

Circular economy in agriculture: A case study of Msunduzi Municipality, KwaZulu-Natal

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Complex
societal
challenges to
be addressed
by the circular
economy



Population growth and rapid urbanization



Nutrient mining



Environmental degradation



Sanitation and waste management

What is the circular economy?

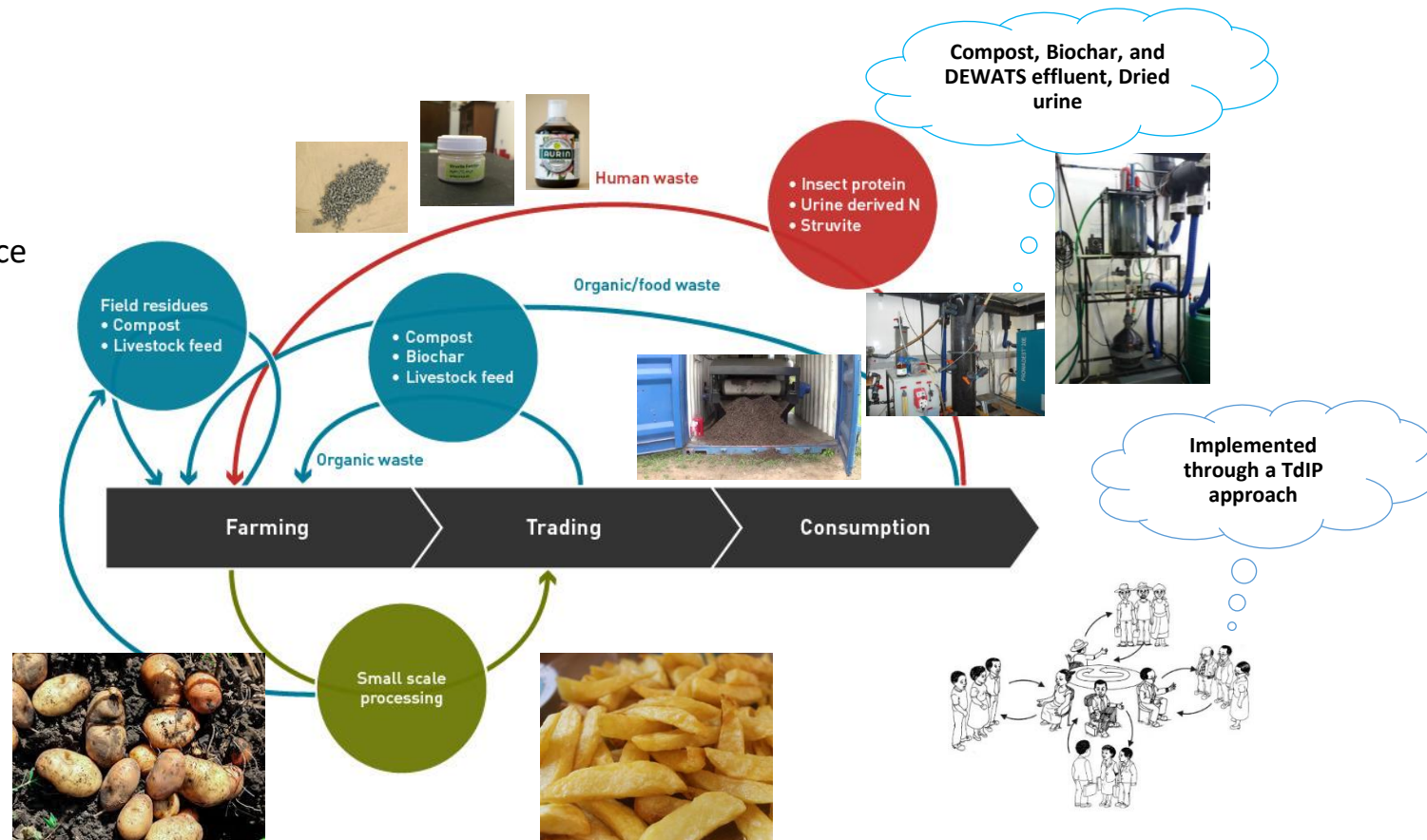
- The Ellen MacArthur Foundation defines the circular economy “as a system that provides mechanisms for *multiple value creation* to create a solution for resource scarcity issues while ensuring economic growth.”
- The focus is on
 - Value creation -the circular economy uses resources available in cascading systems, **(the waste of a system is an input in another)**
 - Sustainability-economy, society and environment



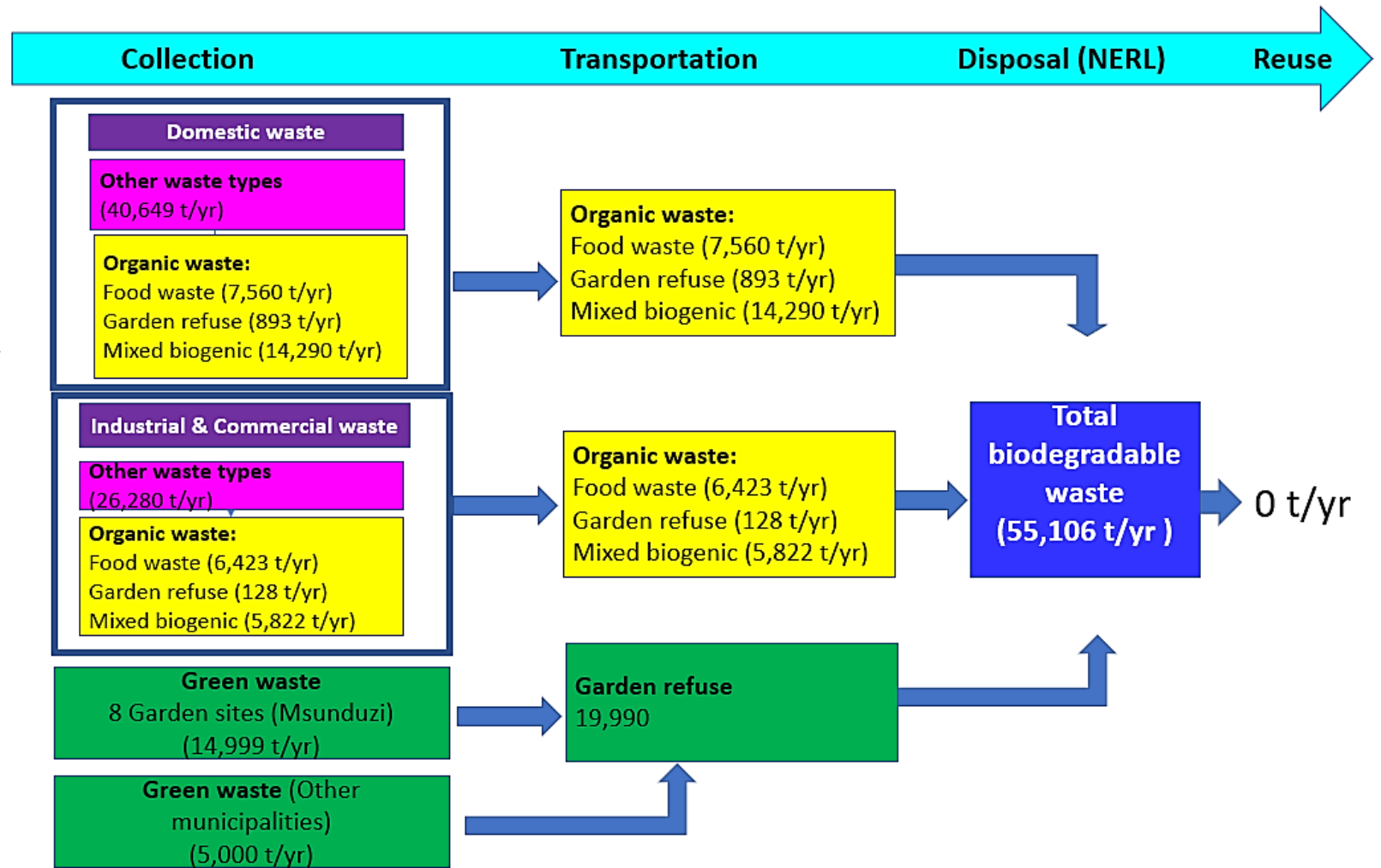
The rural-urban nexus: Establishing a nutrient loop to improve city region food system resilience (RUNRES) model

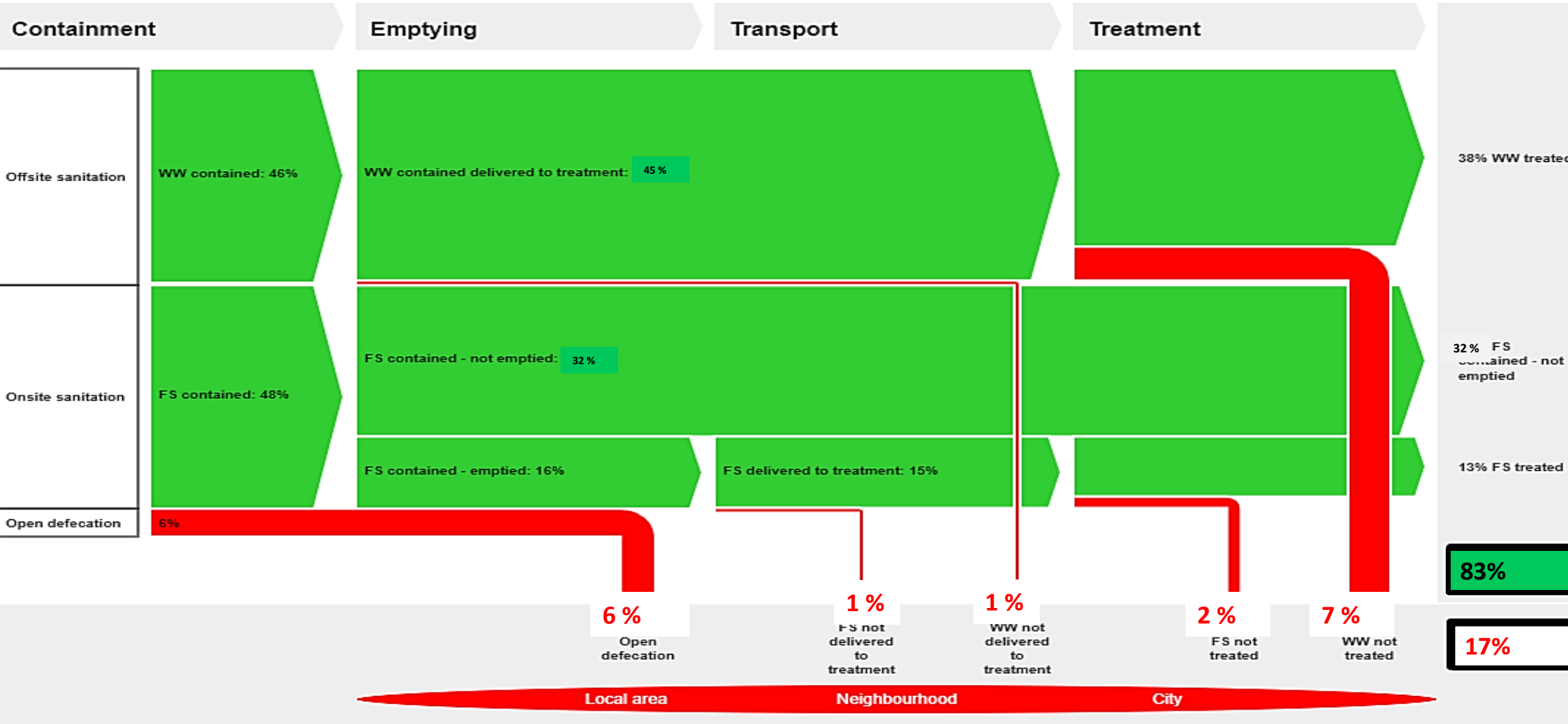
RUNRES principles

- Co-financing
- Transdisciplinarity
- Systems thinking (socio-technical transitions)
- Sustainability and resilience
- Community impact
- Policy impact



Green waste flows





Key: WW: Wastewater, FS: Faecal sludge, SN: Supernatant

█ Safely managed

█ Unsafely managed

CO-COMPOSTING INNOVATION PLATFORM

DUZI TURF, UMGENI WATER, MSUNDUZI MUNICIPALITY CLUSTER & UKZN



Green waste from Msunduzi Municipality

6600 tons

Sewage sludge from Umgeni Water

899 tons

Co-composting at DuziTurf

4500 tons

Co-composting at DuziTurf

Reuse in urban agriculture

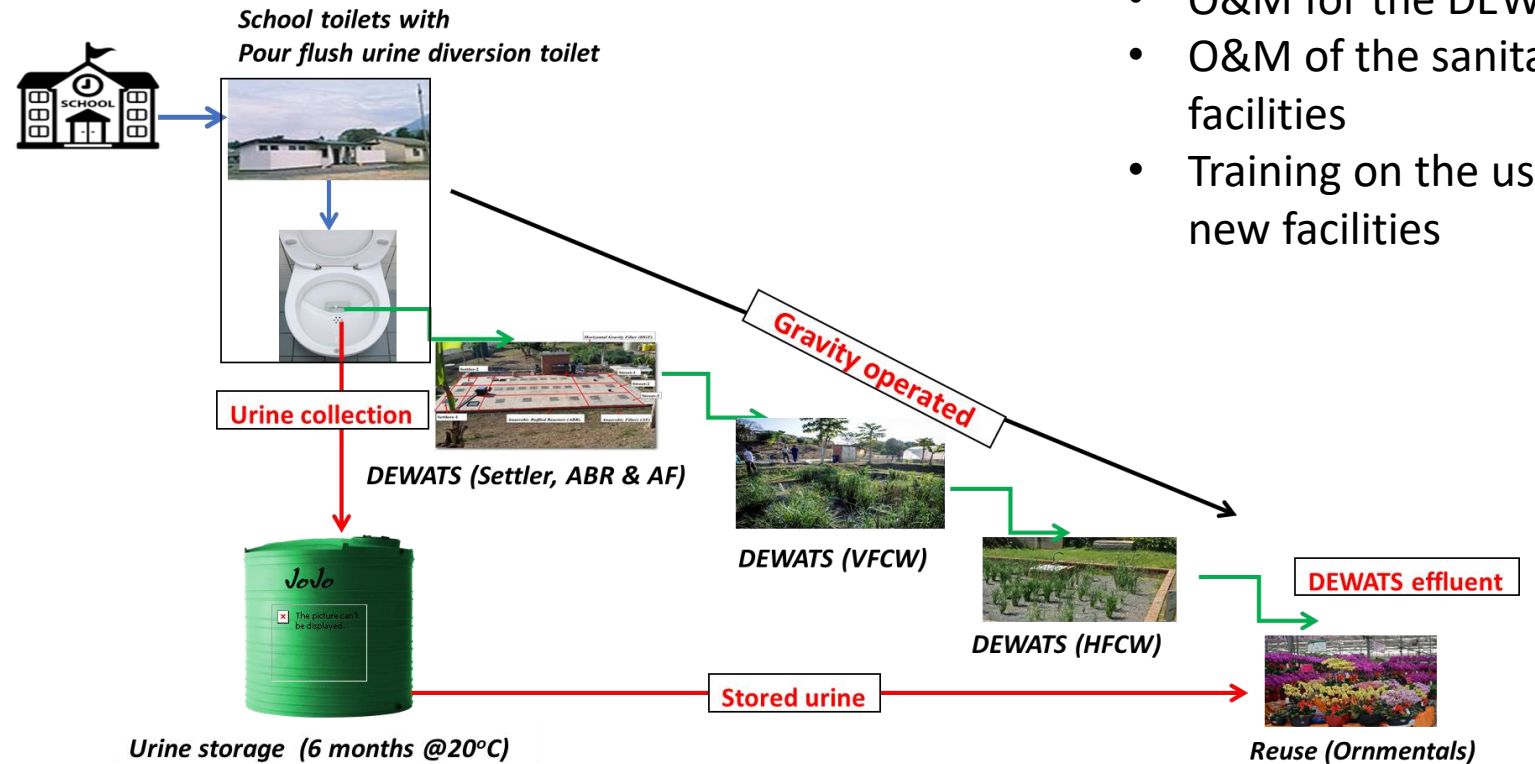
Compost Sold = 1524 tons
Compost still in windrows = 3620 tons



DEWATS

INNOVATION

UMNGENI WATER,
H2O/BORDA, RUSUS,
DOE, UKZN, MSUNDUZI
MUNICIPALITY



Keys issues

- Decommissioning the VIP toilets
- O&M for the DEWATS
- O&M of the sanitation facilities
- Training on the use of new facilities

ENHANCED BIOCHAR CLUSTER

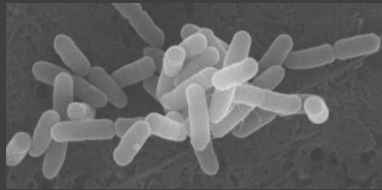
(RUSUS, PID, MSUNDUZI MUNICIPALITY, UKZN)

Keys issues

- Organizational capacity
- O&M of the FSTP
- Co-financing
- Training of co-ops in business skills, etc
- Gatekeeper interest



Contaminants



Agronomic Parameters

N
P
K
N
Ca
Mg
C



Quality Assurance Program (QUAP)



Lack of organizational capacity for cooperatives:

- Mainstreaming self-sustaining training programs in co-op business model, business skills, financial literacy, record keeping, etc. using



Perceived health risks:

-Developing a contextualized sanitation safety plan using the multi-barrier approach



Poor revenue flows:

- Viability gap financing, tipping fees, clean development mechanisms, social enterprise investment (public benefit corporation), green bonds, etc.



The red herring and green washing of sustainability:

- Implement the triple bottom line approach, full-cost accounting, CSR, ESG, etc. in project evaluation frameworks



Waste contamination

- Better management of green zones to ensure source separation and implementing integrated waste management (IWM)

Challenges and recommendations...



NGIYABONGA..

