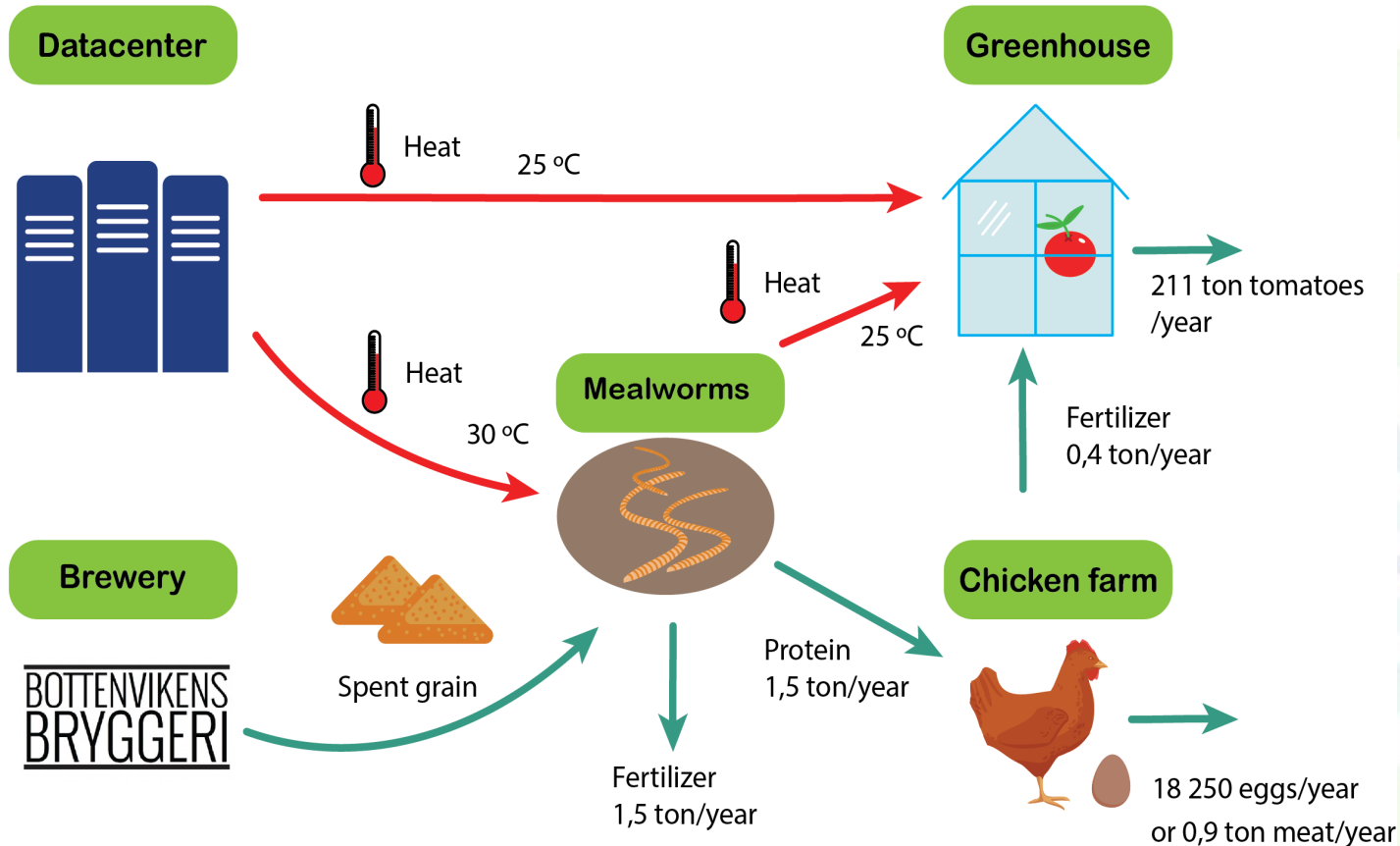


# Mealworm farming – spent grain from brewery, heat from datacenter



## Background

- Bottenvikens brewery annually generates 60 tons of wet spent, 1000 kg batch dispatched every week.
- Spent grain is wet product, about 70 weigh% is absorbed water, it spoils fast. Need to be consumed within 1-2 days or add preservatives.

Cooperation between Arctiq DC (EU Interreg Nord) and SYMBIOMA project





## Key partners, activities and resources

### **Supply**

- Brewery Bottenvikens Bryggeri Ab – spent grain: preservation and transport to mealworm growing
- Datacenter – controlled heat supply

**Processing** - mealworm growing farm to be established

- Humidity and temperature regulated environment
- Feeding mealworms, organic food and water
- Unit for separation mealworms from feed bed or frass
- Packaging and delivery of mealworms to customer
- Packaging and delivery of residue feed bed to customers
- Later if supplied in powder form, sterilization and drying facilities, milling, powder packaging



## Value propositions

### **Brewery**

- Reinforced sustainability message in branding beer, with better utilization of high quality resources

### **Datacenter**

- Better energy performance for datacenter, where waste heat is generating new products

### **Chicken farm**

- Protein feed for chicken farm is usually dry product and transported from distant location, proposed local solution saves energy for drying and transport
- Chicken wellbeing improved using natural to them feed

### **Fertilizer**

- Organic fertilizer with no smell

### **Other social benefits**

- Improved use of locally available resources
- Local value chains boosts local prosperity



## Customer segments and product selling channels

### **Mealworms**

- Chicken farm (first entry) – fresh, sold directly
- Fish farms – fresh, sold directly
- Consumer market:
  - Pet feed for households, fresh
  - Pet feed for households, dried powder
  - Human food supplement – dried powder

Dried products can be sold through e-shop portals or through distributors in conventional shop

### **Fertilizer**

- Bed supplement for greenhouse production - delivered directly to local facilities
- Dried powder sold to households through e-shops and/or distributed to conventional shops



Northern Periphery and  
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2014-2020



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## Cost structure

- Preservation of spent grain e.g. with formic acid
- Inbound transport
- Staff costs for mealworm farm operations
- Outbound transport to customer

Investments → depreciations



## Revenue streams

### **Datacentre**

- Energy sold as a product/service, also possible shared with mealworm farming revenues

### **Brewery**

- Spent grain sold to the mealworm farm and/or shared revenues

### **Mealworm farm**

- Sold chicken feed to chicken farm
- Sold dried, amazon price is around 10-15 €/kg (producer selling price estimate 5 €/kg)

### **Fertiliser**

- Sold to greenhouses locally and or shared revenues from green house production
- Current price of sterilised, dried and packed fras in retail can be up to 20 /kg.
- Possible to sell to organic fertilizer manufacture for preparing mixes



## Challenges

- Brewery, datacentre, mealworm growing facilities and greenhouse need to be in proximity to enable direct use of excess energy and assure low costs for logistics of spent grain.
- Who is the owner or the investor of the mealworm growing business?
- Costs of business start-up including certification of products are not fully known
- Thorough comparison of market product prices and production costs
- Competition with other insects and also plant-based products