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Waste management and systems for treating biowaste in Switzerland

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- Introduction: Waste concept in Switzerland
- Biowaste in Switzerland
- Systems for treating biowaste in Switzerland
- Conclusions

Introduction: Waste concept in Switzerland

Introduction: Waste concept in Switzerland

› Swiss expenses 2010 (federation + canton + local municipality): 179 billions CHF (CHF 22'900.- per inhabitant and year)

› Expenses for waste: CHF 150 - 200.- per inhabitant and year (separate collection + composting / biogas production / incineration) = 1%

› Expenses for organic waste (source separated): CHF 10 - 20.- per inhabitant and year (+ collection expenses) = 0.1%

Introduction: Waste concept in Switzerland

Introduction: Waste concept in Switzerland

- Reduce
- Avoid
- Re-use
- Incinerate

- Recycling / separate collection makes only sense if there is a market for the products

Introduction: Waste concept in Switzerland

› Everybody is concerned!

Introduction: Waste concept in Switzerland

› Everybody is concerned!

Used oil

Batteries

Aluminium
Metal

+ Paper
+ Biowaste
+ Electronics
+ …

Clothes

PET

Green glass

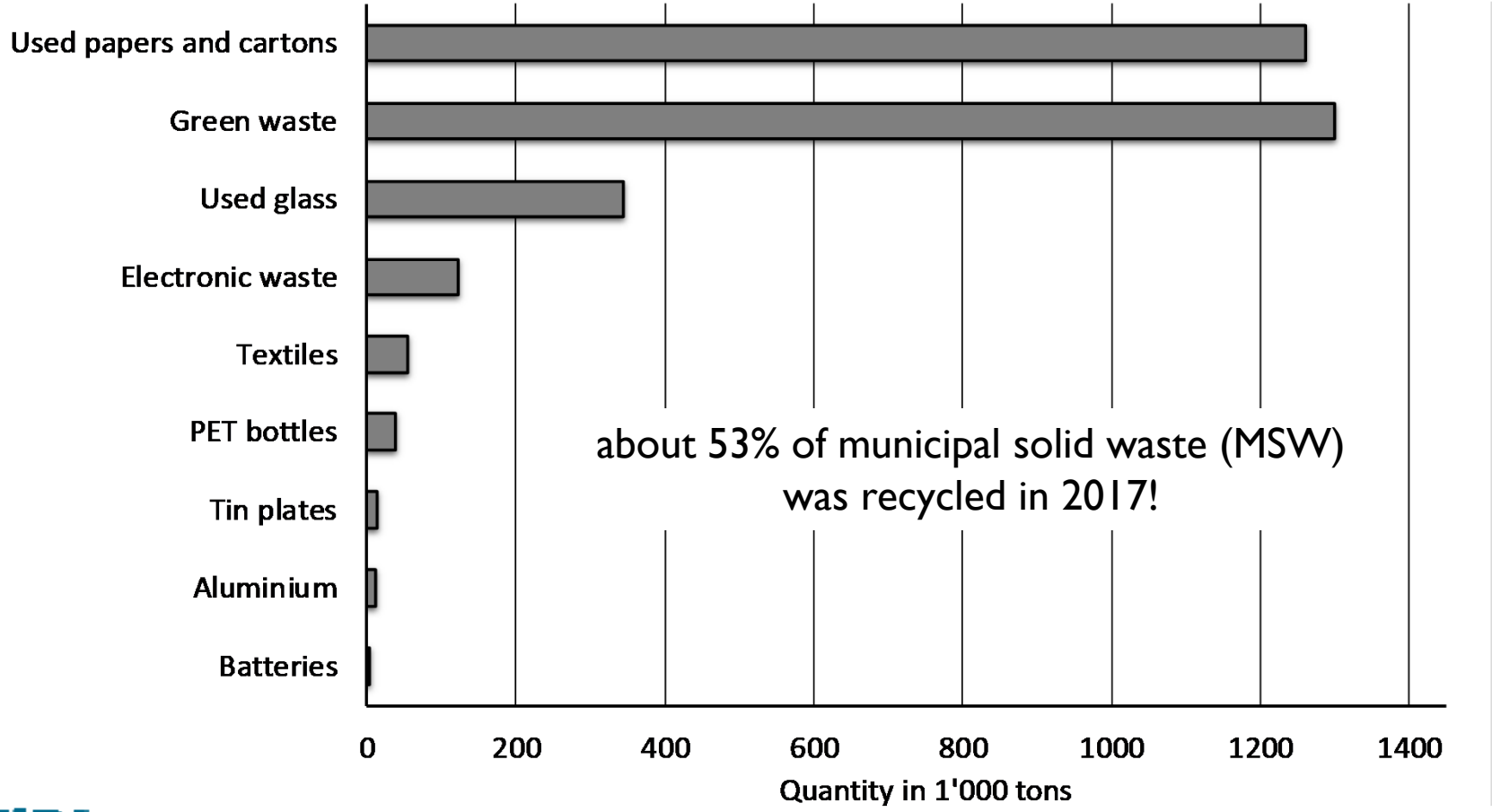
Coffee capsules
(Nespresso)

white glass

Brown
glass

Introduction: Waste concept in Switzerland

- Everybody is concerned!
  - Separate collection of waste in 2017 in CH



Biowaste in Switzerland

Biowaste in Switzerland

- Biowaste compost production in Switzerland
  - Payment for taking over the green waste covers nearly the production costs (for minimal quality compost)
  - Costs for production of higher quality have to be covered with the sale of the compost
- Composting / biogas production / burning
  - Competition for input materials between composting and biogas production increases continuously
- Motivations for composting
  - Disposal of green waste ?
  - Soil fertility improvement ?

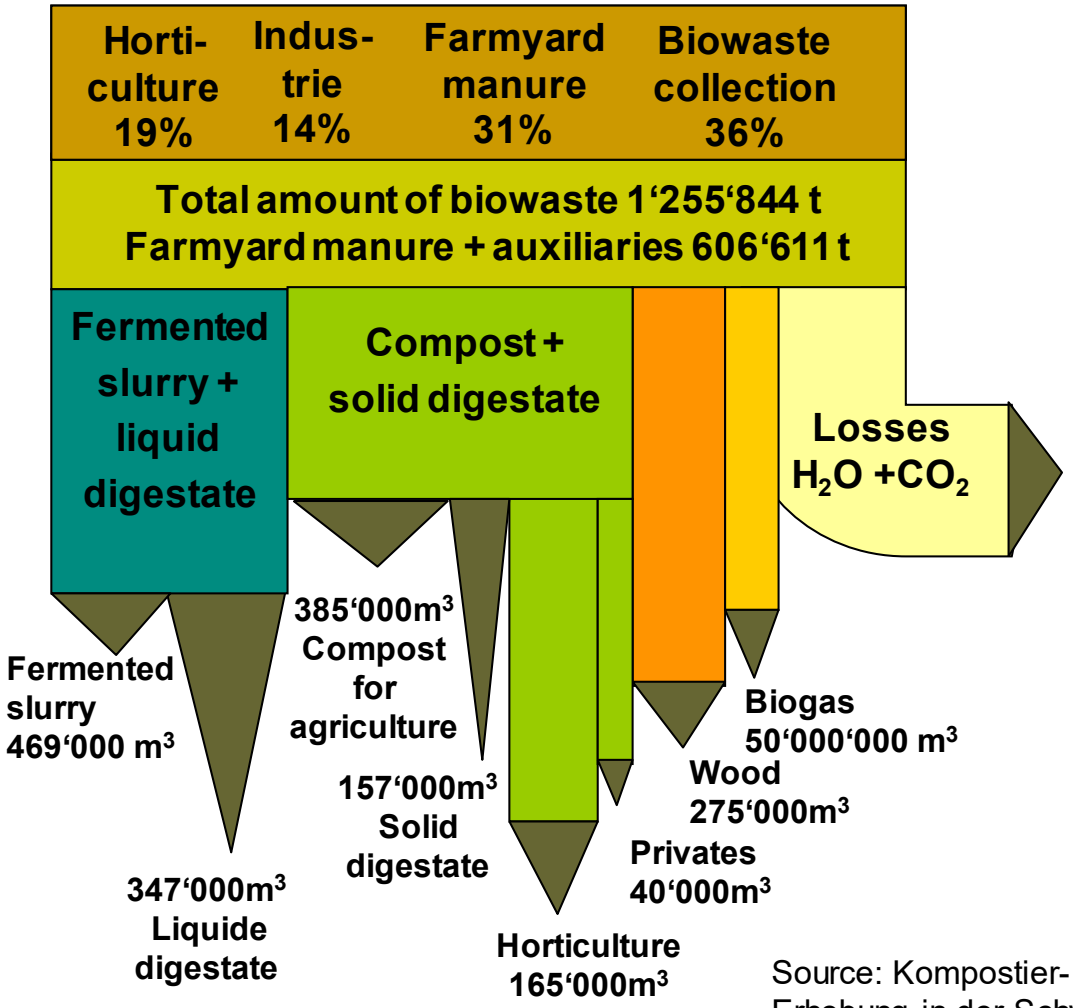
Biowaste in Switzerland

- Compost user
  - Some users (horticultural producers among others) are convinced of the advantages of compost. They use compost to improve the fertility of their soils and to support the production of their plants.
  - Other users still consider compost as a waste product and are not willing to pay for it.
  - Compost producers have to work on the relationship with these users, to convince them of the positive effects of compost on soil and plants.

Biowaste in Switzerland

- Compost production in Switzerland
  - Each year, about 150 kg of biowaste per inhabitant are collected (total: about 1'250'000 tons). These are composted or treated by anaerobic digestion (AD).
  - About 1/3 of this material is treated by AD, while 2/3 are composted. The proportion of AD has risen significantly in the past years.
  - About 70% of the produced compost or digestate are used in agriculture.

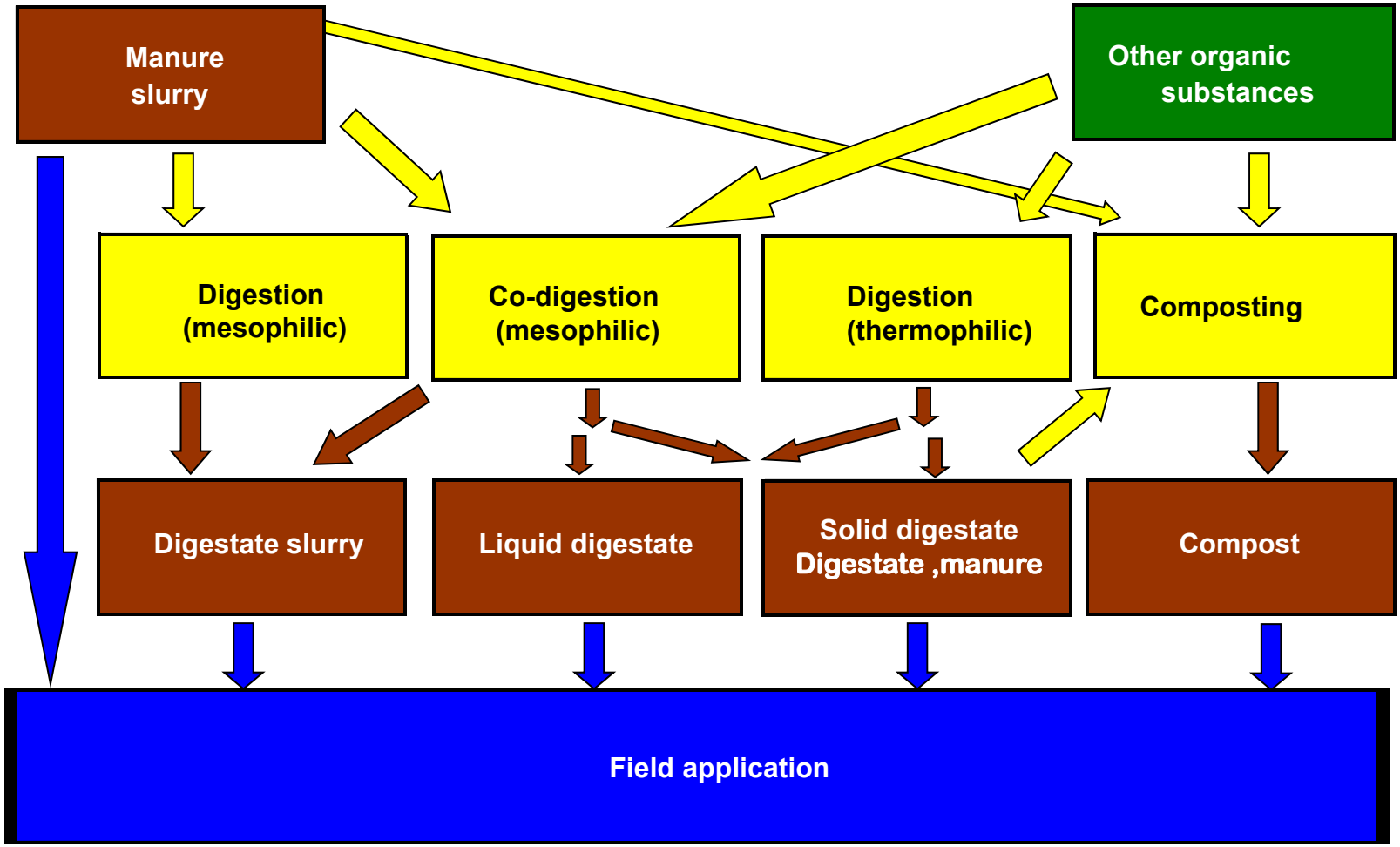
Biowaste in Switzerland



Source: Kompostier- und Vergärungsanlagen Erhebung in der Schweiz und in Liechtenstein, Federal Office for the Environment FOEN, 2016

Systems for treating biowaste in Switzerland

Systems for treating biowaste in Switzerland



Systems for treating biowaste in Switzerland

› Field edge composting

› For rural areas, mainly for horticultural waste, manure, …

Systems for treating biowaste in Switzerland

› Small windrows composting

› For horticultural waste, manure, peelings, …
› Structure of starting mixture relatively fine
› In general, intensive process (curing time: 2-3 months)

Systems for treating biowaste in Switzerland

› Large windrows composting

› For horticultural waste, manure, peelings, …
› Structure of starting mixture relatively coarse
› In general low intensiveness process (curing time 6-12 months)

Systems for treating biowaste in Switzerland

› Box composting

› Process +/- automatic
› Relatively sparse need of space
› Can be closed to allow the treatment of released gas (odors)

Systems for treating biowaste in Switzerland

› Hall composting

› Closed system with treatment of emissions
› Appropriate for urban situation

Systems for treating biowaste in Switzerland

› Co-digestion anaerobic

› Treatment of manure/slurry with other organic waste
› Generally mesophilic
› For rural regions (managed by farmers)

Systems for treating biowaste in Switzerland

› Industrial anaerobic fermentation

› Industrial plants, mostly in urban regions
› Generally thermophilic

Systems for treating biowaste in Switzerland

› Anaerobic fermentation in box

› Industrial plants, mostly in urban regions
› Starting mixture with structure (not liquid)
› Generally mesophilic

Systems for treating biowaste in Switzerland

› Vermicompost

- Can be automated relatively well
- Initial mixture with low structure (pomace, vegetable waste, manure, ...)
- Only "healthy" material should be treated in this way (no heat phase) or short hot rotting should be used.

Systems for treating biowaste in Switzerland

› Good compost/digestate can be produced with a lot of systems, but all systems can also produce bad compost/digestate!

› Choice of system depends on:

- Available organic waste
- Market opportunities for products
- Available space and resources (personal and funds)
- Geographical situation
- etc…

Conclusions

Conclusions

› Waste is an important source of money if it is properly recycled.

› Sorting waste at source is the most efficient and advantageous way to achieve high-performance recycling.

› Green waste can be an important benefit for agriculture if it is treated in an optimal way.

- › They permit to recycle fertilizing elements
- › They can improve soil fertility
- › They can promote plant growth and health

Questions ? Discussion ?

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