

4. Empirical Cases and Business Models in FSM (I)

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In cooperation with:



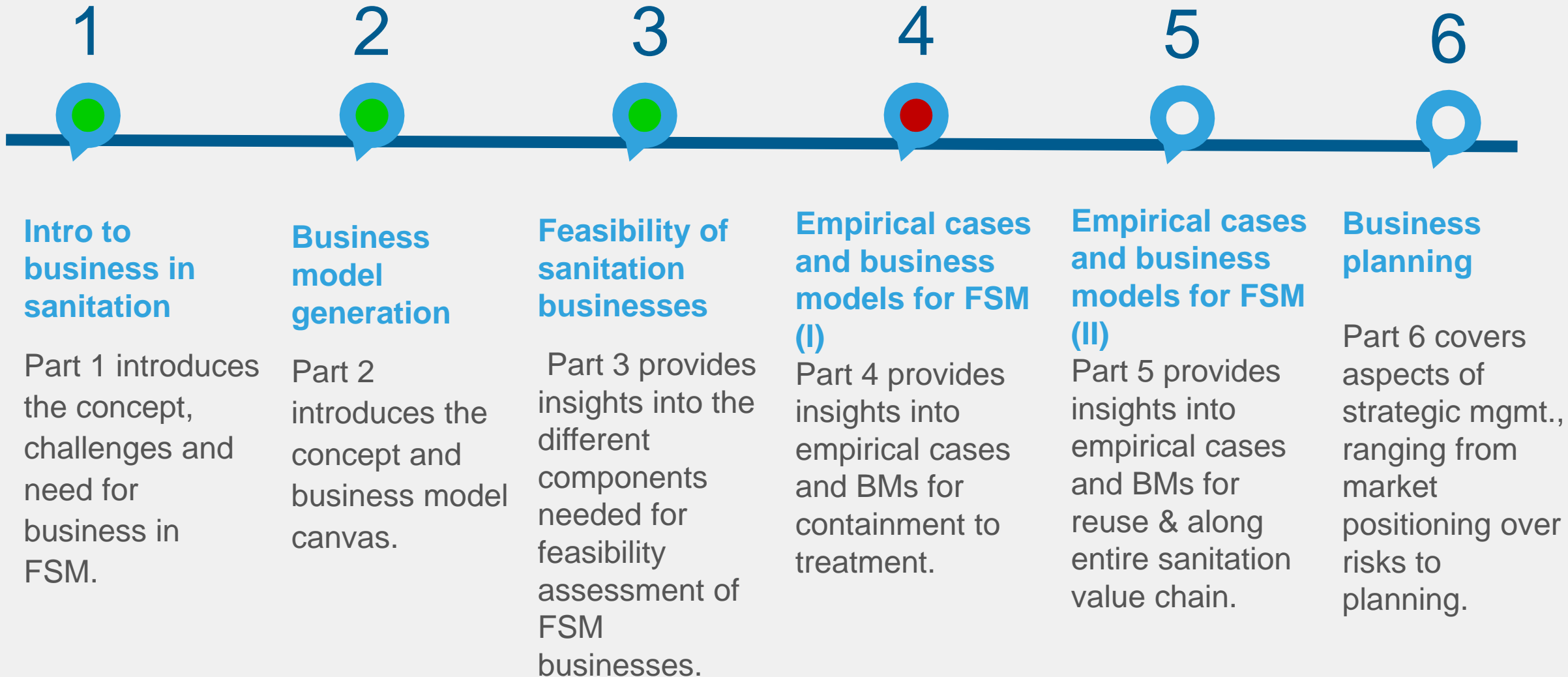


Learning Objectives

This component will allow you to:

- ♻️ Be conversant with real-life FSM business case examples
- ♻️ Be conversant with FSM business model covering:
 - **Toilet access and in-situ energy recovery**
 - **Emptying and transport of fecal sludge**

Session structure



SANITATION SERVICE CHAIN

ACCESS TO TOILET



EMPTYING & TRANSPORT



TREATMENT



DISPOSAL OR REUSE



BUSINESS MODELS FOR TOILET ACCESS AND *IN-SITU* ENERGY RECOVERY

- Public toilet with energy recovery

BUSINESS MODELS FOR TOILET ACCESS AND *IN-SITU* ENERGY RECOVERY (CONT.)

- Residential-institutional biogas

MODELS FOR EMPTYING AND TRANSPORT OF FECAL SLUDGE

- Commonly occurring private emptying and transportation
- Franchise
- Nonprofit
- Transfer station

MODELS LINKING EMPTYING, TRANSPORT AND TREATMENT

- Commonly occurring public FSM
- Licensing
- Call center
- Scheduled desludging sanitation tax
- Incentivized disposal
- Full private

MODELS EMPHASIZING REUSE AT THE END OF THE SERVICE CHAIN

- Farmer-truck operator partnership
- Co-composting
 - Town cluster approach
 - Pull-push

MODELS COVERING THE ENTIRE SANITATION SERVICE CHAIN FROM TOILET ACCESS TO REUSE

- Non-movable UDDT installation
- Container-based sanitation (CBS)

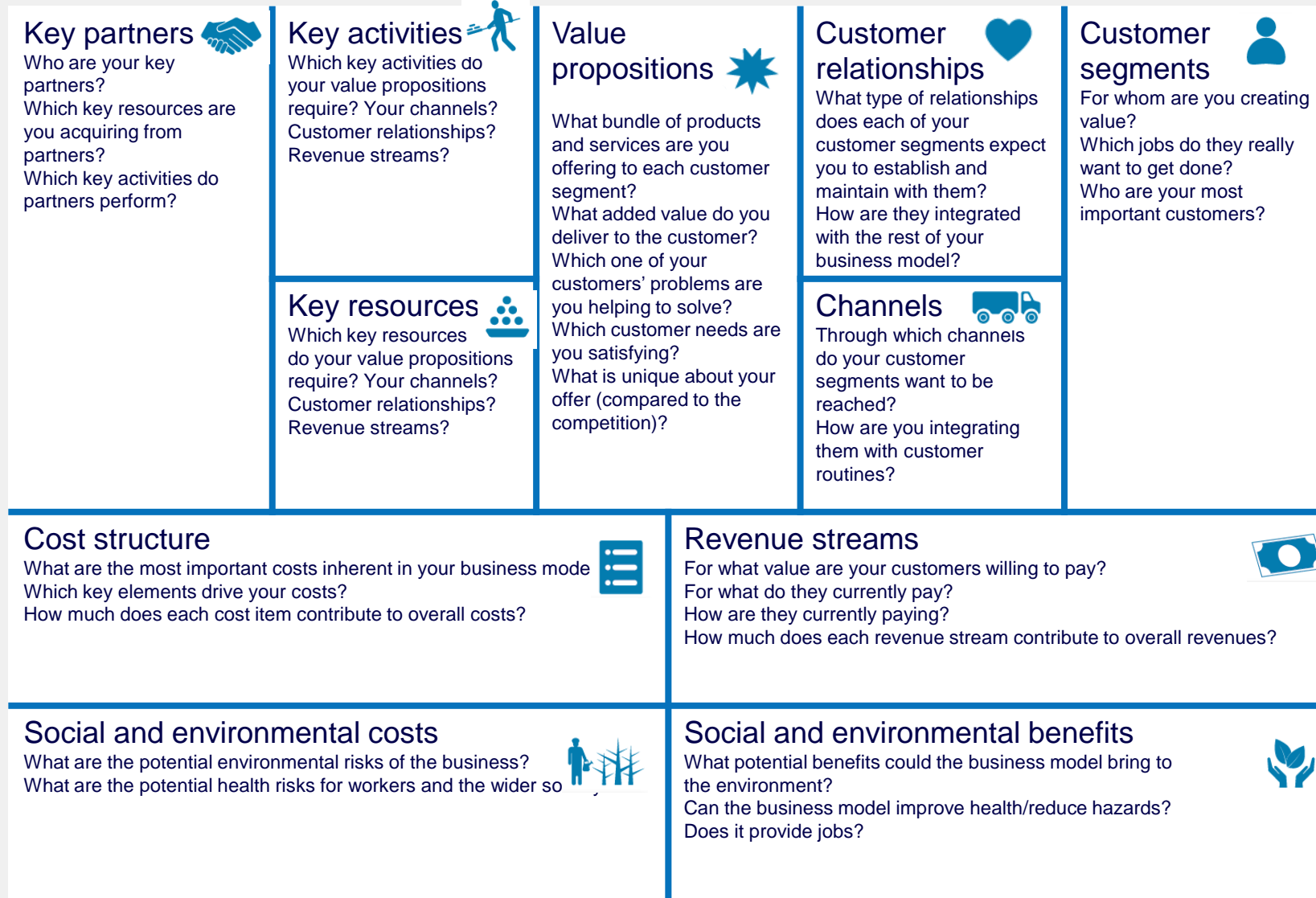
Fecal Sludge Management



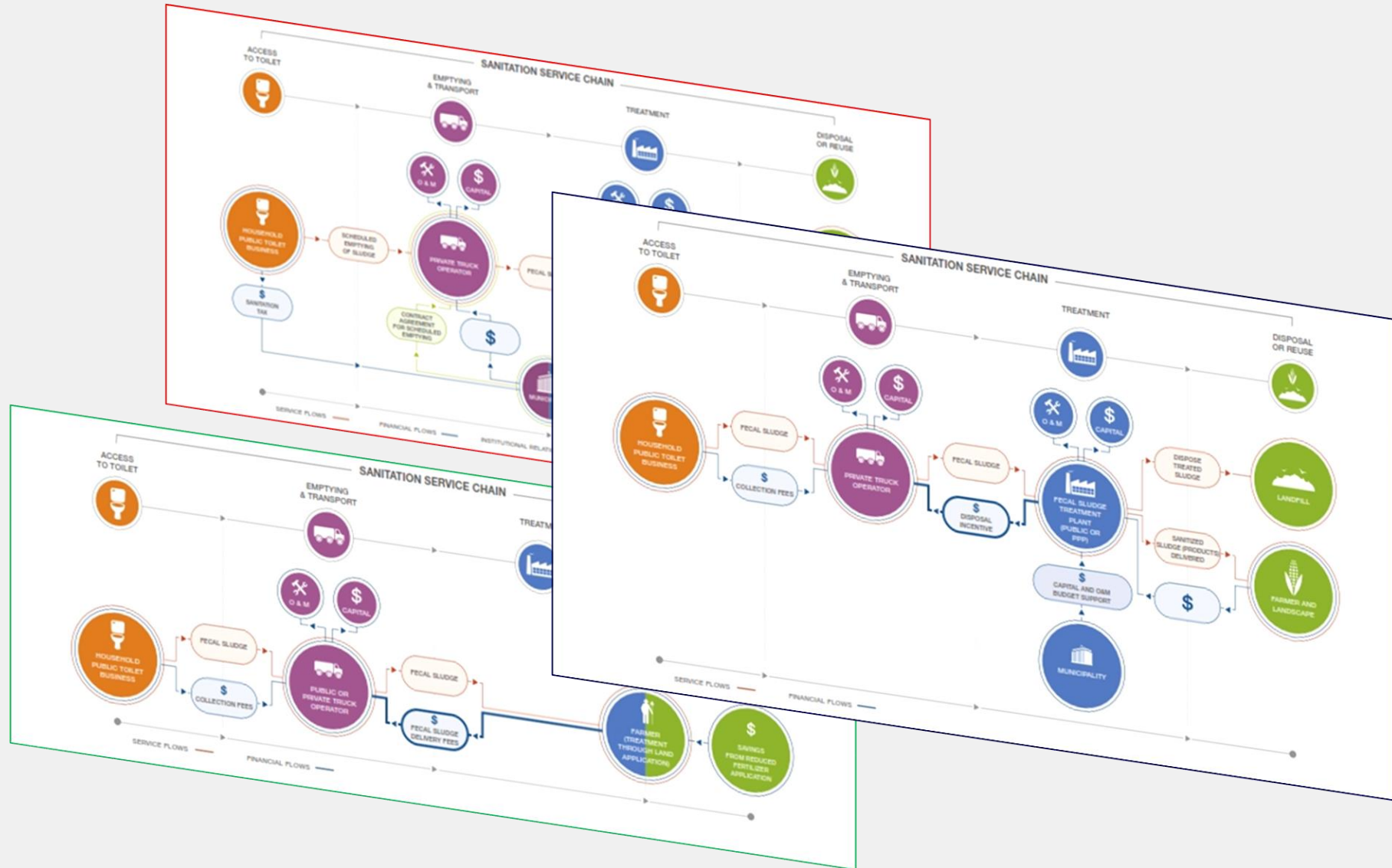
Access, Emptying, Transport and Treatment Model

■ “Business Model Canvas”

Extended business model canvas



Institutional linkages and partnership models – key to business analysis!

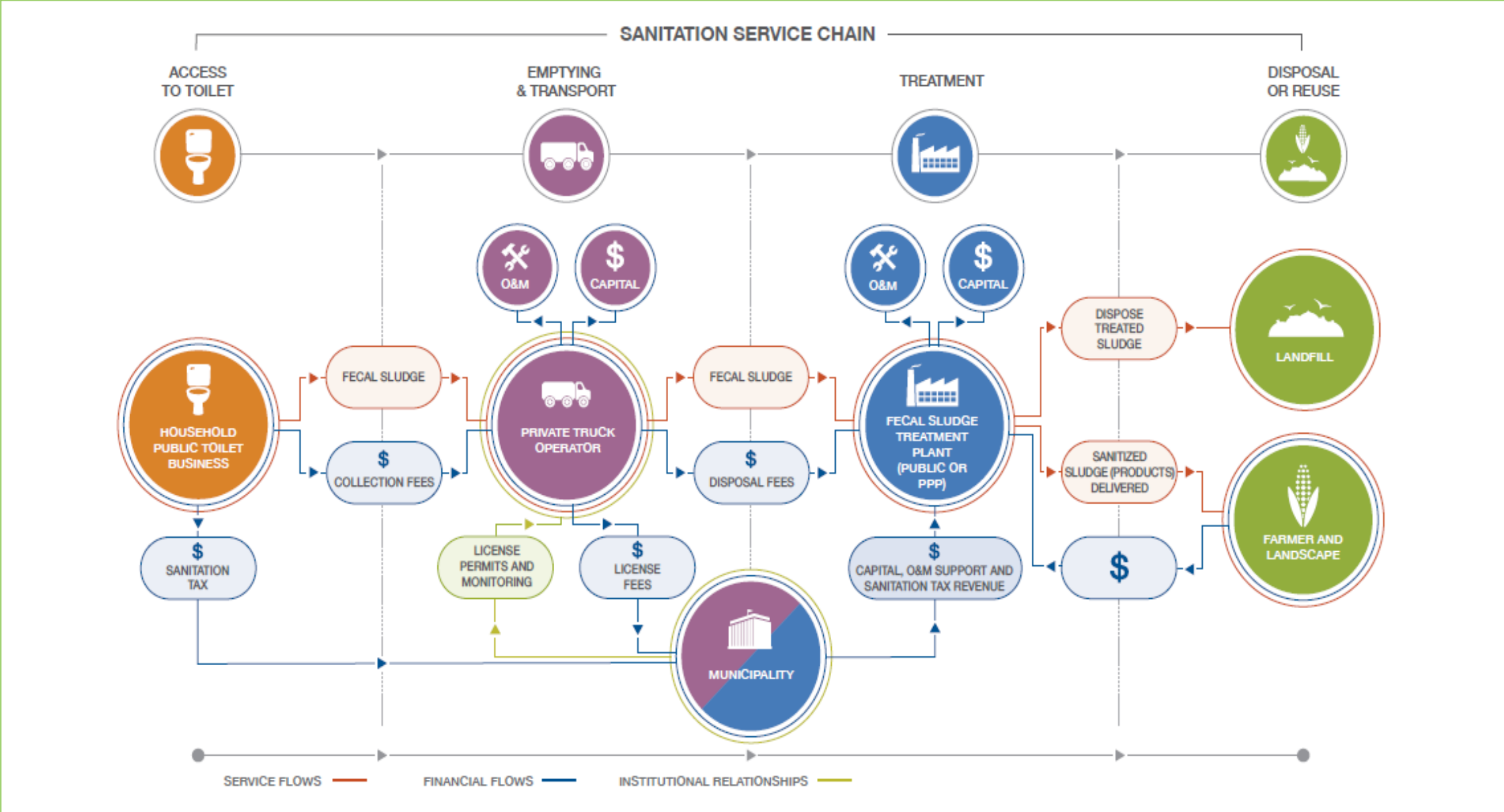


■ Elements of the Business Models for FSM

Description of the business model using the sanitation service chain to depict **key stakeholders** across each component of the chain, and the **mode of interaction** between these stakeholders.

- ♻️ **Service flow:** depicts the type of service rendered by one stakeholder to another.
- ♻️ **Financial flow:** indicates the (contractually agreed) exchange of money between the stakeholders. Typically, a service rendered has a corresponding financial transaction.
- ♻️ **Institutional relationships:** Typically, it is a regulatory measure that influences the operations of the business model, for example, issuing license permits and monitoring to ensure regulatory compliance, issuing contracts, etc.

Common elements of the business model for FSM

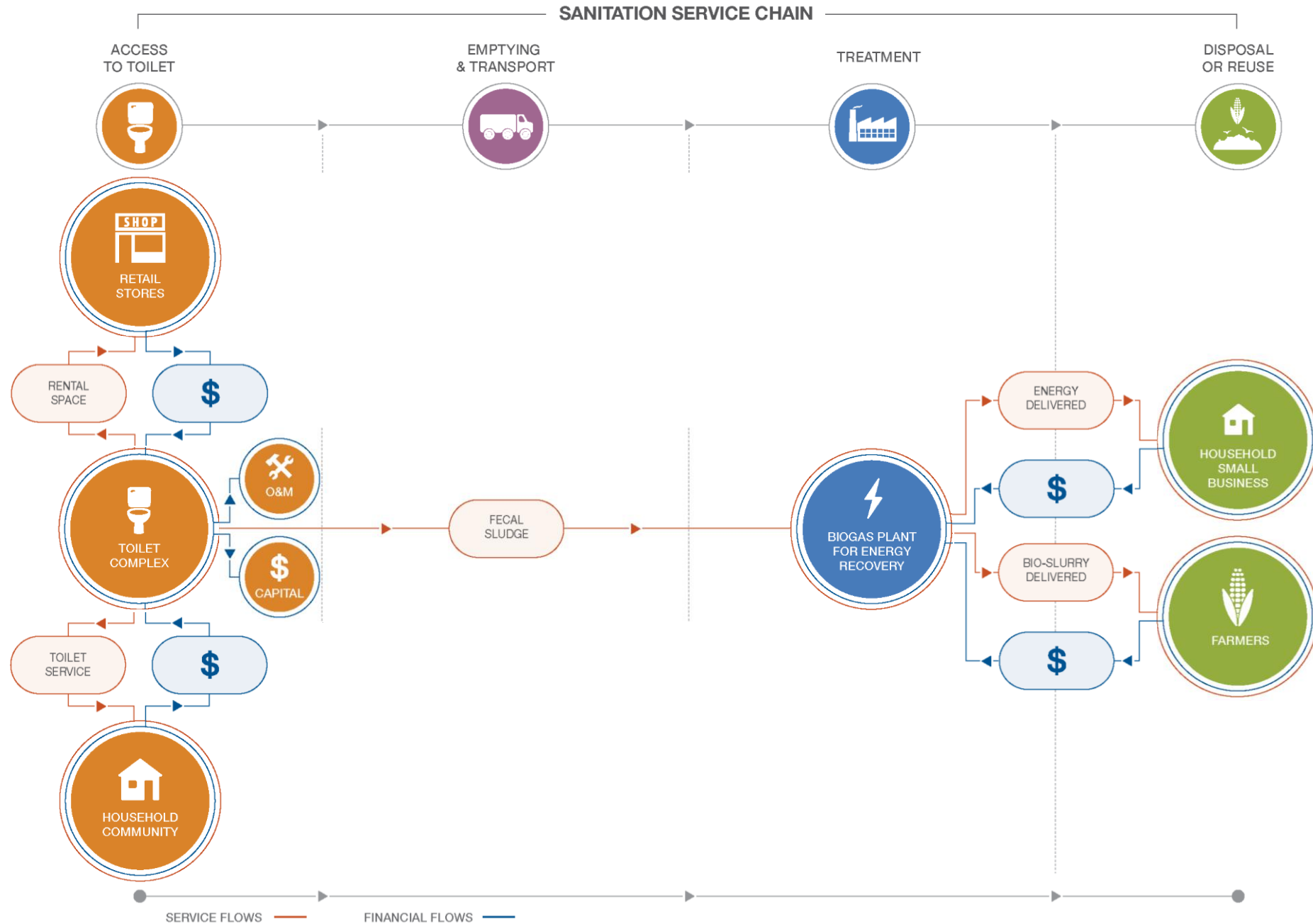


Business Model 1: Access to toilets

Case Examples from Kenya and India



1.1 Public Toilet with Energy Recovery Model



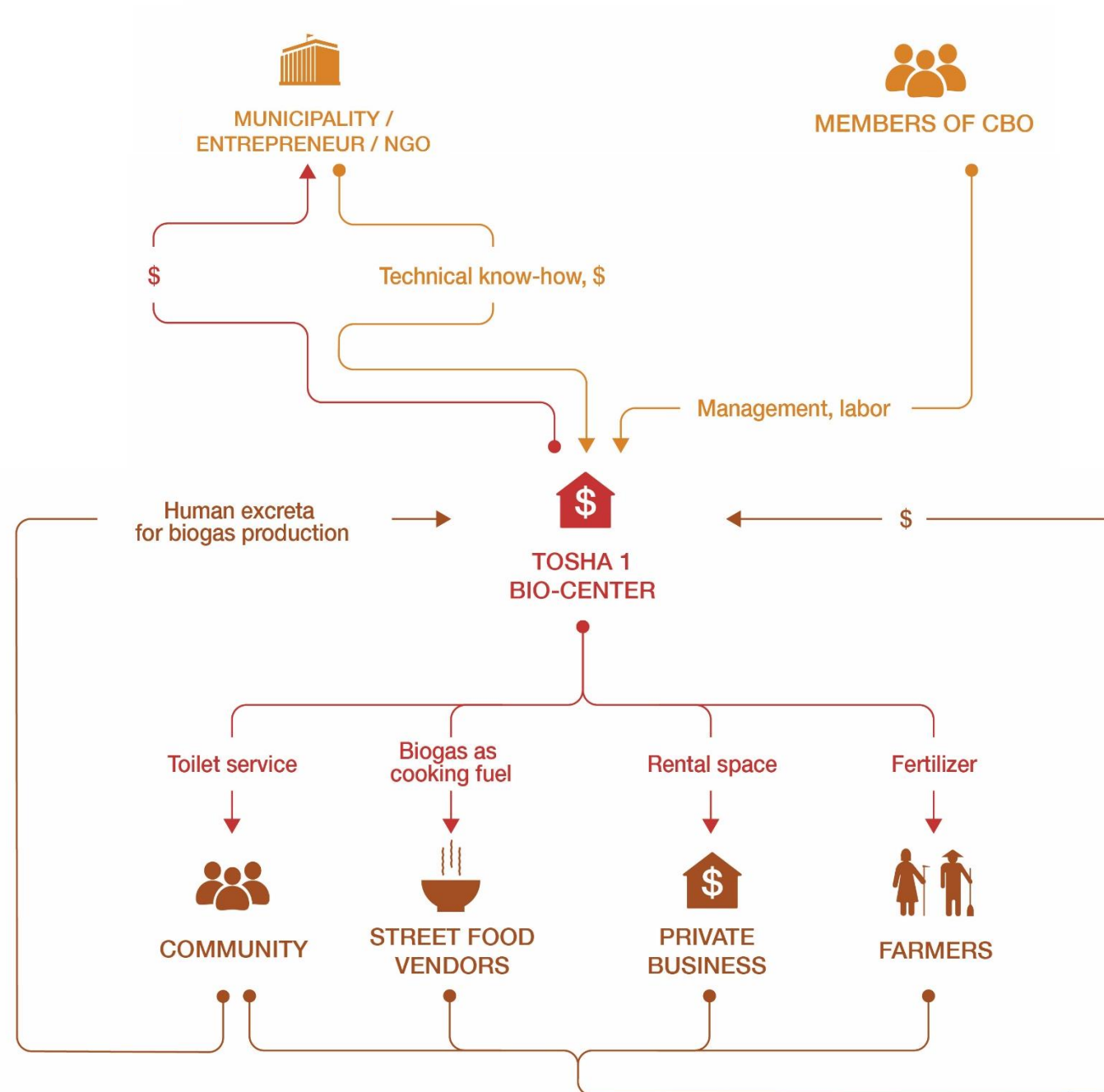
❖ Umande Trust, Kenya



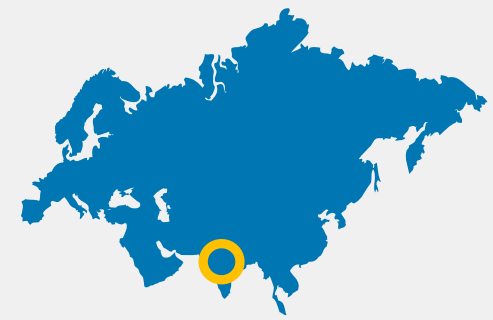
- Gap in sanitation value chain for **urban migrant community, low-income areas**.
- Umande Trust, civil society organization (CSO) runs 57 bio-centers (public toilets) across Nairobi's informal settlements with NWSC.
- **Mobilizes local communities** to form CBOs that operate and manage bio-centers.
- Provides technical **guidance** and appropriate training to the CBO to operate and manage.
- **Multi-revenue:** (1^o revenue source (88%) - toilet services, 2^o from rental space for shops, biogas treated FS); 1,000 daily users
- Construction cost = USD22,500, community mobilization, campaigns and training = USD10,000



Umande Trust Bio-center



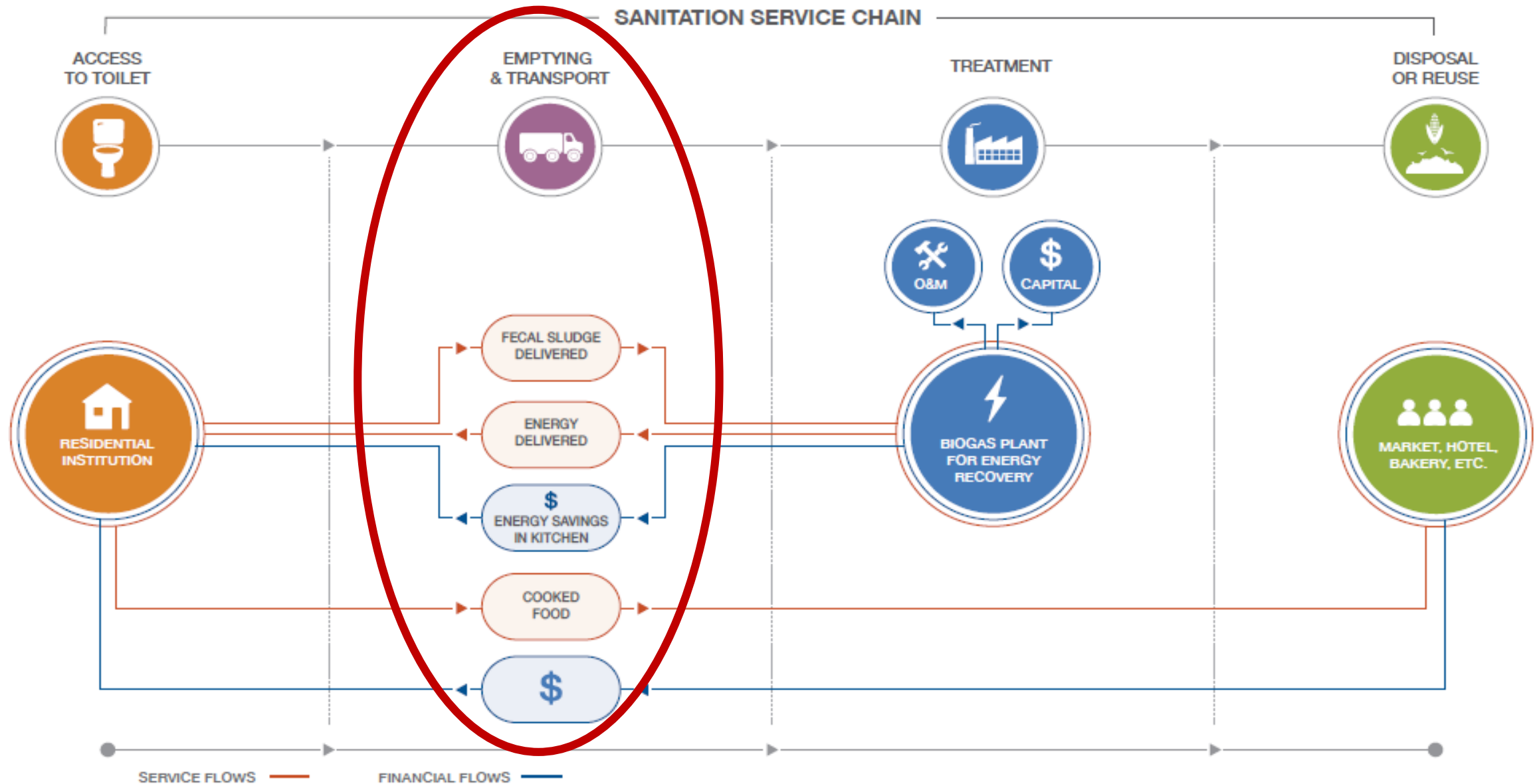
❖ Sulabh International Social Service Organization, India



- Gap in sanitation value chain for **low-income areas**.
- Sulabh (non-profit) built 7,500 public pay-and-use toilet complexes (200 linked to biogas systems).
- **Partnership with government for financing:** capital cost covered by central government, state government and local community at a ratio of 60:30:10.
- Toilet complex cost = USD 4,000. Sulabh charges 20% of total cost spent on consultation and implementation fees, maintains for a period of 30 years.
- Typical toilet complex = 2,000 users; annual revenue = USD10,800; operating costs USD10,320
- 50% of 7,500 toilets generate enough revenue to be **self-sustaining and profitable**.



1.2 Residential-institutional Biogas Model

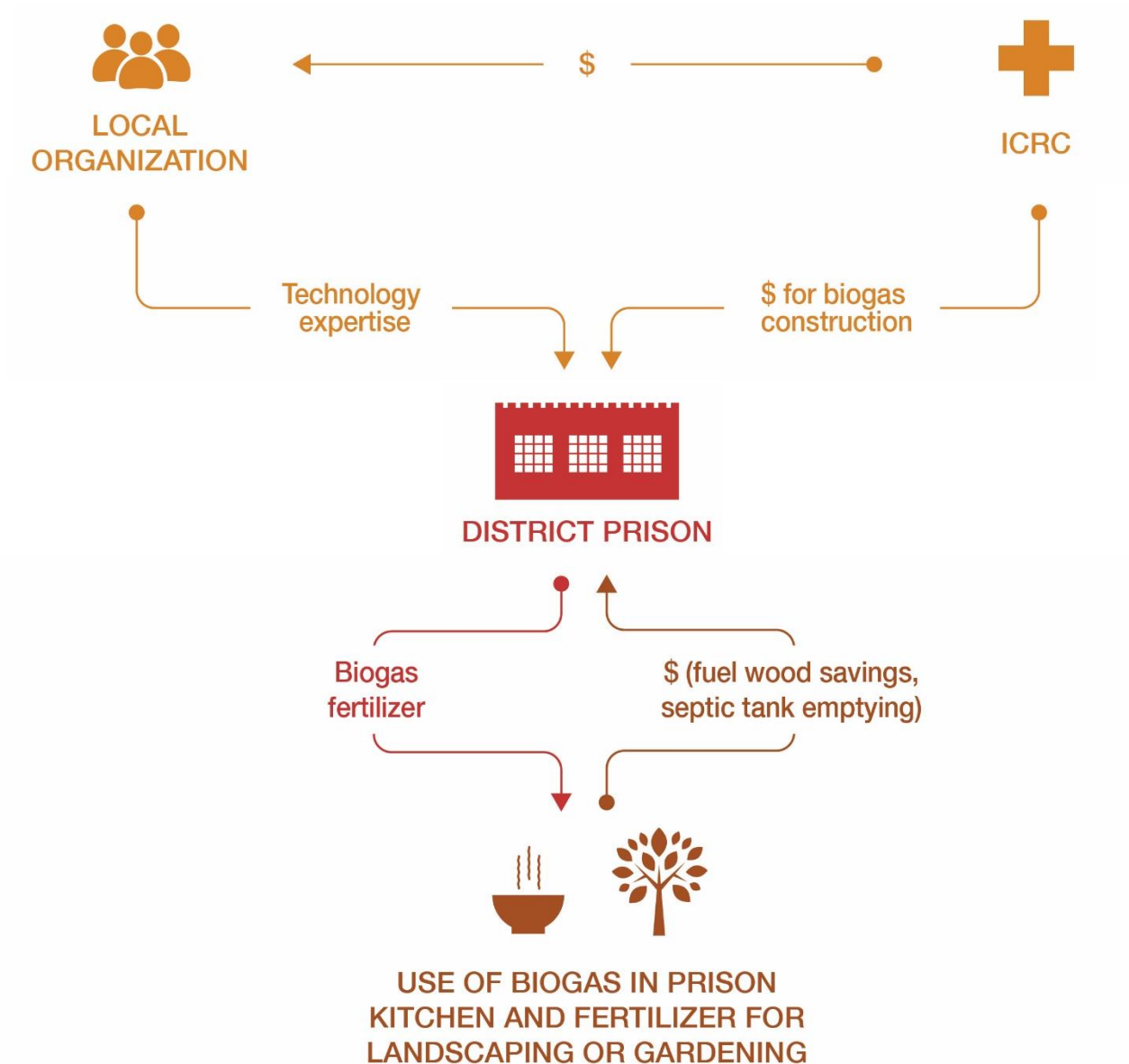


❖ ICRC – Prison biogas systems in Rwanda, Nepal, Philippines

- Gap in collection and treatment of waste in prisons (applicable to other large institutions).
- ICRC implemented institutional biogas sanitation systems across prisons in several countries
- Biogas systems consist of fixed dome digesters of varying sizes (from 10 to 500 m³) depending on number of detainees in prisons range from 100 to 5,000.
- Depending on size and region, capital cost ranges from USD13,000 -74,000.
- Average cost of a biogas plant in Philippines US\$ 230/ m³, Nepal 250/ m³, Rwanda 300/ m³.
- **O&M costs** are 2% of the total investment cost.
- Savings from biogas -reduced consumption of firewood: USD26-53/day Rwanda; Philippines - 5%, Nepal - 17% to 41%.



ICRC – Prison biogas systems in Rwanda, Nepal, Philippines

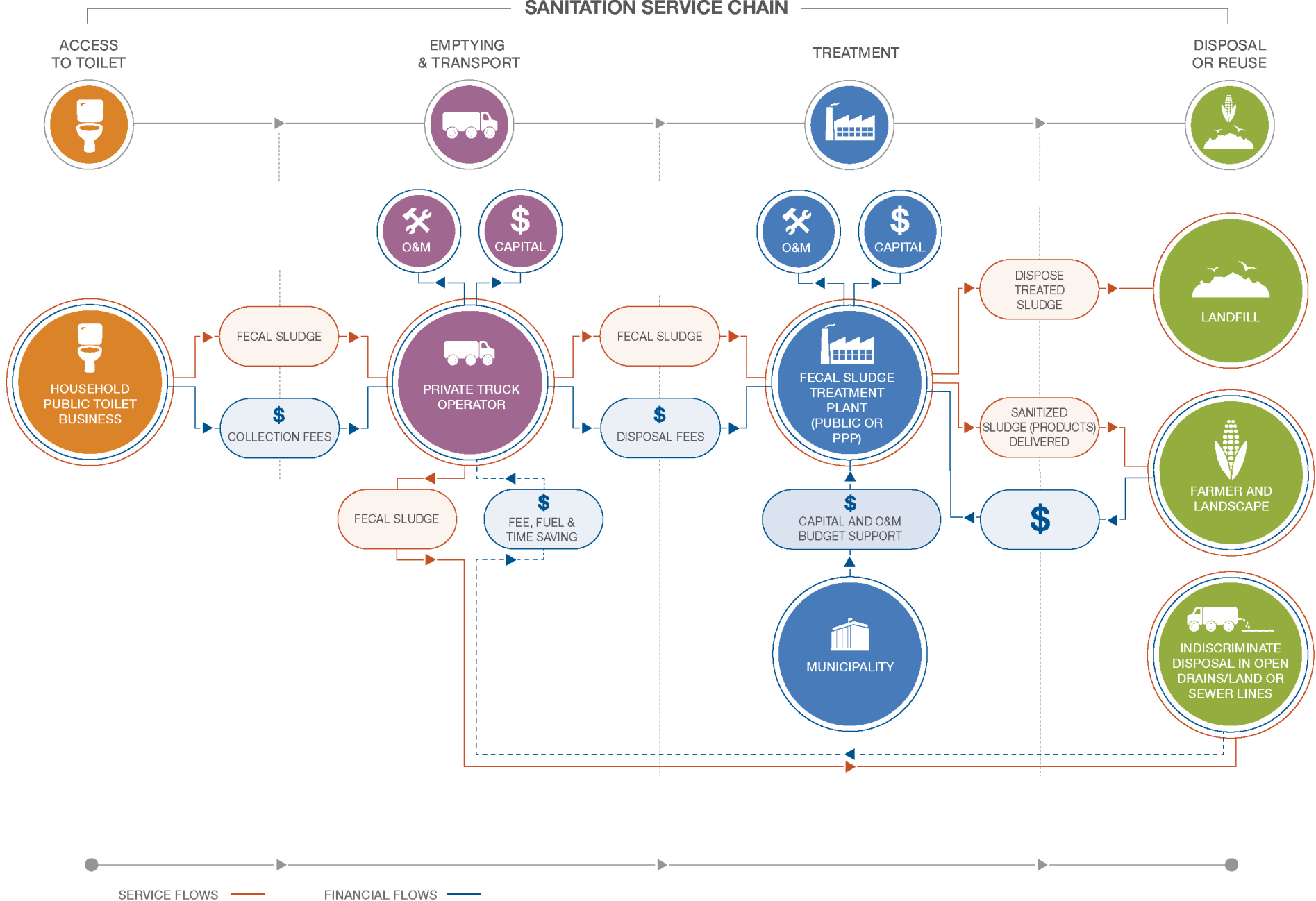


Business Model 2: Emptying & Transport Models

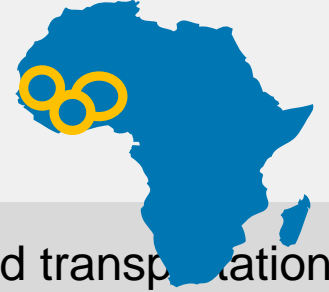
Case Examples from Africa and Asia



2.1 Typical Private Sector Emptying Model

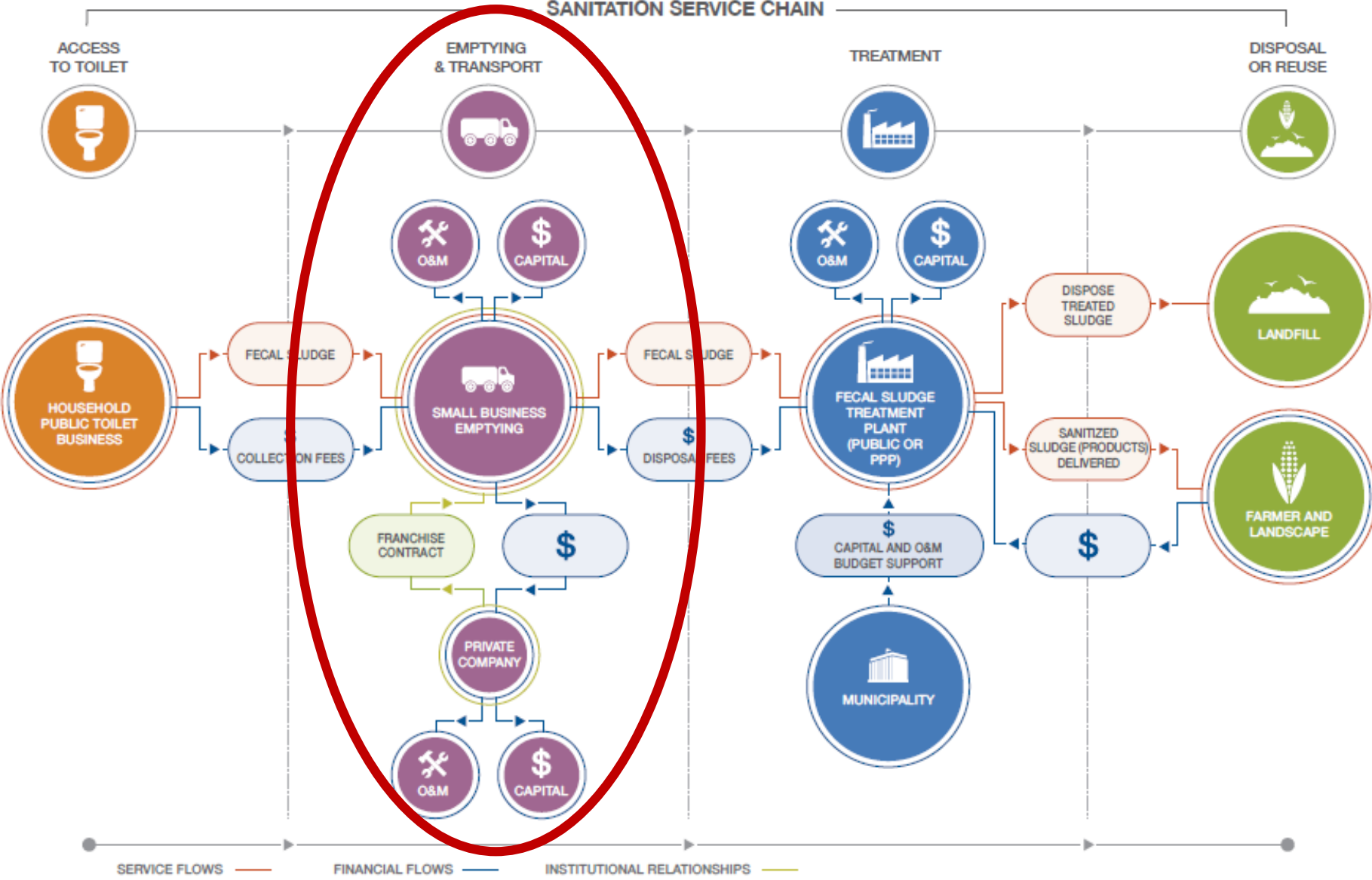


❖ Cases from Ghana, Benin, Senegal



- Gap in sanitation value chain for emptying and transportation, especially in **low-income areas**.
- **Private truck emptying associations**: lobby, demarcate geographical boundaries of operations, develop informal rules for truck operations, including fixing tariffs.
- **Accra, Ghana**: Cesspool Services Association, sets a tariff for emptying, monitors truck movements (times of entry to and exit from disposal sites) inform Waste Management Department; capacity to influence policy.
- **Cotonou, Benin**: Union des Structures de Vidange formed to monitor indiscriminate dumping, assist fellow truck operators, and engage with city authorities to regulate desludging tariffs
- **Dakar, Senegal**: Association of Senegalese Sanitation Workers (47 companies and 200 trucks) centralizes resources, register and map domestic sanitation, consumer database, map desludging services, manage fecal sludge. ONAS engages the association to monitor FS emptying, planning of treatment plants, and call center operations

2.2 Private Sector Emptying and Transport Franchise Model



❖ Amanz' abantu Services Ltd, South Africa

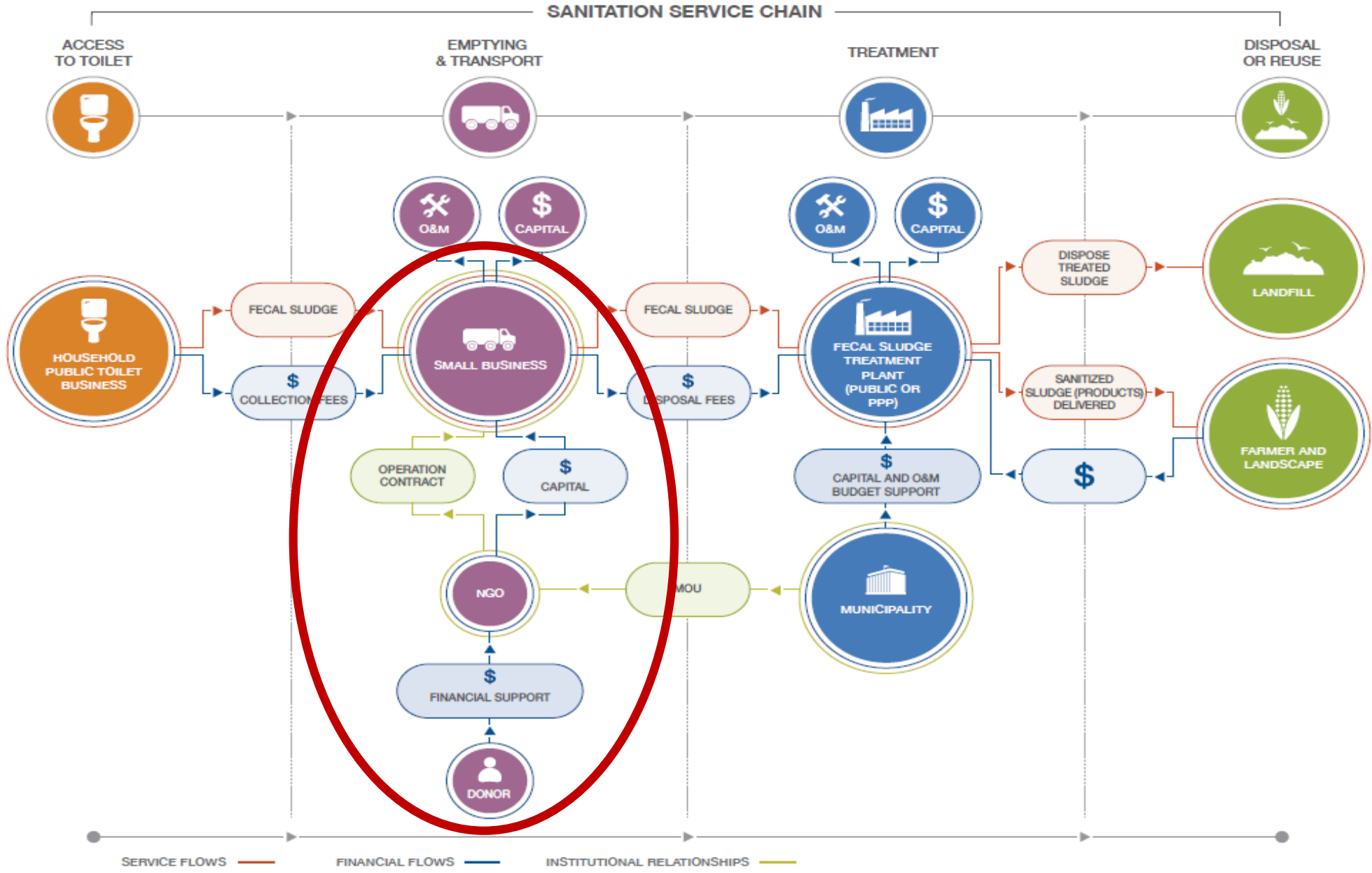


- Gap in sanitation value chain for emptying and transportation, especially in **low-income areas**.
- Subsidiary – Impilo Yabantu Services: is franchisor responsible for manual emptying of pit latrines from 1,300 schools and 4,000 households.
- Micro-entrepreneurs trained and contracted as franchisees.
- **Services provided by franchisees:** (i) cleaning sanitation facilities, education and awareness-raising on hygiene among the community; and (ii) emptying pits and septic tanks.
- **Payment:** % of revenues & system loyalty (brand name franchisor)
- **Franchisor support** functions: management, administration, marketing, procurement, operational support, safety, health and environment, and training (technical support to franchisees on appropriate methods for emptying latrines, servicing strategy).



Source: <https://www.aserve.co.za/>

2.3 Non-Profit Model



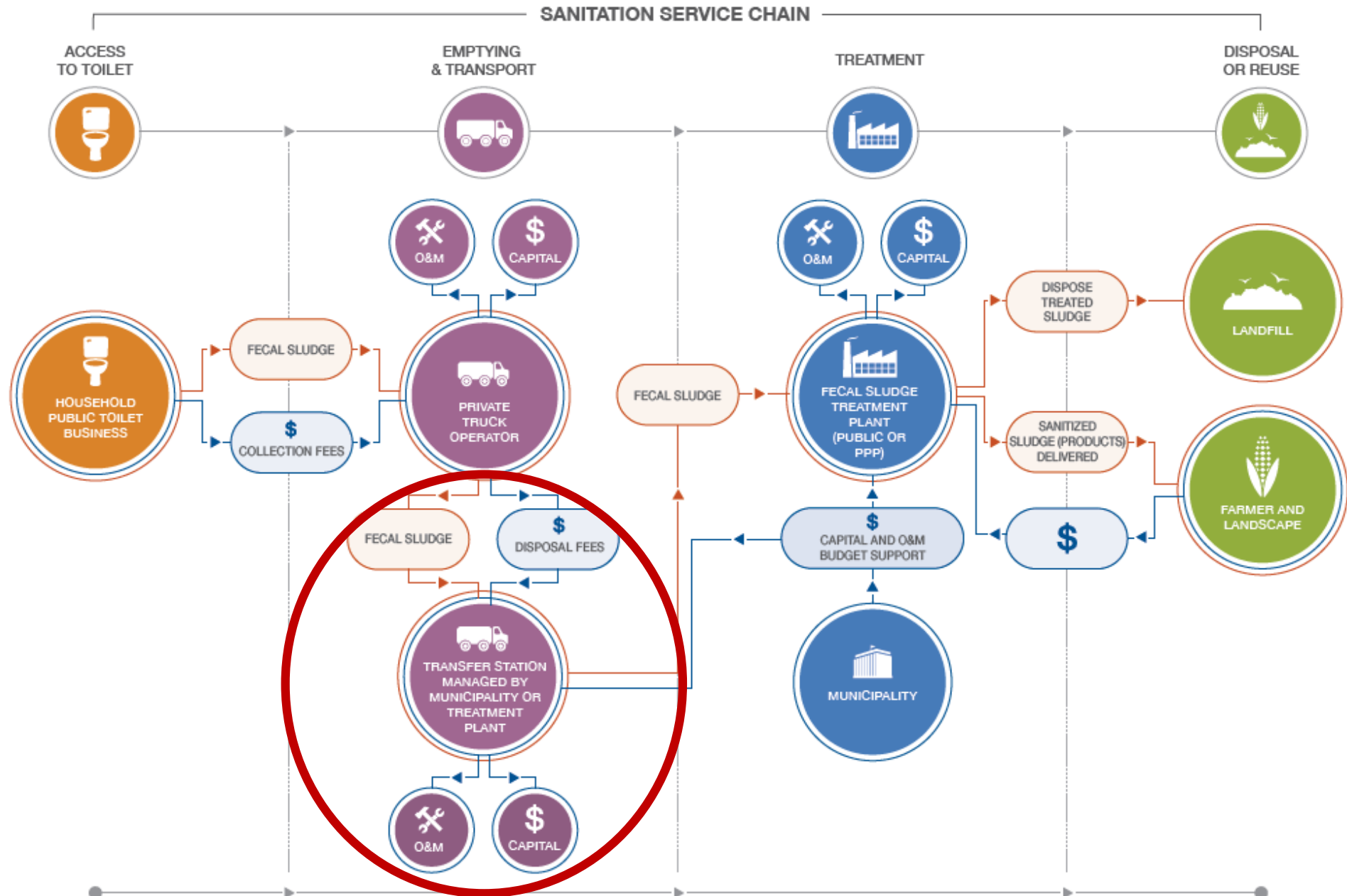
❖ WSUP & Uaiene Gama de Serviços de Maputo, Mozambique



- WSUP, developing commercially viable models to support water utilities and municipal authorities deliver improved water and sanitation services.
- **Partnership** with local private enterprise, Uaiene Gama de Serviços de Maputo (UGSM), for providing emptying services, based on existing market network.
- UGSM provides **primary refuse collection services to residents** in Maputo.
- WSUP provides hand-operated gulper pumps with a system of carts to transport waste to strategically stationed vacuum trucks operated by UGSM → treatment plant.
- WSUP provided US\$ 20,000 **interest free loan** to UGSM for equipment.
- UGSM charges US\$ 20 -60 per emptying session



2.4 Transfer Station Model

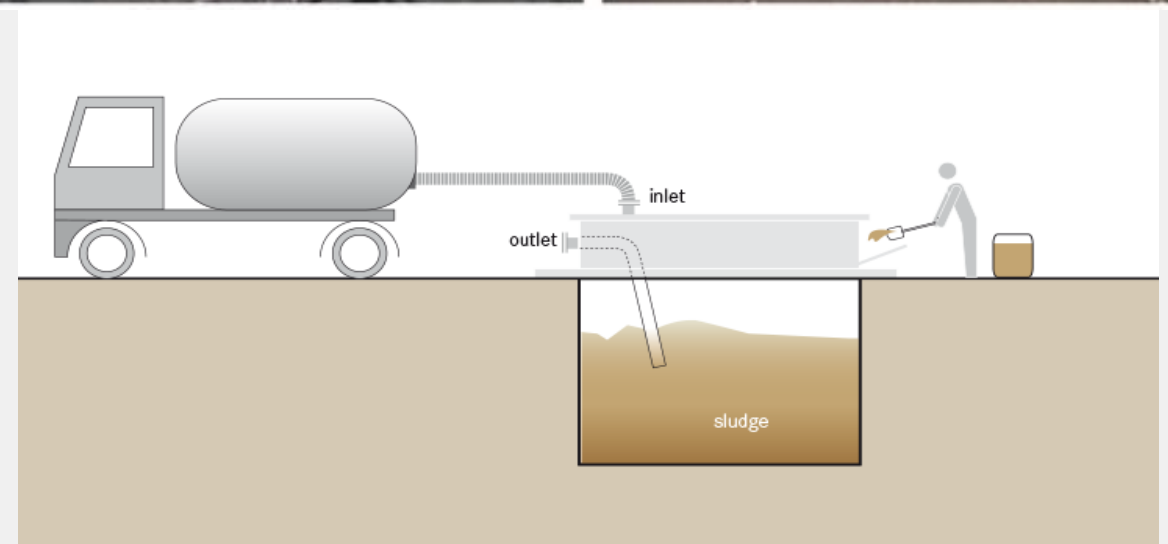


❖ Cases from Ghana* and Malaysia






Ghana:

- Accra Metropolitan Assembly (AMA) and Waste Management Department (WMD) installed 60 UHTs with a capacity of 23 m³ each to serve private emptying operators (contracted by WMD), who emptied on-site sanitation systems inaccessible to vacuum trucks.
- **Institutional challenge:** Limited engagement of informal manual emptying operators (illegal disposal of sludge into UHTs, resulting in increased frequency and cost of UHT cleaning.
- **Technology:** not user-friendly, especially when waste was drier (sludge from pit latrines), and when FS stored over relatively long periods resulted in siltation of the sludge. Sludge extraction infeasible, and operations became too expensive and time consuming.







■ List of references

-  RAO, K., KVARNSTRÖM, E., DI MARIO, L., DRECHSEL, P. (2016). *Business models for fecal sludge management*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 80p. (Resource Recovery and Reuse Series 6).
-  Unless otherwise noted, all images from IWMI flickr library www.flickr.com/photos/iwmi/
-  Unless otherwise noted, all graphics and case studies from RAO, K., KVARNSTRÖM, E., DI MARIO, L., DRECHSEL, P. (2016). *Business models for fecal sludge management*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 80p. (Resource Recovery and Reuse Series 6).

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