

BENITO JUAREZ, Mexico

City Information

Population: 743,626 inhabitants (INEGI 2015)

Area (km²): 1,664 Km²

Climate: Warm sub-humid

Main Economic Activities: Tourism

City website: <http://cancun.gob.mx/>



Country Information

Population: In accordance with the 2015 intermediate census, México's population for that year was, 119,530,753. (INEGI 2015)

Area (km²): 1,964, 000 km²

Economy and GNI/Capita: Upper-middle-income economy

Main Economic Activities

The main activities of Mexican economy are, listed in order of importance.

- Remittances: Earnings that Mexican workers send home.
- Oil extraction
- Service sector: Tourism
- Manufacturing operation: Maquiladora industry
- Automotive industry.

The Mexican gross domestic product by economic activity during 1990-2005 period is show in the next table.

Centro de Estudios de las Finanzas Públicas

Cuadro 4
México: Producto Interno Bruto por Actividad Económica^{af}, 1990-2005
(millones de pesos a precios corrientes)

Año	Total	Impuestos a los Productos Netos de Subsidios	Valor Agregado Bruto a Precios Básicos	Agropecuaria, silvicultura y pesca	Industria					Servicios				Cargo por los servicios bancarios imputados	
					Total	Minería	Manufactura	Construcción	Electricidad, gas y agua	Total	Comercio, restaurantes y hoteles	Transporte, almacenaje y comunicaciones	Servicios financieros, seguros, actividades inmobiliarias y de alquiler		Servicios comunales, sociales y personales
1990	734,802	62,802	672,000	48,990	192,128	15,820	140,608	26,504	9,196	438,632	167,202	61,450	89,628	120,352	-7,750
1991	945,190	80,891	864,299	61,409	243,385	16,024	178,729	35,698	12,933	570,693	201,009	86,563	118,952	164,170	-11,188
1992	1,123,936	96,286	1,027,651	67,425	289,144	17,959	208,365	46,372	16,448	694,678	234,755	97,970	149,021	212,931	-23,596
1993	1,256,196	101,064	1,155,132	72,703	309,897	16,258	219,934	55,379	18,327	806,239	251,629	107,480	183,208	263,922	-33,707
1994	1,423,364	113,858	1,309,506	78,165	350,778	17,442	245,012	69,146	19,178	923,040	275,679	124,833	211,497	311,031	-42,477
1995	1,840,431	158,184	1,682,247	95,311	468,917	29,072	350,196	68,358	21,331	1,208,233	351,745	168,083	308,361	380,044	-60,214
1996	2,529,909	228,901	2,301,008	144,087	652,617	35,755	494,520	95,475	26,867	1,561,118	494,293	233,848	345,234	487,743	-56,814
1997	3,179,120	301,002	2,878,118	164,014	821,764	43,923	615,478	128,022	34,340	1,934,669	613,546	304,348	384,189	632,585	-42,328
1998	3,848,218	328,568	3,519,650	185,379	1,007,027	48,424	749,293	165,013	44,298	2,362,611	701,090	381,118	481,762	798,641	-35,367
1999	4,600,488	387,981	4,212,506	199,567	1,208,302	60,140	884,331	207,277	56,554	2,861,648	840,850	468,657	555,142	997,200	-57,010
2000	5,497,736	508,191	4,989,545	207,979	1,398,132	70,178	1,013,598	258,465	55,892	3,444,518	1,065,628	556,840	605,499	1,216,552	-61,084
2001	5,811,776	540,035	5,271,742	218,958	1,436,841	72,500	1,031,218	270,643	62,481	3,706,715	1,090,164	595,066	641,710	1,379,774	-60,772
2002 ^{af}	6,267,474	528,491	5,738,983	226,397	1,519,870	77,207	1,068,603	292,180	81,881	4,077,494	1,148,997	611,602	769,222	1,547,672	-84,778
2003	6,895,357	646,446	6,248,911	242,896	1,611,645	82,512	1,123,213	326,319	79,601	4,469,407	1,270,886	645,698	824,536	1,728,288	-75,036
2004	7,713,796	745,037	6,968,759	272,405	1,830,690	100,704	1,257,054	380,234	92,699	4,944,039	1,449,270	725,500	904,356	1,864,912	-78,375
2005	8,374,349	870,043	7,504,306	288,513	1,945,595	111,475	1,331,955	401,439	100,727	5,359,581	1,591,552	788,307	982,198	1,997,525	-69,383

^{af} Estimado por el promedio trimestral.

^{af} Cifras preliminares a partir de la fecha en que se indica.

Fuente: Elaborado por el Centro de Estudios de las Finanzas Públicas de la H. Cámara de Diputados, con datos del Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Government Agencies responsible for guidance on waste legislation

Secretaría de Medio Ambiente y Recursos Naturales. SEMARNAT:

<http://www.gob.mx/semarnat>

Classification of MSW

Solid urban waste is generated in households as a result of the elimination of materials used in domestic activities (such as consumer products and their packaging) or those that come from any other activity that takes place within establishments or on public spaces, with domicile characteristics, and those resulting from public roads and places, as long as they are not considered as other type of waste.

Based on the previous description MSW or Urban Solid Waste are composed by those wastes originated at:

- Household
- Restaurants,
- Hospitals
- Public spaces
- Shops
- Offices
- Hotels

MSW Generation

The waste generated varies according to the characteristics of the different areas of the municipality. In the Hotel Zone of the city, the minimum average record is 140 tons of waste per day, however it may reach values of more than 180 tons in high season. The city of Cancun, the Alfredo B. Bonfil delegation, and the town of Puerto Juarez generate at least 800 tons per day.

Based on data from SIRE SOL Cancún, per capita waste generation is approximately 1.3 kg per day. This results in a total average generation of 960 tonnes per day.

Collection Coverage and Type

Approximately 95% of waste generated is collected by the municipal collection system. Nowadays, the municipality is running a segregated waste collection pilot program in one sector of the city focused on household waste generation. Hotels and restaurants have segregation programs where recyclable waste is delivered to private collectors while organic and wastes without economic value are collected by the municipal system.

Waste Composition

According to a waste generation study made by the Municipality on 2009, the household waste composition is:

TABLA RESULTADO DEL MUESTREO REALIZADO EN LOS TRES ESTRATOS ECONÓMICOS.	
CONCEPTO	% PROMEDIO
1.-ALGODÓN	0.04%
2.-CARTÓN	4.45%
3.-CUERO	0.09%
4.-RESIDUO FINO	0.89%
5.-ENVASE DE CARTÓN EN CERRADO	3.15%
6.-FIBRA DE VEGETAL (Esclerénquima)	1.95%
7.-FIBRA SINTÉTICAS	2.02%
8.-HUESO	0.28%
9.-HULE	2.65%
10.-LATA	2.12%
11.-LOZA Y CERÁMICA	0.79%
12.-MADERA	1.29%
13.-MATERIAL DE CONSTRUCCIÓN	0.50%
14.-MATERIAL FERROSO	1.98%
15.-MATERIAL NO FERROSO	0.52%
16.-PAPEL	13.90%
17.-PAÑAL DESECHABLE	8.52%
18.-PLÁSTICO DE PELÍCULA	5.80%
19.-PLÁSTICO RÍGIDO	0.94%
20.-POLIURETANO	0.33%
21.-POLIESTIRENO EXPANDIDO	1.72%
22.-RESIDUOS ALIMENTICIOS	15.68%
23.-RESIDUOS DE JARDINERÍA	5.18%
24.-TRAPO	6.35%
25.-VIDRIO DE COLOR	1.77%
26.-VIDRIO TRANSPARENTE	4.39%
27.-BOTELLAS DE PET	8.38%
28.-ALUMINIO	0.96%
29.-MARMOL	0.23%
30.-MATERIAL BIOLÓGICO INFECCIOSO	0.17%
31.-MATERIAL ELECTRÓNICO	2.65%
32.-PILAS	0.19%
33.-CERA	0.02%
34.-COBRE	0.10%

However, this information is not considered reliable due to the fact that a long period of time has passed since its collection.

Waste Management Practice

Waste collected by the municipal system collection is transported and delivered to the Centro Intermunicipal de Manejo Integral de Residuos de Benito Juárez e Isla Mujeres (CIMIRS), located in Isla Mujeres territory, and operated by the Benito Juárez municipality.

These waste management facilities have a waste segregation, recovery and compaction system that treats about 40% of the received wastes.



Due to the waste segregation and recovery system, some materials are recovered and sold. Materials recovered by this system are:

- Cardboard
- HDPE
- LHPE
- PET
- Metals
- Glass

The recovery average is under the 5% of recyclable materials contained on 400 tons per day.

A local program collects recyclable waste that citizens deliver called RECICLATON. Every last Saturday of the month, local recyclers in coordination with municipal authorities establish gathering points to receive plastics, paperboard, glass, vegetable oil, and electronic wastes so they can be transported to the recycling industry located at the center and north of the country. There is no recycling industry in the territory.

Most hotels have private collection services for recyclable wastes. At the municipal level, there is no information available about recyclable materials amounts recovered by private collection sector.

The Benito Juárez Municipality has three landfills, two of them are closed and one in operation at the CIMIRS facilities.

All the waste collected at the municipal territory are disposed at the CIMIRS landfill that operates in accordance to NOM-083-SEMARNAT-2003.

Formal Waste Sector

To perform the waste collection, the municipality establishes annual contracts with at least three companies to provide the service in all the municipal territory.

Regarding to waste disposal, there are three companies that attend the different landfills. The landfills and companies are listed below.

- Relleno sanitario Norte. The company ABARMAR has a 10 years concession since 2007 for extraction, burning and energy generation. Nevertheless, they have only been able to burn the landfill gas during this period.
- Relleno sanitario parcela 1113. This landfill has finished operation on April 2013. During this year until now, there are only maintenance activities conducted on this landfill. For this purpose, the municipality establish annual contracts for maintenance. No landfill gas burning is carried out.

- Centro Intermunicipal para el Manejo Integral de Residuos de los Municipios de Benito Juárez e Isla Mujeres. These are the facilities for waste treatment and disposal. The operation has been concessioned for 20 years, since 2013, to Promotora Inmobiliaria Majahual.

Informal Waste Sector

Informal waste street collection exists at the municipal territory. This informal sector recovers mainly aluminum and PET contained in bags that people bring out of their homes and place on the streets for their collection. There is no information about amounts of materials recovered.

The impact of this sector has not been measured, however, is not considered to have an important impact.

Financing of MSW

Citizens do not pay for waste collection. Commercial entities pays collection fees that are used to subsidize part of the household collection. The rest is subsidized by other municipal taxes. The payments made by waste collection service are directed to SIRE SOL accounts. SIRE SOL is the decentralized public organism in charge of waste management system.

Waste collection budget represents approximately the 10% of the entire municipal budget.

Waste Management Challenges

Areas of work

1. The municipality is running a segregated waste collection pilot program in order to define logistic details. Once the logistics are defined, it will be necessary a communication strategy for the different sectors of the society. This is a high priority need in order to convince the citizens to be part of the waste management strategy.

The expected outcome of this activity is the effective communication of the separate waste collection program to all society sectors

Down below the table presents a general execution schedule.

Activity	Months											
Strategy design	█	█										
Communication tools design		█	█									
Program execution				█	█	█	█	█	█	█	█	█

2. An important amount of food leftovers, as well as gardening waste, is sent to the CIMIRS facilities. It is necessary to make available to the population different waste treatment alternatives like composting. There are different types of households in Cancún, each one

generates organic waste, but they do not have equal opportunities to treat them, because of the space and necessary care so the compost does not become a problem. A municipal composting strategy has to be developed, this strategy has to propose different composting techniques that respond Cancún household context, involvement of the different sectors of Cancún society. It may be part of a larger strategy that allows recirculation of nutrients in the city, like urban orchards.

This is a high priority need in order to reduce *SLCPs*, mainly methane from landfill.

The main goal is to encourage the use of composting as a common practice and the expected outcome is to establish composting as a local home practice.

Activity	Months											
Strategy design	■	■										
Communication tools design		■	■									
Program execution				■	■	■	■	■	■	■	■	■

For this program, technical and financial support is needed in order to identify adequate composting techniques and design the program and communication tools. There are other cities (members of the Coalition) that already have successful initiatives; an exchange of experiences will help to define the better options for Cancún.

- Almost 100 tons of food wastes are generated by the tourism sector only at the Cancún Hotel Zone. Waste segregation is a common practice at the hotel zone but wastes collected by the municipal collection system are disposed at the CIMIRS. There is not information available about organic waste treatment systems that respond to hotel facilities characteristics. It is necessary to make an evaluation of the existing technologies for organic (food waste) treatment that can be suitable to hotel facilities.

The expected outcome is a document that presents pros and cons of the existing technologies for organic waste treatment that can be utilized for hotel companies.

- Waste generation and composition diagnosis. This study can be carried out in approximately two months. The expected outcome is information about waste composition and generation. The municipality requires technical support and economic support.

Technical Assistance

- Benito Juárez Waste generation diagnosis.
- Technical assistance in order to define and design a municipal composting strategy that responds to society needs.
- Waste segregation communication and education program.
- Evaluation of technologies for the treatment of organic waste for hotel facilities

General description and overview of common practice

In 2010, an average of 86,357 tonnes of MSW were collected in the nearly 2,400 municipalities in the country from which information was collected. Of the collected residues, 89% corresponded to non-selective collection and the remaining 11% to selective collection (that is, separation of MSW in organic and inorganic, at least). The census also revealed that 2,282 municipalities (about 93% of the country's population) had collection and final disposal services, 148 sent at least a fraction of their collected waste to a treatment plant and 161 had none of these services.

Waste Generation (per capita/year)

- Mexico total generation 102,894.96 t/día
- Per capita generation 310.9 Kg/year

Collection Coverage

In 1998, about 85% of the waste generated in the country was collected, which in 1993 reached 93%. However, when considering the size of localities, the situation is different. In 2011, in the metropolitan areas of the country, coverage of the collection of waste reached 90%, while in the average cities was 80%, in the small cities, coverage was 26% and in the rural or semi-urban localities it reached 13%.

Number of Landfills/MSW Disposal rate (tonnes/year)

In 2011, it was estimated that 72% of the generated volume of MSW in the country was disposed in landfills and controlled sites, 23% was deposited in uncontrolled sites

Recycling Rate

Although the volume of MSW recycled in the country has increased in recent years, it is still low. According to the figures obtained in the final disposal sites, in 2011, 4.8% of the generated RSU volume was recycled.

Waste management of organic fraction (composting, anaerobic digestion)

Daily average of organic waste sent for treatment: 2,748,727

City Level

Aimed at improving Waste Management in General

- Municipal development plan. 2016-2018
- SIRESOL's waste management project
- Municipal program for the prevention and integral management of waste (obsolete).
- Metropolitan found. Financial instrument currently used for waste facilities construction.

Aimed at addressing Climate Change and Reducing SLCPs through Waste Related Activities

- Programa de acción climática municipal de Benito Juárez

Country Level

Aimed at improving Waste Management in General

- Plan Nacional de Desarrollo 2013-2018.
 - Develop the institutions and policy instruments of the National Climate Change System.
 - Accelerate the transition to low carbon development in the primary, industrial and construction sectors, as well as in urban, tourism and transportation services.
 - Promote the use of advanced systems and technologies, high-energy efficiency and low or zero generation of pollutants or greenhouse compounds.
 - Promote and strengthen regional and international cooperation on climate change, biodiversity and the environment.
 - To achieve a comprehensive management of solid waste, special handling and hazardous, including the use of materials that result and minimize the risks to the population and the environment.
 - To carry out scientific and technological research, generate information and develop information systems to design environmental policies and to mitigate and adapt to climate change.
 - To achieve the ecological ordering of the territory in the regions and political districts priority and strategic, especially in the zones of greater vulnerability climatic.
 - Continue to incorporate sustainability criteria and environmental education into the National Education System, and strengthen environmental training in strategic sectors.
 - Contribute to improving air quality, reducing emissions of greenhouse compounds through more efficient fuels, sustainable mobility programs and eliminating inefficient supports for fossil fuel users.
 - Achieve better air quality monitoring through increased quality of existing monitoring systems and better coverage of cities.

Financial Instruments

National resources

- SHCP (PEF)
- BANOBRAS
- FONADIN

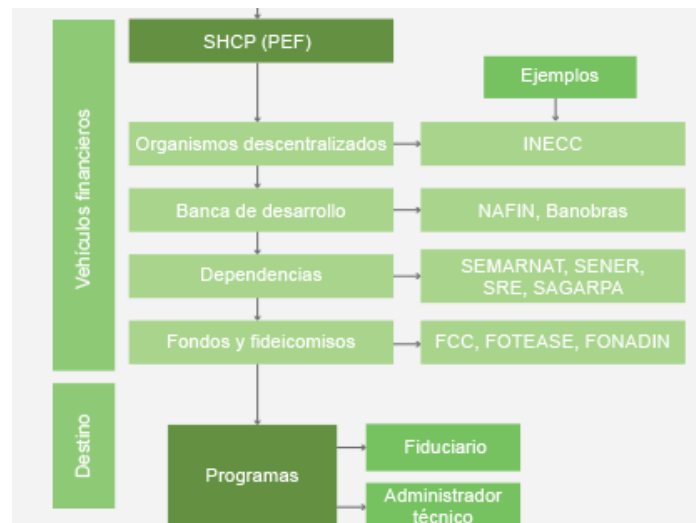
Aimed at addressing Climate change and reducing SLCPs through waste related activities

- Plan Nacional de Desarrollo 2013-2018.
 - Develop the institutions and policy instruments of the National Climate Change System.
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 - Achieve better air quality monitoring through increased quality of existing monitoring systems and better coverage of cities.
- Programa especial de cambio climático 2013-2018
 - *Objective 1.* Reduce the vulnerability of the population and productive sectors and increase their Resilience and resilience of the strategic infrastructure
 - *Objective 2.* To conserve, restore and sustainably manage ecosystems by ensuring their environmental services for mitigation and adaptation to climate change

- *Objective 3.* Reduce emissions of greenhouse gases to move to an economy competitive and low emissions development.
- *Objective 4.* Reduce emissions of short-lived climate pollutants, health and wellbeing co-benefits
- *Objective 5.* Strengthen the national policy on climate change through effective instruments and coordination with federative entities, municipalities, legislative power and society

Financial Instruments

National resources



City Level

Legislation governing MSW management

- Reglamento para la prevención y gestión integral de residuos del municipio de Benito Juárez
- Reglamento de ecología y gestión ambiental del municipio de Benito Juárez.

Guidance for MSW management (after legislation, before inspection activities)

There are no official guidelines

Inspection activities/supervision and enforcement of legislation

Supervision activities observe the accomplishment of Benito Juárez municipal regulations related to waste management.

National Level

Legislation governing MSW management

Ley general para la prevención y gestión integral de los residuos.

Guidance for MSW management (after legislation, before inspection activities)

Programa Nacional para la Prevención y Gestión Integral de los Residuos

Inspection activities/supervision and enforcement of legislation

NOM-083-SEMARNAT-2003

Current Projects or Activities Aimed at Reducing SLCP Emissions

Separate collection pilot program. The municipality is working in the collection logistics design for household separate waste collection program. The main goal of this program is to recover organic waste free of any pollutants so it can be treated by composting at the CIMIRS facilities.

A methane burning project is under evaluation. The goal of this project is to treat the methane gas generated in relleno sanitario parcela 1113 facilities.

Key Stakeholders

- Asociación de Hoteles de Cancún y Puerto Morelos
<http://www.resortscancun.com/>
- Waste collection enterprises SIRESOL Cancun
<https://www.siresolcancun.com/>
- Secretaría de Educación y cultura de Quintana Roo
<http://www.seq.gob.mx/>
- Instituto de planeación municipal de Benito Juárez
<http://implancancun.gob.mx/>

Additional Useful Information

[Include brief description/Title and weblink]

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