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## Scaling-up Interventions for Safe Water

**T**he latest report from the WHO/UNICEF Joint Monitoring Programme (JMP) in 2008 pointed towards real progress being made in regards to water supply, particularly in that over half the global population now receives piped drinking water directly into their homes. With this increase in the global population having access to 'improved' sources of drinking water there are mounting challenges for managing the quality of these supplies. Many of these improved sources via piped connections are intermittent or otherwise compromised requiring interventions that reduce the risks to public health.

The rewards of effectively managing water, sanitation and health are significant. The 2008 report from WHO 'Safer water, better health' suggests that nearly 10% of the global disease burden could be prevented by improving water supply, sanitation, hygiene and management of water resources. Furthermore, a report published in June by the International Scientific Forum on Home Hygiene indicates that "... a significant proportion of global infectious disease could be prevented through improved hygiene practice coupled with provision of adequate water and sanitation."

Success stories from effective intervention strategies for improving water quality range from household-based approaches to integrated city-wide initiatives such as Water Safety Plans (WSPs). Each successful intervention brings with it optimism for widespread application and grand promises for alleviating a portion of the global disease burden attributed to lack of safe drinking water. But in reality replicating these success stories – or 'scaling-up' – is difficult to do. These difficulties can be attributed to a number of factors including a common desire to see immediate impact

without considering the need for a more incremental approach to improving water safety over a long period of time; differing or conflicting strategies from NGOs, multi-laterals, donor agencies etc in promoting interventions, and; lack of executive political commitment amongst others.

Many of these factors point towards the need for a more harmonised approach to promoting intervention strategies between sector support agencies – professional associations, multi-lateral agencies, donor agencies and banks. Such an approach will establish a framework for achieving long-term impact on improving water supplies and health which considers a range of interventions. This will provide a sound basis for subsequent advocacy, planning and implementation activities.

In a recent meeting in Geneva, Switzerland a number of organisations, including IWA, WHO, UNICEF, the African Development Bank, WaterAID and other multi- and bi-laterals discussed the basis for establishing this harmonisation amongst stakeholders. Coupled to this is the increasing number of organisations supporting interventions such as WSPs including UNHABITAT, CAP-NET, WSP / World Bank, AusAID, USAID, DfID and many more.

There is consensus that interventions such as Household Treatment and Safe Storage (HWTSS) and WSPs are effective in reducing waterborne disease; there is commitment from a variety of organisations to continue financing and promoting these interventions and there is a demand from governments and water professionals for support in implementing them. The challenge now is to provide consistent and coherent multi-lateral support in a way which empowers local stakeholders to make long lasting improvements to water safety through a portfolio of intervention strategies. ■

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supplier's performance; (5) optimization of on-line control equipment.

WSP are becoming essential tools for drinking water organizations. ISO 22000 certification allows WSP validation by independent organizations and an evolution to a more holistic and integrated system, giving the utility the capacity to simultaneously focus in critical issues

and evaluate all the data, information and knowledge available.

Drinking Water Product certification allowed Águas do Algarve, SA to focus in water quality goals (ISO 22000 focus is on health goals) sustained in a very solid and reliable management system, improving the confidence in the water quality supplied in the Algarve region. ■

### About the authors

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## AquaSafe: an R&D complement to Bonn Network tools to support Water Safety Plans implementation, exploitation and training

The gathering and application of data from catchment to consumer presents a challenge to any water utility. **Adelio Silva** talks about a research project looking at an integrated solution for managing information.

**The safety of drinking-water depends on a number of factors, including quality of source water, effectiveness of treatment and integrity of the distribution system that transports the water to consumers. At every stage in the production and delivery of drinking-water, hazards can potentially compromise the quality of the water.**

The implementation of a water safety plan, by defining a set of procedures and actions intending to promote control of the water quality from the catchment to the consumer, is indeed a step forward to guarantee the quality of the water distributed.

Although a water safety plan has this fundamental added-value of systematizing procedures and actions (preventive or corrective), its effectiveness in operational terms relies on timely access to useful information. Such requirements are sometimes difficult to meet, which is indeed a paradox because, more often than not, a lot of critical data needed by a water safety plan is already there. It is scattered

within the organization, it has different formats, but the fact remains that the water utility it is already paying for it.

Hidromod's work with water utilities in several European countries lead the company (a spin off from IST<sup>1</sup>) to a clear understanding about the need for tools to integrate existing information to optimize the operation, anticipate problems and improve the interaction between the different activities within an organization.

AquaSafe R&D project<sup>2</sup>, joining Hidromod (as coordinator), Action Modulers (another spin off), IST1 and several Portuguese water and wastewater utilities, is developing answers to those questions, integrating data, already existing in water utilities, to deliver useful information tailored to specific needs. The tailoring process may require, in some cases, coupling of existing or commercially available modelling tools, which are considered by the project as mere instruments to support the main objectives, sometimes contradictory: increase productivity and enhance safety.

For the project, the water safety plan professional is another relevant "client" of timely and useful information and therefore project deliverables will include a set of diagnostic, prognostic, reporting and dissemination tools that may help to evaluate risks, evaluate the most suitable preventive and corrective actions and to optimize the operational monitoring. All of this is being developed with a close attention to WHO and IWA adopted methodologies for water safety plans, for

instance in the context of IWA Bonn Network.

As for water safety plans, the first step refers to the quality of the water sources. Therefore, a set of tools integrating models and data capable to support early warning systems are included in the project workplan. With commonly available field data, such tools may help for instance to link rain events with potential threats for water quality and to evaluate the potential effects of different engineering works or operational options in reducing the risk of non-compliance.

Once the water is treated and pumped into the network, new processes and concerns take place. Presently, it is a wide spread practice to control water quality in the network with sensors combined with non-remote routine monitoring procedures. The sensors are capable to deliver data in almost real time, but only for a few number of parameters. Instead, much more parameters can be determined with the non-remote monitoring, but not in real time (e.g. daily, weekly, monthly). As a result there is always a limited knowledge of what is happening in real time in the network and, consequently, when a threat is detected it is difficult to define the areas at risk.

However, although it is not possible to monitor everything, everywhere, every time, the potential of that knowledge of the status of some parameters in a small set of points in the network should not be overlooked. As a first approach, warnings for relevant threats can be based on that data. Simultaneously, the same data may

also be used to validate network models, which many utilities have implemented or are implementing. Once validated, those models may also be running in real time. As a result there will be available many “virtual” sensors all over the network, providing new and important sources of data and ultimately leading to the implementation of a cost-effective warning system for failures and health risks. The sensors (real or virtual) are capable to deliver almost in real time the values of parameters such as free chlorine, water pressure, dissolved oxygen and turbidity. Sudden anomalous changes in any of these parameters may indicate a problem with the system and the need to take corrective measures. Indeed, the integration of data and network models, enable to search for cause-effect relationships and to define potentially affected areas in case of emergency.

The example above makes clear the concept of AquaSafe, as it shows how, at a limited additional cost (most of it is or will be there), a set of very common tools can be combined to define, when needed, the proper actions to reduce public health risks and hazards, as well as the liability of the water utility.

Additional modeling tools can also be used to define procedures to operations in the network, such as the valves to operate in case of need to close a section,

optimize the chlorination process in order to keep the appropriate free chlorine levels along the network, define areas for network purging actions, optimize energy consumption, etc. In any case, regardless of the scope of existing modeling tools in a specific utility, the information is vital and that’s where AquaSafe is aiming.

Another relevant aspect of any water safety plan is the training of the staff responsible for the operation. In a crisis situation, most of the times, the effectiveness of a proper response depends on the level of train of the people involved. The availability of a network model coupled with a database of events (similar to the one under construction in AquaSafe), may help to develop and test the operational level of response, by simulation with real life scenarios built on past information. As a productivity tool, AquaSafe will meet user needs also in respect to automatic reporting capabilities and approaches to improve the communication with the public.

Bringing together these capabilities and making them work in real operational environments is particularly challenging when it comes to design the interface with the people that, in real life, will be in charge and take the responsibility for the decisions. The experience shows that most of the water utilities already have a lot of

data, based in state of the art data systems, and that most of the times that existing data is difficult to use even for most simple reporting purposes. For this reason, one of the prime objectives of AquaSafe is to respond to the needs of those in charge: timely access to useful information. That is also relevant for cost-effective implementation and management of water safety plans.

Finally, Hidromod consortium would like to express the appreciation by all contributions received, especially those given by AquaSafe Advisory Board that Águas de Portugal, IWA, SABESP (Brazil) and CETESB (Brazil) kindly accepted to join. ■

#### References

- <sup>1</sup> Instituto Superior Técnico – Engineering School of the Technical University of Lisbon
- <sup>2</sup> Co-funded by Agência de Inovação / Quadro de Referência Estratégico Nacional

#### About the authors

**Adelio Silva** is a civil engineer and founding partner of Hidromod

#### NEWS

### IWA-WHO Water Safety Conference set for Malaysia 2010

Following on from the successful WSP conference in Lisbon, Portugal in May 2008, IWA and WHO will be organizing the next conference in Malaysia in 2010. The final dates have yet to be set but will be communicated soon. The conference programme will look to expand on the theme of WSPs and provide a more comprehensive programme looking at a range of safe water management strategies – from household-level management to city-wide strategies. See [www.iwa-ws2010.org](http://www.iwa-ws2010.org) for more details.

Source: *IWA*

#### NEWS

### US Lends Support to WSP Implementation in Developing Countries

The recently released Fourth Annual Report to Congress on Water and Sanitation Strategy in Developing Countries from the US Department of State highlighted the role of various US agencies – including CDC and USEPA – in supporting the implementation of WSPs in developing countries. The report highlighted the contribution of these agencies to the establishment of the Latin American and Caribbean Network WSP Network (<http://www.bvsde.paho.org/wspnetwork>) and also the launch of a web-based repository for WSP resources ([www.wspportal.org](http://www.wspportal.org)). IWA are partners for both of these initiatives.

Source: *US Department of State*

#### NEWS

### Chinese Translation of WSP Manual Now Online

A Chinese translation of the WHO-IWA Water Safety Plan manual is now available to download from [www.iwahq.org](http://www.iwahq.org)

Source: *IWA*