



Comprehensive social protection programming: what is the potential for improving sanitation outcomes?

Keetie Roelen & Karol Rodriguez

To cite this article: Keetie Roelen & Karol Rodriguez (17 Dec 2024): Comprehensive social protection programming: what is the potential for improving sanitation outcomes?, Journal of Development Effectiveness, DOI: [10.1080/19439342.2024.2442379](https://doi.org/10.1080/19439342.2024.2442379)

To link to this article: <https://doi.org/10.1080/19439342.2024.2442379>



© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 17 Dec 2024.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

Comprehensive social protection programming: what is the potential for improving sanitation outcomes?

Keetie Roelen^a and Karol Rodriguez^b

^aCentre for the Study of Global Development, The Open University, Milton Keynes, UK; ^bMaastricht Economic and Social Research Institute on Innovation and Technology, United Nations University, Maastricht The Netherlands

ABSTRACT

We estimate and assess the impact of a comprehensive social protection intervention on sanitation access and behaviour in rural Haiti. Evaluations of such interventions point to positive effects on lives and livelihoods, yet their impact on sanitation remains relatively unexplored. Despite rapid acceleration of efforts in the past decade, progress towards adequate and equitable sanitation has been limited. Using a mixed methods approach, we find that bundled interventions can be effective in improving access to sanitation facilities and promoting sanitation behaviour. Findings also point to the importance of contextual factors and the role of women in facilitating positive outcomes.

ARTICLE HISTORY

Received 17 August 2022
Accepted 9 December 2024

KEYWORDS

Social protection; poverty; sanitation; water; behaviour; Haiti

Introduction

The ‘world is alarmingly off-track to deliver sanitation for all by 2030’ (UNICEF and WHO 2020). This comes at tremendous human cost with 0.8 million to 1.8 million deaths every year attributed to poor water, sanitation and hygiene (WASH) (Ray and Smith 2021). Conventional efforts to improve WASH outcomes have focused on providing sanitation ‘hardware’ and changing behaviours (Ayyangar et al. 2019; Waddington and Snilstveit 2009). It is increasingly recognised that programmes can be made more effective by integrating interventions that lift financial constraints at household level (Kohlitz, Carrard, and Willetts 2019).

Targeted subsidies and sanitation hardware support directed at poor households are now widely used mechanisms to ensure universal access (Andres et al. 2019; Kohlitz, Carrard, and Willetts 2019). Their success has been mixed: subsidies can cover the affordability gap and ensure individuals’ ability and willingness to pay for sanitation services, but they are only effective if well-targeted and if they benefit the poorest and most vulnerable (UNICEF and WHO 2020). The relevance of subsidies also depends on context: costs of latrines tend to be higher in urban areas and are therefore more likely to prevent the poor from using sanitation facilities (Myers 2014). Others have raised concerns about external support, including provision of hardware, crowding out community-led action (Venkataramanan et al. 2018) and have argued the need for hybrid approaches that strengthen and build on intra-communal support (Myers et al. 2017).

Strikingly absent from research about targeted household-level subsidies and sanitation hardware to improve WASH outcomes is the overlap with a policy area that relies heavily on direct

CONTACT Keetie Roelen  keetie.roelen@open.ac.uk  Centre for the Study of Global Development, The Open University, Walton Hall, Kents Hill, Milton Keynes MK7 6AA, UK

© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

provision of cash transfers and in-kind support to the poorest segments of the population, namely social protection. Social protection has become integral to development policy in the last two decades (Devereux, Roelen, and Ulrichs 2016), as evidenced by its embeddedness in the SDGs. Interventions such as cash transfers and comprehensive programmes that combine economic support with behaviour change components have grown particularly popular (Roelen 2021). A widening evidence base attests to wide-ranging positive impacts including reduced hunger, greater uptake of education and health services and improved psychosocial wellbeing (Banerjee et al. 2015; Bastagli et al. 2019; Roelen and Saha 2021).

Comprehensive schemes also have the potential to improve WASH outcomes by removing financial and social barriers (Renzaho et al. 2018). In Nepal, for example, the provision of regular transfers alongside capacity building and behaviour change interventions had a positive impact on the use of improved drinking water sources and sanitation facilities as well as on the disposal of children's faeces (Renzaho et al. 2018). While there has been some acknowledgement of the role of social protection in ensuring access to affordable sanitation services (UNRISD 2016) and increased interest from civil society actors in how to best leverage policy instruments in improving WASH outcomes (Sengupta, Sivanu, and Khan 2023), this area of works remains largely unexplored.

In this article, we make a unique contribution to the thin body of literature on the impact of comprehensive social protection schemes on the use of sanitation facilities and sanitation behaviour. Using a mixed methods approach, we assess the impact of a comprehensive intervention – the *Chemen Lavi Miyò* (CLM) programme – on the use of sanitation and water facilities and sanitation practices of women in extreme poverty in rural Haiti. Given the programme's focus on women, this study also builds evidence on the links between women's empowerment and sanitation practices, which is still nascent (Hirai, Graham, and Sandberg 2016). By combining quantitative impact estimates with in-depth qualitative data from programme participants, the study offers unique insights into both the magnitude of and pathways to impact. Despite the importance of integrating quantitative and qualitative information in impact evaluations being widely recognised, it is still not common practice (Copestake 2024).

Literature review

Targeted subsidies and in-kind support in WASH

The use of targeted subsidies and in-kind support in the rural sanitation sector has been subject of longstanding debate. Demand-side, or consumer subsidies, are often targeted at poorer consumers to improve affordability (Komives et al. 2005) and foster access to and take-up of water and sanitation services (Narzetti and Cunha Marques 2020). Construction of hardware, such as wells or latrines, create the conditions for hygienic sanitation to be practised (Hulland et al. 2015).

Arguments in favour of such interventions can be made on moral and economic grounds (Evans, Van der Voorden, and Peal 2009). From an equity perspective, it is unfair that poorer households are unable to afford basic sanitation while richer families can access services at lower cost in their own homes (*ibid*). From an economic point of view, subsidies incentivise people to access sanitation services, especially when they hold insufficient information about the benefits of doing so or underappreciate the benefits of individual action for society as a whole (*ibid*). Lack of affordability or access to building materials is a well-documented obstacle to the adoption of improved sanitation facilities (Garn et al. 2017; Mara et al. 2010).

There is some evidence showing that monetary incentives – especially when combined with existing behavioural interventions – can change sanitation behaviour and improve outcomes over and above impacts of behaviour change interventions alone. A study from Ghana shows that the provision of well-targeted subsidies to the poorest households can render community-oriented behaviour change approaches such as Community-Led Total Sanitation (CLTS) more effective (Radin et al. 2020). When comparing costs and benefits associated with a 'traditional' CLTS-only

intervention and a 'CLTS plus' intervention, that net benefits of the plus variant are higher compared to the CLTS-only approach in reducing open defaecation (*ibid*). Research in Bangladesh, India and Lao PDR also demonstrated that supplementing CLTS with targeted hardware vouchers or subsidies can make the approach more effective in decreasing open defaecation (Cameron et al. 2021; Guiteras, Levinsohn, and Mushfiq Mobarak 2015; Hammer and Spears 2016).

There are also concerns about the use of subsidies and hardware support within the WASH sector. Poor targeting can lead to 'inclusion errors' with subsidies ending up with more wealthy households than intended (Andres et al. 2019; Evans, Van der Voorden, and Peal 2009). Creation of dependency and lack of ownership lowering the chance of sustainable use are other widely held concerns (Robinson and Gnilo 2016; Venkataramanan et al. 2018). At sector level, subsidies have also been criticised for being unaffordable for donors and governments, distorting the market, stifling innovation and for facilitating rent-seeking by governments and service providers (Andres et al. 2019; Evans, Van der Voorden, and Peal 2009).

Targeted cash and asset transfers in social protection

The provision of targeted cash and asset transfers to achieve a wide set of development outcomes has become a popular component of the social protection toolkit. In recognition that financial incentives alone have limited impact on intractable problems such as malnutrition or morbidity (Bastagli et al. 2019), so-called 'cash plus' interventions are a form of comprehensive social protection that provide cash transfers (or subsidies) and complement these various other types of support (Roelen et al. 2017). The 'plus' components that complement cash transfers often seek to incentivise behaviour change or address supply-side constraints by providing behaviour change communication (BCC) or additional in-kind transfer, or by establishing cross-sectoral linkages (e.g. referrals to health services, health insurance or tuition fee waivers) (*ibid*). In Ghana, for example, beneficiaries of the Livelihood Empowerment Against Poverty (LEAP) received fee waivers for the National Health Insurance Scheme (NHIS), thereby incentivising take-up of health insurance among poor households (Palermo et al. 2019).

Bundled interventions that seek to stimulate income-generating activities and improve household living conditions, also referred to as 'economic inclusion' programmes, have also grown increasingly popular in the last decade (Andrews et al. 2021). In addition to cash transfers, access to savings and credit, livelihood training and coaching, programmes commonly include sizeable in-kind asset transfers and behaviour change components, some of which are directly related to sanitation (*ibid*). The Bihar Rural Livelihoods Project in India, more commonly known as JEEViKA, for example, includes BCC on hygiene and sanitation practices as well as links to government-run sanitation programmes to help programme participants build toilets (JEEViKA 2019).

A recent systematic review of the impact of 'cash plus' programmes over and above the provision of cash alone indicates a positive impact on sanitation behaviour (Little et al. 2021). In line with findings within the sanitation literature, the provision of financial support in conjunction with other measures such as BCC led to reductions in open defaecation, handwashing practices and treating drinking water (*ibid*). Commonly these 'cash plus' programmes are focused on improving child health and nutrition, considering sanitation a key mechanism through which to achieve impacts (as opposed to viewing changes in sanitation behaviour as a goal in and of itself). In Myanmar, for example, the 'cash plus' intervention focused on improving maternal and infant health, targeting its support to women at the beginning of their pregnancy up until their children reached 2 years of age (Field and Maffioli 2021).

A rapidly growing evidence base attests to the impact of 'economic inclusion' programmes on household-level outcomes such as asset holdings and living conditions (Andrews et al. 2021; Banerjee et al. 2015). There is some evidence to point to programmes' positive impact on sanitation practices. In Bangladesh, for example, BRAC's Ultra-Poor Graduation programme significantly reduced the practice of open defaecation among programme participants compared to a control

group (Bhattacharjee et al. 2020). Nevertheless, a recent review of the sector indicated that the evidence base of ‘economic inclusion’ interventions’ impact on WASH outcomes is extremely limited (Andrews et al. 2021).

Gender in WASH and social protection

Women may be more compelled to improve sanitation in the household. Shame and stress associated with menstrual hygiene management (Mahon and Fernandes 2010) and risk of sexual violence when defaecating away from home (Lennon 2011) are important reasons for women to invest in a sanitation facility close to home. Women often carry the greatest time and energy burden in ensuring access to hygienic sanitation and safe drinking water, such as through the fetching of water (Sorenson, Morssink, and Abril Campos 2011). There is some evidence suggesting that greater gender equity results in households improving their sanitation conditions (Hirai, Graham, and Sandberg 2016). Overall, the WASH sector has become increasingly concerned with serving women’s interests and being ‘gender-transformative’ as opposed to simply leveraging women’s roles to improve WASH outcomes (MacArthur, Carrard, and Willetts 2020).

Similarly, gender-sensitive social protection has extensively explored how programmes can address gender inequities and improve or undermine women’s empowerment, such as through payment of transfers to women directly (Holmes and Jones 2013). The evidence is mixed: transfers can reduce intimate partner violence (Buller et al. 2016) but attaching conditions to the receipt of cash transfers, such as requiring children to have health check-ups, adds to women’s time burden and stress (Cookson 2018; Holmes and Jones 2013).

The latter is a recurrent issue in schemes that aim for behaviour change and channel their activities through women to be most effective. For example, ‘cash plus’ programmes that seek to reduce child malnutrition are almost exclusively focused on women, seeking to improve their autonomy to making better choices with respect to diets for their children (Barnett et al. 2022; de Groot et al. 2017). This instrumental inclusion of women is problematic because (i) it reaffirms women’s roles as main caregivers and reinforces existing gender norms in relation to unpaid work and caregiving, and (ii) it can compound drudgery and perpetuate the combined burden of paid and unpaid work for women (Chopra and Zambelli 2017). Notwithstanding increased efforts to for WASH interventions to serve women’s interests, time constraints and the daily toll of juggling multiple stressors and responsibilities have also been identified as impediments to consistent use of water and sanitation technology (Ray and Smith 2021).

Context and case study

Haiti

Haiti is the poorest country in the Americas and one of least developed countries in the world. The most recent monetary poverty estimates indicate that 59 percent of Haitians were living under the national poverty line of \$2.42 per day in 2012 (World Bank 2018) and that 41 percent of the population were experiencing multidimensional poverty in 2016/17 (UNDP 2019). Recent episodes of political and institutional instability as well as the fallout of the COVID-19 pandemic are likely to have increased poverty (World Bank 2020, 2024).

Most Haitians do not have access to improved hygiene and sanitation. Haiti has high levels of open defaecation and use of unimproved water sources, especially in rural areas (JMP 2021). In 2020, 31.5 percent of the population practised open defaecation and another 25.9 percent used unimproved sanitation facilities. Fourteen percent reported no handwashing facilities while a further

70.5 percent listed limited services for hygiene. Roughly half of the population consumed water from unimproved sources (*ibid*).

CLM programme

The CLM programme has been implemented by NGO Fonkoze in central Haiti since 2007. The programme supports women from extremely poor households over a period of 18 months, helping them to improve wellbeing and build sustainable livelihoods through agricultural diversification, development of income-generating activities and cultivation of socioeconomic resilience. Programme selection is based on an intricate process of social mapping, participatory wealth ranking and final verification. Research about targeting efficiency has found that the programme includes those most vulnerable in the communities that are served (Greeley 2019). The programme complements government policy and works in collaboration with local officials or representatives through their membership of village-level committees, which seek to integrate participants more fully in community activities (Werlin 2018).

Female participants receive intensive and tailored support, including: (i) weekly stipends of 350 gourdes (approximately 4 USD) during the first 6 months of implementation; (ii) asset transfer (primarily rearing goats or pigs), (iii) support to join Village Savings and Lending Association (VSLA), (iv) home visits by case managers, including health and nutrition messaging and (v) in-kind support such as housing materials and access to the local hospital.

With respect to sanitation, the most pertinent programme components relate to direct provision of materials for families to build a pit latrine (although they must find support from within the community to help them build the latrine) and include messaging about washing hands after defaecation and before cooking meals, building and using their latrines, and keeping their children clean. The programme also provides a ceramic water filter and jug at the start of the programme and promotes other water treatment methods such as boiling and sunlight exposure.

Research design and methodology

This paper employs a mixed-methods approach, using quantitative evaluation data to estimate programme impact and in-depth qualitative data to unpack the ‘black box’ of programme impact (or lack thereof) (Bamberger 2015; Quisumbing et al. 2020) and as a result produce insights that are particularly relevant for policy and practice (de Haan, Dowie, and Mariara 2020). In particular, the study seeks to investigate whether a comprehensive social protection can improve access to sanitation facilities and sanitation behaviour, and what contributes to or challenges such impact.

Research adhered to ethical protocol, including informed consent, anonymity in data analysis and dissemination and respectful conduct in the field. Ethical approval was provided by the Research Ethics Committee (REC) at the Institute of Development Studies.

Quantitative data analysis

The quantitative component of the evaluation is based on a quasi-experimental design. The treatment group was pre-determined by programming considerations, with all eligible women in programme sites selected as participants. Eligibility criteria included living in extreme poverty (based on a wide set of indicators), having dependants and being able to work. Ethical considerations, potential spillover effects and budget constraints precluded the possibility of either establishing counterfactuals within the same communities or undertaking a cluster-randomised control trial. A comparison group was therefore sampled from other communities in the Central Plateau region by (i) selecting neighbourhoods similar to those where the programme took place; and (ii) identifying women with similar living conditions as those of programme participants. Selection of women into the comparison group was based on social mapping and participatory wealth rankings, thereby mirroring the CLM programme’s targeting procedure.

Baseline data for the treatment group was collected in June–July 2017, at which time prospective CLM members received orientation training for the CLM programme. Data for the comparison group was collected August–December 2017. Endline data for the treatment group was collected in April 2019 for the treatment group, roughly 1 month after the end of the intervention, and in May–June 2019 for the comparison group.

The total panel sample includes 1,168 respondents (561 treatment and 607 comparison). The sample is balanced in terms of age of primary female household and spousal literacy but shows significant differences between groups for household size, number of household members older than 10 years who work, literacy of the woman, marital status, wealth index and maternal and mental health (Table 1). Attrition rates average 15 percent and are higher among the comparison group (19%) compared to the treatment group (11%). However, attrition patterns across observable characteristics are similar both between and within treatment and comparison groups (Tables A1 and A2). The likelihood of attrition increases with age of primary female in both treatment and comparison groups, which is a direct result of the survey being targeted at women with infants only.

We use Propensity Score Matching (PSM) to overcome selection bias as a result of the study's quasi-experimental design and establish a valid counterfactual (Angrist and Pischke 2008). The propensity score denotes the probability of participating in the programme based on observed household and individual-level characteristics at baseline (Rosenbaum and Rubin 1983), and is specified as follows:

$$P_i = \alpha + \beta X_i + \varepsilon_i \quad (1)$$

where P_i is a binary variable that takes the value of one for treatment group and zero for comparison group, X_i is a vector of observed characteristics at baseline, and ε_i is an error term. The variables included in vector X include location (department), age and marital status of the respondent, total number of household members, number of household members over 10 years of age who work, whether the respondent knows how to read and write, mental health of the respondent measured by the 6-item K6 – Kessler Psychological Distress Scale (Kessler et al. 2010), and a composite index of living standards modelled on the Demographic and Health Surveys (DHS) wealth index (Rutstein and Johnson 2004).

We employ the Nearest Neighbour Matching (NNM) method with replacement, ensuring that the treatment observations have comparison observations 'nearby' in the propensity score distribution (Heckman, Robert, and Jeffrey 1999). Results of the balancing test indicate a substantial reduction in standard bias after matching (Table A3 and Figures A1 and A2), suggesting that the sample is well-balanced across all variables used in the matching procedure.

Table 1. Demographic characteristics at baseline.

	Total (<i>N</i> = 1,168)	Comparison (<i>N</i> = 607)	Treatment (<i>N</i> = 561)	Difference (comparison- treatment)	
				t-stat	p-value
Living in department 'Centre'	0.496	0.458	0.537	-0.079	-2.689 0.007
Household size	5.157	4.962	5.367	-0.405	-0.405 0.001
Number of members > 10-years old who work for at least 1-h last week	3.325	3.150	3.515	-0.365	-5.103 0.000
Woman able to read and write	0.128	0.157	0.096	0.060	3.094 0.002
Spouse able to read and write	0.160	0.153	0.168	-0.014	-0.668 0.505
Age of the primary female household	34.026	33.916	34.144	-0.228	-0.334 0.738
Traditionally or legally married	0.784	0.743	0.829	-0.086	-3.567 0.000
Wealth index (quintile)	2.861	3.226	2.467	0.759	9.216 0.000
Maternal mental health	11.004	11.366	10.613	0.753	3.095 0.002

The wealth index is based on a composite index of living standards modelled on the Demographic and Health Surveys (DHS) wealth index (Rutstein and Johnson 2004); maternal mental health of the respondent is measured using the 6-item K6- Kessler Psychological Distress Scale (Kessler et al. 2010).

We combine Difference in Differences (DID) with the propensity score, also known as Conditional Difference in Differences (CDID) (Blundell and Costa Dias 2008; Imbens and Wooldridge 2009), to estimate the treatment effect. The empirical specification is as follows:

$$Y_{it} = \theta_i + \lambda_t + D_{it}\alpha + X_{it}\beta + \mu_{it} \quad (2)$$

where Y_{it} corresponds to the outcome of the household i in period t , term θ_i captures all time-invariant factors that are specific to each household (i.e. fixed effect); λ_t is the time trend that is common to the comparison and treatment groups; D_{it} captures the interaction between treatment and the time trend and α is the difference and difference estimator (i.e. treatment effect); X_{it} is a vector of characteristics in household i in period t ; μ_{it} denotes the error term. The error term μ_{it} is assumed to be orthogonal to D_{it} .

We employ two outcome measures, namely improved toilet facilities and access to safe drinking water. Improved toilet facilities include flush toilet, pit latrine with slab, traditional pit latrine and composting toilet. Sources of safe drinking include private faucet, public standpipe (provided through DINEPA – National Directorate of Potable Water and Sanitation), well or tube well, or water obtained from kiosk, truck, bottle, bag, bucket or jerrycan. Quantitative data on sanitation and water is collected at household level; we are therefore unable to consider differential impacts depending on gender or age of individuals, for example.

The causal interpretation of the DID estimator relies on the parallel trends assumption, which suggests that in the absence of treatment, the treatment and comparison groups would have followed the same trajectory over time. Lack of pre-treatment data prevents us from directly testing this assumption. Nevertheless, the matching procedure adopted in this study and the resultant balanced sample and robustness checks using alternative matching procedure give us confidence in the study's internal validity. By aligning the covariates more closely between the groups, it is more likely that any observed differences in outcomes are due to the treatment effect rather than pre-existing differences.

Qualitative data analysis

Qualitative data was collected between February and April 2018 and included 24 case studies (CSs) and 30 focus group discussions (FGDs) with programme participants, their family members and community members, as well as seven key informant interviews (KIIs) and group conversations with programme staff. Respondents were purposively selected to introduce a degree of heterogeneity across age, spousal relationships and progress in the programme. In total, the qualitative data includes 215 respondents. Participatory tools such as family mapping, daily activity clock, body map, programme component scoring and community mapping exercises were incorporated in case study, FGD and KII activities as appropriate.

All activities were transcribed in Haitian Creole and subsequently translated into English. Deductive and inductive thematic analysis took place using a purposively developed coding scheme, grounded in conceptual frameworks and themes that emerged during fieldwork and first reading of transcripts. The scheme included detailed nodes in relation to sanitation and water, pertaining to access to and use of water and sanitation facilities, whether the CLM programme changed sanitation practices and how, and whether sanitation behaviour is liable to seasonal effects or other changes. Coding was undertaken by three research officers using NVivo, working together to ensure consistency across.

Results

We present our quantitative and qualitative findings in turn.

Table 2. Descriptive statistics about the use of improved toilet facilities.

	Baseline	Endline	Diff	t-stat	p-value
Treatment group	0.06 (0.00)	0.74 (0.01)	-0.68	-32.15	0.00***
Comparison group	0.23 (0.01)	0.25 (0.01)	-0.02	-0.67	0.50

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3. Programme impact on the use of improved toilet facilities.

	DiD (Naïve) (1)	DiD (Controls) (2)	DiD (PS weighted) (3)	DiD (PS matched sample) (4)
CLM programme effect	0.668*** (0.017)	0.661*** (0.015)	0.653*** (0.017)	0.675*** (0.011)
<i>Household characteristics</i>				
Proportion of ill members in the hh		-0.049 (0.042)	-0.059 (0.042)	-0.044 (0.052)
Share of members under the age (15 and over 60)		0.022 (0.056)	0.010 (0.051)	0.040 (0.063)
Both parents present		-0.139 (0.073)	-0.137 (0.080)	-0.171 (0.082)
Proportion of children aged (0–5)		0.023 (0.018)	0.102* (0.038)	0.139 (0.064)
Proportion of girls (aged6–17)		-0.017 (0.150)	0.024 (0.136)	0.121 (0.069)
Constant	0.149*** (0.004)	0.264 (0.128)	0.222 (0.123)	0.149 (0.087)
Observations	2,336	2,336	2,320	1,704
R-squared	0.506	0.513	0.518	0.593
Number of households	1,168	1,168	1,160	852

Treatment effects are estimated using a panel fixed-effects model with time interactions, clustering standard errors at the commune level to account for potential intra-commune correlation. Robust standard errors, clustered by communities, in parentheses. Asterisks indicate significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Columns (1) to (3) present results based on a sample of 1,168 respondents, with 561 in the treatment group and 607 in the comparison group. Column (4) presents results based on the matched sample which contains: 554 households in the treatment group and 298 households in the control group. The matching process uses Nearest Neighbour Matching with replacement.

Quantitative findings

Descriptive statistics show that only 6 percent of the treatment group and 23 percent of the comparison group used improved toilet facilities at baseline (Table 2). We observe a significant increase to 74 percent for the treatment group while the use of improved toilet facilities remains mostly stagnant for the comparison group.

Impact estimates indicate that the CLM programme increases the probability of using improved toilet facilities by 67 percent (Table 3). This positive and significant impact is observed using the full model specification based on the matched sample (4) as well as more basic specifications that include the original sample without controls (1), with controls (2) and weighted with propensity scores (3).

At baseline, 26 percent of the treatment group and 48 percent of the comparison group used improved sources of drinking water (Table 4). We observe no change from baseline to endline.

Impact estimates confirm that the programme did not have a significant effect on the use of improved sources of drinking water, regardless of model specification (Table 5).

As a robustness check, we estimate impact based on matching without replacement (Table A4) and find the same results.

Table 4. Descriptive statistics about the use of improved sources of drinking water.

	Baseline	Endline	Diff	t-stat	p-value
Treatment group	0.26 (0.02)	0.26 (0.02)	0.00	0.07	0.95
Comparison group	0.48 (0.02)	0.48 (0.02)	0.00	0.11	0.91

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5. Programme impact on the use of improved sources of drinking water.

	DiD (Naïve) (1)	DiD (Controls) (2)	DiD (PS weighted) (3)	DiD (PS matched sample) (4)
CLM programme effect	0.002 (0.027)	0.012 (0.025)	0.013 (0.023)	0.011 (0.008)
<i>Household characteristics</i>				
Proportion of ill members in the hh		0.052 (0.029)	0.079 (0.040)	0.092 (0.040)
Share of members under the age (15 and over 60)		0.002 (0.019)	0.003 (0.023)	-0.012 (0.031)
Both parents present		-0.005 (0.030)	-0.009 (0.033)	0.005 (0.053)
Proportion of children aged (0–5)		0.043 (0.083)	0.065 (0.097)	0.131 (0.093)
Proportion of girls (aged6–17)		-0.006 (0.046)	0.007 (0.028)	0.049 (0.057)
Constant	0.378*** (0.007)	0.352*** (0.032)	0.322*** (0.023)	0.229** (0.060)
Observations	2,336	2,336	2,320	1,704
R-squared	0.000	0.003	0.007	0.014
Number of households	1,168	1,168	1,160	852

Treatment effects are estimated using a panel fixed-effects model with time interactions, clustering standard errors at the commune level to account for potential intra-commune correlation. Robust standard errors, clustered by communities, in parentheses. Asterisks indicate significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Columns (1) to (3) present results based on a sample of 1,168 respondents, with 561 in the treatment group and 607 in the comparison group. Column (4) presents results based on the matched sample which contains: 554 households in the treatment group and 298 households in the control group. The matching process uses Nearest Neighbour Matching with replacement.

Qualitative findings

We explore CLM participants' and programme staff perceptions about impacts of the CLM programme on sanitation and pathways to impact.

Perceived programme effects

Almost all respondents noted a change in sanitation behaviour since participating in the CLM programme, thereby mirroring quantitative impact estimates.

We used to poop on the ground and we could get sick more easily. For example, flies used to go on our poop and then get in our food, this can give you cholera. Now that CLM has given us toilets we are less likely to be ill. [MBFGCLM2–2-female]

Reports of behaviour change commonly included reflections about the risks of open defaecation, especially for children.

When they [children] poop on the ground, the microbes can enter the children's parts, and then the flies and the wind can take the microbes and bring them to the food. This is why children have major diseases such as fever, typhus and cholera. [...] The toilet is important because the children go there often, the plants don't hurt them anymore, the thorns don't sting them anymore [...] you are not afraid for the children because you know they have a place to go. [MKFGCLM5–2-female]

The fact that the CLM programme provided materials to all its participants for building their latrines was reported to play a strong role in behaviour change. CLM case managers also actively encouraged participants to prioritise the establishment of a latrine during their home visits.

Qualitative data also confirms quantitative findings about lack of impact on the use of improved water sources. When asked about where they obtained their drinking water, respondents indicated to use the same water sources all year round, most of which can be categorised as unimproved. Those using spring or river water reported seasonal changes in their water sources. However, this would primarily consist of substituting one unimproved source with another. For example, respondents in the most remote area of Mable indicated they use local springs or streams in the rainy season but that they resort to using river water in the dry season.

Qualitative findings do suggest a considerable shift towards treating water before consumption. As noted above, CLM participants received a water filter at the start of the programme as well as repeated messages about how to use it, and the importance of doing so. When asking participants about perceived impact, the provision of the water filter emerged as one of the key benefits of the programme, as illustrated by the following excerpt from a FGD [MBFGCLM2–2-female]:

Respondent 3: 'My child had diarrhoea, since I have the filter he drinks the treated water and doesn't have diarrhoea anymore'.

Respondent 8: 'When you give untreated water to the child, they would get microbes from the water. Since I've been giving them the treated water they are no longer sick'.

Respondent 1: 'Since I've been giving treated water to my son he doesn't get any disease, I don't spend money for the hospital'.

Respondent 2: 'When you wash your child with treated water, he doesn't get infections'.

Female participants also reported having changed their practices in handling children's faeces and keeping themselves and their children clean. In line with advice received through the programme, women would dispose of faeces in the newly built pit latrine, wash their children's bottoms and wash their own hands with soap after handling faeces and cleaning their children.

In addition to these self-reported behaviour changes, fieldworkers also observed that houses and newly built pit latrines were kept clean and were well-maintained. They also noted that most participants were using the water filters at the time of their visits, and that soap was available for washing hands.

Respondents highlighted the importance of advice they received and how this helped them to gain helpful knowledge. *'Yes, they [case managers] told me to have the child wash his hands when he comes from using the latrine, don't let him walk around barefoot'* [MKCSCLM5–2-female]. In response to questions about how the programme changed their children's lives, almost all respondents spoke about how they benefited from messaging and advice for changing sanitation practices.

Qualitative findings thus point to the combined effect of different types of support provided by the CLM programme. The provision of materials to build a latrine and messaging regarding the importance of constructing a latrine, directly contributed to improved sanitation practices. With respect to treatment of water prior to its consumption, the combination of repeated messaging in conjunction with the provision of water filters as well as demonstrations about and monitoring the use of water filters led to a synergetic effect. Overall, respondents spoke highly of the programme and the changes it caused.

Because of CLM, the children drink treated water, the children are not sick and they don't walk around dirty. CLM taught me how to keep them clean. The children don't get wet in the rain; they have a house to sleep in. [LCCSCLM2–4-female]

Challenges to impact

Despite support provided through the CLM programme, financial constraints remained a challenge. One respondent reflected on how lack of money prevented the use of soap when washing hands: *'I always wash my hands with soap. Not every time, because you don't have the means'* [LCCSSpouse2–2]. Another participant noted that diapers are only used occasionally given their cost.

Once the child is 3 months old, we don't use diapers; we put him/her in underwear and shorts. We put them in diapers when we are going out with them, but we don't buy them often because we don't have the money. [LCFGSpouse2–2-male]

The use of diapers or nappies varied among CLM participants. Some respondents indicated that their babies always wore a nappy or diaper to prevent them getting dirty and defaecating in the open. However, the most common response was that children would often be without nappy, diaper, or clothing when at home, but that they would wear such items when going out or being left with others. Cost was the main reason for infants not wearing diapers. A common reason for children not wearing nappies or clothes was the amount of time and effort required to wash them properly.

When using nappies, respondents indicated they disposed of faeces in the latrine to then wash and dry the cloth so it could be reused. However, in the case of diapers, disposal was arguably less hygienic and environmentally unfriendly. In the absence of any waste management, diapers would be thrown in the latrine or in water sources, such as rivers. In response to the question of what women did with their baby's poop, respondents said: *'If it's diapers, we throw them in the latrines. If it's clothes, we wash the clothes'*, while another respondent added: *'I throw it away in the river'* [MKFGCLM2–2-female].

Ensuring that all family members, and especially children, adhere to sanitary practices also emerged as a challenge. Respondents reflected on the difficulty to monitor their children's sanitary practice, such as washing their hands with soap. *'When I leave the latrine, I always wash my hands with soap. On the other hand, when the child washes his hands by himself, he would wash it without soap'*. [MKCSSpouse2–4-male]

A recurrent issue among CLM participants – most of whom are women with young infants – is the struggle to combine many demands on their time, and juggling paid, unpaid, and care work responsibilities. As the programme incentivises productive activities that may require going to the market, working on the farm, or undertaking other tasks that are difficult to combine with childcare, women are often required to leave their children in the care of others. Depending on the strength of family and social networks, such care may be provided by family members, neighbours, or older siblings. Female respondents raised concerns about how well their children would be looked after when in the care of others, such as whether they would be kept clean. One respondent reflected: *'I spend less time with the baby. Sometimes I find she is soiled, because when I go to wash in the river, I leave her with the neighbour to watch over for me'*. [LCCSCLM2–3-female]

Finally, qualitative data also point to supply side issues that undermine the ability to shift to use of improved sources of drinking water. In the semi-remote area of Mache Kana, people tend to use the river for bathing and laundry, and to use a spring for collecting drinking water. However, when it rains, the overflow from the river contaminates the spring water, which makes it unsafe for consumption [MKCSCLM2–2]. The quality of water from the river is also questionable as *'animals might defecate in it, and it's next to a creek and [some people] might drop bad things in it'*. [MKCSSPOUSE2–3-male].

In comparison, in the peri-urban area of La Chappelle, there are standpipes that provide clean water throughout the year. These standpipes are considered important assets to the community: *'The standpipe, because that's where I get water to drink, to wash in and to wash the clothes. I get water every day'* [LCCSCLM2–2-female]. However, the number of standpipes is too low to cover the population adequately, and some respondents use spring water for drinking instead [LCFGCLM5–2].

For residents in the remote area of Mable, water access is very limited. People collect rainwater and if this is insufficient, they rely on a pond. Once the pond dries up, then they go to the nearest water source or the river in the valley that could take at least 40 min to reach [MBFGCLM5–2-female].

Discussion

This paper sought to assess whether a comprehensive social protection intervention can promote the use of improved sanitation facilities and improve sanitation practices, and what supports or hampers impact. Given the paucity of research in this area, the combination of quantitative impact estimates with qualitative explorations of reasons for impact (or lack thereof) offers rigorous and vital insights of both academic and policy relevance.

Findings suggest that a comprehensive intervention like the CLM programme in Haiti has potential to improve access to sanitation facilities and change sanitation practices. Programme participation increases access to improved toilet facilities, in part because materials to build latrines are provided through the programme. Qualitative data suggests that follow-up by case managers supports the latrines being built and maintained and that participants are aware of the benefits of using latrines, especially for children.

These findings do warrant caution. In the absence of evaluation data beyond the end of the programme and in recognition of evidence suggesting that the construction of sanitation facilities may not lead to lasting impact on sanitation behaviours (Hirai, Graham, and Sandberg 2016), we are unable to draw conclusions about the sustainability of impacts. Access to and use of improved toilet facilities may be relatively short-lived. In addition, qualitative data about the use of pit latrines for disposing of diapers raises concerns about sustainability from an environmental perspective. Finally, we are unable to draw conclusions about any impact on the wider community: comparison group households in the quantitative sample did not live in the same communities and the qualitative sample did not include non-programme participants. Evidence from other comprehensive interventions similar to the CLM programme – such as in Burundi – do suggest substantial intra-community spillover effects in relation to sanitation and health practices (Roelen and Devereux 2018).

The programme does not significantly change access to or use of sources of drinking water. Qualitative data reveals that supply side constraints hamper the ability to diversify to other sources of drinking water. As in other low-income countries, limited connectivity to water services and poor quality of such services will continue to hamper access to improved sources of drinking water (Cook, Fuente, and Whittington 2020).

At the same time, the programme encourages treating water using a water filter before its use, and this practice appears to have been taken up widely. The programme's bundled approach of providing the filter, repeated messaging about its use and checks on its use during home visits explain the widespread reported usage of such filters. Again, given evidence about lack of correct and consistent long-term use of technology such as water filters (Ray and Smith 2021; Waddington and Snilstveit 2009), we are unable to draw conclusions about effects beyond programme end.

Findings in this paper add to the limited literature on the role of social protection in improving access to sanitation facilities and changing sanitation behaviour in important ways.

First, findings suggest that comprehensive interventions that combine provision of cash, assets and advice can be effective. These findings are in line with evidence from within the sanitation literature regarding the effectiveness of behaviour change interventions coupled with financial incentives such as targeted subsidies (Cameron et al. 2021; Guiteras, Levinsohn, and Mushfiq Mobarak 2015; Hammer and Spears 2016). They also contribute to the debate about merits versus risks of supplying sanitation hardware (Venkataramanan et al. 2018), with qualitative findings suggesting that the provision of building materials combined with sanitation information are vital for extremely poor households to improve access to and use of improved toilet facilities.

Second, this study's findings contribute to literature on the tension between female empowerment for improving family-level outcomes, including improved sanitation and hygiene practices, and women's increase in time burden (Chopra 2021). Women reported difficulties in maintaining good practices while engaging with income-generating activities, especially if this results in having to leave children in the care of others.

Third, this study points to the importance of context. Findings with respect to access to drinking water show that the degree of remoteness and availability of public services serve as binding constraints beyond the reach of household-focused interventions. In the context of Haiti, such constraints exist against a backdrop of limited government capacity and continued political instability, suggesting that improvements in public services are unlikely to occur in the near future.

Finally, from a policy perspective, findings point to the need for stronger cross-sectoral linkages between social protection and WASH. Both sectors have widespread experience with the implementation of financial incentives in the form of cash transfers and targeted subsidies, respectively, as well as the provision of assets in the form of hardware or building materials, yet policy coordination or even lesson-learning across sectors appears limited. Findings in this study highlight the potential of interventions that combine forms of economic and material support with advice and behaviour change components. Future research and policy efforts should give further insight into the appropriate mix of support in different contexts, and how to deliver such support most effectively across sectors. This includes a consideration of how NGO-implemented interventions may be strengthened and scaled up in collaboration with government to enhance its reach and effectiveness. As evidenced in this paper, the use of mixed methods approaches can enhance rigour in understanding the magnitude of and pathways to impact, thereby offering salient and practical insights for accelerating efforts to improve sanitation outcomes.

Acknowledgements

This work was supported by W.K. Kellogg Foundation; the British Academy [grant EC170207]; Swedish International Development Cooperation Agency, Sida. The funders do not necessarily share the views expressed in this material. Responsibility for its contents rests entirely with the authors.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The work was supported by the British Academy [EC170207]; Swedish International Development Cooperation Agency, Sida; W.K. Kellogg Foundation.

Notes on contributors

Keetie Roelen is Senior Research Fellow at the Centre for the Study of Global Development at The Open University, UK. Her research focuses on poverty and social protection across the globe.

Karol Rodriguez is a Ph.D. Fellow in Economics of Development at Maastricht University School of Business and Economics and UNU-MERIT. Her research focuses on how public policy can shape household and children's wellbeing.

References

Andres, L. A., M. Thibert, C. C. Lombana, A. V. Danilenko, J. George, and C. Borja-Verga. 2019. *Doing More with Less : Smarter Subsidies for Water Supply and Sanitation*. Washington DC: World Bank.

- Andrews, C., de Montesquiou, A. S. Aude, D. Ines, P. Vasudeva, B. V. Paul, S. Samaranyake, J. Heisey, T. Clay, and S. Chaudhary. 2021. *The State of Economic Inclusion Report 2021: The Potential to Scale*. Washington, DC: World Bank. <http://hdl.handle.net/10986/34917>.
- Angrist, J. D., and J. S. Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.
- Ayyangar, A., S. Narayanan, R. Devaraj, V. Santhosh Kumar, G. Devkar, and T. Rajan Annamalai. 2019. "Target Segmentation in WASH Policies, Programmes and Projects: A Systematic Review." *Journal of Development Effectiveness* 11 (1): 43–67. <https://doi.org/10.1080/19439342.2019.1595090>.
- Bamberger, M. 2015. "Innovations in the Use of Mixed Methods in Real-World Evaluation." *Journal of Development Effectiveness* 7 (3): 317–326. <https://doi.org/10.1080/19439342.2015.1068832>.
- Banerjee, A., E. Duflo, N. Goldberg, D. Karlan, R. Osei, W. Parienté, J. Shapiro, B. Thuysbaert, and C. Udry. 2015. "A Multifaceted Program Causes Lasting Progress for the Very Poor: Evidence from Six Countries." *Science* 348 (6236). <https://doi.org/10.1126/science.1260799>.
- Barnett, I., J. Meeker, N. Nisbett, and K. Roelen. 2022. "Behaviour Change Communication for Child Feeding in Social Assistance: A Scoping Review and Expert Consultation." *Maternal & Child Nutrition Forthcoming* 18 (3). <https://doi.org/10.1111/mcn.13361>.
- Bastagli, F., J. Hagen-Zanker, L. Harman, V. Barca, G. Sturge, and T. Schmidt. 2019. "The Impact of Cash Transfers: A Review of the Evidence from Low- and Middle-Income Countries." *Journal of Social Policy* 48 (3): 569–594. <https://doi.org/10.1017/S0047279418000715>.
- Bhattacharjee, A., A. Rahman, R. Nisat, and N. Das. 2020. *Impact Evaluation of BRAC's Ultra-Poor Graduation Programme for Host Community in Cox's Bazar*. Dhaka: BRAC Institute of Governance and Development (BRAC) and BRAC University.
- Blundell, R., and M. Costa Dias. 2008. *Alternative Approaches to Evaluation in Empirical Microeconomics CWP26/08*. London: Centre for Microdata Methods and Practice (cemmap).
- Buller, A. M., M. Hidrobo, P. Peterman, and L. Heise. 2016. "The Way to a man's Heart is Through His Stomach?: A Mixed Methods Study on Causal Mechanisms Through which Cash and In-Kind Food Transfers Decreased Intimate Partner Violence." *BMC Public Health* 16 (1): 1–13. <https://doi.org/10.1186/s12889-016-3129-3>.
- Cameron, L., P. Santos, M. Thomas, and J. Albert. 2021. "Sanitation, Financial Incentives and Health Spillovers: A Cluster Randomised Trial." *Journal of Health Economics* 77:102456. <https://doi.org/10.1016/j.jhealeco.2021.102456>.
- Chopra, D. 2021. "Paid Work and Unpaid Care Work in India, Nepal, Tanzania and Rwanda. A Bi-Directional Relationship." In *Women's Economic Empowerment. Insights from Africa and South Asia*, edited by Grantham, Dowie and de Haan, 186–206. London: Routledge.
- Chopra, D., and E. Zambelli. 2017. *No Time to Rest: Women's Lived Experiences of Balancing Paid Work and Unpaid Care Work*. Brighton: Institute of Development Studies.
- Cook, J., D. Fuente, and D. Whittington. 2020. "Choosing Among Pro-Poor Policy Options in the Delivery of Municipal Water Services." *Water, Economics & Policy* 6 (03): 1950013. <https://doi.org/10.1142/s2382624x19500139>.
- Cookson, T. 2018. *Unjust Conditions: Women's Work and the Hidden Costs of Cash Transfer Programs*. Oakland, California: University of California Press.
- Copestake, J. 2024. "Mixed-Methods Impact Evaluation in International Development Practice: Distinguishing Between Quant-Led and Qual-Led Models." *Journal of Development Effectiveness*: 1–20. <https://doi.org/10.1080/19439342.2024.2351892>.
- de Groot R., T. Palermo, S. Handa, L. Peter Ragno, and A. Peterman. 2017. "Cash Transfers and Child Nutrition: Pathways and Impacts." *Development Policy Review* 35 (5): 621–643. <https://doi.org/10.1111/dpr.12255>.
- de Haan A., G. Dowie, and J. Mariara. 2020. "To RCT or Not, is Not the Question: Methods for Policy-Relevant Research on Gender Equality." *World Development* 127:104794.
- Devereux, S., K. Roelen, and M. Ulrichs. 2016. "Where Next for Social Protection?" 2016 47 (4). <https://doi.org/10.19088/1968-2016.158>.
- Evans, B., C. Van der Voorden, and A. Peal. 2009. *Public Funding for Sanitation - The Many Faces of Sanitation Subsidies*. Geneva: Water Supply & Sanitation Collaborative Council.
- Field, E., and E. Maffioli. 2021. "Are Behavioral Change Interventions Needed to Make Cash Transfer Programs Work for Children? Experimental Evidence from Myanmar." *NBER Working Papers*. Cambridge, MA: National Bureau of Economic Research (NBER).
- Garn, J. V., G. D. Sclar, M. C. Freeman, G. Penakalapati, K. T. Alexander, P. Brooks, E. A. Rehfuess, S. Boisson, K. O. Medlicott, and T. F. Clasen. 2017. "The impact of sanitation interventions on latrine coverage and latrine use: A systematic review and meta-analysis." *International Journal of Hygiene and Environmental Health* 220 (2): 329–340.
- Greeley, M. 2019. *Targeting the Ultra-Poor: Lessons from Fonkoze's Graduation Programme in Haiti. Learning Brief* Brighton: Institute of Development Studies (IDS).
- Guitaras, R., J. Levinsohn, and A. Mushfiq Mobarak. 2015. "Encouraging sanitation investment in the developing world: A cluster-randomized trial." *Science* 348 (6237): 903–906. <https://doi.org/10.1126/science.aaa0491>.
- Hammer, J., and D. Spears. 2016. "Village sanitation and child health: Effects and external validity in a randomized field experiment in rural India." *Journal of health economics* 48:135–148. <https://doi.org/10.1016/j.jhealeco.2016.03.003>.

- Heckman, J., L. Robert, and S. Jeffrey. 1999. "The Economics and Econometrics of Active Labour Market Programs." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and David Card, 1865–2097. Amsterdam: Elsevier Science.
- Hirai, M., J. P. Graham, and J. Sandberg. 2016. "Understanding women's decision making power and its link to improved household sanitation: the case of Kenya." *Journal of Water, Sanitation and Hygiene for Development* 6 (1): 151–160. <https://doi.org/10.2166/washdev.2016.128>.
- Holmes, R., and N. Jones. 2013. *Gender and Social Protection in the Developing World. Beyond Mothers and Safety Nets*. London: Zed Books.
- Hulland, K., N. Martin, R. Dreibelbis, J. DeBruicker Valliant, and P. Winch. 2015. *What factors affect sustained adoption of safe water, hygiene and sanitation technologies? A systematic review of literature*. London: EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London.
- Imbens, G., and J. Wooldridge. 2009. "Recent Developments in the Econometrics of Program Evaluation." *Journal of Economic Literature* 47 (1): 5–86.
- JEEViKA. 2019. *Livelihoods and Nutrition : A Women's Empowerment and Convergence Initiative - JEEVIKA*. Bihar: Bihar Rural Livelihoods Promotion Society.
- JMP. "Updated global estimates for WASH in households. Haiti data." WHO/UNICEF. Accessed July 13, 2021. <https://washdata.org/data/household#!/table?geo0=country&geo1=HTI>.
- Kessler, R. C., J. Greif Green, M. J. Gruber, N. A. Sampson, E. Bromet, M. Cuitan, T. A. Furukawa, et al. 2010. "Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) survey initiative." *International Journal of Methods in Psychiatric Research* 19 (S1): 4–22. <https://doi.org/10.1002/mpr.310>.
- Kohlitz, J., N. Carrard, and J. Willetts. 2019. "Support mechanisms to strengthen equality and non-discrimination (EQND) in rural sanitation (Part 2 of 2)." In *Frontiers of CLTS: Innovations and Insights*, 13. Brighton: Institute of Development Studies (IDS).
- Komives, K., V. Foster, J. Halpern, and Q. Wodon. 2005. *Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?*. Washington DC: World Bank.
- Lennon, S. 2011. "Fear and anger: Perceptions of risks related to sexual violence against women linked to water and sanitation in Delhi, India." In *Briefing Note*, Delhi: SHARE (Sanitation and Hygiene Applied Research for Equity) and WaterAid, UK.
- Little, M. T., K. Roelen, B. C. L. Lange, J. I. Steinert, A. R. Yakubovich, L. Cluver, and D. K. Humphreys. 2021. "Effectiveness of cash-plus programmes on early childhood outcomes compared to cash transfers alone: A systematic review and meta-analysis in low- and middle-income countries." *PLOS Medicine* 18 (9): e1003698. <https://doi.org/10.1371/journal.pmed.1003698>.
- MacArthur, J., N. Carrard, and J. Willetts. 2020. "WASH and Gender: a critical review of the literature and implications for gender-transformative WASH research." *Journal of Water, Sanitation and Hygiene for Development* 10 (4): 818–827. <https://doi.org/10.2166/washdev.2020.232>.
- Mahon, T., and M. Fernandes. 2010. "Menstrual hygiene in South Asia: a neglected issue for WASH (water, sanitation and hygiene) programmes." *Gender & Development* 18 (1): 99–113. <https://doi.org/10.1080/13552071003600083>.
- Mara, D., J. Lane, B. Scott, and D. Trouba. 2010. "Sanitation and Health." *PLOS Medicine* 7 (11): e1000363. <https://doi.org/10.1371/journal.pmed.1000363>.
- Myers, J. 2014. "Water, Sanitation and Hygiene Services Beyond 2015: Improving Access and Sustainability." Paper presented at the 38th WEDC International Conference, Loughborough University, UK.
- Myers, J., L. Maule, M. Gnilo, R. Chambers, and S. Cavill. 2017. *Supporting the Least Able Through the CLTS Process. Learning Brief*, CLTS Knowledge Hub. Brighton: Institute of Development Studies (IDS).
- Narzetti, D. A., and R. Cunha Marques. 2020. "Models of Subsidies for Water and Sanitation Services for Vulnerable People in South American Countries: Lessons for Brazil." *Water* 12 (7): 1976.
- Palermo, T. M., E. Valli, G. Ángeles-Tagliaferro, M. de Milliano, C. Adamba, T. Renee Spadafora, and C. Barrington. 2019. "Impact evaluation of a social protection programme paired with fee waivers on enrolment in Ghana's National Health Insurance Scheme." *BMJ Open* 9 (11): e028726. <https://doi.org/10.1136/bmjopen-2018-028726>.
- Quisumbing, A. R., A. Ahmed, D. O. Gilligan, J. Hoddinott, N. Kumar, J. L. Leroy, P. Menon, D. K. Olney, S. Roy, and M. Ruel. 2020. "Randomized controlled trials of multi-sectoral programs: Lessons from development research." *World Development* 127:104822. <https://doi.org/10.1016/j.worlddev.2019.104822>.
- Radin, M., B. Wong, C. McManus, S. Sinha, M. Jeuland, E. Larbi, B. Tuffuor, N. Kofi Biscoff, and D. Whittington. 2020. "Benefits and costs of rural sanitation interventions in Ghana." *Journal of Water, Sanitation and Hygiene for Development* 10 (4): 724–743. <https://doi.org/10.2166/washdev.2020.066>.
- Ray, I., and K. R. Smith. 2021. "Towards safe drinking water and clean cooking for all." *Lancet Global Health* 9 (3): e361–e5. [https://doi.org/10.1016/S2214-109X\(20\)30476-9](https://doi.org/10.1016/S2214-109X(20)30476-9).
- Renzaho, A., S. Chitekwe, W. Chen, S. Rijal, T. Dhakal, I. R. Chikazaza, and P. Dahal. 2018. "Impact of a multidimensional child cash grant programme on water, sanitation and hygiene in Nepal." *Journal of Water, Sanitation and Hygiene for Development* 8 (3): 520–532. <https://doi.org/10.2166/washdev.2018.006>.

- Robinson, A., and M. Gnilo. 2016. "Promoting choice: smart finance for rural sanitation development." In *Sustainable Sanitation for All: Experiences, challenges, and innovations*, edited by P. Bongartz, N. Vernon, and J. Fox, 225–243. Rugby: Practical Action.
- Roelen, K. 2021. "Child-Sensitive Social Protection." In *Handbook on Social Protection Systems*, edited by Schüring Loewe, 368–377. Cheltenham: Edward Elgar Publishing.
- Roelen, K., and S. Devereux. 2018. "Money and the Message: The Role of Training and Coaching in Graduation Programming." *The Journal of Development Studies* 55 (6): 1121–1139.
- Roelen, K., S. Devereux, A. Abdulai, B. Martorano, T. Palermo, and L. P. Ragno. 2017. How to make 'cash plus' work: Linking cash transfers to services and sectors. *Report No: 2017–10*. Florence, Italy.
- Roelen, K., and A. Saha. 2021. "Pathways to stronger futures? The role of social protection in reducing psychological risk factors for child development in Haiti." *World Development* 142:105423. <https://doi.org/10.1016/j.worlddev.2021.105423>.
- Rosenbaum, P., and D. Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika* 70 (1): 41–55.
- Rutstein, S. O., and K. Johnson. 2004. "The DHS Wealth Index." In *DHS Comparative Reports No. 6*, Calverton, Maryland: ORC Macro.
- Sengupta, S., S. Sivanu, and R. Khan. 2023. Synergies in Social Protection and WASH: What should Red Cross and Red Crescent National Societies know? The Hague: Red Cross Red Crescent Climate Centre.
- Sorenson, S. B., C. Morssink, and P. Abril Campos. 2011. "Safe access to safe water in low income countries: Water fetching in current times." *Social Science & Medicine* 72 (9): 1522–1526. <https://doi.org/10.1016/j.socscimed.2011.03.010>.
- UNDP. 2019. Human Development Report 2019. Beyond Income, Beyond Averages, Beyond Today: Inequalities in Human Development in the 21st Century. New York: UNDP.
- UNICEF and WHO. 2020. *State of the World's Sanitation: An urgent call to transform sanitation for better health, environments, economies and societies*. New York: United Nations Children's Fund (UNICEF) and the World Health Organization (WHO).
- UNRISD. 2016. "Sanitation and Social Protection. A Human Rights-Based Approach." In *Issue Brief*, Geneva: UNRISD.
- Venkataramanan, V., J. Crocker, A. Karon, and J. Bartram. 2018. "Community-Led Total Sanitation: A Mixed-Methods Systematic Review of Evidence and Its Quality." *Environmental Health Perspectives* 126 (2). <https://doi.org/10.1289/EHP1965>.
- Waddington, H., and B. Snilstveit. 2009. "Effectiveness and sustainability of water, sanitation, and hygiene interventions in combating diarrhoea." *Journal of Development Effectiveness* 1 (3): 295–335. <https://doi.org/10.1080/19439340903141175>.
- Werlin, S. 2018. *Fonkoze's CLM Program: Its past, its present, and its future*. Port-au-Prince: Fonkoze.
- World Bank. 2018. *Poverty & Equity Brief. Haiti*. Washington DC: World Bank.
- World Bank. 2020. *World Bank Supports COVID-19 Response and Increased Resilience to Health Shocks and Natural Hazards in Haiti*. Port-au-Prince: World Bank.
- World Bank. 2024. "The World Bank in Haiti. Overview." Port-au-Prince: World Bank. Accessed July 31, 2024. <https://www.worldbank.org/en/country/haiti/overview>.

Appendices

Table A1. Differential attrition analysis by demographic characteristic.

	Lost to attrition			Difference (comparison-treatment)	p-value
	Total (N = 213)	Treatment (N = 70)	Comparison (N = 143)		
Living in department 'Centre'	0.488	0.429	0.517	0.089	0.225
Household size	4.723	4.829	4.671	-0.157	0.605
Number of members > 10-years old who work for at least 1-h last week	3.296	3.343	3.273	-0.070	0.686
Woman able to read and write	0.169	0.200	0.154	-0.046	0.401
Spouse able to read and write	0.131	0.143	0.126	-0.017	0.732
Age of the primary female household	30.531	29.629	30.972	1.343	0.424
Traditionally or legally married	0.758	0.800	0.738	-0.062	0.321
Wealth index (quintile)	3.066	2.986	3.105	0.119	0.574
Maternal mental health	11.160	10.457	11.504	1.046	0.073

This table presents the number of observations lost due to attrition in our panel. The initial sample comprised 1,381 respondents, with 631 in the treatment group and 750 in the comparison group. Attrition led to the loss of 213 respondents – 70 from the treatment group and 143 from the comparison group. Consequently, the final panel consists of 1,168 respondents, with 561 in the treatment group and 607 in the comparison group.

Table A2. Attrition analysis per group, by demographic characteristic.

	Treatment-panel (N = 561)	Treatment-lost to attrition (N = 70)	Difference (treatment-treatment lost to attrition)		Comparison – Comparison-lost to attrition (N = 143)		Difference (comparison-comparison lost to attrition)	
				p-value		p-value		p-value
Living in department 'Centre'	0.537	0.429	0.108	0.088	0.458	0.517	-0.059	0.2002
Household size	5.367	4.829	0.539	0.036	4.962	4.671	0.291	0.1103
Number of members > 10-years old who work for at least 1-h last week	3.515	3.343	0.172	0.210	3.150	3.273	-0.123	0.3169
Woman able to read and write	0.096	0.200	-0.104	0.008	0.157	0.154	0.003	0.9372
Spouse able to read and write	0.168	0.143	0.025	0.600	0.153	0.126	0.027	0.4082
Age of the primary female household	34.144	29.629	4.516	0.003	33.916	30.972	2.944	0.0063
Traditionally or legally married	0.829	0.800	0.029	0.554	0.743	0.738	0.005	0.9026
Wealth index (quintile)	2.467	2.986	-0.519	0.003	3.226	3.105	0.121	0.3668
Maternal mental health	10.613	10.457	0.156	0.776	11.366	11.504	-0.138	0.7079

The initial sample comprised 1,381 respondents, with 631 in the treatment group and 750 in the comparison group. Attrition led to the loss of 213 respondents – 70 from the treatment group and 143 from the comparison group. Consequently, the final panel consists of 1,168 respondents, with 561 in the treatment group and 607 in the comparison group.

Table A3. Balancing property of the covariates.

Variable	Status	Mean		% Bias	% Reduction	t-test		p> t
		Treatment	Control			t-statistic	p> t	
Department where respondent lives	Unmatched	4.8628	5.1716	-15.5		-2.63	0.009	
	Matched	4.8628	4.8628	0.0	100.0	-0.00	1.000	
Household size	Unmatched	10.143	11.952	-24.6		-4.17	0.000	
	Matched	10.143	10.141	0.0	99.9	-0.00	0.997	
Household members aged 10 or older who work	Unmatched	1.4838	1.1881	23.8		4.06	0.000	
	Matched	1.4838	1.4874	-0.3	98.8	-0.05	0.964	
Literacy of respondent (Read and write)	Unmatched	0.29242	0.4703	-17.9		-3.02	0.003	
	Matched	0.29242	0.25993	3.3	81.7	0.62	0.533	
Literacy of spouse	Unmatched	0.9639	0.9604	0.2		0.04	0.969	
	Matched	0.9639	0.95307	0.7	-209.2	0.12	0.906	
Age of respondent	Unmatched	34.487	33.972	4.5		0.77	0.444	
	Matched	34.487	34.301	1.6	63.9	0.28	0.783	
Marital status of respondent	Unmatched	2.4657	2.3515	12.2		2.08	0.038	
	Matched	2.4657	2.4856	-2.1	82.6	-0.36	0.717	
Wealth Index	Unmatched	2.5144	3.0891	-41.2		-7.01	0.000	
	Matched	2.5144	2.5451	-2.2	94.7	-0.38	0.702	
Sample	Pseudo R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	% Var
Unmatched	0.053	85.18	0.000	17.5	16.7	55.4*	0.88	38
Matched	0.001	1.03	0.998	1.3	1.2	6.1	1.19	0

The table summarises the balance of covariates between the treatment and control groups before (unmatched, 'U') and after (matched, 'M') matching. Results based on matching using Nearest Neighbour with replacement. The p-value associated with the t-test. A p-value greater than 0.05 suggests no statistically significant difference between the two groups.

Table A4. Estimated effects based on matched sample.

	Improved toilet facilities	Improved sources of drinking water
CLM programme	0.661*** (0.015)	0.023 (0.022)
<i>Household characteristics</i>		
Proportion of ill members	-0.062 (0.044)	0.078* (0.028)
Members under 15 and over 60	0.025 (0.057)	-0.002 (0.019)
Both parents present	-0.148 (0.072)	-0.024 (0.027)
Proportion of children (aged 0-5)	0.059 (0.034)	0.027 (0.117)
Proportion of female in the hh	-0.019 (0.158)	-0.038 (0.040)
Constant	0.259 (0.136)	0.362*** (0.028)
Observations	2,216	2,216
R-squared	0.525	0.007
Number of households	1,108	1,108

Treatment effects are estimated using a panel fixed-effects model with time interactions, clustering standard errors at the commune level to account for potential intra-commune correlation. Robust standard errors, clustered by communities, in parentheses. Asterisks indicate significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table presents results based on the matched sample which contains: 554 households in the treatment group and 554 households in the control group. The matching process uses Nearest Neighbour Matching without replacement.

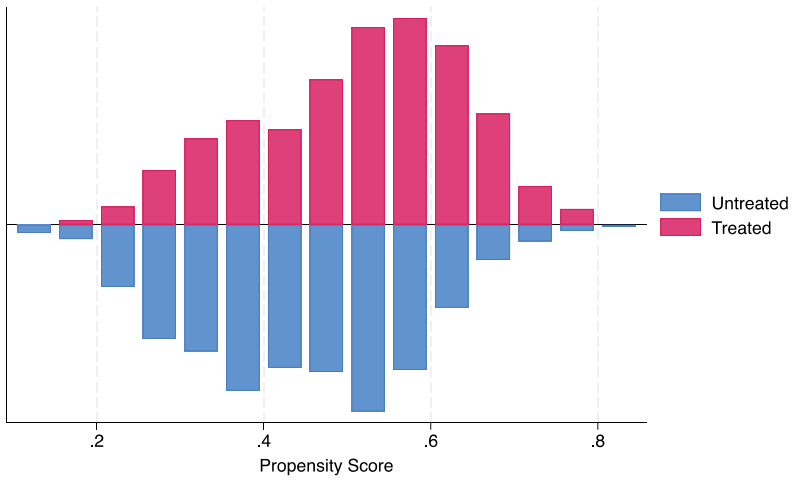


Figure A1. Test of common support: nearest neighbour matching with replacement. This histogram illustrates the distribution of propensity scores for treated and untreated groups. The overlap between the two distributions represents the common support area.

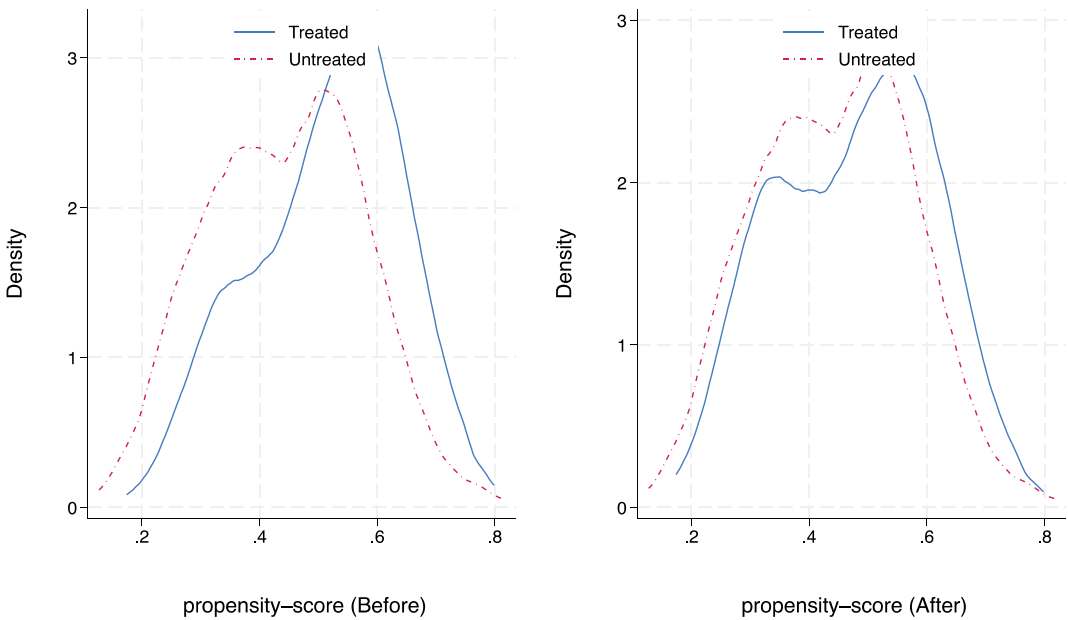


Figure A2. Density of propensity score matching of treated and comparison groups. The blue solid line represents the treated group, and the red dashed line represents the untreated group. The left-hand side panel displays the distribution of propensity scores for the treated and untreated groups before matching; right-hand side panel displays the distribution of propensity scores for the treated and untreated groups after matching.