

Dioxins, Furans, and HCB

Inventories and Sources for Mexico

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- **Objective:**

Estimate the emissions to the atmosphere of dioxins, furans and hexachloro bencene generated from relevant sources produced by nature and man-made in Mexico from the years 1995 to 2000, using standard procedures.



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Chapter 1. A. Forest Fires (1994-98)

- 56 million hectares are forests and jungle
- 84 million hectares are pastures, brush, etc.
- Most fires are man-made (95%)
- Most fires are superficial (90%), only affecting grass and brush.
- Only 5 % of fires affect upper part of trees, cups.
- Fires have seasonality occurrence: from January to June, April is the most critical month.
- Average area affected: 312, 860 hectares in 8,757 incidents in 1999. (average 35 ha/fire).

B. Agricultural Fires (1994-1999)

- 5 million hectares/year are burned to clear land from agricultural waste, undercutting excessive vegetative growth and forest clearings (1999).



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■ Forest Fires Emission Estimate:

➤ Affected Areas:

- Types of vegetations (p.23 of Mexico Draft Report)
- Biomass densities (p.24)
- Emission factors (p32)

➤ Estimated Emission = 2.352 grams/year (1999)

- Highest in states: Chiapas, Oaxaca, Chihuahua, Durango, and Baja California Norte.



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■ **Agricultural Fires:**

- Total Agricultural Areas: 7.4 million hectares. (p.33)
- Total Agricultural Areas Burned: 5.9 million hectares (p. 33)
- Emission Factor for corn waste= 0.00003 grams TEQ/ha

Estimated Emission: 221.48 grams per year (1999)

- States with highest emissions: Chiapas, Jalisco, State of Mexico, Veracruz and Oaxaca.



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- **Chapter 2. Incineration and Combustion Sources.**

- **2. A. Medical Waste Incinerators. (p. 37)**

- 26 facilities authorized since 1995, 4 shut by 2000, 22 remain.
- National treatment capacity 8, 000 ton/year, operating most at 50 % capacity; Concentrated in 11 states, most in the Mexico City area.
- Average input capacity 400 kg/hr, largest is 590 kg/hr.
- Emission factors: 0.551 ug/kg in small incinerators (less than 90 kg/hr; 1.54 ug/kg in medium incinerators more than 90 kg/hr)
- **Estimated Emissions: 5.2 grams/year**



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■ 2. B. Industrial Waste Incineration (p. 40)

- 14 authorized industrial incinerators (since 1997)
- National average capacity 700 tons/day
- Amount of industrial waste incinerated: 220,000 tons/year
- Emission factor = 3.8 ng TEQ/ kg

Estimated Emission (2000) = 0.84 grams/ year



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■ 2.C. Backyard Burning. (p. 42)

- Practiced in most small towns and in half of refuse in medium cities, where refuse collection is deficient,
- Most organic waste is fed to small animals or buried in ground; combustible materials are burned (about 6 % of refuse)
- Amount of refuse burned in backyards: 0.7 million tons/year
- Emission factor (Lemieux, 1997) = 0.14 ug/kg (p-46)

Estimated Emission (2000) = 103.8 g TEQ/year



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■ 2.D. Open Dumps Burnings

- Open dumps are operated by medium and small cities (about 33 % of total refuse generated)
- Scavengers collect plastic, metals, wood and paper; burn wasted to save space and strip cables; estimated 6 % of refuse received.
- Estimated refuse burned inside open dumps = 825, 000 tons/year
- Emission factor (Lemieux, 1997) 0.14 ug/kg refuse

Estimated Emissions (2000) = 115.5 grams/year



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■ 2.E. Biogas Burning (p. 53)

- Few sanitary landfills in the country; largest receives 5,000 tons/day, average capacity, 1,000 tons/day. 16-17 operating in 2000. Estimated national capacity 25, 000 tons/day
- No sanitary landfill practice biogas burning, most vent directly to air.
- Only the Santa Fe/Prados de la Montaña (closed in 1995; estimated 60, 000 tons) has 3 venting and burning gas shoots
- Estimating to burn 65 million cubic meters per year
- Emission factor = 2.4 ng/cubic meter

Estimated Emissions = 0.091 grams/ year



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■ 2.F. Tires Burned (p.54)

- Tires Balance: Production 224, 000/year; import 7.5 million/year; export 25, 000; passive tires stored 45 million.
- About 1 % of tires reach open dumps and burned jointly with refuse
- About 2, 000 tires are used as fuel in brickmaking processes
- About 5, 000 tires are used as fuel in cement plants
- Emission factor 0.282 ng/ kg tire (each tire weighs 10 kg)

Estimated Emission (from brickmaking only)
0.460 grams/year



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■ Chapter 3. Cement Industry (p. 67)

- National Clinker production 30 million tons or 300 x 100,000 tons
- 26 cement installations are authorized to used hazardous waste as supplementary fuel (mostly used lubricating oil) and tires; rest do not use hazardous wastes or tires.
- Waste used as fuel range from 5 to 30 %; average is 15 %
- Emission factor weighted for waste usage (p.67, chart 4.3) = 0.2 ng/kg

Estimated Emission (2000) 7.14 grams/year



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■ Chapter 4. Metallurgical Industry (p. 70)

- Large metallurgical facilities, mostly using minerals
- Secondary recovery of metals is mostly done by small and unregistred foundries, and difficult to track.
- Scrap metals are recovered by electric arc furnaces in 10 million ton/y
- Emission factor 0.57 ug/ton of scrap

Estimated Emissions 0.805 grams/year (2000)



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■ Chapter 5. Chemical Industry

■ A. Chlorine production:

- No longer use graphite anode, instead use titanium anode: so no Dioxins are not emitted.
- B. Pulp and Paper Bleaching.
- Most bleached paper is imported
- Only one small pulp&paper plant bleach with chlorine: 89 tons/y

■ Estimated Emissions: 0.744 grams/year

■ Estimated discharge : 0.010 grams/year



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- **Chapter 5.C. PVC Production (p. 83)**
- Production of PVC 485, 000 tons/y
- Emission factor 0.494 grams/ 100, 000 tons

- Estimated Emissions : 2.4 grams /year



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- **Chapter 6. HCB Emissions (p. 86)**
- Only tire production is estimated: other sources were not estimated (see page 86 chart 7.1)
- Rubber tires production 55,600 tons/year, or 5.6 million tires/y
- Emission factor for HCB : 1.492 ng HCB / tire
- **Estimated Emission of HCB (1999)= 39.33 kg/y**

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■ Estimated Annual D&F Emissions Trends between 1995 and 2000.

Forest fires	Decreased	1.9 g/y	0.4 %
Agricultural fires	Unchanged	221.8 g/y	48.2 %
Medical WI	Increased	5.3 g/y	1.2 %
Industrial WI	Increased	0.8 g/y	----
Backyard burning	Decreased	103.8 g/y	22.5 %
Open dump burning	Decreased	115.5 g/y	25.1 %
Biogas	Unchanged	0.09 g/y	---
Brick making	Unchanged	0.06 g/y	---
Cement Plants	Decreased	7.14 g/y	1.5 %
Pulp&Paper	Increased	0.8 g/y	----
PVC Prod	Increased	2.4 g/y	0.5 %
Scrap Recovery	Increased	0.8 g/y	----
National	Decreased	460.4 g/y	100 %



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- Comments would be received at and copies can be requested to:

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