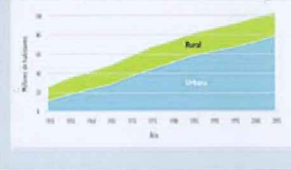
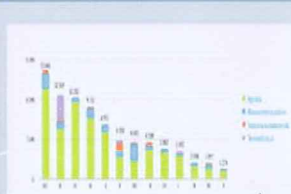




# STATISTICS ON WATER IN MEXICO

## 2007 EDITION



# SEMARNAT

SECRETARÍA DE  
MEDIO AMBIENTE Y  
RECURSOS NATURALES

## **DISCLAIMER**

The unaltered reproduction of the material contained in this book is authorized, for non-profit making purposes and quoting the source.

This publication is one of the products generated by the National Information System on the Quantity, Quality and Conservation of Water, part of the Planning Division. The edition of this publication was the responsibility of the General Coordination for Institutional Attention, Communication and Water Culture of the National Water Commission of Mexico.

**Title:** Statistics on Water in Mexico, 2007  
ISBN: 978-968-817-870-6  
First 2007 edition

**Author:** National Water Commission  
Av. Insurgentes Sur 2416, Col. Copilco El Bajo  
C.P. 04340, Coyoacan, Mexico City, D.F., Mexico  
Tel. +52 55 5174 4000.

**Editor:** Ministry of the Environment and Natural Resources  
Boulevard Adolfo Ruiz Cortines No. 4209 Col. Jardines de la Montaña,  
C.P. 14210, Tlalpan, Mexico City, D.F., Mexico

Printed in Mexico  
Distributed free of charge. Not for sale.

## **EDITORIAL TEAM**

**General coordination:**

José Antonio Rodríguez Tirado  
Orlando Jaimes Martínez

**Publication manager:**

Ricardo Martínez Lagunes

**Integration of the edition:**

Eduardo Acosta Lara

**Proofreader of the Spanish version / English translator:**

Colin Herron

**Collaborators:**

Claudia Esther Coria Bustos Pérez, María Eugenia de la Peña Ramos, Alejandro Díaz Ponce, Héctor Fonseca Meléndez, María Elena del Carmen Lagos Santoyo, Carlos Raúl Montaña Espinosa, Gabino Gaspar Monterrosa Reyes, Jessica Penagos García, Rubén Ramírez Castro, Lidya Ramírez Altamirano, José Guadalupe Trujillo Jiménez, Gilberto Valdez Rivera y Lourdes Vargas Martínez

Your opinion and comments are very important for us:

Write to us at: [sina@cna.gob.mx](mailto:sina@cna.gob.mx).

## **ACKNOWLEDGEMENTS**

For the elaboration of this document, we received the priceless support of the following institutions: Ministry of the Environment and Natural Resources; National Statistics, Geography and Informatics Institute; National Population Council; Ministry of Health; Federal Commission for the Protection against Health Risks; and Federal Commission for Electricity.

In particular, we would like to thank the support of the following individuals:

Benito Arciniega Castro, Luis Berga, Mario Chavarría Espinosa, Edmundo Gutiérrez Martínez, Carlos Roberto López Pérez, Alejandra Martínez, Hortencia Medina Uribe, María Isabel Monterrubio Gómez, Virgilio Partida Bush, Gilberto Salinas Mendoza, Francisco Takaki Takaki, Eduardo Vázquez Herrera y José Enrique Zavaleta Dorantes.

From the CONAGUA, it would be practically impossible to mention the names of all of the people who contributed information; however, we would particularly like to recognize and thank the collaboration of the following:

Antonio Acosta Godínez, Julio Alexander Freziers, Guillermo Bautista Bárcenas, Luis Josafat Caballero, Othón Cervantes Sánchez, Rubén Chávez Guillén, Roberto Contreras Martínez, Antonio Dávila Capiterucho, Valentina Davydova Belitskaya, David Estrella Gómez, Alberto Fernández Cervantes, Antonio Fernández Esparza, Juan Carlos Garcés del Angel, Anabelle García Espinosa, Isidro Gaytan Arvizu, Ernesto González Ocaña, Antonio de Jesús Gordillo Ozuna, Héctor Gutiérrez Ahumada, Martín Hidalgo Wong, José María Hinojosa Aguirre, Ulrich Hungsberg Engelmann, Alberto Hernández Unzón, Juan José Jiménez Becerril, Oscar Islas Camacho, Jorge Juárez González, Mario López Pérez, Jorge Malagón Díaz, Ixchel Martínez Cortés, Carlos Marsch Moreno, Enrique Mejía Maravilla, Antonio Mosqueda Tinoco, Rodrigo Murillo Fernández, Gerardo Ramírez Jiménez, Luís Rendón Pimentel, Mario Alberto Rodríguez Pérez, Pedro Sedano Flores, Lourdes Vargas Martínez, Judith Vásquez Vásquez, Ricardo Vázquez González y Mirna Vida Olascoaga.

# CONTENTS

<b>1. GEOGRAPHICAL AND SOCIO-ECONOMIC CONTEXT</b>	<b>9</b>
1.1 GEOGRAPHICAL AND DEMOGRAPHICAL ASPECT	10
1.2 ECONOMIC INDICATORS	14
1.3 INDEX AND DEGREE OF MARGINALIZATION	14
1.4 THE HYDROLOGICAL-ADMINISTRATIVE REGIONS FOR WATER MANAGEMENT	16
1.5 REGIONAL CONTRAST BETWEEN DEVELOPMENT AND WATER AVAILABILITY	17
1.6 SUMMARY OF DATA BY HYDROLOGICAL-ADMINISTRATIVE REGION AND STATE	18
<b>2. STATE OF WATER RESOURCES</b>	<b>23</b>
2.1 THE COUNTRY'S CATCHMENTS AND AQUIFERS	24
2.2 MEAN NATURAL AVAILABILITY OF WATER	26
2.3 METEOROLOGICAL PHENOMENA	33
2.4 SURFACE WATER	37
2.5 GROUNDWATER	44
2.6 WATER QUALITY	48
<b>3. USES OF WATER</b>	<b>59</b>
3.1 CLASSIFICATION OF THE USES OF WATER	60
3.2 DISTRIBUTION OF USES THROUGHOUT MEXICO	61
3.3 AGRICULTURAL USE	65
3.4 USE FOR PUBLIC SUPPLY	66
3.5 USE IN SELF-SUPPLYING INDUSTRY	66
3.6 USE IN THERMOELECTRIC PLANTS	67
3.7 USE IN HYDROPOWER PLANTS	67
3.8 WATER STRESS	68
<b>4. HYDRAULIC INFRASTRUCTURE</b>	<b>71</b>
4.1 THE NATION'S HYDRAULIC INFRASTRUCTURE	72
4.2 THE MAIN DAMS IN MEXICO	72
4.3 HYDRO-AGRICULTURAL INFRASTRUCTURE	77
4.4 DRINKING WATER AND SEWERAGE INFRASTRUCTURE	85
4.5 WASTEWATER TREATMENT AND REUSE	98
4.6 PROTECTION AGAINST FLOODS AND EMERGENCY ATTENTION	106
<b>5. WATER MANAGEMENT TOOLS</b>	<b>109</b>
5.1 INSTITUTIONS RELATED WITH WATER IN MEXICO	110
5.2 LEGAL FRAMEWORK FOR THE USE OF NATIONAL WATERS	111
5.3 ECONOMY AND WATER FINANCES	114
5.4 PARTICIPATION MECHANISMS	123
5.5 WATER-RELATED STANDARDS	132
<b>6. WATER, HEALTH AND THE ENVIRONMENT</b>	<b>139</b>
6.1 WATER AND HEALTH	140
6.2 SOILS, VEGETATION AND FORESTS	143
6.3 BIODIVERSITY	146
6.4 WETLANDS	150
<b>7. FUTURE SCENARIOS</b>	<b>153</b>
7.1 GROWTH TRENDS	154
7.2 NATIONAL DEVELOPMENT PLAN 2007-2012	160
7.3 NATIONAL WATER PROGRAM 2007-2012	161

<b>8. WATER IN THE WORLD</b>	<b>163</b>
8.1 SOCIO-ECONOMIC AND DEMOGRAPHIC ASPECTS	164
8.2 COMPONENTS OF THE HYDROLOGICAL CYCLE IN THE WORLD	168
8.3 USES OF WATER AND INFRASTRUCTURE	174
8.4 WATER IN THE INTERNATIONAL AGENDA	186
8.5 4TH WORLD WATER FORUM	188
8.6 THE MILLENNIUM DEVELOPMENT GOALS	190
<b>ANNEXES</b>	<b>193</b>
ANNEX A. INFORMATION ON THE HYDROLOGICAL-ADMINISTRATIVE REGIONS	193
ANNEX B. INFORMATION ON THE STATES	206
ANNEX C. CHARACTERISTICS OF THE HYDROLOGICAL REGIONS	223
ANNEX D. LIST OF AQUIFERS WITH PUBLISHED AVAILABILITY	225
ANNEX E. LIST OF OVEREXPLOITED AQUIFERS	230
ANNEX F. LIST OF CATCHMENTS WITH THEIR MEAN ANNUAL SURFACE WATER AVAILABILITY PUBLISHED	232
ANNEX G. CHARACTERISTICS OF THE TECHNICAL GROUNDWATER COMMITTEES (COTAS)	244
ANNEX H. LOCATION AND SURFACE AREA OF THE WETLANDS REGISTERED IN THE RAMSAR CONVENTION, BY YEAR OF INCORPORATION	247
ANNEX I. BIBLIOGRAPHY FOR THE ELABORATION OF STATISTICS ON WATER IN MEXICO 2007	249
ANNEX J. GLOSSARY	252
ANNEX K. ABBREVIATIONS AND ACRONYMS	256
ANNEX L. UNITS OF MEASUREMENT	257
ANNEX M. ANALYTICAL INDEX	258