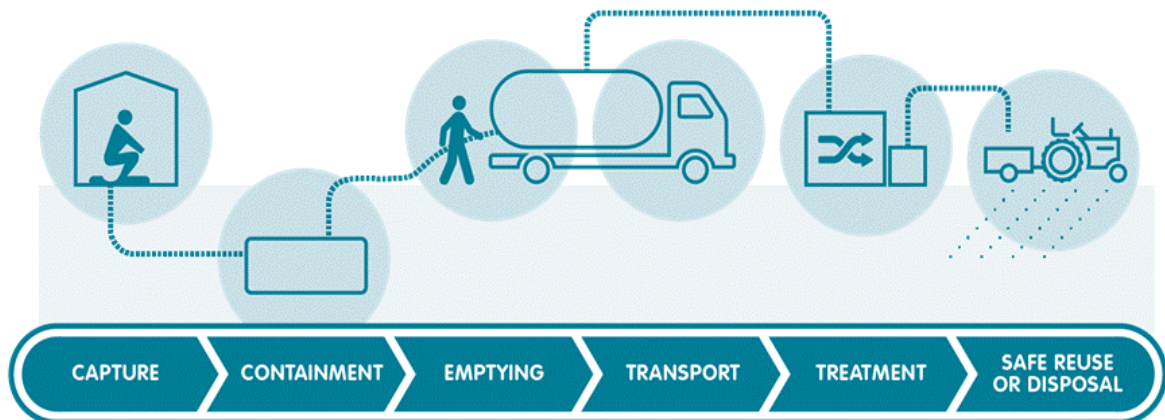




Eastern and Southern Africa Water and Sanitation
Regulators Association

Guidelines for Citywide Inclusive Sanitation (CWIS) Planning



March 2020

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Abbreviations and Acronyms

AMCOW	African Ministers' Council on Water
AREEN	Autorité de Régulation des secteurs de l'Eau potable et de l'Energie (Burundi)
AURA	Autoridade Reguladora de Águas, Instituto Público (Mozambique)
CSOs	Civil Society Organisations
CWIS	Citywide Inclusive Sanitation
DA	Development Assistance
ESAWAS	Eastern and Southern African Water and Sanitation Regulators Association
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
FSM	Feecal Sludge Management
FSTP	Feecal Sludge Treatment Plant
GIS	Geographical Information System
LEWA	Lesotho Electricity and Water Authority (Lesotho)
LICs	Low Income Communities
NWASCO	National Water Supply and Sanitation Council (Zambia)
OECD	Organisation for Economic Cooperation and Development
PPP	Public Private Partnership
RURA	Rwanda Utility Regulatory Authority
SDGs	Sustainable Development Goals
SFD	Shit Flow Diagram
UN	United Nations
WASAMA	Water Services Association (Malawi)
WASREB	Water Services Regulatory Board (Kenya)
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation
WWTP	Waste Water Treatment Plant
WURD	Water Utility Regulation Department (Uganda)
ZURA	Zanzibar Utilities Regulatory Authority (Zanzibar)

1. INTRODUCTION

1.1 Background

The Eastern and Southern African Water and Sanitation (ESAWAS) Regulators Association is a network of water supply and sanitation (WSS) regulators, formed in 2007 to enhance the regulatory capacity of members to deliver quality and effective regulation to achieve public policy objectives through cooperation and mutual assistance.

The regulators have generally been mandated to undertake both economic and technical regulation of WSS service provision to ensure efficient, affordable, reliable and quality service while balancing the commercial interest (sustainability) with that of social consideration (affordability).

The attainment of SDG6 'Ensure availability and sustainable management of water and sanitation for all' is a key target for all water supply and sanitation regulators. 'Sanitation is defined as access to and use of facilities and services for the safe disposal of human urine and faeces.' (WHO Guidelines on Sanitation and Health, 2018). Achieving the 2030 SDG target of safely managed sanitation requires an inclusive urban sanitation approach that combines regulation of both sewerage and non-sewerage sanitation service provision.

Recognizing that the largest proportion of the population in the urban areas of the member countries depend on non-sewerage sanitation, ESAWAS has developed a Regulatory Framework and Strategy for inclusive urban sanitation service provision incorporating non-sewerage sanitation services that specifies regulatory touch points along the entire service chain of non-sewerage sanitation. This means that all links of the sanitation chain need to be operated and managed sustainably to ensure continued service provision that protects both public health and the environment.

To achieve safely managed sanitation services requires a **Citywide Inclusive Sanitation (CWIS)** approach to urban sanitation that involves collaboration among many actors to ensure that everyone benefits from adequate sanitation service delivery outcomes.

Citywide inclusive sanitation aims to help cities develop comprehensive approaches to sanitation improvement and means that: human waste is safely managed along the whole sanitation service chain; effective resource recovery and re-use are considered; a diversity of technical solutions is embraced for adaptive, mixed and incremental approaches; and onsite and sewerage solutions are combined, in either centralized or decentralized systems, to better respond to the realities found in developing country cities.

These guidelines provide guidance on how CWIS can be implemented at country level.

1.2 Objective of the guidelines

The aim of these guidelines is to provide guidance for citywide inclusive sanitation planning that encompasses long-term planning, technical innovation, institutional reforms and financial mobilisation. Specifically, these guidelines:

- i. Outline the basic elements for the preparation of the sanitation business model;
- ii. Specify the basic elements of the sanitation business plan;
- iii. Specify the basic elements of the sanitation investment plan;
- iv. Identify financing options for the sanitation business;
- v. Propose criteria for selecting appropriate technologies that are suitable for users and relevant to local conditions;
- vi. Outline incentives and opportunities for the private sector participation in the development and operation of sanitation services;
- vii. Outline key tools and information required for short, mid and long-term planning,
- viii. Provide guidance on engagement, collaboration, responsibilities and coordination of key stakeholders along the sanitation chain; and
- ix. Provide guidance on addressing gender, culture, disability, and social inclusion along the sanitation chain.

1.3 Targeted audience

These guidelines will mainly be used by:

- Policy makers/ Line Ministries;
- Local government: City-, town-, county- planners, experts, etc.
- Decision-makers;
- Private sector;
- Service Providers;
- Regulators;
- NGOs;
- Consultants, and
- Any relevant stakeholders in the sanitation sector.

1.4 Citywide Inclusive Sanitation ¹

Citywide Inclusive Sanitation (CWIS) is a public service approach to planning and implementing urban sanitation systems to achieve outcomes summarised by Sustainable Development Goal 6: safe, adequate, equitable, and sustainable sanitation for everyone in an urban area, paying special attention to the needs of the poor, the marginalized, and women and girls.

¹ Citywide Inclusive Sanitation: An Urban Sanitation Service Framework for Sustainable Development Goal 6, Bill and Melinda Gates Foundation

To advance and sustain SDG outcomes at a meaningful scale, all CWIS systems must demonstrate three core functions:

- A responsible authority (ies) is executing a public mandate for inclusive urban service delivery;
- The authority(ies) is accountable for performance against its mandate;
- Resource management and planning reflect authority mandates, priorities and performance accountability.

A public services approach to urban sanitation acknowledges the market failures inherent to urban sanitation systems. This approach does not preclude, but rather improves, private sector incentives to expand investments and stimulate innovations along all stages of the sanitation service chain.

CWIS focuses on outcomes rather than specific system designs, so sanitation authorities may and must consider the range of possible technologies, services and business models.

Clear roles, responsibilities, relationships and data-driven management information systems are requisite. These are required for meaningful collaborations among relevant stakeholders including national and-city-level leaders, the private sector, development professionals and donors, communities and of course, customers.

Formalising service delivery systems helps stakeholders share responsibilities and accountability at all levels in pursuit of SDG6 outcomes.

To accelerate progress toward target outcomes, CWIS reimagines many traditional approaches. Pursuit of CWIS outcomes (equity, safety and sustainability) provides guidance for cities to consider decentralized sanitation approaches such as non-sewered sanitation (NSS), fecal sludge management (FSM) and new sanitation technologies and market models, along with conventional systems, based on cities' needs and resources.

With its focus on equity, a CWIS approach challenges investment and service delivery norms that excluded many communities and marginalized groups from safe sanitation facilities and services. CWIS includes their interests and voices as core objectives of and resources for planning, design, and implementation of services.

1.4.1 Factors affecting Citywide Inclusive Sanitation

There are three main factors affecting effective urban planning: - rapid population growth in cities, poor sanitation facilities and poor infrastructure planning.

1.4.1.1. Rapid population growth in cities

Most of the world's population now lives in urban areas, and in developing regions the proportion living in cities and towns has risen from 35 percent in 1990 to 45 percent in 2010 from 1.4 billion to 2.5 billion people (Jacobsen et al. 2012) and predictions show that about 70% of the world's population will be urbanised by 2050, with an additional 2.25 billion people from the developing world across Asia, Africa and Latin America living in cities.²

UN-Habitat estimates that just under 40 percent of urban dwellers live in slums, a number that is growing by more than 20 million per year (Baker 2008). In addition, the African Ministers' Council on Water (AMCOW) Country Status Overviews estimated that 150 to 180 million urban dwellers in Africa, mostly living in rapidly growing informal settlements, lack sanitation, and most do not own their land and/or houses, and lack incentives to invest in sanitation (WSP 2009).³

Specifically, in ESAWAS Member countries, more than 28.43% of the population currently lives in urban areas, and it is predicted that it will increase up to 45.45 % by 2050.

As a result of this rising populations and increasing migration, ESAWAS' Member cities (like other cities) will be more overpopulated and low-income communities (LICs) will become more featured in the urban life, with provision of basic sanitation facilities a challenge, and may be worse if nothing is done along the whole sanitation service chain.

1.4.1.2 Poor sanitation facilities

With neighbourhoods and public spaces turning into open sewers, many cities struggle to manage human waste. With the 60 million new residents moving to urban areas every year, one in four lives in low-income communities, amounting to 1 billion people with inadequate housing, limited access to basic services and usually lacking land tenure security. As a result, urban population growth dramatically outpaces gains in access to safe sanitation. Only 37% of urban excreta are safely managed globally.⁴ And evidence shows that even where piped water networks exist, sewerage and septic tank connections lag far behind. The majority of the population therefore relies on non-sewered sanitation, with many households sharing one toilet.

² <https://www.eawag.ch/en/departement/sandec/projects/sesp/citywide-inclusive-sanitation-cwis/>

³ WSP: Poor-Inclusive Urban Sanitation: An Overview, Peter H. et al; 2013

⁴ CWIS, Call to action

Pit latrines are unlined, filled with solid wastes, and hard to access for emptying services thus leading to unhygienic conditions and posing health and environmental risks for the people. This mainly results in environmental degradation and public health impacts, leading to high child mortality and morbidity, poor school attendance and performance, especially for girls, and low productivity. They also contribute to the vicious cycle affecting the delivery of other key urban services such as housing, potable water, solid waste and drainage. All these factors ultimately limit economic growth, urban development and city competitiveness.

Non-sewered systems should be given priority particularly in inaccessible areas and coupled with sewered systems whenever applicable; in addition, solid waste management infrastructures should not be left behind if we are thinking of a sustainable urban sanitation development.

1.4.1.3 Poor infrastructure planning

Normally, urban sanitation primarily focuses on centralised/conventional infrastructure, which only benefits a small percentage of the population. It fails to shift political priorities, funding allocations, institutional coordination, as well as the planning, design and management practices needed to achieve services for all. It fails to consider the trade-offs between sanitation investments and doesn't consider incrementalism. In those cases, drainage systems, open rivers and streams become the next dumping sites for non-sewered areas especially in slums; causing environmental degradation and pollution.

Acknowledging the importance of urban sanitation and its intrinsic link to appropriate land use planning and the need for affordable housing is fundamental in the transformation of cities becoming clean, liveable and productive.

1.4.2. Citywide Inclusive Sanitation principles

Addressing the urban sanitation challenge with a public service, CWIS framework requires a shift in our common understanding of what is needed and what is achievable. The following Seven Principles suggest a vision and direction for CWIS implementation:

- i. Everyone in an urban area, including the urban poor, benefits from equitable safe sanitation services***
 - Inclusive. Legal mandates are based on urban planning principles, without restrictions based on land tenure, hardware type, or local political boundaries. The needs of transient and permanent workers and downstream communities are met.
 - Equitable. Prices reflect service levels, affordability, availability, and legitimacy of public finance decoupled from hardware type or on-plot/off-plot siting. Subsidized finance prioritized for the poorest.
 - Safe. Users' waste is safely managed, and communities are free of others' waste.

ii. Gender and social equity are designed into planning, management, monitoring

- Those who are marginalized, women and girls and those without formal land tenure or access to sewers, are intentionally engaged in decision making.
- Users' and workers' needs, values, constraints, and voices are understood and incorporated into hiring, service delivery planning, and service delivery.
- Workers' health and rights are protected by occupational health and safety measures.

iii. Human waste is safely managed along sanitation service chain, starting with containment

- Infrastructure and service delivery systems protect workers, households, communities at all stages from containment through disposal/reuse.
- Containment and connections are managed to protect groundwater and environmental health.
- Hardware investments and service models position resource recovery as a tool to incentivize safe waste management.

iv. Authorities operate with a clear, inclusive mandate, performance targets, resources, and accountability

- Mandate for urban sanitation is clearly defined and assigned to service authorit(ies) without overlap, explicitly prioritizing serving the poor and captured in key performance indicators.
- Authorit(ies) have performance indicators and meet data-informed progressive targets.
- Service authority performance targets are monitored and tied to regulatory penalties and incentives.
- Financing and revenue opportunities are designed to sufficiently support implementation of mandates.

v. Authorities deploy a range of funding, business, and hardware approaches—sewered / non-sewered—to meet goals

- Sanitation service mandates are technology agnostic; planning and investments support incremental and integrated systems that prioritise resources for achieving safety, inclusivity, and sustainability;
- Service authorities deploy a range of business models to reach different customer segments within a city efficiently and equitably, including engaging the private sector to execute services when appropriate.

vi. Comprehensive long-term planning fosters demand for innovation and is informed by analysis of needs/resources

- Investment and finance decisions are based on activity-based accounting of costs and revenues and inclusive performance targets;
- Investment and planning are informed by climate change, water, and energy resource constraints;
- Performance incentives foster service authority capacity, responsiveness, and innovation;
- Investment planning and allocation processes are transparent and engage relevant stakeholders;
- Processes are coordinated with those of other urban investments and services, e.g. neighborhood upgrades, water services, storm and greywater management, and solid waste management.

vii. Political will and accountability systems incentivise service improvements in planning, capacity, and leadership

- Commitment to safe inclusive urban sanitation is demonstrated at multiple levels of government.
- Budget allocations and expenditures are transparent and based on equity and performance accountability.
- Accountability systems such as performance regulators are designed to be autonomous and independent and to empower voices of marginalized communities.
- Service authorities have support from politicians for effective institutional reforms, including tariff-setting and enforcement.

2. SANITATION BUSINESS MODEL DEVELOPMENT

2.1 Definition of a business model

Ref:
CWIS Principle 5

A business model is a conceptual structure that supports the viability of a product or company and explains how the company operates, makes money, and how it intends to achieve its goals. According to management guru Peter Drucker, 'a business model is supposed to answer who your customer is, what value you can create/add for the customer and how you can do that at reasonable costs'. Thus a business model defines how a business creates, delivers and captures 'value' – the benefit that customers receive by using a product or service.

Researchers on the best business model to be adopted, recommend the Business Canvas Model which has clearly defined what basic elements are required for a model to be sustainable under nine core blocks defined as follows:

- i. **Customer Segments:** defines the different groups of people or organisations an enterprise/utility aims to reach and serve. The Customer Segments can be broken down into sub-segments if their needs require and justify a distinct offer (e.g. they are reached through different channels, they require different types of relationships, they have substantially different profitability, or they are willing to pay for different aspects of the offer).
- ii. **Value Propositions:** represent the bundle of products and services that create value for a specific Customer Segment. The Value Propositions may be quantitative (e.g. price, speed of service) or qualitative (e.g. design, customer experience).
- iii. **Channels:** describe how a company/utility communicates with and reaches its Customer Segments to deliver their Value Proposition. Channels represent a company/utility's interface with its customers, and can include communication, distribution, and sales.
- iv. **Customer Relationships:** describe the types of relationships a company/utility establishes with specific Customer Segments, and can range from personal relationships to entirely automated interactions. The Customer Relationships are a key issue in determining the overall customer experience.
- v. **Revenue Streams:** describes how a company/utility will generate cash from each Customer Segment. The Revenue Stream has to take into account how much customers will be willing to pay for the value the company/utility delivers taking special consideration for the vulnerable. There are two basic types of revenue stream: revenues from one-time customer payments, and recurring revenues from on-going payments.
- vi. **Key Resources:** describes the most important assets within a company/utility that make a business model work. These generally include physical resources (e.g. buildings,

vehicles, etc.), intellectual resources (e.g. brands, partnerships, proprietary knowledge, etc.), human resources (e.g. employees), and financial resources (e.g. cash, lines of credit, etc.).

- vii. **Key Activities:** describe the most important things a company/utility must do to make its business model work. They can be activities to create and offer Value Propositions, reach markets, maintain Customer Relationships, and earn revenues. General categories for Key Activities include production, problem solving, and platform/networking.
- viii. **Key Partnerships:** The Key Partnerships describes the network of suppliers and partners that make a business model work. Partnerships are essential in most businesses to optimize their business models, reduce risk, or acquire resources. Partnerships can generally be categorized into: strategic alliances between non-competitors, strategic partnership between competitors, joint ventures to develop new businesses, and buyer-supplier relationships and more importantly with the community to be served especially in WSS services.
- ix. **Cost Structure:** The Cost Structure describes all costs incurred to operate a business model, for example in creating and delivering value, maintaining Customer Relationships, and generating revenue. Cost structures can be divided into fixed costs, variable costs, economies of scale, and economies of scope.

By mapping the activities of a sanitation business with the Business Model Canvas tool, one can find out exactly how sanitation businesses work, where they don't work well and how they could be improved and expanded to serve target markets. For example, using the Business Model Canvas, we can map the infrastructure required for Utilities to offer non-sewered sanitation services and understand the finances involved (costs and incomes). These can be compared to the efforts and profits Utilities make from their other offerings, such as new sewer connections.

Table 1 highlights basic elements to be considered in each section of the Business Model Canvas.

Table 1: Nine blocks Business Model Canvas

<p>KEY PARTNER</p> <ul style="list-style-type: none"> • Who are the key partners? • Who are the key suppliers? • Which key resource are we acquiring from partners? • Which key activities does the partner perform? <p>Motivation for partnership</p> <ol style="list-style-type: none"> 1. Optimization and economy; 2. Reduction of risks and uncertainty; 3. Acquisition of particular resources and activities. 	<p>KEY ACTIVITIES</p> <ul style="list-style-type: none"> • What key activities do our value propositions require? • Distribution channel • Customer relationship • Revenue streams <p>Categories</p> <ol style="list-style-type: none"> 1. Production 2. Problem solving 3. Platform/network 	<p>VALUE PROPOSITIONS</p> <ul style="list-style-type: none"> • What value do we deliver to the customer? • Which one's of our customer's problems are we helping to solve? • What bundles of products and services are we offering to each customer segment? • Which customer needs are we satisfying? <p>Characteristics</p> <ol style="list-style-type: none"> 1. Newness 2. Performance 3. Customization 4. Getting the job done 5. Design 6. Brand/status 7. Price 8. Cost reduction 9. Risk reduction 10. Accessibility 11. Convenience /usability 	<p>CUSTOMER RELATIONSHIP</p> <ul style="list-style-type: none"> • What type of relationship does each of our customer segments expect us to establish and maintain with them? • Which one have we established? • How are they integrated with the rest of our business model? • What are the requirements in terms of cost? <p>Examples</p> <ol style="list-style-type: none"> 1. Personal assistance 2. Dedicated personal assistance 3. Self service 4. Automated services 5. Communities 5. Co-creation <p>CHANNELS</p> <ul style="list-style-type: none"> • Through which channels do our customer segments want to be reached? • How are we reaching them now? • How are our channels integrated? • Which ones work best? • Which ones are most costly – efficient? • How are we integrating them with customer routines? 	<p>CUSTOMER SEGMENTS</p> <ul style="list-style-type: none"> • For whom are we creating value? • Who are our most important customers? <p>Categories</p> <ol style="list-style-type: none"> 1. Mass markets 2. Niche markets 3. Segmented 4. Diversified 5. Multi-sided Platform
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • What key resources do our value propositions require? • Distribution channel • Customer relationship • Revenue streams <p>Categories</p> <ol style="list-style-type: none"> 1. Physical 2. Intellectual (brand patents, copyrights, data) 3. Human 4. Financial 			

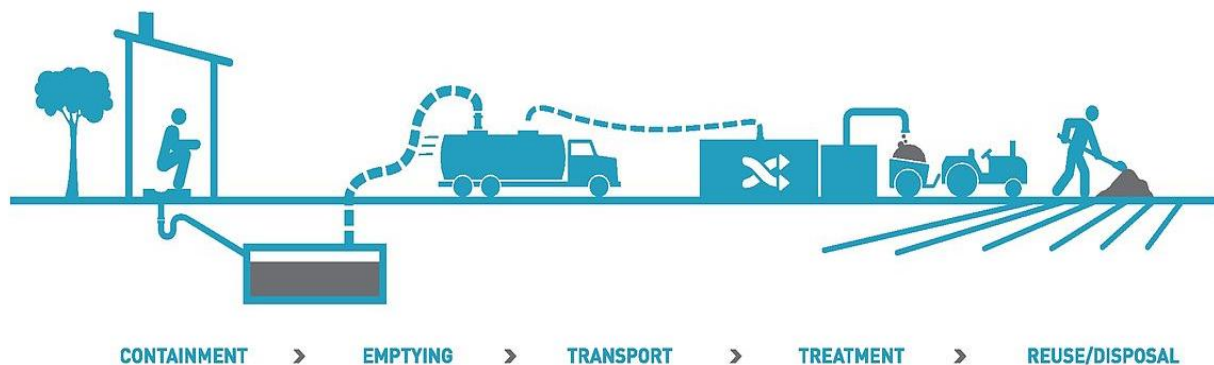
			<p>Channel phases</p> <p>1.Awareness How do we raise awareness about our company's products and services</p> <p>2.Evaluation How do we help customers evaluate our organization's value proposition</p> <p>3.Purchase How do we allow customers to purchase specific products and services?</p> <p>4.Delivery How do we deliver a value proposition to customers?</p> <p>5.After sales How do we provide post-purchase customer support?</p>																									
<p>COST STRUCTURE</p> <ul style="list-style-type: none"> • What are the most important costs inherent in our business model? • Which key resources are most expensive? • Which key activities are most expensive? <p>Is your business more</p> <p>1. <i>Cost driven (leanest cost structure, low price value proposition, maximum automation, extensive outsourcing)</i></p> <p>2. <i>Value driven (focused on value creation, premium value proposition)</i></p> <p>Sample characteristics</p> <ol style="list-style-type: none"> 1. <i>Fixed costs (salaries, rents, utilities)</i> 2. <i>Variable costs</i> 3. <i>Economies of scale</i> 4. <i>Economies of scope</i> 		<p>REVENUE STREAMS</p> <ul style="list-style-type: none"> • For what value are our customers really willing to pay? • For what do they currently pay? • How are they currently paying? • How would they prefer to pay? • How much does each Revenue Stream contribute to overall revenues? <table border="0" data-bbox="1016 1050 2065 1347"> <tr> <td>Types</td> <td>Fixed Pricing</td> <td>Dynamic Pricing</td> </tr> <tr> <td>1. Asset sale (bargaining)</td> <td>1. List price</td> <td>1. Negotiation</td> </tr> <tr> <td>2. Usage fee</td> <td>2. Product feature dependent</td> <td>2. Yield management</td> </tr> <tr> <td>3. Subscription fees</td> <td>3. Customer segment dependent</td> <td>3. Real-time-Market</td> </tr> <tr> <td>4. Lending/Renting/Leasing</td> <td>4. Volume dependent</td> <td></td> </tr> <tr> <td>5. Licensing</td> <td></td> <td></td> </tr> <tr> <td>6. Brokerage fees</td> <td></td> <td></td> </tr> <tr> <td>7. Advertising</td> <td></td> <td></td> </tr> </table>			Types	Fixed Pricing	Dynamic Pricing	1. Asset sale (bargaining)	1. List price	1. Negotiation	2. Usage fee	2. Product feature dependent	2. Yield management	3. Subscription fees	3. Customer segment dependent	3. Real-time-Market	4. Lending/Renting/Leasing	4. Volume dependent		5. Licensing			6. Brokerage fees			7. Advertising		
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2.2 Sanitation business model

Sanitation business models are defined as methods and strategies used to attain a specific goal in the sanitation sector for specific targeted people/community within a certain area using specific affordable technologies which are reliable, sustainable, financially affordable and environmentally friendly for the end users.

Specifically, pursuing the ESAWAS Regulatory Framework and Strategy, the sanitation business model can tackle any business in line with the sanitation service chain, as a stand-alone business or combination of one or more segments of the sanitation service chain.

Figure 1: Sanitation service chain



From the sanitation service chain, six main sanitation business models can be developed for sanitation services:

1. Capture and containment services;
2. Emptying and transportation services;
3. Treatment, reuse and disposal services;
4. Combination of emptying, transportation, treatment, reuse and disposal services and
5. Combination of the capture, containment, emptying, transportation, treatment, reuse and disposal services.
6. While for the sewerage sanitation services, a combination of conveyance, treatment, reuse and final disposal services is the major sanitation business model employed.

2.2.1 Capture and Containment services in non-sewered sanitation systems

The capture and containment business model in non-sewered sanitation services will mainly focus on innovation regarding facilities i.e. toilets. Based on the canvas business model, the following are basic elements the utility/company should look at:

Table 2: Capture and Containment services business model matrix

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, NGOs working in the same area, local government, researchers (in case it's a new technology) • Key suppliers: manufacturers who are offering the best option in terms of cost, technology and durability; basic construction materials if the facility has to be built from different materials • Key resources: construction materials to install the facility or if the facility has to be built from local materials (sand, cements, iron bars, etc...) • Key activities: <ul style="list-style-type: none"> ○ Construction, ○ Awareness campaign to sensitize the community on the new products, its costs & maintenance to ensure longevity and sustainability of the containment. 	<ul style="list-style-type: none"> • Feasibility study: (information on the community to be served now and at a certain horizon period, type of available facilities (toilets), its technical specification and costs (installation cost inclusive), Community acceptability of the offered facilities; water supply connection, problem related to sanitation: water related diseases occurrence (diarrhoea and malaria mainly), mortality of children under 5 years and causes), • Packaging, marketing, selling and installation of the products; • After sale services 	<ul style="list-style-type: none"> • The proposed facility should be local condition appropriate (durability, accessibility, affordability, sustainability, gender considerate) • Technological options suitable to consumer needs • Selling of different standardised toilet designs at different price points; • Installation and maintenance of the facilities; • Improvement of health due to the proposed containment (reduction of water related diseases, reduction/eradication of open defecation) • Inclusion of vulnerable people. 	<ul style="list-style-type: none"> • Communication platform (how can the community reach the service provider before and after the installation?) <ul style="list-style-type: none"> ○ Call centre? ○ Free line number? ○ Regular meeting? • Application and payment for services 	<ul style="list-style-type: none"> • Household, public and community toilet users without toilets or with poor quality toilets and containment facilities; • Community/city; • Vulnerable people inclusion: women, children, elderly and people with disability.
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Market research outcomes: analysis of what is on the market, information on community's preferences regarding facilities, purchasing power of the community, competitors and partners, suppliers and distributors, future market trends, etc. • Different manufacturer's products and choose the best products • Raw materials • Trained artisans 		<p>CHANNELS</p> <ul style="list-style-type: none"> • Marketing • Community awareness campaign on the facilities • Feedback of the community • Door-to-door sales • Communication • Research/innovation to improve on the proposed containment if necessary based on outcomes from the first product. • Monitoring and evaluation 	

COST STRUCTURE

- Capture and containment facility initial cost (packaging, branding cost inclusive)
- Installation cost
- Maintenance cost
- Marketing cost
- Communication cost (awareness cost, after sell communication cost)
- Replacement cost after x times
- Operating expenses (offices, salaries, insurance, etc...)

REVENUE STREAMS

- Capture and containment facility price
- Capital contributions
- Sanitation universal access charge/ levy/surcharge
- Incentives and subsidies
- Health improvement quantifications
- Environmental protections quantifications.

2.2.2 Emptying and transportation services in non-sewered sanitation systems

Emptying and transportation business model in non-sewered sanitation services will mainly focus on affordable tariff of the service, technology used and quality of service delivered (full emptying of the septic tanks/pit latrines). Based on canvas business model, the following are basic elements the utility/company should look at:

Table 3: Emptying and transportation services business model matrix

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, NGOs working in the same area, local government, financial institutions; faecal sludge treatment plant operators; • Key suppliers: sellers of emptying trucks or mechanical pumping units such as gulpers and vacuum pumps, Personal Protective Equipment (PPE) sellers; • Key resources: adequate personnel, training manuals, initial and O&M funds; • Key activities: <ul style="list-style-type: none"> ○ Tariff setting; ○ Emptying; ○ Transportation of faecal sludge; ○ Continuous trainings ○ Awareness campaign to sensitize the community on the emptying of filled pit latrines/septic tanks. 	<ul style="list-style-type: none"> • Feasibility study : analysis of what is on the market, information on community sanitation facilities (septic tanks, pit latrines, emptying frequency per family, tariff for emptying and transportation, purchasing power of the community, competitors, available technology and its cost (mechanized or manual), information on manual emptying practices and costs involved, etc..) • Evaluation of the available FSTP (infrastructure status, technology, end use of final products, tariff of faecal sludge disposal at the FSTP, Cost of final treated products) • Tariff settings with local community collaboration; • Purchase of emptying facilities : mechanized or manual depending on the local conditions (LICs for 	<ul style="list-style-type: none"> • The proposed emptying and transportation service should be consistent in terms of quality (removing all the sludge, availability and punctual). • Affordable tariff reflecting local purchasing power of the community; • Improvement of health due to the proposed emptying and transportation services (reduction of water related diseases, reduction of exposure and risks for manual unregulated emptiers); • Appropriate technology selection for the emptying and transportation facilities; • Provision of jobs for manual emptiers wherever applicable 	<ul style="list-style-type: none"> • Communication platform (how can the community reach the utility to get the service done?) <ul style="list-style-type: none"> ○ Call center? ○ Free line number? ○ Paid number? ○ Regular meeting for services evaluation. • Mobile payment of service fees 	<ul style="list-style-type: none"> • Septic tank users • Lined pit-latrines users

	<p>example)</p> <ul style="list-style-type: none"> • Installation of transfer stations; • Training of personnel on emptying and PPE requirements; • Marketing/communication with the community (call center, free line) • Emptying and transportation services; • After sale services 	<ul style="list-style-type: none"> • Community acceptability of services especially taking into consideration their purchasing power; • Leasing of trucks/equipment to community organisation for job creation • Inclusion of vulnerable people; 		
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Initial investments funds (O&M funds inclusive) • Continuous training facilities • Communication facilities with the community to get the service done (call centre, free line number...) 	<ul style="list-style-type: none"> • Ensuring trucks/pumps are always in good condition. • Environmental protection (dumping untreated sludge into the environment with its related consequences) 	<p>CHANNELS</p> <ul style="list-style-type: none"> • Marketing • Awareness campaign on the service to be provided) • Feedback of the community • Communication • Monitoring and evaluation 	
<p>COST STRUCTURE</p> <ul style="list-style-type: none"> • Purchase of emptying and transportation facilities (trucks or pumps depending on local conditions) • Operation and Maintenance cost of the trucks/pumps (fuel, repair of trucks/pumps, new spare parts etc.), transfer stations • Marketing cost • Communication cost (awareness cost, after sell communication cost) • Replacement cost after xxx times • Operating expenses (offices, personnel, insurance, etc...) 			<p>REVENUE STREAMS</p> <ul style="list-style-type: none"> • Tariff for the emptying service • Lease fees • Incentives and subsidies • Health improvement quantifications • Environmental protections quantifications 	

2.2.3 Treatment, reuse and disposal services in non-sewered sanitation systems

Treatment, reuse and disposal business model in non-sewered sanitation services will mainly focus on innovation technology to be used for treatment, and reuse consideration for both liquid and solid products as well as final disposal of the non-biodegradable materials which can be present in faecal sludge (pads, plastic bottles, clothes, etc.).

For this model, self-sustainability is enhanced when a sanitation levy and/or sanitation surcharge is applied; see Chapter Five- financing options for sanitation services. Based on the canvas business model, the following are basic elements the utility/company should look at:

Table 4: Treatment, reuse and final disposal service business model matrix

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, emptiers and transportation associations, local government, financial institutions; incinerator/landfill operators, researchers/university; • Key suppliers: construction materials (sand, cement, pipes, electrical and mechanical equipment for the plant etc.) chemical suppliers if necessary, packaging materials for solid end products, plant spare parts, PPE sellers; • Key resources: adequate personnel, training manuals, initial and O&M funds; 	<ul style="list-style-type: none"> • Design of the FSTP: making an appropriate design/upgrade the existing plants, information on the current faecal sludge generation from the community; design period and forecast sludge, sources of sludge (commercial, households, public toilets), initial concentration of main parameters (COD, BOD, TSS, TN, TP, presence of some metals), quality effluent requirements, reuse requirements, estimation of treated sludge to be produced for reuse option (co-composting for example); • Construction/upgrade of the FSTP; • Operationalization and maintenance of the FSTP; 	<ul style="list-style-type: none"> • The proposed FSTP should treat all parts (liquid and solid) in a sustainable manner; • Appropriate technology selection for the treatment and reuse option; • Tariff of dumping should reflect inputs from emptiers needs, • Tariff of the end product should be in line with the purchasing power of the local community; • Low operation and maintenance cost; • Easy operation; • Environmental protection (quality assurance of the effluent to be released into the environment) 	<ul style="list-style-type: none"> • Communication platform (how many emptiers? are they satisfied with the services provided? community using the end products, are they satisfied?) • Regularly meeting with both group of customers for services evaluation; • Payment options for purchase of end-use products 	<ul style="list-style-type: none"> • FS transporters • Community/city; • Private sector • End product users • Emptiers' association

<ul style="list-style-type: none"> • Key activities: <ul style="list-style-type: none"> ○ Tariff settings for faecal sludge disposal at the site and for the solid end products; ○ Treatment of the faecal sludge; ○ Reuse of the final product both solid and liquid effluent; ○ Continuous trainings of the key personnel; ○ Quality monitoring of influent and effluent for both the solid and liquid; 	<ul style="list-style-type: none"> • Quality monitoring of both the influent and effluent of the main parameters (COD, BOD, TSS, TN, TP, presence of some metals, etc...) • Tariff setting for dumping the faecal sludge at the FSTP with emptiers collaboration and tariff of end products (mainly the treated sludge) • Training of personnel on operation and maintenance of the FSTP; • Community acceptability of the end product; • Packaging of end products; • Selling of end products; 			
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Initial investments funds (O&M funds inclusive) • Continuous training of the key personnel; • Laboratory facilities for quality monitoring; • Communication facilities with the emptiers and the community using the end products 		<p>CHANNELS</p> <ul style="list-style-type: none"> • Marketing for the end products • Awareness campaign on the end products use and its positive impacts; • Feedback of the community and the emptiers' association; • Monitoring and evaluation 	

COST STRUCTURE	REVENUE STREAMS
<ul style="list-style-type: none">• Construction /upgrade of the FSTP;• Operation and Maintenance cost of FSTP;• Branding, packaging and marketing cost of the end products (treated sludge);• Communication cost (awareness cost, after sell communication cost)• Replacement cost after x times for main spare parts;• Operating expenses (offices, personnel etc...)	<ul style="list-style-type: none">• Tariff for the service (disposal/dumping fee of the faecal sludge at the FSTP)• Sale from the end products• Sanitation universal access charge/ levy/surcharge• Incentives and subsidies.

2.2.4 Combination of emptying, transportation, treatment, reuse and disposal services in non-sewered sanitation systems

Combination of emptying, transportation, treatment, reuse and disposal business model in non-sewered sanitation services will look at affordable tariff of emptying and transportation service, technology to be used and quality service delivered (full emptying of the septic tanks/pit latrines) in addition the utility will look at innovative technology to be used for treatment, and reuse consideration for both liquid and solid products as well as final disposal of the non-biodegradable materials which can be present in faecal sludge (pads, plastic bottles, clothes, etc.). Based on the canvas business model, the following are basic elements the utility/company should look at:

Table 5: Combination of emptying, transportation, treatment, reuse and final disposal model matrix

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, emptiers and transportation associations (competitors), FSTP, NGOs local government, financial institutions; incinerator/landfill operators, researchers/university; • Key suppliers: construction materials (sand, cements, pipes, electrical and mechanical equipment for the plant...) emptying trucks or mechanical pumping units such as gulpers and vacuum pumps supplier, chemical suppliers if necessary, packaging materials for solid end products, plant spare parts, PPE sellers; • Key resources: construction materials for the plant, adequate personnel, training manuals, initial and O&M funds; 	<ul style="list-style-type: none"> • Feasibility study: (information on the community to be served now and at a certain horizon period, sanitation facilities (septic tanks, pit latrines, emptying frequency per family, tariff for emptying and transportation, purchasing power of the community, competitors, available technology and its cost (mechanized or manual), information on manual emptying practices and costs involved, etc..) • Design of the FSTP: making an appropriate design/upgrade the existing plants, for that information on the current faecal sludge generation from the community; design period and forecast sludge, sources of sludge (commercial, households, public toilets), initial concentration of main parameters (COD, BOD, TSS, TN, TP, presence of some metals), quality effluent requirements, reuse requirements, estimation of treated sludge to be produced for reuse 	<ul style="list-style-type: none"> • The proposed emptying and transportation service should be consistent in terms of quality (removing all the sludge, availability and punctual. • Emptying and transportation service tariff reflecting local purchasing power of the community; • Appropriate technology selection for the emptying and transportation facilities; • Provision of jobs for manual emptiers wherever applicable • Community acceptability of services especially taking into consideration their purchasing power; • Inclusion of vulnerable people; • Ensuring trucks/pumps are always in good condition. • The proposed FSTP should treat all parts (liquid and solid) in a 	<ul style="list-style-type: none"> • Communication platform with the community (satisfaction with the emptiers association on dumping fees, satisfaction on emptying and transportation services by the community, community using the end products, are they satisfied?) <p>For that can it be:</p> <ul style="list-style-type: none"> ○ Call center? ○ Free line number? ○ Paid number? ○ Regularly meeting with each group of stakeholders services evaluation. 	<ul style="list-style-type: none"> • Septic tank users • Lined pit-latrines users • FS transporters • Emptiers association • Community/city • End product users. • Private sector

<ul style="list-style-type: none"> • Key activities: <ul style="list-style-type: none"> ○ Construction for the FSTP, ○ Tariff settings for emptying and transportation; ○ Emptying and transportation of faecal sludge to FSTP; ○ Tariff settings for faecal sludge disposal at the site and solid end products ; ○ Treatment of the faecal sludge; ○ Reuse of the final product both solid and liquid effluent; ○ Continuous trainings of the key personnel; ○ Awareness campaign to sensitize the community on the new service for emptying of filled pit latrines/septic tanks. ○ Quality monitoring of influent and effluent for both the solid and liquid; 	<ul style="list-style-type: none"> option (co-composting for example); • Purchase of emptying facilities : mechanized or manual depending on the local conditions (LICs for example) • Emptying and transportation services; • Tariff settings for the emptying and transportation service with local community collaboration; • Tariff setting for dumping the faecal sludge at the FSTP with others emptiers collaboration • Tariff settings of end products (mainly the treated sludge) • Packaging, marketing, selling of the end product (treated sludge) • Training of emptiers on appropriate techniques of emptying and transportation as well as PPE requirements; • Construction/upgrade of the FSTP; • Operationalization and maintenance of the FSTP and transfer stations; • Quality monitoring of both the influent and effluent of the main parameters (COD, BOD, TSS, TN, TP, presence of some metals, etc...) • Training of personnel on operation and maintenance of the FSTP; • Community acceptability of the end product; • Marketing/communication with the community (call center, free line) • After sale services for the service chain 	<ul style="list-style-type: none"> sustainable manner; • Appropriate technology selection for the treatment and reuse option; • Tariff of dumping and of the end products should reflect inputs from emptiers needs, and the tariff of the end product in line with the purchasing power of the local community; • Low operation and maintenance cost; • Easy operation; • Leasing of trucks/equipment to community organisation for job creation • Environmental protection (quality insurance of the effluent to be released into the environment) • Improvement of health due to the proposed sanitation service chain (reduction of water related diseases, reduction/eradication of open defecation, reduction of exposure and risks for manual unregulated emptiers etc.) 		
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	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Market research outcomes: analysis of what is on the market in regard to emptying and transportation services, community s' preferences, purchasing power of the community, competitors and partners, suppliers and distributors, future market trends, etc. • Different manufacturer's emptying mechanisms and choose the best products based on local context • Initial investments funds (O&M funds inclusive) • Continuous training facilities • Communication facilities with the community to get the service done (call center, free line number... as well as with the emptiers) • Laboratory facilities for quality monitoring; 		<p>CHANNELS</p> <ul style="list-style-type: none"> • Marketing of all products along the sanitation value chain (emptying services and end products) • Awareness campaign on the service to be provided along the sanitation value chain) • Communication on the feedback of the services provided (containment, emptying and end products) • Monitoring and evaluation 	
<p>COST STRUCTURE</p> <ul style="list-style-type: none"> • Purchase of the emptying and transportation facilities (trucks or pumps depending on local conditions) • Operation and maintenance cost of the trucks/pumps (fuel, repair of trucks/pumps, new spare parts, etc.), transfer stations • Construction/upgrade of the FSTP; • Operation and Maintenance cost of the FSTP; • Marketing cost for all products along the sanitation service chain (emptying services, end products reuse etc.) • Communication cost (awareness cost, after sell communication cost) • Replacement cost after xxxx times of all necessary spare parts • Operating expenses (offices, salaries, insurance, etc.) 		<p>REVENUE STREAMS</p> <ul style="list-style-type: none"> • Tariff for the emptying service • Sales from the end products • Lease fees • Incentives and subsidies • Health improvement quantifications • Environmental protections quantifications. 		

2.2.5 Combination of capture, containment, emptying, transportation, treatment, reuse and final disposal services in non-sewered sanitation systems

Combination of capture, containment, emptying, transportation, treatment, reuse and final disposal business model in non-sewered sanitation services will look at the whole sanitation service chain and proposing a sustainable solution in every case, considering mainly local community inputs with special consideration for vulnerable people and their local purchasing power. The business model is best used in low income communities where there are no or little sanitation facilities.

Based on the canvas business model, the following are the basic elements the utility/company should look at:

Table 6: Combination of capture, containment, emptying, transportation, treatment, reuse and final disposal business model matrix

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, emptiers and transportation associations, FSTP, NGOs local government, financial institutions; • Key suppliers: containment supplier, construction materials (sand, cements, pipes, electrical and mechanical equipment for the plant...) emptying trucks or mechanical pumping units such as gulpers and vacuum pumps supplier, chemical suppliers if necessary, packaging materials for solid end products, plant spare parts, PPE sellers; 	<ul style="list-style-type: none"> • Feasibility study: (information on the community to be served now and at a certain horizon period, type of available containments (toilets), its technical specification and costs (installation cost inclusive), water supply connection, problem related to sanitation: water related diseases occurrence (diarrhoea and malaria mainly), mortality of children under 5 years and causes, information on community sanitation facilities (septic tanks, pit latrines, emptying frequency per family, tariff for emptying and transportation, purchasing power of the community, competitors, available technology and its cost (mechanized or manual), information on manual emptying practices and costs involved, etc..) • Design of the FSTP: making an appropriate design/upgrade the existing plants, for that information on the current 	<ul style="list-style-type: none"> • The proposed containment should be appropriate (durability, accessibility, affordability, sustainability) • Community acceptability of the new containment ; • Inclusion of vulnerable people; • Installation and maintenance of the new containment; • The proposed emptying and transportation service should be consistent in terms of quality (removing all the sludge, availability and punctual. • Emptying and transportation service tariff reflecting local purchasing power of the community; • Appropriate technology selection for the emptying and 	<ul style="list-style-type: none"> • Communication platform with the community (satisfaction with the new containment product, with the emptiers association, satisfaction on emptying and transportation services, community using the end products, are they satisfied?) <p>For that can it be:</p> <ul style="list-style-type: none"> ○ Call center? ○ Free line number? ○ Paid number? ○ Regularly meeting with each group of stakeholders services evaluation; 	<ul style="list-style-type: none"> • Household, public and community toilet users without toilets or with poor quality toilets and containment facilities; • Septic tank users • Lined pit-latrine users • FS transporters • Emptiers association • Community /city

<ul style="list-style-type: none"> • Key resources: construction materials for both containment and the plant, adequate personnel, training manuals, initial and O&M funds; • Key activities: <ul style="list-style-type: none"> ○ Construction for both the containment and the FSTP, ○ Tariff settings for emptying and transportation; ○ Emptying and transportation of faecal sludge to FSTP; ○ Tariff settings for faecal sludge disposal at the site and solid end products ; ○ Treatment of the faecal sludge; ○ Reuse of the final product both solid and liquid effluent; ○ Continuous trainings of the key personnel; ○ Awareness campaign to sensitize the community on the new containment product and emptying of filled pit latrines/septic tanks. ○ Quality monitoring of influent and effluent for both the solid and liquid; 	<p>faecal sludge generation from the community; design period and forecast sludge, sources of sludge (commercial, households, public toilets), initial concentration of main parameters (COD, BOD, TSS, TN, TP, presence of some metals), quality effluent requirements, reuse requirements, estimation of treated sludge to be produced for reuse option (co-composting for example);</p> <ul style="list-style-type: none"> • Packaging, marketing, selling of the containment, • Purchase of emptying facilities : mechanized or manual depending on the local conditions (LICs for example) • Emptying and transportation services; • Tariff settings for the emptying and transportation service with local community collaboration; • Tariff setting for dumping the faecal sludge at the FSTP with emptiers collaboration and tariff of end products (mainly the treated sludge) • Packaging, marketing, selling of the end product (treated sludge) • Training of emptiers on appropriate techniques of emptying and transportation as well as PPE requirements; • Construction/upgrade of the FSTP; • Operationalization and maintenance of the FSTP; • Quality monitoring of both the influent and effluent of the main parameters (COD, 	<p>transportation facilities;</p> <ul style="list-style-type: none"> • Provision of jobs for manual emptiers wherever applicable -- Community acceptability of services especially taking into consideration their purchasing power; • Leasing of trucks/equipment to community organisation for job creation • Ensuring trucks/pumps are always in good conditions. • The proposed FSTP should treat all parts (liquid and solid) in a sustainable manner; • Appropriate technology selection for the treatment and reuse option; • Tariff of dumping and end products should reflect inputs from emptiers needs, and the tariff of the end product in line with the purchasing power of the local community; • Low operation and maintenance cost; • Easy operation; • Environmental protection (quality insurance of the effluent to be released into the environment) • Improvement of health due to the proposed sanitation service chain (reduction of water related 		<ul style="list-style-type: none"> • End product users. • Private sector
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	<p>BOD, TSS, TN, TP, presence of some metals, etc...)</p> <ul style="list-style-type: none"> • Training of personnel on operation and maintenance of the FSTP • Community acceptability of the end product; • Marketing/communication with the community (call center, free line) • After sale services for the service chain 	<p>diseases, reduction/eradication of open defecation, reduction of exposure and risks for manual unregulated emptiers etc.)</p>		
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Market research outcomes: analysis of what is on the market in regard to containment and community s' preferences, purchasing power of the community, competitors and partners, suppliers and distributors, future market trends, etc. • Different manufacturer's containment and choose the best products (SWOT analysis) • Initial investments funds (O&M funds inclusive) • Continuous training facilities • Communication facilities with the community to get the service done (call center, free line number... as well as with the emptiers) • Laboratory facilities for quality monitoring; 		<p>CHANNELS</p> <ul style="list-style-type: none"> • Marketing of all products along the sanitation value chain (containment, emptying services and end products) • Awareness campaign on the service to be provided along the sanitation value chain) • Communication on the feedback of the services provided (containment, emptying and end products) • Monitoring and evaluation 	

COST STRUCTURE	REVENUE STREAMS
<ul style="list-style-type: none"> • Containment initial cost (packaging, branding cost inclusive) + Installation cost • Purchase of the emptying and transportation facilities (trucks or pumps depending on local conditions) • Operation and Maintenance cost of the trucks/pumps (fuel, repair of trucks/pumps, new spare parts .etc....) • Construction /upgrade of the FSTP; • Operation and Maintenance cost of FSTP; • Marketing cost for all products along the sanitation value chain services provided (containment, emptying services, end products reuse etc...) • Communication cost (awareness cost, after sell communication cost) • Replacement cost after xxx times of all necessary spare parts • Operating expenses (offices, salaries, insurance, etc....) 	<ul style="list-style-type: none"> • Containment price • Tariff for the emptying service • Sales from the end products • Lease fees • Incentives and subsidies • Health improvement quantifications • Environmental protections quantifications.

2.2.6 Combination of conveyance, treatment and final disposal for sewerage services

Combination of conveyance, treatment, reuse and final disposal business model in sewerage services will mainly be applicable in cities where sewerage network is existing and there is a need to connect the remaining community; people must have toilet already but not connected to the sewer system. The following are the basic elements/ the utility/company should look at for this model:

Table 7: Combination of conveyance, treatment, reuse and final disposal business model matrix for sewerage services

KEY PARTNER	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIP	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> • Key partners: community, WWTP operator, NGOs local government, financial institutions; incinerator/landfill operator, researchers/university ; • Key suppliers: construction materials (sand, cement, pipes for conveyance, electrical and mechanical equipment for the plant...) chemical suppliers if necessary, packaging materials for solid end products, plant spare parts, PPE sellers; • Key resources: adequate personnel, training manuals, initial and O&M funds; 	<ul style="list-style-type: none"> • Design study: (information on the community to be served now and at a certain horizon period, wastewater network system available, connection percentage, water supply facility, problem related to sanitation: water related diseases occurrence(diarrhoea and malaria mainly), mortality of children under 5 years and causes, price of sewerage conveyance and treatment, community response to the current offered service; information on emptying frequency per family, tariff for emptying and transportation (if any), purchasing power of the community, for the WWTP making an appropriate design/upgrade the existing plants, with current wastewater flow, and for the design period sources of wastewater (commercial, households, public toilets), initial concentration of main parameters (COD, BOD, TSS, TN, TP, presence of some metals), quality effluent requirements, reuse 	<ul style="list-style-type: none"> • The proposed conveyance treatment and reuse model should be appropriate, sustainable but more importantly affordable. • Community acceptability of the new proposed model → in accordance with their purchasing power; • Installation and maintenance of the conveyance system; • Provision of jobs for local community whenever applicable (during construction of the conveyance system for example) • Appropriate technology selection for the treatment and reuse option; • Tariff of conveyance and treatment of wastewater with input from the community and taking into consideration the vulnerable people; • Low operation and maintenance cost; • Easy operation; • Environmental protection (quality insurance of the effluent to be 	<ul style="list-style-type: none"> • Communication platform with the community (acceptance of the proposed sanitation value chain, satisfaction of the service delivered) • For that can it be: <ul style="list-style-type: none"> ○ Call center? ○ Free line number? ○ Paid number? ○ Regular meeting with each the community for the service evaluation. • Payment options for services 	<ul style="list-style-type: none"> • Household toilet users • Community /city • End product users. • Private sector

<ul style="list-style-type: none"> • Key activities: <ul style="list-style-type: none"> ○ Construction for conveyance system and the WWTP if necessary (or upgrade), ○ Tariff settings for conveyance and treatment of wastewater; ○ Reuse of the final product both solid (if possible) and liquid effluent; ○ Continuous trainings of the key personnel; ○ Awareness campaign to sensitize the community on the new sanitation system for tariff settings especially; ○ Quality monitoring of influent and effluent for both the solid and liquid; 	<p>requirements;</p> <ul style="list-style-type: none"> • Tariff settings for conveyance, treatment and reuse; to be combined to the water bills on a monthly basis with local community collaboration; • Construction/upgrade of the WWTP; • Operationalization and maintenance of the WWTP; • Quality monitoring of both the influent and effluent of the main parameters (COD, BOD, TSS, TN, TP, presence of some metals, etc...) • Training of personnel on operation and maintenance of the WWTP; • Reuse option (land reclamation, groundwater refill, release into the environment, reuse in agriculture, etc....) 	<p>released into the environment)</p> <ul style="list-style-type: none"> • Improvement of health due to the proposed sanitation service chain (reduction of water related diseases, reduction/eradication of open defecation, etc.) 		
	<p>KEY RESOURCES</p> <ul style="list-style-type: none"> • Purchasing power of the community; • Initial investments funds (O&M funds inclusive); • Construction materials (sand, cements, pipes, electrical and mechanical equipment, etc....); • Continuous training facilities; • Communication facilities with the community; • Laboratory facilities for quality monitoring. 		<p>CHANNELS</p> <ul style="list-style-type: none"> • Awareness campaign on the service to be provided along the sanitation value chain; • Communication on the feedback of the services provided; • Monitoring and evaluation 	

COST STRUCTURE	REVENUE STREAMS
<ul style="list-style-type: none"> • Conveyance system + Installation cost • Construction /upgrade of the WWTP; • Operation and Maintenance cost of conveyance and WWTP; • Communication cost (awareness cost, feedback on the performance, etc...) • Replacement cost after x times of all necessary spare parts • Operating expenses (offices, personnel etc...) 	<ul style="list-style-type: none"> • Tariff for the conveyance system (including treatment) • Sale of reclaimed water • Incentives and subsidies • Health improvement quantifications • Environmental protections quantifications.

3. SANITATION BUSINESS PLAN DEVELOPMENT

Ref:
CWIS Principle 1, 6

Business planning is recognized as an essential tool for management and planning in both private and public companies. It encourages the company to specify objectives and define strategies and actions to achieve them. Management is guided in its decisions by the logical framework of the business plan.

A business plan is a guide which outlines the goals of the business and roadmap of how to achieve them. A business plan is a formal written document containing business goals, the methods on how these goals can be attained, and the time frame within which these goals need to be achieved. It also describes the nature of the business, background information on the organisation, the organisation's financial projections, and the strategies it intends to implement to achieve the stated targets. In its entirety, a business plan provides direction to the business.

Business plans should cover the company's strategy over a period of a minimum one year, and maximum of three years, and must be updated annually. The business plan must at minimum comprise the following sections:

- Executive Summary
- Company Overview
- Market Landscape/Situation Analysis
- Strategic Plan
- Financial and Investment Plan
- Implementation Plan

3.1. Executive Summary

The executive summary, is typically written last in one or two pages and synthesises the key aspects of the sanitation business plan in a precise manner covering brief mission statement of the company; key strategic objectives and targets; main activities (operations and investments) to be implemented; projected total annual costs; sources of funds; impact of proposed sanitation /business in terms of major achievements to be realized during the plan period and perceived major risks and the possible mitigation measures.

3.2 Company Overview

This section gives a general description of the business and provides information on:

- **Vision Statement:** - an inspirational description of what the utility/company would like to achieve or accomplish in the mid-term or long-term future. It is intended to serve as a clear guide for choosing current and future courses of action.

- **Mission Statement:** - a concise statement of the purpose of existence of the utility/company and its scope of work, which should fit within the policy and legal framework for the sector
- **The history and legal status, funding, current organisation structure, brief profiles of key personnel** (management and board), their qualification and experience;
- **Description of utility's activities** specifically towards sanitation, available regulation guidelines, wastewater treatment plants managed, sewerage pipes, effluent disposal;
- **A description of demographics, service area**, services provided distinguishing water supply and sanitation services, customers served, services to the poor and un-served areas within the licensed service area; and
- **Main stakeholders, customer care and communication;**

Outline the number of sewer and non-sewered connections, population in the service areas, proportion served etc
 Explain the services the utility provides to collect or transport sludge, or onsite like in the case of septic tanks, capacity of wastewater or faecal sludge treatment plants etc
 Describe service improvements made e.g. increase in sewered customers by X connections, installation of Y number of toilets, procurement of Z vacuum tankers, W liters of faecal sludge emptied and disposed of safely.

3.3 Market Landscape/Situation Analysis

In order to develop the course of future actions it is necessary to assess the current performance and operating environment of the utility/company against clearly defined criteria. This assessment should be conducted in the light of quality of service sanitation performance targets. Assessment of current and future performance will include:

- The current quality of service levels and the performance targets;
- Brief descriptions of the on-going operational activities and projects as well as committed interventions and projects to improve performance if any;
- Relevant developments within the sector such as sanitation policy and strategy, legislation,
- Business environment analysis using SWOT, PESTLE;
- Setting of future quality of service and performance targets

The situation analysis will aim to synthesise the following information:

i. Service Area overview

- ✓ Problem identification and description of the existing situation: type of available toilets and its cost, emptying services provision (mechanical or manual) and its related tariffs, treatment methods used and all annexed costs; reuse option available; general satisfaction of the community in each case; inclusion of vulnerable people etc..
- ✓ Town/area description: geographical description, type of infrastructures, type of houses available, type of toilets, etc...
- ✓ Current population and projected population; what is their current income status? Low income communities? Middle class? A mixture? → population classification and income level will allow to propose affordable technology;
- ✓ Infrastructure development status: roads, water supply scheme, solid waste management status, drainage systems, → opportunity of combining different components of the sanitation service chain whenever applicable;
- ✓ Types of existing interventions in regard to the business, technology available, satisfaction of the local population within current conditions, health concern data in regard to the business (water related diseases, poor hygiene) → intervention quantification during the implementation;
- ✓ Others infrastructures development status available: schools, hospitals, etc.....

ii. Technical Specification

- ✓ Type of containment available, collection and transport service type and efficiency level, treatment efficiency, reuse option (technical level of each value chain according to the forecast business);
- ✓ Service performance level (containment, collection, transportation and treatment level);
- ✓ Appropriate technology: is the existing technology fitting within the current area of interventions?
- ✓ Open defecation.

iii. Operational requirements

- ✓ Volume of faecal sludge generated;
- ✓ Characteristics of the faecal sludge;
- ✓ Frequency of desludging;
- ✓ Current type of collection and transportation systems;
- ✓ Volume of the effluent after treatment (treated sludge quantity/briquette produced/ animal feed produced, market available, price of the products, etc....);
- ✓ Quality of the output after treatment (international and national standards).

iv. Stakeholders analysis

- ✓ Government organizations for policy, legal frameworks and guidelines on all required administration tariff settings inclusive;
- ✓ Non-government organizations (technical assistance, collaboration) ;
- ✓ Consumers (quality service, tariff);
- ✓ Financiers (conditions for grants and loans).

- v. Financial analysis**
- ✓ Revenue collection by current interventions: how many toilets are sold each year? What are the revenues collected with emptying and transportation services? How much is collected for sludge treatment and reuse? etc.
 - ✓ Revenue collection efficiency rate;
 - ✓ Tariff structure and rates;
 - ✓ Price of the sanitation including payment for connection if applicable;
 - ✓ Costs (investment and operation and maintenance);
 - ✓ Funding sources to cover investment costs;
 - ✓ Performance indicators within the existing situation (viability of the services): information on similar interventions (loops and gaps, operation and maintenance cost, and specific efficiency);
 - ✓ Affordability (community satisfaction).

3.4 Strategic Plan

The Strategic Plan outlines the course of action including the specification of resources required to achieve a specific target. This will set the company’s objectives for the planned period. The Strategic Plan will provide a framework for company decision-making within the period of the Business Plan and give direction to the whole organisation.

The Strategic Plan should state the company objectives for the period, including the overall policies and guidelines for achieving the objectives. The company objectives and strategies for the period must reflect progress towards the Minimum Service Level and harmonised with the Service Level Agreement. For each objective, the plan should describe:

- The activities to be undertaken;
- Starting and completion dates;
- Performance measurements for each target that will be used to determine progress;
- The costs involved and source of funding; and
- Any additional relevant information

Sample Objective and KPI		
	Strategic Objectives	KPI
1.	Provide adequate safely managed sanitation facilities	<ul style="list-style-type: none"> • Number of individual household toilets installed • Number of shared toilets installed
2.	Ensure collection and transportation of faecal sludge from scheduled containment facilities	<ul style="list-style-type: none"> • Number of septic tanks desludged • Amount of faecal sludge collected and transported to the FSTP
3.	Treat all collected faecal sludge	<ul style="list-style-type: none"> • Quality of effluent after treatment meets environmental standards
4.	Increase revenue through promoting use of treated sludge as a natural fertiliser	<ul style="list-style-type: none"> • Amount of treated sludge sold for agriculture

3.5 Financial and Investment Plan

The Business Plan must clearly articulate how the various works and activities will be financed over the entire period.

The financial plan will cover projections of Capital Expenditures (CAPEX) and Operation and Maintenance Expenditures (OPEX) as well their sources of financing. The objective of financial planning is to assist the utility/company to foresee their cash flows in achieving medium to long term operational and financial sustainability. Therefore, the tariff plan must be harmonised with revenue projections required to achieve the Business Plan. Other sources of financing should also be stated such as aide from Cooperating Partners, Government grants and private sector participation.

The investment plan describes projects for investment to fulfil the objectives set for the duration of the business plan. It also includes an explanation of how funds are to be mobilised and used to implement the plans. *(Refer to Chapter 4)*

Some costs to be considered while investing in CWIS are :

- Capture and Containment
 - Construction and/or rehabilitation of latrine or toilet facilities, septic tank and soak away facilities
- Emptying and Transport of Faecal Sludge
 - Procurement and operation of exhauster trucks,
 - Procurement and operation of emptying equipment
 - Installing and operating transfer stations
- Sewage Conveyance
 - Installation, maintenance and operation of Pumping stations
 - Extension and repair of sewer networks
 - Sewer manholes
 - Civil works
- Treatment
 - Land
 - Installation, rehabilitation, expansion, operation of Treatment plant (s)
 - Civil works within the plant
 - Vehicles used for treatment services

3.6 Implementation Plan

In implementing the Business Plan, key consideration must be given to the critical success factors, risks and their management/mitigation, the person responsible for driving the plan, monitoring and evaluation. The utility/company shall indicate the process of implementation of their sanitation business plan by having in place internal control mechanisms of monitoring, evaluation and reporting its performance over a period of time. The utility shall commit itself to undertake bi-annual reviews and assessment of implementation of their sanitation business plan in line with preparation of their annual budget.

4. SANITATION INVESTMENT PLAN DEVELOPMENT

Ref:
CWIS Principle 1, 6

Investment planning is normally defined as the planning process that matches the financial goals and objectives within the financial resources available.

With CWIS approach, the sanitation investment plan development will require the service provider to consider investments needed for the component of the sanitation service chain to be developed throughout its lifecycle.

At minimum, the investment plan should comprise the following⁵:

- **Analysis of existing installations:** describe the condition of the existing assets (derived from the asset inventory) including sewer system, faecal sludge emptying and transportation equipment, treatment facilities, and general investments such as billing systems, length and size of pipes, capture and containment facilities.
- **Supply and sales forecasts:** analysis of past trends and present situation and compilation of data concerning service coverage per service area, number of customers per tariff category and person served per connection, population growth. Thereafter forecast of increase in service coverage, measures for demand management.
- **Planned investments:** separate each component of the sanitation service chain and different type of investment (replacement, new extensions, major work, general investments, additional measures such as training of personnel, additional employment, new software, marketing etc.)
- **Benefits of investments:** describe the rationale behind the investment e.g., cost reduction by X%, increase in coverage by X%, X additional volume treated, etc.
- **Investment options:** present alternatives e.g., extensions by onsite solutions vs sewer connections, expansion of treatment facilities as a first step of rapid measures to increase coverage and in case of limited funds
- **Funding requirement:** outline the cost of each planned investment and separately, each of the alternative solutions. Rank each investment according to priority and indicate the method of calculation (e.g., unit price per quantity). A breakdown of cost is required such as foreign exchange, engineering and physical costs, disbursement over time, base year of prices, inflation rates, and additional cost for operation and maintenance:
 - Amount of funding required to sustain the operations without additional investments;
 - Funding requirements based on projects to be implemented during the year
 - Explain how these funds will be utilised;

⁵ Guideline on Business Planning, 2019, WASREB

- Specify if the funds are for recurrent (operating) or capital (investment) expenditure.
- **Financing options:** outline potential sources of financing such as commercial credits, funds from development partners, sanitation surcharge etc.

According to WASHCOST (2015) the main sanitation lifecycle cost items identified according to when they are incurred in the sanitation lifecycle and adaptable in practice, are:

- Initial investment;
- Day to day operations;
- Intermittent maintenance and
- Major rehabilitation, replacement and asset renewal.

The following are the key cost items needed for investment plan development for each component of the sanitation service chain:

Table 8: Key cost components to develop a sanitation investment plan

Sanitation business model	Main sanitation cost items to be considered for the investment plan development			
	Initial investment	Day to day operations	Intermittent maintenance	Major rehabilitation, replacement and asset renewal
Capture and Containment services	<ul style="list-style-type: none"> • Business preparation in general (data collection, feasibility study, market research etc....); • Community engagement/awareness campaign to understand the proposed containment, its added value compared to the existing technology; • Importing facilities or buying from suppliers; • Initial marketing cost; and • Construction and installation cost (materials & labour) • Training of artisans for construction of facilities 	<ul style="list-style-type: none"> • Maintenance cost; • Marketing cost (continuous marketing cost which will include branding, packaging, etc...); • Communication cost (awareness cost, after sale communication cost); • Administration operation expenses (offices, personnel, cleaning materials, etc....) 	<ul style="list-style-type: none"> • Replacement cost of some spare parts of the capture and containment facilities. • Repair costs for pipes 	<ul style="list-style-type: none"> • Replacement cost after x times of the whole facility; • Major Repair costs • Buying new personal protective equipment (PPE) after a certain time.
Emptying and transportation services	<ul style="list-style-type: none"> • Business preparation in general (data collection, feasibility study, market research etc....); • Community engagement/awareness campaign to understand the proposed new emptying and transportation services and its added value compared to the existing services; • Purchase of emptying and transportation trucks/pumps/equipment suitable for local conditions; • Installation of transfer station; 	<ul style="list-style-type: none"> • Operation and Maintenance cost of the trucks/pumps (fuel, repair of trucks/pumps.etc....), emptying equipment, transfer stations • Discharge/dumping fee • Administration operation expenses (offices, personnel, insurance, etc....) 	<ul style="list-style-type: none"> • Replacement cost of some spare parts of the trucks/pumps, emptying equipment, transfer station; • Repair and maintenance costs 	<ul style="list-style-type: none"> • Replacement cost of the trucks/pumps/ equipment after a certain time; • Major Repair costs for vehicles; • Buying new PPE after a certain time.

	<ul style="list-style-type: none"> • Buying of PPE; • Training of emptier on sustainable emptying techniques as well as use of PPE; • Marketing cost; • Communication cost: how is the emptier contacted? Is it by phone? Is it by free line? Call centre? Mobile App? 			
Treatment and reuse services	<ul style="list-style-type: none"> • Business preparation in general (data collection, feasibility study, sludge quantification, treatment option analysis, reuse option, etc.); • Stakeholders meeting throughout project cycle: city engineers, environmental protection agency, etc..... • Construction/upgrade of the FSTP with all related cost (land, site preparation, construction, installation of equipment, laboratory, sludge storage facilities etc.) • Buying of PPE. 	<ul style="list-style-type: none"> • Operation and Maintenance cost of FSTP: (including reagent of the laboratory, fuel, electricity, water, etc...) • Branding, packaging and marketing cost of the end products (treated sludge); • Communication cost (awareness cost, after sale communication cost) • Administration operation expenses (offices, personnel, licenses etc.) 	<ul style="list-style-type: none"> • Replacement cost after x times of main spare parts; • Maintenance and repair costs of treatment plant equipment, ponds, vehicles etc • Maintenance of sludge storage facilities 	<ul style="list-style-type: none"> • Replacement cost after xxx times for main components of the plant: pumps, lab equipment, etc. • Major Repair costs for the treatment plant
Combination of conveyance, treatment, reuse and final disposal for sewered systems	<ul style="list-style-type: none"> • Conveyance system + Installation cost • Construction /upgrade of the WWTP; • Communication cost (awareness cost, feedback on the performance, etc.) 	<ul style="list-style-type: none"> • Operation and Maintenance cost of conveyance and WWTP (fuel, electricity, laboratory reagent, pumps etc); • Administration operation expenses (offices, personnel, billing system etc.) 	<ul style="list-style-type: none"> • Repair and minor replacement cost after x times of some spare parts of the plants or the conveyance systems • Deblocking sewer lines; • Maintenance of sewer manholes. 	<ul style="list-style-type: none"> • Replacement cost after x times of main components of the plants such as pumps, pipes, laboratory equipment, etc. • Major Repair costs for sewer network

5. FINANCING OPTIONS FOR THE SANITATION BUSINESS

Ref:
CWIS Principle 4

Financing options for the sanitation business is the main issue in the sector as it requires high investment cost but the recovery scheme is not matching in general.

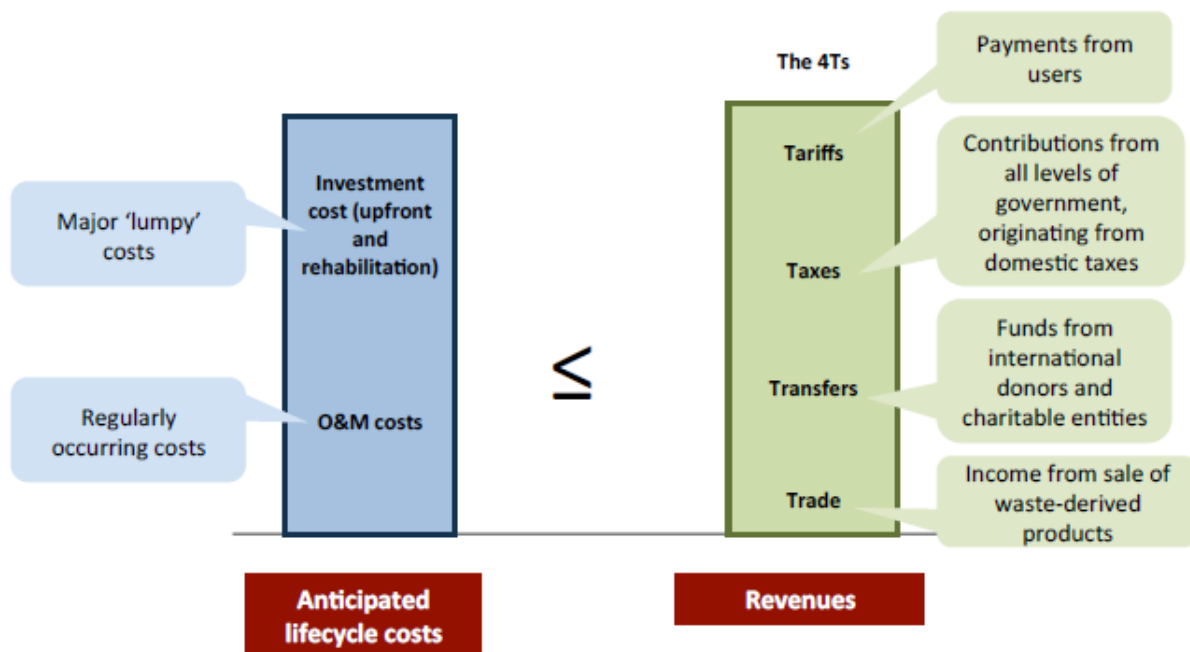
For a business to be sustainable, cost recovery should be considered carefully and sanitation financial planning well established.

5.1 Sanitation financial planning

The 2003 Camdessus Panel proposed the concept of ‘sustainable cost recovery’ where the full lifecycle costs of water and sanitation services are recovered through a combination of **Tariffs**, **Taxes** and **Transfers**, known as the **3Ts** (Trémolet and Rama, 2012) and a ‘4th T’ = **Trade** (revenues from the sale of products that capture the value of the sewage waste stream, such as fertilizer products, fuel products and aquaculture).

For a sustainable sanitation investment plan, the **4Ts streams revenue should match or exceed the financial requirements** outlined in Chapter Four. This is illustrated in the figure below, which shows the requirements for sustainable full cost recovery over the lifecycle of the sanitation service:

Figure 2: Requirements for sustainable full cost recovery over the lifecycle of the sanitation services (adapted from IRC & WSUP 2012)



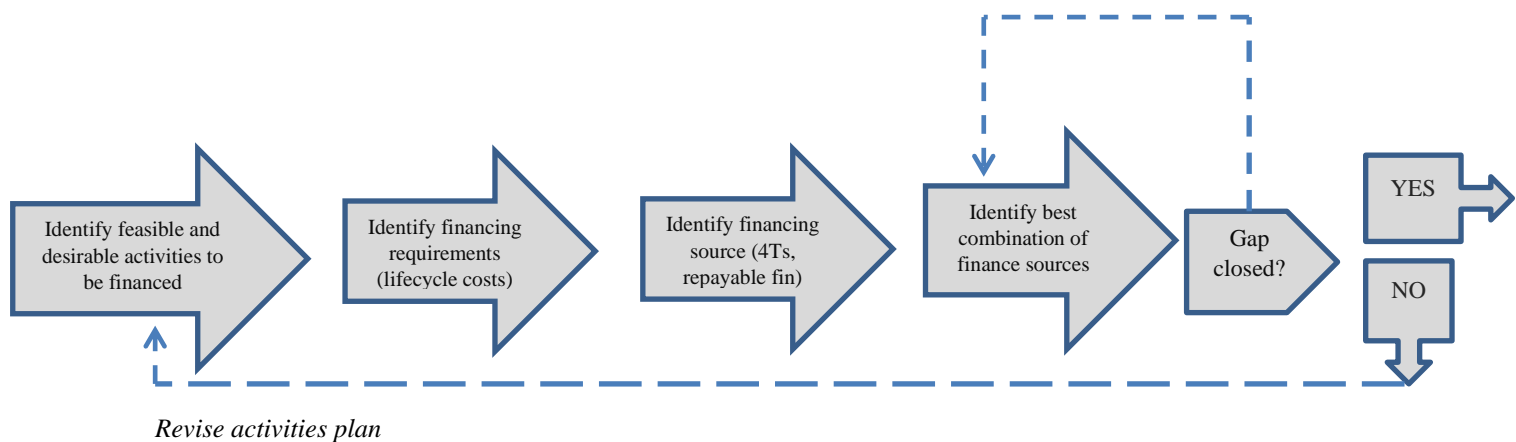
In practical terms, planning for sustainable (long term sanitation) services needs to make sure that revenues from tariffs, government contributions, donor support and sewage reuse products (4Ts) can fully cover the anticipated costs over the lifecycle of the service, as shown in Figure 2.

It is further required to find the right mix of the 4Ts in order to leverage additional capital, which could be an iterative process. Finding additional capital in form of **repayable finance** - made available 'now' but has to be re-paid sometime in the future - to 'bridge' the financing gap is needed.

Figure 3 shows that planning finance is an iterative process of reducing planned costs and identifying a right mix of revenue sources that in combination with schemes for accessing repayable finance, meet the requirement for sustainable cost recovery. If the gap cannot be closed, the sanitation infrastructure plan may need to be revised.

From the financial requirements to financial revenue, the following steps will be analyzed to find the best suitable investment plan needed:

Figure 3: Financial scheme required for a sustainable financing plan for sanitation services



With the sanitation business models identified in Chapter 2, the 4Ts streams means:

- **Tariffs:** from customers (households, institutions, commercials, schools etc) and fees paid to service providers and repayable finance raised by public utilities, as well as customer investment in self-supply solutions.
- **Taxes** (government) – funds originating from domestic taxes that are channeled to the sector by central, regional and local governments, and repayable finance borrowed by governments other than Development Assistance (DA).

- **Transfers** (external sources) – funds from international donors and charitable foundations. Transfers include grants and concessional loans, which include a grant element in the form of subsidized interest rate or a grace period.
- **Trade** revenue from the sale of the product that captures the value of the sewage waste stream such as fertilizer products, fuel products or aquaculture.

On top of the 4Ts streams, enabling institutional and regulatory framework which allows a developer to access additional financing schemes such as financial guarantees or loans with fewer difficulties is also necessary: most sanitation projects do not easily get funded due to lack of tangible financial guarantees. An enabling institutional and regulatory framework will be able to facilitate:

- Commercial bank loans for sanitation projects without difficulties;
- Government loans mainly for local government and municipalities to raise necessary funds for sanitation projects;
- Access to different grant schemes with government collateral guarantee;
- Green/environment and/or Sanitation basket funds to be easily accessible;
- Microfinance scheme which facilitate access to funds for sanitation projects;
- Equity: facilitating local equity markets and other enabling conditions can increase access to equity capital for small sanitation service providers;
- Bonds: provision of credit rating by government to facilitate strong investor demands to create bonds for the sanitation sector;
- Sanitation universal access charge/levy/surcharge: implementation of sanitation charge on water bills and ensure that funds are ring-fenced to accelerate citywide inclusive sanitation initiatives.

If enabling regulatory and legislation framework is provided, cost recovery required for investments, operation and maintenance may be obtained from the founding sources as cited above. Feasible combination of financial sources for the different sanitation business models to achieve citywide inclusive sanitation could be as follows:

Table 9: Financing option for each sanitation business model

Sanitation business model	Feasible financing option							
	Commercial bank loan (recovered under Tariffs)	Government loan (recovered under taxes)	Grant with government collateral (recovered under transfer)	Sanitation funds (recovered under transfer)	Microfinance (recovered under tariff)	Equity (recovered under tariff)	Bond (recovered under taxes)	Sanitation charge (recovered under tariff)
1.Capture and Containment service business model	√	√	√	√	√	√	N/A	√
2.Emptying and transportation business model	√	√	√	√	√	√	N/A	√
3.Treatment, reuse and disposal business model	NA	√	√	√	N/A	N/A	√	√
4.Combination of emptying and transportation, treatment ,reuse and disposal services business model	√	√	√	√	√	√	√	√
5.Combination of containment, emptying and transportation, treatment ,reuse and disposal services business model	NA	√	√	√	N/A	N/A	√	√
6.Combination of conveyance, treatment, reuse and disposal business model	NA	√	√	√	N/A	N/A	√	√

√: Possible

N/A: Not Applicable

6. APPROPRIATE TECHNOLOGY SELECTION

Ref:
CWIS Principle 3, 5

Appropriate Technology (AT) is defined as “technology that is designed with special consideration for the environmental, ethical, cultural, social and economic aspects of the community it is intended for. With these goals in mind, AT typically requires fewer resources, is easier to maintain, has a lower overall cost, and has less impact on the environment.”

The appropriateness of a sanitation technology is influenced by the following criteria:

- Accessibility (particularly for women, girls, elderly, disabled and sick)
- Affordability (for low-income individuals and communities);
- Functionality;
- Quality;
- Sustainability over the long term;
- Manageability;
- Operation and maintenance (O&M) requirements;
- Compliance with environmental protection regulations (having the least possible ecological impact); and
- Improvements to health.

Selecting a certain technology will require analysing all options available for the particular segment of the sanitation service chain which is under development, but having as well a holistic point of view for the whole sanitation chain whenever necessary. For instance, if a utility needs to check on which containment to adopt in a certain area, it will also need to check on the collection and transport system available and to which type of treatment at the end, in order to maximize outputs for all segments.

Specifically, the following are the most important components to check for appropriate technology selection:

- **Topography:** analysis of topography will help to understand which type of capture and containment facilities to be provided, which type of Faecal Sludge (FS) collection and transportation system to be adopted and where the treatment plant can be built (hilly areas, flooding areas, etc...); if it is in densely populated areas, special consideration for all cited components will be necessary, especially on where to put capture and containment facilities and FSTP as well as techniques for FS collection and transportation systems in such areas.

- **Size of the population:** will help the utility to understand the investment needed and revenue streams for different technology available and choose the most appropriate for the sanitation business model to be sustainable; it will mainly help to establish different scenarios required and opt for the more viable.
- **Population income:** will help to understand the financial trends of the community to be served. Based on their income, affordable capture and containment facilities will be provided, establishment of FS collection and transportation cost fees, cost for end products as well as establishment of FS dumping fees at the treatment plant.
- **Water availability and consumption:** will mainly be helpful in capture and containment facilities selection; in case of water scarcity Ecosan facilities may be more appropriate.
- **Type of toilets:** information on type of toilets will be helpful in selecting FS collection and transportation system to be used and capture and containment facilities to be provided especially for densely populated areas.
- **Existing FS Collection and transportation system:** will be used to check on the performance, gaps and constraints and where to emphasise within the new sanitation business model to be established.
- **Policy, laws and regulation including financial regulatory framework:** helps establish compliance requirements.
- **Existing Tariff and all related costs for the whole sanitation value chain:** this is mainly important while establishing new tariff for FS collection and transportation.
- **Social inclusion** (gender, disabled, elders, women and children): women involvement in management of WASH infrastructure has been found effective and guidance from elders in some communities being very critical for a new technology /system to be adopted (*Refer to chapter 9*).
- **Culture consideration:** culture consideration is important while proposing new technology for it to be easily adopted by the community: on collection and containment facilities (For public toilets, consideration of male and female separation, menstruation facilities for female, and urinal for male), acceptance of the treated sludge as a fertiliser to be used for agriculture, etc...(*Refer to chapter 9*)

Table 10 shows specific criteria for appropriate technology selection based on different proposed sanitation business models:

Table 10: Appropriate Technology selection criteria

Sanitation business model	Topography	Size of the population	Population income	Water consumption and availability	Type of toilets	Existing FS Collection and transportation system	Policy, laws and regulation including financial regulatory framework	Existing Tariff and all related cost for the whole sanitation chain	Vulnerable people (gender, elders, woman and children)	Culture consideration
1.Capture and Containment service business model	√	√	√	√	√	√	√	√	√	√
2.Emptying and transportation business model	√	√	√	N/A	√	√	√	√	√	√
3.Treatment, reuse and disposal business model	√	√	N/A	N/A	√	√	√	√ (end products cost only)	/NA	√ (for end products and reuse of treated effluent)
4.Combination of emptying and transportation, treatment, reuse and disposal services business model	√	√	√	√	√	√	√	√ (tariff on emptying and transportation only)	√	√ (for end products and reuse of treated effluent)
5.Combination of containment, emptying and transportation, treatment, reuse and disposal services business model	√	√	√	√	√	√	√	√	√	√
6.Combination of conveyance, treatment, reuse and disposal business model	√	√	√	N/A	N/A	N/A	√	√	√	√

√: Applicable
 N/A: Not applicable

7. INCENTIVES AND OPPORTUNITIES FOR THE PRIVATE SECTOR ALONG THE SANITATION SERVICE CHAIN

Ref:
CWIS Principle 5, 6

Six sanitation business models have been developed along the sanitation service chain (see *chapter two*). Among them, only three models have potential to be implemented by the private sector:

- i. Capture and containment service business model;
- ii. Emptying and transportation services model and
- iii. Combination of containment, emptying & transportation, treatment and reuse model for non-sewered sanitation systems.

These models are preferable because:

- They require relatively low investment, operation and maintenance cost (they can be started at low scale and be increased slowly) and
- They have more potential to get financial support (loans for instance in commercial banks) if no supportive legal and financial instruments and scheme available (*refer to chapter five*).

Incentives and opportunities which can attract private sector to invest in the above models include:

- Innovative finance to de-risk sanitation private sector involvement and address financial constraints. This could include equity finance, government guaranteed loans, subsidized credit, and community/revolving funds to offer accessible and affordable credit to sanitation start-ups through microfinance/microcredit schemes; Green/environment funds or sanitation funds and easy access to different grants.
- Targeted fiscal packages: tax incentives such as income tax holiday, waived import duties, bands of income tax, VAT exemptions or refunds, location incentives, etc....
- Non-financial opportunities to support sanitation private sector including incubation and training, and brokering business development relationships. This support is particularly crucial in the start-up phase as micro and small enterprises establish and grow.
- A viable policy and regulatory framework for creating an enabling environment; a viable industry for distributing sanitation products and services; institutional reforms; and the necessary legal, institutional and regulatory framework standards and guidelines.
- Encouraging associations of similar business formulation, for mapping all private sectors involved in sanitation and then support/strengthen them in order to provide a coherent voice and platform for sanitation to influence policy and national dialogue.
- Private sector capacity building strategies to support manufacturers, vendors, artisans/masons and project management companies.

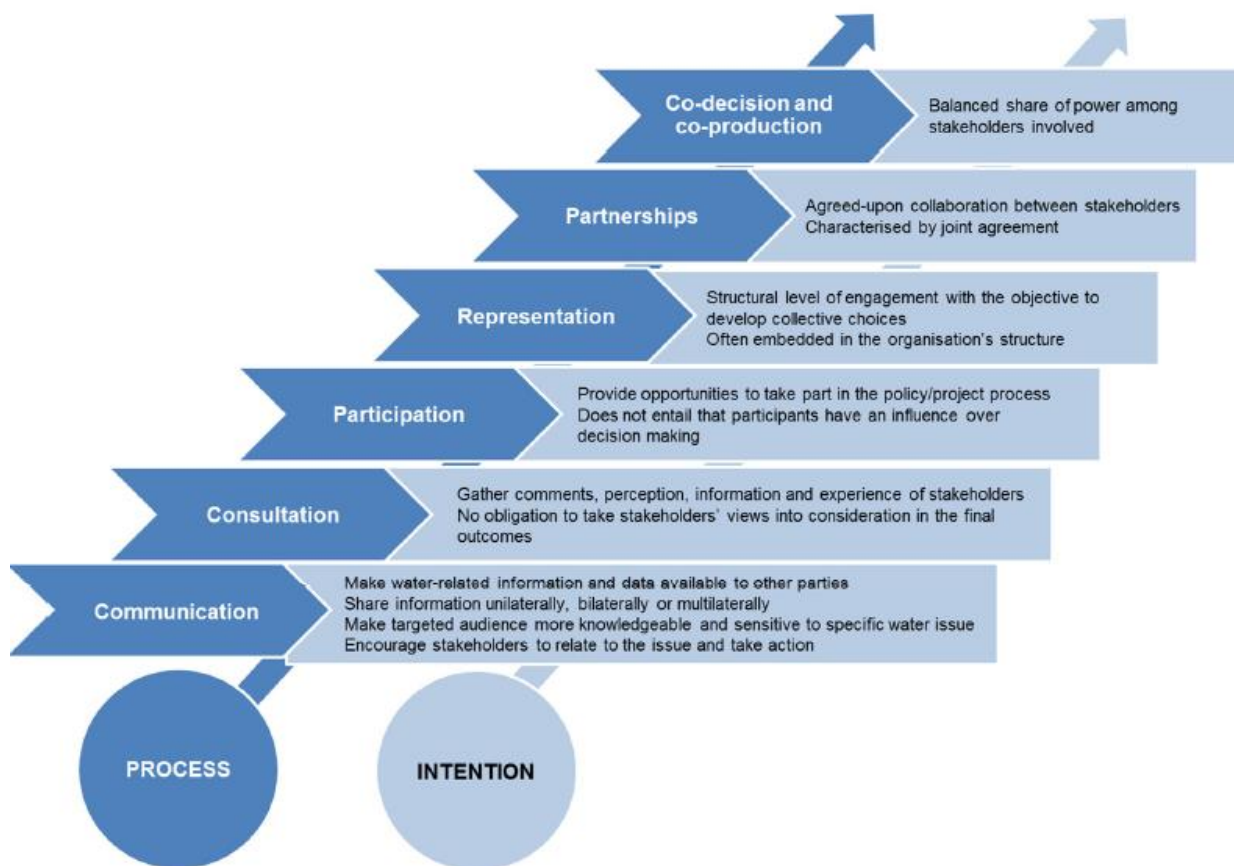
8. ENGAGEMENT, COLLABORATION, RESPONSIBILITIES AND COORDINATION OF KEY STAKEHOLDERS ALONG THE SANITATION SERVICE CHAIN

Ref:
CWIS Principle 1, 2, 4, 7

Collaboration and engagement among different stakeholders involved in the sanitation sector is a key factor to achieve sustainable management of sanitation services.

The Organisation for Economic Co-operation and Development (OECD) has developed a typology that distinguishes six levels of stakeholder engagement depending on the processes and the intentions they pursue as shown in Figure 4:

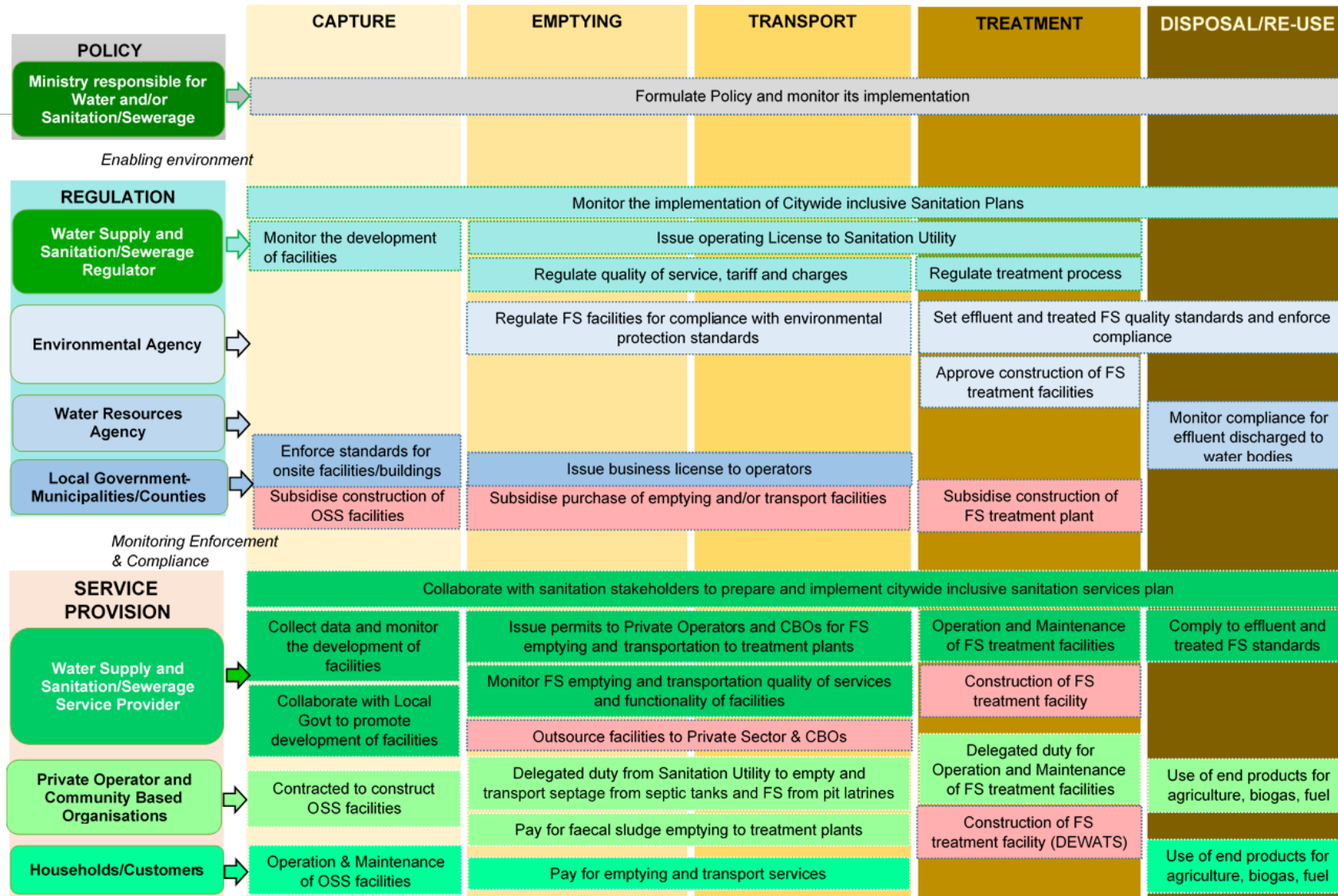
Figure 4: Stakeholders engagement process



8.1 Roles and Responsibilities of key stakeholders

The ESAWAS Regulatory Strategy and Framework for Inclusive Urban Sanitation Service Provision-incorporating Non-sewered Sanitation Services has provided a working framework for key stakeholders to ensure effective implementation of sanitation service provision. The recommended framework aims to ensure that the roles and responsibilities of each stakeholder are clear with accountability and transparency, do not overlap, nor is there a gap- as shown in Figure 5.

Figure 5: Roles and responsibilities of stakeholders along the sanitation service chain



Based on that framework, and to engage and ensure that all stakeholders are involved, the following supporting mechanisms will be necessary:

- Stakeholder mapping and engagement
- Sector coordination
- City/town level planning
- Community level engagement

8.2 Stakeholders mapping and engagement

Stakeholder mapping will help to identify stakeholders' involvement along the sanitation service chain and they will mainly be mapped depending on their degree of influence, power, legitimacy and collaboration:

Figure 6: Engagement matrix based on the interest and influence on the sanitation

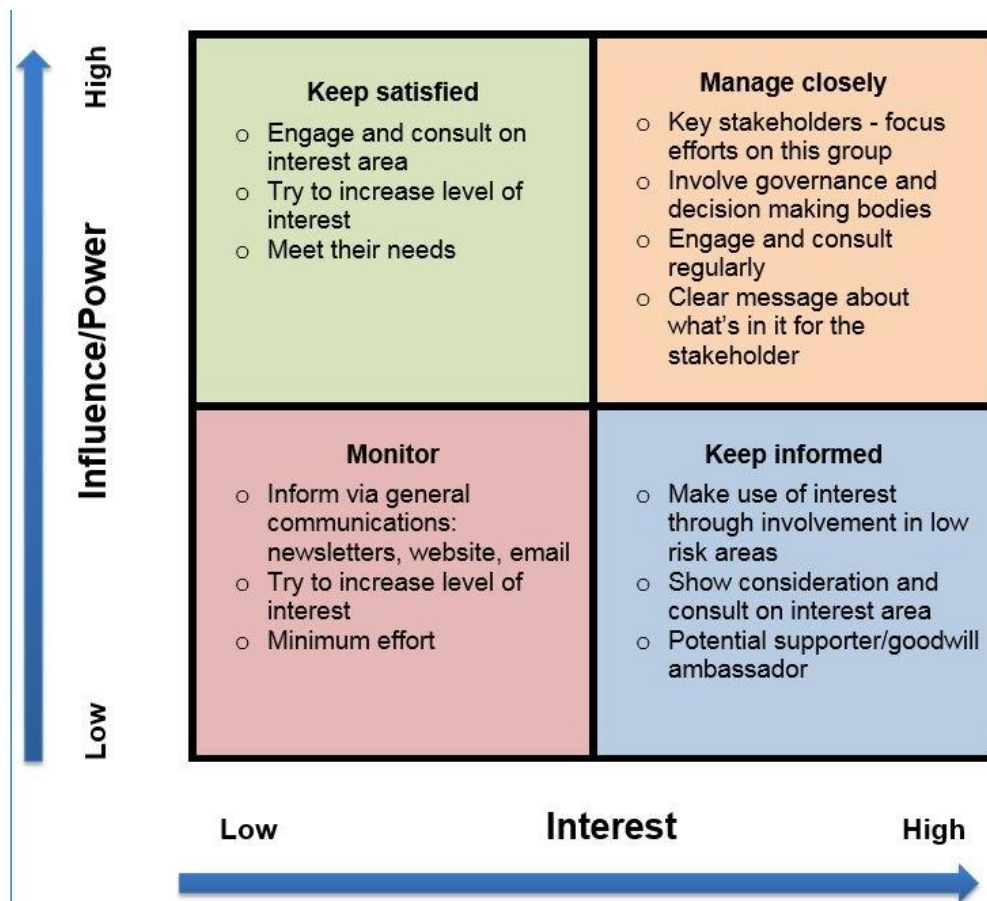


Figure 6 shows the collaboration level per identified stakeholder and it will guide the degree of engagement and which information needs to be provided to the stakeholder. The following are key stakeholders to be mapped for CWIS:

- General public;
- Line ministries (water and sanitation, environment, infrastructures, health etc....);

- Regulators;
- Consumers;
- Municipality;
- Financiers;
- Capture and containment facilities providers;
- FS collection and transportation services providers;
- FSTP operators;
- Landfill/incinerators operators;
- Environmental protection agencies;
- NGOs and
- Researchers/University.

8.3 Sanitation Sector Coordination

At the national level, there should be a lead institution for sanitation sector coordination. Ideally, this would be the institution responsible for sanitation policy development. Key institutions for engagement at policy level development & implementation and for sector planning & coordination include:

- Line ministries for water supply, water resources, environment, health, finance, local government, national planning, gender and education;
- Regulators for sanitation, water supply, water resources and environment;
- Water supply and sanitation service providers;
- Sector relevant cooperating partners;
- NGOs;
- CSOs and
- the private sector.

Coordination can be done through the following platforms:

- Technical/special sector working groups;
- Sector advisory groups;
- Inter-ministerial/sector consultation;
- National conferences/workshops,
- Surveys;
- Targeted stakeholder communications, knowledge sharing & dissemination; and
- Partner with learning and research institutions.

8.4 City/Town Level Planning

City/town level CWIS plans should be led by the Local Municipality and embedded within urban governance. At town level, there should be engagement of the community, local NGOs, civil society, private sector, as well as consideration of gender, low-income communities and disabled and elderly persons.

The utility should also have a close relationship with the municipality which gives the business license to service providers. Consideration of zoning of areas for service delivery with financial viability considerations will also be necessary for a sustainable planning.

In addition, formation of a technical steering committee to spearhead CWIS implementation- advising on and facilitating planning, M&E, reporting, resource mobilization, minimum standards for non-sewered sanitation, standard operating procedures, inclusive strategies to reach the most vulnerable and partnership building processes- will also be required.

For all concerned stakeholders to be fully engaged at planning level, the Municipality will need to promote public consultation in making decisions concerning provision of sanitation services and media engagement for advocacy will be necessary.

8.5 Community Level engagement

Community level engagement will be done through a Community Participatory Approach (CPA). Community involvement will be an important step in decisions for infrastructure, capital contribution, provision of labour and materials, in regulation through consumer representatives (Consumer Consultative Council, Consumer Watch Groups etc) and tariff consultations.

The CPA will:

- Encourage the formulation of community based organisations to participate in service delivery;
- Establish community champions for advocacy;
- Engage Women groups for gender-inclusive services and
- Ensure low-income communities are included for pro-poor and vulnerable focus.

The community should be consulted from the beginning of the project and during implementation phase for better service provision. Whenever applicable, management of provided infrastructures can be delegated to local communities to ensure ownership, understanding and adoption of the concept. The consultation process has been found effective especially when the concerned community understand clearly what the proposed products/services is bringing in and it is helpful during the implementation phase, especially in tariff setting.

Awareness campaigns and behavioural change strategies that are sensitive to cultural aspects and focus group discussions will help to fully involve the concerned community and achieve results which reflect their needs.

9. ADDRESSING GENDER, CULTURE AND SOCIAL INCLUSION

Ref:
CWIS Principle 1, 2

Gender, culture, disability and social inclusion are cross cutting issues which need to be addressed, particularly at the capture level.

For safely managed sanitation service provision, household toilets are preferred over shared toilets and community toilets because in most situations they are safer, especially for women, disabled and children. However, community toilets and public toilets are also important, especially in informal, low-income, high-density settlements where land space is restricted. The availability, design and location of public and community toilets affect how people use and move through these public spaces which can affect their participation in social and economic life.

The processes of planning, constructing (or upgrading) and managing toilets must adequately involve the community- especially women and girls- and respond to their specific requirements. Consultation at the beginning of a project, during execution even after is a must, as the local community has to understand the proposed concept for acceptability.

For instance, when thinking of building toilets to be used by a community, special attention should be taken in including urinals for men, showers and bins for menstrual hygiene for women, special toilets for disabled people and a toilets section for children.

Gender: Women and girls are the most affected when there is an issue related to water and sanitation. Women often bear cleaning responsibilities and, in many cases, are also responsible for the disposal of human waste. When involved in the WASH project, their inputs have been found valuable, especially in the management of provided infrastructures and in addressing sustainability in sanitation. Their involvement should be highlighted depending on local context.

Culture: Before providing onsite sanitation facilities such as toilets, cultural behaviour should be well studied for it to be successful as well. Important criteria to be checked in regards to capture facilities versus culture should include:

- Women behaviour during menstruation period (use of pads, showering, etc.);
- Men's perception of women during menstruation period;
- Education about menstrual hygiene; and
- Open defecation practices and myths around it.

For end products reuse (treated manure, co-composting), special attention should be given to local community's perception if necessary; and clear understanding of its reuse provided (Some cultures can't directly reuse manure from faeces if not mixed with other organic materials).

Sanitation workers: Intrinsic to safely managed sanitation, are sanitation workers who provide an essential public service but which often comes at the cost of the health, safety and dignity of those workers. Sanitation workers often face stigma and social discrimination resulting from the nature of their work. 'Sanitation work' includes emptying toilets, pits and septic tanks; entering manholes and sewers to fix or unblock them; transporting faecal waste; working treatment plants; as well as cleaning public toilets or defecation around homes and businesses.

Sanitation workers should be protected from occupational exposure through adequate health and safety measures, such as enforcing standard operating procedures (SOPs) and requiring personal protective equipment (PPE) for all aspects of sanitation work. There is need to reform policy, legislation and regulation to acknowledge and professionalise the sanitation workforce along the sanitation service chain.

Requirements for toilet users: In summary, there are six broad requirements that are important for all toilet users. To maximise the benefits for women and girls, while also meeting the needs of men and boys and a wider range of toilet users, such as older people and people with disabilities, the following are some specific requirements identified:

Table 11: Requirement for toilets users⁶

Broad Requirement	Specific Requirement
1. Be safe and private	Separate entrance for female toilet section
	Safe location
	Entrances, exits, walkways, paths and open areas used to access the toilet are well lit
	Designed for privacy
2. Cater for menstrual hygiene management and other hygiene requirements	Solid cubicle doors and structure that users can lock from the inside
	Access to handwashing facilities in each toilet/block – a basin, water and soap.
3. Be accessible to all users	Disposal of menstrual products
	Reasonable distance to the homes of users
4. Be affordable and available when needed	Accessible cubicle and path particularly for persons with disabilities
	If there are fees, they are affordable for all
	Opening times of toilets are adapted to the community needs and activity area, informed by user requirements and displayed clearly
5. Well maintained and managed	Enough cubicles (more female ones)
	Clean and well maintained
	Regular safe removal and disposal of waste, including used menstrual products and soiled nappies
6. Meet the requirements of caregivers and parents	Faecal and liquid waste management services either through sewer network or periodic desludging
	Have sufficient space to accommodate a caregiver for older and sick family and community members and those with disabilities

⁶ Female-friendly public and community toilets: a guide for planners and decision-makers, UNICEF, WaterAid and WSUP (2018)

10. PLANNING TOOLS

Ref:
CWIS Principle 6

The foundation of any CWIS system consists of robust, institutionalised performance indicators and monitoring systems that inform strategy, planning, and decisions at multiple levels of governance, financing and decision-making.

In recent years, many approaches have been developed to understand and address urban sanitation, from formal planning to more community-led processes. Many tools have also been developed, for example famous ones like the Shit-Flow Diagrams (SFDs) which graphically represent the estimated volumes of faecal matter safely managed or not. Many tools focus on non-sewered sanitation, such as decentralized systems and faecal sludge management (FSM).

Three main types of tools have been provided in order to help planners and decision-makers analyze their data and plan accordingly: diagnostic tools, prioritisation tools and planning and decision making tools.

10.1 Diagnostic tools

Table 12 shows the most common diagnostic tools used in the sanitation sector:

Table 12: Most common diagnostic tools

No.	Tool	Description	Use
1.	Shit Flow Diagram (SFD) https://sfd.susana.org/	SFDs are a useful tool to inform urban sanitation programming and communicate visualizing how excreta physically flow through a city or town. It shows how excreta are or are not contained as it moves from defecation to disposal or end-use, and the fate of all excreta generated. An accompanying report describes the service delivery context of the city. They offer an innovative way to engage city stakeholders like political leaders, sanitation experts and civil society organizations in a coordinated dialogue about excreta management.	City-wide diagnostic; useful for engaging stakeholders, advocacy (especially realizing the limits of the current system, if perceived 'good enough'). Useful diagram to introduce the topic.
2.	City Service Delivery Assessment for FSM (CSDA): https://www.worldbank.org/en/topic/sanitation/brief/faecal-sludge-management-tools	Assesses what policies, laws, institutions, processes and budgets exist for FSM services, and where gaps are. Assess the local enabling environment and quality of service delivery along the sanitation service chain, identifying areas for attention. Produces a scorecard.	Diagnostic of the local enabling environment, distinguishes its complexities.
3.	Sanitation GIS Mapping (customisable options exist)	Maps sanitation facilities and their status. Generates geographical maps showing the status of sanitation interventions.	Improve planning and monitoring of service delivery

10.2 Prioritization tools

Most common prioritization tools used in sanitation business are explained in the table below:

Table 13: Most common prioritization tools

No	Tool	Description	Use
1.	SaniPath http://sanipath.org/	The tool assesses exposure to faecal contamination in urban, low-income settings. The results of this assessment can be used to characterize a neighborhood or city according to a matrix of faecal exposure pathways. The outputs serve as a simplified, but still informative, means of identifying priorities for sanitation investments or interventions.	Prioritization: given health issues.
2.	Sanitation Safety Plan (SSP) WHO (2014): https://www.who.int/water_sanitation_health/publications/ssp-manual/en/	Brings health and sanitation sectors to map contamination pathways and highlight risks and priority interventions areas (geographical and/or sectoral). Uses WHO guidelines for wastewater and excreta management as a starting point.	Prioritization and linking with health professionals.
3.	Service Delivery Action Framework https://www.worldbank.org/en/topic/sanitation/brief/faecal-sludge-management-tools	“Which aspects of the enabling environment need development next?” Guide identification of actions in relation to the enabling environment, necessary to deliver desired results	Decision-support: prioritization (“what next”).
4.	Citywide Inclusive Sanitation Services Assessment and Planning (CWIS SAP) Tool (under development by BMGF)	Helps decision-makers to compare the effects of different sanitation interventions or investments on the dimensions of equity, financial sustainability and safety of sanitation services. The tool analyzes and illustrates how each possible intervention is likely to reach low-income areas, positively impact service providers’ viability and increase the amount of waste that is safely disposed of.	Support decision-making and communication about which interventions to prioritize.

10.3 Planning & decision-making tools

The most common planning and decision-making tools used in the sanitation sector are highlighted below:

Table 14: Planning & decision-making tools

No	Tool	Description	Use
1.	SaniPlan https://sites.google.com/site/pasprojectifsmguide/home?previewAsViewer=1	An Excel-based decision support tool, looking at city sanitation through 1) performance assessment, 2) planning and 3) financial planning. A distinct version has been made for FSM.	Decision support, towards a practical plan.
2.	FSM Toolbox https://www.fsmtoolbox.com/	A collection of tools designed for city sanitation planners and associated consultants, following a typical city sanitation planning process. It comes with many guidelines, example contracts and ToRs, and training modules, and as such is more a library of practical documents along the way.	Planning, especially going through practical steps and documents for planners.
3.	Septage Management Decision Support https://forum.susana.org/forum/categories/277-fsm-planning-tools-toolboxes-and-guidelines/16708-oxfam-s-septage-management-leader-s-guidebook#16708	An Excel-based tool to determine the main elements of an FSM plan, such as quantities to collect, a collection plan, CapEx and OpEx of collection, transport and treatment, and suitable tariffs.	Planning, based on financial analysis.
4.	Cost-effectiveness and options assessment https://www.uts.edu.au/sites/default/files/CostingGuidebookCRCWQT.pdf	Process to compare options for sanitation / wastewater on the basis of cost-effectiveness (original report) and sustainability. It combines technical, financial and geographical analysis, to provide a ranking of options and inform investment.	Technology choice based on sound assessment and ranking; use utilities' language.
5.	Intervention Options Assessment https://www.worldbank.org/en/topic/sanitation/brief/faecal-sludge-management-tools	Guide for identification of technical interventions along the service chain – linking to program design guidelines.	Technology choice
6.	Integrated design approach for FSM https://www.eawag.ch/en/departement/sandec/main-focus/management-of-excreta-wastewater-and-sludge/ (Being developed by EAWAG)	Tools under development to favor the reuse of sludge products, by looking: marketing; siting treatment plants given collection and transport; optimize treatment for recovery; characterize FS; and lab methods.	Technology choice (for recovery)