

Environment Case Study

“Innovations for Wasteless Consumption”

MSc Environmental
and Energy Management

MEEM 15
Environmental Stream



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April 17th, 2014



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Introduction

Case Study was made for Vlieland island, Netherlands.

UNESCO World Heritage Site

It was conducted from February 22nd till April 17th



Defining the Case Study

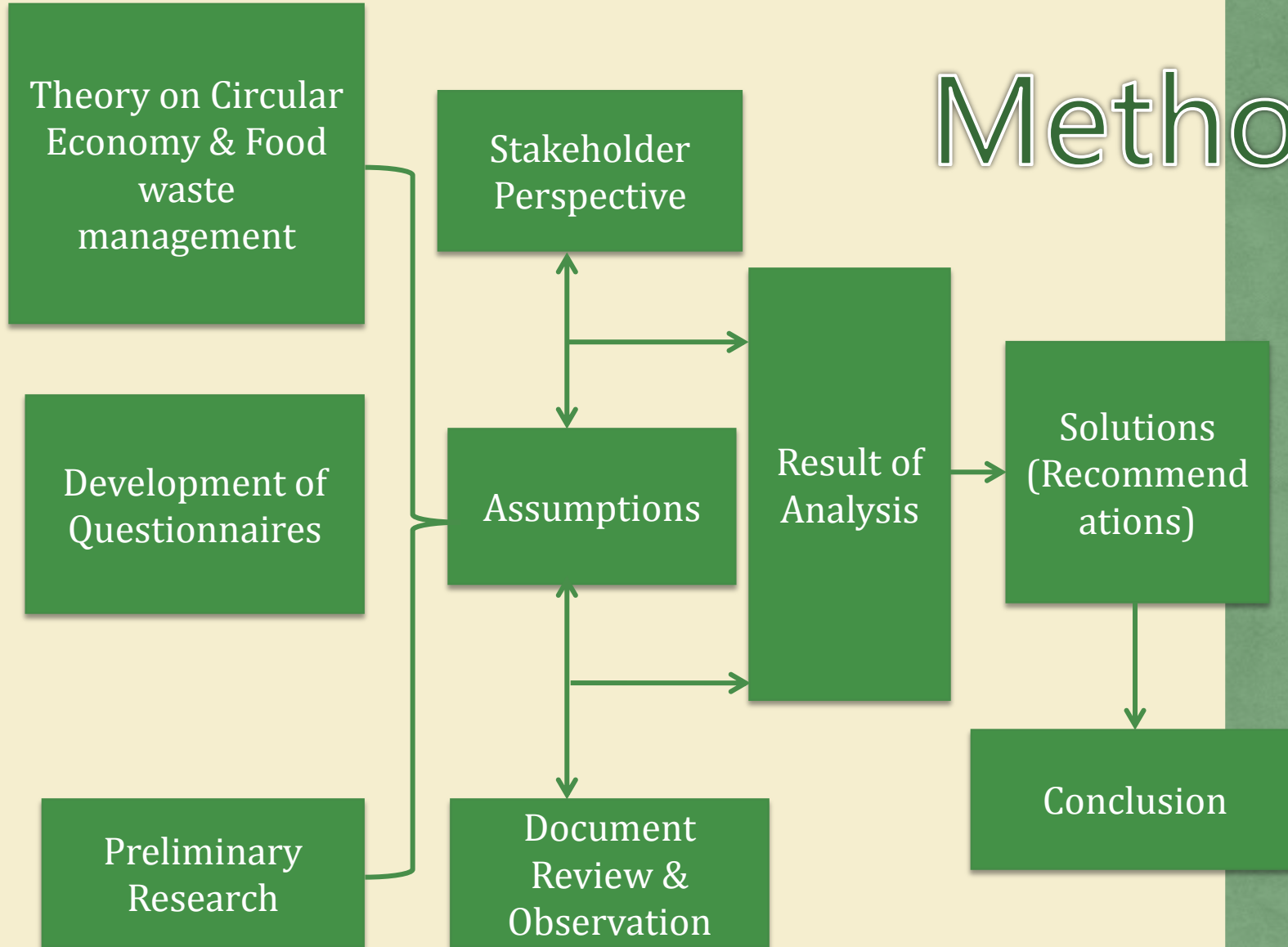
Main Objective: Food Waste

Mapping:

- Retailers: Hotels, Restaurants, School, Butchery and Bakery
- Consumers: Households, Camping Sites and Visitors
- Disposal: Municipality and Omrin
- Other key players:
 - Business Council
 - Lab Vlieland



Methodology



Retailers
Consumers
Disposal

Food waste & Zero Waste Management

- Definition: Zero food waste management
 - Waste is a resource and symbol of inefficiency
 - Technical, Environmental, Financial, Social, Cultural, Institutional, Legal
- Definition: Zero Waste City
 - Avoid and Eliminate waste
 - Recover all resources from waste stream

- Definition: Food Waste
 - Avoidable & Unavoidable waste
 - Discarded, lost, degraded
 - 1/3 of food is lost (Fox, 2013)



Vlieland Findings - Retailers

• Supermarkets (2)

- Inventory management based on experience
- Garbage sorting implemented (even though is then mixed)

• Hotels and Restaurants (4)

- Mostly food waste is bread, fruits and vegetables
- 5% of food is thrown away
- No waste segregation
- Some have tried to make smaller portion plates
- Most of the food waste is leftovers

• School

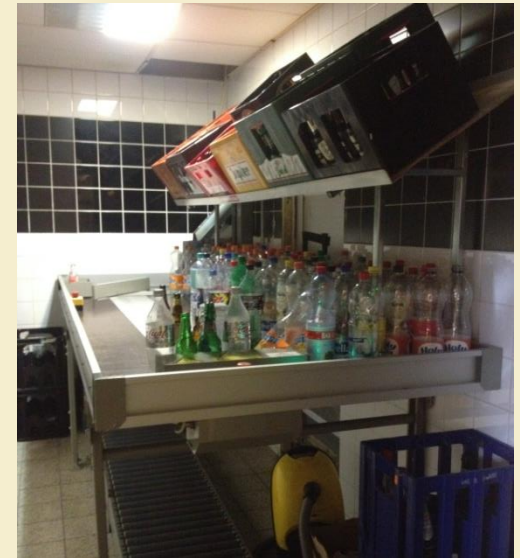
- About 60% of the children throw "lunch" away
- Main waste: Bread
- No compost, no campaign,

• Butchery

- No waste

• Bakery

- Left bread is thrown away (small quantity)
- Impossible to predict future consumption



Vlieland Findings - Consumers

Households (20) and Visitors (5)

- Respondents (100%) support the idea of separating waste but Vlieland has no segregation waste policy
- Practice of preventing and reducing: household (85%), visitors (60%)
 - ✓ kliekje, plan a head before shopping, regular shopping
 - ✓ left over
- Household waste (low) vs visitor waste (high)
- Like gardening(65%) vs composting (45%)
- Shopping = buying + interaction with others
- Family dominated: prefer to cook, buy more

Camping Sites (2)

- Do not separate waste
- But they do have awareness campaigns regarding waste
- A lot of waste in peak season

Category	Reasons	%
Households	Religious	5%
	Life value	10%
	Saving cost	25%
	Self-awareness	60%
Visitors	Saving cost	20%
	Self-awareness	80%

Vlieland Findings - Disposal

Municipality

- No awareness campaigns have been conducted
- There is a problem but not considered priority
- Communal composting was introduced once
- Low volume, odor

- No waste segregation
- Main concern:
 - Collect waste in a more effective and efficient way
 - Proposed magnetic underground bins

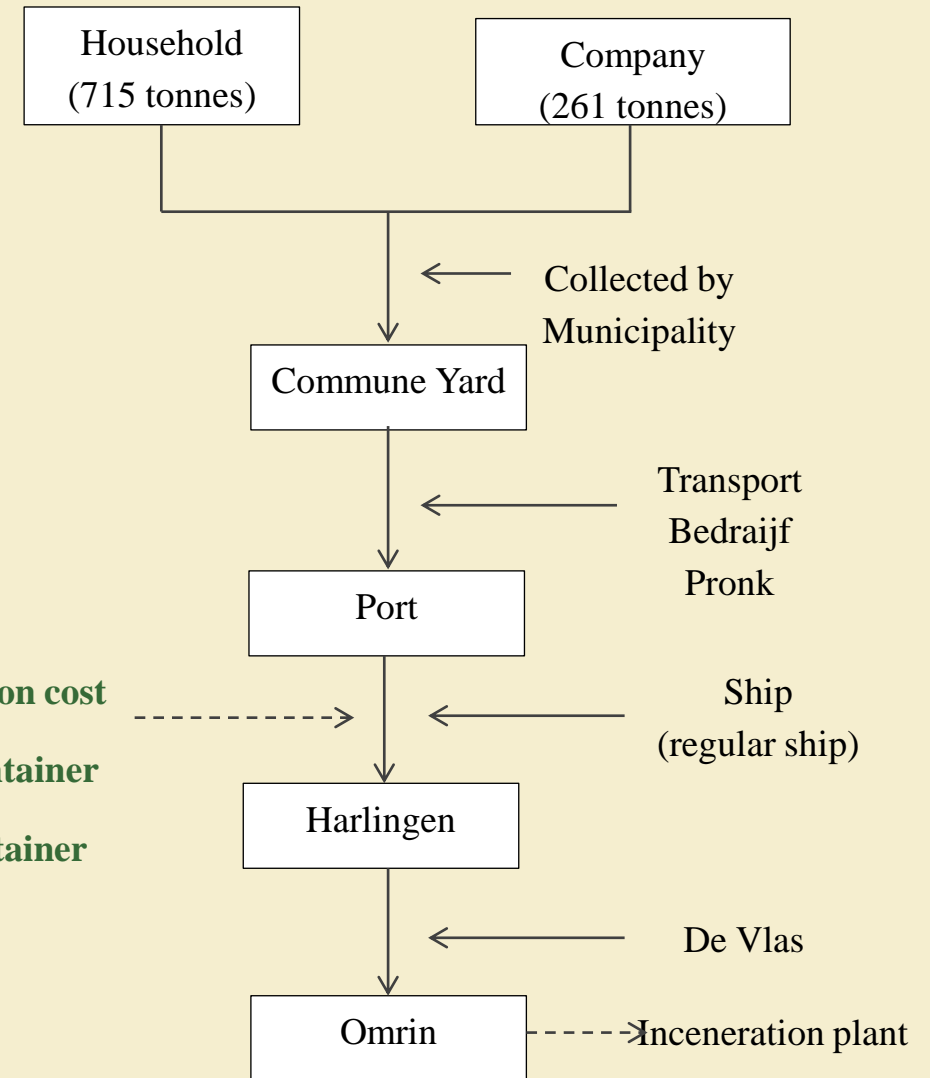
OMRIN

- Waste treatment plant and incinerator are located in mainland
- 640 kg waste produce per person per year
- Waste collection cost is higher in Vlieland than other islands such as

Schiermonnikoog

- Waste produced per year:
 - 715 tons household waste
 - 261 tons companies waste

Transportation cost
€450 per container
14 tons/container



Waste - Flow Diagram

Vlieland Findings - General

Business Representative

- No financial incentive to reduce waste amongst retailers
- Collection of waste is expensive
- No awareness campaigns for reducing waste
- More communication between gov. And bussiness

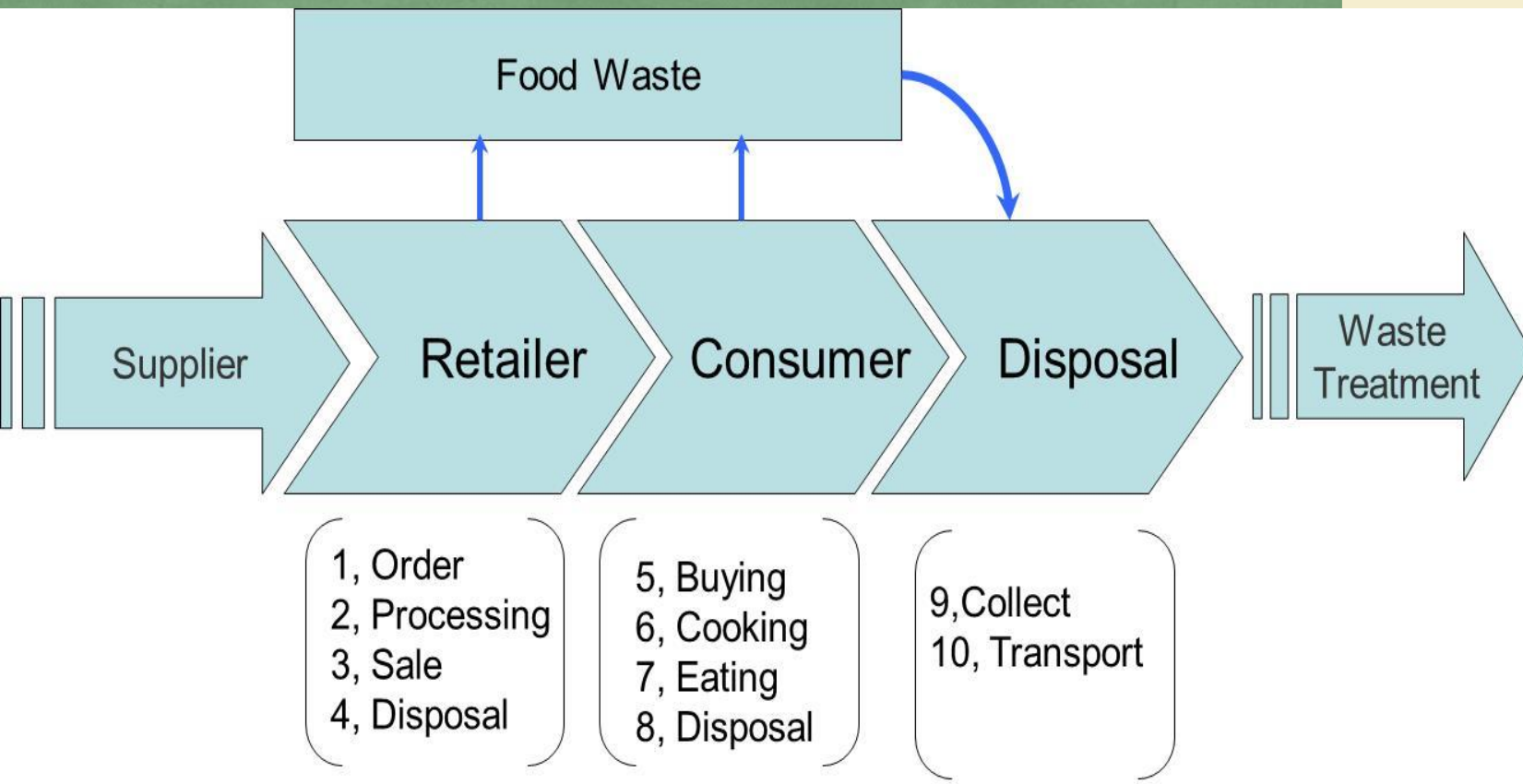
Lab Vlieland

- Food waste is a problem
- Waste neutral festival (I.T.G.W.O.)
- Neither inputs or outputs are controlled

SUMMARY

- There is a food waste problem (not a big one)
- Different waste management from mainland
- No waste segregation (organic & inorganic)
- Households & Visitors have a high sense of awareness
- Costly to send waste to mainland





Solutions



Zero Food Waste Presentation to Students at Vlieland



Solutions

See PDF file (Solutions Table Update) for the list of:

- Generic Solutions
- Retailer Specific Solutions
- Consumers Specific Solutions
- Disposal Specific Solutions



Generic Solutions

Waste Segregation at Source



Awareness

Creation/Campaigns

- Need Municipality involvement
- Raise workshops
- Eco days in community
- Cookery Demonstration (Glasgow, project)

“Waste Free Lunch” School Contest

- Posters and classes about food waste
- Monitor food waste during a week
- Give prizes to the class
- with less weekly waste

Composting & Communal Gardening

- Backyard composting: most HH have garden and they are already doing it.
- Green cone solar composting (Hawaii)
- Communal Composting:
- On-site Composting:
- Rocket accelerator composter:



Policy:

- Subsidies for composters
- Providing separate containers for waste segregation
- Changing from a “fixed cost” system to a “semi – variable” cost system
- EPR



Retail Specific Solutions

E- solutions

- Leftoverswap
- Leanpath
- Wise up on Waste App



Plate Size Reduction

- Go from plates of 24cm to 21 cm
- 19.5% reduction of leftovers



Providing social cues

- 20.5% reduction of leftovers

Re-useable, Durable, Airtight Packaging

Tourist Information sharing

- Helping retailers to have better inventory management

Demand Side Management

- Better product display (small quantities but more often)

School

- Flexibility and change in recess time
- + the awareness campaign

Detailed Solutions – Consumers

Smile Market

- Local production for local consumption
- Based on donations

Barter Market

- Sharing foods
- Trading food
- Give out the excess

Prevention Tips

- Do not peel
- Eat the leaves and stems
- Eggshells for the garden
- Store in the freezer
- Coffee Grounds for the soil



Detailed Solutions – Disposal

Pay as you throw

- Volume based waste fee system (Korea)
- Buying certified bags for disposal
- This encourage people to reduce waste

Restrict use of plastic bags

Promote the reusable container

- Carry your own container for different liquids and some solids (grains)

Waste Bank for Dry Recyclable Waste (Indonesia)

- HH need to separate their waste
- Bring recyclable waste to certain site (volume monitored)
- Wastes are reprocessed into handcrafts
- Reusing the waste for souvenirs



Recommendations

- **Low Investment**
- **Easy implementation**
- **Festival & Municipality Synergy**
- **2020 Campaign “Zero Waste”**



1. Festival

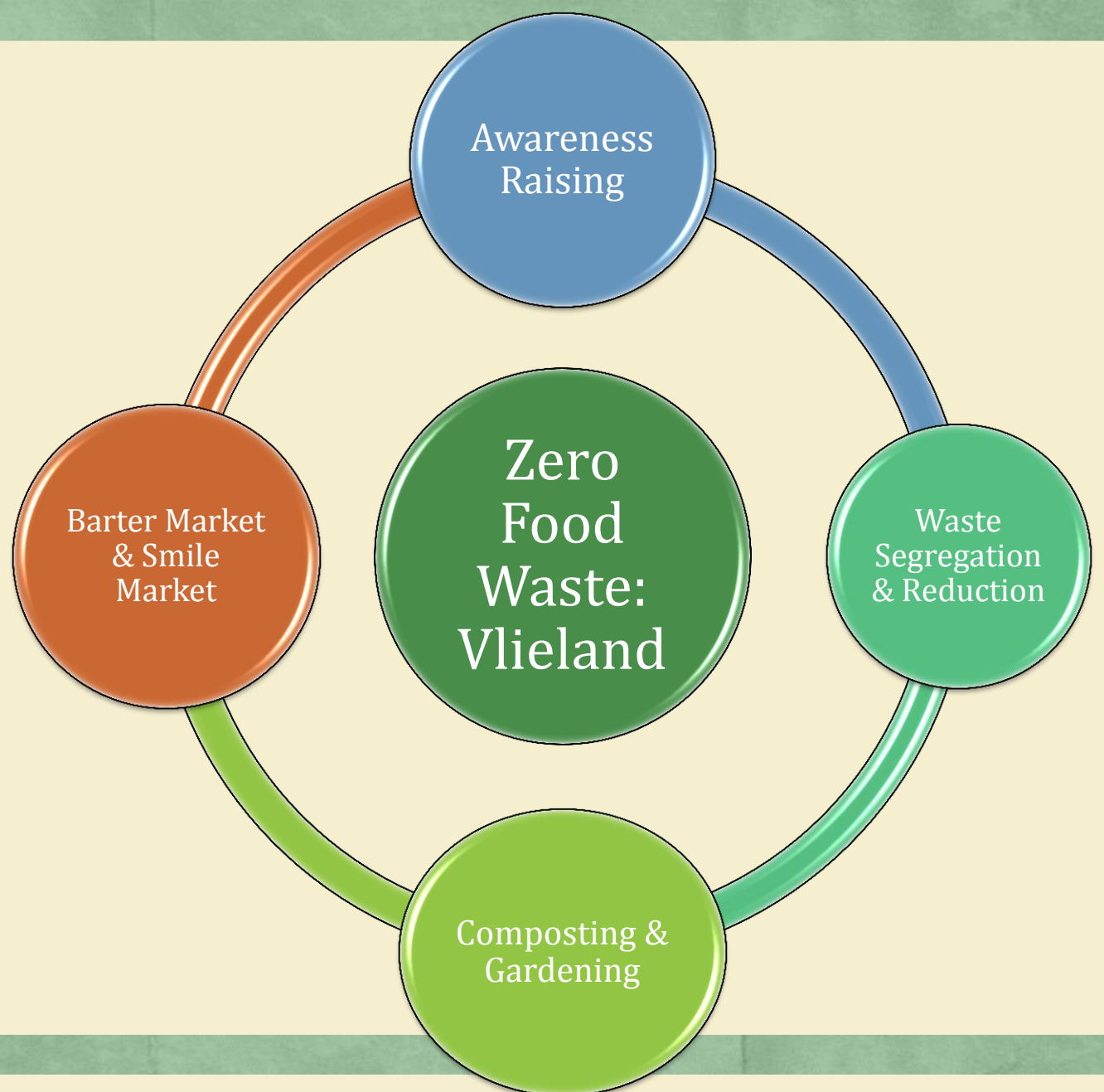
- **Awareness Campaign**
- **Barter Market**
- **Waste Segregation (inside the festival)**
- **Donation Program**

2. Municipality

- **Waste Segregation**
- **Communal Composting**
- **Awareness Campaign**
 - **Vlieland (all island)**
 - **School**

Conclusions

Integral Solutions



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