

Conclusions and suggestions

- The technique of SODIS using bottles effectively inactivates faecal coliforms from a variety of water sources.
- There is a positive effect in reducing waterborne diseases when SODIS is used.
- SODIS was adopted in the groups, but an important question remains as to the total effectiveness of SODIS to destroy protozoa that cause disease.
- The technique is acceptable to the rural community, who find it easy to use, low cost, firewood saving and time saving.
- It is essential to ensure an adequate supply of PET bottles for SODIS adoption to be successful.

- SODIS should be further promoted as an acceptable method of disinfecting water for household water and thereby reducing the risk of waterborne diseases.

About the authors

Stephen Burgess and Collins Onyonge are with ACK Eldoret Region, Christian Community Services. Stephen Burgess may be contacted at sburgess@africaonline.co.ke

References

- 1 Acra, A, Z. Raffoul, Y. Karahagopian (1984) *Solar Disinfection of Drinking Water and Oral Rehydration Solutions. Guidelines for Household Application in Developing Countries*, published for UNICEF by Illustrated Publications, SAL, Beirut, Lebanon;
- Wegelin, M, et al. (1994) 'Solar water disinfection: Scope of the process and

analysis of radiation experiments', *J Water SRT-Aqua*, Vol. 43, No. 3, 154–169.

Lawand, T. A. et al. (1988) 'Solar Water Disinfection', in proceedings of a workshop held at the Brace Research Institute, Montreal, Quebec, Canada. IDRC.

Sommer, B. et al. (1997) 'SODIS – an emerging water treatment process', *J Water SRT-Aqua*, Vol. 46, No. 3, 127–37.

- 2 EAWAG (2002) 'SODIS Technical Notes 1–17', and FAQ, EAWAG/SANDEC, <http://www.sodis.ch>
- 3 Burgess, S. J. and C. Onyonge (2004) unpublished project reports, ACK Eldoret Region, Kenya.
- 4 Burgess, S.J., C. Onyonge and Nyaga (2004), unpublished data, ACK Eldoret.
- 5 WHO (1993) *WHO Guidelines for Drinking Water Quality*, 2nd ed. Vol. 1 – Recommendations, pp 8–29. WHO: Geneva.

software review

Performance Indicators for Wastewater Services – IWA Manual of Best Practice

R. Matos, A. Cardoso, R. Ashley, P. Duarte, A. Molinari and A. Schulz, ISBN: 1900222906, 192pp, £52.50 / US\$84.00 / €84.00 (IWA members); £70.00/ US\$112.00 / €112.00 (non-members)

Many water utilities in developing countries struggle to achieve acceptable levels of performance, but there is often a lack of an effective system for monitoring and evaluating the quality of their services. As a result, and especially with moves towards greater involvement of the private sector, there is increasing interest from both operators and regulators in methodologies to quantify performance as a management tool.

This new *IWA Manual of Best Practice*, combined with SIGMA software, consists of a performance indicator methodology which simplifies an otherwise complex evaluation procedure. The methodology benefits from experience based upon a similar approach in the water supply sector, which has been revised following three years of evaluation. This experience has enabled the wastewater services manual to be developed in a way that is more directly responsive to user needs and perspectives. The wastewater performance indicator manual has maintained the generic principles and approach adopted in the original water supply manual, with adaptations necessary for application to wastewater services.

Sigma Lite is the freeware software package, which incorporates the methodology to guide the process of selecting and implementing a system of indicators for the utility. Indicators can be tracked in time to discover how the utility's performance is evolving, or can be compared with indicators from other companies (benchmarking) in order to assist utility managers in their decision-making processes. Sigma Lite features all the indicators, variables and context information in the IWA methodology, but has limited features. A more advanced and versatile version of the software is also available, but this needs to be purchased separately.

The layout of the manual and software is clear and well structured. Utilities in developing countries should not have too much difficulty acquiring the skills to operate the program. Of course, the results from any software are only as good as the input data. The key issue regarding the applicability of the methodology and the software in developing countries is therefore the availability of reliable data for the input variables, which in many cases may be a significant limitation. However, the software has been designed in such a way that as few or as many of the parameters as are available may be utilized, and this should therefore make the program useful for the majority of service providers, large and small.

In summary, this product will be an invaluable management tool for all those concerned with managing the performance of wastewater services, including

utility managers and policy makers, regulators and other stakeholders.

Managers of service providers – both in the public and private sector – as well as those responsible for regulation increasingly need to consider the options available for developing a comprehensive system for gauging the quality of the services that they offer. The IWA performance indicator methodology offers an excellent system for enabling this to be possible. For the benefits that it offers, the product is well worth the money.

Those who want to download the software for free without the manual and user guide, can obtain it from the internet at www.sigmalite.com.

If you are considering purchasing this IWA product, you should also have a look at alternatives such as the World Bank's *Benchmarking Water and Sanitation Utilities Start-up Kit*. This is also available for free from the internet at http://www.worldbank.org/html/fpd/water/topics/uom_bench.html, and it looks from the information on the website as if it is covering similar ground. However it is more generic and may therefore be less focused on wastewater services.

Jonathan Parkinson,
Civil and Environmental Engineer,
Independent Consultant.
He can be contacted at:
email: parkinsonj@bigfoot.com