

# Water Utility Benchmarking: Measurement, Methodologies, and Performance Incentives

---

[Click here to access this publication from IWA Publishing.](#)

# Water Utility Benchmarking: Measurement, Methodologies, and Performance Incentives

---

*Sanford Berg*

Director of Water Studies, Public Utility Research Center,  
Warrington College of Business Administration, University of Florida

With the assistance of Maria Luisa Corton, Chen Lin, and  
Guillermo Sabbioni Research Associates, Public Utility Research Center  
and

Liangliang Jiang, Aaron Jones, Brandon Phibbs, and Michelle Phillips,  
Research Assistants, Public Utility Research Center



Publishing

London • New York

**Published by**      **IWA Publishing**  
**Alliance House**  
**12 Caxton Street**  
**London SW1H 0QS, UK**  
Telephone: +44 (0)20 7654 5500  
Fax: +44 (0)20 7654 5555  
Email: [publications@iwap.co.uk](mailto:publications@iwap.co.uk)  
Web: [www.iwapublishing.com](http://www.iwapublishing.com)

First published 2010

© 2010 IWA Publishing

Typeset in India by OKS Prepress Services.

Printed by

Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the UK Copyright, Designs and Patents Act (1998), no part of this publication may be reproduced, stored or transmitted in any form or by any means, without the prior permission in writing of the publisher, or, in the case of photographic reproduction, in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK, or in accordance with the terms of licenses issued by the appropriate reproduction rights organization outside the UK. Enquiries concerning reproduction outside the terms stated here should be sent to IWA Publishing at the address printed above.

The publisher makes no representation, express or implied, with regard to the accuracy of the information contained in this book and cannot accept any legal responsibility or liability for errors or omissions that may be made.

#### **Disclaimer**

The information provided and the opinions given in this publication are not necessarily those of IWA and should not be acted upon without independent consideration and professional advice. IWA and the Author will not accept responsibility for any loss or damage suffered by any person acting or refraining from acting upon any material contained in this publication.

#### *British Library Cataloguing in Publication Data*

A CIP catalogue record for this book is available from the British Library

#### *Library of Congress Cataloging-in-Publication Data*

A catalog record for this book is available from the Library of Congress

ISBN 10: 1843392729

ISBN 13: 9781843392729

# Table of Contents

Preface .....	vii
Acknowledgements .....	x
Acronyms and Abbreviations .....	xi
1. Introduction .....	1
1.1 Basic Definitions .....	4
1.2 Five Methodologies .....	6
1.3 Measurement and Data Sources .....	13
1.4 Operational and Accounting Data .....	15
1.5 Illustrative Functions: Model Specification .....	19
1.6 Company Comparisons .....	24
2. Checklist for Conducting Benchmarking Studies .....	27
2.1 Identify Objectives, Select Methodology and Gather Data (Step 1) .....	29
2.2 Screen and Analyze Data (Step 2) .....	38
2.3 Utilize Specific Analytic Techniques (Step 3) .....	48
2.4 Sensitivity Tests (Step 4) .....	50
2.5 Develop Policy Implications (Step 5) .....	54
2.6 Recent Institutional Developments .....	61
3. Overview of Metric Benchmarking Concepts .....	65
3.1 Production Concepts .....	65
3.2 Statistical Estimate of a Production Function .....	70
3.3 Cost Concepts .....	73
3.4 Efficiency Scores Reflecting Outputs and Inputs .....	76
3.5 Outputs and Costs .....	83
3.6 Statistical Estimates of a Linear Cost Function .....	86
3.7 Specification of a Nonlinear Relationship .....	88
4. Strengths and Limitations of Different Methodologies: Technical Considerations .....	91
4.1 Criteria for Selecting Performance Measures .....	91

4.2	Specific Core Indicators (Partial Metric Methods) .....	92
4.3	Aggregating Partial Indices into an Overall Performance Indicator (OPI) .....	93
4.4	Performance Scores Based on Production and Cost Estimates (“Total” Methods) .....	97
4.5	Examples of Empirical Studies .....	104
5.	Summary and Conclusions .....	111
5.1	Potential Impacts of Benchmarking Studies .....	112
5.2	Concluding Observations .....	115

Appendices:

1.	Variable Definitions and Explanations .....	121
	Output Variables .....	121
	Quality Variables .....	125
	Input Variables: Quantities and Prices .....	127
	Accounting/Financial Variables .....	131
	Conditioning/Environmental Variables .....	132
	Weather and Topographical Variables .....	134
	Macroeconomic Variables .....	135
	Governance Structure Variables .....	135
	Concluding Remarks about Variables .....	140
2.	Annotated Bibliography of Water Benchmarking Studies .....	141
3.	Technical Features of Benchmarking Methodologies .....	149
	Partial Indicators (Specific Core Indicators) .....	149
	Total Factor Productivity (TFP) Index .....	150
	Non-parametric Methods .....	150
	Parametric Methods .....	152
4.	Benchmarking in Regions of the World .....	157
	Latin America: ADERASA .....	158
	Africa: Water Utility Partnership .....	160
	Asia: SEAWUN .....	161
	OECD .....	163