Complexities around PPPs within the Circular Economy in Durban South Africa

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EThekwini Municipality, South Africa

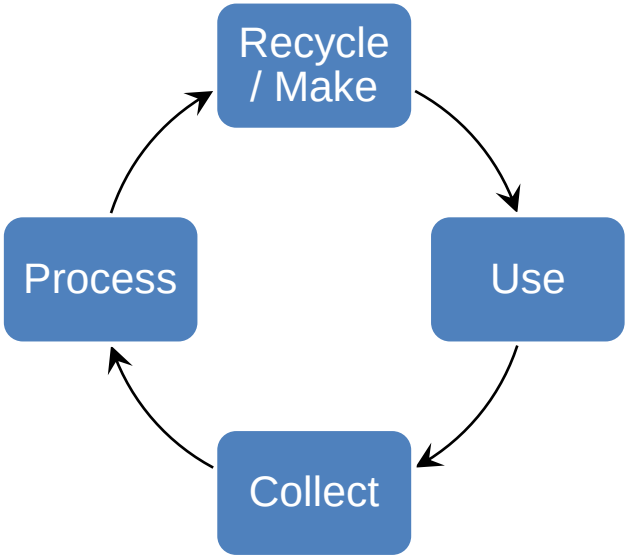
- 2,297 km^2
- 3.7 m people
  - 53% in formal housing
  - 32% in informal settlements
  - 15% in peri-urban & rural areas

Water & Sanitation Challenges

- Access to basic water and sanitation has been a constitutional right since 1994
- Water Service Authorities provide water and sanitation services
- Pro-poor transformation agenda
- Clear need for innovative solutions
- ‘Learn by doing’ approach

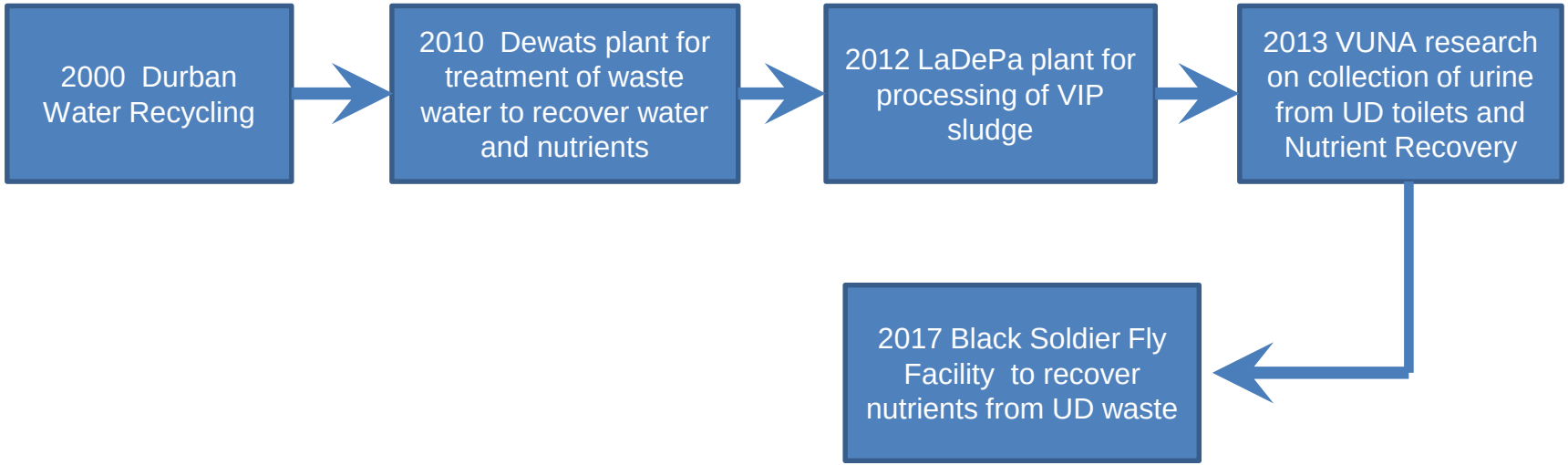
What is a Circular Economy Approach in the Sanitation Sector

- Not the environmentally unfriendly make ➜ use ➜ dispose
- Toilet resources
- Derive value from waste streams



A Path to a Circular Economy/Transforming Waste into Resources

Intervention Timeline



Context

- Over 80 000 urine diversion toilets (UDTs)
- Faecal waste collects in two chambers
- Commitment by Municipality to empty
- Opportunity to consider recycling options

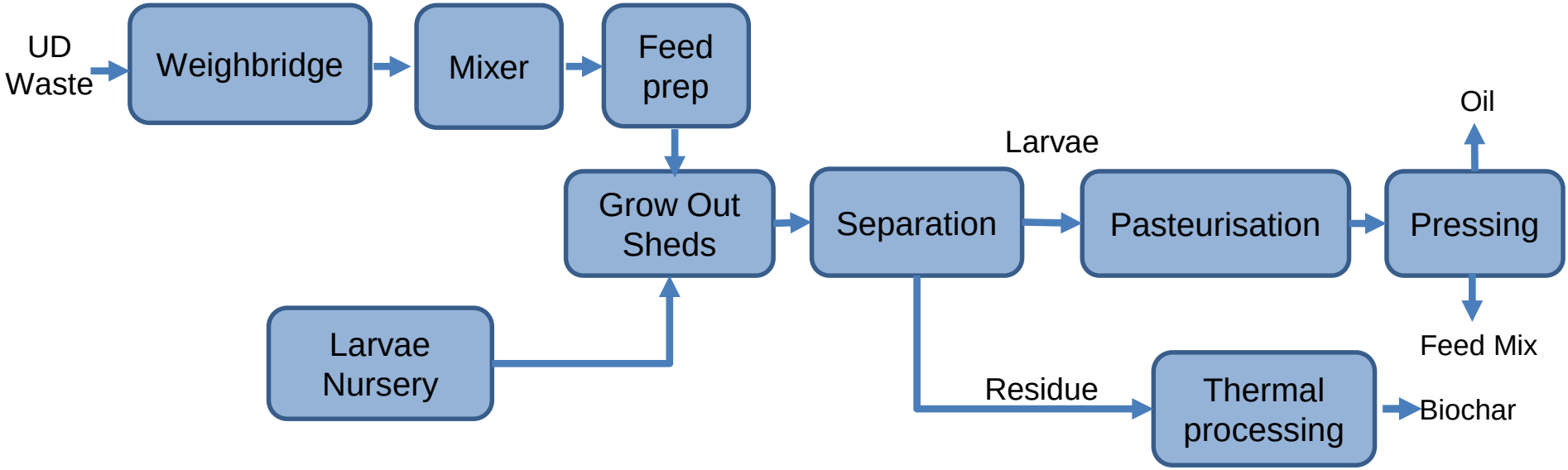
Context cont.

- BioCycle – Black Soldier Fly technology concept
- Development Business Model
- BMGF-city partnership urban sanitation

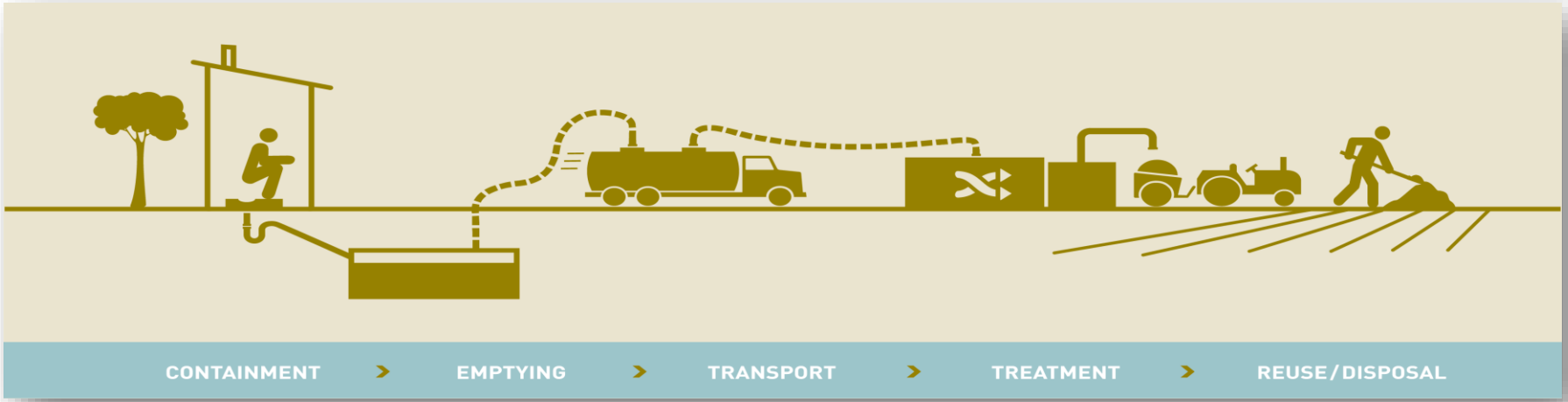
Stakeholders

Bill & Melinda Gates Foundation	BSF process plant CAPEX funding
eThekwini Water and Sanitation (Municipality)	Municipal oversight and Program Management
Emptying Contractor	Emptying of UDs and transporting of waste to plant
The BioCycle	Operation of BSF plant on a for profit basis
University of KwaZulu-Natal	Testing and monitoring of system
Khanyisa Projects	Project & Business Management

UD Waste to Resources process:



Partnerships/Contracts to Address Value Chain



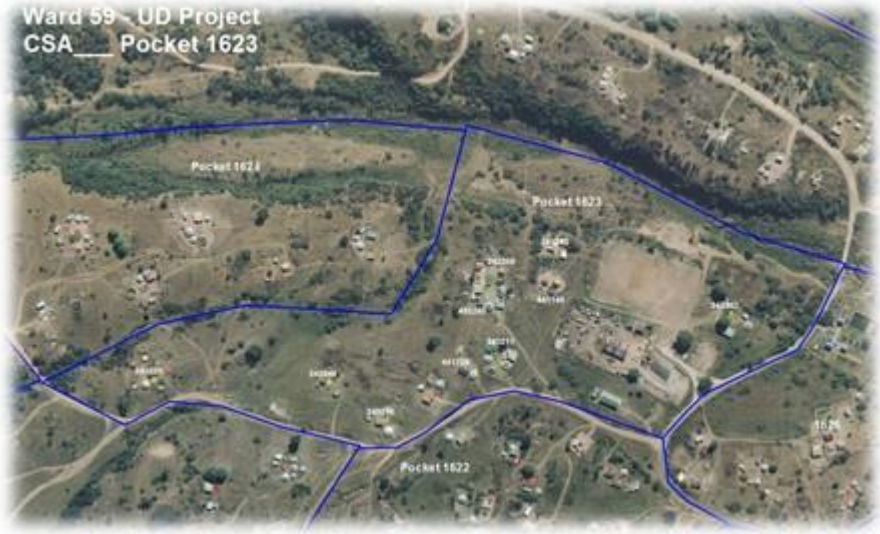
Tender based contract using local entrepreneurs

Service Level Agreement (SLA) BioCycle

Contractor Interface

Tender Based Contract using Local Entrepreneurs

- Contract specifications
- Health, safety and environmental compliance
- Mentoring
- Quality control
- GIS management of data and implementation



SLA: Municipality and BioCycle

- Defines risks, responsibilities, business model structure
- Aims to reduce municipal operational costs
- Black Solider Fly (BSF) processing technology

Bucket elevator

Agitation bin

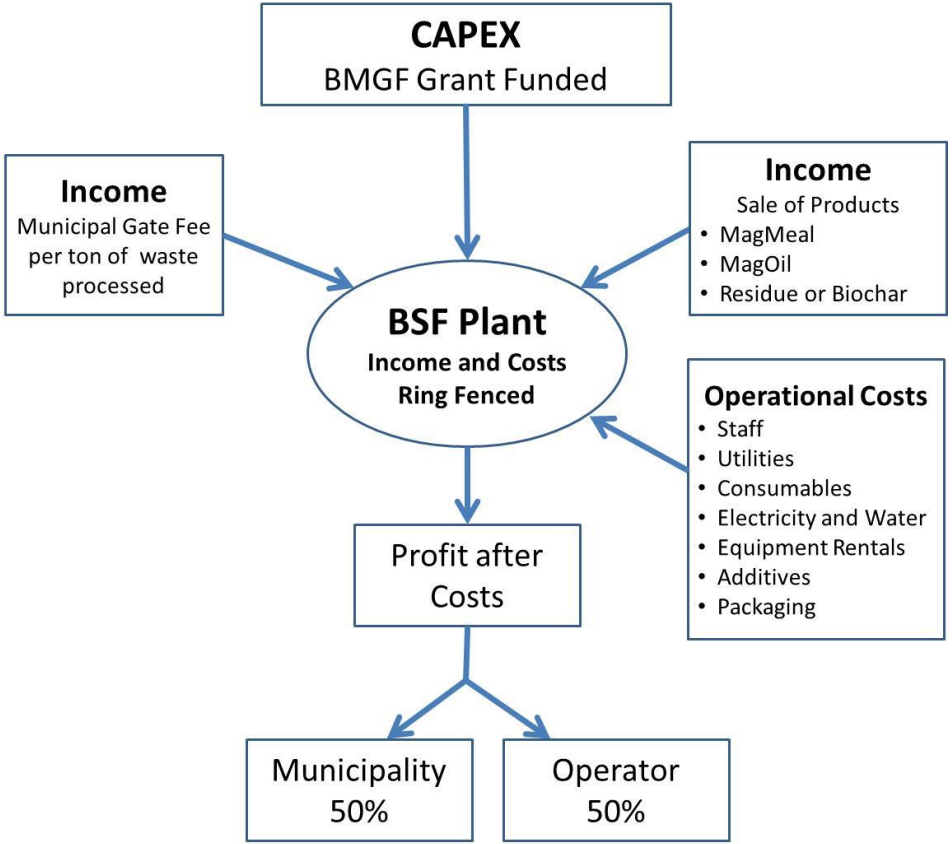
Larvae collects on screen

Oven dryer for larvae

Larvae oil press

Biochar retort for residue

Processing Plant Business Model



Results

- 50 000 UDTs emptied
- Processing plant operational since 2017 – thought not properly commissioned
- Iterative testing of processing elements on-going
  - Front end screening of detritus


  - Optimum feed preparation

  - Climate control


  - Back end product systems

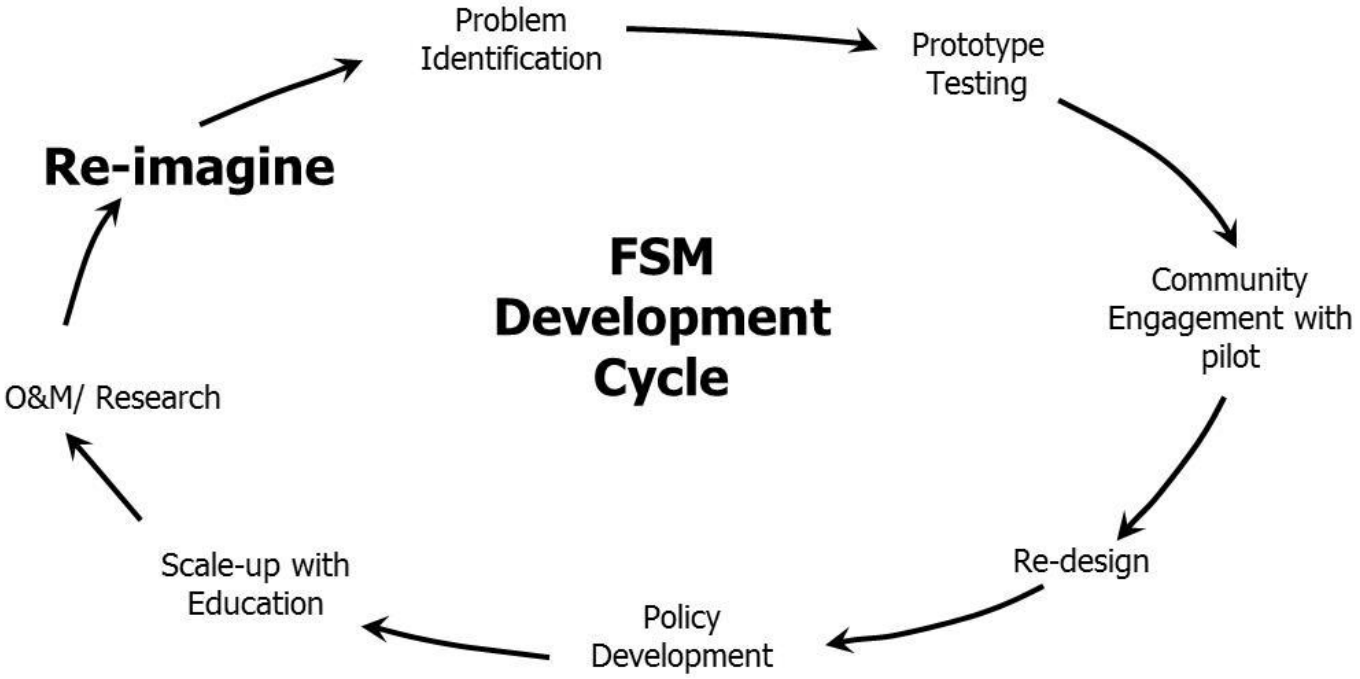
- Discussions with potential market

Challenges

- Delays due to:
- Private sector and municipality different scm processes
- Operational challenges
- Environmental conditions
- Lower nutrient value of UD faecal waste
- Market acceptance and validation of products

EWS Iterative Approach

Feedback Loops



Lessons Learnt

- Regulatory framework
- Incentives and penalties; checks on performance
- Social understanding and engagement

Lessons Learnt

- Blended funding to derisk
- Invested efforts geared towards cost recovery
- Engage potential markets early

Lessons Learned

- Remove bureaucratic barriers
- Adopt step-wise approach
- Need to be patient and perseverant !

Conclusion

FSM designed for resource recovery is an area of rapid technological innovation. Municipalities /Business have an opportunity to start seeing sanitation as a medium of valuable resources and fully embrace technologies and practice that support the circular economy, which also offers added economic benefits in creating jobs end even new business sectors and domestic markets

Thank you for listening!