

Contents

List of Figures	IX
List of Tables	XVII
Acknowledgments	XXI
Permissions and Credits	XXIII
Preface	1
<i>Estela Morales Campos</i>	
Introduction	3
1 Water Resources in Mexico: A Conceptual Introduction <i>Úrsula Oswald Spring and Ignacio Sánchez Cohen</i>	5
Part I Hydrological Processes and Management of Basins	19
2 Mexico's Water Challenges for the 21st Century <i>Felipe I. Arreguín Cortés, Mario López Pérez and Humberto Marengo Mogollón</i>	21
3 Integrated Water Management in Hydrological Basins: Multidisciplinary and Multi-Institutionality as an Action Paradigm <i>Ignacio Sánchez Cohen, Úrsula Oswald Spring, Gabriel Díaz Padilla and José Luis González Barrios</i>	39
4 Analysis of Weather Time Series for Decision-making in Mexico <i>Gabriel Díaz Padilla, Ignacio Sánchez Cohen and Rafael Alberto Guajardo Panes</i>	51
5 Coastal Aquifers of Sonora: Hydrogeological Analysis Maintaining a Sustainable Equilibrium <i>Miguel Rangel Medina, Rogelio Monreal Saavedra and Christopher Watts</i>	73
6 Preliminary Investigation of Groundwater and Surface Water Geochemistry in Campeche and Southern Quintana Roo <i>Eugene Perry, Guadalupe Velazquez Oliman and Niklas Wagner</i>	87

Part II	Water Use, Availability and Alternative Sources	99
7	Environmental Monitoring and Crop Water Demand <i>Jaime Garatuza Payán, Julio Cesar Rodríguez and Christopher J. Watts</i>	101
8	Advances in Geomatics and Geospatial Technology for Solving the Water Problem in Mexico <i>Felipe Omar Tapia Silva</i>	111
9	Water Use for Agriculture in Mexico <i>Enrique Palacios Vélez and Enrique Mejia Saez</i>	129
10	Social Problems with the Agricultural Use of Urban Wastewater <i>Francisco Peña</i>	145
11	Effects of Land Use in the Hydrology of Montane Catchments in Central-eastern Mexico <i>Lyssette E. Muñoz Villers, Miguel Equihua, Conrado Tobón and Francisco J. Gutiérrez Mendieta</i>	155
12	Impact of Land Use Changes in the Surface Hydrodynamics of a Water-harvesting Basin <i>José Luis González Barrios, Jean-Pierre Vandervaere, Luc Descroix, Ignacio Sánchez Cohen, Eduardo Chávez Ramírez and Guillermo González Cervantes</i>	167
13	Evapotranspiration in the Upper and Middle Nazas River Basins <i>Eduardo Chávez Ramírez, Guillermo González Cervantes, José Luis González Barrios and Alejandro López Dzul</i>	177
Part III	Water Quality, Pollution and Health	187
14	Potable Water Use from Aquifers Connected to Irrigation of Residual Water <i>Juana Enriqueta Cortés Muñoz and César Guillermo Calderón Mólgora</i>	189
15	Evaluation of the Pollution of Hydrological River Basins: Priorities and Needs <i>Anne M. Hansen and Carlos Corzo Juárez</i>	201
16	Water Quality in the State of Aguascalientes and its Effects on the Population's Health <i>Francisco Javier Avelar González, Elsa Marcela Ramírez López, Ma. Consolación Martínez Saldaña, Alma Lilián Guerrero Barrera, Fernando Jaramillo Juárez and José Luis Reyes Sánchez</i>	217
17	Potable Water Pollution with Heavy Metals, Arsenic, and Fluorides and Chronic Kidney Disease in Infant Population of Aguascalientes <i>Laura Arreola Mendoza, Luz María Del Razo, Olivier Barbier, M. Consolación Martínez Saldaña, Francisco Javier Avelar González, Fernando Jaramillo Juárez and José L. Reyes Sánchez</i>	231
18	Environmental Study on Cadmium in Groundwater in Yucatan <i>Julia Pacheco Avila, Armando Cabrera Sansores, Manuel Barcelo Quintal, Ligia Alcocer Can and Mercy Pacheco Perera</i>	239

19	Fish and Macroinvertebrates as Freshwater Ecosystem Bioindicators in Mexico: Current State and Perspectives <i>Catherine Mathuriau, Norman Mercado Silva, John Lyons and Luis Manuel Martínez Rivera</i>	251
20	Configuration of a Hydrocarbon Contamination Plume and Restoration of a Site near Reynosa, Tamaulipas <i>Salvador Israel de la Garza González and Raúl Herrera Mendoza</i>	263
21	Endocrine Disrupting Compounds in Surface Water and Their Degradation by Advanced Oxidation Process with Ozone <i>Ramiro Vallejo Rodríguez and Alberto López López</i>	279
22	Biodegradation of a Reactive Red Azo Dye in an Upflow Anaerobic Bioreactor <i>Linda González and Eleazar Escamilla Silva</i>	299
Part IV	Social Effects, Conflicts and Hydro-diplomacy	317
23	Water Security, Conflicts and Hydrodiplomacy <i>Úrsula Oswald Spring</i>	319
24	Distribution of Surface Water of the Rio Bravo between Mexico and the United States <i>Vicente Germán Soto and José Luis Escobedo Sagaz</i>	339
25	Determining Spaces for Intervention in a Coastal Basin <i>Antonina Galván Fernández</i>	351
26	Social Intervention as a Practice of Translation: Sustainability and Processes of Community Knowledge <i>Claudia Rocío González Pérez and Antonina Galván Fernández</i>	367
27	The Governance Crisis in Urban Water Management in Mexico <i>David Barkin</i>	379
28	The Growth of Water Demand in Mexico City and the Over-exploitation of its Aquifers <i>Jorge A. Morales Novelo and Lilia Rodríguez Tapia</i>	395
Part V	Public Policy, Institutions and Legal Aspects	407
29	Reflections on the Magdalena River Master Plan in Mexico City <i>Arsenio Ernesto González Reynoso and Itzkuauhtli Zamora Saenz</i>	409
30	Assessment of a Water Utility Agency: A Multidisciplinary Approach <i>Alejandra Martín Domínguez, Víctor Javier Bourguett Ortiz, Flor Virginia Cruz Gutiérrez, Miguel Ángel Mejía González, Víctor Hugo Alcocer Yamanaka, Juan Maldonado Silvestre, Gustavo Armando Ortíz Rendón, Petronilo Cortés Mejía, Arturo González Herrera, Martín Piña Soberanis, Ma. de Lourdes Rivera Huerta, Leticia Montellano Palacios, Carlos Eduardo Mariano Romero and Velitchko Georguiev Tzatchkov</i>	421

31	Water Pollution from Agriculture: Policy Challenges in a Case Study of Guanajuato <i>Rosario Pérez Espejo</i>	435
32	Urban Water Management: From a Vicious Circle to Public Participation, Self-sufficiency and Sustainability <i>Nicolás Pineda Pablos and Alejandro Salazar Adams</i>	449
33	Institutional Barriers for Effective Water Governance in Mexico: Study of the Central Gulf Hydrological Administrative Region X <i>Judith Domínguez Serrano</i>	457
	Concluding Remarks	473
34	Concluding Remarks <i>Úrsula Oswald Spring</i>	475
	Abbreviations	491
	Biographies	497
	Index	509