Recycling local organic waste in peri-urban horticulture: a case study in the Parisian region

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Recycling local organic waste in peri-urban horticulture: a case-study in the Parisian region

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Strengthening functional links between cities and peri-urban agriculture
Strengthening functional links between cities and peri-urban agriculture

- Organic household waste
- Green waste
- Human excreta
- Horse manure

Instead of incineration

Shredding, composting, digesting

Recycled as amendment or fertiliser

Improve soil properties, fertility, increase soil carbon and organic matter, reduce mineral fertiliser so energy consumption and resource depletion (Noirot-Cosson, 2016; O’Connor et al., 2021; Herrera et al., 2022).
Strengthening functional links between cities and peri-urban agriculture

Instead of incineration

Shredding, composting, digesting

Recycled as amendment or fertiliser

Not new !!!

Improve soil properties, fertility, increase soil carbon and organic matter, reduce mineral fertiliser so energy consumption and resource depletion (Noirot-Cosson, 2016; O’Connor et al., 2021; Herrera et al., 2022).
The case of the Paris city-region

12 Millions inhabitants

48% of agricultural land

Per year:

900 000 T of OW produced only by private households

Compulsory to collect it separately by 2024

== 300 000 T of compost
Knowledge gap about recycling urban OW for peri-urban vegetables and fruits

Existing work on potential recycling of OW in field crops (Moinard et al., 2021)

Information needed for vegetables and fruit which have high nutrient needs and often low return of organic matter to the soil (Neuweiler and Krauss, 2017)

**Hypothesis:** high potential!

**Research questions:**

Current fertility management practices and use of OW?

Perceptions of different types of OW?
A focus on 3 territories with strong local dynamic and F&V

<table>
<thead>
<tr>
<th>Studied areas</th>
<th>Ile-de-France</th>
<th>Versailles plain</th>
<th>Saclay plateau</th>
<th>Triangle Vert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total surface (ha)</td>
<td>1,201,200</td>
<td>23,217</td>
<td>15,607</td>
<td>4,859</td>
</tr>
<tr>
<td>Total UAA (% of surface)</td>
<td>563,965 (47%)</td>
<td>12,156 (52.4%)</td>
<td>3,724 (23.9%)</td>
<td>1,491 (30.7%)</td>
</tr>
<tr>
<td>UUA dedicated to MG and FG** (ha) (% UAA)</td>
<td>5000ha (0.9%)</td>
<td>298 (2.5%)</td>
<td>100 (2.7%)</td>
<td>113 (7.6%)</td>
</tr>
</tbody>
</table>
Qualitative analysis of interviews with 28 Fruit and Vegetable growers

- 0.12 to 30 ha
- 0 to 42 years

**Diversity of marketing channels:**
- 89% in short
- 62% organic

**Questions:**
- General context and farm
- Fertility management
- Discussion on a range of OW
Types of OW presented to farmers

- Ramial chipped wood (RCW)
- Compost from green waste
- Compost from biowaste
- Digestate from biowaste
- Cattle manure
- Horse manure
- Fertilisers from human urine
Most farmers already use organic fertilisers and amendments

70% use commercial fertilizers (organic or mineral)
Variable but high quantities of OW used

Cereals: 5-10 T
Drivers to use OW

Offsetting nutrient export
Increase organic matter
Soil porosity
Global fertility
**But also:** mulching
Keeping humidity
Reducing weed
Alternative to plastic
Will you be ready to use these OW?

<table>
<thead>
<tr>
<th>Material</th>
<th>Yes</th>
<th>Under Conditions</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramial chipped wood</td>
<td>11</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Green waste compost</td>
<td>16</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Biowaste compost</td>
<td>11</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Horse manure</td>
<td>9</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Cow manure</td>
<td>14</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Biowaste digestate</td>
<td>13</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Urine</td>
<td>12</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>
Barriers to use OW

For compost: plastic

**For urine and digestate:**

Regulations (urine forbidden for organic farming; digestate forbidden for vegetables)

Aspects

Smell

Liquid form

Investment (storing and spreading)

Industrial image

Perception by neighbours and consumers (hormone or pharmaceutical residues..)

A need to overcome these barriers
Perspectives: extrapolation of required acreage to recycle all composted organic wastes from private households in Paris-city region

900,000 T of OW

== 300,000 T of compost per year

10,000 ha of Fruit and Vegetables required

(currently 5000 ha)

30 T / ha / yr

Hight potential contribution of Fruit and Vegetable to recycle OW at city-region level
Developing relevant collect, use and distribution systems for urban OW

- Citizen behaviour (quality, plastic)
- Composting vs methanisation
- Logistics
- Large-scale vs small-scale
- Economic models
Thank you for your attention