

# IRC

THE HAGUE, THE NETHERLANDS | 12 – 14 MARCH 2019

## All systems go!

# Education and training in sustainable WASH systems

Paper for the WASH systems symposium

Pam Furniss (UK)



50 years of IRC.  
WASH systems that transform lives.



© 2019, IRC

This paper was drafted by P. Furniss for the All systems go! WASH systems symposium, The Hague, The Netherlands, 12-14 March 2019.

Cite this publication as follows. Furniss, P., 2019. Education and training in sustainable WASH systems. [UK].

For all proceedings of the All systems go! WASH systems symposium, please check <https://www.ircwash.org/proceedings>

We grant permission for individuals and organisations to share and adapt this material, in whole or in part, for noncommercial use, educational, scientific or development-related purposes, provided that the appropriate and full citation is given. This publication is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Netherlands License. View the terms of the license here: <https://creativecommons.org/licenses/by-nc-sa/3.0/nl/deed.en>

When considering the sustainability of WASH systems, one component that is still often overlooked is education and training. To last into the future, WASH projects and programmes need to be managed and maintained by people with essential relevant knowledge and skills, and used by people who understand their role in ensuring long-term success. All these people need appropriate education and/or training. In the WASH sector, emphasis is frequently placed on much-needed infrastructure development with education and training rarely getting much attention, even though the capacity gaps are well-known. This paper considers the different levels and scales of education, training and awareness-raising needed, and some of the challenges they present in the progress towards achieving SDG6.

## Introduction

SDG 6 aims to ensure availability and sustainable management of water and sanitation for all. Its targets refer to expansion of capacity-building support to developing countries (6a) and strengthening the participation of local communities in water and sanitation management (6b). How can this be achieved?

This paper puts forward a case for addressing these targets by raising the priority of education and training in WASH to meet the need for more skilled, better trained people working in a variety of roles, and thereby improving the sustainability of WASH systems.

For the purposes of this paper, 'education and training' encompasses a range of learning experiences providing knowledge and/or skills for WASH professionals, managers, technicians, WASH facilitators and others. 'WASH facilitators' should be interpreted as people such as schoolteachers, community leaders, local government officers and health workers who are not employed in the WASH sector but have a role in society that enables them to influence others and, if they have the necessary understanding themselves, to encourage appreciation of WASH issues in their community. Education and training is therefore intended to include methods and resources that raise awareness of WASH as well as formal accredited courses of various types and levels.

## Defining the WASH system

In the past, WASH was defined in separate domains of water, sanitation, and hygiene (if hygiene was included at all). The perspectives of practitioners tended to be based on traditional academic disciplines and defined by the practitioner's own sphere of expertise such as engineer or hydrologist, frequently with limited appreciation of the links between disciplines. This contributed to a perceived separation between 'hard' and 'soft' elements of WASH with an emphasis on technical infrastructure, sometimes characterised as 'taps and toilets', rather than the people-based social and cultural dimensions. The separation between components of WASH was reinforced by administrative and governance responsibilities that were divided between ministries/regional offices of, for example, water resources, agriculture, health, urban development, and others.

This silo mentality has been widely (though by no means universally) superseded by more systemic thinking that appreciates the interconnections between the formerly separate components of water, sanitation and hygiene and also incorporates the social, cultural, political and economic contexts. The widespread use of the neat acronym of 'WASH' goes some way towards recognition of the integration between components, but care is needed to avoid the assumption that thinking in terms of WASH equates to a systems approach. It brings together the three integrated topics but may still be limited by traditional perspectives and omit key elements.

It has been said that systems thinking begins when you see the world through the eyes of another (Churchman, 1971 cited in Foster et al., 2016). A key principle therefore is to understand that stakeholders will view through different eyes and have different perceptions of the components of a 'system'. In any given situation, the stakeholders, whether individuals or groups, are likely to define different 'systems of interest' with different placement of the 'system boundary' based on their own perspectives on what is inside or outside the system. A second principle is that perspectives and system boundaries will change and evolve over time in response to the flux of events, people and ideas that create a changing context for any system (The Open University, 2015). Any system definition therefore should reflect this potential for change and be open to variation.

Definitions of the WASH system generally do not include education and training within the system boundary. For example, IRC's definition (Huston and Moriarty, 2018) includes nine building blocks that imply many different roles for people working in WASH but there is no explicit

reference to the education and training those people would need to enable them to fulfil those roles. The building blocks include institutional capacity and the importance of learning and knowledge sharing within the WASH community, but there is less emphasis on the learning needs of individuals as potential new WASH sector employees or the need for appreciation of WASH issues among user communities. Although overlap between WASH and education is acknowledged, the education system is placed outside and separate from the WASH system (Huston and Moriarty, 2018, Figure 7).

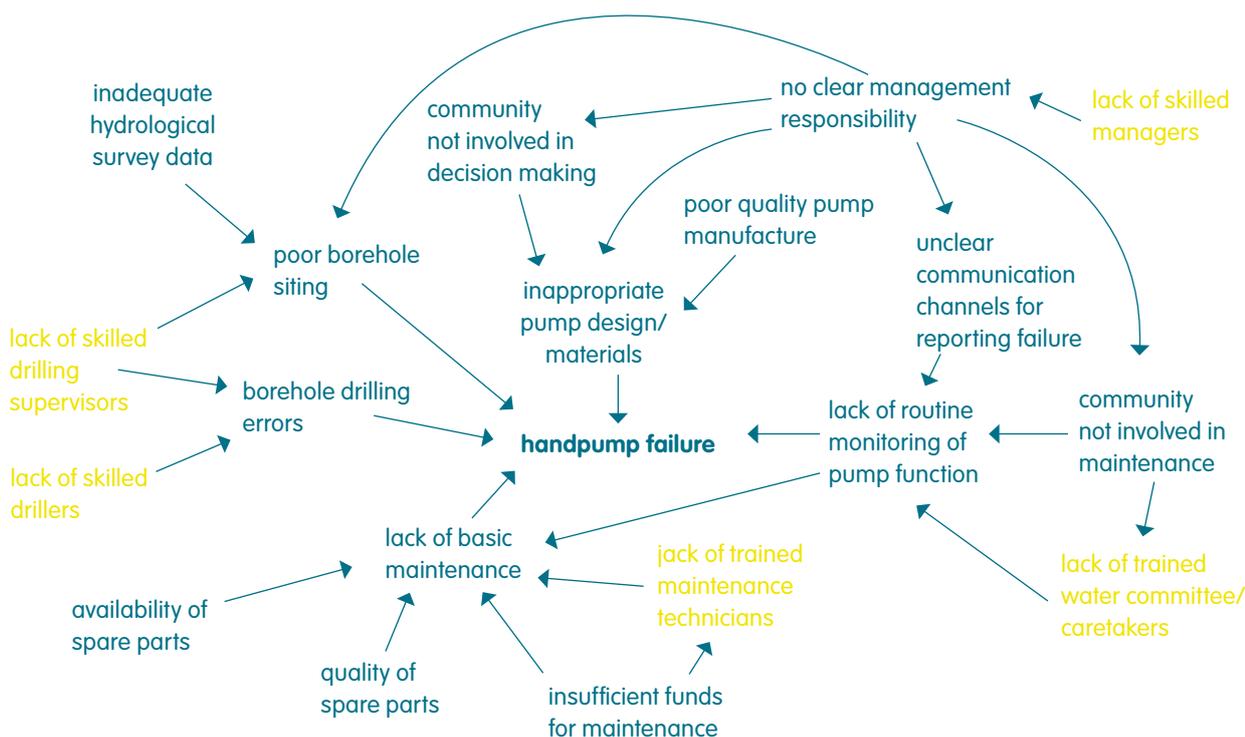
This separation of the education system is reflected in WASH programme funding which generally does not place high priority on education and training – ‘taps and toilets’ still dominate. If included at all, education and training tend to be incorporated in notions of WASH sector strengthening or the WASH enabling environment. But is that sufficiently explicit? Does it give appropriate weight to the education building block that, it could be argued, is a prerequisite for all the others? Even phrases like capacity building and capacity development, though more targeted on human resources, tend not to be specific about the courses and resources needed to provide people with the appropriate skills and knowledge to support and sustain WASH systems.

## The need for education and training

There is considerable evidence of the skills gaps in WASH with numerous studies and reports over many years highlighting the shortage of skilled personnel (e.g. Cavill and Saywell, 2009; Cavill et al., 2011; IWA, 2013; IWA, 2014; Curry, n.d.; Mara and Evans, 2018). The IWA Human Resource Capacity Gap Study reported that if universal access was to be achieved, there was a shortfall of nearly 800,000 trained water and sanitation professionals, and that figure was for only 10 countries (IWA, 2014). Mara and Evans (2018) highlighted the shortage of engineers with the combination of technical knowledge and soft skills required to design and deliver sustainable sanitation and hygiene systems, particularly the skills of interacting with beneficiary communities and being aware of the needs of women and girls.

However, the need is not only for engineers and other professionals. There are also shortages in a diverse mix of other roles that all require appreciation of WASH as a system. Figure 1 is a multiple cause diagram using one particular example, handpump failure, to illustrate the crucial role of education and training for sustainable WASH. Multiple cause diagrams are used to explore why a given change or event tends to occur (The Open University, 2015). Figure 1 shows factors that have been identified as contributory causes of handpump failure, and the links between them.

Figure 1. Multiple cause diagram of reasons for failure of handpumps



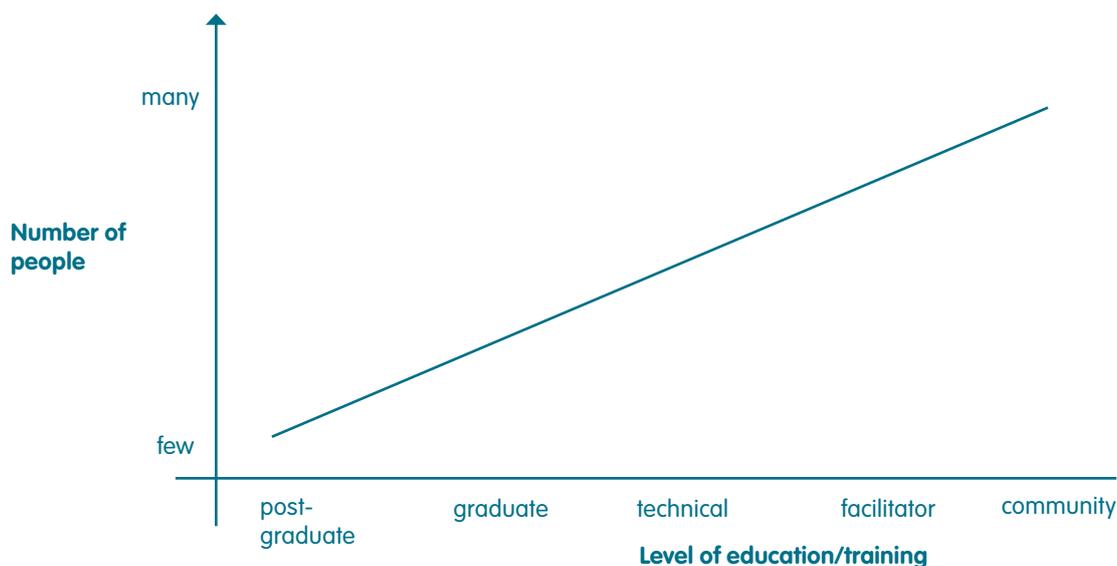
Source: Author's diagram derived from Carter et al, 1999; Chilton, 2015; Purvis, 2016; UPGro n.d.

The highlighted elements in the diagram demonstrate the frequent recurrence of the lack of appropriately skilled and trained people in various roles as causal factors. The educational levels required for these roles range from degree qualifications at graduate and postgraduate levels through technical qualifications to foundation level training of the facilitators (e.g. water committee members) as well as broad awareness raising for the wider community. For sustainable WASH services, all of these people need an understanding of the system in which they operate. With

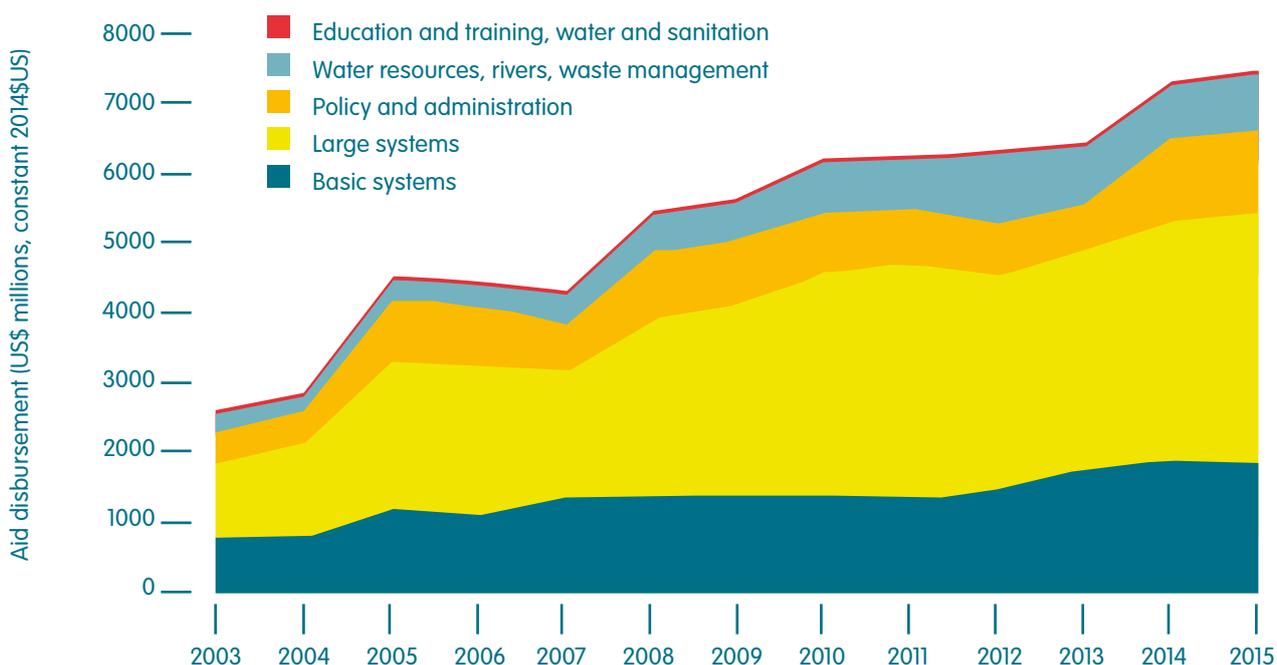
the need at professional levels measured in the hundreds of thousands (IWA, 2014), the demand for appropriate training at foundation level can only be estimated (Figure 2).

However, despite this clearly identified need, the level of funding for education and training as a proportion of aid within WASH almost vanishes (Figure 3). On this GLAAS graph, although overall funding increased significantly during the MDG era, the thin red line indicating aid for education and training is barely visible.

**Figure 2. Sketch indicating the scale of need for WASH education and training at different levels**



**Figure 3. Breakdown of water and sanitation aid commitments by purpose type (2003 – 2015)**



Source: GLAAS, 2017, p13

## Why is education and training a low priority?

Creating effective new courses and curriculum – at any level – is not easy, quick or cheap. The complexity and scale of the financial and human resources required should not be underestimated. There are daunting and complex challenges in reaching all levels at the necessary scale. Particularly at technical, facilitator and community levels, there is a need to reach very large numbers of people (Figure 2) in many different countries. This requires learning resources that are locally relevant, appropriate for diverse learner groups, accessible to all, available in local languages, and more. From the perspective of those providing the finance, it is understandable that putting funds into infrastructure development would be more attractive than creating educational resources.

One possible answer to the challenge lies in distance learning. In Ethiopia, the need for broad education and training in WASH in order to achieve universal access has been recognised in the One WASH National Programme (OWNP). The OWP identifies 'capacity gaps at all levels as one of the most pervasive threats to the successful implementation of the programme' (FDRE, 2013, p.34, emphasis added). One of the challenges in Ethiopia is the low numbers of qualified college staff with the necessary background to teach the integrated approach advocated in the OWP to WASH employees of the future. In response to this challenge, distance learning techniques have been used to develop high quality learning resources for the WASH sector (OpenWASH 2016/2018). The OpenWASH modules are designed for independent study and therefore can fill the gaps where there are insufficient numbers of skilled teachers and trainers. The modules are being used in Ethiopia to provide a consistent and relevant curriculum for face-to-face teaching in the under-resourced colleges. As freely-available open educational resources, the modules have also been adapted for other learning contexts such as continuing professional development of WASH practitioners and to support training at facilitator and community levels.

Another factor contributing to the low priority is that evaluation of education and training in the longer term is difficult (Crocker et al., 2016; Curry, n.d.). It is straightforward to monitor the number of people attending a training course and relatively simple to assess their responses to the training, or to count the number of students who pass the final test/exam in formal courses. However, evaluating the impact of a learning experience is challenging (Simister, 2010). Among the reasons for this is timescale. The consequences of the learning may not be realised, even by the individual concerned, for many years and after that time, it is difficult to connect cause and effect. How do

you assess someone's competence in an aspect of their job, for example, and attribute this to a course they took maybe five, 10 or more years ago?

These difficulties of evaluation could influence the decision-making process and the choices made by funding bodies, whether these are governments, NGOs, development banks, aid organisations or other donors. It is reasonable and necessary for funders to want to know the effectiveness and impact of projects and programmes they have paid for. However, there is a danger that ease of evaluation could skew the decisions about which proposals receive funding towards those that are more 'evaluatable', which could be to the detriment of education and training.

## Conclusion

Recognition of the WASH system as an integrated and interconnected set of components is now accepted but education and training is not usually considered to be part of that system. This is despite the well-documented capacity gaps within WASH.

Education and training is generally low in the priority list of funders because of its many challenges, not least the difficulties of impact evaluation. Delivering broad, foundation level training and awareness-raising activities for WASH facilitators and communities is especially challenging because of the scale and diversity of the need.

Finally, returning to SDG 6 and the targets 6a and 6b, the indicator for achievement of 6a is money allocated for capacity building, and for 6b it is the presence of policies and procedures to strengthen local communities. What seems to be missing is an indicator that will assess if there are people with the knowledge and skills to spend the money sensibly and apply the policies and procedures effectively. Raising the profile of education and training within the WASH system could go some way towards achieving that target.

## References

- Carter, R.C., Tyrrell, S.F. and Howsam, P. (1999) The impact and sustainability of community water supply and sanitation programmes in developing countries, JCIWEM, Vol 13, pp292-296
- Cavill, S., Parkinson, J. and de Vette, K. (2011) Mind the gap, Meeting the water and sanitation Millennium Development Goals, Synthesis Report. DFID/IWA.
- Cavill, S. and Saywell, D. (2009) The capacity gap in the water and sanitation sector. Proceedings of the 34th WEDC International Conference. Available at [https://wedc-knowledge.lboro.ac.uk/resources/conference/34/Cavill\\_S\\_-\\_335.pdf](https://wedc-knowledge.lboro.ac.uk/resources/conference/34/Cavill_S_-_335.pdf)
- Chilton, J. (2015) The Hidden Crisis project. Available at <https://vimeo.com/11413305>
- Churchman, C.W. (1971) The Design of Inquiring Systems, New York, USA. Basic Books.
- Crocker, J., Shields, K.F., Venkataramanan, V., Saywell, D. and Bartram, J. (2016) Building capacity for water, sanitation, and hygiene programming: Training evaluation theory applied to CLTS management training in Kenya, Social Science and Medicine, Vol. 166, October 2016, pp. 66-76. Available at [https://ac.els-cdn.com/S0277953616304300/1-s2.0-S0277953616304300-main.pdf?\\_tid=f386ac4d-c364-4391-b501-df7e2b2d1fb2&acdnat=1545325171\\_8a84f9dd63e17bf469f96682b3ce542d](https://ac.els-cdn.com/S0277953616304300/1-s2.0-S0277953616304300-main.pdf?_tid=f386ac4d-c364-4391-b501-df7e2b2d1fb2&acdnat=1545325171_8a84f9dd63e17bf469f96682b3ce542d)
- Curry, S. (n.d.) Narrowing the WASH capacity gap (blog) Available at <http://washfunders.org/narrowing-the-wash-capacity-gap/>
- De Vette, K. (2016) To succeed, the water sector needs people (blog). IWA. Available at <http://www.iwa-network.org/to-succeed-the-water-sector-needs-people/>
- Federal Democratic Republic of Ethiopia (FDRE) (2013) One WASH National Program, Program Document, Final [Online]. Available at [http://www.cmpethiopia.org/media/ownp\\_project\\_document](http://www.cmpethiopia.org/media/ownp_project_document)
- Foster, N., Collins, K., Ison, R. and Blackmore, C. (2016) Water Governance in England: Improving Understandings and Practices through Systemic Co-Inquiry. Water, 5, article no. 540. Available at <http://oro.open.ac.uk/47802/>
- GLAAS (2017) Financing universal water, sanitation and hygiene under the sustainable development goals. UN-Water Global Analysis and Assessment of Sanitation and Drinking Water (GLAAS) report. Geneva. World Health Organization. Available at [https://www.who.int/water\\_sanitation\\_health/publications/glaas-report-2017/en/](https://www.who.int/water_sanitation_health/publications/glaas-report-2017/en/)
- Huston, A. and Moriarty, P.B., (2018) Understanding the WASH system and its building blocks: building strong WASH systems for the SDGs, (IRC WASH systems series) The Hague, the Netherlands: IRC. Available at: [https://www.ircwash.org/sites/default/files/084-201813wp\\_buildingblocksdef\\_web.pdf](https://www.ircwash.org/sites/default/files/084-201813wp_buildingblocksdef_web.pdf).
- IWA (2013) Human resource capacity gaps in water and sanitation: Main findings and the way forward. London: IWA. Available at <https://editorsinc.files.wordpress.com/2012/04/summary-of-synthesis-report1.pdf>
- IWA (2014) An avoidable crisis: WASH Human Resource Capacity gaps in 15 Developing Economies, London: IWA. Available at <http://www.iwa-network.org/downloads/1422745887-an-avoidable-crisis-wash-gaps.pdf>
- Mara, D. and Evans, B. (2018) The sanitation and hygiene targets of the sustainable development goals: scope and challenges. Journal of Water Sanitation and Hygiene for Development, 8 (1). pp. 1-16. Available at <http://eprints.whiterose.ac.uk/124866/>
- OpenWASH (2016/2018) WASH learning resources. The Open University/World Vision Ethiopia/UNICEF; The Open University/WaterAid. Available at [www.open.edu/openlearncreate/OpenWASH](http://www.open.edu/openlearncreate/OpenWASH)
- Purvis, K. (2016) How do you solve a problem like a broken water pump? The Guardian. Available at <https://www.theguardian.com/global-development-professionals-network/2016/mar/22/how-do-you-solve-a-problem-like-a-broken-water-pump>
- Simister, N. (2010) Monitoring and evaluating capacity building: Is it really that difficult? INTRAC Praxis Paper 23. Available at <https://www.intrac.org/resources/praxis-paper-23-monitoring-evaluating-capacity-building-really-difficult/praxis-paper-23-monitoring-and-evaluating-capacity-building-is-it-really-that-difficult/>
- The Open University (2015) Techniques for environmental decision making, Part of postgraduate module T891 Making environmental decisions.
- UPGro (n.d.) Hidden Crisis: unravelling current failures for future success in rural groundwater supply Available at <https://upgro.org/consortium/hidden-crisis2/>

## Keywords

education, training, WASH system, capacity gaps

## Contact details

Pam Furniss  
STEM Faculty  
The Open University  
Milton Keynes, MK7 6AA; UK  
Tel: +44 1908 652101  
Email: [pam.furniss@open.ac.uk](mailto:pam.furniss@open.ac.uk)



**50 years of IRC.**  
WASH systems that transform lives.