Full-Cost Accounting of Food Wastage
The Hidden Costs

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29th FAO Regional Conference for Europe
2 April 2014, Bucharest, Romania
Why is it important?

- The economic loss incurred by food wastage has not triggered the necessary investments to reduce it, despite decades of FAO assistance on post-harvest losses and much knowledge.
- At the retail and consumer levels, it is economically more “profitable” to waste food than preventing it.
- Full-cost accounting seeks to lower the “profitability” of unsustainable production and consumption practices by monetizing environmental and social externalities.
- Awareness on the societal costs can inform decision-makers on the actual contribution of ecosystems to human wellbeing.
Full-Cost Accounting of Food Wastage

Framework

<table>
<thead>
<tr>
<th>Food wastage during</th>
<th>Production</th>
<th>Post-harvest</th>
<th>Processing</th>
<th>Distribution</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced food availability</td>
<td>=&gt;</td>
<td>Food security concerns</td>
<td></td>
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<td></td>
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<tr>
<td>Increased pressure on land for production</td>
<td>=&gt;</td>
<td>Planetary boundaries concerns</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Increased waste management challenges</td>
<td>=&gt;</td>
<td>Landfill concerns</td>
<td></td>
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</tbody>
</table>

Environmental impacts

- **Direct impacts**
  - Air pollution
  - Climate change
  - Land occupation
  - Land degradation
  - Water use
  - Water pollution
  - Biodiversity loss
  - Ecosystem services
  - Deforestation
  - Loss of wild landscapes (grasslands, wetlands)

- **Scarcity**
  - Energy
  - P-resources
  - Land
  - Water

Socio-economic impacts

- Increased public costs
- Increased labour demand
- Increased food prices
- Increased pesticide and nitrate exposure
- Increased safety and displacement risks
- Reduced access to ecosystem services (regulating, provisioning and supporting)

Pillars of sustainable livelihoods

- Income
- Food security
- Health
- Reduced vulnerability
- Sustainable use of the natural resource base
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Economic impact

Economic quantification of 1.3 Gt of food wastage

If using producer prices (FAOSTAT, 2009)

\[ \text{USD } 750 \text{ billion / year} \]

If using trading prices (TRADESTAT, 2005-2009)

\[ \text{USD } 845 \text{ billion / year} \]

This cost is much higher if socio-environmental costs are considered

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Environmental and related social impacts

1.3 Gt of food wastage/ year

3.8 Gt CO₂eq/year
Food wastage ranks as 3rd largest emitting “country”

1.5 billion ha
30% of agricultural land

305 km³/year
> Lake Onega (Russia)

Impact of natural resources degradation on society

Livelihoods
Health
Conflicts

66% of endangered/vulnerable species threatened by food production
Natural resources used by food wastage cost more than USD 675 billion

USD 429 billion
Includes GHG from:
• food production, disposal
• deforestation
• managed organic soil

USD 172 billion
Includes:
• irrigation water
• water scarcity

USD 42 billion
Includes:
• soil erosion by water
• soil erosion by wind
• deforestation

USD 32 billion
Includes:
• pesticides, N and P impacts on biodiversity
• pollinators loss
• fish stocks depletion

... and still, not all the environment costs have been accounted for, such as grassland degradation, loss of species and ecosystem services
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Valuation method

**Total Economic Value (TEV) approach**

- **Use value**
  - Direct use value
    - Consumptive (e.g. irrigation water)
  - Indirect use value
    - Benefit from ecosystem services (e.g. pollution filtering)

- **Non-use value**
  - Option value
    - For others (possible future use)
    - For its existence value

- **Non-Consumptive**
  - (e.g. recreation)

Scope of the FWF study: mainly damage costs (e.g. cost of cleaning pesticides in water) but also social cost of carbon (e.g. property damages due to climate extremes) from consumptive use of natural resources.
Well-being Valuation estimates the amount of money to compensate individuals, using data from the World Values Survey in 57 countries (2005-2008), the British Household Panel Survey data (since 1991) and Uppsala University Conflict Data Programme (since 1970).
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Environmental, social and economic costs

**Carbon**
- USD 429 billion

**Water**
- USD 172 billion

**Land**
- USD 42 billion

**Biodiv.**
- USD 32 billion

Natural resources degradation

USD 280 billion
Livelihoods (due to water erosion)

USD 150 billion
Health (due to pesticides)

USD 390 billion
Conflicts (due to water erosion)

Subsidies (OECD countries) USD 119 billion

Market price USD 845 billion
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Total costs

Hidden costs are twice the market price of food wastage

Socio-environmental costs (understated)

USD 1.614 trillion

Market price

USD 845 billion

Total: USD 2.46 trillion
Hierarchy of food wastage reduction measures on the environment

- **Avoided loss** of natural resources
- **Saved** natural resources
- **Wasted** natural resources

From the most to the least environmentally-friendly measure:

1. **Reduce**
2. **Reuse (humans)**
3. **Reuse (animals)**
4. **Recycle/Recover**
5. **Landfill**
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GHG impact of reduction measures

<table>
<thead>
<tr>
<th>Type of reduction measure</th>
<th>Kg CO2-eq saved/kg food waste</th>
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</thead>
<tbody>
<tr>
<td>Information campaign</td>
<td>2.59</td>
</tr>
<tr>
<td>Food bank</td>
<td>1.58</td>
</tr>
<tr>
<td>Feeding pigs</td>
<td>0.44</td>
</tr>
<tr>
<td>Anaerobic digestion</td>
<td>0.06</td>
</tr>
<tr>
<td>Incineration</td>
<td>0.04</td>
</tr>
<tr>
<td>Composting</td>
<td>-0.29</td>
</tr>
<tr>
<td>Landfilling</td>
<td>-0.84</td>
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</tbody>
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42 times better

15 times worse
Conclusions

- Externalities surpass the economic production value of food wastage ... findings give a sense of market distortions
- Understanding the full-cost of food wastage promotes action to mitigate impacts on natural resources and well-being
- The impact of food wastage on the environment, people and the economy calls for cross-sectoral cooperation to reduce it
- Pre-waste action should be a priority over post-waste solutions
- Where investment potential is limited, wastage reduction measures should target high impact commodities (e.g. meat)
THANKS