Successful implementation of separate collection of bio-waste in Urban areas

Brussels, 24 June 2015
European Economic and Social Committee

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www.compost.it
Successful implementation

• Large and constant participation
• High capture rates
• Good quality (i.e. low contamination with plastics)
• Economical sustainability
Source separation of foodwaste is difficult....

- High moisture
- Leachate
- Putrescible
- High density

Likely to be uncomfortable?
The need for kitchen-caddies?

- Volume: 6-12 liters
- Limit volumes → prevent mixture with MSW
- Small and manageable
- Allows to collect cooked food too...
- Vented → reduce odors, moisture, weight
- Bags/liners should be compostable (comply with CEN standard EN 13432)

Source Separation in the kitchen: compact, comfortable, clean
Il sacchetto, quale ci metto?

I sacchetti non sono tutti uguali. Per raccogliere l’umido si devono utilizzare solo sacchetti compostabili, certificati:

Possono essere utilizzati anche i sacchetti compostabili della spesa.

Utilizzando i sacchetti compostabili la qualità della raccolta è migliore e si evitano sanzioni.

Per informazioni:
www.amsa.it
servicedelcontigiamma.it
0800-332200
It’s difficult to make compost from plastics....
Comfort and participation (Kassel D)

- Participation and quantities rise significantly in urban areas if households are provided with right tools.
Customer satisfaction and participation (Milan\Italy)

Evaluation of the collection service for food waste

- Abbastanza efficiente 59%
- Molto efficiente 20%
- Non sa 14%
- Poco efficiente 6%
- Per nulla efficiente 1%

Practising separate collection of food waste

- Regularly, daily
Successful implementation

- Large and constant participation
- High capture rates
- Good quality (i.e. low contamination with plastics)
- Economical sustainability
Separate collection of biowaste: comingled collection

- **Mixed collection scheme for (limited amounts) food waste & garden waste**
  - Excluding cooked food (i.e. meat, fish, etc.)
  - Large amounts of garden waste
  - Collection 1 times/week

- **Collection schemes for households separated from those for (small) commercial activities (Ho.Re.Ca)**

- Competing with residual waste collection
Integrated MSW management:

**Without FOODWASTE collection**
- MSW (mixed)
  - 1/week

**With FOODWASTE collection**
- Foodwaste
  - 1/week
- Residualwaste
  - 1/2weeks

**Without FOODWASTE collection**
- MSW (mixed)
  - 3/week

**With FOODWASTE collection**
- Foodwaste
  - 2/week
- Residualwaste
  - 1/week

**Without FOODWASTE collection**
- MSW (mixed)
  - 6/week

**With FOODWASTE collection**
- Foodwaste
  - 3-4/week
- Residualwaste
  - 1/week

*Source: European Compost Network, updated by authors*
Integrated MSW management:

**without FOODWASTE collection**
- MSW (mixed) 1/week

**with FOODWASTE collection**
- Foodwaste 2/week
- Residualwaste 1/week

**without FOODWASTE collection**
- MSW (mixed) 1/2weeks

**with FOODWASTE collection**
- Foodwaste 1/2weeks
- Residualwaste 1/week

Source: European Compost Network, updated by authors
Where does the bio-waste goes?

- Germany (Kassel)

Where does the bio-waste goes?

- UK

**Total food-waste in residual-waste bin (UK)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Total Food in Residual Waste Bin (kg/ hh/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Residual Waste Collections</td>
<td>155</td>
</tr>
<tr>
<td>Fortnightly Residual Waste Collections</td>
<td>82</td>
</tr>
</tbody>
</table>

Source: Performance analysis of mixed food and garden waste collection schemes; WRAP; 2010
Separate collection of biowaste: intensive source separation

- Specific collection scheme for food waste
  - Including cooked food (i.e. meat, fish, etc.)
  - Collection 2-4 times/week

- Specific collection scheme for green waste
  - Bring-sites at Community Centers
  - Curbside collection with low-frequency 0.5-1 times/week

- Collection schemes for food waste are used both by households and (small) commercial activities (Ho.Re.Ca)
Food-only vs commingled food & garden waste collection

Food waste capture rate (UK)

<table>
<thead>
<tr>
<th>Mixed food and garden collections – average yield of food recycled</th>
<th>Food waste collections – average yield of food recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 kg/hh/year</td>
<td>78</td>
</tr>
</tbody>
</table>

Source: WRAP. Performance analysis of mixed food and garden waste collection schemes; 2010
Diversion of food waste from residual waste

- Combining waste-composition analysis of residual waste and food waste
- 86% of food waste in separate collection
- 14% inside residual waste

Source: AMSA 2014,
Lesson to be learned for FW collection

- Intensive source separation schemes focus on food waste only, with higher capture rates.
- Biowaste schemes collect large amounts of garden waste with lower capture rates for FW.
- Quality check possible with curbside collection only.
- Savings can be done by revising collection frequencies for residual waste (with low organic content!).
IMPLEMENTATION OF BIO-WASTE COLLECTION IN CITIES (IN EUROPE)
Cities in Europe with bio-waste collection

- Milan: data include forecast or year 2014
- Milan: Biowaste is 100% food waste
- München, Berlin, Hamburg and Vienna: Biowaste contains significant amounts of green waste
- Barcelona: bring-schemes (large road containers)
Milan Metropolitan Area

Population 1.5 M inhab
Density 5-7000 inhab/km²
Italy’s most vital Economical center
Transient population

Year 2012: food waste collection at Ho.Re.Ca sector only → 23kg/inhab/yr
Recycling rate 34,5%

AMSA is a Public-owned company responsible for MSW management in Milan
2, Distribution of biobins and starter-kit
Raccolta della Frazione Umida

Lunedì 16 settembre inizia la consegna dei contenitori per la raccolta differenziata dell'umido presso le utenze domestiche nella zona nord-est di Milano, corrispondente alle zone 2 e 9 e completamento della zona 3.

Con questa estensione la raccolta dell'umido, che partirà lunedì 9 dicembre, raggiungerà circa il 75% del territorio cittadino.

Clicca sull'immagine per verificare se il tuo stabile è nella zona interessata.

http://www.amsa.it/gruppo/cms/amsa/multilingua/uk/separate_waste/milano.html
Municipality of Milan
Successful implementation

• Large and constant participation

• high capture rates

• Good quality (i.e. low contamination with plastics)

• Economical sustainability
Weekly collection rate of foodwaste (kg/inhab/week)

- **Separate collection of foodwaste**: from Ho.Re.Ca only $\rightarrow$ 23kg/inhab/yr

- **Separate collection of foodwaste**: including families $\rightarrow$ 91kg/inhab/yr

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**Diagram**

- Blue line: Primaticcio
- Red line: Zama
- Green line: Olgettina

- Dashed line: Expected outcome
- Solid line: Average outcome

Year range: 2011-2019
Successful implementation

• Large and constant participation

• high capture rates

• **Good quality** (i.e. low contamination with plastics)

• Economical sustainability
Quality of food waste (non-compostable content)

Analysis performed by CIC

Source: AMSA 2014,
Montello Biogas & Composting plant (Italy)

- 285,000 t/yr of food + green waste
- Biogas & Compost production
- Compost with quality certification
- 11MW electrical power generation
Successful implementation

- Large and constant participation
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- Economical sustainability
MSW management cost are stable for increasing complexity of MSW management.

- Kerbside
- Double road container
- No food-waste collection
MSW management cost are stable for increasing complexity of MSW management.

MSW management cost for different collection schemes (€/inhab)

- Without foodwaste: €82,45 ($38,86 + €43,59)
- Double road container: €97,62 ($49,92 + €47,70)
- Kerbside collection: €85,11 ($54,66 + €30,45)

Region Veneto (Italy); data evaluated by the Author; 2009
MSW management cost are stable for increasing separate collection rates of MSW.

Cost of collection (green bars) and cost of treatment/disposal (blue bars).

Separate collection of MSW
Use labour intensive schemes: Manual emptying = fast
Conclusions

- Separate collection of food waste in Cities is possible; it reaches outstanding results (Milan: 93 kg/inhab/yr)
- Use of vented kitchen-caddy & compostable bio-bags (EN13342 certified) allows for large acceptance and participation
- Low contamination of feedstock is the key-element for producing quality compost and digestate allowing for recycling at AD/C plant
- Total MSW management cost are found to be non-increasing compared to “low-recycling” municipalities, especially in the medium term considering the increase of disposal costs
Thank you

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downloadable → https://db.tt/i5bgVo0G