SOLID WASTE MANAGEMENT IN A COLOMBIAN UNIVERSITY

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6th International Conference on Sustainable Solid Waste Management
Greece - NAXOS 2018
UNIVERSITY CONTEXT

Small towns

Impacts

Actions must be taken

Sustainable University

Source: https://bit.ly/2LhnVHi

Solid waste management: the great challenge

First stage: solid waste characterization studies

Source: https://bit.ly/2sBiM4Z
Colombian case:

- No economic and regulatory incentives to minimize waste.
- Precarious education on source separation, recycling and reuse.
- Relatively low recycling level (~17%).

Source: https://bit.ly/2Ld7OdN
### Location

**Universidad Nacional de Colombia, Palmira Campus (UNALP)** located in Colombia

<table>
<thead>
<tr>
<th><strong>Area</strong></th>
<th>13.9 Ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green area</strong></td>
<td>67.2%</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>Approx. 3756 students and staff</td>
</tr>
<tr>
<td><strong>Days</strong></td>
<td>Monday to Saturday</td>
</tr>
<tr>
<td><strong>Schedules</strong></td>
<td>6:00 AM - 7:00 PM</td>
</tr>
<tr>
<td><strong>Periods</strong></td>
<td>February to June, June to July and August to December</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Teaching, research and consulting projects</td>
</tr>
</tbody>
</table>

Humidity: 60%  
Temperature: 25°C
Methods

• Estimation of waste generation and recycling

Total Solid Waste

Recyclable materials
- UNALP Recycling Centre
- Data base from 2008-2016
- Environmental Management Office staff

Non-recyclable materials
- Sent to landfill
- Reports of collection 2008-2016
- Proactiva Veolia - Valle del Cauca
• **Waste characterization**

Two waste audits

- In 2007, before implementing a CSWMS
- In 2016 after implementing a CSWMS

<table>
<thead>
<tr>
<th>Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>Cardboard</td>
<td></td>
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<tr>
<td>Plastics</td>
<td></td>
</tr>
<tr>
<td>Polystyrene</td>
<td></td>
</tr>
<tr>
<td>Food waste</td>
<td></td>
</tr>
<tr>
<td>Garden waste</td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td></td>
</tr>
<tr>
<td>Metal</td>
<td></td>
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<tr>
<td>Others</td>
<td></td>
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</tbody>
</table>

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Results


From 2008 to 2016, solid waste generation increased from 59.71 to 79.62 g/day/person.

The number of students increased 38% and the annual economic growth of the country was 3.7%, on average, during that period of time.
2. Recycling level 2008 - 2016

70% of the total solid waste is recyclable.

Recycling increased from 5.7% to 30.0% between 2008 and 2016.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Others (miscellaneous)</th>
<th>Paper</th>
<th>Plastics</th>
<th>Garden waste</th>
<th>Polystyrene</th>
<th>Food waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>21%</td>
<td>10%</td>
<td>11%</td>
<td>17%</td>
<td>7%</td>
<td>25%</td>
</tr>
<tr>
<td>2016</td>
<td>11%</td>
<td>5%</td>
<td>11%</td>
<td>10%</td>
<td>11%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Bulk density (kg/m³)

2007: 169, 172, 161, 150, 149, 148, 153, 145, 149
2016: 161

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Universidad de Medellín
4. SOLID WASTE MANAGEMENT AT UNALP
ACTIONS TAKEN

Environmental Policy

Recycling center

Bins network

Environmental culture

Environmental educational program

2007

2016

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Strengths

- Strong leadership
- Administration support
- Proper planning

Barriers

- Lack of commitment by students and staff
- Insufficient funding
- Lack of recycling infrastructure and expertise at local/regional level
- Delays in the national regulatory framework
Conclusions

• A low rate of waste generation, a significant increase of recycling and an important reduction in paper and glass generation have proved the effectiveness of a CSWMP implemented at the Universidad Nacional de Colombia Campus Palmira, since 2008.

• Changes in the consuming habits of staff and students have an important impact in the type of waste generated and its availability of recycling.

• As public University in a developing country, there are barriers that the institution has to face to improve its environmental performance. Nevertheless, strong leadership, the support of the administration of the University and the knowledge and proper planning are proven to be key factors at UNALP.
Thanks

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http://www.sga.palmira.unal.edu.co/
You are all invited to:

XIII Latin American Workshop and Symposium on Anaerobic Digestion

“An environmental, social, and energetic innovation alternative”

October 21 to 24, 2018
Medellín, Colombia