



BALANCING THE BURDEN?

DESK REVIEW OF WOMEN'S TIME
POVERTY AND INFRASTRUCTURE
IN ASIA AND THE PACIFIC

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Notes:

1. In this publication, “\$” refers to US dollars.
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Executive Summary

The objectives of this review are as follows:

- (i) determine the contribution of infrastructure in reducing women's time poverty and how this is being recorded;
- (ii) determine if women's time savings result from increased access to infrastructure and are used for productive work that also reduces consumption poverty;
- (iii) assess ways in which infrastructure projects more effectively reduce both time and consumption poverty for women.

Allocation of time for different activities between individuals within the household is influenced by gender division of labor and social and cultural norms. All over the world, women work more hours than men; men spend more time in paid work, whereas women bear the burden of unpaid work. Much of this unpaid work relates to household tasks such as fetching water and collecting firewood; cooking; and caring for the family, including the children, the sick, and the elderly. This can result in time poverty for women, necessitating trade-offs with regard to allocating time, reducing their time for paid work, and depriving them of time for social or community activities to improve their status. The findings from time-use surveys in Asia and the Pacific clearly indicate these gendered patterns of time-use.

The review finds that basic infrastructure has the potential to reduce the time spent on housework and care work and influence the gender division of labor. However, infrastructure projects rarely include interventions to address this directly, even when reducing time burdens is a slated aim of the project.

The review also reveals that the impacts of improved infrastructure on women's time poverty significantly differ across types of infrastructure.

Improved water supply has significant impacts on reducing the time women spend doing burdensome unpaid work but has little impact on the gender division of labor in the household.

For women and girls without access to improved sanitation, the amount of time needed each day to find a place to defecate, or to accompany children, is significant but has been largely invisible until recently.

Electricity also tends to reduce the amount of time spent on housework on care work, despite its limited use for cooking. Electricity sometimes has an impact on the amount of

time women spend on paid work despite the reluctance to use electricity for cooking. An important impact of electricity is on the empowerment of women through increased access to information.

Improved transport infrastructure results in significant changes in the lives of women and girls, which impact on how their time is allocated to different tasks. However, the impacts of travel time on time poverty of women are complex due to the new opportunities that are opened up, adding new time-use demands on women in addition to their traditional roles.

There is a substantial gap in data indicating the relationships between infrastructure, time poverty, and women's empowerment. Project-specific research could collect both quantitative and qualitative information and data to better understand such relationships.

Abbreviations

| | |
|------|--|
| ADB | Asian Development Bank |
| ESI | Economics of Sanitation Initiative |
| OECD | Organisation for Economic Co-operation and Development |
| SNA | System of National Accounts |
| TUS | time-use survey |

NOTE

In this report, “\$” refers to US dollars; “Tk” refers to Bangladesh taka.

The following exchange rates are used in this report:

\$1 = Tk77.78 (as of 7 October 2015)

1. Introduction

Time is a finite resource to which men and women, rich and poor, have equal access. The allocation of time between different paid and unpaid, and market and nonmarket work is influenced by numerous factors, including social and cultural norms, and gender division of labor. In most countries, women work longer hours than men, with more hours allocated to unpaid work such as subsistence production (including collection of water and firewood); household chores; and care of children, the elderly, and the sick. Time spent on this unpaid work minimizes the time available for women and girls to engage in paid work, thereby limiting their contribution to the economic welfare of their families. It also leaves them with little or no time to study or participate in social or political activities that could help improve their status and future prospects. This aspect is time poverty, which effectively limits the contribution of women toward poverty reduction and economic growth, and it perpetuates gender inequalities across generations.

Basic infrastructure such as water supply, sanitation, energy services, and all-weather roads and affordable transportation has the potential to reduce time poverty by reducing the time spent on burdensome work, the most typical of which are fetching water and collecting firewood. When infrastructure results in improved health, it reduces the burden of unpaid work as in caring for sick members of the family. The time saved might be used for economic and productive purposes, and infrastructure could also help to increase the productivity and returns on this “time.” The time saved could be used for study or for participating in social or political activities to improve the status and opportunities for women and girls.

In designing basic infrastructure projects, we often assume that the projects will have positive impacts on the social and economic welfare of the beneficiaries including resultant time savings. However, time use is not an indicator that is often included in monitoring frameworks, nor is it accorded more than a passing attention in most evaluations. Changes in time-use patterns are, however, important indicators to understand the contributions that infrastructure makes to improved gender equality and women’s empowerment.

This desk review explores the links between infrastructure development and women’s time poverty in the Asia and Pacific region by drawing on time-use data and reviewing the existing research and evidence from impact evaluations. The review seeks out information where it is available on the changes in time use of women and girls as a result of increased access to infrastructure. It looks at how this, in turn, brings economic empowerment to women in the region. The types of infrastructure included are water supply, sanitation, electricity, and transport. It attempts to make operationally relevant recommendations for how infrastructure projects in these sectors might do more to measure and improve

the impacts with respect to reducing time poverty of women and girls and improving the returns to the time they spend on productive activities.

The objectives of this review are as follows:

- (i) determine the contribution of infrastructure in reducing women's time poverty and how this is being recorded;
- (ii) determine if women's time savings result from increased access to infrastructure and are used for productive work that also reduces consumption poverty;
- (iii) assess ways in which infrastructure projects more effectively reduce both time and consumption poverty for women.

The research study was carried out using sources available on the internet, including:

- (i) Academic literature traced using keywords and delimited to the past 12 months to identify the most recent research.
- (ii) Studies, impact evaluations, and other documents available on the websites of multilateral and bilateral organizations working in the relevant sectors, including Asian Development Bank (ADB), World Bank, United Nations agencies, Organisation for Economic Co-Operation and Development (OECD), Department for International Development of the United Kingdom, and Department for Foreign Affairs and Trade of the Government of Australia.
- (iii) Websites of nongovernment organizations active in the sectors such as Oxfam, WaterAid, and International Forum for Rural Transport and Development, for relevant papers or evaluations.

Following this introduction on rationale, research objectives, and methodology in this section, Section 2 describes the concepts of time use and time poverty, and why it is important in the context of broader discussions of poverty. Section 3 explains time-use data across the Asia and Pacific region and the allocation of paid and unpaid work between women and men in the countries for which these data are available.

Section 4 is a meta-analysis and systematic review of evidence of the impacts of four categories of infrastructure—water supply, sanitation, electricity, and transport—on time use by women, collected from research and impact evaluations in the Asia and Pacific region. Section 5 enumerates what can be learned from research carried out in other regions.

Section 6 draws on the evidence to identify some of the drivers for reducing time poverty and how this could be built into program design. Finally, Section 7 discusses the research methodologies and Section 8 makes recommendations for improving the collection of evidence and analysis of the linkages.

2. Time Use and Time Poverty

In the past few decades, there has been an increasing recognition of the important insights that can be drawn from understanding how time is allocated between activities. Time-use surveys (TUSs) were introduced as a way to measure how time gets allocated to different tasks by different people. Collecting time-use data can be challenging, but the information contributes a valuable dimension to gender analysis. (Further discussion on TUS is provided in Appendix 1.) From a gender perspective, a TUS is an important tool to draw attention to the nonmarket work that is carried out mostly by women. This work is not counted in the System of National Accounts used to calculate the gross domestic product and is often ignored in other survey instruments. Among the activities not counted are housework and care of the children, the sick, and the elderly. Women are also likely to spend more time than men in work that, while counted as contributing to gross domestic product, is unpaid, for example, agricultural work for own consumption, and fetching of water and collection of firewood. These unpaid activities can consume a large proportion of the available time and act as constraints to women participating in paid and productive work. Further information on how the different categories of work are defined is given in Box 1.

Unlike many other resources, time is something that everyone, rich or poor, men, women, or children, has equal access to. Time poverty, therefore, is not about adding or taking away hours from a person but about the choices made in how this finite resource is used each day. Some time is needed for personal care such as sleeping and eating, some to secure the cash needed to purchase goods and services in a cash economy or produce these goods, and some to meet household needs. *Necessary time* is that needed to earn sufficient money to meet consumption needs and meet essential personal and household needs. *Discretionary time* is any additional time over which an individual can make choices as to how it is allocated.¹

Time poverty is when there is no discretionary time, and perhaps not even enough necessary time available to a person, and choices need to be made over allocation of time between essential activities. Or in other words:

Time poverty is the burden of competing claims on an individual's time that reduce their ability to make unconstrained choices in how they allocate their time leading to increased work intensity and to trade-offs among various tasks.²

¹ R. E. Goodin et al. 2008. *Discretionary Time: A New Measure of Freedom*. Cambridge: Cambridge University Press. pp. 3–5.

² A. Kes and H. Swaminathan. 2005. Gender and Time Poverty in Sub-Saharan Africa. In C. Blackden and Q. Wodon, eds. *Gender, Time Use, and Poverty in Sub-Saharan Africa*. Washington, DC: World Bank. pp. 13–38.

Box 1 Defining “Work”

A number of systems and categories have been developed to describe the different types of paid and unpaid work. The System of National Accounts (SNA) defines production that is measured in the gross domestic product and includes the following categories of work:

- i. *Paid market work* is the production of goods and services for the market by remunerated labor and remunerated self-employment;
- ii. *Unpaid market work* is the production of goods and services for the market by contributing family workers belonging to economic units producing for the market;
- iii. *Unpaid nonmarket work* is the production of goods and services for own consumption or own capital formation of the household, or the contribution of family members belonging to economic units not producing for the market (including collection of water and firewood, and growing and processing agricultural produce for own consumption).

Not included in the SNA is a fourth category:

- iv. *Unpaid nonmarket work* is domestic and care services including preparation of meals; volunteer work; as well as care of the children, the sick, persons with disability, and the elderly.

The relationship between the different categories and definitions is shown in the table below.

| | Market Work | | Nonmarket Work | |
|--------------|-------------|-------------|----------------|-------------|
| | Paid Work | Unpaid Work | Unpaid Work | Unpaid Work |
| SNA work | 1 | 2 | 3 | |
| Non-SNA work | | | | 4 |

SNA = System of National Accounts.

Source: J. Charmes. 2006. A Review of Empirical Evidence on Time Use in Africa from UN-Sponsored Surveys. In C. Blackden and Q. Wodon, eds. *Gender, Time Use, and Poverty in Sub-Saharan Africa*. Washington, DC: World Bank. pp. 40–43.

The choice of how to allocate time depends on a number of factors and is often made according to the demands and composition of the household as a unit. Within a household, allocation of time to meet the basic needs of the household is made between men, women, adults, and children, who make up the household. Factors that determine how time is allocated among individuals in the household may be

- (i) demographic: relating to the size and composition (male, female, elderly, those of working age, and children) of the household;
- (ii) social: influenced by social norms and gender division of labor; and
- (iii) economic: balancing paid work, subsistence production, and unpaid work to meet the family's needs.³

³ Footnote 2, pp. 15–16.

Analysis of TUSs all over the world reveals that those most prone to time poverty are women and girls, mainly due to the gender division of labor that thrusts upon them the burden of unpaid work within the household.⁴

Time poverty can be experienced differently across income levels. It may be felt by the nonpoor who work long hours in paid work for higher income or by the poor who work long hours in unpaid work to simply meet the most basic of needs. There are also those who are not time-poor—either because they have sufficient income without working or because they are underemployed, or unemployed.⁵ Of particular concern is time poverty when individuals work long hours but still have insufficient income; or when the burden of unpaid nonmarket work—including subsistence production, housework, care work—impacts significantly on an individual's welfare or ability to participate in paid market work.

Consumption poverty can be exacerbated by time poverty when

- (i) lack of access to time-saving resources increases time poverty and reduces the time available for paid work;
- (ii) gendered division of labor reduces substitutability in nonpaid work and increases the impact on women; and
- (iii) reduced time for education and skills training (especially for women and girls) impedes their ability to increase their economic returns.⁶

Women's time poverty and their low status in society are intertwined. Work such as housework and care work that is unpaid is not accorded any value—economic or otherwise—and hence is carried out by those with lower status in the household, normally women and children. The burden of carrying out this work limits women's ability to participate in market activities and contribute to the economy of the households, and this, in turn, reinforces their low status. Tackling women's time poverty therefore needs to address issues of status as well, and use a better understanding of the structural and social drivers that influence decisions on time allocation.

⁴ World Bank. 2011. *World Development Report 2012, Gender Equality and Development*. Washington, DC, pp. 217–219.

⁵ E. Bardasi and Q. Wodon. 2009. *Working Long Hours and Having No Choice: Time Poverty in Guinea*. Washington, DC: World Bank. p. 12.

⁶ Footnote 2, p. 17.

3. Time Use in Asia and the Pacific

Since the 1940s, TUSs have been carried out in 21 countries in the Asia and Pacific region. The Centre for Time Use Research at the University of Oxford has compiled a list of all the TUSs that have been undertaken. Those carried out in the Asia and Pacific region are shown in Appendix 2. However, according to the 2011 report on Asia and the Pacific by OECD, only 12 of the 36 countries in the region had sufficiently recent and reliable data to include in a special chapter on time use.⁷ These 12 countries did cover the majority of the population in the Asia and Pacific region since three of the four most populous countries are included (the People's Republic of China, India, and Pakistan). A range of economic and human development issues is also covered with Australia, Japan, the Republic of Korea, and New Zealand on one hand; and Cambodia, India, and Pakistan on the other. However, no surveys from Pacific developing member countries were included. The surveys used are of different years between 1998 and 2008, and the report lists a number of inconsistencies with methods of data collection and comparability. Despite this, the authors conclude that the comparison across countries is still useful.⁸ More information about the surveys included in the report is provided in Appendix 2.

The 2011 OECD report found that total time worked (paid and unpaid, market and nonmarket) varied across the region, with the highest in Mongolia (10 hours for men and 11 hours for women) and lowest in Cambodia (6 hours for men and 7 hours for women). Women worked consistently longer hours in total work than men (Figure 1).

However, of this total time worked, men spend consistently more time in market work and learning (Figure 2), and women spend consistently more time in nonmarket activities (Figure 3).⁹

One finding to stand out in Figure 3 of the OECD report that is relevant to this current review is that women spend similar lengths of time on nonmarket or unpaid activities in the OECD and the non-OECD countries. This seems to contradict the premise that access to electricity and water supply, and time-saving devices such as washing machines and refrigerators, actually reduces the amount of time women spend in unpaid work. However, the report also points out that the intensity of work is probably different in many non-OECD countries if women are engaged in collecting and chopping firewood and carrying water.¹⁰

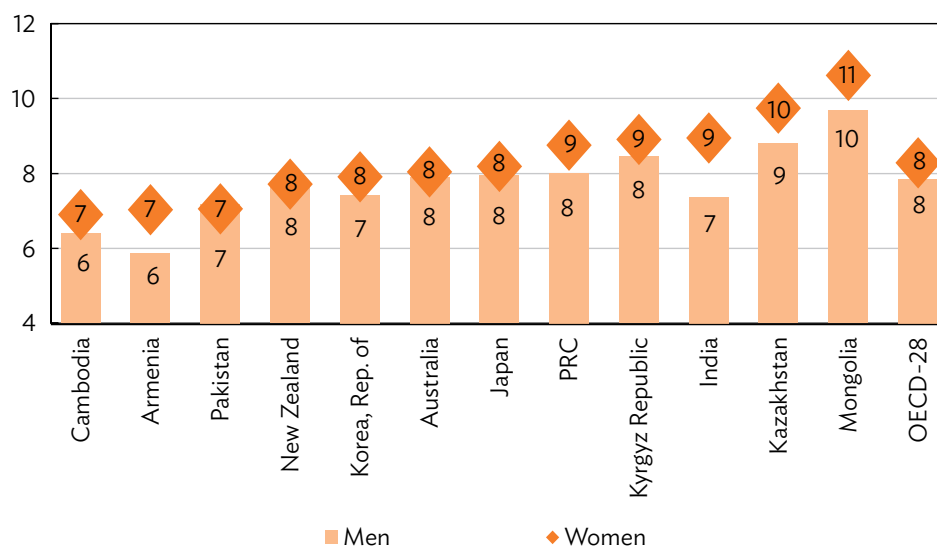
⁷ OECD. 2011. *Society at a Glance—Asia/Pacific Edition*. Paris. pp. 11–24. <http://www.oecd.org/els/soc/49263450.pdf>

⁸ Footnote 7, pp. 12–15.

⁹ Footnote 7, p. 16.

¹⁰ Footnote 7, p. 18.

Figure 1 Total Hours Worked per Average Day, by Sex

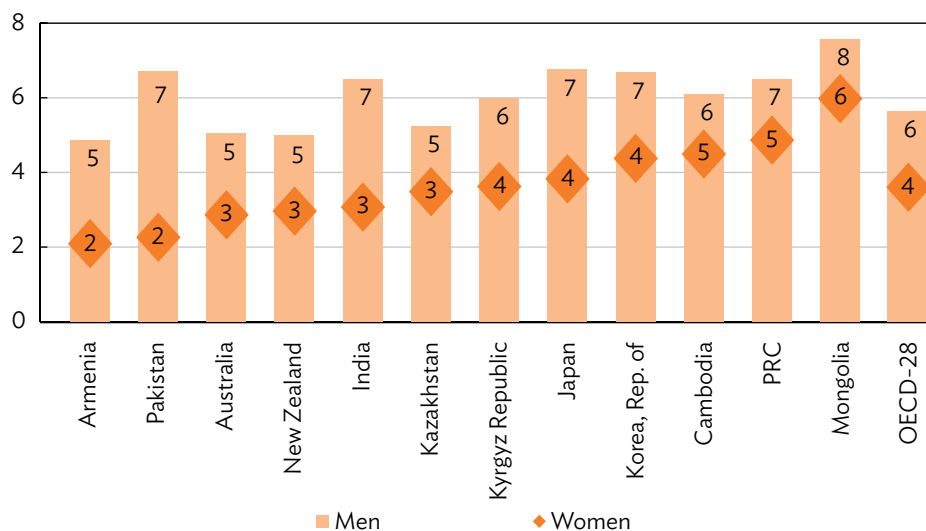


OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Note: Figures as of 2011 except for Armenia (average of 2004 and 2008).

Source: OECD. 2011. *Society at a Glance—Asia/Pacific Edition*. Paris. p. 17. <http://dx.doi.org/10.1787/888932545996>

Figure 2 Total Hours Spent on Market and Learning Activities per Average Day, by Sex



OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

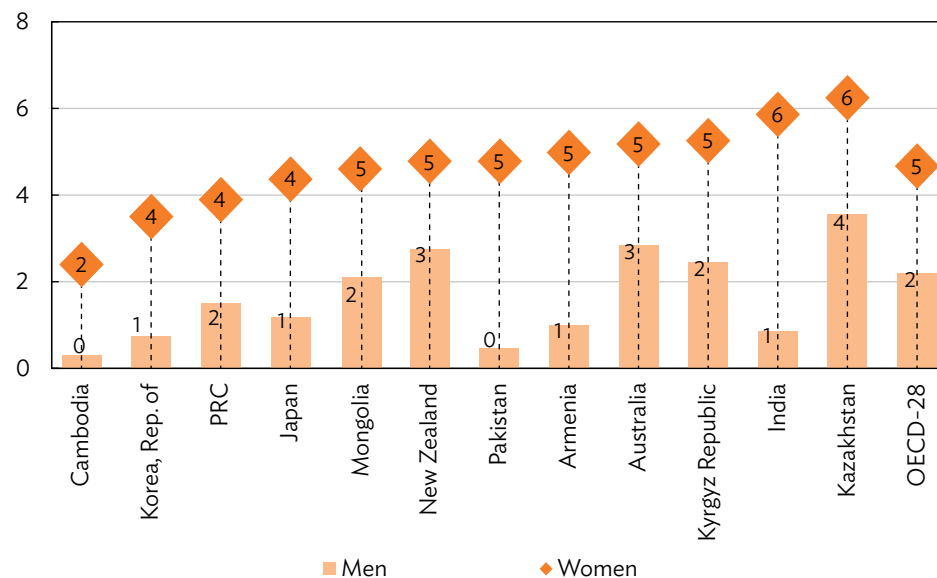
Note: Figures as of 2011 except for Armenia (average of 2004 and 2008).

Source: OECD. 2011. *Society at a Glance—Asia/Pacific Edition*. Paris. p. 17. <http://dx.doi.org/10.1787/888932546015>

The findings above are mirrored in an analysis of TUSs undertaken by the World Bank. In the six Asia and the Pacific countries included in the analysis, women spent consistently more time in housework and care work, whereas men spent consistently more time in market work.¹¹ The women's share of the total time spent by men and women on housework and care varied between 60% and 84% in Asia and the Pacific countries. The women's share of the total time spent by men and women on market work ranged from 11% to 42%.¹²

The findings discussed above do not include the category of free time also included in the TUSs. Free time includes all nonwork time and can be further divided into time allocated for personal care and leisure. Personal care includes activities such as eating and sleeping, whereas leisure includes education and participation in social and community activities. Men tend to have slightly more free time than women across the countries¹³ although the World Bank analysis found no significant gender or cross-country differences in these categories.¹⁴

Figure 3 Total Hours Spent on Nonmarket Activities per Average Day, by Sex



OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Note: Figures as of 2011 except for Armenia (average of 2004 and 2008).

Source: OECD. 2011. Society at a Glance—Asia/Pacific Edition. Paris. p.18. <http://dx.doi.org/10.1787/88893254603>

¹¹ Pakistan, Armenia, Timor-Leste, India, the Kyrgyz Republic, and Cambodia.

¹² Footnote 4, p. 219.

¹³ Footnote 7, p. 19.

¹⁴ Footnote 4, p. 216.

4. Impact of Infrastructure on Women's Time Poverty in Asia and the Pacific

This section looks at the findings from research and evaluations on the impact of infrastructure on women's time use in Asia and the Pacific. Four types of infrastructure—water supply, sanitation, electricity, and transport—are reviewed.

The gender issues that each type of infrastructure addresses, or could potentially address, is very different. Clean water is an essential resource for which there is no substitute. Time to collect water is prioritized in the household, and the time of the collectors—usually women and girls—will be allocated to this and away from other potential uses. When the gender division of labor within the household determines that water collection is part of the reproductive role of women and girls, the time taken in collecting water reinforces the gender roles and relationships and contributes to gender inequalities in the household.

Poor or inadequate sanitary facilities negatively impacts on the time of women and girls as they have to walk distances for privacy. The gendered impacts are felt through increased vulnerability from low self-esteem and risks to their security. When care of family members afflicted with diseases caused by poor sanitation falls on women, the gender division of labor again reinforces their reproductive role.

Electricity as a source of energy can be substituted with other sources such as firewood or kerosene. Each household will analyze the costs and benefits before deciding whether to connect to electricity, and how much to substitute electricity with other sources for different purposes. They will take a range of variables such as cost, smell, efficiency, and risk into consideration. The extent to which the opportunity costs of time spent by women on collecting firewood or continuing with electricity substitutes are taken into account depends on the value they accord to women's time.

Transport can open up a whole new range of choices to different members of a household regarding their time use. Arguably, transport has the greatest ability to make structural changes to division of labor within the home and alter gender relations. Increased mobility may give girls the opportunity to continue education, and women the opportunity to participate in market work. This could alter the way they view themselves, and the way others view them.

In each case, the value of time-use information should not be to simply monitor how infrastructure impacts on time poverty overall, but to see how it changes the allocation of time for different purposes. In this way, time-use information can help to explain both the contribution that infrastructure makes to gender equality and women's empowerment, and how women can better contribute to poverty reduction and economic growth.

Water Supply

Women's time use and water supply

Clean water is an essential resource for which there is no substitute. Each family needs a certain amount of water each day to survive, and the lack of access to improved water supply places a disproportionate burden on women and girls who tend to be the primary collectors of water for the family in many countries. The impact is felt the most by the poor who are more likely to lack access to improved water supply.

Where there is no adequate water supply close by, people—mostly women and girls—have to travel, sometimes long distances, to fetch water. Around the world, women spend 200 million hours each day in collecting water for their families.¹⁵ The amount of time used to collect water to meet the daily requirements of the household depends on the travel time to the source, waiting time at the source, and the number of family members who are available to help.

The length of time can vary quite significantly: A survey across six states in India in 1996 determined that women spent, on average, 1 hour per day collecting water.¹⁶ Analysis of 2,000 TUSs in India found that in all states (except Gujarat, where all water collection was done by men), women in both rural and urban areas spent more time than men collecting water. On average, women spent just over 5 hours each week collecting water compared with men who spent 3.6 hours.¹⁷ A study across nine countries, including three in Asia (India, Nepal, and Pakistan), found that women did most of the water collection across all countries, and that many women reported spending at least 1 hour each day collecting water.¹⁸ No figures were found for countries in the Asia and Pacific region outside India, Nepal, or Pakistan for the amount of time spent on collecting water.

It is not just the collection of water that has an impact on women's time use. Women are also affected to a great extent by the health issues resulting from inadequate water supply—first in that, as the collectors and carriers, they tend to be exposed to harmful pathogens in water and risk being ill themselves, and second in that they bear the brunt of caring for the other members of the household who are sick due to unclean water (see Section 4.2).

The actual situation with regard to water collection is probably more complicated than presented here. Water for different purposes—drinking, washing, or laundry—may be used from different sources with varying journey times. Women may also contribute to

¹⁵ Asian Development Bank (ADB). 2014. *Women and Water Project Management in Asia and the Pacific*. p. 1. www.adb.org/features/women-and-water-project-management-asia-pacific

¹⁶ World Bank. 2004. *The Impact of Energy on Women's Lives in Rural India*. Washington, DC. p. 1. The evaluation used results from a household energy survey carried out in 1996 that interviewed the main cooks in 5,000 households, most of whom were women.

¹⁷ L. S. Chakraborty. 2008. *Deficient Public Infrastructure and Private Costs: Evidence from a Time-Use Survey for the Water Sector in India*. Annandale-on-Hudson: The Levy Economics Institute. p. 9.

¹⁸ G. Koolwal and D. van de Walle. 2009. *Access to Water, Women's Work, and Child Outcomes*. Washington, DC: World Bank. p. 19. The other countries included in this analysis were Madagascar, Malawi, Morocco, Rwanda, Uganda, and Yemen. All the countries included are those where parts of the country suffered from water shortages, and where sufficient information was available from household surveys for the analysis. The analysis only included rural households.

transporting water for livestock, or to water their gardens, and this may involve additional time and travel although there is little data on this.

Impact of improved water supply on women's time poverty

Access to clean water supply closer to home could, therefore, have a significant impact on women's time poverty, especially for poor women and girls who otherwise tend to have the least access to clean water. Overwhelmingly, the evidence confirms time savings for women and girls when there is improved access to water supply. However, apart from significant and important impacts on girls' attendance at school, there is little hard evidence to show that time saved is reallocated to activities that might have a transformative effect on gender relations in a household, such as participation in market work.

The one possible exception is an analysis of time-use statistics from six states in India to investigate whether better access to water infrastructure can help women to spend more time on market-oriented activities. This study found that worsening infrastructure could lock in the time women spend in unpaid work that might otherwise be available for income-generating activity. However, it also found evidence that supported the hypothesis that better public infrastructure may release women's time to more market-oriented work.¹⁹

Analysis of data from Pakistan also found that greater distance to water source lowers the participation of women in income-generating activities. However, when there was water supply in the home, women were more likely to spend the additional time available on leisure than in market-based activities.²⁰ This finding was supported by a nine-country study including three in Asia—India, Nepal, and Pakistan—that found no evidence indicating improved access to water led to more off-farm work for women.²¹ The analysis did, however, find that improved access to water led to improved schooling for both boys and girls in countries where a large gender gap existed, and some evidence of improvements in health measured by anthropometric scores. The authors concluded that time saved in collecting water may have been reallocated to improving family welfare.²²

The findings above are from empirical analysis of national data. They are consistent with findings from an impact evaluation of rural water supply and sanitation projects in Punjab, Pakistan.²³ Two projects were included and both had objectives and/or intended impacts of reducing time in fetching water that would permit time to be allocated for productive activities.²⁴ The evaluation findings did not support the hypothesis that time freed up from fetching water was used for income-generating activities, contrary to the expectation of

¹⁹ Footnote 17, p. 13.

²⁰ N. Ilahi and F. Grimard. 2000. Public Infrastructure and Private Costs: Water Supply and Sanitation in Rural Pakistan. *Economic Development and Cultural Change*. 49 (1). pp. 45–75, cited in G. Koolwal and D. van de Walle. 2009. *Access to Water, Women's Work, and Child Outcomes*. Washington, DC: World Bank. p. 7.

²¹ Off-farm work in this case includes wage work (agricultural and nonagricultural), as well as work in nonfarm, self-employment activities.

²² G. Koolwal and D. van de Walle. 2009. *Access to Water, Women's Work, and Child Outcomes*. Washington, DC: World Bank. pp. 28–29. See footnote 18.

²³ ADB. 2009. *Impact Evaluation Study: Impact of Rural Water Supply and Sanitation in Punjab, Pakistan*. Manila. pp. 9–11 and 23–24.

²⁴ The two projects are: (i) Punjab Rural Water Supply and Sanitation Project; and (ii) the Punjab Community Water Supply and Sanitation (Sector) Project.

the project designers.²⁵ However, the evaluation did find significant benefits for women and girls: first, in reduction of drudgery measured in terms of pain and other health impacts caused by carrying water, and second, in increased attendance of girls in high school (footnote 23).

The quote below comes from a qualitative study looking at the relationship between access to water, sanitation, and hygiene, and gender equality in the Pacific.²⁶ This quote from a woman beneficiary of a water supply project in Vanuatu illustrates the choices that women make to manage time reallocation efficiently. The necessity of collecting water, and time poverty, can force women to make trade-offs in how they use their time, so that time saved gets reallocated to previously neglected household and care work rather than market work:

Before there was so much difficulty to fetch water so I used to shut my baby in the sleeping house so I could take the clothes down to wash and carry back the water. It used to be such hard and heavy work. When I came back the baby would be crying. Now there is less walking and work to get the water. I have more time at home to care properly for my children. I'm now teaching good hygiene practices and I am a good mother. Before I used to go to the hospital with my children all the time. But now they are healthy. Nanen woman, crying as she told this story.²⁷

The Vanuatu study found that, in general, reduced labor in collecting water as a result of improved supply was highly valued especially by women, and also by men. Unfortunately, quantitative data showing the amount of time saved was not presented.²⁸ Other than this study, there is little analysis available on time use and infrastructure in the Pacific developing member countries.

At the project level, the time-saving impacts of water supply do not often appear to be monitoring indicators of the completed projects even when the designs state women's and girls' time saving as an intended benefit. More recently approved projects include this indicator in project gender action plans but not in the project results framework. One of the few projects that measured the impacts of water supply on women's time use in the completion and validation reports is the Third Water Supply and Sanitation Project in Sri Lanka.²⁹ According to the report, the benefit monitoring and evaluation survey had indicated that 82% of women found it easier to collect water after the project, and 57% of women increased their monthly incomes because they were able to use time saved in collecting water to pursue income-generating activities. The impact on health as a result of this project was also significant, as incidence of waterborne diseases among beneficiaries decreased from 17% to less than 1%, which may also have contributed to the increased time available for income-generating activities.

²⁵ The impact evaluation applied a mixed methods approach and included a household survey of 1,301 treatment and 1,301 comparison households. The study focused on measuring impacts in three areas: health, education, and labor force participation and hours worked.

²⁶ J. Willetts et al. 2010. Addressing Two Critical MDGs together: Gender in Water, Sanitation and Hygiene Initiatives. *Pacific Economic Bulletin*. 25 (1). pp. 162–176.

²⁷ Footnote 26, p. 171.

²⁸ Footnote 26, p. 169.

²⁹ ADB. 2011. *Validation Report. Sri Lanka: Third Water Supply and Sanitation Project*. Manila.

The amount of time spent on collecting water in Nepal was assessed in an independent review of five ADB-funded projects, which found that in all of the selected subproject areas, women and girls had been especially burdened with the responsibility of collecting clean water. In the two areas where the amount of time had been measured, after the project, the wet season average of 28 minutes gave way to 8 minutes, whereas the dry season average of 32 minutes had come down to 11 minutes. According to the evaluation report, beneficiary households had been able to spend this time on vegetable growing, animal raising, and small business, and women had more time to spend on the care of their children and in improving sanitary conditions. The evaluation does not provide quantitative evidence for these changes in time allocation.³⁰

A survey to measure the impact of a water supply project funded by the World Bank in the People's Republic of China did use time-use data in the baseline and follow-up survey of 11,313 households in Hebei, Hubei, Inner Mongolia (autonomous region), Jiangxi, and Yunnan provinces in 2001. The surveys found that before the water supply improvement, each household needed 20–60 minutes per day for fetching water, and the time for fetching water increased in drought seasons that lasted for 3–5 months. After access to piped water supply systems, each household saved 183 hours per year, assuming that they earlier spent 30 minutes per day to fetch water. The impact study assumed that the saving in time would be spent on more productive activities such as children's education, cultivation, and improved housekeeping.³¹

The findings of various studies show that increasing access to water supply addresses an important practical need for women and girls in reducing the time burden and drudgery associated with collecting water. There is convincing evidence from some countries of the impact this has on girls' attendance in schools, and this could have a long-term gender equality impact. However, there is little concrete evidence to show that when women's time is freed up from water collecting, it is reallocated to market activities. It seems more likely that the essential nature of water, and the absence of alternatives, makes its collection a priority, causing women to make trade-offs with other important household tasks.

Water supply is, therefore, an essential first step to alleviating women's time poverty, but on its own is insufficient to make a significant change to the gender division of labor, and gender equality, within the household. The role that water supply plays in reducing time poverty warrants more attention in project designs and monitoring indicators than is currently given.

³⁰ WaterAid. 2006. *Water for All? Review of Asian Development Bank's Water Policy Implementation in Nepal's Context—Main Report*. Kathmandu. pp. 3–4 and 22–23. A mixed methods approach was applied for the review including household surveys of 418 households in seven subproject areas.

³¹ M. Shuchen, T. Yong, and L. Jiayi. 2004. *Rural Water Supply and Sanitation in China—Scaling Up Services for the Poor*. A case study from *Reducing Poverty, Sustaining Growth—What Works, What Doesn't, and Why*, A Global Exchange for Scaling Up Success. Technical paper for the World Bank Group's Scaling Up Poverty Reduction Conference. Shanghai. 25–27 May. p. 20.

Sanitation

Women's time use and sanitation

The lack of decent sanitation also contributes to women's time poverty, and it is the women in the poorest households—which are the majority of those without access to improved sanitary facilities—that bear the brunt. A major recent initiative, the Economics of Sanitation Initiative (ESI), developed a methodology for calculating the costs of unimproved sanitation. Table 1 takes the impact indicators that were considered in the initiative and puts a specific gender lens over it to highlight the time-use impacts for women of unimproved sanitation.

The ESI looked at the costs and benefits of lack of access to sanitation, and the benefits of providing improved facilities in three South Asian and six East Asian countries.³² Taking household-level impacts and scaling up to calculate the impacts at the national level led to some breath-taking statistics. The most salient points relating to women's time use from each of the country studies are shown in Table 2.

Table 1 Dimensions of Impact of Unimproved Sanitation on Women's Time Use

| | Direct | Indirect |
|---------------|--|---|
| Health | <p>Women have more chance of being in contact with pathogens</p> <p>Loss of time in sickness</p> <p>Loss of time traveling to health facility</p> | <p>Women care for other family members who are sick</p> <p>Loss of time in additional care of sick members</p> <p>Loss of time accompanying family members to health facility</p> |
| Water | <p>Women bear chief responsibility for providing drinking water</p> <p>Loss of time boiling water for drinking</p> <p>Loss of time hauling clean water for drinking if water supply polluted</p> | <p>Women bear burden of housework</p> <p>Loss of time collecting fuel to boil water</p> |
| Toilet Access | <p>Women and girls lose extra time seeking privacy and security</p> <p>Women and girls miss school or work if facilities inadequate to deal with menstrual hygiene</p> <p>Loss of time in accessing open defecation sites and shared toilets</p> <p>Lost days at school and work</p> | <p>Women accompany children to toilets</p> <p>Loss of time accompanying children to defecate</p> |

Source: Based on Water and Sanitation Program. 2014. *Economic Impacts of Sanitation Initiative*. p. 20. www.wsp.org/content/economic-impacts-sanitation

³² Water and Sanitation Program (WSP). 2014. *Economic Impacts of Sanitation Initiative*. www.wsp.org/content/economic-impacts-sanitation. The WSP is a multi-donor partnership administered by the World Bank. The South Asia countries included in ESI were Bangladesh, India, and Pakistan, and the East Asia countries were Cambodia, Indonesia, the Lao PDR, the Philippines, and Viet Nam, and also Yunnan Province in the People's Republic of China.

Table 2 Impact of Unimproved Sanitation on Women's Time Use: Key Findings of the Economics of Sanitation Initiative

| Country | Findings |
|--|---|
| Cambodia ^a | 605 million hours are spent each year accessing open defecation sites or shared toilets. Lost school days and work days for women and girls noted but not calculated. |
| Indonesia ^b | Average number of days taken to care for a sick person in rural areas is 3.4 days per year, and in urban areas it is 4.3 days per year. About 90% of households in both urban and rural areas boiled water for drinking. Rural women without a toilet spent 5 minutes a day finding a place to defecate, and men spent 4 minutes. In urban areas, women spent 8 minutes, and men spent 9 minutes. Children spent the same amount of time; most of them were usually accompanied by women or older girls. |
| Lao People's Democratic Republic ^c | Household surveys estimated that 3.8 days of productivity per year were lost for each adult aged over 15, 4.4 for children aged 5–14, and 3.2 days for children under 5 ^d as a result of diarrheal disease due to poor sanitation. Adults without a toilet in rural areas spent 23 minutes a day traveling to and waiting for access to a place to defecate, a little more than for adults in urban areas. 23% of households said that children were accompanied, which increased the time burden for the carers. |
| Philippines ^e | Household surveys estimated 4.1 days of productivity per year were lost for each adult aged over 15, 3.4 for children aged 5–14, and 1.1 days for children under 5 as a result of diarrheal disease. 15% of households boiled water for drinking; however, water treatment habits were found not to change as a result of improved sanitation. Both rural men and women in homes with no toilets spent about 24 minutes each day accessing toilets. About a third of these families also said they accompanied children to find a place to defecate, responsibility for which falls mostly on women. |
| Viet Nam ^f | 5.3% of the total economic loss due to poor sanitation was estimated to come from time lost, with most of this loss in rural areas. Adults aged over 15 spent 816.3 million hours per year accessing latrines in rural areas, and 168.4 million hours per year in urban areas. The figures are not sex disaggregated. |
| Yunnan Province, People's Republic of China ^g | Average rural household without a private toilet spends 37.6 days (travel plus waiting time) to access sanitation, 36.6 days for peri-urban households, and 24.0 days for urban households. |
| Bangladesh ^h | Access time as a result of inadequate sanitation costs the country Tk31.78 billion, or 0.68% of gross domestic product, not including cost of caring for the sick, and hauling cleaner water when nearby sources are polluted. 5,119 million hours spent accessing open defecation sites and shared toilets in 2007. Economic cost of inadequate sanitation in schools due to loss of time for women and girls is Tk1.67 billion. 17.5% of urban households boil water. |
| India ⁱ | 16% of urban and 7.7% of rural households boil water. 754 million people either defecate in the open or use shared toilets. An estimated 78.9 billion hours each year is spent accessing open defecation sites or shared toilets. Economic cost of loss of time at school and work is estimated to be \$213 million. |

^a WSP. 2012. Economic Assessment of Sanitation Interventions in Cambodia. Jakarta: World Bank.

^b WSP. 2011. Economic Assessment of Sanitation Interventions in Indonesia. Jakarta: World Bank.

^c WSP. 2013. Economic Assessment of Sanitation Interventions in Lao People's Democratic Republic. Jakarta: World Bank.

^d Lost days for adults includes time away from regular activities; for children aged 5–14, it includes some time away from school and also carers' time; and for children under 5 it is just the carers' time. Carers' time was adjusted to account for the possibility that not all time lost was spent on productive activities and to reach a more conservative estimate. WSP. 2011. Economic Assessment of Sanitation Interventions in the Philippines. Jakarta: World Bank. p. 31.

^e WSP. 2011. Economic Assessment of Sanitation Interventions in the Philippines. Jakarta: World Bank.

^f WSP. 2008. Economic Impacts of Sanitation in Vietnam. Jakarta: World Bank.

^g WSP. 2012. Economic Assessment of Sanitation Interventions in Yunnan Province, People's Republic of China. Jakarta: World Bank.

^h WSP. 2012. Economic Impacts of Inadequate Sanitation in Bangladesh. Dhaka: World Bank.

ⁱ WSP. 2011. Economic Impacts of Inadequate Sanitation in India. New Delhi: World Bank.

Source: Various country reports in Water and Sanitation Program. 2014. *Economic Impacts of Sanitation Initiative*. www.wsp.org/content/economic-impacts-sanitation

Impacts of improved sanitation on women's time use and time poverty

The ESI also went on to calculate the costs and benefits of improving sanitation in some of the countries by comparing households with improved sanitation and those without. The time saved in not having to find a place to defecate or accompany children to do so and time saved in not having to care for the sick due to the reduced incidence of disease were calculated and given an economic value that could be factored into the equation. However, these calculations were adjusted so that economic value was only given to the time that might have been lost from paid work, and not unpaid work.

The ESI studies measure productivity losses due to lack of sanitation, that is, they assume that women have the same roles with and without sanitation, but that some of the productive time is lost without it. What they do not measure is the extent to which women's role may change as a result of improved sanitation, that is, how many more girls would go to school if there were adequate toilet facilities in the school, and how many more women would start to work if the workplaces had adequate facilities. Attracting more women to work and school, rather than just providing better facilities to those already there, would constitute a strategic rather than a practical change, contributing to changing gender roles and improving equality.

Based on these estimates, for example, it was calculated that in Viet Nam, time savings alone from improved sanitation could save \$41.6 million per year.³³ This figure is not broken down into the percentage due to women's time saved and men's time saved; however, the explanation of the assumptions made in the calculations indicate that a higher percentage of this cost saving would be due to the amount of women's time saved.

What is not captured in the ESI work is the extent to which increased dignity, self-esteem, and confidence that improved sanitation would give to women would lead to them making different choices in how they use their time.

At the project level, no reference to time savings as an impact of improved sanitation has been found in the reviewed project validation reports approved during October 2013–October 2014. Time savings related to improved sanitation was not found to be either an expected impact or an objective of any of the projects reviewed, and time use in finding a place to defecate, waiting times at communal latrines, or in caring for sick members of the household has not been monitored. More research and data collection during projects are needed on how improved sanitation has impacted on women's time poverty or how time saved has been used.

Electricity

Women's time use and energy

Energy is another necessity within the household. It is needed for essential tasks such as cooking and for lighting—and in cold regions, also for heat. Unlike water there are a number of alternatives available on the energy ladder with electricity at the top. The availability of the source, cost, and labor, all influence the choice of energy source. At the bottom of the

³³ WSP. 2008. Economic Impacts of Sanitation in Viet Nam. Jakarta: World Bank.

ladder are biofuels such as wood, dung, or crop residues that are considered to be free if collected locally, since the time spent on collecting biofuels is not accorded a value. Further up the ladder are paraffin, kerosene, and liquefied petroleum gas, and finally electricity, which all have different costs and collection times.

For the poorest households in rural areas, biomass fuels are often the only option, and the burden of collection of fuel often falls on women in many, but not all, countries.³⁴ This reflects the low value accorded to women's time by families and society due to women's low status. An energy survey in India found that women spent on average about 40 minutes a day collecting fuel compared with an average of 1 hour collecting water—these figures reflect the fact that water is collected daily and fuelwood, every few days.³⁵ There were wide variations in the time spent on collecting fuel depending on the geographic location and on the availability of, for example, firewood.³⁶ As fuelwood stocks become depleted, women have to travel longer distances to find wood, or they resort to lower-quality substitutes of which more is needed.³⁷ There are, however, trade-offs. Lower-quality fuels mean longer cooking times; so while the time to collect may be less, more time is spent on cooking. Around Asia, there is often a preference for firewood, especially for cooking, because of the greater efficiency, even if it takes more time to collect. A survey in India found that women using wood to cook spent on average 50 minutes collecting wood compared with 45 minutes for those using dung, and 30 minutes for those using crop residues.³⁸ Meanwhile, those that use kerosene for cooking are less likely to spend time collecting fuel.³⁹

The survey of 5,000 women in India who were the primary cooks in their households found that they spent 3 hours a day cooking meals and an additional hour or two processing food to prepare it for cooking—including grinding spices and other activities.⁴⁰ While reports on the time women in India spend on collecting fuel varies widely across different studies, there is less variation in the amount of time spent on cooking and preparing food.⁴¹

The impact of electrification on women's time poverty

Apart from the anticipated time savings in collecting firewood, a commonly held assumption is that connection to electricity opens up the opportunity for labor-saving devices that would reduce the time burden of housework on women. Also, since electric light helps to lengthen the time that can be used for work or leisure activities, there is more time available—both from time savings and from the lengthened day—for women to engage in productive activities.

The preference for cooking with firewood showed up in a qualitative study in two villages in the northern Lao People's Democratic Republic (Lao PDR). It was found that most people still used fuelwood for cooking, and the time spent on gathering fuelwood had not

³⁴ World Bank. 2008. *The Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits*. Washington, DC, p. 89. A table in the annex of this report shows that, in Indonesia, men spend somewhat more time than women collecting wood (0.21 compared with 0.09 hours per day), while in India both men and women spend 0.65 hours a day.

³⁵ Footnote 16, p. 21.

³⁶ Footnote 16, p. 22.

³⁷ Footnote 16, p. 32.

³⁸ Footnote 16, p. 37.

³⁹ Footnote 16, p. 50.

⁴⁰ Footnote 16, p. 4.

⁴¹ Cited from various studies, Footnote 16, p. 13.

changed significantly after connection to electricity.⁴² This study, however, seems an outlier, with others showing a decrease in the amount of time spent on collecting fuelwood. For example, an evaluation of assistance of ADB to rural electrification in Bhutan showed that both men and women benefited from a reduction in the time spent on collecting firewood, but the impact was greater for women (a reduction of 27.6 minutes per day for women compared with 21.6 minutes for men).⁴³ In India, rural women with electricity spent 10.05 hours per month collecting biofuels whereas women without electricity spent 12.22 hours. On the contrary, rural men with electricity spent 5.07 hours and those without electricity spent 5.93 hours collecting biofuels.⁴⁴ Electrified households in Bhutan saved about 35 minutes per round trip for fuelwood collection.⁴⁵

Despite these stated reductions, many households are still reluctant to use electricity for cooking as shown in Table 3. The very low use of electricity for cooking is consistent with the Bangladesh study that found 95% of households with or without electricity still used earthenware burners for cooking.⁴⁶ Rice cookers are becoming more common in electrified homes across Asia, which may contribute to increased use of electricity for cooking over time.⁴⁷ However, while most of the families interviewed in the Lao PDR study owned rice cookers and water boilers, this time-saving equipment was found to be rarely used because of safety concerns relating to mixing water and electricity, and lack of knowledge on how to properly use the devices.⁴⁸

Table 3 Use of Electricity for Cooking

| Country and Year of Data Source | Percentage of Households with Electricity Using Electricity for Cooking | |
|---------------------------------|--|-------|
| | Rural | Total |
| Bangladesh (2004) | 0.0 | 0.2 |
| Cambodia (2000) | 1.1 | 0.6 |
| India (1998) | 0.4 | 0.7 |
| Indonesia (2002) | 0.2 | 0.4 |
| Nepal (2001) | 0.0 | 0.4 |

OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Sources: *OECD Based on National Time Use Surveys*. <http://www.oecd.org/gender/data/balancingpaidworkunpaidworkandleisure.htm>; World Bank. 2008. *The Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits*. Washington, DC. p. 90.

⁴² M. Korkeakoski. 2009. *Impact of Micro-Hydropower (MHP) Based Electrification on Rural Livelihoods: Case Study Nam Mong in Luang Prabang Province, Lao PDR*. Jyväskylä: University of Jyväskylä. p. 34.

⁴³ Asian Development Bank. 2010. *Asian Development Bank's Assistance for Rural Electrification in Bhutan—Does Electrification Improve the Quality of Rural Life?* Asian Development Bank. Impact Evaluation Study. Independent Evaluation Department. Manila. p. 17.

⁴⁴ S. R. Khandker et al. 2012. Who Benefits Most from Rural Electrification? Evidence in India. *Policy Research Working Paper*. No. 6095. World Bank: Washington, DC. The paper is based on analysis of the India Human Development Survey (IHDS) 2005.

⁴⁵ Footnote 51, p. 17.

⁴⁶ A. Barkat et al. 2002. *Economic and Social Impact Evaluation Study of the Rural Electrification Program in Bangladesh*. Dhaka: National Rural Electric Cooperative Association International Ltd. p. 103.

⁴⁷ Footnote 42, p. 33.

⁴⁸ Footnote 50, p. 37.

Most studies are consistent in finding a reduction of housework in households with electricity. For example, the Bangladesh study found that 70% of women reported a reduction in housework.⁴⁹ The presence of water pumps and rice mills in the Lao PDR clearly had an impact in reducing women's housework. In some villages in the Lao PDR study, electric pumps were used after electrification to bring water to the village, and modern rice-milling methods were now being used. This had led to significant time saving for women and girls.⁵⁰

We had 200 liters water containers before electricity and we had to go to Nam Mong each day to get water for twenty-four times back and forth to fill the containers. It took 10 minutes back and forth once to go and collect the water. Now we use water [pumping] services. Female, Phon Home⁵¹

The most significant domestic use of electricity across all countries is for lighting. This contributes to longer waking days with households across a number of countries reporting that they stay awake on average an additional 1–2 hours. While most of this time is used for watching television,⁵² there is also evidence that electricity connection contributes to longer working hours. In India, one of the long-term impacts of electrification is that both men and women work longer hours: men in regular wage work, and women in more casual wage work.⁵³ In the Lao PDR, electricity enabled women to prepare their goods for market the next day.

I can use lightbulb and do weaving at night and watch TV. It is much more convenient to do things at night. Female Vang Khan⁵⁴

Similarly, in Bangladesh, electricity had increased the working hours so that women in electrified households engaged in a range of income-generating activities, mostly sewing and handicraft making or crop threshing, for significantly more hours, usually in the evenings, than women in households without electricity.⁵⁵ At almost every income stratum in India, women in households with electricity spent less time collecting fuel and more time on income-generating activities than women in households without electricity. The additional time being used for income-generating activities was especially noticeable among women in the lowest income groups.⁵⁶

There is also a consensus between the different studies and impact evaluations in the finding that electricity had given women the ability to lead a more balanced life, and to have more flexibility about how they used their time. In the Lao PDR, the study found that the effect of better lights was to give women more choice about how they spent their time.⁵⁷ In India, it was found that women from households with electricity led a more balanced life between work and leisure, spending less time on collecting fuel and water, and cooking,

⁴⁹ Footnote 46, p.104.

⁵⁰ Footnote 42, p. 40.

⁵¹ Footnote 42, p. 72.

⁵² Footnote 34, p. 46.

⁵³ D. van de Walle et al. 2013. Long-Term Impacts of Household Electrification in Rural India. Washington, DC: World Bank.

⁵⁴ Footnote 42, p. 72.

⁵⁵ Footnote 42, p. 33.

⁵⁶ Footnote 42, p. 33.

⁵⁷ Footnote 42, p. 72.

and more time on earning an income, reading, and watching television.⁵⁸ The idea of a more balanced lifestyle after electrification was also discussed in a Philippine study that found women spent an hour a day less on housework after the introduction of electricity with the time saved used for watching television.⁵⁹ In Bangladesh, women in homes with electricity had more flexibility in how they organized their time, and in addition to extra time in productive activity, they spent 65 minutes each day watching television compared with 18 minutes for women in homes without electricity in electrified villages, and 13 minutes for women in villages with no access to electricity.⁶⁰

Time spent on watching television was indeed a striking feature of all the studies and evaluations. In India, for example, it was found that electricity had had an impact on women's lives, especially in terms of time spent on reading and watching television.⁶¹ An interesting finding from the Bangladesh evaluation was that the additional time spent on watching television had had a measurable impact on women's empowerment, with greater awareness of gender equality issues and issues such as wage discrimination, and an increased participation in decision making with regard to the use of income.⁶² The World Bank multi-country evaluation found that health had improved in electrified households, and fertility had fallen. They attributed this to the improved access to information through the television.⁶³ Also, in Bhutan, a significant improvement in decision making on issues related to health care and education, but not on finances, was found in women in electrified households. Women said they were becoming more assertive and confident, thanks to exposure to information on health, education, gender equality, and domestic violence through the television.⁶⁴

Several limitations of electrification projects were identified from the studies. The qualitative work in the Lao PDR identified that the poorest, and those without their own connections, including widows, benefited the least from electrification.⁶⁵ However, in India, merely living in a village that is connected does not entitle any household to the benefits of electrification (which is the case with roads and, to a degree, water supply)—the household needs to be connected.⁶⁶ This implies that subsidies and pricing policies are important to ensure that poor women, including poor households headed by women, have access to and can utilize affordable infrastructure facilities and services.

There were also suggestions that the impacts were lower than anticipated. The World Bank multicountry evaluation concluded that more could be done to use electricity to improve time savings and also to help expand and develop small and medium-sized enterprises.⁶⁷ The study in India also concluded that more could have been done to increase the time-saving benefits by the introduction of time-saving equipment. The study drew a link between the low status of women and the lack of incentives to invest in assets and equipment that would reduce the time they spend on drudge tasks. This would free up time

⁵⁸ Footnote 16, p. 59.

⁵⁹ Footnote 34, p. 46.

⁶⁰ Footnote 46, p. 111.

⁶¹ Footnote 16, p. 6.

⁶² Footnote 46, pp. 101–113.

⁶³ Footnote 34, pp. 43–45.

⁶⁴ Footnote 43, p. 18.

⁶⁵ Footnote 42, p. 46.

⁶⁶ Footnote 16, p. 68.

⁶⁷ Footnote 34, pp. 46–47.

for them to engage in activities—such as education or paid work—that would improve their status.⁶⁸

In summary, access to electricity appears to reduce the time spent on housework, and it also adds waking hours to the day, which contributes to relieving time poverty. Additional hours are either spent in productive (market) work or watching television. Both of these have the potential to impact on gender roles within the household and to empower women either through increased incomes or increased access to information. However, the poorest houses may still be unable to connect and share in the benefits, especially if pricing policies are skewed against them, and more could be done to help realize the full potential of electrification.

Transport

Women's time use and transport

Of the infrastructure types reviewed, the relationship between women's time poverty and transport is the most complex. Mobility is a key dimension of gender equality since it not only helps women and girls carry out their socially constructed gender roles more efficiently but also opens up access to new opportunities and resources that may cause an increase in the demands on women's time, thereby also helping to redefine these gender roles.

TUSs collect information on travel times. The graphs in Figures 4 and 5 are constructed from data from several TUSs available in the OECD gender portal. They show the difference in travel time of men and women for work and study and for household-related activities. Other than in India, women spend more time in household-related travel than men, and in all countries, men spend more time in work or study-related travel than women do. These graphs do not include time for social, personal, or leisure activities which often include voluntary work outside the home.

In rural areas, the lack of transport infrastructure can mean a long journey to collect water and firewood, or undertake other household and care work outside of the home. Even when transport is available, the costs may be high and women may choose to walk if the journey is for nonmarket purposes. Transport to fields, gardens, or plantations for agricultural work may consume considerable amounts of time that might otherwise be used to increase productivity. Poor transport infrastructure reduces mobility, especially of women and girls, and limits their access to markets and services such as health and education where these are located far away.

In an urban context, time is important for working women as they may still have to carry out the reproductive and housework responsibilities at home. The travel required for undertaking these care or domestic roles (dropping children at childcare, shopping, etc.) may add additional complexity and time to trips made for work. Long commutes limit women's ability to take formal or higher-paying jobs because they are not compatible with their care duties.⁶⁹ A study in Jakarta found a decline in the number of women who commuted after the age of 29, probably because of the challenge of balancing household

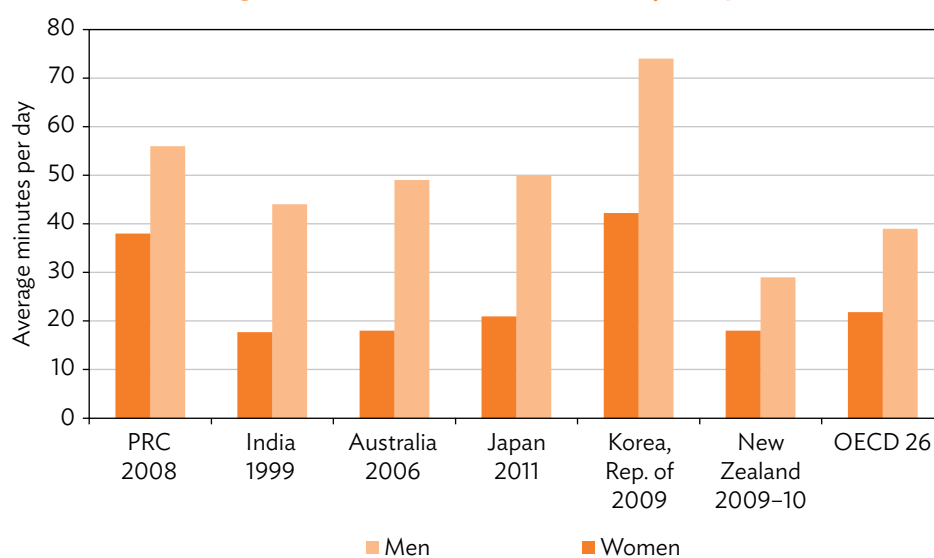
⁶⁸ Footnote 16, p. 78.

⁶⁹ Footnote 4, p. 156.

Figure 4 Travel Related to Household Activities

OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Source: OECD Based on National Time Use Surveys. <http://www.oecd.org/gender/data/balancingpaidworkunpaidworkandleisure.htm>

Figure 5 Travel to and from Work/Study

OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Source: OECD Based on National Time Use Surveys. <http://www.oecd.org/gender/data/balancingpaidworkunpaidworkandleisure.htm>

responsibilities and work. The authors suggest that these women may have entered the informal economy nearer their homes.⁷⁰ Some of the care work may be carried out by domestic workers, who are mainly women, and who may need to travel to work early in the morning or travel back home late at night. Also, the majority of those working in the informal sector in cities are women, and their travel paths may not conform to the normal routes connecting residential areas on the outskirts of the city with the commercial business districts.⁷¹

Generally, women make more frequent and shorter trips than men, and make more trips with multiple destinations (trip chain) (footnote 70). This was confirmed, for example, in Viet Nam, in a 2010 survey in the Mekong Delta, which shows that women tend to walk and use nonmotorized transport more than men, and this resulted in longer travel times for women even though men traveled longer distances. Women tended to make more journeys each month to farms and markets, while men traveled more than women to the telephone booths and the post office. The survey also found that women used public transport more than men and traveled more in off-peak hours, undertaking a number of tasks in connected trips known as trip chaining.⁷²

Impact of transport on women's time use

Perhaps, because of the complexity of how transport infrastructure and services impact on the time allocation choices that are made, and because of the significance of other impacts, women's time use is rarely mentioned in general transport literature—especially that relating to Asia and the Pacific. However, the literature on the impacts of transport does point to transport being transformational for women in other respects.

With transport infrastructure and services in place, women are more likely to access health care and reproductive health services, and girls are more likely to go to school. School enrollment is higher in communities with paved roads, and the percentage of children, especially girls, enrolled in schools declines if the schools are located far away. It is estimated that 75% of maternal deaths could be prevented through timely access to essential health care.⁷³ Expansion of road networks has had a strong impact on women's mobility and girls schooling in Pakistan.⁷⁴ In Nepal, the average time taken to access health posts was 28.6 minutes before the construction of trail bridges. The bridges resulted in time savings of between 3 minutes and more than an hour.⁷⁵

Several studies have found that the burden of women's housework has reduced as a result of improved transport access. In one case in Sri Lanka, improved roads have meant that bicycles can be used to help transport water, and other members of the family, including

⁷⁰ S. H. Rachmad, A. Adji, and D. Handiyatmo. 2012. Chapter 13: Gendered Patterns of Urban Communiting with Better Connectivity in Jakarta Megapolitan Area. p. 143. In K. Kusakabe, ed. *Gender, Roads and Mobility in Asia*. UK: Practical Action Publishing Ltd.

⁷¹ M. Kunieda and A. Gauthier. 2007. Module 7a Gender and Urban Transport: Fashionable and Affordable. GTZ, Division 44, Environment and Infrastructure Sector Project "Transport Policy Advisory Service," Eschborn.

⁷² World Bank. 2011. *Building Capacity to Make Transport Work for Women and Men in Vietnam: Gender and Transport Challenges*. East Asia and Pacific Region. Washington, DC.

⁷³ World Bank. 2011. *Transport and Gender*. <http://go.worldbank.org/3ZH49VHFC0>

⁷⁴ Footnote 4, pp. 155–156.

⁷⁵ B. Shrestha. 2012. Chapter 20: Mobility and Accessibility of Health Services in Rural Nepal. p. 208. In K. Kusakabe, ed. *Gender, Roads and Mobility in Asia*. UK: Practical Action Publishing.

men, now help in the task.⁷⁶ In the Lao PDR, it appears that the new road led to a reduction in the time spent by women on housework, thereby increasing their opportunity to participate more in market work. There is evidence of other members of the household sharing the responsibility of cooking, laundry being outsourced to laundry services, and instead of women collecting firewood, some families have either converted to liquefied petroleum gas or are now purchasing firewood.⁷⁷

The economic impacts of transport appear to be significant with some evidence that these benefits are shared by women at least in part. In addition to the example of the Lao PDR in the previous paragraph, a study on the impact of the Kunming–Bangkok highway in Thailand found that while both men and women had benefited, men had benefited more than women since they were more mobile and had displaced women from small-scale border trade. Many women had, however, benefited by opening small businesses along the road and, therefore, had become less mobile.⁷⁸ In Bangladesh, better rural roads led to a 49% increase in male labor supply and a 51% increase in female labor supply.⁷⁹

In summary, improved transport has a significant impact on the lives of women and girls, which results in changes in how time is allocated and the gender division of labor. However, a limited amount of time-use analysis has been carried out to understand the complexity of these changes and the impact on women's time poverty. Also, with increasing urbanization in Asia, there are important impacts of long commuting time on time poverty of urban women that have not been investigated.

⁷⁶ U. Pannilage. 2012. Chapter 15: Role of Transport Infrastructure in Changing Gender Relations in Rural Sri Lanka. p. 157. In K. Kusakabe, ed. *Gender, Roads and Mobility in Asia*. UK: Practical Action Publishing.

⁷⁷ S. Thammanosouth, V. Douangphachanh, and L. Khounphakdy. 2012. Chapter 9: Gender Analysis of Changes in Livelihoods at the Border: A Case of Houayxai, Lao PDR. p. 83. In K. Kusakabe, ed. *Gender, Roads and Mobility in Asia*. UK: Practical Action Publishing Ltd.

⁷⁸ W. Yunxian and Z. Qun. 2012. Chapter 7: Gendered Impacts of Road Infrastructure Development along the Kunming–Bangkok Highway. p. 70. In K. Kusakabe, ed. *Gender, Roads and Mobility in Asia*. UK: Practical Action Publishing Ltd.

⁷⁹ Footnote 4, p. 223.

5. Experience from Other Regions

Women's Time Poverty

There is a larger body of evidence available in other regions. In particular, there is stronger evidence both on women's time poverty, and also on the impact that lack of access to basic infrastructure has on this, from several African countries.

A research paper using data from Guinea investigated time poverty using different time poverty thresholds. Given that some people work long hours out of choice, the researchers also looked at those that worked above the time poverty line but were still below the consumption poverty line, that is, even after working long hours, the household still fell below the consumption poverty line or would fall below it if the number of hours of work was reduced. The hours of work took into account the hours worked in unpaid and nonmarket activities as well as paid work. The results are shown in Table 4 and are included here as an example of analysis that might be useful to replicate in Asia.⁸⁰

Table 4 Results from the Analysis of Time Poverty in Guinea

| | Time Poverty Line (50 hours/week) | | | Time Poverty Line (70.5 hours/week) | | |
|---|-----------------------------------|-------|------|-------------------------------------|-------|------|
| | Urban | Rural | All | Urban | Rural | All |
| Time Poverty without Consumption Poverty Constraint | | | | | | |
| Women | 35.8 | 56.3 | 50.3 | 18.5 | 26.4 | 24.1 |
| Men | 37.4 | 34.7 | 35.7 | 11.7 | 8.3 | 9.5 |
| Time Poverty with Consumption Poverty Constraint | | | | | | |
| Women | 8.1 | 31.5 | 24.7 | 4.0 | 14.0 | 11.1 |
| Men | 7.4 | 19.5 | 15.1 | 1.9 | 4.2 | 3.4 |

Source: E. Bardasi and Q. Wodon, 2009. *Working Long Hours and Having no Choice: Time Poverty in Guinea*. Washington DC: World Bank. p. 8–22.

Women's Time Poverty and Infrastructure

Research in Ghana in 2009 found that time spent by men and women on remunerated activities increases when households have access to electricity although the total number

⁸⁰ Footnote 5. The analysis used data from the EIBEP (*Enquete Integrale de Base pour l'Evaluation de la Pauvrete*), a nationally representative household survey including a time use module as well as modules on income, consumption, health, education, etc.

of hours that women work stays the same. There is no impact on time poverty of women. Access to water supply has a significant impact on women's time use since it reduces the time burden faced by rural women. Access to water supply had to a certain extent increased the amount of time in market work but had reduced the total time worked.⁸¹

The most significant impact of electrification on changing women's time use and enabling them to spend more time in productive work was found in South Africa where electricity substituted for firewood for cooking. This had a positive impact on increasing women's labor force participation more than that of men. However, it was also found that this was associated with lower wages for women.⁸²

More work has been done on the impact of transport on women in Africa. A paper by the Overseas Development Institute makes a number of references to time poverty with regard to the difficulty girl children in Ghana and Malawi had in getting to school in time. This was due to the chores that needed to be done before they left for school and the distance they were required to walk to school. The report also noted the limited time available for women in rural South Africa to get to health care centers due to the time they needed to collect water and the distance to the health care center.⁸³

A special attention was paid to the impact of transport burden on women's time poverty in the transport surveys carried out first in Tanzania in 1986 and then in Zimbabwe in 1995. These surveys were innovative at the time since they used the household as the unit of analysis of transport use and needs. By analyzing the transport requirements of each of the members within the whole household, the huge loads carried by women on a regular basis over significant distances were highlighted. In Tanzania, women accounted for nearly 67% of the household time spent on transport and 85% of the load carried. The typical adult female undertook more than three journeys, spending over 4 hours per day solely on transport, while men made just one journey, devoting less than 2 hours per day on transport.⁸⁴

This survey influenced the types of interventions that were introduced with the specific aim of reducing the time poverty and the physical burden on women with regard to transporting water, fuel, and crops to the market. However, a postevaluation of the project in 2007 found that some interventions, such as wheelbarrows, had not been successful since women found them difficult to use. The introduction of donkeys took a long time to be adopted but was more successful and helped to reduce the burden shouldered by women. Despite this, it had no impact on gender roles since donkeys were owned by men, and the gendered nature of transportation of goods had not changed. Meanwhile, women's time poverty had been reduced by significant progress in improving water supply

⁸¹ J. Costa et al. 2009. *The Implications of Water and Electricity Supply for the Time Allocation of Women in Rural Ghana*. International Policy Center for Inclusive Growth. Brazil: UNDP. p. 21.

⁸² T. Dinkelman. 2011. The Effects of Rural Electrification on Employment: New Evidence from South Africa. *American Economic Review*. 101 (7). pp. 3078–3108.

⁸³ G. Porter. 2007. Transport (Im)Mobility and Spatial Poverty Traps: Issues for Rural Women and Girl Children in Sub-Saharan Africa. Conference paper for the Chronic Poverty Research Centre and Overseas Development Institute's international workshop on Understanding and Addressing Spatial Poverty Traps. Stellenbosch, South Africa. 29 March. pp. 1–5, 12–14.

⁸⁴ C. Lema. 2007. *Makate Integrated Rural Transport Project: A Case Study of MIRT and Its Impact on Rural Transport Policies in Tanzania*. Dar es Salaam/London: International Forum for Rural Transport and Development. pp. 14–15.

under other initiatives not related to the transport project. Although this was an old project with apparently limited success, it is interesting in that it set out to explore Intermediate Methods of Transport in order to reduce women's time poverty caused by the transport burden they bore.⁸⁵

This and other post-project evaluations of projects that had used similar approaches—known as the Makete approach—identified that while the data had been collected to show that transport burden fell on women, the projects had not addressed the gendered nature of roles in transport in a way that could empower women. Similar approaches do not appear to have been used in Asia where travel times, distance, and purpose tend to have been collected from individual respondents.

The evaluations of the Makete approach also highlighted that even when data are collected, they are not always used in the design of interventions. And, when they were used, the practical needs of women in transporting large loads was addressed but not the underlying societal issues that lead to such unequal burden sharing between men and women in the first place.

Of increasing relevance for Asia is the work being done to look at transport undertaken in the course of caring for the other members of the household. An interesting concept that has been put forward by Gendered Innovations at Stanford University is that of “Mobility of Care.” Using data from Spain, they showed how including questions about care trips (taking children to day care or school, escorting elderly to health care, etc.) altered the findings of surveys. This category is normally concealed within others, but when counted as a separate category, it actually accounted for 25% of all trips.⁸⁶ This has significant implications for things that need to be considered by transport planners.

⁸⁵ Footnote 84, pp. 23–24.

⁸⁶ L. Schiebinger et al., eds. 2011–2013. *Public Transportation: Rethinking Concepts and Theories*. Retrieved from Gendered Innovations in Science, Health & Medicine, Engineering, and Environment: www.genderedinnovations.stanford.edu/case-studies/transportation.html#tabs-2

6. Factors That Enhance Time-Saving Benefits and Balance Time Allocation for Women

Improving Access is an Essential Starting Point

It is clear from the reviews that improving access to basic infrastructure brings significant benefits to women in terms of their ability to reallocate and reprioritize their time use.

There is no substitute for water; hence, access to clean water supply is critical in freeing up women's time. Improved transport can help with temporary alleviation of the time burden if water can be transported faster, and by reducing the heavy load, but the ultimate aim should be household connections. However, access to water supply alone simply relieves women's burden, but it does not change the gender division of labor and open new opportunities for women.

The impact of poor sanitation, especially on women and girls, has had more attention recently, tragically highlighted by the rape and murder of young girls in India while they were finding a place to defecate.⁸⁷ Despite this, progress in increasing access to sanitary facilities is abysmally slow, and awareness of the issues facing women and girls, such as menstrual hygiene requirements, are still not widely discussed and addressed. Increasing access to sanitary facilities would have impacts on the self-esteem and security of women and girls, and also needs to include access to adequate toilets in schools and the workplace as well as at home.

Subsidies and pricing policies may be needed to ensure women from low-income households are able to connect to and benefit from affordable electricity supply. Households may benefit from village improvements in water supply and sanitation without having private connections, but the same does not hold true for electricity and most benefits seem confined to households with direct access.

Access to transport appears to have the most transformative effect on women's roles and status. Improved transport increases mobility and presents an opportunity to travel to school, health centers, and work as well as for social and leisure trips. It may open new work opportunities for women increasing their time poverty if there is no reallocation of the household chores to balance the burden of unpaid or care work.

⁸⁷ B. Frost et al. 2014. *Global Development*. www.theguardian.com/global-development/2014/jun/01/girls-toilet-rape-murder-anger-embarrassment

Investing in increasing access to infrastructure is an essential start to reducing time poverty and/or giving women more choices about how their time is allocated, but it is not, in itself, the solution, nor is it sufficient on its own to empower women.

Quality of Services Affects Women's Time Allocation Choices

Improving the quality of water reduces the time women spend on treating water, finding clean water sources for drinking, or caring for family members ill with waterborne diseases. Sanitation is closely linked since poor sanitation is often the cause of unhealthy water supply. Improved quality of sanitation contributes to cleaner water and healthier environments, resulting in the reduction of the burden of housework and care work that falls on women.

Quality of electricity includes a regular and reliable supply such that women can be more confident about the usefulness of the time-saving devices, and they are not called upon to reallocate time when the supply fails.

Quality of service with respect to transport means that routes and services must take the women's needs into account. The travel patterns of women are very different from that of men and include a significant amount of travel related to their household responsibilities and their role as carers.

In short, the benefit of access on reducing time burdens can be magnified with improved quality of infrastructure service and facilities.

Time Use as a Measurable Indicator to Increase Effectiveness

Unpaid work in caring for children and family members, and household chores, carries little or no economic value from a state perspective, or at the society and the family level, and is therefore often ignored. Where time allocation data are available, they help to highlight aspects of women's time poverty that need to be addressed and to find innovative design solutions. In India, the hours that women spend preparing food—including grinding spices—each day even after connecting to electricity raised important questions on why time-saving devices are not more widely used. The analysis of data from Spain that showed the significant percentage of journeys women made in carrying out unpaid care work is leading to a new concept of Mobility of Care that can be used to influence design.

It is only through highlighting disparities in the way time is allocated differently to both paid and unpaid work, and between men and women, that the time poverty issue faced by women attracts attention and gets recognized.

Changing Attitudes to Reduce Unpaid Work Burdens and Improve Gender Equality

Time poverty affects millions of women across all socioeconomic strata in both urban and rural areas. They may be working women in the cities juggling work and family responsibilities while spending long hours each day navigating public transport systems that do not suffice for their needs. Or, they may be women in remote areas spending hours collecting fuelwood and water to meet the daily needs of the family. It is hard to generalize about women's time use and time poverty since numerous factors are involved. However, the common thread is that women throughout Asia and the Pacific bear the brunt of unpaid and unrecognized care and household work, which constrains their time for other activities such as paid work, participation in social activities, or politics. Underlying this phenomenon are social attitudes and norms that shape the gendered division of labor and reinforce structural gender inequality.

Focusing only on access and quality to reduce women's time burden, for example, in water supply, risks reinforcing traditional gender roles rather than attempting to change them. Project designs that incorporate community participation have a unique opportunity to raise awareness and understanding among both men and women about the opportunities for women outside these roles. Women's participation in meetings and consultations helps to challenge preconceived notions of women's roles, as does the participation of women in construction of infrastructure or in management and maintenance. All of these activities require time to be allocated to them. Given that there is an opportunity cost for women in terms of the trade-offs, they will need to be carefully designed to have the best impact in the long term. They need to be factored into a time cost-benefit analysis where the costs of participating in activities that challenge the status quo are balanced against the benefits of time savings in burdensome tasks.

Infrastructure for Women's Economic Empowerment

To be truly effective as an instrument of economic growth, poverty reduction, and empowerment, infrastructure projects can do much to ensure that the potential of the services installed is realized by households and individuals. There are opportunities to go beyond saving time in unpaid and burdensome work, and influence choices on how time can be used to maximize the returns on productive activities. For example, projects can include initiatives to encourage and support investment in equipment, and provide training on how to use new equipment properly. New technologies and ideas for using infrastructure to develop new or expand old businesses could be disseminated, and training in business and financial management could be added for small-scale businesses owned by women. Information and communication technology helps women in gaining access to vital information, finance, and tools to run their businesses.

7. Considering Time Poverty in Monitoring and Evaluation

There is substantial scope for improving the understanding of the relationship between time poverty and infrastructure, and how infrastructure impacts on time allocation decisions and influences gender equality and women's empowerment. Some indicative questions that might be considered in the design of monitoring and evaluation frameworks for different infrastructure projects are shown in Table 5.

Table 5 Indicative Monitoring Indicators and Evaluation Questions

| Monitoring Indicators | Evaluation Questions |
|---|--|
| Water Supply and Sanitation | |
| Has the distance and/or time to collect water decreased? | Has there been a reallocation of tasks among family members? |
| Has the time taken to find a place to defecate, and accompany children to toilet changed? | What are the perceptions of gender roles within the family with regard to how time is used? |
| Who has benefited from this time saving? | What are the impacts on school attendance and health, and implications for time allocations in the home? |
| Has the saved time been reallocated to other housework or care tasks; or leisure or social activities; or market paid or unpaid work? | Has water supply reduced time poverty? |
| Electricity | |
| What sources of energy were used and how were they collected? | How have roles of family members, and the allocation of their time changed? |
| Has there been a reduction in the time taken to collect fuel? | What influences investment in time-saving equipment and how can electricity be used to increase productivity of the household? |
| Who has benefited from the time saving? | Are women more empowered as a result of changed roles and access to information? |
| Has the saved time been reallocated to other housework or care tasks, leisure or social activities, or market paid or unpaid work? | Has electrification reduced time poverty? |
| What electrical equipment has been purchased and who uses it? | |
| Does anyone in the family run a business at home (who)? | |
| Is electricity used for business at home by anyone in the household? | |
| Has electricity been used to increase productivity in any way? | |
| Transport | |
| Are trips made by different family members for work or study, housework or care, leisure or social? | How has improved transport changed the use of health and education centers and access to markets? |
| What is the mode of transport used and how much time is taken and with whom? | How has the allocation of time between different family members changed and has the gender division of labor changed? |
| How is time allocated between work, study, housework, care, and leisure? | Are women more empowered as a result of changed roles? |
| | Has transport reduced time poverty? |

Source: Asian Development Bank

Sampling in surveys linked to specific projects would necessarily be purposive and, therefore, relevant to single interventions and not useful for measuring cumulative impacts. There is, however, opportunity for using innovative approaches for measuring time use. For example, a research program in Ethiopia compared three methods of collecting time-use data in mostly illiterate communities to look at the impact of water supply projects:

- (i) direct recall—where participants were asked directly by an interviewer as to how much time they had spent on different activities;
- (ii) pictorial approach—using macaroni divided among pictures using modified participatory rural appraisal methodology; and
- (iii) Melina method—using diaries with a pictorial approach.

The results were analyzed using a difference-in-difference methodology and a basic estimation model. The team also used low-power sensors on jerricans and smartphones to monitor water collection information.⁸⁸

Project-specific research also offers the opportunity to use qualitative information to get a better understanding of attitudes to time use, and how decisions on time allocation are made.

⁸⁸ J. Cook et al. 2012. *Measuring Time Savings from Improved Water Supply in Rural Ethiopia*.

8. Conclusion

Around the world, women do more work than men because of gender divisions of labor that cause most of the burden of housework and care work to fall on women and girls. This results in women being more prone to time poverty, and limits their participation in study, paid work, or social and political activities that would help improve their status and reduce gaps in gender equality. An important distinction needs to be made between those who experience time poverty but live in households that are above the consumption poverty line, and those who live in households that are below the poverty line, or would fall below the poverty line if less work was done. No analysis of this has apparently been carried out in Asia and the Pacific countries to identify groups who are time poor. This is an important gap since it would be a valuable contribution to policy discussions on both reducing poverty and improving gender equality.

Infrastructure has the potential to reduce the time spent on housework and care work and influence the gender division of labor and could, therefore, be an important intervention for reducing time poverty. However, the design and implementation of infrastructure projects rarely include interventions to address this directly, even when reducing time burdens is a stated aim of the project.

This review looked at findings of research, evaluations, and some project documents to assess the impacts that the four types of infrastructure had on women's time poverty. Broad themes that were drawn out from this are summarized in the following paragraphs.

- Improved water supply has significant impacts on reducing the time women spend doing burdensome unpaid work but has little impact on the gender division of labor in the household. However, since water is an essential daily need, and collecting it is a priority, other important housework or care work often gets neglected. After connection to improved water supply, time saved in collecting water tends to get reallocated to other household chores such as caring for children. Water supply results in marginal changes in the time spent on paid work, if any. As such, there is little impact on the gender division of labor in the household and although a very important practical need of women is met, there is often no impact on the strategic needs of women that would result in empowerment.
- For women and girls without access to improved sanitation, the amount of time needed each day to find a place to defecate, or to accompany children, is significant and was largely invisible until the Economic Impacts of Sanitation Initiative work of recent years. Moreover, the burden of caring for family members who fell sick as a result of poor sanitation is a time burden that could be reduced

through improved sanitation. The data on the resulting time burden on women have now been collected in several countries and are used in the analysis of the costs of poor sanitation. Intangible benefits of improved sanitation that are hugely important to women and girls, such as improved self-esteem and confidence, and increased security, were not included, but they add to the urgency of increasing the investment in sanitation.

- Electricity also tends to reduce the amount of time spent on housework and care work, and sometimes has an impact on the amount of time women spend on paid work. An important impact of electricity is on the empowerment of women through increased access to information. Despite a preference for continuing to cook using firewood in Asia, and the reluctance to use electricity for cooking, there still seems to be a reduction in the burden of housework after households have connected to electricity. There are also indications that the number of hours women spend in paid work may increase, in part due to the increase in the number of waking hours as a result of lighting. The longer working day might actually increase women's time poverty in some cases. Women in electrified homes have more choices in how they spend their time, and tend to lead more balanced lives with an increased amount of time also spent on watching television. There is some evidence that the resulting increase in access to information, for example, on reproductive health, domestic violence, and gender equality helps to empower women in homes connected to electricity.
- Improved transport infrastructure results in significant changes in the lives of women and girls, which impact on how their time is allocated to different tasks. However, the impacts of travel time on time poverty of women are complex due to the new opportunities that are opened up adding new time-use demands on women in addition to their traditional roles. This is not a well-researched area in Asia.

It also became clear during the review that there are many opportunities to increase the potential of projects to reduce time poverty and also to empower women. Water supply projects could do more to change community perceptions on the role of women and change the ingrained gender division of labor so that women can avail themselves of other opportunities. The benefits of electricity for women are felt only in households that have a connection and not where the community is connected but not the household (as in the case with water supply and roads). This calls for a focus on pricing policies and subsidies to help the poorest households connect. Additional interventions are needed to encourage investment in labor-saving devices, and help to use electricity to increase productivity and returns on investment of time, for example, in small businesses run by women. Transport policies and designs need to respond to the needs of women taking into account the different travel patterns including travel for housework and care work, and their time constraints.

Time allocation decisions are influenced by deep structural notions of gender roles and norms that contribute to the invisibility of household and unpaid care work, and to the time poverty of women. TUSs, and analysis of time allocation and trends, can build awareness and highlight previously unforeseen constraints to the effective use of infrastructure. Building on infrastructure projects with interventions that challenge these norms could make a substantial difference. The benefits could help to maximize the returns to the investment in terms of poverty reduction or contribution to economic growth.

Appendix 1: Time-Use Surveys

Time-use surveys (TUSs) were initiated as it was recognized, among other things, that other national surveys were grossly underestimating women's contribution to the economy by underestimating the amount of time they contributed in the form of unpaid work.

Several of the studies cited in this review have used empirical data from TUSs and combined them with other survey data to impressive effect. However, even some of the more recent studies have used data from the 1990s since good time-use data are scarce. In the context of measuring time savings resulting from infrastructure, TUSs are most useful if the data are collected as part of a national socioeconomic survey where information on access to basic services is also measured. Treatment and control comparisons can be made, for example, of household electricity connections, or proximity to roads. This provides a more national and long-term picture of the time-saving benefits and changes in consumption poverty.

Comparing time-use data requires care since there are several challenges in collecting accurate data:

- (i) Capturing simultaneous activities, for example, caring for children while minding a shop or kiosk, is challenging both for the respondent and for the enumerator.
- (ii) Distinguishing between weekdays and weekends is especially important for accurately reflecting women's contribution since their work tends to carry on regardless of whether it is a weekday or weekend.
- (iii) Accounting for seasonal variations can be difficult if the data are collected over a short period of time during which a specific agricultural activity is taking place (or in between agricultural seasons), or if comparing across countries where one set of data may have been collected in spring, and another collected in autumn.
- (iv) The national time-use data are rarely representative of the country as a whole. Important rural-urban differences are often missed.
- (v) Surveys capture time use of household members aged 5 and over, so in countries where there are a high number of children, such as Cambodia, the amount of work is likely to show up as being lower unless it is disaggregated by age as well as gender.¹
- (vi) The literacy rates of respondents may be an issue for using self-reporting diaries, as much as respondents' concepts of time and ability to measure it.

¹ Footnote 7, pp. 13–15.

- (vii) Definitions of work and leisure may be interpreted differently by different groups of people.

These aspects may be treated differently in different countries and care needs to be taken in drawing cross-country comparisons. A comparison of surveys in Benin, India, and Mexico identified the following issues and challenges:

Two forms of data collection are commonly used in TUSs:

- (i) direct observation, which is especially popular in developing countries as literacy is not required; and
- (ii) interviewer-administered time diaries, which are used in developed countries where literacy is not an issue.

Good training of interviewers is considered to be essential, especially in gender sensitivity (footnote 47).

A comprehensive review of the TUSs in several countries was carried out by Budlender, with a specific focus on how time related to care activities is analyzed. The review identified a number of key issues, questions, and inconsistencies similar to those identified above, in each country.²

The numerous issues involved have cast doubts on the credibility of TUSs and, therefore, there is a reluctance to invest significant time and budget costs into implementing them. This then leads to many years between surveys and to further inconsistencies. Time-use modules combined with nationally representative socioeconomic household surveys can help to reduce costs. These provide data that allow for several forms of infrastructure to be studied with the same set of data and thereby enable the analysis of the cumulative impact of the different types of infrastructure.

² D. Budlender. 2007. *A Critical Review of Selected Time Use Surveys*. Geneva: United Nations Research Institute for Social Development.

Appendix 2: List of Time-Use Surveys in Asia and the Pacific

| Country | Recent Studies | Studies between 1960 and 1989 | Studies before 1960 |
|-----------------------------|--|---|---------------------|
| Australia | 2013, 2009–2010, 2007–2010, 2006, 2005–2006, 2004–2010, 2003–2004, 1997, 1996–2009, 1992 | 1987, 1982, 1981, 1977, 1976, 1974, 1974 | None |
| Bangladesh | None | 1976, 1974 | None |
| China, People's Republic of | 2008, 2005 | None | None |
| Fiji | None | 1987 | None |
| India | 2010, 1998–1999, 1996, 1990–1991, 1990 (6 surveys) | 1980, 1976–1977, 1975–2006 | None |
| Indonesia | 2005, 2004, 1998–1999 | None | None |
| Japan | 2011, 2006, 2005, 2001, 2000, 1996, 1995, 1993–2004, 1991a and 1991b, 1990s, 1990 | 1986, 1985, 1981, 1980, 1976, 1975, 1973, 1972, 1970, 1965, 1960–1961 | 1941–1942 |
| Lao PDR | 1998 | None | None |
| Malaysia | 1990–1991 | None | None |
| Nepal | 1998–1999 | 1980s, 1977 | None |
| New Zealand | 2013, 2009–2010, 1998–1999, 1990 | None | None |
| Pakistan | 2007, 1990–1991 | 1986–1989 | None |
| Papua New Guinea | None | 1977, 1962 | None |
| Philippines | 2000 | 1977, 1976, 1975 | None |
| Kiribati | 2001–2002 | None | None |
| Korea, Republic of | 2014, 2009, 2005, 2004, 2000, 1999, 1995, 1990 | 1987, 1985, 1983, 1981, 1980 | None |
| Vanuatu | 1999, 1995 | 1984 | None |
| Samoa | 1991 | None | None |
| Thailand | 2000–2001, 1990–2001 | None | None |
| Tuvalu | 2003 | None | None |

Lao PDR = Lao People's Democratic Republic.

Source: Center for Time Use Research. *Time Use Studies*. <http://timeuse-2009.nsms.ox.ac.uk/information/studies/> (accessed 7 March 2014).

Appendix 3: Time-Use Surveys Used by the Organisation for Economic Co-operation and Development

| Country and Year of Survey | Sample Size | Type of Survey | Age Range (years) | Source | Other Data Features |
|------------------------------------|----------------------------------|---|-------------------|--|---|
| Armenia (2008) | Unknown | Unknown | 15–80 | UNECE Statistical Division Database, not representative of the year Gender Statistics Database | Not representative of the population or of the year |
| Armenia (2004) | 235 people, 60 households | Two diaries: one for weekdays and one for weekend | 15–80 | National Statistical Service of the Republic of Armenia, Armenia Time Use Pilot Survey 2004 | Not representative of the population or of the year |
| Australia (2006) | 6,961 people, 3,643 households | Two consecutive days, diary | >15 | Australian Bureau of Statistics, Time Use Survey | |
| Cambodia (Nov 2003–Jan 2005) | 2,000 households | Diary sheet included in the household survey | >5 | National Institute of Statistics of Cambodia, www.nis.gov.kh/index.php/statistics/surveys/cses | |
| China, People's Republic of (2008) | 37,142 people, 16,661 households | One weekday + one weekend day | 15–74 | National Bureau of Statistics of China, Time Use Survey | Not representative of the year |
| India (Jul 1998–June 1999) | 18,591 households | One weekday —interviewing method | >6 | Ministry of Statistics and Programme Implementation. Government of India | |
| Japan (2007) | 18,291 people, 3,866 households | Unknown | >10 | Statistics Bureau and Statistical Research Training Institute, Survey on Time Use and Leisure Activities (Questionnaire B) | Not representative of the year |
| Kazakhstan (2006) | Unknown | Unknown | 20–74 | UNECE Statistical Division Database Gender Statistics Database | |
| Korea, Republic of (2004) | 12,750 households | Two consecutive days, diary | >10 | Korea National Statistical Office, Time Use Survey | Not representative of the year |
| Kyrgyz Republic (2005) | Unknown | Unknown | 20–74 | UNECE Statistical Division Database Gender Statistics Database | |
| Mongolia (2000) | 2,753 people, 1,086 households | 24-hour diary | >12 | NSO, UNDP A Pilot Time Use Survey, 2000 | Not representative of the year |

continued on next page

Appendix 3 continued

| Country and Year of Survey | Sample Size | Type of Survey | Age Range (years) | Source | Other Data Features |
|-----------------------------------|-------------------|-----------------------------|-------------------|---|--|
| New Zealand Jul 1998–June 1999 | 8,532 people | Two consecutive days, diary | >12 | Statistics New Zealand, Time Use Survey | |
| Pakistan 2007 | 19,380 households | 24-hour diary | >10 | Government of Pakistan, Statistics Division, Federal Bureau of Statistics, Time Use Survey 2007, April 2009 | Representative for the population and the year |

NSO = National Statistical Office of Mongolia, UNDP = United Nations Development Programme, UNECE = United Nations Economic Commission for Europe.

Source: OECD. 2011. *Society at a Glance—Asia/Pacific Edition*. <http://www.oecd.org/els/soc/49263450.pdf>

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Balancing the Burden?

Desk Review of Women's Time Poverty and Infrastructure in Asia and the Pacific

This desk review explores the links between infrastructure development and women's time poverty in Asia and the Pacific by drawing on time-use data and reviewing existing research and evidence from impact evaluations. Three questions are asked: (i) What contribution does infrastructure make in reducing women's time poverty, and how is this being recorded? (ii) Are women's time savings resulting from increased access to infrastructure used for productive work that also reduces consumption poverty? (iii) Can infrastructure projects more effectively reduce both time and consumption poverty for women?

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