Research Paper

Challenges and facilitators of public engagement with water, sanitation, hygiene and other environmental health issues in Ghana and Uganda: perspectives of scientists, journalists and the public

Bernard Appiah, Anubhuti Poudyal, David A. Anum, George Appiah, Andrew Christopher Wesuta, Kofi Akodwaa-Boadi, Ochieng' Ogodo, Esther Nakkazi, Edgar M. Mulogo and Samuel Nii Odai

ABSTRACT

Despite many water, sanitation, hygiene (WASH) and other environmental health challenges in sub-Saharan Africa, little is known about interactions involving scientists, journalists and the public to aid public understanding of the relationship between WASH and health. Using purposive sampling, we conducted key informant interviews and focus group discussions with scientists, journalists and members of the public in Ghana and Uganda to identify issues associated with the promotion of public engagement with WASH and environmental health issues. An inductive thematic analysis was used to explore the evidence, challenges and opportunities of public engagement. The effectiveness of public engagement was constrained by poor interaction between scientists and journalists and limited understanding among the public on WASH and other environmental health issues. Challenges identified included inadequate scientists–journalists collaborations, scientists' lack of time, pressure from media organizations and concerns about journalists' inadequate capacity to communicate environmental issues due to lack of training. Possible solutions included increased interactions, science communication training and using public information officers as knowledge brokers between scientists and journalists to boost public engagement with WASH and other environmental health issues. Our study contributes to the literature on the need to actively engage the public with WASH and other environmental health concerns.

Key words | environmental health, public engagement, science journalism, sub-saharan africa, WASH

Bernard Appiah (corresponding author)
Research Program on Public and International Engagement for Health, Department of Environmental and Occupational Health, School of Public Health,
Texas A&M University,
College Station, TX,
USA
E-mail: *appiah@sph.tamhsc.edu*

Bernard Appiah
David A. Anum
George Appiah
Centre for Science and Health Communication,
Accra, Ghana

Anubhuti Poudyal
Department of Health Promotion and Community Health Sciences, School of Public Health,
Texas A&M University,
College Station, TX, USA

Andrew Christopher Wesuta
Edgar M. Mulogo
Department of Community Health,
Mbarara University of Science & Technology,
Mbarara, Uganda

Kofi Akodwaa-Boadi
Samuel Nii Odai
Department of Civil Engineering,
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Ochieng' Ogodo
Kenya Environment and Science Journalists Association,
Nairobi, Kenya

Esther Nakkazi
Health Journalists Network Uganda,
Kampala, Uganda

doi: 10.2166/washdev.2019.019

INTRODUCTION

Environmental health issues such as water, sanitation and hygiene (WASH) confront sub-Saharan Africa, resulting in avoidable diseases on the continent (World Health Organization 2014). Unfortunately, sub-Saharan Africa is one of the developing regions that missed the water and sanitation targets proposed in the Millennium Development Goal (World Health Organization 2015). Greater efforts are needed to attain the Sustainable Development Goals (SDGs) of increasing access to improved water sources for all by 2030 (Cornish 2018). Such efforts require a multidisciplinary approach (Cornish 2018), including the active involvement of scientists, science journalists, policymakers and members of the public.

Interactions between scientists and others, such as science journalists, policymakers and members of the public, are important for at least three reasons. First, scientists have a social responsibility to let members of the public – taxpayers – and policymakers understand the potential impact of their research through such interactions (Davies 2013). Second, many journalists with interest in reporting science do not have scientific backgrounds (Appiah *et al.* 2015), and thus such interactions could help journalists develop more interest in covering science. Finally, in part through the public image of scientists as people who are disconnected from society or not 'normal', the gap between scientists and the public is wider (Massarani & Peters 2016). Scientists' interactions with the public in forms such as media interviews and face-to-face meetings including scientific café could help bridge this gap (Matheson 2016). While it is the responsibility of journalists to translate scientific terms to the public, scientists should be able to communicate directly with the public (Brownell Price & Steinman 2013).

The interactions involving scientists, science journalists and members constitute a form of public engagement. In addressing the effectiveness of public engagement in the context of WASH and other environmental health issues, it is necessary to describe what is meant by 'public engagement'. Some researchers indicate that public engagement has no specific definition and have interchanged it with the term 'public participation' (Bauer & Jensen 2011). Others define public engagement as 'any scientific communication that engages an audience outside of academia' (Poliakoff & Webb 2007, p. 244). Moreover, public engagement is defined as 'a two-way process, involving interacting and listening, with the goal of generating mutual benefit' (http://www.publicengagement.ac.uk/explore-it/what-public-engagement). The variations in the definitions have implications for the audiences and mechanisms for achieving public engagement goals and objectives (Rowe & Frewer 2005).

Journalists view public engagement as an opportunity to educate the public on scientific issues (Besley & Roberts 2010). In such a context, journalists act as advocates for an idea rather than as conveyors of news. The 'public' in public engagement includes several groups including community members who may identify themselves differently depending on the issue being described (McCallie *et al.* 2009). Studies with community members have identified trust between the public and service providers as important for public engagement with municipal water decision-making (Wilson *et al.* 2008) and education of community members as key to sustainable waste management (Goven & Langer 2009).

In addressing water and other environmental health issues, there is a need for active engagement with community members, advocacy and civil society organizations to achieve sustainable solutions (Seppälä 2002; Stewart & Gray 2006). Knowledge sharing involving community residents is key to addressing WASH and related challenges (Furlong & Tippett 2013). Studies have documented challenges to public engagement such as difficulty in motivating the public and the time-consuming nature of such interactions (Cohen *et al.* 2008). Factors that influence scientists' potential participation in public engagement include facilitators such as efforts by institutions to help their scientists popularize their findings (Marcinkowski *et al.* 2014) and barriers such as lack of skills and a belief that their colleagues are not taking part in public engagement either (Poliakoff & Webb 2007).

Many studies have explored scientists–journalists interactions (e.g., Peters 2013; Dijkstra *et al.* 2015), but

environmental health issues in sub-Saharan Africa are hardly discussed in such studies. Moreover, some studies with scientists as respondents have explored attitudes to public engagement, with many indicating a need for scientists to be trained in science communication (Besley 2015; Ndlovu *et al.* 2016). A study of experts identified the challenges and strategies for promoting handwashing promotion in humanitarian emergencies (Vujcic *et al.* 2015). Studies involving only journalists or communicators as respondents also show a need for journalists to receive more training in science communication to promote public engagement (Besley & Roberts 2010; Besley *et al.* 2016). Despite the importance of such studies exploring WASH-related issues, they miss the perspectives of a key actor: members of the public.

Some scholars have documented the importance of engaging the public to help address WASH and related challenges (Allen *et al.* 2018). However, little is currently known about the challenges and opportunities of public engagement with WASH and other environmental health issues from the perspectives of scientists, journalists and members of the public in sub-Saharan Africa.

Thus, to understand the challenges faced by scientists and journalists in promoting public engagement with WASH and other environmental issues, and the opportunities that exist for addressing the challenges, the present exploratory study focussed on the local context of scientists, journalists and members of the public from Ghana and Uganda.

The two countries were selected because of the following reasons:

(1) Both 'made limited or no progress' on the Millennium Development Goal targeting water and sanitation (World Health Organization 2015).
(2) Both have made recent discoveries of oil, resulting in the likelihood of environmental issues becoming prominent (Bybee & Johannes 2014).
(3) A science and technology university in each country was part of a consortium that aimed to tackle water and sanitation issues. The consortium, called AfricanSNOWS (Scientists Networked for Outcomes from Water and Sanitation), aimed 'to build African capacity for interdisciplinary research in water supply, sanitation and environmental health, bringing together universities from across the continent, with research-active universities in the North' (http://www.africansnows.org/).

The current study involves scientists with research interest in environmental health issues from the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana, and Mbarara University of Science and Technology (MUST) in Mbarara, Uganda. Journalists and members of the public with interest in environmental issues in the two cities were included.

Our main objective was to seek the perspectives of scientists, journalists and members of the public on the challenges and opportunities for promoting public engagement in the context of water, sanitation, hygiene and other environmental health issues. For the purpose of this study, we defined public engagement as 'the interactions among WASH researchers, journalists and members of the public with a goal of discussing and or addressing WASH-related issues'.

METHODS

Sampling and recruitment

In both Ghana and Uganda, we conducted key informant interviews and focus group discussions (FGDs) with journalists, scientists and members of the public.

The scientists whose views were sought distinguished themselves from the others through their involvement in the AfricanSNOWS consortium. The journalists had a special interest in reporting on WASH and other environmental health issues, and the members of the public had a particular interest in addressing WASH and environmental issues, including one in Ghana who worked for a waste disposal company and another in Uganda who worked for a water and sewerage company.

The respondents were purposively selected. In Ghana, one of the co-authors, who is a scientist and a science journalist, helped in recruiting the journalists. He phoned an executive of the Ghana Journalists Association, who identified reporters residing at Kumasi, Ghana. The reporters were then recruited based on their interest in

reporting about scientific issues, including WASH and other environmental health issues.

In Uganda, a co-author, who is a science journalist, helped recruit journalists with a similar interest in the Mbarara region of Uganda. The scientists were purposively selected from the KNUST in Ghana and the MUST in Uganda. In each country, the respective AfricanSNOWS consortium project manager helped recruit scientists and members of the public with interest in WASH and other environmental health issues. The project managers had face-to-face contacts with, or telephoned, scientists and members of the public most of whom had previously participated in AfricanSNOWS consortium activities including workshops.

Data collection tools and process

Respondents were informed of the voluntary nature of the study. Written informed consent was obtained from all respondents before beginning the interviews and the FGDs. The research was approved by the Texas A&M University Institutional Review Board, research ethics committees of the KNUST and MUST, and the research ethics committee of the Uganda National Council of Science and Technology, a body in Uganda that approves research ethics following approvals from review boards of local institutions.

The interview and FGD guides had the same open-ended and closed questions (Kaplowitz & Hoehn 2001). Both the FGDs and the semi-structured interviews began with questions seeking the respondents' places of work, job positions and brief job responsibilities, with a goal of making them comfortable (Guenther *et al.* 2018). The guides solicited answers to our research questions about environmental issues covered by the mass media, and challenges and solutions for engaging with the public with environmental health from the perspectives of scientists, journalists and members of the public (see Supplementary Material). For example, we asked both journalists and scientists to describe their interactions with each other in the context of WASH and other environmental health issues, and whether the interactions were positive. We also asked members of the public to indicate the extent to which these environmental health issues were presented in the mass media with the perspectives of the public. All respondents were asked to describe the challenges and potential solutions in regards to public engagement with WASH and other environmental health issues (see Supplementary Material). The interviews lasted between 19 and 45 min, whereas the FGDs lasted between 45 and 101 min. A researcher with expertise in qualitative research, but who is not involved in the AfricanSNOWS consortium, conducted the interviews and moderated the FGDs.

Data collection occurred in March 2015 and March 2016 in Ghana and Uganda, respectively. Each FGD had at least a scientist, journalist and member of the public (Table 1). The mix of three diverse groups – scientists, journalists and members of the public – in the FGDs

Table 1 | Characteristics of respondents who took part in the study

Data collection method	Ghana ($n = 15$)	Uganda ($n = 20$)
Focus group discussion 1	2 female scientists 1 male, newspaper journalist 1 male member of the public	2 male scientists 1 female radio journalist 1 male, newspaper journalist 1 male member of the public
Focus group discussion 2	1 male scientist 1 male, multimedia journalist 1 female member of the public	2 male scientists 1 female radio journalist 1 male online news reporter 1 male member of the public
Interviews	3 male scientists 1 male, newswire journalist 1 male, newspaper journalist 3 male members of the public	3 male scientists 1 female scientist 1 female radio journalist 1 female TV journalist 1 male, newspaper journalist 3 male members of the public

helped explore different perspectives on a similar topic: public engagement with WASH and other environmental health issues (Kitzinger 1995). The responses were recorded in an audio device and used later for data transcription and analysis.

As shown in Table 1, across the two countries, there were four FGDs involving a mix of scientists, journalists and members of the public; seven interviews with scientists, five interviews with journalists and six interviews with members of the public. Overall, across the two countries, 35 respondents made up of 14 scientists, 11 journalists and 10 members of the public participated in the study (Table 1).

Data analysis

An inductive thematic analysis based on the framework analysis (Gale *et al.* 2013) was conducted on the interview and focus group transcripts. In the thematic analysis, what is identified as a theme is not necessarily dependent on the number of times it is mentioned but whether it helped answer the research questions (Braun & Clarke 2006). In other words, the quality of a theme is valued more than the frequency of statements that make up the theme (Vaismoradi *et al.* 2013).

Two coders with experience in analysing qualitative data used an integrated approach to develop a thematic index from the transcripts. Using Excel spreadsheets, the data were summarized and assigned to three broad themes: evidence of public engagement efforts, challenges of public engagement and facilitators of public engagement. Similar identified themes were grouped and relationships existing between them were explored. The two coders met several times to resolve discrepancies such as the wrong placement of quotes and themes.

RESULTS

In both countries, themes that resulted from the interviews and the FGDs were about (a) current nature of public engagement, (b) challenges of public engagement and (c) facilitators of public engagement.

Evidence of public engagement

In Ghana, members of the public thought that environmental health issues were reported less in media than other issues. Among the few environmental health topics, journalists covered water and sanitation issues more than other environmental health topics. Limited understanding and curiosity among the public on matters related to environmental health was a potential reason for low coverage of such issues in the media.

When it comes to interaction between scientists and journalists, journalists reached out to the scientists more frequently to discuss environmental health stories than the other way around. Such interaction, however, was highly limited to drastic situations such as disaster or epidemics.

> '*Normally they [journalists] would contact you when there is a disaster or there is a problem. (Interview 1, Scientist, Ghana)*'

In Uganda, participants regarded the scientist–journalist interaction important mostly because it is through journalists that scientists reach the public.

> '*Journalist are … the avenues through which we communicate to … the community. (Interview 2, Scientist, Uganda)*'

Although scientists mentioned journalists' inclination to 'catchy' news rather than those that are environmentally significant, there was a consensus on the role of scientists, journalists and the public on reporting environmental health issues. Journalists who were trained in health reporting were considered important assets to public engagement. Members of the public noted scientists' limited involvement in discussing environmental health issues in the mass media.

> '*So we haven't even seen scientist are actively writing media science to guide the community. It is mostly the comments that are made in the media by an expert at a meeting or at a conference. (Interview 5, Member of the public, Uganda)*'

Challenges of public engagement

Scientists' lack of communication training or expertise in communication techniques was a barrier to public engagement. Thus, scientists had difficulties in simplifying the 'scientific' language into a version that the public could understand. The fear of being misquoted, especially during the process of simplifying the language, demotivated scientists from talking to journalists. For example, a journalist said:

> '*Scientists most of the time[s] have problems with journalist[s], because they think if you give them [journalists] information they are going to turn things [around] to their [scientists'] dissatisfaction.' (Interview 8, Journalist, Ghana)*'

Also, the lack of collaboration between scientists and journalists was considered to be a barrier to public engagement with environmental health issues. Journalists had limited knowledge of scientific issues and required expert consultation to report on environmental health issues. However, scientists were not easily accessible mostly due to teaching and research obligations. Additionally, scientists were under constant pressure due to lack of funds within the universities, which limited their time and interest in public engagement.

An important finding was scientists' reluctance to communicate the research findings because they felt that the journalists lacked the knowledge and skills needed to communicate these issues to the public.

> '*Some findings are such that they are very sensitive. So you must be careful how you handle them. If you don't take care, you will create panic, you see, within the populace. (Interview 1, Scientist, Ghana)*'

The apparent lack of interest among the public in environmental health issues was also cited as a barrier to public engagement. Other key barriers to effective public engagement included financial pressure among scientists and journalists, scientists' lack of time, lack of education among the public on environmental health issues, lack of scientists who communicate their research findings outside of journal articles, incomprehensible scientific language of journal articles that cannot be simplified for the mass media and political interference in media coverage.

> '*I think we over-politicize issues here. So anytime you want to talk about issues that affect people directly, sometimes the scientists are unable to speak based on the fact that they may be maligned in terms of thoughts to a political party. (Focus Group Discussion 2, Journalist, Ghana)*'

In Uganda, important barriers to public engagement included public's lack of interest in environmental health issues and their ignorance on the severity of the issues. The public preferred news focussing on immediate consequences and threats, and responded less to the future implications, especially if the news report failed to provide enough justification or emotional appeal.

> '*The stories do not carry the deep human interest … feeling of it, they tend to report mostly like I said disaster water, floods has killed four people. But nobody actually goes beyond the occurrences resulting from this flood, nobody goes into reporting to tell me why the flood, why in this area. (Interview 5, Member of the public, Uganda)*'

Another important barrier to reporting was the lack of funds to cover environmental health stories. Very few organizations supported their journalists to cover environmental health issues because such coverage was expensive.

> '*Every media house in Uganda is a profit making venture and to be honest with you … the owners of this media houses they will tell you they are looking at very cheap content that attracts the audience. (Focus Group Discussion 1, Journalist, Uganda)*'

Much like Ghana, political involvement in news reporting limited journalists' ability to cover a topic of their choices.

> '*There is one main barrier, for example, national water advises us, you cannot write a very very bad report about them [government] exposing their [government's] weaknesses. (Interview 9, Journalist, Uganda)*'

A journalist indicated that scientists are willing to speak with the public if they viewed the story as positive for the

government – '*If I am writing about nutrition, that one is a positive reporting … it is very easy to get a doctor to interview but if … a machine … is not working it becomes difficult for me to get a comment from hospital director because this is a government hospital.*' *(Interview 10, Journalist, Uganda)*

Journalists were often exasperated when the government ignored their suggestions. Lack of investigation by law enforcement or policies through government on critical environmental issues, despite media attention, demotivated journalists from covering such issues.

'*You will write today. Tomorrow we will write the same thing but it will just still mean nothing. (Focus Group Discussion 1, Journalist, Uganda)*'

Much like Ghana, participants from Uganda indicated that they had difficulty in understanding medical jargons or scientific terms.

Facilitators of public engagement

In Ghana, collaborations among corporate bodies, governments, research institutions and media houses were considered integral to promote public engagement. Respondents mentioned the critical role of government agencies such as information service department in publicizing environmental health issues. A collaboration suggested was one involving research institutions and the country's information service department.

'*Maybe the information service department too can do more … to educate us so if the public health officials carry out a research which would be beneficial to the community I believe the information service department too should be empowered to spread these outcomes. (Interview 2, Member of the public, Ghana)*'

Simplifying scientific language and covering stories with narratives and 'human element' could enhance public engagement on environmental health issues.

'*And if they [public] get to know the impact of it, they would gladly accept it whatever you force even down on them. That is one of the things that we have to look at in addressing the problem. (Focus Group Discussion 1, Journalist, Ghana)*'

To avoid misinterpretation, scientists suggested having science experts review news articles before publishing them. At the organizational level, awards or recognition of journalists, training editors and organizational decision-makers on the significance of environmental health issues were mentioned as potential solutions to addressing challenges of public engagement.

In Uganda, the increased interaction between scientists and journalists was suggested to promote public engagement. Journalists viewed themselves as key bridges between the public and scientists in communicating WASH and other environmental health issues.

'*It is our job to entertain, inform and teach people. Because trust me a peasant down there, if you don't teach them garbage near their houses is not good there is no way they will learn. (Interview 9, Journalist, Uganda)*'

For better communication between scientists and journalists, there was a growing interest among participants on the role of public information officers (PIO) in research institutions.

'*We need a communication officer who could also help us to package this thing with the journalist. The journalists become one of our routes of communication. (Interview 2, Scientist, Uganda)*'

Having a science communication training programme that brought together scientists and journalists for interactions was suggested as having the potential to increase public engagement. Social media and conventional channels, such as television and radio, were mentioned as important channels to disseminate environmental health information to the public.

Finally, participants suggested the important role of law enforcement agencies and government in facilitating public engagement with WASH and other environmental health issues. '*The government should come in and may be put a requirement on media houses like a policy maybe 10% of the airtime may be weekly … should be specifically about environment, water and sanitation issues.*' *(Focus Group Discussion 1, Scientist, Uganda)*

DISCUSSION

Using Ghana and Uganda as case studies for exploring public engagement related to WASH and other environmental health issues from the perspectives of scientists, journalists and members of the public, we found that, in general, there was a limited interaction among these key actors. Across the two countries, the evidence of public engagement with WASH and other environmental health concerns appear to be similar. For example, respondents in both countries mentioned the irregular interaction between journalists and scientists. Our findings appear to be similar to those of studies that have accessed scientists–journalists interactions in Ghana (Appiah *et al.* 2015) and the United States (Gunter *et al.* 1999). Although the current study did not specifically quantify the number of interactions, our findings appear to be different from that of the study of biomedical researchers in the United States, Japan, Germany, Great Britain and France that showed increased interactions with media professionals (Peters *et al.* 2008).

Moreover, there appeared to be similar challenges faced by journalists and scientists in both countries. These suggest that similar public engagement interventions could be implemented in both countries, although they need to be adapted to the local context (Bull *et al.* 2010).

Some findings were specific to the countries. In Uganda, respondents mentioned how members of the public were interested more in short-term rather than long-term WASH and other environmental health issues. Such a stance calls for a need for journalists and scientists to frame WASH environmental health issues (Nisbet 2009; Wibeck 2014) in ways that would make members of the public appreciate both the short-term and long-term consequences. These could include the use of images and metaphors (O'Neill & Nicholson-Cole 2009) in communicating environmental issues such as climate change.

In both countries, the potential influence of politics and government was cited as a barrier to scientists interacting with journalists. Given that journalists tend to seek societal and political dimensions of stories especially when covering environmental risks (Dunwoody & Peters 1992), if this challenge is not adequately addressed, it could have a negative impact on engagement with risk issues. In Ghana, scientists indicated a need to review news stories on WASH and other environmental health issues before they are to be published. Journalists, on the other hand, might have organizational pressure not to entertain this request. Such observation reflects the view that perhaps scientists do not know how the media operates and vice versa (Dunwoody & Peters 1992). Moreover, this study identified the need for simplification of scientific terms to aid understanding by the public. However, there is a need to avoid over-simplification, which can be a problem (Pew Research Center for the People and the Press 2009).

Organizational challenges such as a lack of funding for journalists undertaking investigative WASH and environmental stories could also discourage reporters to engage with scientists and members of the public (Hansen 2011). The study by Poliakoff & Webb (2007) also identified a lack of skills as a barrier to public engagement among UK scientists. The lack of efforts by scientific institutions to popularize environmental health research was also identified by Marcinkowski *et al.* (2014).

In both countries, the solutions to the identified problems included increased interaction between journalists and scientists. This could be achieved through strategies such as the formation of scientists–journalists networks, with regular meetings to discuss public engagement with environmental health issues. The network, with funding, could meet at least twice a year to discuss issues relevant to public engagement with WASH and other environmental health issues. Such face-to-face meetings could be complemented with an online platform in the form of a discussion group. To sustain the online discussion group, a moderator may be needed to provide information relevant to the group, although the members may need to be encouraged to initiate interactions. An award scheme could be introduced to reward members of the network for their exemplary public engagement efforts in a particular year. Such networks could increase interactions among scientists and journalists and help build trust. This increased interaction is important to ensure that journalists understand the scientific language because they are key to engaging with the public especially with WASH and environmental risk issues (Covello *et al.* 1987). Conversely, increased interactions are likely to enable scientists understand how media professionals work.

There is a need to train scientists and journalists to engage with each other and help journalists acquire more

WASH and environmental knowledge to serve as mediators for the public (Giannoulis *et al.* 2010; Besley *et al.* 2016). The interactions between scientists and science communicators could lead to strategies that may enhance increased public awareness and changes in behaviour in regards to WASH and other environmental health issues (Davis *et al.* 2018).

In Uganda, the role of PIO in research institutions, who act as responsible entities connecting scientists and journalists, was considered integral in ensuring better public engagement. This finding may well be applicable in Ghana and other African countries. In general, PIOs may be more willing to provide information to journalists, but even then journalists may prefer to interact with scientists as credible sources. In regards to promoting engagement with environmental issues such as disasters, it is necessary to involve PIOs, journalists and scientists together in collaborative interventions to help them understand each other's roles (Lowrey *et al.* 2007). The call for effective collaborations among scientists and journalists identified mirrors that found in a study of only experts regarding handwashing promotion in humanitarian emergencies (Vujcic *et al.* 2015).

In both countries, funding or some forms of rewards for encouraging scientists and journalists to communicate WASH and other environmental health issues seem appealing. For example, journalists could be given small grants to investigate environmental health issues. Already, a two-year initiative that began in 2018 and is being implemented by the African Academy of Sciences gives US$700 per story to journalists from Kenya, Nigeria, Senegal and South Africa to report on scientific issues, including water and sanitation (Otieno 2018). Upon a successful pilot, the initiative may be extended to other African countries, including Ethiopia, Ghana, Malawi, Zambia and Zimbabwe. Similar funding for scientists to engage with journalists to boost public engagement with environmental issues might also be useful. For example, in Zimbabwe, researchers have cited lack of funding as a reason for their lack of interest in engaging with the public (Ndlovu *et al.* 2016). Given that the public as taxpayers have a right to be more informed about scientific issues such as WASH being tackled by scientists (Davies 2013), prioritizing funding for public engagement may be justified. As members of the public become more enlightened on scientific issues, they may be likely to advocate influence policymakers to commit for funding to research.

Our findings have some strengths and limitations. First, our study combines FGD and interview data, thus enhancing data richness (Lambert & Loiselle 2008). Second, that each focus group had all the three key actors – scientists, journalists and members of the public – ensured each perspective was valued (Kitzinger 1995). However, we were aware that having different groups in FGDs could lead to intimidation, especially in instances similar to that of a teacher–pupil relationship. Moreover, larger studies, including surveys with rigorous sampling strategies, are needed to explore this topic, so that the findings could be generalized to the populations of scientists, journalists and the public in the two countries.

CONCLUSION

The current study contributes to the literature on the need to actively engage the public with WASH and other environmental health concerns by integrating the perspectives of scientists, journalists and members of the public to explore the topic. Our findings show that despite the challenges of public engagement with WASH and environmental health issues in Ghana and Uganda, potential solutions exist for strengthening effective engagement among these actors. Disseminating WASH and other environmental health issues accurately to the public is a collective effort that requires the active participation of journalists, scientists and the public. More research is needed to explore the extent to which these actors could engage or collaborate with each other to tackle WASH and related issues.

ACKNOWLEDGEMENT

The authors are grateful to the Wellcome Trust for funding the study (WT102039/Z/13/Z). The support given by the AfricanSNOWS (Scientists Networked for Outcomes from Water and Sanitation) consortium is also acknowledged.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this paper is available online at http://dx.doi.org/10.2166/washdev.2019.019.

REFERENCES

Allen, E., Morazan, I. M. & Witt, E. 2018 Actively engaging women is helping solve the global water crisis. *Journal of Water, Sanitation and Hygiene for Development* **8**, 632–639.

Appiah, B., Gastel, B., Burdine, J. N. & Russell, L. H. 2015 Science reporting in Accra, Ghana: sources, barriers and motivational factors. *Public Understanding of Science* **24**, 23–37.

Bauer, M. W. & Jensen, P. 2011 The mobilization of scientists for public engagement. *Public Understanding of Science* **20**, 3–11.

Besley, J. C. 2015 What do scientists think about the public and does it matter to their online engagement? *Science and Public Policy* **42**, 201–214.

Besley, J. C. & Roberts, M. C. 2010 Qualitative interviews with journalists about deliberative public engagement. *Journalism Practice* **4** (1), 66–81.

Besley, J. C., Dudo, A. D., Yuan, S. & Abi Ghannam, N. 2016 Qualitative interviews with science communication trainers about communication objectives and goals. *Science Communication* **38** (3), 356–381.

Braun, V. & Clarke, V. 2006 Using thematic analysis in psychology. *Qualitative Research in Psychology* **3** (2), 77–101.

Brownell, S. E., Price, J. V. & Steinman, L. 2013 Science communication to the general public: why we need to teach undergraduate and graduate students this skill as part of their formal scientific training. *Journal of Undergraduate Neuroscience Education* **12** (1), E6.

Bull, R., Petts, J. & Evans, J. 2010 The importance of context for effective public engagement: learning from the governance of waste. *Journal of Environmental Planning and Management* **53** (8), 991–1009.

Bybee, A. N. & Johannes, E. M. 2014 Neglected but affected: voices from the oil-producing regions of Ghana and Uganda. *African Security Review* **23** (2), 132–144.

Cohen, E. R., Masum, H., Berndtson, K., Saunders, V., Hadfield, T., Panjwani, D., Persad, D. L., Minhas, G. S., Daar, A. S., Singh, J. A. & Singer, P. A. 2008 Public engagement on global health challenges. *BMC Public Health* **8** (1), 168.

Cornish, L. 2018 *Challenges Facing SDG 2030 Deadline for Safe Water and Sanitation*. Available from: https://www.devex.com/news/challenges-facing-sdg-2030-deadline-for-safe-water-and-sanitation-93249.

Covello, V. T., von Winterfeldt, D. & Slovic, P. 1987 Communicating scientific information about health and environmental risks: problems and opportunities from a social and behavioral perspective. In: *Uncertainty in Risk Assessment, Risk Management, and Decision Making* (V. T. Covello, L. B. Lave, A. Moghissi & V. R. R. Uppuluri eds). Springer US, Boston, MA, pp. 221–239.

Davies, S. R. 2013 Research staff and public engagement: a UK study. *Higher Education* **66** (6), 725–739.

Davis, L., Fähnrich, B., Nepote, A. C., Riedlinger, M. & Trench, B. 2018 Environmental communication and science communication – conversations, connections and collaborations. *Environmental Communication* **12** (4), 431–437.

Dijkstra, A., Roefs, M. M. & Drossaert, C. H. 2015 The science-media interaction in biomedical research in the Netherlands. Opinions of scientists and journalists on the science-media relationship. *Journal of Science Communication* **14** (2), A03.

Dunwoody, S. & Peters, H. P. 1992 Mass media coverage of technological and environmental risks: a survey of research in the United States and Germany. *Public Understanding of Science* **1** (2), 199–230.

Furlong, C. & Tippett, J. 2013 Returning knowledge to the community: an innovative approach to sharing knowledge about drinking water practices in a peri-urban community. *Journal of Water, Sanitation and Hygiene for Development* **3** (4), 629–637.

Gale, N. K., Heath, G., Cameron, E., Rashid, S. & Redwood, S. 2013 Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology* **13** (1), 117.

Giannoulis, C., Botetzagias, I. & Skanavis, C. 2010 Newspaper reporters' priorities and beliefs about environmental journalism: an application of Q-methodology. *Science Communication* **32** (4), 425–466.

Goven, J. & Langer, E. R. 2009 The potential of public engagement in sustainable waste management: designing the future for biosolids in New Zealand. *Journal of Environmental Management* **90** (2), 921–930.

Guenther, L., Weingart, P. & Meyer, C. 2018 'Science is everywhere, but no one knows it': assessing the cultural distance to science of rural South African Publics. *Environmental Communication* **12** (8), 1046–1061.

Gunter, B., Kinderlerer, J. & Beyleveld, D. 1999 The media and public understanding of biotechnology: a survey of scientists and journalists. *Science Communication* **20** (4), 373–394.

Hansen, A. 2011 Communication, media and environment: towards reconnecting research on the production, content and social implications of environmental communication. *International Communication Gazette* **73** (1–2), 7–25.

Kaplowitz, M. D. & Hoehn, J. P. 2001 Do focus groups and individual interviews reveal the same information for natural resource valuation? *Ecological Economics* **36** (2), 237–247.

Kitzinger, J. 1995 Qualitative research. Introducing focus groups. *BMJ* **311** (7000), 299–302.

Lambert, S. D. & Loiselle, C. G. 2008 Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing* **62** (2), 228–237.

Lowrey, W., Evans, W., Gower, K. K., Robinson, J. A., Ginter, P. M., McCormick, L. C. & Abdolrasulnia, M. 2007 Effective

media communication of disasters: pressing problems and recommendations. *BMC Public Health* **7** (1), 97.

Marcinkowski, F., Kohring, M., Fürst, S. & Friedrichsmeier, A. 2014 Organizational influence on scientists' efforts to go public: an empirical investigation. *Science Communication* **36** (1), 56–80.

Massarani, L. & Peters, H. P. 2016 Scientists in the public sphere: interactions of scientists and journalists in Brazil. *Anais da Academia Brasileira de Ciências* **88** (2), 1165–1175.

Matheson, S. 2016 A scientist and a journalist walk into a bar …. *Cell* **167** (5), 1140–1143.

McCallie, E., Bell, L., Lohwater, T., Falk, J. H., Lehr, J. L., Lewenstein, B. V. & Wiehe, B. 2009 *Many Experts, Many Audiences: Public Engagement With Science and Informal Science Education*. A CAISE Inquiry Group Report 1. Center for Advancement of Informal Science Education (CAISE), Washington, DC.

Ndlovu, H., Joubert, M. & Boshoff, N. 2016 Public science communication in Africa: views and practices of academics at the National University of Science and Technology in Zimbabwe. *Journal of Science Communication* **15** (6), 1–29.

Nisbet, M. C. 2009 Communicating climate change: why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development* **51** (2), 12–23.

O'Neill, S. & Nicholson-Cole, S. 2009 'Fear won't do it': promoting positive engagement with climate change through visual and iconic representations. *Science Communication* **30** (3), 355–379.

Otieno, S. 2018 *Initiative to Build African Science Journalism Capacity*. Available from: https://www.scidev.net/sub-saharan-africa/.

Peters, H. P. 2013 Gap between science and media revisited: scientists as public communicators. *Proceedings of the National Academy of Sciences* **110** (Supplement 3), 14102–14109.

Peters, H. P., Brossard, D., de Cheveigné, S., Dunwoody, S., Kallfass, M., Miller, S. & Tsuchida, S. 2008 Science-media interface: it's time to reconsider. *Science Communication* **30** (2), 266–276.

Pew Research Center for the People and the Press 2009 *Public Praises Science; Scientists Fault Public, Media*. Pew Research Center, Washington, DC.

Poliakoff, E. & Webb, T. L. 2007 What factors predict scientists' intentions to participate in public engagement of science activities? *Science Communication* **29** (2), 242–263.

Rowe, G. & Frewer, L. J. 2005 A typology of public engagement mechanisms. *Science, Technology, & Human Values* **30** (2), 251–290.

Seppälä, O. T. 2002 Effective water and sanitation policy reform implementation: need for systemic approach and stakeholder participation. *Water Policy* **4** (4), 367–388.

Stewart, A. & Gray, T. 2006 The authenticity of 'type two' multistakeholder partnerships for water and sanitation in Africa: when is a stakeholder a partner? *Environmental Politics* **15** (3), 362–378.

Vaismoradi, M., Turunen, H. & Bondas, T. 2013 Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nursing & Health Sciences* **15** (3), 398–405.

Vujcic, J., Ram, P. K. & Blum, L. S. 2015 Handwashing promotion in humanitarian emergencies: strategies and challenges according to experts. *Journal of Water, Sanitation and Hygiene for Development* **5** (4), 574–585.

Wibeck, V. 2014 Enhancing learning, communication and public engagement about climate change – some lessons from recent literature. *Environmental Education Research* **20** (3), 387–411.

Wilson, Z., Malakoana, M. & Gounden, T. 2008 Trusting consumers: involving communities in municipal water service decision making in Durban, South Africa. *Water SA* **34** (2), 141–146.

World Health Organization 2014 *Public Health and Environment in the African Region: Report on the Work of WHO, 2012–2013*. World Health Organization Regional Office for Africa, Brazzaville.

World Health Organization 2015 *Progress on Sanitation and Drinking Water: Update and MDG Assessment*. UNICEF and World Health Organization, New York.

First received 24 January 2019; accepted in revised form 22 August 2019. Available online 12 December 2019