



Mapping water, sanitation, and hygiene achievements to prosperity, stability, and resilience outcomes

The COVID-19 pandemic brought a renewed focus to water, sanitation, and hygiene (WASH) issues, as it highlighted that there was still substantial work needed to be done in this sector. Though there has been significant progress in understanding the impacts of WASH on human health, less is understood about the broader implications it may have on higher-level development outcomes, such as prosperity, stability, and resilience. Understanding the link between achieving WASH outcomes and higher-level outcomes is needed to better understand the far-reaching impacts of delivering WASH services.

To address this research gap, the International Initiative for Impact Evaluation (3ie) was commissioned by USAID's Bureau for Resilience and Food Security to develop a systematic map. This map went beyond WASH's effects on health to understand the research base that links the achievement of WASH outcomes (improving access to drinking water, improving access to sanitation facilities, and increasing practices of hygiene behaviors) with high-level development outcomes (improved prosperity, increased stability, and enhanced resilience in low- and middle-income countries).

Highlights

- This WASH systematic map is 3ie's first study employing an outcome-to-outcome mapping approach and identifies 279 studies examining the question: are WASH outcomes linked to higher-level development outcomes?
- Among WASH outcomes, we found concentrations of research on *increased access to enhanced drinking water services* and *increased access to sanitation/hygiene facilities, products, or services*. Among high-level outcomes, we found concentrations of research on *education, livelihoods, public perceptions of institutions, women's empowerment, and pollution*. We also found a concentration of research at the intersection of *expansion of enabling environments for menstrual health and hygiene* achievements and *education*, primarily focused on school absence.
- The map reveals research gaps on *increased uptake of safe food-hygiene practices* among WASH outcomes, and on *conflict* and *climate-linked resilience* outcomes among high-level outcomes.
- We identified relatively few impact evaluations and a lack of quality systematic reviews, indicating opportunities for more causal research and high-quality synthesis work.



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Main findings

We identified 279 studies to be included in this map: 211 observational studies, 49 impact evaluations, and 19 systematic reviews. Most of the included studies were published between 2016 and 2021. The study locations spanned 104 low- and middle-income countries, with the greatest number of studies in Kenya, India, and Ethiopia. Gender and socioeconomic status were commonly used by the studies to target participants. Very few studies focused on programming for indigenous people, displaced populations, or disabled populations.

The intermediate WASH outcomes were generally well-represented in the map. Most studies examined the association between access to drinking water or access to sanitation and hygiene and a high-level outcome. We also found that many studies looked at multiple WASH outcomes, and often combined access to drinking water with other WASH aspects. We found a cluster of studies that examined the association between sustainably managing, operating, or maintaining drinking water systems with high-level

outcomes. However, we did not find any medium- or high-quality systematic reviews for this outcome, which indicates an area for future synthesis work.

Most studies examined the association between achieving WASH outcomes and prosperity.

Education, livelihoods, and public perceptions of institutions were the most measured high-level outcomes. However, most of these studies were observational; we found few impact evaluations investigating the causal links between WASH outcomes and these high-level outcomes. Education and livelihoods were frequently included as covariates in observational studies, which could have contributed to the research cluster found in the map. The majority of studies included within the public perceptions of institutions were willingness-to-pay studies. We also did not find very many medium- or high-quality systematic reviews for this topic, which could indicate another area for future synthesis work.

We found research gaps within the safe food hygiene, stability, and resilience domains. Very few studies looked at the association between the uptake of safe food hygiene practices and high-level outcomes. We also found several research gaps within the stability and resilience domains, especially when looking at conflict- or climate-linked outcomes. We did not find any studies that linked WASH outcomes to climate-linked migration, as our inclusion criteria specified that the migration must be linked to climate change.

There is a lack of high-quality synthesis work in this research base. Our critical appraisal rated only one systematic review as high confidence and one systematic review as medium confidence. The remaining systematic reviews were low confidence. This indicates a future area of research where additional high-quality syntheses should be commissioned.

Implications for future WASH programming and research

Overall, we find a moderate and emerging volume of research on the associations between WASH outcomes and accelerating prosperity, building stability, and, to a much lesser extent, enhancing resilience. However, of the 279 studies in the map, less than 18 per cent examine the link between WASH and high-level outcomes within a causal framework.

The findings of this systematic map have the following implications:

- This map is a useful tool for decision-makers, development practitioners, and researchers to consult when designing theories of change, testing links between WASH and other elements of a program's results framework and planning future studies. It facilitates access to a large body of research
- investigating the association of WASH with prosperity and stability outcomes, as well as *pollution* outcomes, within the resilience outcome domain
- The WASH programming community should exercise caution when interpreting the contents of the map, as most research presented is observational rather than causal.¹
- WASH practitioners and researchers should partner to conduct more impact evaluations to explore the causal links between WASH achievements and high-level outcomes. Developing this evidence could bolster the argument for investment in WASH as not only a vital goal in its own right, but also for its effects on other development objectives.
- Researchers can fill primary research gaps by conducting food hygiene studies and examining the links between intermediate WASH outcomes and *conflict- or climate-linked food insecurity, climate-linked economic challenges, climate-linked migration or resilience to climate-linked natural disasters*.
- Researchers should aim to conduct higher-quality systematic reviews on WASH outcome topics, particularly where the map reveals primary research concentrations and corresponding synthesis gaps, such as the effects of *improvements in drinking water systems management* on high-level outcomes or the effect of WASH achievements on *public perceptions of institutions*.



How to read a systematic map

The International Initiative for Impact Evaluation (3ie) presents systematic maps using an interactive online platform that allows users to explore the research base. Bubbles appearing at intersections between intermediate outcomes and high-level outcomes denote

the existence of at least one study or review. The larger the bubble, the greater the volume of research in that cell. The colour of each bubble represents the type of study and, for a systematic review, a confidence rating (as indicated in the legend). In the online version,

hovering over a bubble displays a list of the research for that cell. The links for these studies lead to user-friendly summaries in the 3ie evidence database. Users can filter the research by type, confidence rating (for systematic reviews), region, country, study design and population.

What is a 3ie systematic map?

Systematic maps are tools to help policymakers and researchers working in a sector or thematic area make evidence-informed decisions. They use systematic methods to search and screen the literature to identify studies that answer the selected research questions. For this systematic map, studies are mapped onto a framework of

WASH intermediate outcomes and high-level outcomes pertaining to the advancement of prosperity, stability, and resilience.

We provide a visual display of the volume and type of research identified, an indication of research gaps, and a confidence rating of systematic reviews. The map can be used by development

practitioners and researchers to understand the volume and characteristics of the research on WASH outcomes and their associations to higher-level development goals, and to identify concentrations of studies and gaps that may present promising areas for future research and programming.



Mapping water, sanitation and hygiene achievements to prosperity, stability and resilience: An outcome-to-outcome systematic map

Total unique studies: 279		High-Level Outcomes														
		Prosperity					Stability			Resilience						
WaSH Outcomes		Education	Livelihoods	Women's Empowerment	Benefits to Enterprise	Economic Growth	Public Perception of Institutions	Governance Processes or Services	Conflict	Climate-linked food insecurity	Climate-linked economic challenges	Climate-linked migration	Resilience to climate-linked natural disasters	Pollution		
Drinking Water	Improvement in drinking water systems' sustainability, management, operations, and maintenance	● ●	● ●	● ●	● ●	●	● ●	● ●							●	
	Improvement in water utility consumer relations		●		●	●	● ●	●								
	Improvement in external agencies and local surveillance systems' capacity to provide oversight and regulatory functions of drinking water systems	●	● ●	●	●		● ●	● ●							●	
	Improvement of drinking water quality in drinking water systems	● ●	● ●		●		● ●	● ●							● ●	
	Increased access to enhanced drinking water services	● ●	● ●	● ●	● ●	● ●	● ●	● ●	●	●	●	●	●	●	● ●	
	Increased uptake of safe drinking water management practices by individuals and communities	● ●	● ●	●	●	●	● ●	● ●		●						
Sanitation and Hygiene	Improvement in management and oversight of communal or public sanitation and/or hygiene facilities	● ●	● ●	● ●	●	●	● ●	●							● ●	
	Increased demand for sanitation and/or hygiene products and/or services	● ●	● ●	● ●	● ●	● ●	● ●	● ●	●						● ●	
	Expansion of functioning market(s) for sanitation and/or hygiene products and/or services	●	●		●		● ●	● ●								
	Increased consistent and convenient access to sanitation and/or hygiene facilities, products, and/or services	● ●	● ●	● ●	● ●	● ●	● ●	● ●	●	●	●				● ●	
	Expansion of enabling environments for menstrual health and hygiene (MHH)	● ●	● ●	● ●	● ●		● ●	● ●			●	●			●	
	Increased uptake of hand hygiene practices by individuals and communities	● ●	● ●	● ●	● ●	●	● ●	● ●	●	●	●				●	
	Increased uptake of safe excreta disposal practices by individuals and communities	●	●		●		● ●	● ●			●	●			● ●	
Increased uptake of safe food hygiene practices by individuals and communities	●	●				● ●	● ●							● ●		
Frequently Combined WaSH	Increased access to enhanced drinking water services + improvement in drinking water systems' sustainability, management, operations, and maintenance	●	●	●	●		● ●	● ●	●							
	Increased access to enhanced drinking water services + improvement of drinking water quality in drinking water systems		●	●	●	●	● ●	● ●					●			
	Increased access to enhanced drinking water services + increased consistent and convenient access to sanitation and/or hygiene facilities, products, and/or services	● ●	● ●	● ●	● ●	● ●	● ●	● ●								

● Low confidence reviews ● High confidence reviews ● Medium confidence reviews ● Impact evaluations ● Ongoing evaluations ● Other studies ● No records found



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About this map

This brief is based on *Mapping water, sanitation and hygiene achievements to prosperity, stability, and resilience outcomes*, 3ie Evidence Gap Map Report 18 by Sridevi Prasad, Heather van Buskirk, Carolyn Huang, John Evers, Daniel Frey, Faez Ahmed, Binyang Song, Kristen Marie

Edwards, Jaron Porciello, and Birte Snilstveit. The authors identify, map and describe the research measuring the association between WASH outcomes and high-level development outcomes in prosperity, stability, and resilience. The report describes 46 completed and three

ongoing impact evaluations, 19 systematic reviews, and 211 observational studies mapped on a framework of 14 WASH outcomes and 13 high-level outcomes spanning 104 low- and middle-income countries.

Funder acknowledgment

This brief is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The RFS Evidence Aggregation for Programmatic Approaches (REAPER) Project was

funded through the Comprehensive Initiative on Technology Evaluation (CITE) managed by the Massachusetts Institute of Technology (MIT) with additional support from the Feed the Future Knowledge, Data, Learning and Training (KDLT) activity managed by

Bixal Solutions Incorporated. The contents are the responsibility of the authors from the International Initiative for Impact Evaluation (3ie) and its technical partners and do not necessarily reflect the views of USAID or the United States Government.

Endnotes

¹An observational study at the intersection of a WASH outcome and high-level outcome only indicates that the authors investigated a relationship between the outcomes; it does not indicate whether a relationship was found. The methods used are unable to infer the direction of the relationship or whether the WASH outcome caused the high-level outcome. While impact evaluations and systematic reviews can provide causal evidence, their location in the map does not indicate whether WASH achievements have positive, negative, mixed or no effects on high-level outcomes. The map also does not reveal which types of interventions effectively achieve WASH outcomes. Studies should be consulted individually for details on findings and implementation considerations.



The International Initiative for Impact Evaluation (3ie) develops evidence on how to effectively transform the lives of the poor in low- and middle-income countries. Established in 2008, we offer comprehensive support and a diversity of approaches to achieve development goals by producing, synthesizing and promoting the uptake of impact evaluation evidence. We work closely with governments, foundations, NGOs, development institutions and research organizations to address their decision-making needs. With offices in Washington DC, New Delhi and London and a global network of leading researchers, we offer deep expertise across our extensive menu of evaluation services.

For more information on 3ie's evidence gap maps, contact info@3ieimpact.org or visit our website.

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April 2023