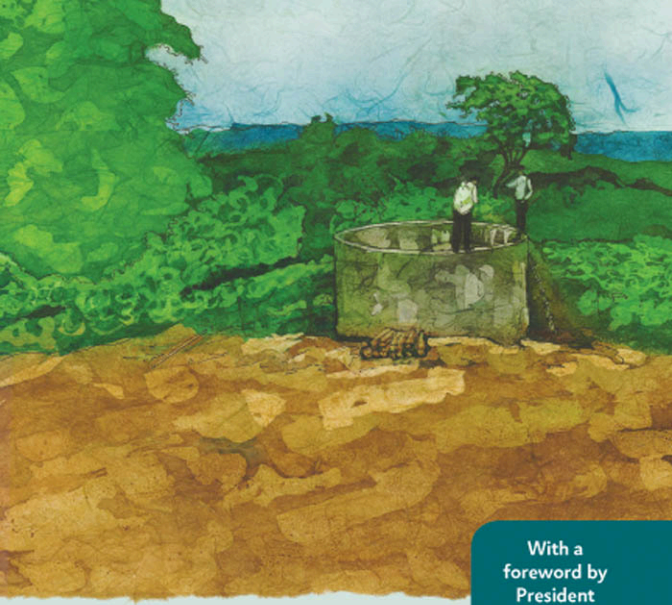

With a foreword by President Jimmy Carter

Field Guide to Environmental Engineering for Development Workers

Water, Sanitation, and Indoor Air

James R. Mihelcic, Ph.D.
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Linda D. Phillips, P.E.
Brian D. Barkdoll, Ph.D., P.E.

ASCE PRESS

Hygiene Resources

Three Key Hygiene Behaviors to Reduce Diarrhea

1. Safe disposal of feces, especially those of
   - Babies
   - Young people
   - Those with diarrhea
2. Hand washing
   - After defecation
   - After handling babies' feces
   - Before feeding and eating
   - Before handling food
3. Keeping drinking water free from fecal contamination
   - In the home
   - At the source

Source: World Health Organization, Sida Swedish International Development Agency, UNDP-World Bank Water and Sanitation Program (1998). *PHAST step-by-step guide: A participatory approach for the control of diarrhoeal diseases,* World Health Organization, Geneva, Switzerland.

Resources for Health Promotion

Technical Briefs/Reports

PHAST step-by-step guide: A participatory approach for the control of diarrhoeal diseases, World Health Organization, Sida Swedish International Development Agency, UNDP-World Bank Water and Sanitation Program. (1998). World Health Organization, Geneva, Switzerland. Available online at <http://www.who.int/water_sanitation_health/hygiene/envsan/phastep/en/index.html>

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Hygiene promotion: A practical manual for relief and development, Ferron, S., Morgan, J., and O'Reilly, M. (2007). Practical Action Publishing and CARE, Warwickshire, U.K. ISBN 9781853396410.

Gibson, D. A. (2009). *Health needs assessment survey guide for engineers,* <http://cee.eng.usf.edu/peacecorps/Resources.htm> (May 21, 2009).

Websites

World Health Organization, http://www.who.int/en/
Carter Center, http://www.cartercenter.org/
Centers for Disease Control and Prevention, http://www.cdc.gov/
UNICEF, http://www.unicef.org/
International Federation of Red Cross and Red Crescent Societies, http://www.ifrc.org/

Field Guide to Environmental Engineering for Development Workers

Other Titles of Interest

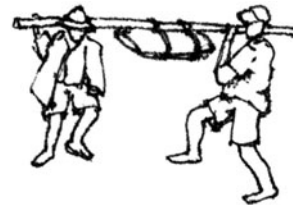
***Advances in Water and Wastewater Treatment,* edited by Rao Y. Surampalli and K. D. Tyagi.** (ASCE Committee Report, 2004). Describes the application of innovative technologies for water and wastewater treatment with an emphasis on the scientific principles for pollutant or pathogen removal. (ISBN 0-7844-0741-X)

***Appropriative Rights Model Water Code,* edited by Joseph W. Dellapenna.** (ASCE Committee Report, 2007). Presents a legal framework that balances management of water with social, economic, political, and administrative concerns. (ISBN 978-0-7844-0887-2)

***Climate Variations, Climate Change, and Water Resources Engineering,* by Jurgen D. Garbrecht and Thomas C. Piechota.** (ASCE Committee Reports, 2006). Highlights current knowledge about climate variations and change and their impact on water resources systems. (ISBN 978-0-7844-0824-7)

***Sharing Water in Times of Scarcity: Guidelines and Procedures in the Development of Effective Agreements to Share Water Across Political Boundaries,* edited by Stephen E. Draper.** (ASCE Committee Report, 2006). Offers narrative guidelines and procedures for formulating a water sharing agreement. (ISBN 0-7844-0846-7)

***Sustainable Engineering: An Introduction,* by the Committee on Sustainability of the Technical Activities Committee.** (ASCE Committee Report, 2004). Provides a broad, fundamental understanding of sustainability principles and their application to engineering work. (ISBN 0-7844-0750-9)



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The cover shows the construction of a 10,000-gallon, reinforced brick water storage tank built for the Los Chaguites community in southern Honduras. The system serves 150 homes and consists of a catchment structure feeding the storage tank, 5,400 m of conduction line, two break pressure tanks, and 1,000 m of distribution piping. Watercolor batik on Japanese rice paper by Linda D. Phillips.

ISBN 978-0-7844-0985-5
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Wastewater Treatment

Solid Waste

Air Quality

Appendix

Foreword

Peace falls under the general umbrella of many things: freedom, democracy, human rights, the alleviation of suffering, and the improvement of environmental quality and health. Yet it is global health that connects us all.

Global health can be found in a small child in Mali learning to wash her hands to prevent the spread of diarrheal disease. It appears in the work of a community erecting a water storage tank in the mountains of western Honduras or village members pouring concrete slabs used for latrines in Timor-Leste. Global health is also present in groups of women constructing more efficient cooking stoves in Asia that not only reduce indoor air pollution but also make better use of scarce tree resources.

From these seemingly simple beginnings, global health broadens its reach to affect the prosperity and stability of whole nations—whether empowering communities to better educate and provide for themselves, stopping a rapid outbreak of illness, preventing famine, or eliminating socially and economically devastating diseases.

Having access to the basic needs of water, sanitation, hygiene, and shelter are issues of human rights, not just issues of development and engineering. Providing these basic rights in a sustainable manner is critical if we are to improve the health among poor people afflicted with disease, people who are often isolated, forgotten, ignored, and without hope.

If you examine engineering closely, it is about solving problems. Engineering is also tied to eradicating poverty and disease, just as much as it is tied to planning, design, and construction. One key, though, is to provide engineers and others with resources so they understand the beneficial use of appropriate technology. This type of technology is developed and deployed with ongoing input from local communities to accommodate economic, social, environmental, and cultural conditions unique to each locale. Such an approach holds greater promise of fostering healthy communities and reducing gender inequalities.

One principle of the Carter Center is that people can improve their lives when provided with the necessary skills, knowledge, and access to resources. What is special about this book is that it provides all of these so that people can improve the lives of their families, their communities, and their countries.

I am proud to see that much of the knowledge in this book was created by those who served in the U.S. Peace Corps as water-sanitation engineers. Many do not know that my mother also served in the Peace Corps as a health volunteer. Like the child in Mali, she has been an inspiration to me. Only after global health is improved will we all be connected in a world of peace and equality.

President Jimmy Carter

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