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## Income-enabling, not consumptive: association of household socio-economic conditions with safe water and sanitation

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### Abstract

Water.org's programme, WaterCredit, uses microfinance to empower the world's poor to access water and sanitation. A major obstacle to scaling up this approach is the general assumption that loans for water and sanitation are too risky because they are consumptive rather than income-generating. This article challenges that argument by highlighting the financial gains people are able to derive to some extent from having water and/or sanitation infrastructure at home. Data that examine the economic implications of the reallocation of time formerly dedicated to water collection and defecation practices are provided from surveys and interviews conducted with WaterCredit borrowers in India.

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### 1. Introduction: purpose and policy relevance of this article

The World Economic Forum's *Global Risks Report 2016* placed the water crisis among the top five global risks based on its impact on society over a 10-year horizon for the fifth year in a row. Expanding drinking water and sanitation coverage to achieve universal access would cost an estimated USD535 billion – a figure that increases to approximately USD1 trillion when the costs of maintaining the existing water and sanitation infrastructure are included as well. According to the Organisation for Economic Co-Operation and Development (OECD) (2016), total official development assistance from major bilateral and multilateral donors for investments in water and sanitation ranged from USD7.7 to USD10.4 billion during the period 2010–2014. This leaves a huge gap in the funding needed

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to solve this crisis and maintain it long term, even when accounting for other sources of investment (as encouraged at the Third International Conference on Financing for Development [UN, 2015]).

Seeking non-traditional ways to bridge this gap between grant financing and more market-driven models, Water.org launched its WaterCredit programme in 2003. WaterCredit innovates upon the standard microfinance model by providing initial financing and technical assistance to financial institutions to develop loan portfolios for products designed to support the construction of household-level water connections and sanitation facilities. The financial institutions are then responsible for mobilizing the capital that they lend for these loan products. To date, WaterCredit programmes have been promoted and offered by local microfinance institutions (MFIs) and non-governmental organizations (NGOs) in partnership with Water.org across 10 countries around the world – India, Bangladesh, Kenya, Uganda, Indonesia, Philippines, Peru, Cambodia, Ghana and Ethiopia.

The assumption that micro-loans for the consumptive purposes of water and sanitation are too great a financial risk is pervasive, despite the fact that WaterCredit programmes have a cumulative average repayment rate of 99 per cent. (Water.org staff have also observed the average repayment rates for water and sanitation loans offered by financial institutions not affiliated with Water.org to be higher than the average repayment rate of their respective overall portfolios.) This misconception continues to dissuade financial institutions from disbursing such loan products, donor agencies from adopting this approach in their philanthropic portfolios and governments from enabling greater financial flows to this sector. The author has been personally informed by representatives of inclusive finance departments in commercial banks that, although they provide micro-loans for income generation, they would not be interested in offering micro-loans for ‘non-productive’ purposes such as water or sanitation. By demonstrating the financial gains people are able to generate as a result of, among other things, having water and/or sanitation infrastructure at the household level, this article challenges the categorization of these micro-loans as ‘consumptive’ and argues for a more accurate understanding of these micro-loans as ‘income-enabling’.

All too often, water and sanitation issues are viewed through the lens of public health and relegated to the realm of government, public sector or philanthropic interventions. Assigning these issues to the social domain leaves ample opportunity to overlook the effects of water and sanitation on individual benchmarks, such as income. The failure to draw connections between water, sanitation and income is one of several oversights that led to development approaches that ignored financial markets as an important ally in the global effort to eradicate the water and sanitation crisis. The landmark 2003 ‘Camdessus’ report, *Financing water for all* (Winpenny, 2003), highlighted the need for access to capital markets for water sector financing, but the creation of financial market instruments that can truly reach the poor (as well as a more market-based incentive structure for engaging with these communities) have proved to be challenging. The World Health organization (WHO) is another voice trying to draw attention to the interrelated nature of water and income. Its 2012 publication, *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage*, calculates that universal access to safe water and sanitation would result in USD32 billion of economic benefits each year from reductions in health care costs and increased productivity from reduced illness. More detailed data proving the connection between water, sanitation and household-level income are scarce.

This paper has three aims. At the most basic level, it seeks to build an evidence base for the real economic gains enabled by households having access to water and sanitation. Second, by demonstrating the clear link between income gains and water and sanitation access, it is hoped that the perception of micro-lending for water and sanitation as ‘consumptive’ will be challenged in favour of ‘income-enabling’. Finally, as a result of this data-based change of perspective surrounding micro-lending for water and sanitation access, ideally this paper will encourage government, the philanthropic and private sectors, and multi- and bilateral institutions to embrace this model and develop policies and programmes that increase the availability and scale of market-based solutions to household-level water and sanitation access.

Please note that in its pursuit of the goals outlined above, this paper is not intended to comprehensively address all issues related to the provision of household water and sanitation, nor is it designed to discuss interactions with local water and sanitation initiatives. This analysis is strictly limited to demonstrating the connection between household access and income. Other considerations, such as faecal sludge management or the Indian government’s Swachh

Bharat campaign, while critical to the overarching issue of water and sanitation in India, are beyond the scope of this discussion.

Perception matters, and data are going to be the vehicle that drives a major shift in popular opinion. This article is one step towards the accumulation of that dataset, although much deeper data collection needs to be conducted. Changing government and financial sector perspectives (and purse strings) will require considerable effort. Mind sets regarding access to water are deeply ingrained at all levels of society and drawing the connection between water and income has to be made for all of them; those in need of access as well as those in the position to facilitate that access through policy and finance. Figure 1 identifies the benefits that 294 Water.org borrowers from the study featured in this article highlighted as being received from household water facilities. *Time savings* emerges as the most widely-appreciated benefit, while *financial gains* are much lower on the list. (Also worthy of notice is that *sufficient water* is ranked lowest, other than the claim of *no benefit at all*. Having adequate water in and of itself was not the motivation for these people to take out loans to ensure access to a water supply.)

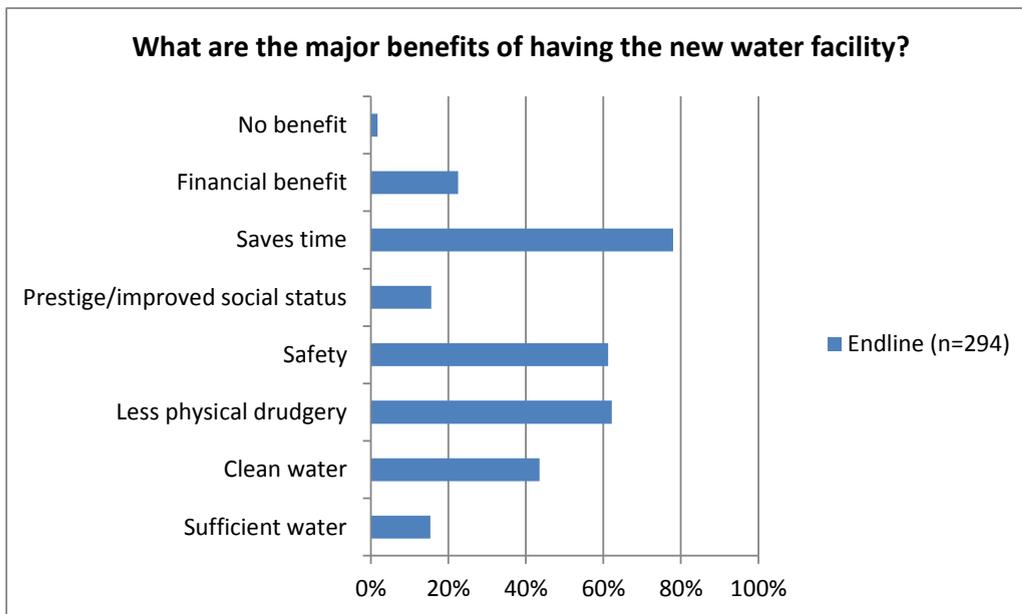


Figure 1. Major perceived benefits of a water connection

This separation of time savings and financial benefit (and the observation made above regarding the low priority placed on *sufficient water*) serves to remind the reader how pervasive the perspective remains that water is a basic need rather than a tool or condition for economic empowerment. These deeply-ingrained assumptions are part of the reason that access to water continues to be far from universal. Seeing water as a need to be provided for, rather than the investment-worthy asset it is, relegates water issues to government handouts and philanthropic benevolence, which, although critical to the solution, will never be sufficient. According to the WHO/UNICEF Joint Monitoring Programme (JMP) (WHO/UNICEF, 2015), 663 million people – 1 in 10 – lack access to safe water. Yet this article already has identified the extremely limited reach of philanthropic efforts. Water access needs to be considered in more holistic ways in order to unlock solutions that can truly address the scale of the need.

In 2015, due in part to advocacy efforts from Water.org, the Reserve Bank of India added drinking water and sanitation infrastructure to its Priority Sector Lending (PSL) guidelines. This designation enables banks to allocate significantly larger amounts of capital towards micro-lending for sanitation, a change likely to spur additional capital for credit-enabled household sanitation lending in India. Analysis (Ikeda and Arney, 2015) suggests that continued advocacy for this policy change in India alone could release an additional USD40–50 billion into the sector, significantly reducing the reliance on philanthropic aid and unlocking critical funding for water and sanitation

financing for the poor. Widespread understanding of the impact that access to water and sanitation has upon household incomes will act as a catalyst. It will encourage more stakeholders to take up the model and make serious progress towards the achievement of Sustainable Development Goal 6 (SDG 6) and universal water and sanitation coverage – targets that simply cannot be achieved through the current mixture of charity, grants and other investments.

This paper presents key quantitative findings that highlight household economic implications from the reallocation of time formerly dedicated to water collection and defecation practices. Additionally, it documents changes in spending patterns from several end-line surveys conducted at the end of multi-year WaterCredit programmes in India. Qualitative data collected from monitoring interviews with WaterCredit borrowers are also incorporated in the review.

## 2. Methodology

Most of the quantitative data included in this article were collected through the baseline and end-line surveys of three WaterCredit programmes across India. The baseline data were collected by the three partner NGOs at the beginning of their respective programmes in 2012. The end-line data were collected by an external consulting firm between November and December 2014 through household surveys of people who a) had participated in the baseline survey and b) had subsequently taken out a WaterCredit loan. The assessment data included self-reported information relating to borrower satisfaction and household socio-economic and health changes over time. The water and sanitation improvements were assessed by the evaluation team. The findings and inferences are based on the comparison of the baseline and the end-line data, with the analysis conducted using the statistical software package STATA 12. The total sample size represented 14.3 per cent of the total WaterCredit loans disbursed by the three partners during the life of the programme. The confidence level was 95 per cent and the margin of error was less than three per cent. Data highlighted in this article that were collected from other WaterCredit studies are clearly identified in the analysis.

Qualitative data were collected by the author during monitoring visits to urban Hyderabad in July 2014 and by another Water.org staff member documenting borrower profiles for donor reporting in rural Tamil Nadu and Karnataka in June-July 2014.

Questions asked to examine the economic implications of access to water and/or sanitation investigated the following topics:

- Time spent collecting water and/or tending to defecation needs before the relevant facility was built as well as after.
- Who in the household collects water?
- Did the household perceive the new facility to have contributed to economic benefits for the family in any way? If yes, what was the main reason for the economic gain after having the new facility – reduced household expenses for water and/or sanitation, or was a family member able to earn additional income because more time was available?
- Who (if anyone) has become more economically active after having the new facility?
- What has been the impact (if any) of the new facility on a woman's ability to earn income; enter the workforce for the first time, or work more hours?
- Did children's hours of studying per day increase or decrease after having the new facility?
- Did the frequency of family members falling ill increase or decrease after having the new facility?
- What were the approximate monthly medical expenses before and after the new facility?
- What illnesses had caused any household member to visit the doctor or a hospital during the past six months?

This article will move through the findings by first establishing the time savings facilitated by access to water and/or sanitation. It will then look at how the reallocation of time formerly dedicated to addressing water and sanitation needs has been perceived to benefit households. From there, the analysis shifts to the effects on medical expenses and finally to those on study time for youth. All conversions of Indian rupees (INR) to US dollars (USD) reflect an exchange rate of INR60 = USD1.

Unfortunately, market-based approaches do not lend themselves to the establishment of control and treatment groups. Because the end-line survey was conducted exclusively with households that had actually taken a loan under the WaterCredit programme, that there is a potential bias in the results. Another limitation of this particular study is that much of the data is self-reported and relies heavily upon recall. In addition, because the baseline data were collected by each partner institution itself, comparing results between institutions is less definitive. Finally, because the end-line survey was conducted by a single external agency, there are discrepancies between the baseline and end-line data. That said, this examination of results presents a preliminary understanding of the relationship between time savings and household income and represents a first step that can be further analysed in subsequent studies.

### 3. Findings and analysis

#### 3.1 Brief background of the three partner organizations surveyed

The majority of data analysed in this article reviews three Water.org partner programmes across different geographies in India. A table outlining borrower income levels is provided for greater understanding of the impacts of changes in income or household expenditure.

Partner organization	Location of Water.org programme	Proportion of end-line borrowers with average per capita monthly household income of USD0.01–USD38.05 (monthly average less than USD1.25/day PPP) (%)	Proportion of end-line borrowers with average per capita monthly household income of USD38.06–USD60.88 (average monthly equivalent of USD1.25–USD2/day PPP) (%)	Proportion of end-line borrowers with average per capita monthly household income of USD60.89–USD121.75 (average monthly equivalent of USD2–USD4/day PPP) (%)
Mahila Housing Trust (MHT)	Jodhpur (Rajasthan) and Katihar (Bihar)	68	19	13
Organization for the Development of People (OPD)	Around Mysore (Karnataka)	97	2.8	0
Society for Integrated Development of Urban and Rural Areas (SIDUR)	Hyderabad (Telangana/ Andhra Pradesh)	92	8	0

Table 1. Income categories of the WaterCredit borrowers surveyed

#### 3.2 Time savings on account of household water and/or sanitation facilities

The logical point of departure for this examination is to verify that household access to water and/or sanitation actually saves time. After that point is established, the scale of the change needs to be considered.

Water collection inherently conjures forth images of long walks and long lines, for good reason. While 55.3 per cent of respondents in the baseline survey suggested that actual travel time was less than an hour (waiting times were calculated separately), nearly as many respondents (43.6 per cent) spent from one to two hours traveling for this chore. Combined with wait times at water sources, the average time spent in one week on water collection was reported to be 13.4 hours in the baseline survey. After a household water connection had been established, those reporting travel times of less than one hour increased to 74.5 per cent, and 21.4 per cent respondents now reported that they do not go outside to collect water. (It is important to note that in many places in India, piped water connections are managed by the local governments and often are only available for certain time periods on particular days – for example, one hour a day every alternate day – and service may be interrupted for indefinite periods at the discretion of the local government. Therefore, while the specific explanation for why a water loan borrower may reduce, but not eliminate, the amount of time s/he collects water out of the household is not provided, it can be assumed that these travel times include multiple trips to and from a water source. This also helps explain why someone with a household water connection might still make trips outside to collect water. A household may use the new source for drinking water, but continue to collect water for domestic purposes, such as washing or cleaning, from their previous sources, or they need more water than what they can receive from their piped connection. In these cases the household water connection may reduce external water collection even if it does not eliminate it entirely.) Even more notably, the average weekly water collection time investment after having a household water connection declined to 7.1 hours – a 52 per cent decrease. *That change represents an average freeing up of 6.3 hours – just short of one full eight-hour working day – per week.*

Time investment in sanitation requires a little more unpacking. In the baseline data, an overwhelming 88.6 per cent of respondents practiced open defecation. For 70.7 per cent of these people, travel time for this need ranged between 30 minutes and one hour. For 25.7 per cent of respondents the travel time was less than 30 minutes and 2.8 per cent of people had to travel for more than one hour. Only 0.8 per cent of respondents reported they did not have to travel. These amounts add up. Assuming a person defecates twice a day, seven days a week, then a significant majority of respondents were spending seven to fourteen hours a week – almost two full working days – on traveling to accommodate this basic human necessity. This stands in stark contrast to the 98.1 per cent of borrowers who, having constructed a toilet at their homes, reported they do not travel for defecation in the end-line data. On a weekly basis, the time ‘freed’ through household access to a toilet would actually appear to be somewhat more than that freed by having access to water. One observation that has some bearing on this is that defecation is typically a daily (or twice-daily) activity, if not more. Water collection, however, is not so uniform – some households may only travel to collect water three or four days in a week and may also engage additional household members to help (e.g. a mother and her two daughters). Additional deconstruction of water collection would be a valuable component of any follow-up studies on this topic.

### 3.3 *Access to safe water and sanitation and household incomes*

Every person has 24 hours in a given day to allocate as they best see fit. Time spent collecting water or traveling for defecation is time that could be spent in other ways, ranging from working, studying and caring for others, or for recreational, spiritual and mental health needs. In the section above, the data have shown that household access to water and/or sanitation can liberate anywhere from six to 14 hours a week to be reallocated from tending to water and sanitation needs to however an individual chooses. While not every person with access to improved water and/or sanitation ultimately opts to use this extra time to earn additional income, data collected and shared below suggests that many people (predominantly women) who took loans in order to construct household water and/or sanitation facilities directed their newly-freed time towards income-generating activities (21.4 per cent of water borrowers and 58.4 per cent of sanitation borrowers). It is possible that these borrowers are a self-selecting group of extremely motivated people – after all, not everyone will choose to put themselves or their families into debt. But if that is the case – and it is only incredibly industrious people who have made careful cost-benefit calculations before taking a loan for household water and/or sanitation access – reluctant government officials and bankers should interpret these loans as even more critical to creating the enabling environment through which committed individuals can pull themselves and their families out of poverty.

### 3.3.1 Income and household access to safe water

Of the borrowers surveyed who had taken a loan for a water connection, 58.5 per cent reported that household access to water had led to economic benefits for the family. Upon further questioning about how access to water had led to economic gains, the respondents attributed the increases first to the savings accrued on water-related expenses (37.8 per cent). This was followed by at least one family member re-directing time formerly dedicated to water collection towards income-generating activities on account of having a water facility at home (21.4 per cent). A very small component of respondents (0.7 per cent) mentioned selling or otherwise using their new water supply for commercial purposes.

When asked who (if anyone) in the family had become more active economically, women emerged as those most changed (13.3 per cent), followed by a smaller proportion of men (8.2 per cent). An even smaller proportion (2.7 per cent) stated that both men and women had increased their economic activities. This is not a major discovery, as discussions about access to water are generally conversations about women. Women are overwhelmingly perceived as the primary beneficiaries of access to water; 88.1 per cent of respondents highlighted women as those having benefitted most from the new water facility. Where the presence of a water facility was perceived as having an impact on a woman's ability to generate income, 17.4 per cent of women reported being able to work additional hours. It was reported that 6.1 per cent of women had entered the workforce for the first time as a result of having a water facility at home.

### 3.3.2 Income and household access to sanitation

In strikingly similar numbers, 54.3 per cent of the borrowers surveyed who had taken a loan for sanitation (i.e. toilet construction) reported that household access to sanitation has led to economic benefits for the family. Respondents drew a more definitive connection to income from time savings than the water borrowers. Having a toilet at home led to 58.4 per cent of people having the ability for at least one family member to re-direct time formerly dedicated to defecation towards income-generating activities. Since defecating in open places does not generally require any kind of fee, the fact that only 1.7 per cent of respondents noted savings accrued on sanitation-related expenses is not a surprise.

When 83.5 per cent of respondents highlighted women as those who benefitted most from having a household toilet facility, respondents also identified women as those who (if anyone) in the family had become more active economically (24.3 per cent). However, men were also perceived to have become more active in this regard (15.5 per cent). Moreover, 13.3 per cent of respondents indicated that both women and men had become economically engaged. Given that 96.4 per cent of respondents reported that all men in their household were using the new toilets (contrary to popular belief that males will continue to defecate in the open despite having an alternative), these numbers demonstrate the universality of the connection between time savings and income generation.

Where the presence of a toilet was perceived as having an impact on a woman's ability to generate income, 50.3 per cent of women reported being able to work additional hours and 9.4 per cent of women reported entering the workforce for the first time as a result of having a household toilet.

### 3.3.3 Changes in income

A comparison of household incomes before and after constructing a water and/or sanitation facility found substantially higher incomes in those respondents who had constructed facilities as compared to their pre-loan information. The differences were not determined to be statistically significant, however, and may have been a result of a discrepancy in baseline data collected.

An earlier evaluation of WaterCredit programmes, completed in 2014 by a different consulting firm, identified the following implications of access to water and/or sanitation upon household income: Before taking a loan, only 53 per cent of WaterCredit borrowers in India earned at least INR3,000 (~USD50) per month. After the loan, this proportion nearly doubled to 97 per cent, suggesting that the investment in water and/or sanitation may have contributed to the

households' abilities to generate income. According to the impact analysis, nearly one-quarter of borrowers was able to increase income as a result of the extra time becoming available to the women, and one in five was able to increase income as a consequence of increased productivity (Ikeda and Arney, 2015).

### *Borrower profile: Padma\**

Padma and her family live in a village outside Bangalore. She runs a small shop from her home selling flowers, incense sticks, lamps and other items that are used while performing rituals at the nearby temple. She was earning ~INR400–600 (USD6–9) per day. Her husband is an auto driver. Both their children, Suresh (14) and Amrita (10), are in school.

**PROBLEM:** In order to collect enough water for the daily needs of her family, Padma would rise at 5 a.m. and make 5 trips to the local water tap. She then travelled 1.5 km for defecation. For these reasons, she could not open her shop until 11 a.m., even though the best business hours for her shop to be open were the early morning ones when devotees passed by on their way to the temple.

**SOLUTION:** Padma took a loan for INR10,000 (~USD167) to install a household water connection and construct a toilet. **With these new amenities, she opens her shop one hour earlier every day and earns an average additional INR500 (~USD8) per day, thus doubling her daily income.**

Padma uses her income to buy school supplies for her children and saves the remaining amount for the future purchase of a larger shop. Her husband's income is used for buying groceries for the house and on savings for their children's higher education. Padma was only able to study through fifth grade and takes comfort in knowing that her children will have more opportunities than were available to her.

*\*Names changed*

#### 3.4 Medical expenses and household access to safe water and/or sanitation

The connection between water, sanitation and health does not need to be repeated. The relationship between health and income, however, warrants deeper investigation. At the most basic level, sick adults miss work (i.e. income), and sick children miss school (i.e. the potential, through education, to earn higher incomes later as working adults). The reality is much more nuanced than the extremely general statement above, of course, as not every person works or attends school every day. Those minutiae aside, the income losses often experienced as a result of illness frequently come accompanied by corresponding medical expenses that can relegate households to cycles of perpetual poverty. WHO (2012) assesses that universal access to safe water and sanitation would result in USD32 billion in economic benefits each year from reductions in health care costs and increased productivity from reduced illness.

The data collected in this analysis approach health from an economic perspective and focus the questions on medical expenditures as well as savings. While the opportunity cost of being sick was not calculated, comparisons between the frequency of hospital visits, the illnesses that necessitated those visits and the average monthly medical expenses help to demonstrate that some of the economic gains from access to safe water and sanitation are actually through savings.

When respondents who had taken a loan and constructed a water or sanitation facility were asked if the frequency of household members falling ill had increased, decreased or stayed the same, an overwhelming 72 per cent noted a decrease while 27 per cent noticed no change. A closer look at the types of illnesses that respondents had observed during the past six months, however, yielded more interesting results that are illustrated below in Figure 2.

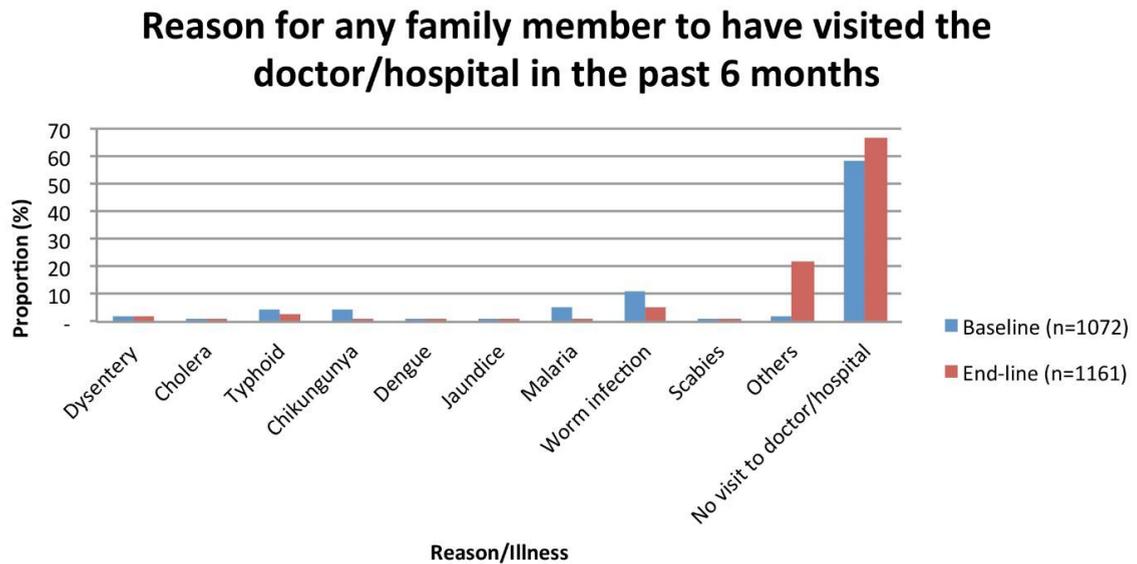


Figure 2. Reasons for doctor/hospital visits

Note that three of the water-borne diseases – diarrhoea, cholera and typhoid – have been reduced or disappeared, particularly cases of diarrhoea. Moreover, the proportion of respondents who reported not having visited the hospital in the past six months had increased by 7.8 per cent between the baseline and the end-line surveys. This strongly suggests that access to safe water and sanitation positively affects health outcomes that necessitate a visit to the doctor or hospital (which are never free of charge), although the degree of this impact is unknown.

The most revealing impact of the economic implications of health can be observed in the changes in respondents' average monthly spending on medical needs. As seen in Figure 3, the proportion of households in the baseline spending from INR0 to 250 (USD0 to ~USD4.2) (53.7 per cent) was nearly equal to that of households spending between INR251 and 500 (~USD4.2 to USD8.3) (43.6 per cent). The average monthly expenses reported in the end-line data reveal that post construction of a water and/or sanitation asset at home, households spending more per month declined to 13.8 per cent while those spending in the lowest bracket increased to 82.9 per cent. The spending levels were not adjusted for inflation over the two years between the collections of the baseline and end-line data.

## Approximate monthly medical expenses

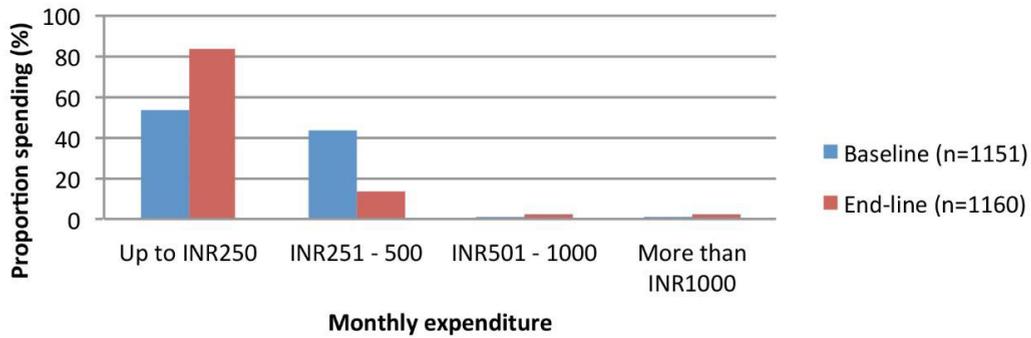


Figure 3. Average monthly medical expenditures

While the presence of a water and/or sanitation facility cannot be proved by this data to be the only factor responsible for this decline in average monthly spending for medical needs, this transfer for many households from the higher bracket of spending to the lower suggests a strong correlation between water, sanitation and medical expenditures. An extra USD4 per month of disposable income that was formerly used for medical expenses adds up to USD48 per year, which can be an important gain for people living on USD2 a day or less.

### 3.5 Access to safe water and/or sanitation and time invested in school/study

Understanding the effects of reinvesting time previously dedicated for collecting water or addressing sanitation needs on school attendance or after-school study is probably the least conclusive of the findings examined in this analysis. Despite this disclaimer, a few strong observations can be noted and one family profile is highlighted to help speak for values that are harder to quantify.

To start with, it is no secret that women and children bear the primary responsibility for collecting water. The WHO/UNICEF Joint Monitoring Programme (JMP) documents this fact in a 2010 report. However, that finding can also be observed and further specified from our own data, which demonstrate that female children bear the responsibility for collecting water more frequently than male children. Figure 4 shows the baseline/end-line comparison of responses to the question, ‘Who in your house collects water from outside?’

## Who collects water from outside in your house?

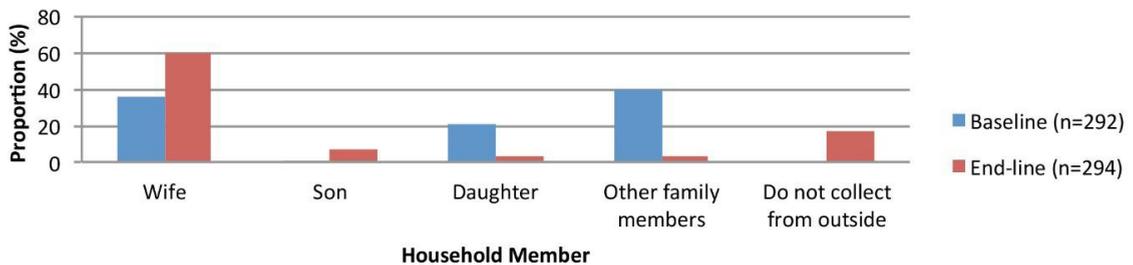


Figure 4: Family responsibility for water collection

Remember that in the baseline survey, household members invested, on average, 13.4 hours per week on water collection. The brunt of that work was undertaken predominantly by ‘other family members’ (most likely a sister or sister-in-law) and the wife and then followed by the daughters. Once the travel times were drastically reduced through a household water connection, however, the trend changes dramatically: as the chore became less burdensome and time consuming. It shifted overwhelmingly to the wife and, to a smaller extent, the male members of the household – the husband and the sons. Thus we can see from this figure and infer from the earlier analysis that daughters (i.e. young girls) gained a lot of free time when their households installed water connections.

Of end-line survey respondents who had taken water loans, 51 per cent reported that the hours that school-going children devoted to study had increased, while 48.2 per cent reported no change. The impact was even stronger among end-line survey respondents who had taken sanitation loans, where 59.3 per cent reported an increase in study hours. Given that earlier calculations show slightly greater time savings for sanitation facilities than water facilities, and also being cognizant of the fact that both male and female children may benefit from a household toilet (while male children were not overly burdened with collecting water in the pre-household connection scenario), these greater increases in study time for the children of sanitation borrowers are easy to understand.

### *Family profile: Laxmi, Sunita and Jaya\**

Laxmi (39) and her family live in a slum of Hyderabad. She is a daily labourer, earning ~INR6,000 (USD100) per month, ~INR300 (USD5) per day. Her husband is a carpenter, earning ~INR15,000 (USD250) per month, ~INR750 (USD12.5) per day. All three children – Jaya (15), Sunita (17) and their brother (18) – are in school.

**PROBLEM:** In order to collect enough water for the daily needs of five people, the girls and their mother would have to travel one kilometre to collect 30 pots of water for their domestic needs and another kilometre to collect drinking water. The collection process would take an hour. To avoid carrying all of this water up the hill to their home, they would also do what washing and cleaning they could at the bottom of the hill, extending the water ‘collection’ time.

**To manage water collection, the three females rotated staying at home 2 days a week.**

**Lost wages for Laxmi = USD10/week (USD40/month).**

**Lost school time for Sunita and Jaya = 2 days a week (8 days/month). That amounts to more than one full week of school per month missed on account of water collection per female.**

**SOLUTION:** Laxmi took a loan for INR10,000 (~USD167) to install a household water connection. Under the programme, she made monthly payments of INR900 (~USD15) and repaid the loan in ten months. She was able to make these payments from her income alone – the extra income from no longer having to miss work certainly helped.

*\*Names changed*

The findings shared in this article highlight the strong connection between access to water and sanitation and household incomes. While not perfect in nature, it lays a solid foundation upon which other investigation teams can build so that a body of evidence around the economic implications of water and sanitation can be developed.

- Access to water and/or sanitation at the household level was found to reduce travel time by an average six to 14 hours a week; thus liberating the equivalent of nearly two eight-hour working days for the discretionary use of the individual. While not every person with access to improved water and/or sanitation ultimately opts to use this

extra time to earn additional income, data collected and shared in this article suggest that a large proportion of the people (predominantly women) who took loans in order to construct household water and/or sanitation facilities directed their newly-freed time towards income-generating activities, either working additional hours or entering the workforce for the first time.

- Of respondents who took a loan for a water connection, 58.5 per cent reported that household access to water had led to economic benefits for the family. Of respondents who took a loan for toilet construction, 54.3 per cent reported that household access to sanitation had led to economic benefits for the family.
- The hours that school-going children, particularly girls, were able to devote to study increased as a result of having a water and/or sanitation facility in their home. This has implications for their future ability to earn income.
- Not only were many families who took a loan for water and sanitation spending less, on average, on monthly medical expenses, but visits to the doctor or hospital prompted by water-borne diseases, particularly diarrhoea, had shown a notable decrease.

The commonly held perception that micro-loans for water and/or sanitation access are consumptive, and, therefore, a greater risk than income-generating loans, needs to change. While the findings shared in this article do not prove that household access to water and sanitation is sufficient for increases in household income, they strongly suggest that these assets contribute in a way that should not be ignored. Moreover, very few households that took out a loan for water actually included having a sufficient quantity of water as one of the main benefits of the water connection. This indicates that the people who put themselves into debt in order to access water at home see the investment and the time savings that accrue as a result of this expenditure as a means to *other* ends, including (but not limited to) income generation. This suggests that these loans are, in fact, less risky than the average. Given these findings shared above, as well as the way in which these loans are perceived by the people who actually use them, micro-loans for water and sanitation should be re-classified as income-enabling. They should be afforded all the benefits and encouragement given to income-generating loans by the government policies that regulate microfinance markets and by the financial institutions that finance as well as administer micro-lending portfolios.

Additional research should be carried out to make more robust economic calculations of how people use the hours formerly allocated towards collecting water and/or defecation needs. The number of days of work missed from tending to these needs or recovering from water-borne illnesses can be monitored. Close observation of the changes in household income levels over time, controlling for a minimum of factors, can be conducted along with the tracking of medical expenditures. A survey of financial institutions that critically assesses the decision-making process around lending (or not lending) for water and/or sanitation would also be valuable for a more comprehensive (and therefore targeted) understanding of who needs to understand the above findings in order for change to occur at the implementation level. Once the link between economic gains and access to water and sanitation is widely appreciated, research investigating these questions will flourish, leading to increased universal understanding of the critical role that access to water and sanitation play in economic growth. This will open the doors to increased financial flows to the sector, catalysing domestic resource mobilization to tackle a major global risk.

### Abbreviations

INR	Indian rupee
JMP	Joint Monitoring Programme
MDG	Millennium Development Goals
MFI	Microfinance institution
NGO	Non-governmental organization
PSL	Priority Sector Lending
SDG 6	Sustainable Development Goal #6 (clean water and sanitation)
UNICEF	United Nations Children's Fund
USD	US dollar
WHO	World Health Organization

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