INTEGRATED SOLID WASTE MANAGEMENT LOJA, ECUADOR

SCALE

- City-wide services system.

SWM VALUE CHAIN

COLLECTION AND TRANSFER

RECOVERY

DISPOSAL

BUSINESS MODEL & FINANCE

- Self-sustainable compost & recycling operations with sales to the private sector.

PROJECT SUMMARY

Project scope

In the 1980s, Loja's **Integrated SWM Programme started with a composting unit which became recognised internationally** in the late 1990s as **one of the first cities to implement wet and dry waste separation at the source**. Its sorting scheme is key throughout the collection, transfer, treatment, and recovery stages of the solid waste value chain. Owned and run by the City's public administration, the initiative's recycling and composting operation is self-sustaining, making it a good example of public sector efficiency.

In the late 1990s the Municipality of Loja established the **Integrated SWM Programme, which it owns and continues to operate in the city today.** The Association of Municipalities of Ecuador (AME) was involved in promoting the results of the project by organising encounters with other Ecuadorian cities interested in replicating the practice. The Embassy of the Kingdom of the Netherlands, and the German Development Service (DED - now merged with GIZ) also supported the programme.

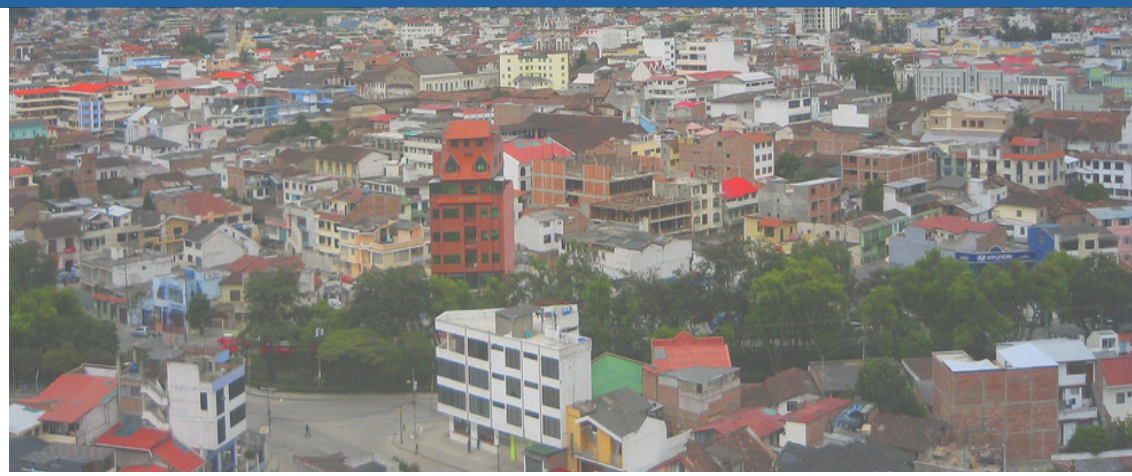

Figure 1: Image of Vista de Loja, by Santiago Vélez (CC 2.0)

SOLID WASTE MANAGEMENT SYSTEM & VALUE CHAIN

Loja's SWM programme was framed in the **'Action Plan for Loja 21st Century'** with the objectives of:

- **Promoting environmental awareness among citizens.**
- **Creating jobs.**
- **Improving working conditions for disadvantaged people.**

COLLECTION AND TRANSFER

The **household waste sorting programme** began with a pilot phase in 1998, involving around 3.000 participants, who **started separating wet** (organic) **waste from dry waste**. When this was first implemented among households, the Municipality requested citizens to purchase two waste containers, coloured green and black respectively, at cost price.[1] This segregation at the source scheme **now takes place across 80% of the city**, and was later introduced to less densely populated suburbs and outer villages within the Loja Country with two separate skip containers that are collected on a weekly basis.[2]

Municipal inspectors conducted a **door-to-door awareness building campaign** to all households within the city to explain the principles of segregation at the source. These inspectors continue to oversee its correct implementation, and to deter households from mixing the two types of waste, a fining system was established.

1 - Since theft of these containers was a huge problem at the start of the project, the Municipality installed loudspeakers on waste collection trucks, which announced their arrival with a popular melody, "Alma Lojana". Citizens got used to taking out their waste containers upon hearing the signal and immediately bringing them back inside when emptied.

2 - These waste containers are manufactured from recycled plastic, according to specifications provided by the Municipality.

RECOVERY: RECYCLING AND COMPOSTING

The Municipality established a controlled landfill in the city's southwest around 1996, which reached the end of its lifecycle in 2014. A 45.6 hectare **Integrated SWM Centre** ("Centro de Gestión Integral de Residuos Sólidos" in Spanish) was established in an adjacent area, consisting of a recovery plant and an organic fertilizer plant:

- **Recovery plant:** Separation, pre-conditioning, and sale of usable materials such as: paper, cardboard, glass, plastics, aluminium, copper, bronze, common and electronic scrap, and end-of-life tyres of different sizes.
- **Organic fertilizer production plant:** processing of organic waste began in the Municipal nursery of the La Banda neighbourhood in the South of the city, where the worm composting method was used to produce organic fertiliser. The Municipality later constructed a worm composting plant within the Centre with a capacity of 40 tonnes of organic waste per day, with the organic fertiliser being sold to local and regional farmers, city dwellers, and used in public parks and gardens in quantities of 10 and 25 kilos. Red Californian earthworms are also sold for the production of humus.

DISPOSAL

The Municipality established a controlled landfill in the city's southwest around 1996-1997. At the end of the landfill's lifecycle in 2014, the Municipality set up a new Integrated Solid Waste Management Centre in an adjacent area. The centre includes a recovery plant and an organic fertilizer plant (see centralised recycling plant previous section). For disposal, the centre is composed of a:

- **Biosecurity cell to dispose healthcare waste**
- **Final disposal cell designated for the long-term deposition and disposal of residual waste**

The 45.6 hectares centre treats 95% of the waste produced in Loja's County and hosts the Municipal Ecological Basic Education School. The centre also provides information and technical guidance services to various local, national, and foreign delegations that visit the facilities of the Integral Solid Waste Management Centre.

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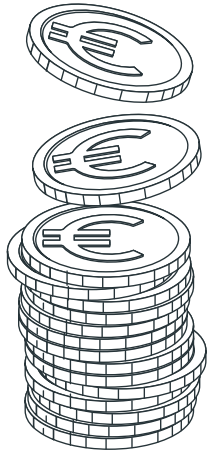
BUSINESS MODEL & SYSTEMS FINANCING



Investment & operational costs

Loja's integrated SWM programme is entirely owned and run by the Municipality. Largely due to the sales of the recycling and composting facilities, outputs cover their own costs. Additionally, the Municipal Director of Hygiene[3] and Sanitation is the project manager for the programme and is responsible for activities such as awareness building, monitoring, planning, and tendering. **The project received initial funding of USD 100.000** from the Embassy of the Netherlands in Quito to construct the first recycling centre. Subsequently, the project continued with municipal funds, while the German Development Service (DED - now merged with GIZ) mobilised an international solid waste expert for three years and two local experts for one year.

SWM is funded through the municipal budget, with an annual expenditure of USD 2 million allocated for the operation and maintenance of the system.

Citizens contributed economically mainly through purchasing waste containers for dry/wet segregation, while the primary source of revenue comes from government transfers.

In 2003, the municipality took the initiative to increase fines on parking infractions to cross-subsidise SWM and social services. However, this measure was not positively received by the population, resulting in the Mayor not being re-elected. The Municipality used applications to pursue donor funding opportunities. A portion of the collection trucks was funded by an Inter-American Development Bank (IDB) grant.

An important feature is **cost efficiency and maximisation of local labour**. The Municipality uses its own workshop for maintenance and repair and ensures that the collection fleet remains in impeccable state. This reduces long term costs associated with repair and replacements. The infrastructure of the recycling and composting facilities were also built by municipal workers in local workshops, while local mechanics have been commissioned to build bespoke machinery rather than purchasing ready-made commercial equipment. Although these machines might not perform as well as their commercial counterparts, the down time of the installations is drastically reduced as local mechanics and replacement parts are readily available.

3 - Now called Integrated Solid Waste Management Centre ("Centro de Gestión Integral de Residuos Sólidos"), which is part of the Environmental Serviaces of Loja's Mayor Office.

SWM System Financing

The system generates revenue through the sale of recyclable materials to private companies throughout Loja and Cuenca. **A portion of the compost produced is sold** at municipal markets and distributed to local cultivators, such as shrimp farmers and agrobusiness in the neighbouring province of Machala. **The income generated from these sales** is used to **cover the operational** costs **of these processes and their associated infrastructure**.

Business model

The Municipality of Loja's Directorate of Hygiene and Sanitation owns and operates the entire SWM system in the city, with no other public institution being involved. Private, informal recyclers have been incorporated in the recycling workforce. Initially, they could participate in the sorting and recovery activities as independent workers, selling recyclable material; yet, after the establishment of the new recycling centre, they work as formal Municipal employees.

Main Risks & Challenges

After 25 years of project implementation and both national and international recognition of its benefits, few risks remain. Citizens are generally proud of the success, the Municipality and the SWM workers have accumulated and institutionalised technical, organisational, and financial competence. However, some risks persist:

- Changes in political will or reduced support for SWM activities.
- Ready criticism and withdrawal of support by citizens if the programme underperforms.
- Volatility in the market for recyclable materials, compost, and composting worms.
- Maintaining the high level of technical, organisational, and financial performance is complex.
- As Ecuador has not yet introduced the "polluter pays" principle, citizens bare the economic brunt of paying for wet and dry waste containers. The polluter pays principle could be applied for further development of the programme and to hold manufacturers accountable.

IDENTIFIED BENEFITS, RISKS & CHALLENGES

Main Benefits

- Provision of organic fertiliser to local and regional farmers.
- Separation, treatment and sales of key material.
- Success of the project enabled and motivated local politicians to go further (modernisation and extension of the facility, mechanisation, investment in wastewater treatment facility).
- Enhanced citizens' identification with their city and local ownership.
- Replication by other municipalities on both national and international scales.
- 80% waste collection coverage.

Read the Solid Waste Management in Low and Middle-Income Countries: Practical Advice booklet

Sources & further reading

- Loja's Integrated Solid Waste Management Programme website.
- SWM Non-Key Expert direct experience in Ecuador.
- Visit the Urban Knowledge Hub on Capacity4dev to learn about other SWM case studies.
- View learning materials from the SWM Training Webinar on INTPA Academy.

DG INTPA F.4 UDTF Urban Development Technical Facility

Urban Development Technical Facility, as part of INTPA F4
The UDTF focuses on supporting partner countries in their urban development challenges. It delivers technical assistance and policy advice to improve the quality and impact of the EU's interventions in urban development at all levels — local, regional and global— with a focus on Africa, Asia, and Latin America and the Caribbean. Integrated urban planning coupled with greener infrastructure and coordinated urban expansion can increase a city's urban resilience while minimizing the negative environmental impacts of human settlements.