdays revealed later times for waking up, shopping, participating in sport, watching TV and going to bed. A Sunday analysis showed less time spent in physical exercise, cinema attendance or religious activities and more time spent in domestic work, paid work and television viewing.

This clearly shows different patterns of weekday and weekend time use. People in the paid workforce, especially those working full-time, tend to organise their weekly activity patterns around paid work. This brings an element of routine into people's Monday-to-Friday lives, with weekends reflecting different activity patterns. There is a clear need to obtain adequate information on weekend time use and depending on the objectives of the survey, they may be occasions when over-sampling of weekends may be advantageous. For example, if one of the survey objectives is to measure people's participation in physically active leisure activities, it may be necessary to over-sample Saturdays so that participation in organised sport is included. The easiest way to obtain data reflecting weekday / weekend differences is to allocate each respondent one weekday and one weekend day for their diary keeping.

Time intervals

As far as time intervals on diaries are concerned, survey designers have to make one of two choices. Do they use the fixed interval method (where time segments are pre-printed on the diary) or do they use open recording (where respondents write in start and finish times themselves)?

Norway and Finland have used pilot surveys to test fixed time interval diaries against open recording time diaries. In the Finnish survey it was found that the open method yielded large variation in the quality of individual diaries. The Norwegian pilot survey also showed that the data editing and data processing were more complicated with the open method. While these results reinforced the benefits of fixed intervals, some disadvantages were also acknowledged. Fixed time intervals measure time less precisely than an open method and they are not suited to measuring activities of very short duration (eg interrupting a task to have a couple of minutes of conversation). However, both countries felt that the administrative advantages of the more standardised method outweighed the disadvantages and concluded that the fixed interval method was preferable. This seems to be supported by the majority of countries undertaking time use surveys around the world. Of the 12 surveys summarised in a recent OECD publication, just two (Canada and Italy) used open time recording (OECD, 1995).

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 is the unit of analysis. However, if fixed intervals are used, the unit of analysis becomes the time slot. Each can be converted to the other, although it is easier to go from activity episode to time slot analysis. In both cases, the process involves time, money and quality costs.

Any low-level analysis must bear in mind the possible effects of different intervals. United States methodology studies suggest that for short-time activities, the open format is more reliable. This is because some activities (and many child assistance episodes are thought to fall into this category) may last for only a short duration. If these last less than the time interval specified in a fixed-interval diary, a lot of information may be lost from the analysis (INSTRAW, 1995).

As with any aspect of methodology, the choice of time interval will be determined by the survey objectives and, in particular, by the ways in which the data will be used. If the decision to use fixed time intervals is made, the length of the interval becomes critical. The section below shows the variety of times chosen by various countries around the world. Fixed intervals range from 5 minutes (chosen by Australia, France and Germany) to 10 minutes (in Finland and Sweden) to the most popular 15 minutes (used in the surveys of Austria, Denmark, Netherlands and Norway). A few countries (Austria, Finland and Norway) extended the fixed interval to 30 minutes for night recording.

New Zealand adopted a five-minute diary interval for the 1990 pilot survey, choosing the shortest manageable time period possible to maximise the number of short-duration activities reported. This was helped further by the computer-assisted coding used in data processing allowing time divisions as small as one minute to be classified. This was found to be essential when two or more activities were reported in a five-minute interval and it was obvious that they could not happen at exactly the same time. An example is “washed hands, brushed teeth, let the dog out”. In this case, four minutes were allocated to personal care and one minute to pet care. A five-minute interval is also being used in the 1998/99 Time Use Survey.

In instances where multiple activities - sequential rather than simultaneous - were reported without indication of how much time was spent on each, coders allocated time based on a set of rules. Where preparation and consumption of a beverage was involved (eg “made a cup of tea and drank it”), five minutes were allotted to preparation and the rest to consumption. In cases of food preparation and consumption, a minimum of ten minutes was allocated to preparation. Similar rules have been adopted for the 1998/99 survey.

Number of activities recorded

No one can deny that each of us has only 24 hours available in any day. Viewed this way, time is a resource and like other resources available to human beings, people can vary markedly in their use of it. Some participate in very few activities while others are constantly busy and manage to do several things at once. These simultaneous activities can consist of simple combinations (such as watching television while smoking a cigarette) or more complicated combinations (such as ironing while listening to the radio while keeping an eye on children). For a full picture of time use and the inter-relationships between activities, this ability of people to do more than one activity at any one time should be captured in a survey. However, as has been stated before, methodological decisions depend on survey objectives and there are some time use surveys around the world which capture information on only primary activities.

The 1990 time use pilot survey asked respondents to record not only what they were doing as their first (or primary) activity but also what they were doing at the same time (second, third and fourth activities). The interviewers also asked supplementary questions about whether the respondent was responsible for children or adults who could not be left alone during the diary period, and this was also recorded.

Just under three-quarters (72 percent) of all time recorded was spent on main or primary activities. Most of the time spent in secondary activities (84 percent) consisted of "communication and physically passive activities" (eg watching television, listening to the radio, having conversations). The majority of third and fourth activities were listening to the radio, eating, drinking and smoking. Women recorded a greater proportion of time spent on secondary activities than men, partly because of their greater responsibility for the care of others which was often done in conjunction with another activity.

This substantiates the findings of overseas surveys which show that if only main or primary activities are recorded, information will be lost on childcare (and passive leisure activities). The loss of this information would be particularly important to survey objectives involving the measurement of either unpaid work or participation in leisure, recreation and cultural activities. In Canada, where only primary activities are collected in the recall questionnaire, the potential loss of childcare information is prevented by asking about this separately in a childcare diary.

For the 1998 / 99 Time Use Survey, simultaneous activities are collected in the diary under a column headed "What else were you doing at the same time?".

Additional diary information

In addition to recording each activity undertaken and the length of time spent on them, time diaries often record other information as well. This can include the place in which the activity was undertaken, who was with the respondent at the time, if travel was involved how the respondent travelled, the person or people for whom a particular activity was being carried out, and whether the respondent was being paid for the particular activity. These items of information are collected to bring further clarity to activities (especially unpaid work), to assist in the task of activity coding and to put time use into a social context.

For example, "for whom" information is important in the development of time accounts reflecting productive activity (INSTRAW, 1995). Any time use surveys where key objectives involve the measurement of unpaid work should include "for whom" information. This clarifies whether the work is being done for someone inside or outside the respondent's own household and assists data coding. Australia has made the decision to add a "for whom" column to the information collected in its 1997 diary.

German experience in pretesting the collection of "for whom" information has been cited as positive, especially in terms of voluntary work activities. "For own household" activities appeared to present no problems during the German data capture phase but there were difficulties in coding "for whom" when the activities involved moral support and information sharing. These included such things as providing consolation, being ready to engage in communication, making suggestions and offering advice.

The German experience shows that the objectives of asking the question "for whom?" can be achieved to differing degrees depending on the activity. It highlights the fact that the "for whom" question needs to be asked only where it will provide data needed at the analysis level, ie the information should be sought only for those activities considered productive and which could reasonably be expected to have been carried out for someone else. INSTRAW suggests that in order to locate the activity in the activity classification and the individual in the labour classification system, the following are the minimum "for whom" categories which should be collected in a time use survey:

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

In the 1990 time use pilot survey, the time diary collected "for whom" information (if something was being done for someone outside the household), along with other information common to time use surveys around the world: main activity, what else the respondent was doing, location, and who the respondent was with. After completion of the diary, respondents were asked two additional questions about whether they had been responsible for children or adults who could not have been left along during any part of the diary period. This was used to identify the time spent providing indirect care, an activity often missed from diary reporting. Respondents were also asked whether they had been paid for any activity during the period of the diary and how this payment was made. That made it possible to separate paid work from unpaid work or other activities.

For the 1998/99 survey, New Zealand is pioneering a model where interviewers seek details on "for whom" in a personal interview when the diary has been completed. The top level of the "for whom" classification are:

- own household (including self)
- another household or individual
- Maori-based committee, organisation, grouping etc
- non-profit organisation (excluding Maori-based committee, organisation, grouping etc)
- employer

Additional questions

While time use diaries collect information on the "what", "when", "why" and "who for?" of activities, other questions need to be asked which provide a social dimension to time use patterns. These questions enable differences in time use to be linked to personal and household characteristics. Commonsense says that people's daily behaviour patterns are greatly influenced by their characteristics: for example, how old they are, whether they are in a relationship, whether they have children, whether they are in paid work, etc. Information from time use surveys supports this. Analysis of Canadian time use data, for example, found that the principal determinants of daily activities were "main activity, sex, marital status, child status, and for seniors, living arrangements" (Statistics Canada, 1995).

These variables, and others which may be appropriate to collect in a time use survey, can be summarised as follows:

Demographic

- sex
- age
- ethnicity
- marital status
- living arrangements

Socio-economic

- educational qualifications
- whether currently studying / training
- labour force status
- status in employment
- usual hours of paid work
- occupation
- income
- industry

Household

- number of people
- relationship between members
- services provided by outsiders
- available facilities / appliances
- childcare arrangements
- dwelling details
- nature of occupancy
- household income

Other

- country of birth
- years in New Zealand
- voluntary work done for others (at home as well as in the community)
- health status (requiring a suite of questions)
- disability status (requiring a suite of questions)
- location (geographical, urban / rural)

As with any aspect of survey methodology, the detailed content of additional questionnaires will be determined by the objectives of the survey. For example, in Japan's 1991 survey of time use and leisure activities, one of the main objectives was to obtain comprehensive data on the nature and frequency of leisure activities such as sports, studies or research, hobbies or amusements, social activities, travel or day excursion. These activities were investigated in detail through the use of an additional questionnaire which asked respondents to specify their participation in the previous 12 months, how often they did these things, who they did them with, etc.

The New Zealand pilot test used a self-administered questionnaire at the back of the diary which, among other things, asked whether the respondent had participated in various activities that may not have been picked up in the diary because they were not undertaken on a daily basis. This included unpaid work of any kind for groups, clubs or organisations in the past 12 months and unpaid help in the last four weeks to people who were not part of the household. There were no problems with this data gathering. It enabled some statistics to be produced on the type of unpaid work done for groups or people outside respondents' own households, an aspect of unpaid community work about which there is little information available, either in New Zealand or overseas.

Sample size

In order to calculate the sample size needed in any survey, statisticians must know four things:

- the detailed objectives of the survey (including key variables and the most important statistical tables to result from the survey);
- the level of accuracy required;
- variability of the key variables; and
- likely response rates.

The first three sets of information lead to the calculation of the required *achieved* sample as the statistician determines the number of observations needed in each cell of each table in order to provide estimates which are both "valid" in the sense of measuring what is intended, and within reasonable precision bounds. The fourth piece of information determines the larger number of potential respondents who must be approached, given that some will not be contacted in the time available and others will not wish to participate in the survey.

By way of an example, the major objectives of a time use survey may be to gather information on the various activities undertaken by a population and to examine the different patterns of time use of different groups within that population. If activities are summarised into major categories (for example, paid work, housework, childcare, personal care, education, sport, etc), some of the most important statistical tables to come out of the survey will be those which show differences in these types of activities between different age groups, different ethnic groups, etc. One possible table might look like this:

Activity	Age (years)					
	Women			Men		
	<30	30-59	60+	<30	30-59	60+
Paid work						
House work						
Child-care						
Personal care						
Education/training						
Sport						
etc						
etc						

If the number of cells in the table were to increase, either through the use of more detailed activity types or a finer breakdown of age, the sample size required to produce valid estimates would also rise. This highlights once again the interdependence of methodological decisions and survey objectives. Only by having detailed knowledge of what is required out of the survey can the required sample size be calculated. Sample size, therefore, is dependent on the specific information needs of sponsors. Looked at another way, if budgetary considerations limit the sample size, some potential information needs must necessarily go unmet.

In Australia's 1997 Time Use Survey, a sample size of approximately 3,000 households from throughout all States and Territories was chosen as being sufficient to provide:

- detailed person-level information for Australia;
- detailed household-level information for Australia;
- relatively detailed data for capital city / rest-of-State areas;
- broad level estimates for the more populous states; and
- estimates for those characteristics which are relatively common and for sub-populations which are relatively large and spread fairly evenly geographically.

The achieved sample size for the 1997 Australian survey was 4,550 households.

Population of interest

Part of knowing what a survey is trying to measure is identification of the population for whom the measures are sought. This "population of interest" determines the characteristics of the people selected to participate in the survey so it plays a major role in determining sample selection procedures. It is also an important determinant of sample size because subgroups of the population are often also of interest and statistics need to be produced for each group. If information is wanted for the entire population, some means has to be found to obtain data on people who are unable to participate, for example through being too young to provide the information or through incapacitation caused by age or illness.

Most countries have decided that time use information is not required for the very young. This is because one of the major objectives of the data gathering is often to measure unpaid work done in the community and also because of the likelihood that children below a certain age will be unable to provide quality information. There is a fair amount of variation, however, in the minimum age countries set as the cut-off for survey participation.

Of the 12 OECD member countries' surveys summarised in a recent publication, six different minimum ages were chosen (OECD, 1995). These ranged from 20 years (used by Sweden in 1990 / 91), to a low of 3 years (used by Italy in 1988 / 89). Other countries were fairly evenly spread in their choice of minimum cut-off age. Denmark and Norway used 16 years, Australia, Canada and France stipulated 15 years, Germany, Netherlands and New Zealand used 12 years, and Austria and Finland used 10 years. Bulgaria, in contrast, has included very young children by asking parents to complete proxy diaries.

In its pilot survey in 1990, New Zealand chose to include people aged 12 and over on the assumption that children of that age do some unpaid work (such as household chores or childcare). Pretesting at an intermediate school had established that 12 year-olds were capable of providing self-completed information, and this was confirmed in the pilot survey. The only factor which appeared to affect respondents' ability and willingness to take part in the survey was their reading and writing ability. About 5 percent of respondents required help from the interviewers who, where necessary, acted as scribes and wrote in the diary activities recalled by respondents for selected diary days. The 12 and over age range prevails for the 1998 / 99 survey.

Selection of respondents within households

As with any other aspect of methodology, the issue of respondent selection within households depends on survey objectives. Methods which select more than one person per household are often favoured for time use surveys because people's use of time is affected by the others with whom they share their lives. Obtaining data from more than one person in each household brings both a household and individual dimension to the data, and provides a basis for investigating intra-household aspects of time use. It also has the benefit of enabling more data to be collected at minimal marginal cost. There is a downside, however, to the selection of multiple respondents per household and that is the increased burden that is imposed on the household and a resulting rise in non-response and refusal to participate.

The issue of selecting respondents within households was tested in New Zealand in the 1990 time use pilot survey. Three methods of respondent selection were tested in order to determine which method produced the best value for cost. The methods were:

- asking every eligible person in the household to be a respondent;
- selecting one person and their spouse or partner (if any); and
- selecting one person only.

Results from the pilot survey showed that once contact was made with a household, individual response rates for the second and third methods were higher than when all eligible members of a household were asked to participate. In households where participation was asked of all eligible individuals, a 75 percent response was achieved in terms of successful completion of all three survey documents (diary, personal questionnaire and diary questionnaire). For households where one person and their spouse were selected, this response rate rose to 80 percent, and in households where only one person was asked to participate, an 86 percent response was achieved. The overall complete response rate was 45 per cent taking into account non-contacted households.

In order to provide the cost component necessary to measure the value of different selection methods, interviewer time spent per household was examined along with the number of completed diaries per selected address. As expected, the time spent per household (on both travelling and interviewing) was related to the number of respondents selected. When the cost per completed questionnaire was calculated, the first method (selecting every eligible person in the household) emerged as the most cost-effective option.

Various problems associated with this method, however, led to the conclusion that another method was preferable. In households where every eligible person is selected, there is the possibility that for those variables which are likely to be common within a household (eg church attendance), the extra diaries may not add sufficient information to justify even the small marginal cost of their being collected or the additional respondent burden. There are also practical problems for interviewers implementing a lengthy questionnaire, especially in large households, and a problem with interviewer workload because large households are not distributed evenly around the country. These factors led to the recommendation that the preferred respondent selection method in New Zealand should be the selection of one person and their spouse or partner, if any. However, for the 1998/99 survey, two randomly selected people per household are selected to complete a diary if the household contains two or more eligible people. This decision was to ensure that people who are not partners are robustly represented.

A number of options are used around the world. In its 1992 time use survey, Australia adopted the approach of selecting all adult members in each selected household. One person in each household was asked to complete a household questionnaire and to provide demographic and socio-economic information for all household members aged 15 years and over. A diary was then left for each of those people to record their activities over two days.

Canada, on the other hand, uses an alternative approach. In its 1992 General Social Survey on Time Use, Statistics Canada recorded demographic data for each household member and then randomly selected only one person 15 years and over to participate in the telephone survey.

Activity coding

Internationally there is a desire for standardisation in the classification of activities so that time use data can be easily compared between countries. Although a lot of work has been done on the standardisation exercise, some variation still exists in activity classification around the world. This is because different areas of activity are emphasised in different surveys according to the particular survey objectives. The United Nations is developing an international activity classification that aims to be relevant for both developing and developed countries.

The table below summarises the classifications used in the Australian and Canadian time use surveys in 1992. They show the major sections of the classifications (where there is much similarity) and the number of activities contained within each section at the most detailed level (where there is much more variety).

Australia		**Canada**	
Major section	***No.***	***Major section***	***No.***
Labour force	18	Employed work	12
Domestic activities	44	Domestic work	19
Child-care/minding	62	Care giving for household members	13
Purchasing goods & services	24	Shopping and services	14
Sleeping, eating & personal care	17	Personal care	11
Education	19	School and education	10
Voluntary work & community participation	24	Organizational, voluntary and religious activity	19
Social life & entertainment	19	Entertainment (attending)	18
Active leisure	29	Sports and hobbies (participation)	35
Passive leisure	23	Media and communication	14
TOTAL	**279**	**TOTAL**	**165**

The activity classification for the New Zealand Time Use Pilot Survey was similar to the two above but it contained differences related to the specific objectives of the survey. The needs of sponsors and other potential users of the data were obviously paramount in the development of the classification but there was also the objective to ease international comparison by being consistent with the multinational coding system. The classification had to classify activities in such a way to as to make it possible to measure the amount of time spent on unpaid work by women and men, and unpaid work activities had to be classified in such a way that they could be related to market equivalents for the purpose of evaluation.

The classification was structured so as to separate economically-productive activities (whether paid or unpaid) from other activities. It contained 12 major groups as follows:

1. Labour force paid work and related activities
2. Domestic work and household administration
3. Childcare and helping/caring for other household members
4. Unpaid work in the community
5. Unpaid production of goods
6. Education
7. Religious, cultural, political and social participation
8. Personal care
9. Social entertainment
10. Sports and hobbies
11. Communication and physically passive free-time activities
12. Completing time diary and unknown activities

In 1997/98, Statistics New Zealand and the Ministry of Women's Affairs worked on developing an activity classification for the 1998/99 Time Use Survey. The 11 top level categories of this classification are:

1. Personal care
2. Labour force activity
3. Education and training
4. Household work
5. Caregiving for household members
6. Purchasing goods and services for own household
7. Unpaid work outside of the home
8. Religious, cultural and civic participation
9. Social entertainment
10. Sports and hobbies
11. Mass media and free time activities

This classification, which has 88 activity codes at the most detailed level, follows the "four kinds of time" typology developed by Norwegian Dagfinn Ås (Ås, 1982).

Necessary time	Personal care
Contracted time	Labour force activity
	Education and training
Committed time	Household work
	Caregiving for household members
	Purchasing goods and services for own household
	Unpaid work outside the home
Free time	Religious, cultural and civic participation
	Social entertainment
	Sports and hobbies
	Mass media and free time activities

Time period of survey

People's use of time is subject to wide seasonal variation. Ideally, a time use survey should reflect those differences by collecting data across all four seasons. The large majority of countries do this, either by collecting data continuously throughout a full year (eg Canada, Finland and France) or by gathering data at different times of the year (eg Australia, Austria and Germany). Only a few countries schedule their surveys to cover just one portion of the year. Denmark collected its 1987 data in March, Sweden ran its 1990/91 survey between September and May, and Japan conducted its 1991 survey on just the first day of October.

A view has been offered in the international arena that autumn is the time of year "closest to the national average", and that if time use data cannot be gathered over an entire year then autumn data collection is the next best thing. Certainly some countries seem to have accepted this viewpoint, but the assertion is questionable in New Zealand. Many activities in this country, particularly leisure and recreational pursuits, are focused on the outdoors so weather and time of year have a major impact on many people's use of time. Activities where large seasonal variations could be expected include playing sport, gardening, home maintenance, freezing/preserving food, leisure shopping, watching television and holiday travel. Interviewing for the 1998/99 survey will take place continuously over a full 12 month period.

Year-round (or at least seasonally representative) data gathering may have cost implications, especially on the survey administration side. However, for meaningful time use statistics to be produced for New Zealand, this approach would have to be adopted. The Australians used it in their 1992 nationwide survey, collecting data in four separate 13-day periods in late February/early March, late May/early June, late September/early October, and late November/early December. This is because one of the three major aims of the survey was to measure the daily activity patterns of people in Australia to establish a basic Australian time use profile over the whole annual cycle.

Summary descriptions of selected national time use surveys

AUSTRALIA

Year	1997
Sample size	4,550 households - 8,600 individuals
Age range	15 and over
Diary	2 days
Length of activity block	5 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	four collection periods over the 1997 calendar year

AUSTRIA

Year	1992
Sample size	23,000 households
Age range	10 and over
Diary	1 day
Length of activity block	day: 15 minutes night: 30 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	two times a year

CANADA

Year	1998
Mode	Telephone
Sample size	10,000 individuals
Age range	15 and over
Diary	1 day
Length of activity block	free declaration
Activity coding	post-coding, primary activity only (supplementary questions on childcare)
Survey period	whole year

DENMARK

Year	1987
Mode	Telephone
Sample size	3,577 individuals
Age range	16-74
Diary	1 day
Length of activity block	15 minutes
Activity coding	pre-coded list, primary activity only
Survey period	March

FINLAND

Year	1987-88
Sample size	10,000 individuals
Age range	10 and over
Diary	2 days
Length of activity block	day: 10 minutes night: 30 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	whole year

FRANCE

Year	1985-86
Sample size	16,047 households - approx. 24,000 individuals
Age range	15 and over
Diary	1 day
Length of activity block	5 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	whole year

Summary descriptions of selected national time use surveys *- continued*

GERMANY

Year	1991-92
Sample size	7,200 households - 16,000 individuals
Age range	12 and over
Diary	2 days
Length of activity block	5 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	four times a year

ITALY

Year	1988-89
Sample size	19,728 households - 40,000 individuals
Age range	3 and over
Diary	1 day
Length of activity block	free declaration
Activity coding	post-coding, primary and one secondary activity
Survey period	whole year

JAPAN

Year	1991
Sample size	99,000 households - 250,000 individuals
Age range	15 and over
Diary	2 days
Length of activity block	15 minutes
Activity coding	pre-coded list, main activity only
Survey period	one day (1 October 1991)

NETHERLANDS

Year	1988
Sample size	7,434 households - 6,443 individuals
Age range	12 and over
Diary	2 days
Length of activity block	15 minutes
Activity coding	pre-coded list, main activity only
Survey period	whole year

NEW ZEALAND

Year	1998/99
Sample size	8,500 individuals
Age range	12 and over
Diary	2 days
Length of activity block	5 minutes
Activity coding	post-coding
Survey period	whole year

NORWAY

Year	1990-91
Sample size	4,862 individuals
Age range	16-79
Diary	2 days
Length of activity block	day: 15 minutes night: 30 minutes
Activity coding	post-coding, secondary activities registered on just one day
Survey period	whole year

SWEDEN

Year	1990-91
Sample size	5,300 individuals
Age range	20-65
Diary	2 days
Length of activity block	10 minutes
Activity coding	post-coding, primary and one secondary activity
Survey period	September to May

Methodology for the 1998/99 New Zealand Time Use Survey

- The Time Use Survey was signalled in the December 1996 Coalition Agreement. Statistics New Zealand is undertaking the survey under contract to the Ministry of Women's Affairs.
- Development work began from July 1997. Interviewing began in July 1998 and will continue until June 1999. Results will be available in December 1999.
- The target population for the survey is "the civilian, non-institutionalised, usually resident population of New Zealand aged 12 years and over".
- About 8,500 people aged 12 and over living in private households in New Zealand will be included in the survey.
- The survey is "over-sampling" Maori in order to provide reliable time use statistics for Maori as well as for the general population. About 2,100 of the 8,500 respondents will be Maori.
- Two people per household are interviewed where eligible.
- Each respondent is asked to complete a 48-hour time diary, with 5 minute preprinted intervals, on days designated by survey rules.
- Respondents are asked to record all the activities that they were doing, as well as where they were and, if applicable, how they were travelling.
- Interviewers go over with respondents what is in their diaries to confirm who the activities were done for, and, if applicable, the age and health status of the person, or the type of organisation.
- Respondents answer questions about their individual and household characteristics (such as sex, age, ethnic group, labour force status, income, number of children in the household, equipment and facilities available in the household) in a face-to-face interview.
- The interview also includes questions about participation in activities which are culturally significant to Maori, voluntary work, and purchase of household services.

Conclusion

A number of countries around the world now undertake time use surveys. While most have several features in common, no two are identical because, as with any other statistical survey, time use surveys are conducted to meet certain objectives and these vary from country to country.

New Zealand has benefited from the wealth of overseas time use survey experience. The methodology developed for the 1998 / 99 Time Use Survey is compatible with other countries' time use surveys, but in some respects, such as interviewers seeking details from respondents on who activities are done for, and the over-sampling of Maori, the New Zealand survey is taking a lead.

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