



CHAPTER 5. WASTE MANAGEMENT

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5.1 Waste policy

Any waste management program, regulation or directive for the municipality of Jiutepec must be implemented under the Mexican Federal Waste Law¹, supplemented by the State of Morelos Waste Law². The Municipal Program for the Prevention and Integral Management of Solid Waste in Jiutepec (PMPGIR) following the general guidelines established by the federal and state enactments offers implementation steps to reduce waste generation and improve waste management practices in the municipality. The program prioritizes household waste separation and separate waste collection services. Its principles are as followed:

Sustainable development

Prevention and waste minimization

Security in processes and environment protection measures

Autonomy in infrastructure and equipments

Communication and education: waste awareness programs

Information exchange and systematization of the data concerning waste generation and treatment

Community participation

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Compost of organic waste from gardens and green areas in Jiutepec.

Waste collection compactor



Sanctions targeting contaminators

Development of technology in industries aimed towards waste reduction

Land cover protection and control of soil and ground pollutants

Policy congruency with other governmental institutions

Waste generation

Jiutepec produces 271.05 Mg/da of solid waste. The waste production per capita is 1.34 kg daily. The production of domestic waste is 77.74 Mg/da. These calculations were published by the agency “Consulting” during a study conducted in 2004 in the locality (Thesis Consulting, 2005). Officials and local practitioners use these figures. They appear in PMPGIR, they are used as a reference point and were mentioned by several experts during the interviews.

Solid waste classification in Jiutepec

Organic waste

biodegradable matter from food waste, green waste and animal residues.

Inorganic waste

all matter non organic and with recyclable potential.

Special waste

urban waste
auto tires, agricultural,
demolition waste
construction waste
sludge and sewage waste,
batteries
bulky waste.

The study Thesis Consulting also indicates domestic waste generation per sector. The lower income sector presented the highest waste generation rate with 45.62Mg/da, compared to the medium income sector (15.45Mg/da) and high income sector with 16.67Mg/d. The low income sector represents 78% of the total population with 142.338 inhabitants (Thesis Consulting, 2005).

Domestic waste composition

Jiutepec is consistent with the tendency in waste composition in the state of Morelos, which estimates that close to 50% of the MSW is organic. In Jiutepec the waste composition is regarded in the following way.

Low socioeconomic group:

Organic 41% , recyclable 33% , special waste 21% , others 5%

Medium socioeconomic group:

Organic 71% , recyclable 19% , special waste 7% , others 1%

High socioeconomic group:

Organic 55% , recyclable 31%, special waste 9%, others 5% (ibid.).

5.2 Waste management operation

Street cleaning

The interviews made with public officers and local sweepers not only confirmed the information obtained through governmental reports but also provided critical additional data. This made possible the identification of key stressors affecting street cleaning processes. They are outline further in this section.

Street cleaning takes place daily. There are 11 sweepers and 1 supervisor providing this public service. 8 routes comprising 21 streets have been established. They are located in the first sector of the municipality in the city center. This central area also know as *Zocalo* hosts several main buildings such as the city town hall, the main church and other commercial buildings.

The sweepers are mostly senior citizens. Some of them have worked as sweepers for more than 10 years. They operate manually between 6:00 and 13:00. Each sweeper is equipped with a hand-cart and one or two brooms. Their journey begins at the city center where they clean the main plaza, its gardens, and adjacent streets. Following that activity, another street is assigned to each sweeper.

In 2005, Consulting made an evaluation of the efficiency of street cleaning in Jiutepec. It reveals that only 27% of the sweepers operated effectively. Only 66 km of roads were swept weekly.

During his interview, Mr. Eloy Castro, head of the Sanitary Department, acknowledged the poor coverage of street cleaning by the municipality, the lack of incentives for sweepers and the “rudimentary” equipment for cleaning the streets of Jiutepec. “We are waiting for a machine that will allow us to be more effective” he commented. (See interview summary in Appendix).

In addition to the limited equipment used by local sweepers and the low number of personnel and limited coverage of the service, a number of external factors affecting the efficiency of street cleaning activities can be re-grouped in several categories.

Box 4. Factors affecting street cleaning

Social factor

Locals don't make the difference between street cleaning and waste collection. Locals dispose of their waste illegally in the hand-cart while sweepers are at work
continuous festivities make street cleaning activities difficult considering that the volume of waste duplicates during those days.

Planning & economical factor

Lack of adequate solutions to solve high waste production during festivities
Lack of personnel during festivities
Lack of incentives or training programs for sweepers
Lack of modern equipment

Urban factor

The reduced size of some streets affects street cleaning
Barriers such as autos and informal commerce slow street cleaning
Poor street lighting produce augmentation of garbage in public areas
Streets with very low traffic and seemingly paradox concentration points such as markets and bus stations produce the highest volume of garbage
Lack of security limits the schedule for street cleaning

Environmental factor

Difficulty of operation during rainy seasons due to the weight of the waste.

Despite the need to improve street cleaning services in several of its main pathways, the municipality of Jiutepec presents a clean appearance in several of its residential boroughs. The reason for this inconsistency is the presence of informal actors who provide public cleaning services in specific areas. It is also not uncommon for neighbors to organize themselves and clean their own streets motivated by a social leader or a municipal program on waste awareness.

Waste collection services

The body of information on waste collection services differs from one source to another. The current data on the number of private actors, waste collection routes and the general infrastructure for collection activities is not clear and general agreements were difficult to obtain. This is due to a number of factors:

- Waste collection is a complex process that the local government alone cannot solve
- The official information is imprecise
- The terms of arrangement - which are currently in process - between private parties and the municipality are complicated and unclear
- The lack of ability from local government to manage and measure the performance of private actors, thus monitoring infrastructure fails

The municipality of Jiutepec supervises and coordinates the waste collection and final disposal occurs through the department of public services, which delegates the operational tasks to the department of sanitation. Both entities employ close to 60 individuals in charge of administrative and operational work. In addition to the monthly salary of all employees, the budget of the department of sanitation includes the costs necessary for collection, transfer, final disposition of waste and street cleaning (Thesis

Consulting, 2005). In Jiutepec, the private contractors participating in MSW waste collection are known as “concesionarios”. They outnumber the personnel attached to the local municipality for the task. They provide the service to local residents, commercial establishments and the industry. The interviews reveal that there are currently 37 contractors classified in two types:

Contractor “type A” pays a renting fee of 500.00 Mexican Pesos (aprox. 32 Euros) for the use of one of the municipality’s waste compactors.

Contractor “type B” provides the service with its private waste collection vehicle and pays 300.00 Mexican Pesos (aprox. 19 Euros).

This suggests that different types of vehicles with different waste loading capacity are used to collect domestic refuse in Jiutepec. There are 10 waste compactors models from 2004 and two earlier models as indicated in the PMPGIR. The other type of vehicles used for the purpose is mostly an open truck. The current exact number is unknown, however Consulting’s study revealed a total of 24 garbage vehicles operating in 2004 (2005). In each waste vehicle there are three operators, 1 conductor and 2 collectors.

The department of sanitation establishes the routes and schedule for waste collection services. According to official data, 70 boroughs are covered in a total of 30 routes. The service is provided twice a week. 10 Additional routes extend the collection service to governmental establishments. Lastly, the industrial area CIVAC relies on its own collection system.

Final disposal

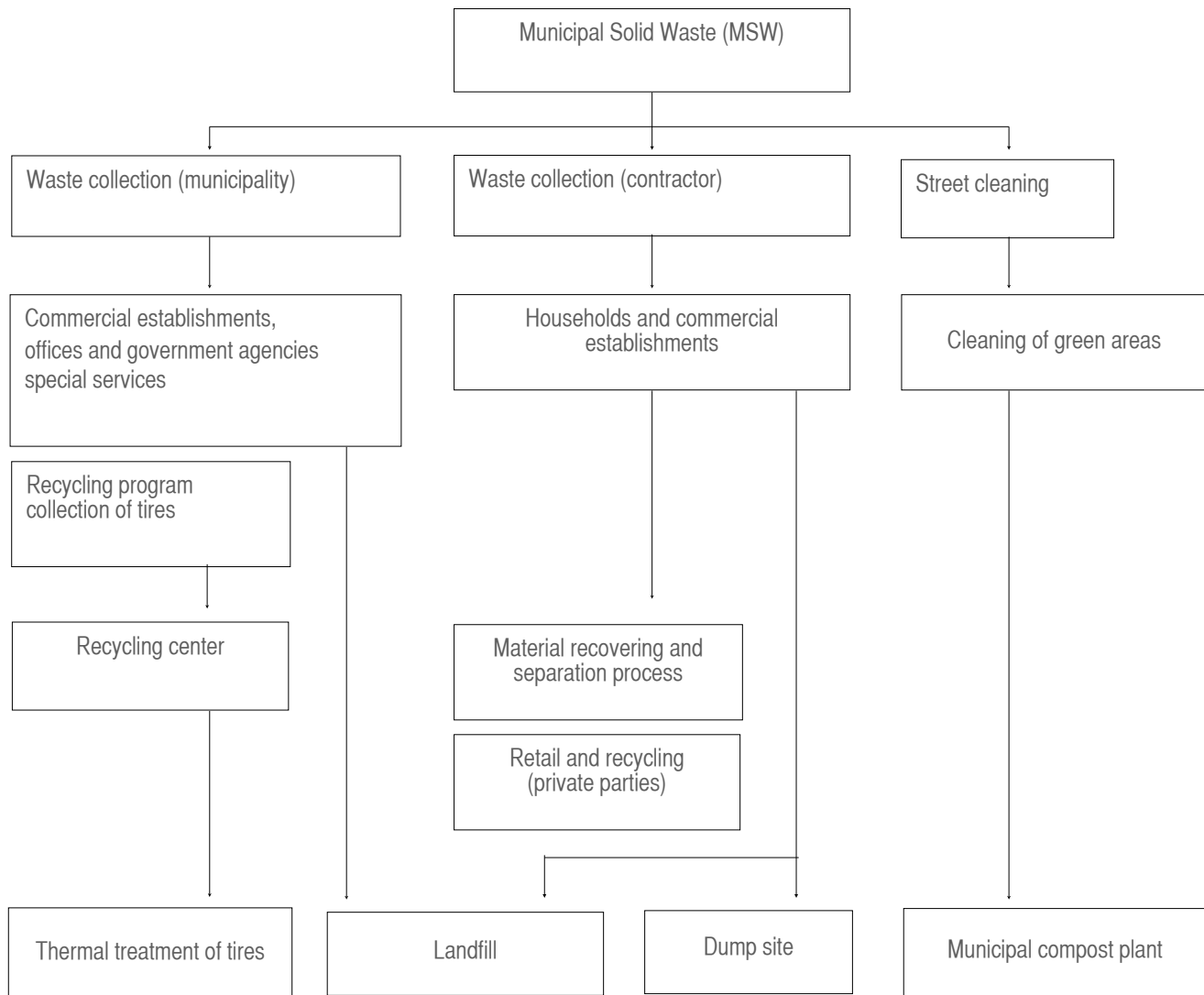
Final disposal in official dump sites and landfilling are the norms in Mexico. Currently the municipality of Jiutepec disposes most of its waste in a sanitary landfill located in the Cuautla Region. Private commissioners as well as collectors from the municipality have the obligation to transport the municipal waste directly to the Cuautla Landfill. Formally, Jiutepec's waste was disposed of in the Tetlama waste dump (see chapter 3), also occasionally the waste was transported to the State of Mexico to be disposed of there. The interview with Mr Eloy Castro revealed that there is a connection between illegal waste dumping and merchandise piracy in the municipality. Merchandise that was purchased illegally often end up in empty lots or ravines.

Composting

The municipal composting facility of Jiutepec treats biodegradable matters from green waste, i.e. branches, grass, tree trunks and leaves. The sources of the organic waste are public garden (80%) and selected private housing units (20%). The end product is aimed at farmers and green garden owners.

The municipal compost plant has renewed operations in May 2007. It is now administrated by a private actor and covers 19,000 square meters. In August 2007 a field visit was undertaken at the compost plant. Observation of activities such as shredding, sieving and pile formations was conducted. The composting method used at the plant is static windrow pile. The process takes 12 to 16 weeks. The compost center receives about 8 to 10 municipal trucks of raw material at the plant.

Figure 10. Diagram of waste management in Jiutepec



5.3. SWOT analysis

The strengths, weaknesses, opportunities and threats of the waste management system in Jiutepec are presented in relation to a broader range of factors as to provide a holistic view of the current waste management processes in Jiutepec.

Strengths

- Jiutepec is one of the fastest-growing entities in the region with a boosting economy. There is a suitable climate for investments in the town.
- Efforts by NGOs and other independent groups to secure the protected area, Texcal, have raised a certain level of environmental awareness among locals.
- The people of Jiutepec want to keep their town clean as demonstrated by the establishment of private initiatives to collect waste in areas not covered by the municipality.
- Locals are willing to pay additional fees for the collection service.

Weaknesses

- The involvement of different actors in the waste collection and treatment as well as the lack of control of local authority make it difficult to obtain reliable data on the waste type and volume produced in Jiutepec.
- The collection of residential waste, provided by public and private actors is difficult to systematize.

- Some private groups offering services of waste collection in distinctive sectors act autonomously and without the adequate supervision of the authorities. For instance the industrial sector has its own waste management system, which is not controlled by the local authority.
- Reports and testimonies obtained on waste management in Jiutepec show an inconsistency related to the frequency, time-schedule and routes of the collection system.
- The combination of remoteness and poor street conditions make it difficult to collect waste in all sectors.
- The condition of some waste collection vehicles is poor. This creates additional pollution and emission.
- The evidence suggests that street cleaning is insufficient in Jiutepec.
- Concerns, related to the excessive administrative work involved with waste managing which contrast with the low performance of waste collection operators have been raised.
- The most important aspect of the weaknesses of the waste management system in Jiutepec is the lack of joint efforts, continuity and coordination. As a result, waste awareness programs are interrupted, initiatives for waste separation do not follow through, the actors involved in the waste process act separately, and common agreements are difficult to reach.

Opportunities

- There is a potential for an integrated waste management industry, considering the level of commercial activities in the municipality.
- Waste with a market value can be reused through recycling centres or separated adequately through “Buy-back Centres”.
- The opportunity for monitoring services as well as guidance on regulatory compliance and good practice exists. Public authority and private actors interested in waste management processes may find it useful to plan adequately for the future.
- The talent and skills of the locals for commerce and the climate offer a potential to actively integrate the population in a lucrative secondary material occupation such as eco-tourism.

Threats

- In Jiutepec springs and other bodies of water have been turned into sewage or contaminated.
- The rapid urbanization process is reported to have negative effects on the natural resources of the area.

- The municipality relies on limited resources in order to prevent actions taken by corporate firms and other private groups in terms of land acquisition. It also lacks the ability to measure the level of its environmental footprint.
- Another related threat to the growing urban character in the municipality is the slow response to the transportation needs of locals. This failure could account for a major setback in future improvements of the waste management system.
- The most important threat in Jiutepec is the lack of a final waste disposal site. The Cuautla landfill which is located at a large distance from the municipality and will soon exceed its filling capacity. This situation indicates the need to find immediate solutions as where and how to handle waste in Jiutepec. Failure to address the issue efficiently may not only provoke severe environmental damages to the region but also instigate civil conflicts between the people of Morelos.

¹ This law known as *Ley Federal de Manejo Integral de Desechos Sólidos* was approved in Mexico City in 2003.

² Approved in September 2007, the State Waste Law is known as *Ley Estatal de Manejo Integral de Desechos Sólidos de Morelos*.