How agri-food waste can create business opportunities

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Presentation overview

Introduction

Success and failure factors, connected to practical examples

(operational, in development & business case analyses)

- Packaging material from tomato stem and leaves
- Carrot fibres: food ingredient from peels
- Foods from vegetable residues

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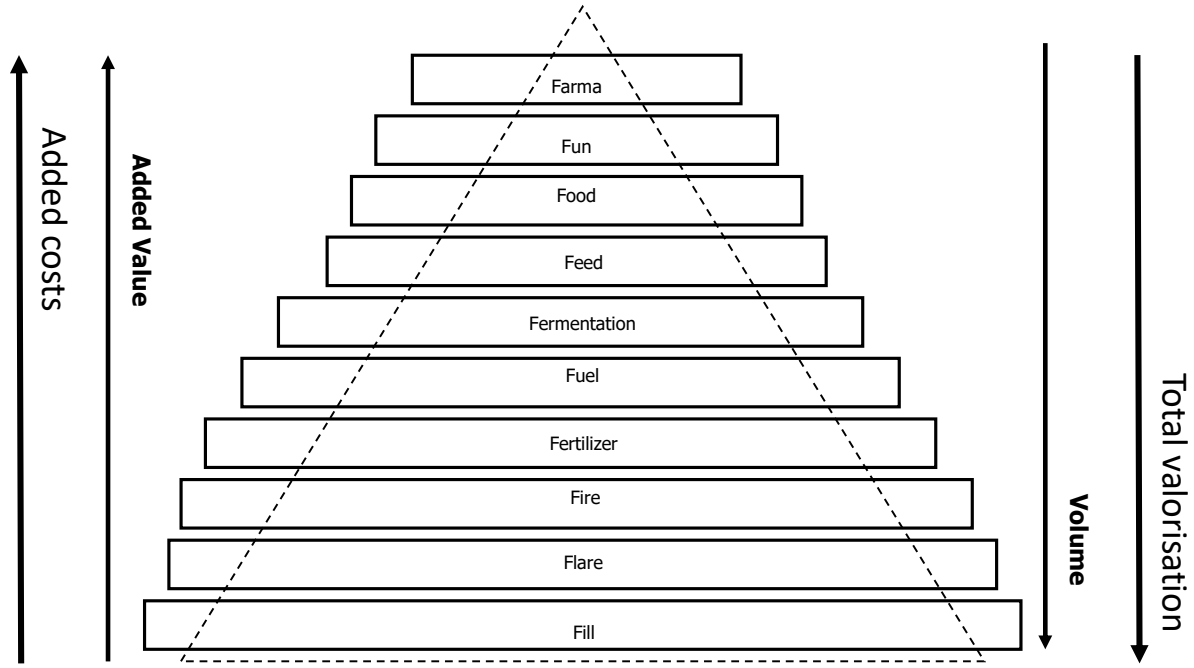
Introduction
Business opportunities: value vs. costs



	€/ton
Farma	High
Fun	High
Food ingredients	5 - 20000
Food nutritional	100-500
Feed young	100-500
Feed pigs	100-300
Feed cattle	50-250
Functional chemical	500-800
Fibre	500
Fermentation	150-400
Fermentation bulk	100-300
Fuel	100-300
Fertilizer	-/- 200-100
Fire	50-150
Flare	0
Fill	-/- 300

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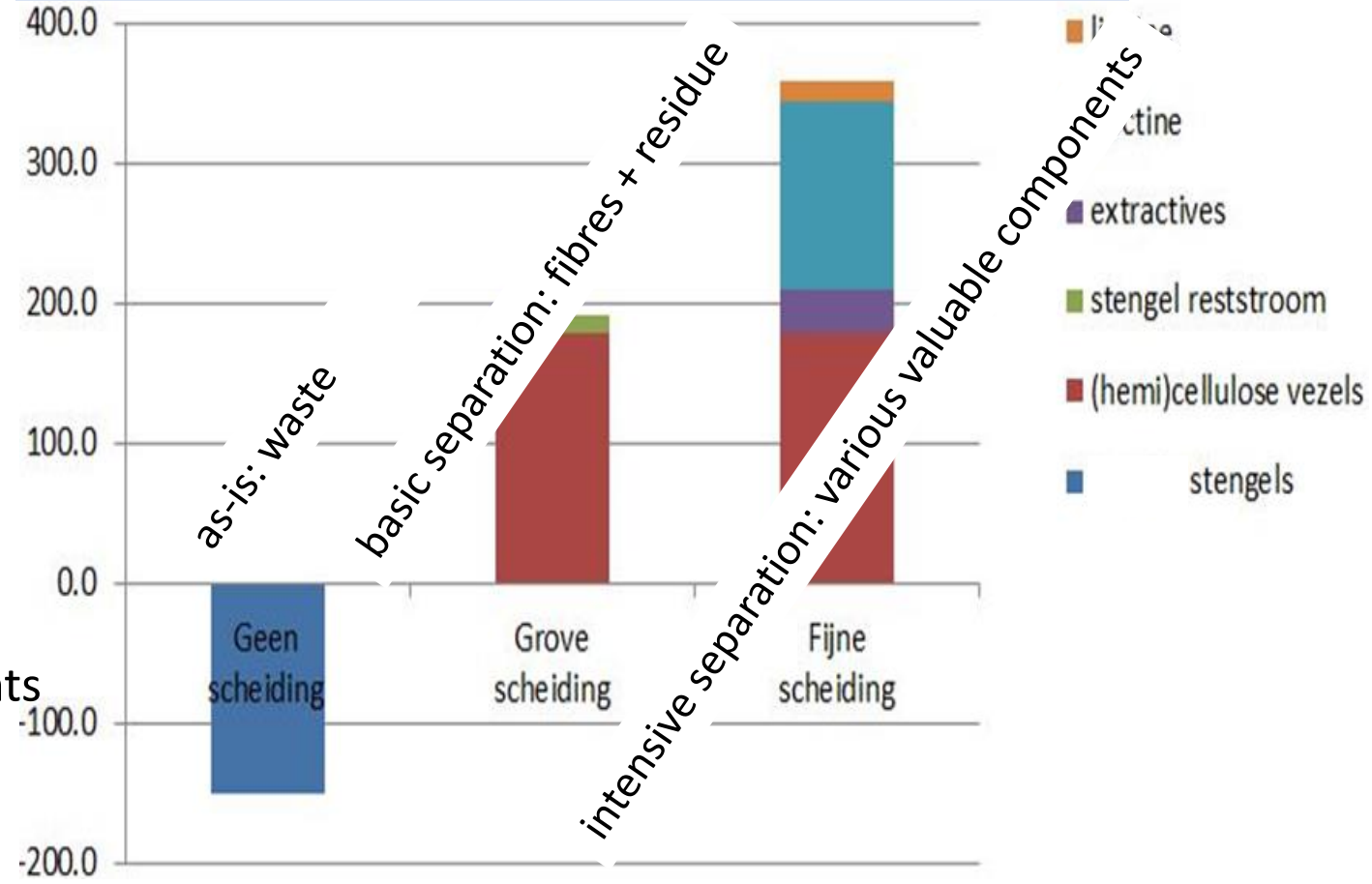
Potential value-creation

Issues:

- (potential) market
  - relevancy, value
  - market size, continuity
  - competing products
- material availability
  - local/regional quantities
  - seasonality
- processing costs
  - logistics
  - fixed costs
  - variable costs

  local processing (efficient logistics)
  or centralized (economies of scale)
- continuity, competing developments
- co-operation
- ...

Potential value addition to an agro-waste stream (€/ton)



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Example:
Packaging from tomato stem and leaves

Vegetable	Crop yield (ton/ha)	Stem yield (ton/ha)	Leaves yield (ton/ha)
Tomato	500	250-450	30
Bell peppers	300	270	80
Cucumbers	600	600	60
Egg plant	450	440	

Issues:

- toxic components in tomato leaves juice
- seasonality
- paper/board production: economies of scale

Result: 'cyclic' tomato box as sustainable added-value product (The Greenery)

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Food processing by-product innovation: carrot fibres from peels

2010-2015: 82 new food products with ingredient ‘carrot fibres’

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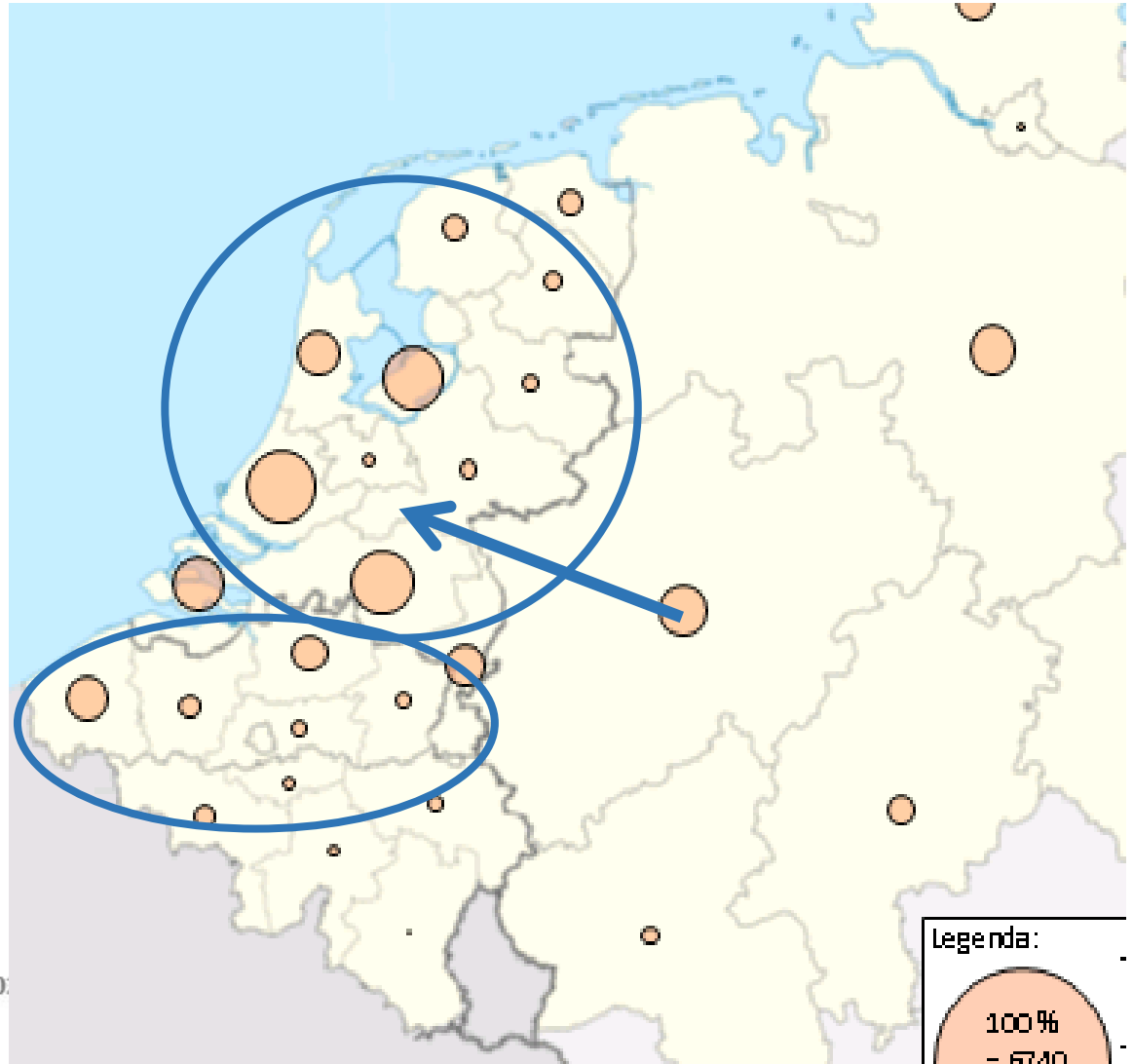
Food processing by-product innovation: carrot fibres from peels

Challenge:

- economies of scale vs. logistic efficiency



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Tasty foods from residual vegetable products
The Waste Factory

- Strategic development by Hutten
  (food catering company)
- Taking responsibility in problem of food waste
- New business, marketing through supermarket
- Use expertise for distinctive ‘culinary’ (mild processed) products

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Example: Combined manure processing in *New Mixed Farm* (Netherlands)

Essential characteristics of this initiative:

- business-driven approach
- small number of entrepreneurs
- manure processing is required for extending the business
- shared interest
- independent from manure market fluctuations in NL

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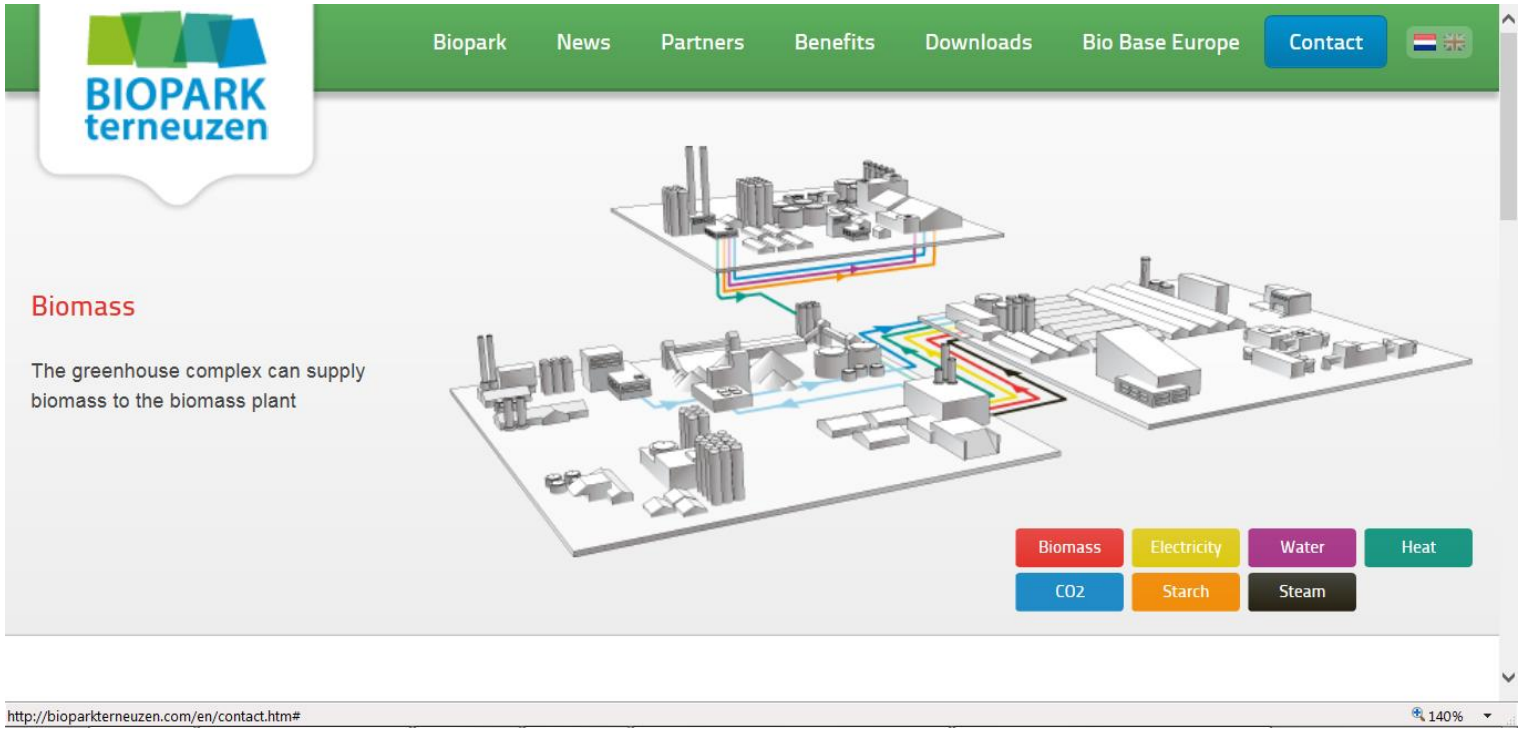
Example: Large scale biogas production in Biopark Terneuzen



Essential characteristics of this initiative:

- business-driven approach
- capital-intensive
- vulnerable to market fluctuations (manure and biomass)

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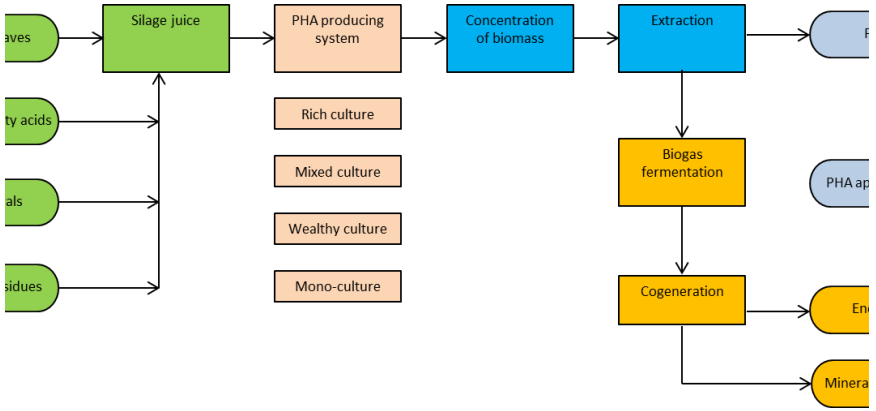
Example: bioplastic (PHA/PHB) production from bio-waste streams?

- Various potential sources, like (pure) sugar or (diluted) bio-waste streams.
- Capital and energy-intensive processing

Economic analysis of a common processing route for sugar and diluted stream:

- sharp economies of scale
- higher energy costs for the diluted material steam

-> Alternative (pre-)processing required for feasible bio-waste based production



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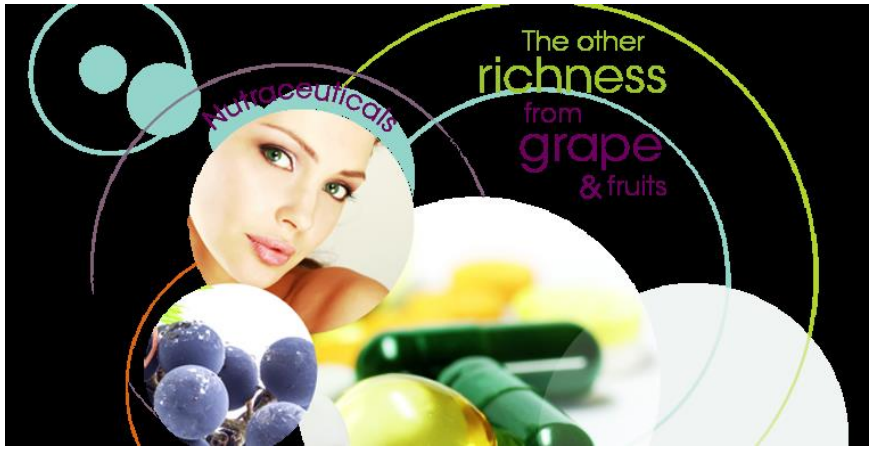
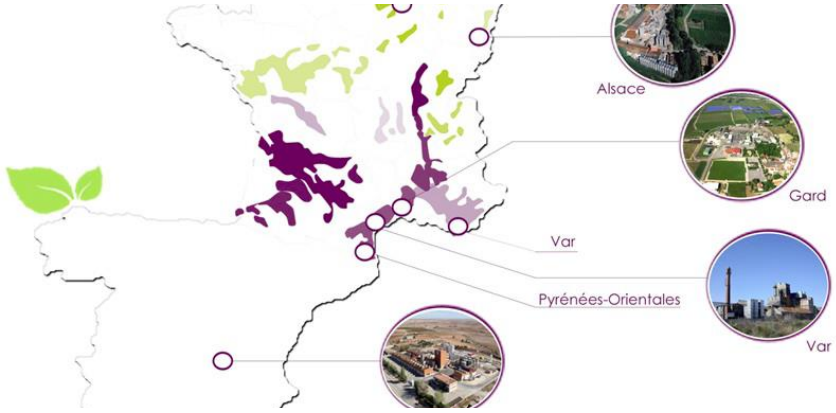
Example: Creating value-added extracts from winery by-products/wastes

- Business based on law that obliges winemakers to deliver their waste for distillation
- Largely developed / extended business (number of product categories, turnover) from 1970s until now
- Current challenge (material supply): new law that cancels the obligation of wine waste delivery (2014)





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Learnings on business creation for agro-food waste and by-products

Essential conditions:

- Market orientation/relevancy (product & price)
- Continuity of co-operation with partners/suppliers/customers
- Competitive advantages compared to traditional production systems

Pitfalls:

- Critical dependency on external conditions
- Combination of risks: technological development, co-operation, market, etc.

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