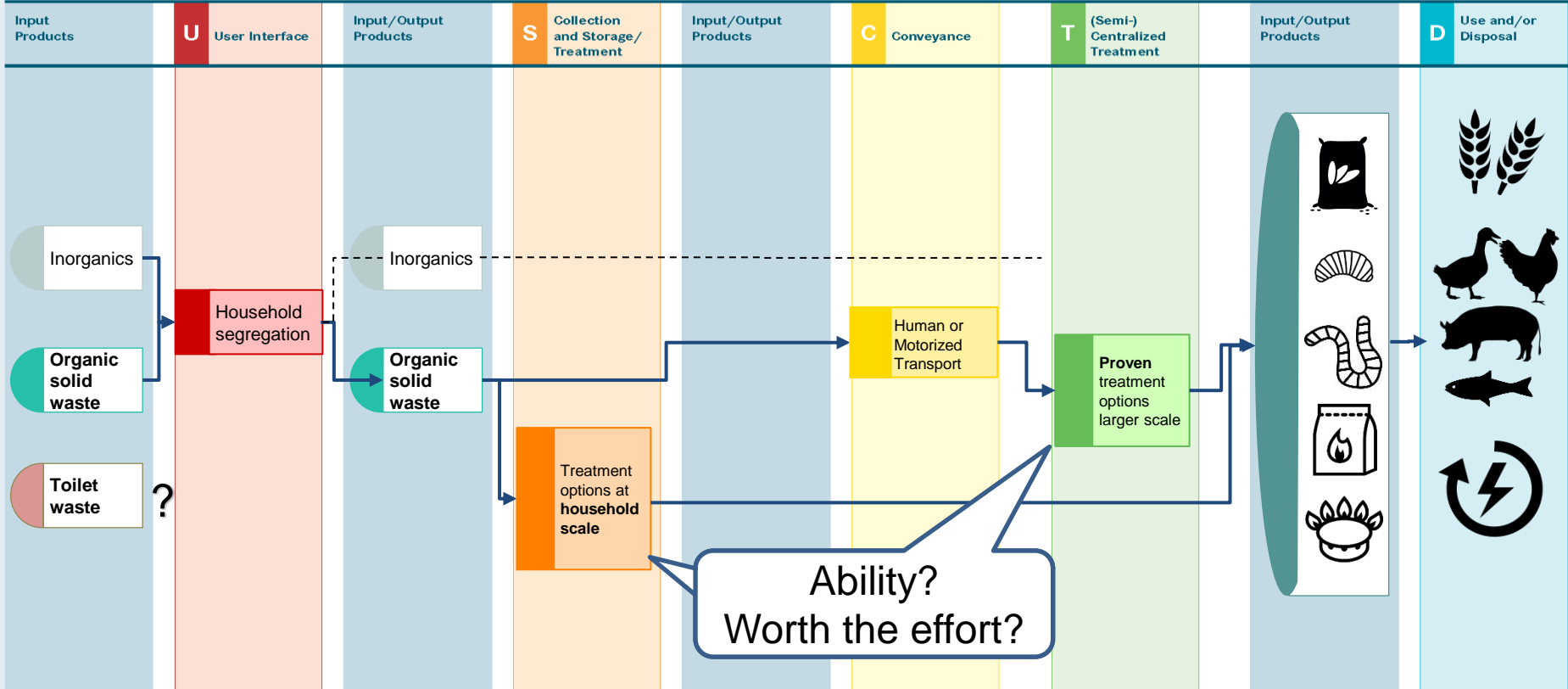


# Linking Solid Waste Recycling to Sanitation

Christian Zurbrügg, Sandec/Eawag

# Solid Waste System

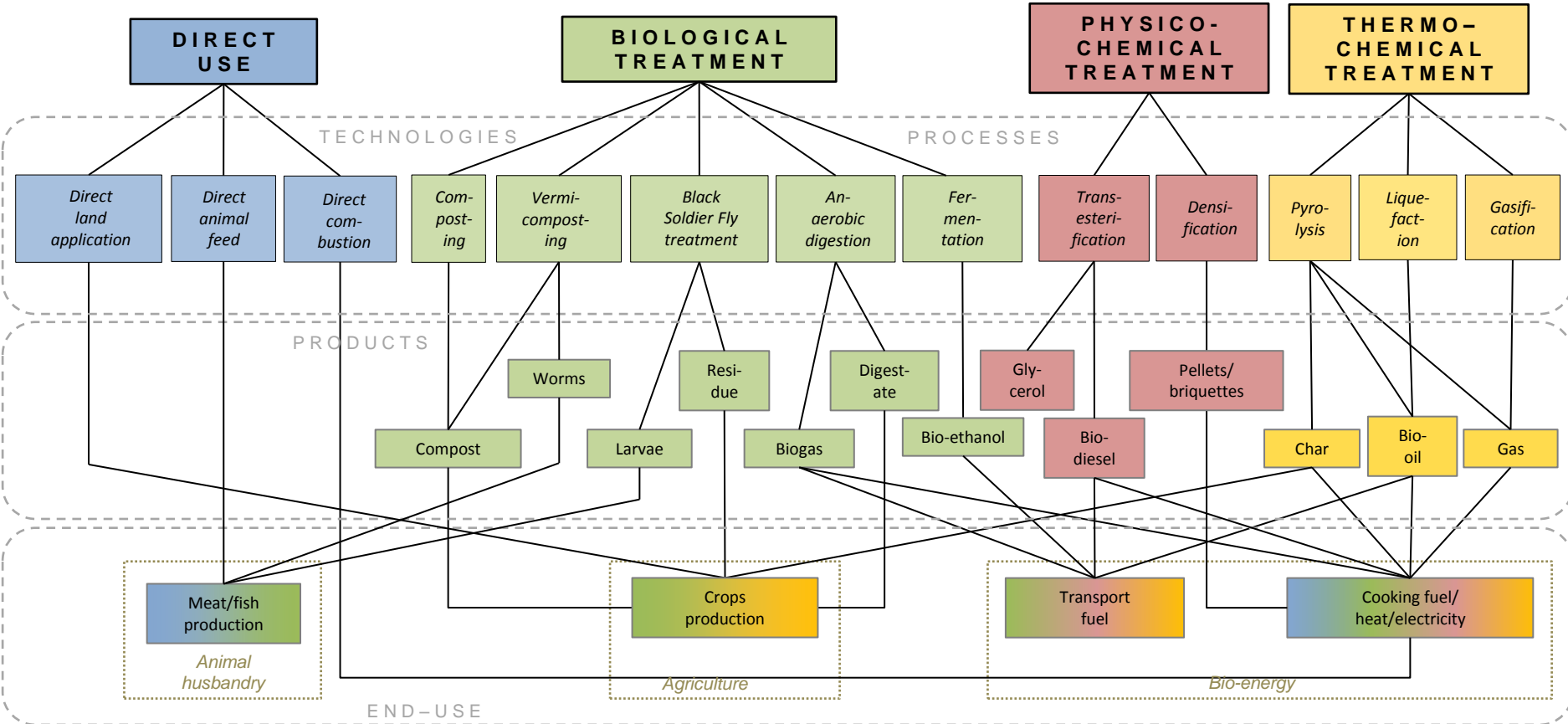
## Segregated Organic Waste Management



Disclaimer: This sanitation system was created using Eawag's Sanitation System Drawing Tool (Version 1). The user of this tool alone is responsible for the correctness and completeness of this system.

# Possibilities

Lohri C.R., et al. (2017). Treatment technologies for urban solid biowaste to create value products – a review with focus on low and middle income settings. *Reviews in Environmental Science and Bio/Technology*. 16/1, pp 81–130.



# Resource recovery: Choice by **market demand**

## Waste Sourcing

Behavior?  
Incentives?  
Accessibility?  
Quality?



Availability?  
Costs?  
Ability?  
Maturity?

## Treatment Technology

Composting  
**Co-composting**

BSF processing  
Vermicomposting

Briquetting/Pelletizing  
Pyrolysis

Anaerobic Digestion

Transport?  
Price?  
Consistency?

## Waste-derived products & markets



# Example: BSF treatment

## Waste Sourcing



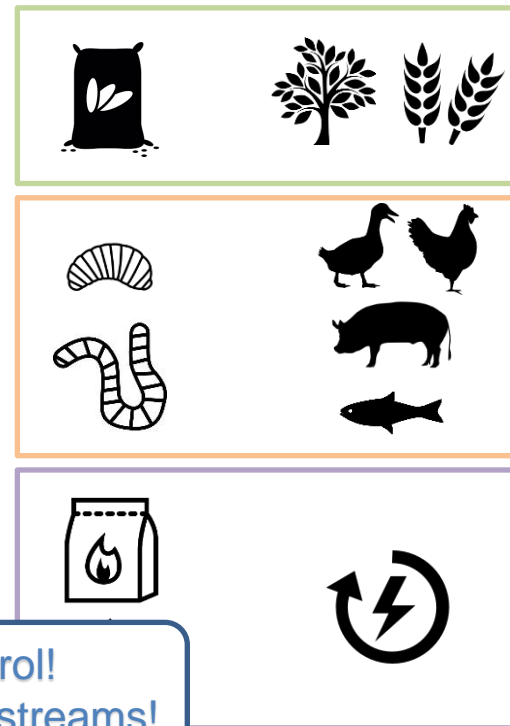
Cherry-picking or solving public challenges?

## BSF Treatment Technology

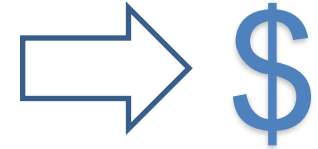
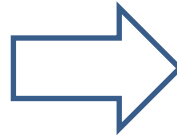


Quality control!  
Multiple revenue streams!

## Waste-derived products & markets



# BSF example: Facility in Indonesia



Sandec Eawag uploaded a video 1 month ago

**How to Use Black Soldier Flies for Biowaste Treatment (short version)**

Sandec Eawag 1 month ago **12,446 views**

This video presents the relevant tasks required to run a Black Soldier Fly facility. For more detailed information and a free download of the "Black Soldier Fly Biowaste Processing - A

# Example: FS for fuel (SEEK project in Uganda)

## Waste Sourcing



Sludge quality and sand!

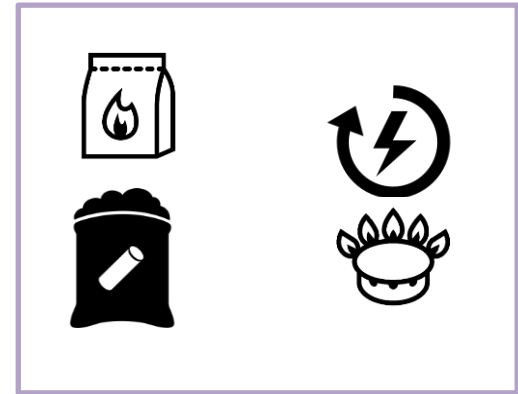
## FS Treatment Technology



Challenges with dewatering

Challenges with gasifier

## Waste-derived products & markets



## Technology

- Develop technology and services around products
- Ensure consistent quality products
- Do not underestimate waste sourcing

## Financial

- Double revenue streams required
- Increase cost effectiveness in operation
- Cherry-picking or impacting on public health issues?

## Institutional & Awareness

- Assess environmental sustainability (LCA)
- Create incentive-based systems
- Communicate positive examples with evidence

## Linking sanitation to solid waste

- Synergies possible
- ...but risks increase