

Water, Power and Citizenship

Social Struggle in the Basin of Mexico

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APPENDIX

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Table I-1 - Population Growth in Mexico City 1910-1990*

1900	344,721
1910	471,066
1921	615,367
1930	1,029,068
1940	1,802,679
1950	3,137,599
1960	5,251,755
1970	8,799,937
1980	13,354,271
1990	15,100,000

Source: INEGI (1990); Torregrosa Armentia (1990).

* Includes the whole Mexico City Metropolitan Area

Table II-1 - Water Supply Daily Volumes per capita in the MCMA (1990)

	Federal District	State of Mexico	Total
Surface (sq. km)	1,504	2,269	3,773
Population	8,300,000	6,800,000	15,100,000
Daily per capita consumption (litres)	364	230	304

Source: Author's elaboration with data from NAS (1995), Chapter 3.

Table II-2 – Daily per capita water consumption by category in the MCMA (percentages) (1990)

	Federal District %	State of Mexico %
Domestic	67	80
Industrial	17	17
Commercial and Urban services	16	3
Total	100	100

Source: Author's elaboration with data from NAS (1995), Chapter 3.

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Table II-3 - Water Sources or the MCMA (1990-92) (in cubic meters per second)

	Raw Water Sources	Federal District	State of Mexico	Total
Basin of Mexico				
Well fields		22.7	20.3	43.0
Magdalena River		0.2	-	0.2
Madin Dam		-	0.5	0.5
Springs, streams		0.5	0.2	0.7
Imported Sources				
Cutzamala River		7.6	3.0	10.6
Lerma well fields		4.3	1.0	5.3
Total Water Supply		35.3	25.0	60.3

Source: Author's elaboration with data from NAS (1995), Chapter 3.

Table II-4a – Percentage of Households by Source of Water Supply in the MCMA – Federal District (1990)

Delegación	Number of Households	In-house %	On-Site %	Neighborhood %	None %
Alvaro Obregón	133,937	72.6	24.2	3.2	2.5
Azcapotzalco	103,130	76.3	22.9	0.8	0.7
Benito Juárez	114,002	95.4	4.5	0.2	0.3
Coyoacán	142,533	78.7	20.8	0.6	0.6
Cuajimalpa de Morelos	23,422	55.0	40.1	5.0	5.6
Cuauhtémoc	157,079	91.9	7.7	0.3	0.7
Gustavo A. Madero	262,905	73.6	25.5	0.9	1.6
Iztacalco	93,815	75.4	24.2	0.4	0.7
Iztapalapa	294,738	62.4	36.1	1.6	5.4
Magdalena Contreras	40,247	59.3	38.8	1.9	3.4
Miguel Hidalgo	98,051	84.5	15.1	0.4	0.6
Milpa Alta	12,258	42.2	50.8	7.0	17.1
Tláhuac	39,311	39.0	59.7	1.2	5.8
Tlalpan	103,137	66.4	30.2	3.4	13.8
Venustiano Carranza	117,640	82.0	17.7	0.3	0.7
Xochimilco	52,966	55.0	40.1	4.9	9.1
Total Federal District	1,789,171	74.3	24.4	1.3	3.1

Source: Author's elaboration from INEGI (1991); NAS (1995), Chapter 3.

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Table II-4b – Percentage of Households by Source of Water Supply in the MCMA – State of Mexico (1990)

Municipality	Number of Households	In-house %	On-Site %	Neighborhood %	None %
Atizapán de Zaragoza	64,990	58.6	25.5	0.8	5.9
Coacalco	32,072	89.1	7.0	0.4	2.1
Cuautitlán	9,693	66.0	30.0	0.9	2.7
Cuautitlán Izcalli	68,019	76.2	17.5	2.3	2.9
Chalco	54,155	13.7	12.9	1.8	69.9
Chicoloapan	10,749	27.2	65.5	2.0	4.7
Chimalhuacán	44,016	21.6	56.2	6.3	15.1
Ecatepec	283,413	46.8	26.4	1.2	9.0
Huixquilucan	25,392	51.5	34.8	2.1	9.9
Ixtapaluca	26,460	32.6	35.3	3.0	28.5
La Paz	25,226	39.3	46.1	2.0	11.5
Naucalpan	159,372	57.3	39.2	1.1	1.3
Netzahualcóyotl	239,951	52.3	43.3	0.7	2.3
Nicolás Romero	34,732	34.2	46.9	1.6	16.4
Tecamac	24,079	42.8	44.5	0.7	11.3
Tlalnepantla	144,366	65.3	30.6	1.3	1.8
Tultitlán	49,847	65.8	21.5	0.6	11.2
Total Municipalities	1,296,532	52.1	32.8	1.4	8.8
TOTAL MCMA	3,085,703	63.3	27.4	1.3	5.5

Source: Author's elaboration from INEGI (1991); NAS (1995), Chapter 3.

Table IV-1
Events of Mobilization over Water Issues - Mexico City Metropolitan Area 1985-92

	1985 ^a	1986	1987	1988	1989	1990 ^b	1991	1992 ^c	Total
Federal District	29	104	91	86	105	43	161	37	656
Conurbated Municipalities	39	120	322	284	221	62	178	77	1303
Total MCMA	68	224	413	370	326	105	339	114	1959

a September-December

b August-December

c January-June

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Note on the methodology used in the identification of events

The events analyzed in Chapter 4 were identified from press reports published between 1985 and 1992 in over twenty newspapers and periodicals in the Mexico City Metropolitan Area. The collection of press reports, which was actually continued until 1994, is deposited in the library of the Instituto Mexicano de Tecnología del Agua (IMTA) (formerly archive of the Subcoordinación de Participación Social), in Jiutepec, Morelos. I have kept a personal copy of a sample of the press reports, which I have used for quotations in several chapters, especially Chapter 4. The identification of the events was carried out by a team of social scientists coordinated by Dr. María Luisa Torregrosa Armentia, within the framework of the research programme Agua y Sociedad funded and organized jointly by the Facultad Latinoamericana de Ciencias Sociales (FLACSO) in Mexico City and IMTA. I had the opportunity to join the team while reading for my M.Phil. in Social Sciences at FLACSO (1990-1992), and afterwards working as a research and teaching assistant at FLACSO and simultaneously as an external consultant for IMTA (1992-1993). During my M.Phil. work I prepared a second database of events over water for the cities of Tuxtla Gutiérrez and Ciudad Juárez for the period 1986-1991. The methodology used was the application of a code composed by over one hundred variables and their respective categories to survey the press reports in search for the relevant information. The data obtained in this way were processed with the Statistical Package for Social Sciences (SPSS).

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Table IV-2

Average Daily Precipitation in the Mexico City Metropolitan Area

(All values in mm. Data recorded in 13 meteorological stations between 1975-88)

Meteorological Stations	Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep
9002-Ajusco (Tlalpan)	1975-1987	2.48	0.38	0.29	0.70	0.41	0.28	0.81	3.27	7.95	7.02	8.10	6.89
9003-A. Serdán (Azcapotzalco)	1975-1987	2.13	0.29	0.28	0.36	0.33	0.24	0.53	2.09	4.81	5.61	5.35	4.17
9004-Calvario (Tlalpan)	1975-1987	2.72	0.21	0.18	0.35	0.21	0.29	0.44	2.35	5.31	5.36	5.17	4.56
9020-Pedregal	1975-1988	2.12	0.20	0.14	0.36	0.29	0.37	0.46	2.39	5.83	6.66	5.97	5.36
9026-Iztapalapa	1975-1988	1.56	0.16	0.09	0.33	0.23	0.30	0.65	1.57	3.33	4.39	3.56	3.16
9034-Xochimilco	1975-1988	1.98	0.22	0.24	0.28	0.21	0.27	0.69	2.19	4.39	4.20	4.24	3.91
9039- Tacubaya	1975-1987	2.39	0.17	0.33	0.34	0.32	0.32	0.63	1.83	4.90	5.83	4.83	4.31
15020-Chalco	1975-1988	1.28	0.21	0.19	0.34	0.35	0.41	0.55	1.85	3.20	4.22	3.93	3.04
15022-Ecatepec	1975-1987	1.33	0.32	0.28	0.38	0.29	0.57	0.61	1.57	3.96	3.92	3.51	2.63
15023-Chimalhuacan	1975-1988	1.47	0.35	0.13	0.40	0.27	0.30	0.90	1.82	3.76	3.68	2.97	2.46
15050-Los Reyes La Paz	1975-1988	1.37	0.15	0.16	0.32	0.21	0.29	0.48	1.36	3.44	3.04	2.81	2.34
15061-Netzahualcóyotl	975-1988	1.53	0.22	0.24	0.28	0.34	0.36	0.83	2.01	4.08	3.83	3.64	3.34
15125-Texcoco	1975-1988	1.07	0.36	0.15	0.31	0.27	0.52	0.60	1.53	3.79	4.01	3.17	2.71
Total Average		1.80	0.25	0.21	0.36	0.29	0.35	0.63	1.99	4.52	4.75	4.40	3.76
Percentage		7.73	1.07	0.88	1.56	1.23	1.49	2.70	8.53	19.38	20.38	18.89	16.12

Source: Author's elaboration from IMTA (1996).

Table IV-3

Average Daily Temperature in the Mexico City Metropolitan Area

(All values in Celsius. Based in average daily temperatures recorded in 10 meteorological stations between 1975-88)

Station	Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
9002-Ajusco (Tlalpan)	1975-1987	8.27	7.35	6.96	5.86	6.30	8.50	9.54	10.22	9.64	9.19	8.99	8.72
9003-A. Serdán (Azcapotzalco)	1975-1987	12.23	9.89	8.48	7.30	8.63	11.52	14.01	15.54	15.63	14.36	14.19	13.78
9020-Pedregal	1975-1988	11.58	9.25	8.09	7.12	7.96	10.46	12.06	12.95	13.32	12.56	12.36	12.43
9026-Iztapalapa	1975-1988	12.61	10.02	8.53	7.12	8.58	11.06	13.17	14.55	15.19	14.64	14.09	13.88
9034-Xochimilco	1975-1988	11.66	9.43	8.33	6.48	7.24	9.99	12.72	14.33	14.91	14.17	13.58	13.47
9039- Tacubaya	1975-1987	11.39	7.72	5.45	4.03	5.05	8.32	11.65	13.74	14.32	13.29	12.88	13.11
15020-Chalco	1975-1988	10.62	7.57	6.27	5.04	6.37	8.88	12.09	13.65	14.10	13.60	13.14	12.62
15022-Ecatepec	1975-1987	11.59	9.59	7.38	5.58	7.54	9.65	12.32	14.71	15.03	14.30	13.86	13.61
15050-Los Reyes La Paz	1975-1988	10.60	7.76	7.00	6.40	6.80	10.08	12.79	13.89	13.96	13.56	13.41	12.57
15125-Texcoco	1978-1988	9.10	4.99	3.77	2.38	4.60	7.43	11.76	13.84	14.05	12.89	12.44	11.58
Total Average		10.96	8.36	7.03	5.73	6.91	9.59	12.21	13.74	14.02	13.26	12.89	12.58

Source: Author's elaboration from IMTA (1996).

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Table IV-4

Average Daily Evaporation in the Mexico City Metropolitan Area

(All values in mm. Data recorded in 10 meteorological stations between 1975-1988)

Station	Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
9002-Ajusco (Tlalpan)	1975-1987	1.12	1.20	1.07	1.07	1.62	1.78	1.67	1.43	1.24	1.02	1.06	0.99
9003-A. Serdán (Azcapotzalco)	1975-1987	3.82	3.15	2.75	2.94	4.16	5.73	5.75	5.20	5.00	4.28	4.31	3.99
9020-Pedregal	1975-1988	2.55	2.24	2.07	2.68	3.11	4.12	4.29	3.94	3.42	2.91	2.90	2.49
9026-Iztapalapa	1975-1988	3.45	3.17	2.97	3.36	3.91	5.34	5.48	5.26	4.70	3.78	3.79	3.30
9034-Xochimilco	1975-1987	3.19	2.93	2.72	2.86	3.63	4.77	4.78	4.67	4.07	3.71	3.76	3.46
9039- Tacubaya	1975-1987	2.73	2.72	2.20	2.69	3.56	5.11	4.98	4.19	3.48	2.86	2.92	2.75
15020-Chalco	1975-1988	3.27	3.26	3.12	3.66	4.63	6.03	6.45	5.65	4.23	3.43	3.18	2.90
15022-Ecatepec	1975-1987	3.67	3.32	2.98	3.18	4.24	5.72	5.88	5.51	4.72	3.92	4.05	3.56
15050-Los Reyes La Paz	1975-1988	3.96	3.64	7.21	3.63	4.31	6.12	6.59	5.93	4.91	4.02	4.01	3.87
15125-Texcoco	1978-1988	3.49	2.88	2.62	3.12	4.42	6.12	6.26	5.65	4.22	3.38	3.43	3.16
Total Average		3.13	2.85	2.57	2.92	3.76	5.08	5.21	4.74	4.00	3.33	3.34	3.05
Percentage		7.11	6.48	5.85	6.64	8.55	11.56	11.85	10.78	9.09	7.57	7.59	6.93

Source: Author's elaboration from IMTA (1996).

Table IV-5a - Events of Mobilization over Water in the MCMA (1985-92)

Federal District	1985	1986	1987	1988	1989	1990	1991	1992	Total	%	Accumulated %
G. A. Madero	6	17	21	25	31	2	21	10	133	20.27	20.27
Iztapalapa	6	15	14	11	10	7	21	7	91	13.87	34.15
Tlalpan	5	14	16	9	9	5	18	5	81	12.35	46.49
Xochimilco	2	13	5	5	5	7	10	4	51	7.77	54.27
A. Obregón	1	6	5	5	9	1	8	2	37	5.64	59.91
Coyoacán	0	4	5	5	8	2	23	2	49	7.47	67.38
Tláhuac	0	4	6	8	3	4	6	0	31	4.73	72.10
V. Carranza	4	2	6	3	4	0	2	2	23	3.51	75.61
Cuajimalpa	1	3	2	3	7	0	11	0	27	4.12	79.73
Iztacalco	2	5	5	0	3	5	8	2	30	4.57	84.30
M. Contreras	0	7	3	1	2	1	5	1	20	3.05	87.35
Cuauhtémoc	2	3	0	0	6	2	4	0	17	2.59	89.94
Azcapotzalco	0	5	1	1	3	1	8	0	19	2.90	92.84
Milpa Alta	0	3	2	6	1	3	10	0	25	3.81	96.65
M. Hidalgo	0	1	0	4	4	0	3	1	13	1.98	98.63
B. Juárez	0	2	0	0	0	3	3	1	9	1.37	100.00
Subtotal	29	104	91	86	105	43	161	37	656	100	

Source: Author's elaboration from Torregrasa Armentia (1988-97).

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Table IV-5b - Events of Mobilization over Water in the MCMA (1985-92)

Con. Municipalities	1985	1986	1987	1988	1989	1990	1991	1992	Total	%	Accumulated %
Ecatepec	7	31	47	40	53	0	16	16	210	16.12	16.12
Naucalpan	5	22	20	42	21	6	8	4	128	9.82	25.94
Chimalhuacan	2	7	49	24	16	8	25	2	133	10.21	36.15
Tlanepantla	2	8	21	35	20	3	12	3	104	7.98	44.13
Atizapán de Zaragoza	2	10	36	24	19	10	17	11	129	9.90	54.03
Netzahualcoyotl	8	19	21	18	16	17	24	15	138	10.59	64.62
Chalco	4	3	25	16	22	5	31	2	108	8.29	72.91
Tultitlán	0	6	14	14	14	2	8	4	62	4.76	77.67
Cuautitlán Izcalli	1	1	17	18	5	2	9	5	58	4.45	82.12
Los Reyes La Paz	3	4	14	8	8	3	4	1	45	3.45	85.57
Ixtapaluca	1	4	10	12	10	2	9	3	51	3.91	89.49
Coacalco	1	2	12	7	7	0	5	1	35	2.69	92.17
Cuautitlán	0	1	11	11	2	0	1	3	29	2.23	94.40
N. Romero	0	0	12	9	2	0	1	2	26	2.00	96.39
Chicoloapan	2	1	11	3	5	4	6	2	34	2.61	99.00
Huixquilucan	1	1	2	3	1	0	2	3	13	1.00	100.00
Subtotal	39	120	322	284	221	62	178	77	1303	100	
TOTAL MCMA	68	224	413	370	326	105	339	114	1959		

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Table IV-6
 Breakdown of Level of Organization of the Actors (Comparative Percentages)
 Mexico City Metropolitan Area 1985-92

	Federal District	Conurb. Municipalities	Total
Representatives and associations of colonos	26.4 (165)	30.4 (326)	28.9 (491)
Popular organizations	8.5 (53)	16.7 (179)	13.7 (232)
Local Governments	2.4 (15)	7.4 (79)	5.5 (94)
Political parties/unions	5.9 (37)	6.2 (66)	6.1 (103)
Other	1.3 (8)	5.2 (56)	3.8 (64)
Without information about the type of organization	13.1 (82)	10.1 (108)	11.2 (190)
Without organization	42.3 (264)	24.2 (260)	30.9 (524)
Total	100 (624)	100 (1074)	100 (1698)

Source: Author's elaboration from Torregrosa Armentia (1988-97).

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Table IV-7a - Sample of Organizations Involved in Events over Water
Federal District 1985-92

Organization	Date
Liga de Comunidades Agrarias del Distrito Federal	3-10-85
Unión de Colonos de Xalpa y Santa Cruz Buenavista (Iztapalapa)	26-11-85
Junta de Vecinos, delegación Alvaro Obregón	12-85
Movimiento Popular de Pueblos y Colonias del Sur (Tlalpan)	01-03-86
Asociación de Residentes de Santa Cruz Meyehualco (Iztapalapa)	24-04-86
Asociación de Residentes de la Colonia Malacates (G.A.Madero)	09-08-86
Regional de Mujeres (Tláhuac)	06-11-86
Unión de Colonos, Inquilinos y Solicitantes de Vivienda (Tláhuac)	06-11-86
Organización Pacto de Tacuba	19-05-89
Asamblea de Barrios	19-05-89
Alianza Vecinal de la Ciudad de México	19-05-89
Federación de Colonias Populares (Iztapalapa)	12-07-89
Movimiento Ecologista Mexicano	08-11-90
Partido Acción Nacional (PAN) - ARDF	22-11-90
Partido de la Revolución Democrática (PRD) - ARDF	22-11-90
Frente Popular Francisco Villa	14-12-90
Colegio de Ingenieros Civiles	08-91
Cámara Nacional del Pequeño Comercio CANAPECO	17-11-91

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Table IV-7b - Sample of Organizations Involved in Events over Water Neighboring Municipalities (State of Mexico) 1985-92

Organization	Date
Movimiento Revolucionario del Pueblo MRP	22-10-85
Consejos de Colaboración Municipal	26-09-85
Central Campesina Independiente	09-85
Partido Acción Nacional PAN	06-01-86
Unión de Colonos y Vecinos (Chimalhuacán)	11-01-86
Unión de Ejidos y Comunales del Valle de México	21-01-86
Colonias Populares de Naucalpan NAUCOPAC	12-02-86
Unión Democrática de Colonos (Naucalpan)	12-02-86
Confederación de Colonias Populares del Estado de México	12-02-86
Asociación de Colonos del Municipio de Ecatepec	26-02-86
Unión General de Obreros y Campesinos de México	16-03-86
Partido Obrero Mexicano POM	16-03-86
Frente de Masas del Oriente del Estado de México	-86
Partido Mexicano de los Trabajadores PMT	13-11-86
Comité de Mejoramiento, colonia Guadalupe Victoria (Ecatepec)	11-86
Federación de Colonias Proletarias del Estado de México (FCPEM)	11-86
Sociedad Médica del Valle de México	15-12-86
Comité de Colonias Proletarias (Chalco)	13-01-87
Unión Promotora de Colonias (Atizapán)	02-02-87
Organización de Pueblos y Colonias (Tultitlán)	23-02-87
Federación de Colonos del Estado de México	23-02-87
Unión Proletaria de Colonos (Tultitlán)	23-02-87
Confederación Nacional de Organizaciones Populares (Tultitlán)	23-02-87
Unión de Lucha Proletaria (Chicoloapan)	16-03-87
Comité de Aguas (allegedly linked to the PAN) (Chimalhuacán)	20-03-87
Unión de Colonos y Comerciantes del Valle Chalco-Ixtapaluca	29-03-87
Asociación Civil Unión de Pueblos y Colonias (Ecatepec)	15-06-87
Unión de Colonos Populares Estatales (Valle Cuautitlán-Texcoco)	09-10-87
Unión de Colonias Populares	89
Movimiento Proletario Independiente (Tultitlán)	12-07-89
Partido Auténtico de la Revolución Mexicana (PARM)	08-08-89
Frente de Colonos Democráticos (Chalco)	27-11-89
Comisión Ambiental, Asociación Mexicana de Salud (Naucalpan)	10-10-90
Liga de Comunidades Agrarias y Sindicatos Campesinos (Colorines)	14-10-90
Asociación de Colonos de Ciudad Satélite (Naucalpan)	20-10-90
Unión Naucalpense de Asociaciones de Colonos UNAC	23-12-90
Unión Popular Revolucionaria Emiliano Zapata UPREZ (Ecatepec)	22-01-90
Misión de los Cuarenta (Ecatepec)	22-01-90
Forjadores del Mañana (Ecatepec)	22-01-90
Unión de Colonos, Inquilinos y Solicitantes de Vivienda - Libertad	
UCISV-Libertad (Ecatepec)	22-01-90
Barrio Nuevo (Ecatepec)	22-01-90
Comités de Lucha (Valle Cuautitlán Texcoco)	01-04-90
Comité de Solidaridad, colonia Darío Martínez (Ixtapaluca)	25-09-92
Unión de Comerciantes Establecidos (Coacalco)	30-09-92
Unión de Colonos de la Zona Norte (Netzahualcóyotl)	17-10-92

Source: Author's elaboration from Torregrosa Armentia (1988-97).

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Table IV-8a - Sample of Targeted Actors in the Events over Water Issues
- Federal District 1985-92

Target	Date
The trans-national industries located in the delegación Azcapotzalco	02-03-86
Private company in charge of public services in a housing estate (Mixcoac)	08-04-86
The delegado político in Iztapalapa	24-04-86
The delegación (Tláhuac)	06-11-86
The municipal and private piperos (Iztapalapa)	30-05-89
The soft drink industries	08-11-90
The purified-water industry	12-09-91
The bottled-water and ice industries	30-09-91
The Federal District Department	17-11-91
Public workers of the delegación Benito Juárez	15-09-92

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Table IV-8b Sample of Targeted Actors in the Events over Water Issues
Neighboring Municipalities (State of Mexico) 1985-92

Target	Date
Governor of the State of Mexico (Ecatepec)	23-09-85
The municipal authorities of Naucalpan	10-02-86
The municipal and private piperos (Naucalpan)	10-02-86
The piperos of the state water utility CEAS (Netzahualcóyotl)	16-03-86
Hotel owners and industrialists (Valley Cuautitlán Texcoco)	28-03-86
Agitators, members of the PAN (Chimalhuacán)	14-03-87
Private water vendors (Valley Cuautitlán Texcoco)	18-03-87
The government of the State of Mexico (Chimalhuacán)	20-03-87
Political parties and the CNC (State of Mexico)	20-03-87
Groups with economic and political interests (Ecatepec)	28-03-87
Private individual, para-state utilities, the CTM (Chalco)	29-03-87
Water speculators, the CTM (Netzahualcóyotl)	22-04-87
The mayor (Ecatepec)	12-06-87
The comuneros, the CNC, the PRI (Ecatepec)	15-06-87
The mayor (Atizapán)	07-08-87
The mayor (Chalco)	01-12-88
The mayor (Tultitlán)	12-07-89
The municipal authorities, water vendors (Chimalhuacán)	21-07-89
Para-state company (Ecatepec)	18-10-87
The state water utility CEAS (Tultitlán)	26-10-87
The municipal authorities (Cuautitlán Izcalli)	05-07-91

Source: Author's elaboration from Torregrosa Armentia (1988-97).

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Table IV-9a - Sample of Water Pricing in the MCMA (Non-Networked Water Supply) - Federal District 1985-92

Date	Location	Type of container	Capacity (liters)	Cost (pesos) (nominal pesos)	Cost per liter (nominal pesos)
25-Sep-85	Eastern DF (Col. Pantitlán)	cubeta	20	200.00	10.00
25-Sep-85	Eastern DF (Col. Pantitlán)	pipa	10000	25,000.00	2.50
28-Sep-85	Colonias la Oriental/Puebla	tambo	200	500.00	2.50
7-Oct-85	Colonia A. López Mateos	tambo	200	300.00	1.50
22-Oct-85	Eastern Federal District	tambo	200	100.00	0.50
22-Oct-85	Eastern Federal District	tina	?	50.00	?
22-Oct-85	Eastern Federal District	bote alcoholero	20	25.00	1.25
22-Oct-85	Eastern Federal District	cubeta	20	25.00	1.25
26-Nov-85	Iztapalapa	tambo	200	200.00	1.00
1-Mar-86	Tlalpan	pipa	10000	3,300.00	0.33
1-Mar-86	Tlalpan	pipa	10000	5,000.00	0.50
24-Apr-86	Iztapalapa	garrafón Electropura	20	115.00	5.75
6-Nov-86	Col Amp. M. Hidalgo Mar	garrafón Electropura	20	200.00	10.00
23-May-89	Gustavo A Madero	tambo	200	2,000.00	10.00
30-May-89	Iztapalapa	tambo (municipal)	200	500.00	2.50
30-May-89	Iztapalapa	pipa	10000	80,000.00	8.00
12-Jul-89	Iztapalapa	pipa	16000	60,000.00	3.75

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Table IV-9b - Sample of Water Pricing in the MCMA (Non-Networked Water Supply) – Conurbated Municipalities State of Mexico 1985-92

Date	Location	Type of container	Capacity (liters)	Cost (pesos) (nominal pesos)	Cost per liter (nominal pesos)
24-Sep-85	Netzahualcóyotl	pipa	10000	20,000.00	2.00
Sep-85	Netzahualcóyotl	balde	20	100.00	5.00
Sep-85	Netzahualcóyotl	pipa	10000	25,000.00	2.50
Sep-85	Netzahualcóyotl	garrafón Electropura	20	400.00	20.00
Sep-85	Netzahualcóyotl	pipa	10000	30,000.00	3.00
22-Oct-85	Netzahualcóyotl	tambo	200	100.00	0.50
22-Oct-85	Netzahualcóyotl	tina	?	50.00	?
22-Oct-85	Netzahualcóyotl	bote alcoholero	20	25.00	1.25
22-Oct-85	Netzahualcóyotl	cubeta	20	25.00	1.25
31-Oct-85	Naucalpan	pipa	10000	15,000.00	1.50
22-Nov-85	Ecatepec	tambo	200	100.00	0.50
11-Jan-86	Chimalhuacán	tambo	200	300.00	1.50
01-Jan-86	Netzahualcóyotl	tambo	200	500.00	2.50
15-Jan-86	Chimalhuacán	tambo	200	150.00	0.75
10-Feb-86	Naucalpan	tambo	200	100.00	0.50
10-Feb-86	Naucalpan	pipa	10000	10,000.00	1.00
21-Feb-86	Ixtapaluca	tambo	200	120.00	0.60
23-Feb-86	Chalco	tambo	200	500.00	2.50
16-Mar-86	Netzahualcóyotl	pipa	10000	3,000.00	0.30
16-Mar-86	Netzahualcóyotl	tambo	200	500.00	2.50
18-Mar-86	Naucalpan	tambo	200	500.00	2.50
19-Mar-86	Naucalpan	tambo	200	200.00	1.00
25-Jul-86	Ecatepec	tambo	200	250.00	1.25

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Table IV-9b – (continued)

Date	Location	Type of container	Capacity (liters)	Cost (pesos) (nominal pesos)	Cost per liter (nominal pesos)
25-Jul-86	Ecatepec	garrafón Electropura	20	150.00	7.50
25-Jul-86	Ecatepec	tambo	200	350.00	1.75
31-Jul-86	Coacalco	pipa	10000	8,000.00	0.80
31-Jul-86	Coacalco	tambo	200	300.00	1.50
6-Aug-86	Ecatepec	tambo	200	350.00	1.75
6-Aug-86	Ecatepec	garrafón Electropura	20	150.00	7.50
6-Aug-86	Ecatepec	pipa	10000	25,000.00	2.50
14-Oct-86	Naucalpan	tambo	200	100.00	0.50
13-Nov-86	Tlalnepantla	tambo	200	250.00	1.25
30-Nov-86	Ecatepec	pipa	10000	7,000.00	0.70
30-Nov-86	Ecatepec	tambo	200	300.00	1.50
6-Dec-86	Ecatepec	tambo	200	600.00	3.00
12-Dec-86	Ecatepec/Tlalnepantla/Netza.	tambo	200	800.00	4.00
13-Jan-87	Chalco	tambo	200	1,000.00	5.00
20-Jan-87	Tultitlán	tambo	200	180.00	0.90
28-Jan-87	Atizapán	tambo	200	800.00	4.00
5-Feb-87	Ecatepec	tambo	200	250.00	1.25
5-Feb-87	Ecatepec	tina	?	150.00	?
5-Feb-87	Ecatepec	bote alcoholero	20	50.00	2.50
9-Feb-87	Ecatepec	garrafón Electropura	20	250.00	12.50
25-Feb-87	Chalco	pipa	10000	30,000.00	3.00

Table IV-9b – (continued)

Date	Location	Type of container	Capacity (liters)	Cost (pesos) (nominal pesos)	Cost per liter (nominal pesos)
27-Feb-87	Naucalpan	tambo	200	500.00	2.50
27-Feb-87	Naucalpan	cubeta	?	300.00	?
27-Feb-87	Naucalpan	pipa	10000	7,000.00	0.70
18-Mar-87	Ecatepec /Chalco	tambo	200	600.00	3.00
23-Mar-87	Naucalpan	tambo	200	600.00	3.00
29-Mar-87	Chalco/Chimalhuacán/Netza.	garrafón	18	300.00	16.67
29-Mar-87	Chalco/Chimalhuacán/Netza.	pipa	10000	30,000.00	3.00
22-Apr-87	Chimalhuacán/Netza /LRLP/Ixtap.	pipa	10000	30,000.00	3.00
22-Apr-87	Chimalhuacán/Netza /LRLP/Ixtap.	garrafones	16	350.00	21.88
12-Aug-87	Cuautitlán Izcalli	tambo	200	3,000.00	15.00
9-Oct-87	Cuautitlán	tambo	200	2,500.00	12.50
15-Oct-87	Netzahualcóyotl / LRLP/Chimal.	tambo	200	1,000.00	5.00
19-Oct-87	Atizapán	pipa	10000	18,000.00	1.80
01-May-89	Ecatepec	tambo	200	1,000.00	5.00
19-May-89	Ecatepec	tambo	200	2,000.00	10.00
24-May-89	Ecatepec	tambo	200	2,000.00	10.00
21-Jul-89	Chimalhuacán	tambo	200	5,000.00	25.00
25-Jul-89	Atizapán	tambo	200	1,500.00	7.50
3-Aug-89	Chimalhuacán	tambo	200	4,000.00	20.00
8-Aug-89	Tecamac	tambo	200	3,000.00	15.00

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Table IV-9b – (continued)

Date	Location	Type of container	Capacity (liters)	Cost (pesos) (nominal pesos)	Cost per liter (nominal pesos)
20-Oct-89	Tultitlán	tambo	200	4,000.00	20.00
29-Oct-89	Ecatepec	tambo	200	2,500.00	12.50
7-Nov-89	Chalco / Chimalhuacán	tambo	200	2,000.00	10.00
27-Nov-89	Chalco	tambo	200	5,000.00	25.00
8-Nov-90	Ecatepec/Chalco	tambo	200	10,000.00	50.00
30-Aug-90	Valle Cuautitlán Texcoco	tambo	200	2,750.00	13.75
1-Apr-91	Naucalpan	tambo	200	3,000.00	15.00
12-Apr-91	Chalco	tambo	200	500.00	2.50
12-Apr-91	Chalco	tambo	200	5,000.00	25.00
27-Apr-91	Netzahualcóyotl	tambo	200	5,000.00	25.00
19-Jun-91		tambo	200	2,000.00	10.00
21-Jun-91	Chalco	tambo	200	1,500.00	7.50
30-Aug-91	Los Reyes La Paz	tambo	200	2,000.00	10.00
22-Sep-92	Netzahualcóyotl	pipa	9000	200,000.00	22.22
22-Sep-92	Netzahualcóyotl	pipa	9000	200,000.00	22.22
29-Sep-92	Netzahualcóyotl	tambo	200	8,000.00	40.00
29-Sep-92	Netzahualcóyotl	pipa	10000	100,000.00	10.00
23-Nov-92	Nicolás Romero	pipa	10000	80,000.00	8.00

Source: Author's elaboration from Torregrosa Armentia (1988-97).

Table IV-10 – Nominal and Real Minimum Daily Salary (MDS), Mexico (1979-93)

Year	Nominal MDS in pesos	Real MDS ^a in pesos
1979	120	100
1980	141	91
1981	183	91
1982	318	80
1983	459	64
1984	719	63
1985	1,108	59
1986	2,244	58
1987	5,867	59
1988	7,253	48
1989	9,139	50
1990	10,787	46
1991	12,084	43
1992	12,084	38
1993	13,060	38

Source: Author's elaboration from Calva (1995), p. 167.

- a. Nominal figures expressed in December 1978 values (1979 = 100).

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Table V-1 - General and Infant Mortality, Federal District (1943-1990)

Year	General Mortality*	Infant Mortality**
1943	23.00	157.20
1945	21.10	135.00
1950	15.50	130.20
1955	11.60	89.80
1960	9.90	85.00
1965	8.80	69.20
1970	9.50	74.70
1975	6.64	45.40
1980	5.00	37.00
1985	5.00	37.00
1990	5.43	23.53***

* Per thousand inhabitants.

** Per thousand registered births under one year old.

*** This figure has been contested by health experts who claim that the actual rate might have been up to 50 per cent higher. The health authorities recognized in 1992 that the figures were affected by an underestimation of 31 per cent. (Jiménez Ornelas, 1995, pp. 26-7).

Source: Author's elaboration from SSP-SSS (1993), pp. 111, 113.

Table V-2 - Main Causes of General Mortality, per thousand people. Federal District (1990)

Disease	Rate
Heart diseases	65.23
Malignant growth	50.67
Road accidents	17.20
Diabetes Mellitus	31.73
Perinatal diseases	28.39
Foetal/new-born respiratory diseases	16.40
Pneumonia/influenza	27.33
Infectious intestinal diseases	27.32
Brain diseases	24.32
Cirrhosis and other chronic liver diseases	22.03
Homicide and intentional wounds	17.84
Malnutrition	14.51
Bronchitis, emphysema, asthma	11.85
Congenital anomalies	11.04
Nephritis and related diseases	10.18
Smallpox	7.26
Tuberculosis	6.69
Other	115.50

Source: SSP-SSS (1993), p. 96.

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Table V-3 - Main Causes of Infant Mortality, per thousand registered born. Federal District (1990)

Disease	Rate
Perinatal diseases	8.48
Foetal/new-born respiratory diseases	4.90
Infectious intestinal diseases	3.63
Pneumonia/influenza	3.20
Total rate	24.07*

* This figure has been contested by health experts who claim that the actual rate might have been up to 50 per cent higher. The health authorities recognized in 1992 that the figures were affected by an underestimation of 31 per cent. (Jiménez Ornelas, 1995, pp. 26-7).

Source: SSP-SSS (1993), p. 102.

Table VI-1 Private Consortiums Working under Contract in the Federal District (1993-circa 2000)

Zone A	Servicios de Agua Potable (SAPSA), integrated by the Mexican companies Ingenieros Civiles Asociados (ICA) and Banco Nacional de México (BANAMEX), and the French Générale des Eaux (later Vivendi). Serving the delegaciones Gustavo A. Madero, Azcapotzalco, and Cuauhtémoc..
Zone B	Industrias del Agua S.A. de C.V. (IASA), integrated by an undisclosed private group from Nuevo León, and the British Severn Trent Water. Serving the delegaciones Benito Juárez, Coyoacán, Iztacalco, and Venustiano Carranza.
Zone C	Tecnología y Servicios de Agua, S.A. de C.V. (TECSA), formed by the Mexican Bufete Industrial and Bancomer, jointly with the French Lyonnaise des Eaux-Dumex (later Suez), and the British Anglian Water. Serving the delegaciones Iztapalapa, Tláhuac, Xochimilco, and Milpa Alta.
Zone D	Agua de México, S.A. de C.V., with the Mexican group GUTSA, and the British company North West Water International. This consortium has the delegaciones Alvaro Obregón, Tlalpan, Magdalena Contreras, Cuajimalpa, and Miguel Hidalgo.

Source: Martínez Omaña (2002), p. 179.

Table VI-2 Key principles of neoliberal water policy

a) Water resources should be allocated through the market; that is, private water rights should be created replacing any existing forms of collective or public rights and they should be freely tradable.

The absence of private property rights over water and the continued existence of public or collective water rights have been blamed for inefficiency in the allocation of water resources, overexploitation, and the situation of water stress affecting many regions, including the Basin of Mexico (Winpenny, 1994: 1). For instance, Roth has argued that in the case of both urban and rural supplies, the absence of property rights in water precludes private sector intervention and increases the difficulties in allocating this scarce resource. Thus, the existence of externalities in water supply calls for mechanisms (such as the vesting of property rights) that would promote more —rather than less— private sector involvement. The possibilities of trading in water would encourage it to be conserved and moved to priority uses (Roth, 1988: 239-40).

In the words of Terence Lee, a pro-privatization water expert formerly at the UN Economic Commission for Latin America and the Caribbean, in water sector reforms ‘the most significant act of privatization may be the granting of property rights over water’ (Lee, 1999: 93). This argument became well established and legitimated by the Fourth Principle of the Dublin Declaration adopted at the UN Conference on Water and the Environment (January 1992), which stated that ‘water has an economic value in all its competing uses and should be recognized as an economic good’ (UN, 1992). This principle could be interpreted in different ways, for example, accepting that water has an economic value does not exclude the fact that it also has many other values that have to be taken into account but that are incommensurable with the economic, such as ecological or intergenerational values. However, mainstream theorists tend to ignore this fact, as the following example suggests:

finally, in the Dublin statement [...] the rhetoric of international meetings on water resources management recognized that water is essentially an economic good. [...] This is not a very new proposal. Economists interested in water resources management have long argued the necessity to recognize that water is an economic good and not to treat water as having ‘unique importance’ but as one good among all others. [...] If water is an economic good then it

should be possible to govern its allocation through the market (Lee and Jouravlev, 1998: 7).

b) Water services have to be considered an economic good, in the sense of being a private good that has to be bought in the market so that non payers can be excluded; the notion that water is a public good or even a social good must be abandoned.

These authors agree that there is no particular reason why water should be considered a public good that has to be excluded from the market (Roth, 1988: 240-2; Triche, 1990: 4.), and some have contended that ‘the argument in favour of direct public provision of [urban water supply] has traditionally been based on the false assumption that it is a public good’ (Nickson, 1996: 25), ‘a “public service” or even a “social good”’ (WSP-PPIAF, 2002: 8-10). Moreover, the persistence of the public-good status of water and the delay to treat it as an economic (private) good has been used to explain the institutional and policy failures diagnosed in the sector, such as the chronic underpricing of water compared to the real cost of provision (Winpenny, 1994: 7-21).

c) Water services should be provided by private operators, which are inherently more efficient than public ones; if possible, water services should be self regulated by market mechanisms and state intervention should be minimized if not altogether cancelled.

Mainstream theorists argue that ‘the transfer of public companies to private ownership can bring substantial improvements in productive efficiency. The findings of empirical research conducted by the World Bank and Boston University [...] indicate that privatisation does bring substantial gains. [...] This empirical evidence is supported by several theoretical arguments’ (Lee, 1999: 101). Others have argued that ‘competitive private provision may well be the most efficient form of organization’ for the delivery of water services (Roth, 1988: 7). The World Bank has also stated explicitly that

private participation offers enormous potential to improve the efficiency of infrastructure services, extend their delivery to the poor, and relieve pressure on public budgets that have long been the only source of finance. Encouraging more private involvement requires that governments change their role —no longer directly providing infrastructure services but mastering the new business of fostering competition among private providers, regulating where competition is weak, and supporting the private sector generally (World Bank, 1998: 1).

Another example from a World Bank water sector specialist who argued for

complete privatization of water assets and unregulated natural monopoly. [...] The rationale for unregulated privatization is straightforward. An unregulated private monopoly would have an incentive to bring as many potential buyers into the system as possible, so as to maximize profit. Unregulated private monopolies could thus significantly increase the number of water connections in developing countries. If unregulated privatization could produce hook-ups for currently neglected low-income customers, the poor would end up with higher real incomes, better water service, more time for other endeavours, and a greater probability of a long life (Brook Cowen and Cowen, 1998: 22-3).

d) Water services are not a natural monopoly, as claimed by the defenders of state intervention; most operations can actually be opened to competition, perhaps with the exception of some core activities; however, high transaction costs can make competition difficult; in these cases, a privately-owned water monopoly is preferable to a public one; even then, keep regulation to a minimum or cancel it altogether if possible.

Some authors have argued that the activities of collecting, treating and distributing water are not inherently a monopoly activity, as a town or city can be supplied from a variety of different sources and distributed through different urban systems subject to 'competition by comparisons of costs and service levels' (Roth, 1988: 231-6).

Likewise,

Introducing competition into previously monopolized and regulated network utilities is the key to achieving the full benefits of privatization. Privatization seems to be necessary but it is not sufficient. Regulation is inevitably inefficient, suggesting that it be confined to the core natural monopoly of the network. Provided that competition is effective, it can replace regulation for network services and thereby increase efficiency (Newbery, 1999: 386).

e) water users should be transformed into customers, and right holders into property owners and consumers.

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