

# LEAN and GREEN

## Management along the food life cycle

### Introduction, objectives and method:

The LEAN IDEA has its starting point in industry. Within the lean philosophy there are seven categories of waste. The objective is to combine the lean categories with a green win-win analysis:

1. Lean Green win-win analysis: 1. Win-win: Less production leads to less material and energy used and less impacts, 2/3 Win-loose: Less storage means more transports and more impacts, 4. Win-win?: Less movements have impact if less energy consumption is involved. 5. Win-win?: Less waiting have impact if less energy consumption is involved., 6. Win-win: Less defect products lead to less material and energy used and less impacts. 7. Win-win: decreased over processing leads to less material used and less energy consumed.
2. The combined analysis is applied to lean data in the pork life cycle: lean pig farming, (Rydberg et al 2014), Lean sausage production (REELIV 2008), lean life cycle (master thesis at retailer COOP 2015, Sonesson et al 2010). These are combined with energy and waste data in the pork life cycle (Cederberg 2009).



### Lean farming

#### Results of LEAN FARMING:

The **farmer** is one the main contributor to the environment, as 90% of GWP are related to farming activity including the animal itself. What are the effects of **lean farming**?

**The case of lean pig farming: Results related to lean:** time for stops and technical problems are up to 25%. **Results for climate impact:** animal mostly methane (35%), N loss to ground (20%) feeding (25%) and mineral (8%), heating/ventilation (8%).

**Recommendations:** more N efficiency (and not production efficiency) due to local crop production, crop rotation, and no extra fertilizer, and better animal health. Look over possibilities for biogas and maintenance of ventilation.



### Lean industry

#### Results of LEAN INDUSTRY:

The **LEAN IDEA** has its starting point in industry. What are the effects of **green lean management**? **The case of lean sausage production:** 2600 ton/yr, 35 employees. **Results related to lean:** large product variety, choice of raw material e.g. beef or pig, slow packaging machines, few line operators. **Results related to climate impact:** cutting process lead to waste (50% climate impact) and cooling process lead to energy use (25% climate impact).

### Lean life cycle - from push to pull



#### Results of OVER THE LIFE CYCLE:

The **lean** results are complemented with retailer and consumer. The **retailer** is one the main actor handling product flows, the **gatekeeper** between producer and consumer. What are the effects of **lean retailing**? **The case of lean retailing:** improve shelf life, better product quality and package, better coordination, better storage/transport. The **consumers are managing the food and waste**. What are the effects of **lean consumption**? **The case of lean consumption:** better storage/transport, better purchasing and meal planning.

The **environmental** improvement potential connected to waste over the life cycle are:

- Waste in Farming (3,2 %), storage (0,7%), processing (5%), distribution (4%), Consumption (11%).
- Climate impact is 3,4 kg CO2 ekv/kg pig meat with farming (90%), processing (6%), and consumer transport (4%).

Over the life cycle both the farmer and the consumer are important.

### Discussion and conclusion:

On the one hand, the environmental management in companies has been criticized for not being integrated in companies daily work. On the other hand, lean management has been criticized for not taking in life cycle considerations. The combined lean and green method helps to integrate lean and green management. It helps actors to focus on win-win situations within the own management and the analysis over the life cycle helps actors to understand lean and green activities over the life cycle.



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