Use of Reclaimed Water and Sludge in Food Crop Production

Committee on the Use of Treated Municipal Wastewater Effluents and Sludge in the Production of Crops for Human Consumption

Water Science and Technology Board

Commission on Geosciences, Environment, and Resources

National Research Council

1996
National Academy Press
Washington, D.C.
COMMITTEE ON THE USE OF TREATED MUNICIPAL WASTEWATER
EFFLUENTS AND SLUDGE IN THE PRODUCTION
OF CROPS FOR HUMAN CONSUMPTION

ALBERT L. PAGE, Chair, University of California, Riverside
ABATENI AYANABA, Del Monte Foods, Walnut Creek, California
MICHAEL S. BARAM, Boston University Law School, Massachusetts
GARY W. BARRETT, University of Georgia, Athens
WILLIAM G. BOGGESS, Oregon State University, Corvallis
ANDREW CHANG, University of California, Riverside
ROBERT C. COOPER, BioVir Laboratories, Inc., Benicia, California
RICHARD I. DICK, Cornell University, Ithaca, New York
STEPHEN P. GRAEF, Western Carolina Regional Sewer Authority, Greenville, South Carolina
THOMAS E. LONG, Washington State Department of Health, Olympia
CATHERINE ST. HILAIRE, Hershey Foods Corporation, Hershey, Pennsylvania
JOANN SILVERSTEIN, University of Colorado, Boulder
SARAH CLARK STUART, Consultant, Philadelphia, Pennsylvania
PAUL E. WAGGONER, The Connecticut Agricultural Experimental Station, New Haven

Staff

GARY KRAUSS, Study Director
MARY BETH MORRIS, Senior Project Assistant
WATER SCIENCE AND TECHNOLOGY BOARD

DAVID L. FREYBERG, Chair, Stanford University, Stanford, California
BRUCE E. RITTMANN, Vice Chair, Northwestern University, Evanston, Illinois
LINDA M. ABRIOLA, University of Michigan, Ann Arbor
PATRICK L. BREZONIK, University of Minnesota, St. Paul
JOHN BRISCOE, The World Bank, Washington, D.C.
WILFORD R. GARDNER, University of California, Berkeley (retired)
THOMAS M. HELLMAN, Bristol-Myers Squibb Company, New York, New York
CAROL A. JOHNSTON, University of Minnesota, Duluth
WILLIAM M. LEWIS, JR., University of Colorado, Boulder
JOHN W. MORRIS, J.W. Morris Limited, Arlington, Virginia
CAROLYN H. OLSEN, Brown and Caldwell, Pleasant Hill, California
CHARLES R. O'MELIA, The Johns Hopkins University, Baltimore, Maryland
REBECCA PARKIN, American Public Health Association, Washington, D.C.
IGNACIO RODRIGUEZ-ITURBE, Texas A&M University, College Station
FRANK W. SCHWARTZ, Ohio State University, Columbus, Ohio
HENRY J. VAUX, JR., University of California, Riverside

Staff

STEPHEN D. PARKER, Director
SHEILA D. DAVID, Senior Staff Officer
CHRIS ELFRING, Senior Staff Officer
JACQUELINE MACDONALD, Senior Staff Officer
GARY D. KRAUSS, Staff Officer
ETAN GUMERMAN, Research Associate
JEANNE AQUILINO, Administrative Associate
ANGELA F. BRUBAKER, Senior Project Assistant
ANITA A. HALL, Administrative Assistant
MARY BETH MORRIS, Senior Project Assistant
ELLEN DE GUZMAN, Project Assistant
COMMISSION ON GEOSCIENCES, ENVIRONMENT, AND RESOURCES

M. GORDON WOLMAN, Chair, The Johns Hopkins University, Baltimore, Maryland
PATRICK R. ATKINS, Aluminum Company of America, Pittsburgh, Pennsylvania
JAMES P. BRUCE, Canadian Climate Program Board, Ottawa, Canada
WILLIAM L. FISHER, University of Texas, Austin
JERRY F. FRANKLIN, University of Washington, Seattle
GEORGE M. HORNBERGER, University of Virginia, Charlottesville
DEBRA S. KNOPMAN, Progressive Foundation, Washington, D.C.
PERRY L. MCCARTY, Stanford University, Stanford, California
JUDITH E. MCDOWELL, Woods Hole Oceanographic Institution, Massachusetts
S. GEORGE PHILANDER, Princeton University, Princeton, New Jersey
RAYMOND A. PRICE, Queen's University at Kingston, Ontario, Canada
THOMAS C. SCHELLING, University of Maryland, College Park
ELLEN K. SILBERGELD, University of Maryland Medical School, Baltimore
STEVEN M. STANLEY, The Johns Hopkins University, Baltimore, Maryland
VICTORIA J. TSCHINKEL, Landers and Parsons, Tallahassee, Florida

STAFF

STEPHEN RATTIEN, Executive Director
STEPHEN D. PARKER, Associate Executive Director
MORGAN GOPNIK, Assistant Executive Director
GREGORY SYMMES, Reports Officer
JAMES E. MALLORY, Administrative Officer
SANDI FITZPATRICK, Administrative Associate
SUSAN SHERWIN, Project Assistant
The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce M. Alberts is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Harold Liebowitz is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce M. Alberts and Dr. Harold Liebowitz are chairman and vice chairman, respectively, of the National Research Council.