Crossfire: Can water safety plans help in managing risk for the poor inhabitants of unplanned, peri-urban areas?

KEVIN TAYLER and SAM GODFREY

In our regular debate between experts, Kevin Tayler and Sam Godfrey discuss 'Can water safety plans help in managing risk for the poor inhabitants of unplanned, peri-urban areas?'

Dear Kevin,
It gave me great pleasure that *Waterlines* accepted my offer of being part of a debate related to water safety plans (WSPs) in peri-urban areas. Having been involved in WSPs for more than a decade and published some of the earliest books and papers on the application of WSPs in low income areas (see Godfrey and Howard 2004), it seemed appropriate for me to argue that WSPs are a practical water quality management solution.

WSPs are a practical water quality management solution

As noted by the former president of the International Water Association (IWA), Michael Rouse, water safety plans are 'the most significant water-related public health development since the introduction of chlorine'. The adaptation of the HACCP (hazard analysis critical control point) approaches from the food industry to WSPs in the water industry in the late 1990s has resulted in successful examples of the application of WSPs in peri-urban areas in countries as diverse as Bolivia, India, Kenya, Haiti and Uganda. WSPs have been applied to primary, secondary and tertiary piped water supply networks. They have been modelled in community tapstands and re-sale household connections and more recently have been adapted for water selling kiosks and household water treatment systems.

WSPs are 'the most significant water-related public health development since the introduction of chlorine'

During two international meetings on WSPs in 2010 (one at the University of North Carolina and the second IWA specialist conference in Malaysia) an exhaustive list of *knowns* and *unknowns* related to the practical application of WSPs was developed. The *knowns* included the fact that WSPs have proven public health benefit, are an excellent tool for undertaking an engineering system analysis, promote change in water utility operator behavior to ensure that better quality water is supplied to all areas (including peri-urban areas) and are a means of establishing effective preventive

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maintenance programmes. The *unknowns* related to the cost-effectiveness of WSPs, the need for more comprehensive analytical laboratory capacity and the complexity of managing WSPs in small rural systems.

From my practical experience of applying WSPs in peri-urban communities in various countries in Africa and Asia, WSPs are without a doubt a more practical solution than previous water quality monitoring and surveillance approaches. I argue this for three reasons:

WSPs are without a doubt a more practical solution than previous approaches

1. WSPs force the water suppliers to undertake a complete systems engineering assessment, which consequently results in a reduction in unaccounted for water (UFW) and therefore increased revenue and potential investment in the overall system upgrade.
2. WSPs consider risk from a public health perspective that combines physical risk points (i.e. hazard sources in the vicinity of a vulnerable point in the network) and population susceptibility (i.e. ensuring better water for lower income areas).
3. WSPs promote effective *risk communication* by water suppliers in peri-urban areas through the publication of both sanitary inspection risk data combined with more applicable microbial testing.

Yours,
Sam

Dear Sam,
You make a very good theoretical case for water safety plans. I recognize the importance of some aspects of the approach, particularly the emphasis on collecting, ordering and using information. Indeed, I would concede that a water safety plan approach could provide the stimulus for the collection of basic information about the water system. One aspect of my resistance to the idea of water safety plans is that it seems to me that water safety should be central to the thinking of any organization with water and sanitation responsibilities, not hived off into a 'special' plan. I think that this hiving off happens with environmental management plans, which consume significant resources during the planning of any project funded by an international agency but are usually seen as completely peripheral by water and sanitation utility staff. This is not an absolute objection. My reading of the literature suggests that it should be possible to integrate a concern with water safety into an overall operational planning process although I would prefer to talk

Water safety should be central to thinking, not hived off into a 'special' plan

in terms of operational planning rather than purely water safety planning. Indeed, I would say that in an ideal world, this should be the norm.

Unfortunately, we do not live in an ideal world. Most of the approaches to planning for the water sector, including water safety plans, assume organizations that already function fairly well, are imbued with a planning culture, are staffed by well-trained people who analyse problems, have sufficient funds to implement plans, are free of political pressure and have access to channels for coordinating their efforts with other concerned stakeholders.

Unfortunately, where I am now, sitting in Sukkur in Pakistan's Sindh Province, and indeed from most of the places I have worked over the last 30 years, most of these conditions do not apply. The reality in many towns, even quite large towns, is that the day-to-day running of the system is left to junior staff, whose knowledge comes almost entirely from experience, some of it good and some of it not so good. In municipal systems in particular, the engineers who are in charge are usually civil engineers with very little interest in operational matters, with the result that O&M becomes a Cinderella subject.

The plan can end up gathering dust on a shelf while urgent operational deficiencies remain

In such circumstances, the key problems are often fairly obvious but routinely ignored. For instance I guarantee that I could go anywhere in an informal area in India or Pakistan and show you a galvanized steel water main laid through or along a wastewater drain within 500 metres. This is clearly a key water safety issue, arguably the key issue, since any protective measures taken upstream in the system will be ineffective against the massive contamination that will occur if the main leaks. Of course, none of these systems is continuously pressurized.

Another example from India occurs to me. While working in Andhra Pradesh a few years ago, I visited around a dozen municipal waterworks. All had gas chlorination facilities but in only one case was the chlorinator working. Waterworks staff were injecting chlorine gas directly into the water supply, with huge escapes of excess chlorine, a clear health hazard for employees. Both of these examples are issues that would presumably be picked up in a water safety plan but my point is that they would also emerge from the most rudimentary assessment of risk. Indeed, there could be a danger that following a water safety plan approach in such circumstances would broaden the focus of attention to such an extent that urgent needs could become subordinated to the need to produce the 'plan'. This could lead to a loss of focus so that the plan, if produced, ends up gathering dust on a shelf while

urgent operational deficiencies remain.

The immediate need is not so much for a plan as for a basic change in mind-sets

The two examples that I have given suggest that the immediate need is not so much for a plan as for a basic change in mind-sets. The fact that water mains are laid through active drains is not a planning problem but a mind-set problem. Similarly, the main cause of the chlorine dosing example given above is a lack of concern with basic operational procedures. When we researched strategic approaches to sanitation planning a few years ago, we found that planning would only be effective if it recognized and dealt with these factors rather than assuming that organizations and individuals already shared a planning culture.

Planning would only be effective if organizations and individuals already shared a planning culture

Over and above this, I have some reservations about the water safety plan approach as set out in the literature. The first step in the process is to form a steering committee. My experience suggests that steering committees are often ineffectual and so it worries me that the requirement to form such a committee is central to the whole water safety plan process. A more general reservation concerns the fact that the process appears to be fairly complicated and very time consuming. It might be appropriate for a large organization such as Melbourne Water or even for a well-organized organization such as the National Water and Sewerage

The process appears to be fairly complicated and very time consuming

in Uganda. Unfortunately, my interactions with managers in more typical organizations in developing countries suggest that very few would have either the motivation or the resources to work through the procedure in full. This illustrates a basic problem with documents of the type represented by the WHO/IWA's *Water Safety Plan Manual*. They start from where their drafters are rather than from where the people that will be required to use them are.

To give an example, the manual gives a list of areas to be covered by a water safety plan and goes on to say 'if a water utility considers that some of these areas fall outside its WSP approach, then it does not have a comprehensive WSP strategy and has not fully understood the concept'. This seems to preclude the possibility that a manager might decide to take a less comprehensive but more focused approach to assessing risks and developing a strategy, commensurate with the capacity of the organization to implement the approach. Last, but not least, it needs to be recognized that coordination between different organizations is difficult, indeed impossible, if some of the key organizations show no interest in engaging with the process.

To sum up, while the water safety plan approach addresses some important issues, I doubt whether there are many developing country utilities

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in which it would be possible to use it at present. We need to recognize that we have to go beyond conventional plans to address the need for the changes in mind-sets, institutional structures and procedures without which meaningful change will be impossible. A simplified water safety planning approach, envisaged as an essential part of an overall approach to operational planning, might help to achieve such change but only if it forms part of a strategy to bring about needed institutional change. Trying to apply the approach, as set out in the WHO Guidelines will achieve little and is likely to be quickly replaced by the latest development industry magic bullet. This would be a pity because there are some valuable insights in the water safety plan approach.

Kind regards,
Kevin

Utilities are becoming more and more commercial and are therefore in need of WSP-type plans

Dear Kevin,

Magic bullet or no magic bullet, your reply suggests you agree that the water safety plans are a useful tool for water utilities. However, you note that in its current form the WHO and IWA guidance documents are too complicated and will be difficult to implement in the majority of urban/peri-urban areas. Outlined below are responses to your specific concerns.

Firstly, you state that WSPs should not be 'ignored in the same way as environmental management plans', and therefore there is a need to 'integrate a concern with water safety into an overall operational planning process'. WSPs are fundamentally different from environmental management plans, as delivery of *safe* water is a core component of a utility's function as opposed to potential environmental impacts which are considered as secondary priorities.

Secondly, you mention that the *non-ideal world* that we live in results in many water utilities being run by 'civil engineers with very little interest in operational matters, with the result that O&M becomes a Cinderella subject'. With the privatization and sub-leasing of many urban and small town water supply schemes, there has been a shift towards optimizing performance of networks to ensure improved revenue generation. Utilities are becoming more and more commercial and are therefore in need of WSP-type plans to identify areas of high UFW and reduced safety.

Thirdly, you note that the 'immediate need is not so much for a plan as for a basic change in mind-sets'. The rationale behind forming an inter-disciplinary steering group is to ensure that operations, finance, asset management and customer service employees of a utility address water safety as a key part of their business.

I would like to bring us back to the objective of this *Crossfire* which is a discussion related *not* to the relevance of WSPs for utilities but to the relevance for peri-urban areas. In my opening comments, I stated that there are a number of successful examples of where WSPs have been applied. In my application of WSPs in peri-urban areas of Kampala, Uganda, and in Guntur, India, amongst other places, the greatest challenge I noted was a lack of knowledge of the secondary and tertiary infrastructure on the ground. *Knowing your system* is fundamental to WSPs and goes hand in hand with improved revenue generation. For example, many utilities are moving towards not only household metering but also metering of kiosks and standpipes. As you know from your experience, willingness-to-pay surveys throughout the world note that even poor communities in peri-urban areas are willing to pay for water if it is in sufficient quantity and quality (at convenience). A WSP for a kiosk in a peri-urban area does not guarantee sufficient quantity and quality but it does improve the likelihood of delivering a better service.

Knowing your system is fundamental to WSPs and goes hand in hand with improved revenue generation

Secondly, many utilities in developing countries are dependent on external donor-funded projects which are based on a master plan. Historically, these master plans focused on infrastructure upgrading and pipe replacement and need to pay sufficient attention to water safety. With the push by IWA/WHO on the WSP agenda, I have noted that there has been increased interest in the inclusion of water safety in piped water supply master plans.

Thirdly, and lastly, the establishment of regulators in a number of African and Asian countries (including in Mozambique) has resulted in greater emphasis on water safety. Cholera outbreaks and other water-related diseases often occur in peri-urban areas. By including a WSP, the regulator has at least a better idea of where and how these outbreaks occur and what mitigation actions need to be taken to reduce the risk of reoccurrence.

There are a number of other points that I wanted to raise related to health-based target setting, sanitary surveillance and chemical quality control which I cannot discuss owing to a lack of time and word limit in this crossfire. I would therefore like to end by stating that WSPs have done one key thing and that is to reignite the discussion on the importance of water safety.

WSPs have done one key thing – reignite the discussion on the importance of water safety

Yours,
Sam

Dear Sam,
I do agree that water safety should be central to any water provider's thinking. In this

respect, I take the point that water safety plans are rather different from environmental management plans although I suspect that my environmental colleagues might beg to differ. Still, for me the question remains whether water safety plans on the WHO/IWA model are an appropriate tool in some or all circumstances. I have no real problem in conceding the 'some' part of this statement, although I do suspect that most water providers would only ever use the WHO/IWA model in a modified and probably considerably simplified form. I do still have considerable reservations about the utility of trying to produce a water safety plan, whatever the background circumstances. Rather, I would prefer to emphasize the importance of putting water safety at the centre of a water provider's concerns.

Working through a water safety plan process provides a way of raising awareness

Getting people to work through a water safety plan process might provide a way of raising people's awareness of the issues and so act as a catalyst for change. However, I think that this process would have to be simpler and probably more open-ended than suggested by the WHO and IWA guidance documents. Otherwise, there is a real danger that the water safety plan will be seen as an end in itself and that, like other plans produced or driven by outsiders, it will be seen as an external intervention and will have no influence on the day-to-day operation of the water supply system.

There is a real danger that the WSP will be seen as an end in itself

I am less optimistic than you about the privatization and sub-leasing of components of the water supply network. Both have their place and I think the sub-leasing option is an interesting one, albeit one that has not, in my experience, been used very often. While private sector involvement has a place in improving performance, it is not a guarantee that ways of thinking and acting will change. Any utility worth its salt would be concerned by the high levels of UFW and reduced safety found in its systems but the unfortunate reality is that the majority of those that I have dealt with have little interest in addressing these issues. This is not an argument for not trying to do things better – quite the reverse. What it does suggest to me is that the approach to bringing about change will often have to be more subtle than that suggested by the WHO/IWA guidelines.

I have no problem with setting up a group to look at the ways in which a water provider can act to improve water safety. Indeed, I would hope that in a well-run organization, regular meetings on water safety would be held anyway. I am, however, suspicious of committees, particularly when they are required as part of an externally defined planning process.

Finally, some thoughts on peri-urban areas: I have argued

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We have to pay more attention to where water providers are now and resources available

throughout that the problem with water safety plans is that the institutional conditions for applying them, in the form proposed by WHO/IWA often do not exist. This is more likely to be true in peri-urban areas, which are not normally formally planned, where government systems are often at their weakest and where formal water supply services are usually poor or non-existent. Planning in such areas is likely to be particularly difficult, not least because it implies a significant change from the procedures through which they have been developed.

To sum up my argument: I am fully convinced that water safety should always be a central concern for each and every water provider. I would see water safety plans as one way of achieving this aim but would only consider a planning process following the WHO/IWA guidelines where it is clear that the institutional conditions are right. Unfortunately, in many cases, that will not be the case and we need to look at other ways of approaching water safety. In doing so, I believe that we have to pay much more attention to where water providers are now and develop approaches that are recognizable to them and which are compatible with the often very limited resources that are available to them.

Kind regards,
Kevin

References

Godfrey, S. and Howard, G. (2004) *Water Safety Plans – a guidance manual*, WEDC, Loughborough, UK.