

# Water, sanitation and hygiene (WASH): the evolution of a global health and development sector

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## ABSTRACT

Despite some progress, universal access to safe water, sanitation and hygiene (WASH) by 2030—a remit of Sustainable Development Goal 6—remains a distant prospect in many countries. Policy-makers and implementers of the WASH sector are challenged to track a new path. This research aimed to identify core orienting themes of the sector, as legacies of past processes, which can provide insights for its future. We reviewed global policy, science and programmatic documents and carried out 19 expert interviews to track the evolution of the global WASH sector over seven decades. We situated this evolution in relation to wider trends in global health and development over the same time period.

With transnational flows of concern, expertise and resources from high-income to lower-income countries, the WASH sector evolved over decades of international institutionalisation of health and development with (1) a focus on technologies (technicalisation), (2) a search for generalised solutions (universalisation), (3) attempts to make recipients responsible for environmental health (responsibilisation) and (4) the shaping of programmes around quantifiable outcomes (metricisation). The emergent commitment of the WASH sector to these core themes reflects a pragmatic response in health and development to depoliticise poverty and social inequalities in order to enable action. This leads to questions about what potential solutions have been obscured, a recognition which might be understood as ‘uncomfortable knowledge’—the knowns that have had to be unknown, which resonate with concerns about deep inequalities, shrinking budgets and the gap between what could and has been achieved.

## INTRODUCTION

With less than a decade of the Sustainable Development Goals (SDGs) remaining, the world is not on track to meet SDG 6, and although progress has been made, this has been deeply uneven<sup>1</sup> and universal access to safe water, sanitation and hygiene (WASH) by 2030 remains a distant prospect in the majority of countries.<sup>2</sup> Recent evidence from

## SUMMARY BOX

- ⇒ This study, which positions the water, sanitation and hygiene (WASH) sector itself as an object of analysis, shows how the evolution of this sector has connected to wider trends, forces and imperatives in global health and development.
- ⇒ We identify four key themes that reflect core commitments of the sector, and that have shaped the thrust of action to know, improve and invest in WASH: technicalisation, universalisation, responsibilisation and metricisation.
- ⇒ This analysis is critical for understanding not just the chronology of events but the scaffolding upon which priorities, programmes and practices in the WASH sector have been built, offering insights for reshaping the sector to reach its goals of universal access to safe WASH around the globe.

large randomised controlled trials (RCTs) has called into question the public health benefits of some low-cost WASH interventions deployed today.<sup>3–7</sup> Disillusionment with the impact, sustainability and equity of investments in WASH—together with interrelated challenges grouped under the planetary health framework, such as climate change, urbanisation and concerns over power dynamics written into global health<sup>8</sup>—has put pressure on those working in the sector to revisit its direction.<sup>9 10</sup> Calls have arisen for WASH to transform<sup>9 10</sup>; to expand beyond technical-focused approaches and bring people and politics to the heart of climate-resilient water and sanitation for all<sup>11</sup>; to incorporate intersectional and gendered approaches to vulnerability into research and practice<sup>12–14</sup> and to decolonise the sector.<sup>15 16</sup> Understanding the factors that have shaped WASH and its priorities, principles, technologies and practices to date can support the transformation of the sector.

Much can already be learnt from scholarship on the history of WASH efforts in different settings around the world,<sup>17</sup> with a focus on, for example, urban sanitation planning<sup>18</sup>; international water politics and development discourses<sup>19–21</sup>; how thinking around water evolved between 1978 and 1998<sup>22</sup>; ‘The Water Decade’<sup>23</sup>; lending in the rural water sector<sup>24</sup>; hygiene and sanitation software<sup>25</sup>; monitoring and evaluation (M&E)<sup>26–28</sup>; cost-effectiveness and quantification at the World Bank<sup>29</sup>; the role of the Joint Monitoring Programme (JMP) for drinking water, sanitation and hygiene<sup>30</sup> and gendered water access, health and participation.<sup>12 14</sup> Extending beyond these analyses to link the evolution of WASH as a sector to wider trends, forces and imperatives in global health and development is critical not just for understanding the chronology of events but to render visible the scaffolding upon which priorities, programmes and practices have been built.

Historical, philosophical and anthropological studies have fruitfully examined the emergence of particular modes of thinking and doing in health<sup>31 32</sup> as well as water.<sup>33</sup> Analysis of discourses, including Foucault’s approach to charting genealogies of particular constructs as dominant discursive objects, is one route to this. Here, discourses do not merely represent and designate things; they are practices that emerge from specific historical conditions. They both name, and systematically form, the objects of which they speak. Such objects—in our case the ‘WASH sector’—emerge in relation to ‘institutions, economic and social processes, behavioural patterns, systems of norms, techniques, types of classification, modes of characterisation’<sup>34</sup> (p. 45). Thus, a genealogical approach here traces the ways in which the WASH sector has been brought into being through these relations that will have privileged certain ways of knowing and practising over others. In this paper, we look back on more than seven decades of pragmatic, academic and policy activity on WASH to describe how the sector evolved. We retrieve key ideas, practices and ideologies that shaped this evolution since the institutionalisation of international health and the birth of development in the mid-1940s.<sup>35</sup> We identify four interrelated themes that have—often implicitly—come to define the parameters and operation of the WASH sector. Each theme reflects and exemplifies broader trends in global health and development while each sector has also followed its own distinctive trajectory. We argue that these commitments have served to parse the ‘uncomfortable knowledge’ (the unknown knows)<sup>36</sup> that those working in this field sit with, compelled to achieve progress through depoliticised ‘solutions’. By revisiting the WASH sector through its evolution, this paper hopes to contribute to the reorientation of the sector’s future.<sup>10</sup>

### Situating the evolution of WASH

This research aimed to identify core orienting themes of the WASH sector, as legacies of past processes, that can provide insights for future WASH. We combined

### Box 1 UN Sustainable Development Goal (SDG) 6 to ‘ensure access to clean water and sanitation for all by 2030’

#### 6 ‘outcome-oriented targets’

Target 6.1 and 6.2 specifically pertain to water, sanitation and hygiene

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

6.3 Improve water quality, wastewater treatment and safe reuse.

6.4 Increase water-use efficiency and ensure freshwater supplies.

6.5 Implement integrated water-resource management.

6.6 Protect and restore water-related ecosystems.

The two ‘means of achieving’ targets

6.A By 2030, expand international cooperation and capacity-building support to developing countries in water-related and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

6.B Support and strengthen the participation of local communities in improving water and sanitation management.

documentary analysis with expert interviews to explore how the WASH sector has been shaped over the past 70 years by both internal changes in the sector and the external forces of the global political economy and development apparatus, and how in turn this has impacted on national agendas. Our genealogical approach treats WASH as a global object—a ‘sector’—that is not fixed, but is being continually remade through global practices and imperatives. It traces the emergence and evolution of WASH primarily in relation to public health and development sphere where it was activated by linking WASH (formerly ‘health’) up to the advent of SDG 6 and the present day (SDG 6, see [box 1](#)). The fusion of water, sanitation and hygiene as WASH may now appear inevitable, yet our intention was, through historical excavation, to reveal contingent forces that have influenced the assembling and stabilising of these relationships.

The documentary analysis was based on policy, scientific and programmatic materials that documented the development and evolution of the WASH sector including academic literature, policy documents, conference proceedings and a range of other media in the public domain. These materials were identified using online searches and snowballing methods from existing citation lists and expert recommendations. We searched the Web of Knowledge/Science databases, Google Scholar and Google using combinations of the following key terms: “safe (drinking) water”, “sanitation”, “health”, “hygiene”, “history”, “WASH”, “Millennium Development Goals”, “MDGs”, “Sustainable Development Goals”, “SDGs”, “monitoring & evaluation”, “M&E”, “Joint Monitoring Program”, “JMP”, “environmental engineering”/ sanitation”, “appropriate/ low-cost technologies”, “human

rights” and “gender”. We included (a) materials that directly discussed the challenge of water, sanitation and/or health/ hygiene in the context of low resources and (b) materials which enabled analysis of the context in which these materials emerged. In all, we included 58 reports, declarations and papers in the analysis.

We approached experts with at least two decades of practical and/or policy experience related to WASH to participate in interviews, to elicit oral histories and to gain insights into their perspectives on the key principles, arguments and trajectory of the sector. Starting with recommendations from those involved in the Lancet WASH Commission, we snowballed from these informants to identify potential participants from different organisations and countries with a range of background expertise and experience. With written informed consent, we carried out 19 expert interviews with individuals who have longstanding experience within or adjacent to the sector (see online supplemental table 1, for an overview of background and expertise of informants and interview guide). We consulted documents written in English and WASH experts who spoke English. To safeguard the anonymity of research participants, who were easily identifiable experts in the sector, full interview transcripts were only accessible to the core study team members carrying out primary analysis.

Analysis was iterative. We assembled documents of significance in a shareable timeline online (in Padlet), which respondents and the coauthor group could review and add to. Analysis of these 58 documents aimed to identify the driving principles, imperatives and arguments made over the last seven decades as the WASH sector has emerged as an entity. For example, we sought out statements that made the case for particular responses and traced how these evolved over time. We situated this WASH-specific documentary analysis in relation to wider trends in global health and development over the same time period, although WASH did not always follow exactly the same trends, to provide context to the themes that appeared to be driving the sector. We reviewed the transcripts of each expert interview line by line to develop an understanding of individual perspectives, experiences and reasoning. We then drew together common ideas across respondents about junctures, achievements, disagreements and challenges over time and identified divergent views. These ideas were then grouped together into themes by drawing them into conversation with the documentary analysis as well wider literature on health and development over this time period. The higher-order themes were solidified by moving between the interview and documentary materials to identify core tenets of the sector and by testing our interim interpretations with our respondents and wider collaborator groups, taking care to capture and accommodate the diversity of strands of thinking across respondents and materials.

Drawing on historical and anthropological approaches, this research does not attempt to provide a single definitive narrative of the WASH sector. Different scholars

might identify different sources, for example in other languages, and might engage differently with interviewees, to produce a different telling of the evolution of this sector. The lack of diversity—and the particularly Global Northern and male representation—among our group of interviewees is also telling. These were the ‘obvious’ experts we were signposted to, often by multiple sources. A narrative of the history of the WASH sector from another angle—such as from a recipient lens—would provide insights of a different nature. However, the commitment in our analysis is not only to report what was said as facts but to interpret this within wider understanding of how such knowledge and expertise is created and naturalised. Our analysis thus takes the positionality of our respondents and the positioning of the documents analysed as part of the data. Thus, while the particular ‘decades’, for example, might be labelled or identified otherwise, the underlying tenets of the themes we believe would be recognisable across spaces touched by the WASH sector, whether these are more or less readily articulated within particular ways of knowing and practising WASH.

### The co-construction of WASH

Constituted by a variety of different stakeholders, including national and international non-governmental organisations (INGOs), multilateral (aid) organisations, private enterprises and governments, the WASH sector has a coherent presence on the global health and development stage. This analysis focuses on the health-specific assemblage of WASH. A recent global assessment reports that 94% of countries have national policies for drinking water and sanitation, and 79% have policies for hygiene, yet a large majority of countries lack the human resources needed to implement national WASH plans.<sup>37</sup> WASH sector constituents share an overall goal to increase access to safe WASH, and thereby reduce the burden of disease from exposure to microbial and chemical contaminants in water sources or transmission routes such as hands and food. The sector’s efforts have focused—with emphasis shifting over time—on infrastructural, technological and behavioural solutions that deliver measurable health impacts, notably in high-burden settings among children under 5 and other susceptible populations. Unpacking these efforts and emphases through our interviews and the wider literature on WASH, we build a picture of the discursive regimes of successive periods of health-and-development practice that shaped the sector, identifying four interconnected themes (box 2, figure 1): technicalisation, universalisation, responsabilisation and metricisation.

The commitments characterised in the four themes emerged in succession but have continued to coexist, although with (dis)continuities, as illustrated in figure 2. We observed the emergence of a shared understanding of WASH as a human development and disease control issue to be solved through science, technologies and cost–benefit justification. As WASH evolved within the

## Box 2 Key themes characterising the assemblage of wash as a health and development sector

- ⇒ **Technicalisation:** water, sanitation and hygiene (WASH) developed in parallel with other health and development issues of focus in the 20th century that can be characterised as problems solvable through science, technologies and economic justification. This theme has been a key driving force and overlaps with all other trends in the evolution of WASH.
- ⇒ **Universalisation:** The evolution of WASH was shaped by the development sector's drive for universal solutions that can be deployed through travelling blueprints of infrastructure, aid and assistance.
- ⇒ **Responsibilisation:** With the rise of new multilateral and non-state actors, around the 1980s, the WASH sector joined the wider health and development communities to emphasise participation and empowerment, moves which increasingly morphed into a passing-on of responsibility to those least able to act, informing rationales for behaviour change solutions and user-fees for basic services.
- ⇒ **Metricisation:** Across health and development fields, metrics—including in WASH—have gained power beyond understanding the scale of problems and performance of interventions. Since the Millennium Development Goals, evidence-based international health programming has seen metrics define the parameters and nature of problems, being trained on aspects that are solvable and evaluable through forms of measurement, monitoring and auditing under a rubric of aid efficiency (cost-effectiveness, value for money), good governance (accountability) and good science (evidence).

shifting landscape of international development paradigms and ideas of global health (depicted in the upper part of [figure 2](#)), with disease prioritisation changing over time,<sup>38</sup> we observed the importance of scientific and technological developments—comprising expertise, practices, systems, devices and materials—as well as the rise of behavioural and social marketing approaches, as dominant models of national policy, technical assistance and aid.<sup>39</sup> Thus, each theme describes a vehicle for pragmatic attention and action within given parameters. Below, the themes are drawn out in broad chronology while recognising connections and continuities.

The timeline in [figure 2](#) begins a century before our period of focus; origin stories of the global WASH sector can be traced back to the mid-19th century European ideas about disease control and water. Hungarian physician Semmelweis was a pioneer of hand washing, having mandated in 1847 the practice of washing hands with chlorinated lime to reduce infections in the maternity clinic where he worked.<sup>40</sup> During the 1848 and 1854 cholera outbreaks in London, physician John Snow demonstrated that the source of exposure was the water supply, which challenged the prevailing miasma theory of disease transmission. The eventual acceptance of this theory of transmission largely influenced the belief that water quality was the most important aspect in controlling specific disease outbreaks.<sup>41</sup> And, with the hitherto rare cholera outbreaks emerging via the increased world commerce through steamships and railroad technology, the mid-19th century also saw the start of International Sanitary Conferences to modernise and standardise

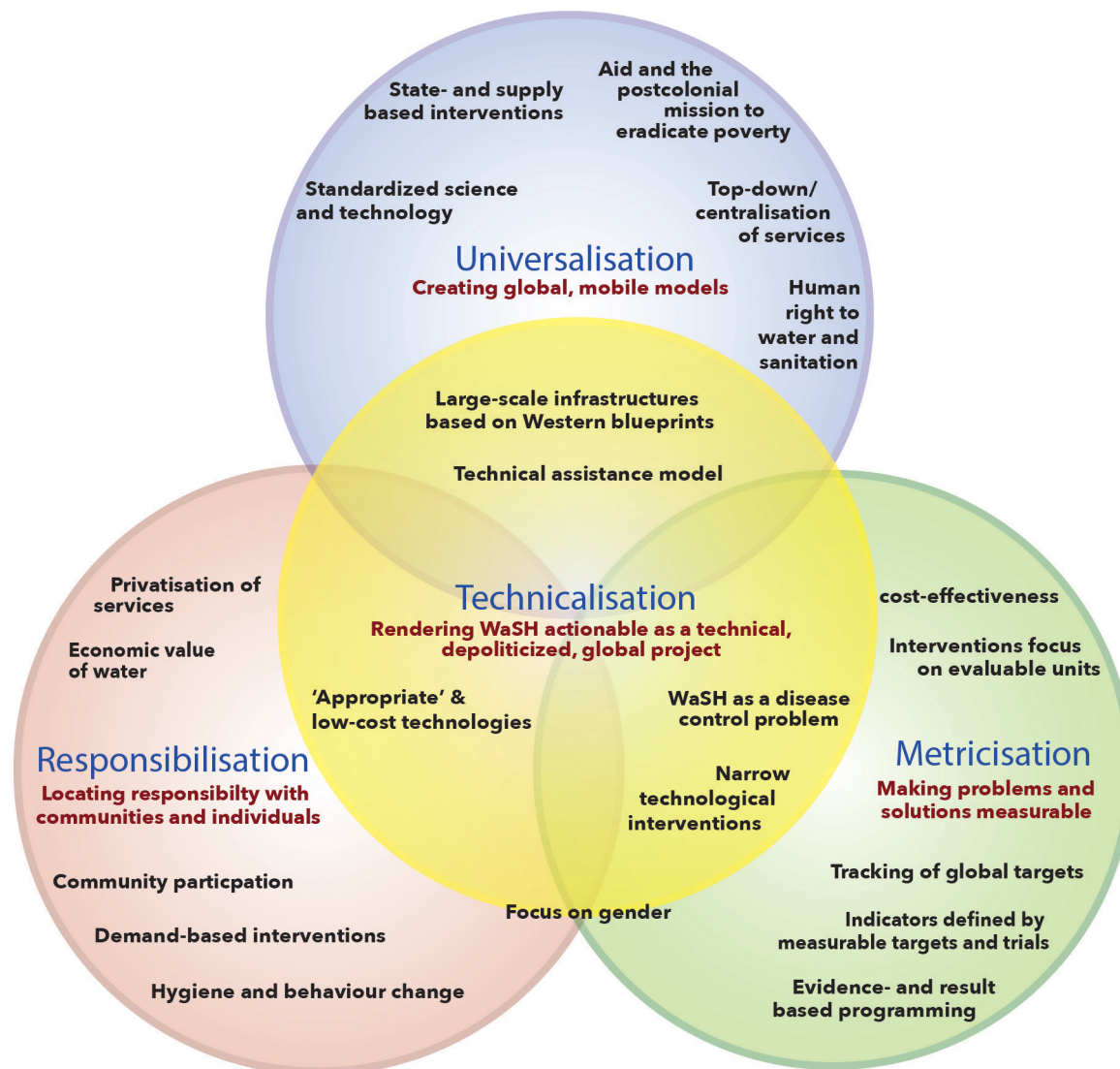
quarantine and other border health controls, initially between Western Europe and 'the East'.<sup>42</sup> However, while a level of coordination and international regulation was sought, the framework through which the field recognisable as the WASH sector could come into being did not exist until the post-World War II period of reconstruction.

### Technicalisation: creating the need for WASH through technical disease control

Technicalisation here refers to the ways in which WASH was rendered actionable as a technical global project. As a process, it included the ways that visions of progress and development become entangled with the solutions produced by science and technology<sup>43</sup> even when those solutions came to then reshape the problem as it became known,<sup>44</sup> enabling a technical solution-led view.<sup>45</sup> The technical focus also reflected an orientation towards solutions that are discrete, mobile forms<sup>46</sup> that are often technological—but may also be social<sup>47</sup>—and lend themselves to commoditisation. A technical identity of health and development solutions also enabled problems to be framed and acted on beyond the political sphere, thus depoliticising the nature of the problem.<sup>48</sup>

Early work in the field of environmental engineering focused almost exclusively on water supply for municipalities, with a focus on ensuring the quality of this water rather than quantity. One of the first comprehensive studies of water, human health and excreta disposal in a rural context relevant to tropical climates was a WHO monograph by public health engineers Wagner and Lanoix in 1958.<sup>49</sup> The authors perceived 'proper excreta disposal' to be 'among the most pressing public health issues' (p. 9); a finding that has been endorsed by public health studies until today.<sup>25 50</sup> The problem of faecal oral transmission was described in their F-diagram (see [figure 3](#)) and has influenced how environmental and sanitary engineering solutions are imagined and still taught at global health institutions as a 'total system', sometimes adapted with additional elements such as animal faeces.<sup>51</sup> The technical objective of WASH as a health project, as the F-diagram shows, is to break the transmission routes by which diarrhoeagenic pathogens pass from infected individuals to new hosts.<sup>49</sup>

The significant 1970s study, *Drawers of Water*, by White and Bradley<sup>52</sup> and related research,<sup>53–55</sup> framed water and sanitation in a new way. This included the classification of water-related disease by transmission route, rather than on the taxonomic or clinical characteristics of the pathogens as was common in preceding medical texts.<sup>56</sup> The book also highlighted the importance of health outcomes of increasing the quantity of, and access to, water, beyond a focus on microbiological quality.<sup>52 57–61</sup> The framings here enabled solution-oriented engineers to tailor their interventions to maximise health benefits.<sup>62</sup> The insight that some faecal-oral diseases are 'water-washed' (which refers to transmission by lack of water for appropriate washing) rather than waterborne and have multiple transmission routes, paved the way for an interest in the study



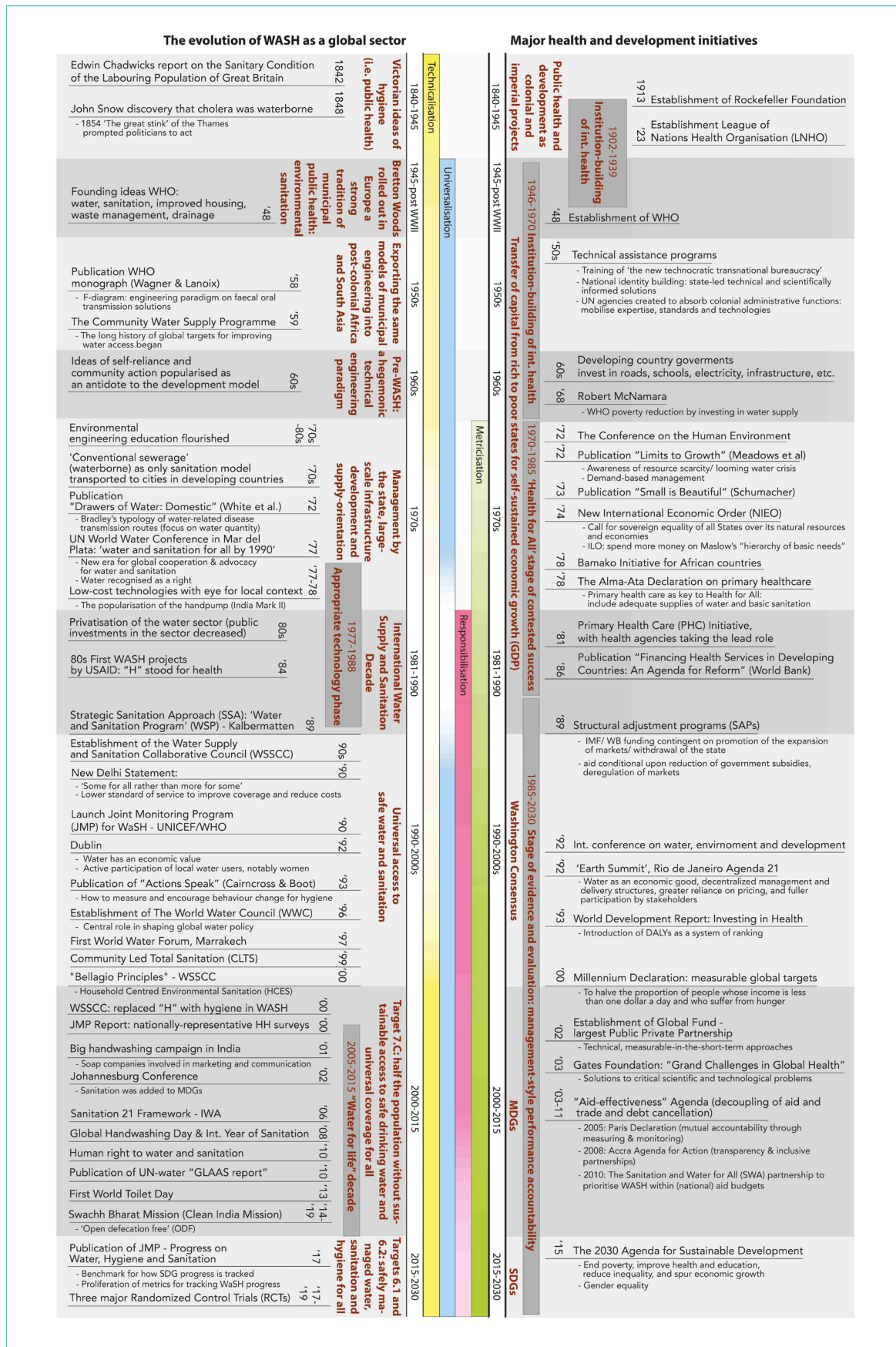
**Figure 1** WASH as a global assemblage: themes and examples. WASH, water, sanitation and hygiene.

of hygiene behaviour.<sup>50 63</sup> The view that ‘clean water’ is an important precondition for diarrhoeal disease control persists among many engineers today (respondent #9).<sup>64 65</sup> Nonetheless, such scientific findings on disease transmission, vectors, micro-organisms and pathogens paved the way for a paradigm on water, sanitation and health (‘H’ initially stood for Health).<sup>24</sup>

Technical approaches to disease control may involve a narrow focus on a technological object, like a hand pump or pit latrine. They can also include practices that Foucault described as technologies of power and of the self, that shape and constrain how individuals conduct themselves in society and with respect to their own bodies and thoughts.<sup>47</sup> (p17-18) These include ways of doing, classifying and policing that become common-sensical within a particular paradigm. Ultimately, the assemblage that was to emerge as WASH was laying its roots in an awareness that (1) hygienic management and disposal of human waste were crucial to control associated infectious diseases and (2) developing countries were plagued with endemic diarrhoea occurrence, high levels of faecal

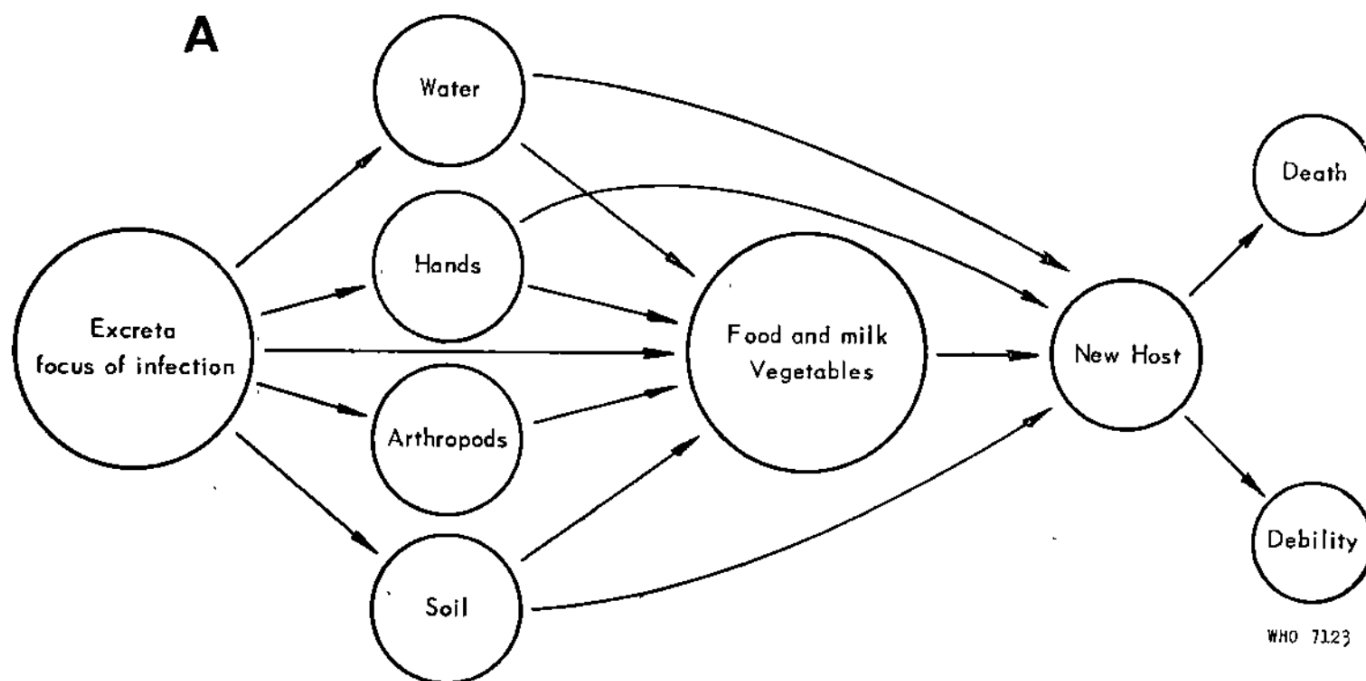
contamination in water, the ‘unsanitary habits’ of local populations, and a lack of resources for public health. These concepts incentivised health planners and economists to explore the roles of water supply and sanitation as a means to control diarrhoeal disease<sup>65 66</sup>; these behavioural principles continue to shape the field today even if the disease picture has changed, for example in the burden of diarrhoea.<sup>67</sup>

The framing of WASH challenges in technical terms became not only a ‘self-evident’ solution to a problem but also a depoliticising device that reposed political questions—related to power dimensions, poverty and deeply unequal control over resources and rights—as amenable to technical interventions.<sup>48</sup> An example is the widespread political support that was eventually galvanised for oral rehydration techniques (ORT) by the 1980s under the auspices of a ‘magic bullet’, after initial challenges by the medical profession. Although designed to manage acute diarrhoea, ORT became embraced by bilateral agencies as a solution to diarrhoea and dehydration in general in the developing world. Thus, in providing a remedy for



**Figure 2** Timeline of key shifts in orientations in the WASH sector. MDG, Millennium Development Goal; SDG, Sustainable Development Goal; WASH, water, sanitation and hygiene; GDP, gross domestic product, the monetary value of the output produced in a country in a given period of time.

## CHANNELS OF TRANSMISSION OF DISEASE FROM EXCRETA



**Figure 3** F-diagram—faecal oral transmission of pathogens and main ways to break the transmission route.

diseases caused by unsafe water and sanitation conditions, ORT allowed public attention to be deflected from the political and economic causes of these conditions.<sup>68–70</sup> This practice of ‘rendering technical’ is not unique to WASH but has been characteristic of the wider field of development cooperation and the post-war period in public health until today.<sup>32 70</sup> Rendering technical is not neutral as it ‘both limits and shapes what improvement becomes’.<sup>71</sup> (p7-8) It has a long history of association with modernity’s narrative of progress and technical solutions became increasingly linked with commercial and industrial interests.<sup>72</sup> Such technicalisation can have the, perhaps inadvertent, result of obscuring the social and political structures that underlie poverty and inequality and that have been produced historically within and across nations.<sup>11</sup>

#### Universalisation: infrastructures based on Western blueprints

We use the term universalisation here to refer to the emergence of solutions imagined to be all-encompassing as well as globally mobile.<sup>73</sup> A precondition for the wide circulation of scientific ideas and technologies to the ‘Third World’ was the success, institutionalisation and professionalisation of international health as a field.<sup>32</sup> The post-World War II period in a broken Europe keen to reconstruct, including through transferable technology, fostered ideas of progress on sanitary transformation and municipal services. The establishment of the WHO in 1948 was linked to a development ideology in which health efforts were entangled with political influence in ‘underdeveloped’ countries, including those colonised at the time, and related to larger Cold War struggles.<sup>32</sup>

By the 1960s, attention in the WHO had turned to the need for basic health services—water, sanitation, improved housing, waste management, drainage.<sup>42</sup> The International Bank of Reconstructive Development (now the World Bank) in particular envisaged the universal transfer of the models of municipal engineering that were designed in Europe and the USA to Africa and South Asia.<sup>74</sup> Soviet expansion after the Cold War involved the training-up by the USSR of Africans from recently independent countries in a range of medical and technical capabilities, including engineering for infrastructural development.<sup>75</sup>

The origins of WASH as a funded global sector were thus rooted in a universalised orientation, driven in part by the desire to alleviate poverty and by the Great Powers (re)building their spheres of influence. By the 1970s, public management by the state, large-scale infrastructure development and supply orientation dominated water policy internationally.<sup>20</sup> (p137) Influential actors like the World Bank focused on funding large urban, top-down, wastewater treatment and piped water supplies.<sup>24</sup> (p42) Environmental engineering education flourished in the 1970s and 1980s in Europe and the USA and focused to a great extent on the challenges and solutions applicable in Western societies, a curriculum that was also followed in the South, benefiting both engineering firms and WASH consultants.<sup>62</sup> The attraction of such capital investment was not met with support for operation and maintenance, which fell to local communities (respondent #12). It was not until the 1980s that a growing body of scientific studies began to acknowledge

that challenges in developing countries were often of a different nature than the promoted technologies were designed for.<sup>53</sup> This period saw increased efforts to standardise and improve hand pumps, latrines and other technologies for WASH for community management.<sup>24</sup>

Through the 1970s, the limitations of development models reliant on the transfer of technologies and resources to the developing world, which had little impact on poverty eradication, became increasingly apparent. In water and sanitation it was clear that low-income groups were often excluded from standard service delivery because piped water and sewerage systems—the standard Western model—were mainly extended to urban elites and were beyond the reach of periurban and rural communities.<sup>22 74</sup> Self-reliance and community participation emerged as alternative models and ideas for redress were discussed during the manifold international conferences that further solidified the sector.<sup>22</sup> (p6) The publication of *Limits to Growth* in 1972<sup>76</sup> heralded the environmental consciousness of a looming water crisis and the need for more efficient local uses of water. The emphasis on the local also contributed to a shift towards community-level engagement, which became a stepping stone towards what was eventually called demand-based management.<sup>20</sup> (p138)

The global coordination of WASH became centralised through UN agencies. INGOs also emerged at this time, with perhaps the largest INGO focused exclusively on WASH, WaterAid, created by a grant from the UK water industry with a mandate to expand access to safe drinking water globally. The Water Decade (IDWSSD, see below) of the 1980s was later followed by the Water for Life decade from 2005 to 2015 along with the Millennium Development Goals (MDGs) from 2000 to 2015, and subsequently the SDGs from 2015 to 2030. From the early 1990s, the World Bank, the United Nations Development Program and UNICEF—together with some research and development banks with large investment profiles—emerged as key players in the delivery of water.<sup>29</sup> (p18) while the WHO maintained a key normative role throughout this period. Since the 1977 Mar del Plata UN Water conference, the idea of water as a human right gained traction, with a UN General Assembly Resolution in 2010 recognising the universal right to water and sanitation.

While blueprints for universal physical infrastructure lost dominance over the decades, the WASH sector, especially in urban contexts, nonetheless evolved with standardised models of development that did little to challenge unequal relations between a Western ‘core’ and developing country ‘periphery.’<sup>77</sup> This involved mobilising guidelines, toolkits and monitoring apparatus—increasingly adaptable with the rise of community participation. The ties to these discourses and intentions meant that WASH became naturalised as a developing countries issue; water quality research and regulations continued in

high-income countries but remained largely separate from the global WASH agenda. While WASH became a developing country issue, with the centralisation of WASH and the emergence of powerful international players, the forms of knowledge production often emanated from the Global North.

### **Responsibilisation: privatisation, community participation and behaviour change**

We identify responsibilisation as a process through which responsibility to tackle the need for WASH shifted towards end-users who have limited resources to take on this responsibility. It reflects a form of biopolitics of self-care and self-improvement<sup>47</sup> associated with Western neoliberalism, which imagines individuals as autonomous, entrepreneurial and free to choose.<sup>78</sup> While not the original intention of participatory movements, this logic came to underpin their successor, behaviour change. Responsibilisation can also be seen in the shifts to pay-for-service models and the incorporation of private-for-profit entities as service providers.<sup>79</sup> Although participation and privatisation had their roots in opposing ideologies and are two different processes, as we describe below, they ultimately reinforced the trend towards holding responsible for WASH those who had limited ability to bear this responsibility.

### **The Water Decade: towards ‘water and sanitation for all’ by 1990**

The Mar del Plata Declaration in 1977 adopted the UN International Drinking Water Supply and Sanitation Decade (IDWSSD 1981–1990) with the ambitious goal to achieve ‘water and sanitation for all by 1990.’<sup>80</sup> The Decade’s focus on health, alongside water as a scarce environmental resource, affected technology choice.<sup>23</sup> (p1934) It was acknowledged that to increase coverage, lower levels of service were necessary in much of the world, and that too narrow a focus on technology would not solve the world’s sanitation problems.<sup>81</sup> (p224). While the goal of universal access was unattainable by most (low-income) countries, it arguably lent political weight and funding to international assistance, which was now open to the view that radically different, low-cost technologies could be needed.<sup>22</sup> (p6) Schumacher had already coined the ‘Small-is-Beautiful’ idea that ‘intermediate’ or ‘appropriate technologies’ needed to be much more sensitive to local contexts than the earlier capital-intensive technologies.<sup>82</sup> (At the Mar del Plata Conference, Schumacher originally proposed the phrase ‘appropriate use of technologies’, which was subsequently erased from the Declaration to his great dismay (respondent #4.)) Emerging alongside the primary healthcare movement, the Decade’s solution was to shift the focus from the existing supply-driven orientation and questions around ‘hardware’ to demand-driven approaches and issues around ‘software’, including health education, the



question of motivating people, and training and organising to instal and maintain facilities.<sup>41</sup> (p2)

A major challenge for reform efforts in the sector has been how to finance the creation and maintenance of infrastructure. Here, we outline the three key elements that reflect the gradual shift towards demand-led management, holding citizens and communities responsible for WASH services and reducing the influence of cash-strapped states: privatisation, community participation and behaviour change approaches.

### Privatisation

Despite the Water Decade's ambitious goals, investment in the sector under Structural Adjustment Programmes (SAPs) actually decreased.<sup>29</sup> Water-sector reforms gained pace in low-income countries during the Thatcher-Reagan era.<sup>83</sup> The Washington Consensus (1989) and SAPs imposed on low-income countries made aid conditional on, inter alia, private sector involvement, the reduction of state expenses and subsidies, the deregulation of markets and the securing of private property rights.<sup>84</sup> The Dublin Conference (1992) was a milestone for the privatisation of the sector when the economic value of water was recognised (Dublin Principle 4<sup>85</sup>). Economists observed that poor people are in fact willing to pay for water, leading to higher user fees and a move towards privatisation.<sup>86</sup> We distinguish here between two forms of privatisation: (1) the transfer of services from public to private control, including hybrid engagements; and (2) the rise of private entities and their repositioning as legitimate development and public health actors post-2000 (eg, soap producing multinationals, see section on behaviour change). Increased private sector participation was seen as an important element in achieving public health benefits.<sup>87 88</sup> In the wake of the slow state-led expansion of WASH services, it was argued that the market could deliver greater efficiency in the management of water resources; and that water user involvement would automatically result in improved efficiency and equity (a shift from being 'beneficiaries' to 'customers'). This was seen as a way to bear the costs of infrastructure and services, accelerated the move towards participatory approaches, especially in rural areas (notably targeting women) and promoted demand-based management overall.<sup>20 89</sup>

Although it was recognised that some costs may need to be passed to consumers, for running and repairs, private sector participation often led to rising prices.<sup>90</sup> These were challenged, for example, through the argument for the right to water, highlighted in the Cochabamba Water Wars of 1999–2000 when violence erupted in the face of rising water prices following privatisation of Bolivian water services as part of an agreement with the World Bank.<sup>91</sup> In 2003, The Camdessus Report supported the diversification of funding sources including aid, loans, markets and tariffs, to overcome the global deficits in water provision.<sup>92</sup> However, the large investments expected to flow from the private sector never materialised<sup>64 93</sup> and neither did the promises of privatisation.<sup>88 94</sup> In sub-Saharan

Africa, the impact of privatisation has been most acutely felt by the poorest for whom access to water and sanitation has remained low or worsened.<sup>95</sup>

### Participation's populist guise: the move towards responsabilisation

The decade's most radical shift called for a new approach to water sector development away from governments towards community participation, management and financing.<sup>85 96</sup> In part the shift reflected disillusionment with state-led water systems that had failed to reach large numbers of the rural poor and had done little to increase water access for the rural poor. This move was a challenge for politicians in low-resource settings for whom water had been an important patronage tool, and where structures were not in place at the grassroots level for supporting such goals, making genuine hand-over of ownership to local communities challenging. Moreover, many communities had difficulty identifying their needs because they were not in a position to formulate the problem, and thus 'were left with the ominous task of becoming masters and guardians of their universe.'<sup>23</sup> (p1932) The movement of community participation shared a common root with the popular idea of 'empowerment' in the 1970s and was also aligned with the primary healthcare movement during the 1980s and 1990s. Increasingly, however, the participation movement became underpinned by a neoliberal political ideology, becoming more an instrument to achieve local contributions to service-delivery costs than a tool of community autonomy.<sup>20</sup> (p180) Thus, the move to signal demand and target investments to communities with the greatest need<sup>97</sup> subtly shifted towards 'individualisation' and 'responsibilisation' of local communities, explicitly diminishing the role of the state in service provision. Instead of institutionalising actual political participation and including the grassroots in decision-making, participation was often cited as a guise for the large-scale removal of state control and state regulation, and for the introduction of market mechanisms supplanting public sector responsibility.<sup>24 98 99</sup>

The shifting responsibility towards community under the 'participatory' agenda is closely related to the gender and WASH agenda, which, since The Dublin Principles (principle 3, UN 1992), encouraged women to become active participants in water management. Community responsibility often devolved to women's groups and mothers' groups who carried out the (usually unpaid) work of mobilising resources, maintaining water systems and ensuring consistent safe water practices. This trend received some pushback about the essentialising effects of such discourses that, instead of liberating women and giving them more control and autonomy, placed ever-greater burdens on their workload.<sup>14 100 101</sup> Moreover, low-cost technologies and the commodification of water indirectly benefited from the unpaid and undervalued labour of women, who could be further marginalised if they did not control the household budget through gendered patterns of care and domesticity.<sup>102</sup>

## Hygiene and behaviour change

Another manifestation of responsabilisation occurred in the early 1990s when epidemiological approaches began to inform the study of human ‘hygiene behaviour’, including household water treatment,<sup>103</sup> as a factor to overcome WASH-related disease transmission. Premised on the idea that governments cannot give access to safe supply of drinking water in the short to medium term, the social marketing of hygiene unfolded as a motivation to poor people in low-income countries to change their sanitation behaviour. Large scale hygiene programmes were initiated to encourage alignment with epidemiological findings (eg, wash hands with soap and safely dispose of stool). The notion that improved health required behaviour change solidified, with efforts channelled into measuring the influence of behaviour change on health (respondent #9).<sup>50 104–106</sup> The domination of diarrhoeal metrics as primary goals of WASH obscured smaller-scale narratives of the value of hygiene for dignity or development in general, which were to become more of a focus in later efforts to incorporate menstruation management into sanitation and hygiene frameworks.<sup>107</sup>

In the late 1990s, consumer studies highlighted the complexity of hygiene behaviour and concluded that ‘simply’ teaching people about health was not going to alter behaviour. Instead, it was argued that positive images and population-scale marketing that motivated consumer behaviour (through emotional drivers) were needed.<sup>108</sup> These studies saw an expanded role for the soap industry when public–private partnerships emerged to become involved in marketing and communication to promote handwashing and sell soap. As the market for soap products displayed stagnant growth in developed economies, multinationals saw new opportunities in developing countries to ‘cater for the needs of the poor.’<sup>109</sup> (p9) The rise of private entities combined with the call for social marketing approaches, repositioned multinationals as key actors in promoting health. This trend further rendered individual households—notably mothers—responsible for the health of the family.<sup>110</sup>

The focus on hygiene promotion, while recognising that access to clean water and sanitation alone will not bring health, at times appeared to overlook the socioeconomic and environmental condition of the recipients on which the practice of ‘hygiene’ is dependent, as ‘ill health is created and sustained within a complex ecology of rural and urban poverty.’<sup>23</sup> (p1935 citing 88) Most of what we have come to think of as WASH is highly water intense, while in environments of low water access, ‘proper’ hygiene behaviour is very difficult to sustain (respondent #6). Behaviour change approaches emerged as a low-cost solution to the failures of technological interventions and gaps in infrastructure. Centralised water treatment systems were too expensive and benefits would accrue only in the long term, hence quick-fix solutions were proposed and sought in participation and health education, in behaviour change approaches and in household water treatment that was enthusiastically promoted

from the 2000s (respondent #5). This move towards the responsabilisation of the poor is part of a larger trend in the sector that has been driven by the implicit assumption that the burden of making WASH successful can be carried by user communities, despite many critiques that the poor and marginalised are least able to bear this burden.<sup>21 23</sup> While the behaviour change paradigm in WASH—in which technologies of shaming and blaming (‘triggering’) of the poor are often promoted—has been critiqued within the sector,<sup>111–113</sup> it continues to underpin many current interventions. Scholars focusing on a range of other public health fields have identified the impact of shame-inducing techniques that are intended to elicit particular healthy behaviours though they also (re)produce stigma, causing further damage to groups that are already socially vulnerable.<sup>114</sup> The construction of such narratives that morally disqualify marginalised communities<sup>115</sup> for ‘improper hygiene behaviour’, are essentially story technologies invested with (social) scientific legitimacy<sup>116 117</sup> that result in practical responsabilisation of the poor and perpetuate historically produced power relations.<sup>8</sup>

## Metricisation: Measuring and evaluating for accelerated development & ‘evidence-based international health programming’ – MDGs and SDGs

Metricisation here connotes that ways that by counting, and defining what counts,<sup>118</sup> a particular form of the sector has been brought into being. Metrics used in policy, implementation and science allow measurement, auditing and evaluation while at the same time forming WASH around these countable targets and outcomes. Knowing the reach and impact of WASH efforts and quantifying the benefits of water and sanitation has always been difficult.<sup>29</sup> Since before the Water Decade, concern was growing—particularly at the World Bank—to demonstrate the cost-effectiveness of water and sanitation investments,<sup>119</sup> and among scientists that these programmes could be more effective if better evaluated.<sup>120</sup> These concerns were sharpened by the reduction of state support for WASH and precipitated a focus on metrics—technologies of measurement—to concentrate efforts in WASH and other health and development fields, both in policy arenas and among scientists.

## Metrics of WASH policy

The history of global targets and monitoring organised around water and health can be dated back to 1959,<sup>121</sup> not long after the establishment of the WHO. Since then, targets, indicators and definitions have shifted in relation to measurement of ‘access’ to ‘safe’ water and ‘adequate’ sanitation.<sup>26 28 37 122 123</sup> The radical shift in development funding of the 1980s when the World Bank’s concerns with how to finance development saw cost-effectiveness as key to investment justification, impacted WASH. The World Bank’s prioritisation of programmes shifted from locating finance where disease burden was greatest to funding interventions with proven cost-effectiveness,

set out in the landmark World Development Report in 1993.<sup>29 124</sup> Since 1990, JMP has tracked progress on global goals in the WASH sector, thereby guiding what counts as success. While the JMP, the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water report and other monitoring tools have been analysed in terms of methodological strengths and weaknesses, less attention has been given to the political work entailed in the universalising and depoliticising impetus in setting and tracking global standards. The inclusion in metrics of not just what WASH policy is implemented but how governments are implementing—such as institutional leadership, capacity, monitoring—mirrors broader ‘good governance’ agendas that aim to influence the organisation of public policy in pursuit of achieving the desired outcomes. In the following, we explore examples of how the sector has framed successes and recent ‘failures’ (or lack of evidence) and the political work global metrics perform.

### Millennium Development Goals

The MDGs (2000–2015) reflected a drive for multidimensional development metrics with quantifiable M&E. A concrete and measurable target was set—belatedly, after lobbying—for WASH, to ‘halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015’.<sup>125</sup> Indicators needed to be simple and standardised proxies—such as the broad category of water source used by a household—without the more complex technical details—such as whether the water source in question was contaminated or provided a continuous supply over time. To compile systematic evidence for the countable indicators, the top-down approach of government engineers answering WHO surveys was replaced by more user-generated data collection through statistically representative household surveys or population censuses. Measurement was characterised by principles of transparency, accountability, audits and conditionality, mid-term reviews and evaluations.<sup>28</sup> Since the 2000s, also in WASH, the substantial time, money and other resources given to M&E have been questioned for its achievements in supporting ‘accelerated development’, its value for money<sup>27 28</sup> and whether a focus on greatest need is outbalanced by targets focusing on greatest effectiveness.<sup>29</sup>

The use of universal, and focused, indicators in global governance creates a form of global knowledge production that reconfigures power relations between rich and poor nations and between governments and civil society; (statistical) measures obscured debates over political priorities with technical expertise.<sup>126</sup> As global health ideas and indicators often emanate from a narrow epistemology, they have the power to flatten difference, ignore context and ‘squeeze out other possibilities’.<sup>127</sup> For example, those working in WASH were uncomfortable with the simplified monitoring indicators such as ‘improved water sources’ that led to the mistaken conclusion that the MDG on ‘safe’ drinking water (itself

a vague and difficult to measure term) was achieved, overlooking water quality, quantity and differentiated access across gender and class within ‘successful’ countries.<sup>128 129</sup> Critics argued that low-income countries, especially in Africa, were labelled as ‘failing’ or ‘not on track’, because although drinking water access did improve, the improvements did not meet the universal bar set by the MDGs.<sup>130</sup> Thus, the objective measures constructed as policy-relevant facts can be seen to result from intense struggles for political and epistemic authority.<sup>131</sup> The sector has, therefore, had to grapple with the work that indicators perform, which can be traced by asking what aspect of reality they reveal, distort and conceal.<sup>132</sup> As the history of monitoring in WASH attests, targets are prone to a wide variety of interpretations,<sup>28</sup> and how things are measured can mesh with other monitoring instruments and different types of evaluations show different perspectives.<sup>30</sup> A widely employed strategy to solve the lack of evidence—or to fill the gaps—is to develop more indices, or design more complex M&E frameworks, which add to the burden of data collection and further disincentivise investment outside of the indicator frame.<sup>28</sup>

### The Sustainable Development Goals

In 2016, the MDGs gave way to a new set of global priorities set for 2030, the SDGs. These were accompanied by the call for disaggregated data and more specific measurements and indicators, the focus on ‘metricisation’ gained even further momentum. The rise of indicator or audit culture connected to an amplified form of evidence-based governance.<sup>133 134</sup> A clear shift took place in WASH from the creation of a single target that guided the measurement of progress on access to improved water, towards the broad, human-rights informed SDG6 that called for a broader range of targets (online supplemental table 2), each with composite numerical indicators. The more overtly political, rather than narrowly technical, targets—and ‘means to achieve’ them—have led to major measurement challenges.

While metrics and numbers strive to convey objective truth and scientific validity—and they are appealing because they allow for comparison and appear to stand above politics—they also risk hiding the interpretive and political work that goes into creating and measuring them. They may overlook crucial dimensions of social life that fall outside of these indicators and categories. Complex social processes such as water access and gendered vulnerabilities cannot be reduced to binary and essentialist categories as typified by the bulk of epidemiological evidence. For instance, data on the relationship between water access and child health omits information about the health of mothers who fetch the water.<sup>14</sup> Global water metrics that indicate safe access can mask challenges in adequate water quantities and quality as attributes are often highly variable with respect to community sociodemographics or political affiliation. Even piped water may not offer protection at the point of use or when water is stored in containers<sup>135</sup>; when piped

water is intermittently delivered, for example, it is more easily contaminated, and (usually) women still need to wait, collect and store it. Finally, only what is considered measurable and countable by the scientific community does not always align with what is valued and needed by users locally. This has precipitated concerns about what should be monitored and on whose terms.<sup>28 136 137</sup>

### Scientists' metrics

The nature of scientific attention to the measurement of WASH has changed over time. Broadly, a shift occurred from a generalised assessment of needs and solutions to more narrowly defined measurements of success with the increasing deployment of trial designs to quantify health impacts with greater precision, to a rebroadening of 'what works' questions in recent years.

Frameworks and indicators for evaluation emerged in the 1970s, aiming for a wide-angle lens to capture the multiple dimensions and impacts of water and sanitation programming.<sup>81 138</sup> Taking as a starting point that much investment was being made into programmes that were deemed ineffective, researchers provided guidance for the multiple parameters that must be assessed and synthesised to understand impact, including technical, administrative, health impact and village-level evaluations.<sup>120</sup> Specifically for health impacts, various study designs were offered that could be used to establish effects and interpret results—including negative findings.<sup>139</sup> By the 2000s, with the paradigm of evidence-based programming now gaining pace, RCTs were solidified, beyond health research, as the gold standard for robust evidence of impacts of interventions. The pinnacle of these designs was the double-blind placebo-controlled randomised trial, able to create evidence in the most objective way—free from most biases and interferences of human behaviour. This highest quality evidence—where quality is understood as being at risk of bias—was perhaps achieved in the evaluation of point-of-use water treatment interventions where placebo trials were conducted. While three such trials in the Gambia, Brazil and Ghana failed to show any impact on diarrhoeal disease,<sup>140</sup> scientists debated the validity of these findings when compared with a wider body of evidence from studies that were deemed to be of lower quality but that had shown significant effects of these interventions.<sup>141</sup> Such debates reflected wider concerns that the required focus for trial design traded off external validity for internal validity constrained the questions that could be asked about water and health and reduced the ability to engage with the complexity of such interventions.<sup>142</sup>

The move towards RCTs in the quest by some researchers, funders and research users in policy positions for definitive evidence of effects involved two scalar shifts: first, the narrowing of the definition of effects to a primary outcome with a set of secondary outcomes; second, the narrowing of intervention possibilities to those that could be randomised to individuals and later small clusters.<sup>143</sup> Implications of the former for WASH

included a need to prioritise primary and secondary measures of the effectiveness of what might be a multi-faceted programme with multiple impacts. Implications of the need to individualise interventions can be seen in the nature of trial evidence: technological devices, washing apparatus and behavioural messaging delivered through home visits. The lack of expected impact on child stunting and diarrhoeal outcomes of such interventions in the large Serving the Health Insurance Needs of Everyone and WASH Benefits trials led investigators to question both the choice of outcomes and whether broader programmes would have been more impactful.<sup>6</sup> It also increased the attention to the reliance on RCTs as the gold standard, rather than high-quality observational study designs and implementation science methods that may be more amenable and cost-effective for addressing critical sectoral questions.<sup>144 145</sup>

The evolution of WASH as a sector has increasingly called for the expansion of outcomes and associated indicators, but the increasing metricisation underpinning evidence-based policy does not overcome its technocratic tenets that neutralise ideologies and make power relations seemingly irrelevant.<sup>146</sup> Rather than being 'objective' indicators of success, metrics become technologies of counting and holding accountable that constitute a particular kind of global knowledge, which enable standardised conversations about how to achieve what some scholars have called 'global health efficacy'.<sup>118</sup> In WASH, this has meant a particular form of counting that has often been at odds with what matters locally. The metricisation trend and debates arising around the interpretation of trial findings can be understood as a form of sense-making within a domain of 'uncomfortable knowledge',<sup>36</sup> which we discuss further below.

### Implications of WASH histories

Over the last seven decades, WASH has emerged and coevolved with wider paradigms in global health and development. By bringing to the fore orientations that we recognise to have shaped the WASH sector—technicalisation, universalisation, responsabilisation and metricisation—we have illustrated how the sector's foci, successes and challenges relate to these shifts in science, politics and economics over a period characterised by increasing neoliberal globalisation. The stabilisation and professionalisation of WASH as a sector, such that it has been able to articulate a series of global goals, to establish funding channels and to measure improvements in peoples' lives around the world, has also meant that alternative ways of knowing, valuing, curating and counting WASH efforts have been overlooked. We argue that this has produced a milieu of 'uncomfortable knowledge'—the knowns that have had to be unknown—through which actors in the sector are navigating. This paper has described key influential commitments that have led the sector to this juncture; those navigating the next stages must now decide whether to continue to follow the same points of orientation.

One potential consequence of aligning the efforts of a sector with the broader prevailing paradigms of global health and development is the possibility that important intrinsic aspects of that sector may become obscured. The commitment to universalisation, advancing Western blueprints for development, has risked overlooking questions that mattered locally around equity of access, but also around management and maintenance, governance, institutional capacity, accountability and sustainability. It also risked masking the organic links between WASH with other development issues, such as housing and urban planning. Informed by the responsabilisation agenda, the focus on community management, appropriate (uptake of) technologies and behaviour change has overlooked the complex and lived (and gendered) experiences of poverty, including for example what ‘affordability’ of water really means<sup>7</sup> as well as the precarity of living conditions in water-deprived environments. Global efforts to create targets through metricisation have paid insufficient attention to the political choices implicated in creating and measuring global indicators and what is valued locally, the unpaid labour that is required to adhere to such measuring protocols on the ground and to the power asymmetries and dependencies sustaining such efforts. While evidence-based policy is a way to prioritise and legitimise certain policy options over others, Saltelli *et al* point out that it can also produce its opposite, ‘policy-based evidence’ (which) ‘may also lead to a dramatic simplification of the available perceptions, in flawed policy prescriptions and in the neglect of other relevant world views of legitimate stakeholders.’<sup>146</sup>(p62)

What is perhaps less obvious is the degree to which a sector such as WASH becomes written-in to the scripts of these wider paradigm shifts, such that these ways of knowing, characterising and counting problems, and of responding to issues as thus characterised become self-evident. We can observe that over the decades, those working within the WASH sector have had to incorporate multiple competing understandings of problems and solutions, noting, for example, tensions between ‘the field’ ‘on the ground’ and ‘the sector’ as a global object that in its construction requires compromises in order to continue momentum. While this produces known unknowns—as noted above—it also raises the possibility of unknown knowns: ‘what we don’t know that we know.’<sup>36</sup> (p108) Rayner describes the often tacit but active exclusion of knowns by societies or institutions ‘because they threaten to undermine key organisational arrangements or the ability of institutions to pursue their goals’ (ibid). Such ‘social construction of ignorance’ (ibid), of knowledge that is in tension or outright contradiction with self-consistent and simplified versions of reality that have been developed in order to act in a complex world, is apparent in debates around metrics and trials in WASH—in the interpretations of what works and for whom, and how we can know this. The resulting ‘uncomfortable knowledge’ that WASH actors are living with emerges not only through the processes of metricisation

but at its intersection with technicalisation, universalisation and responsabilisation.

A persistent known unknown in the evolution of the WASH research and policy literature is attention to the role of gender in WASH provision and in the impacts of (in)adequate WASH. The absence of gender in accounts and reports reviewed for this paper was notable. Recent work has tried to live up to the ‘special attention’ to the needs of women and girls as called for in SDG6, especially with a gendered understanding of physical and mental health with respect to sanitation and menstrual hygiene.<sup>107 147</sup> But mainstream health policy research, through the instrumentalisation of women and the undervaluation of their labour, continues to undervalue the benefits (and costs) of safe water for women, despite acknowledging their ‘central role’ in providing and protecting water.<sup>14</sup> Where gender intersects with other marginalities such as race, caste, indigeneity or disability, the policy literature is even more silent.<sup>148</sup> The discourse of ‘transformative’ WASH has yet to transcend these blind spots.

Our intention is to support a reimagining of the WASH sector by providing a source of reflection on its evolution. The observations in this paper raise questions about the forms of scholarship, knowledge and science that have been privileged in the assemblage of the global WASH sector, and what forms of power asymmetries and dependencies may have been overlooked and reproduced by such knowledge formations. Such observations, driven by a social research approach to the construction of the sector, perhaps differ from the traditional view of the roles social scientists can play in WASH. Traditionally more instrumental (often lamented as ‘handmaiden’) to the existing natural sciences schemata that were already stabilised, social scientists have been tasked with answering questions such as ‘how can we change behaviour?’ rather than to critically scrutinise the objectives and consequences of such endeavours. A similar shift within engineering (education) also occurred over the sector’s first decades when it increasingly narrowed down to technical questions detached from societal ones.<sup>62</sup> This fate has befallen the public health sector as well, which over time became a technical shadow of its own comprehensive beginnings<sup>32</sup> and is confronted with the challenge now of how to transcend an increasingly narrow technical public health ideology.<sup>134</sup> This leads us to articulate similar questions about regional expertise and the forms of knowledge and power that have come to set the norms, priorities and shape ideas of success in the sector. Pertinent questions include to what degree has the field of WASH been defined by actors in the Global North? How might this change without falling into the same instrumentalisation trap that invites ‘other perspectives’ only to sustain the same kinds of relations? What would a reorientation of the field driven by the lived experiences and ‘epistemologies

from the South<sup>149</sup> actually look like and from where might the appetite for this emerge?<sup>15 16</sup> What forms of concern with drinking water and management of human waste could emerge if the particular assemblage of science, power, processes and people that currently defines WASH were decentred, and more prominence was given to the knowledge, experiences and ideas of success as defined outside of these structures?

## CONCLUSION

The emergence of WASH as an international field of expertise and practice is a story that is not unique to this sector. The global forces at play that define how health, development and health science are done have far-reaching impacts on the shape of sectors at national, regional and local levels of implementation. For WASH, this has entailed the creation of a sector largely underpinned by parallel tracks of technically based disease control and engineering foci—although with a relatively small professionally trained cadre—that has resulted in a depoliticisation of poverty and social inequalities, and a focus on particular outcomes and objectives, through neutralising agendas of universalisation, responsibility and metricisation. The uncomfortable knowledge that actors in the WASH sector may encounter is amplified in this moment of increased concern about colonial legacies, shrinking health and development budgets, gender disparities within and across communities, together with heightened awareness of the importance of WASH as epidemics and climate change continue to disproportionately affect those with the least economic, social and political capital.

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