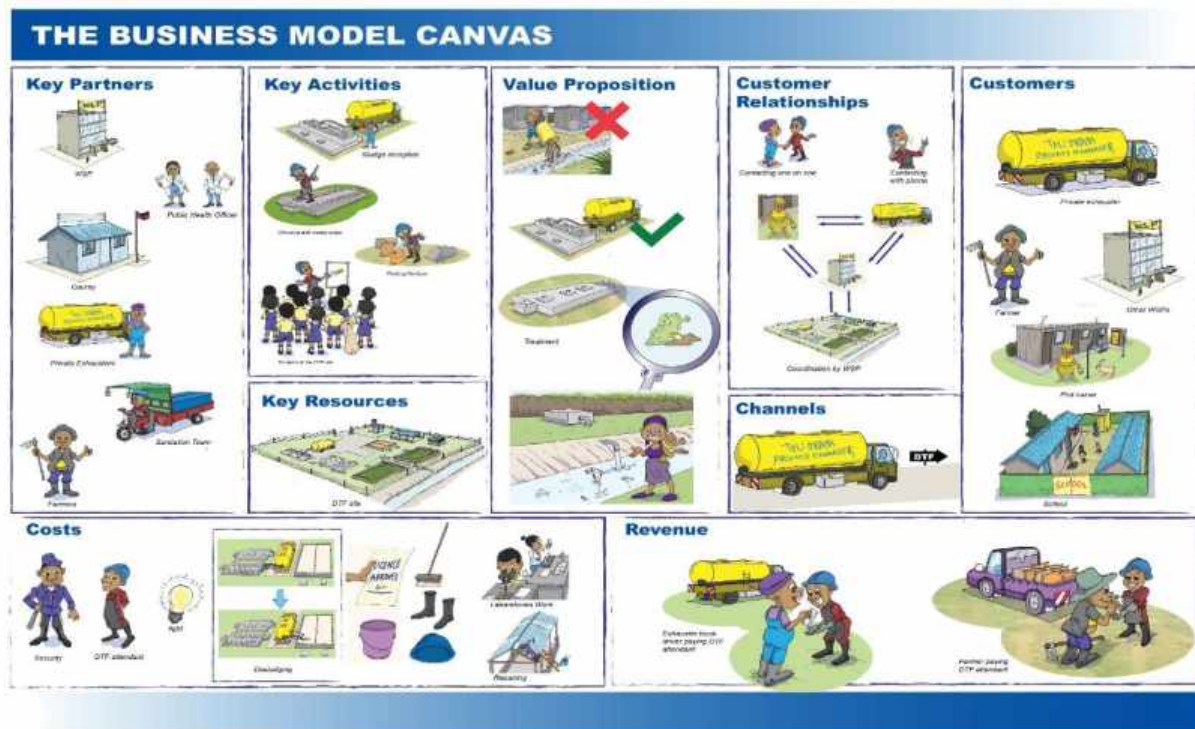


WATER SECTOR TRUST FUND

DTF Business Approach

A business model guide for the operation of a Decentralized Treatment Facility (DTF) within the UBSUP Programme.



Version: 2.0
Last Update: 3.8.2017



ISO 9001:2008 CERTIFIED



Table of Contents

List of Figures	3
Abbreviations	4
1 Introduction	5
2 Business Model Development	5
2.1 What is a Business Model?	5
2.2 The DTF Business Model	5
2.2.1 Products and Services: The Value Proposition.....	7
2.2.2 Activities and Resources	8
2.2.3 Partner Network	9
2.2.4 Costs.....	11
2.2.5 Know your Customers.....	12
2.2.6 Distribution Channels.....	14
2.2.7 Revenue Streams	15
2.3 Business Model Summary.....	16
2.4 Scenario Analysis: Emptying activities and the implications	16
3 Financial Planning and Sustainability.....	19
3.1 Economic Sustainability	19
3.2 Other Sustainability Factors.....	23
Strategy.....	25
3.3 Create an orientation: SWOT Analysis.....	26
3.4 Define a Focus: Strategic Plan.....	27
3.4.1 Risks and Mitigations	28
3.5 Create Meaning.....	28
3.6 Implement.....	28
Finance glossary	29
Annex	31
Annex 1: Business Model Canvas.....	31
Annex 2: Discharging Tariff Calculation Tool (simplified)	32
Annex 3 Discharge Tariff Calculation Tool (detailed).....	33
Annex 4: Detailed Costs for Operation and Maintenance	35
Annex 5 External vs. Internal DTF Operation.....	38



ISO 9001:2008 CERTIFIED



List of Figures

1 DTF Business Model Canvas.....	6
2 Value Proposition.....	7
3 Key Activities.....	8
4 Key Resources.....	9
5 Key Partners.....	10
6 Costs.....	11
7 Customers.....	12
8 Customer Relationships.....	13
9 Channels.....	14
10 Revenue.....	15
11 Building a Marketing Strategy: 4Ps.....	24
12 Main processes of Strategy Development.....	25
13 SWOT Example for a DTF Business.....	26



Abbreviations

CBO	Community Based Organization
CRM	County Resident Monitor (WSTF)
DTF	Decentralized Treatment Facility
FBO	Faith Based Organizaton
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
PHO	Public Health Officer
PPE	Personal Protective Equipment
SWOT	Strength, Weaknesses, Opportunities, Threats
UBSUP	Upscaling Basic Sanitation for the Urban Poor
WASREB	Water Services Regulatory Board
WSB	Water Services Board
WSP	Water Services Provider
WSTF	Water Sector Trust Fund
WRMA	Water Resource Management Authority



1 Introduction

The Up-scaling Basic Sanitation for the Urban Poor (UBSUP) programme of the Water Sector Trust Fund (WSTF) builds upon three major pillars to complete the Sanitation Value Chain: 1. Technical, 2. Social, and 3. Financial and Economic. This document addresses the Financial and Economic pillar in the human waste treatment segment of the programme: the 5 Decentralized Treatment Facility (DTF).

It is key to the UBSUP programme to operate the DTF in a financially and economically sustainable way. This document is meant to promote basic understanding on the general business model and to guide WSPs and their UBSUP Project Teams in the development of a sound business model for their DTF. The operation of DTFs can be carried out by Water Services Providers (WSPs) or private entrepreneurs. The DTF business model builds upon the existing UBSUP document *UBSUP Business Model and Business Plans (2014)*. The detailed information given in this new document specifies the DTF business model and the financial aspects of it. The content has been developed in a joint effort with Managers and Accountants from five WSPs that have constructed a DTF under the UBSUP programme. The WSP representatives and WSTF experts were brought together in a 3-day workshop in which ideas on the business model and scope were exchanged and collected, as well as different issues and aspects discussed. The outcome of the workshop has been used to compile and enrich this document.

Section 2 explains what a business model is and what purposes it fulfils. Further, it describes an exemplary DTF Business Model, which is based on the so-called Business Model Canvas. Section 3 gives guidance on the development of a business strategy. Lastly, Section 4 talks about financial planning and sustainability by demonstrating cost and benefit scenarios by using breakeven analyses and calculating payback periods.

2 Business Model Development

2.1 What is a Business Model?

A business model is a framework in which a company positions itself in terms of how it conducts business to sustain itself by creating, delivering and capturing value (economic, social, cultural, etc). The development of a business model is part of the overall business strategy. The topic of business strategy will be discussed in Chapter 3.

An easy method to develop a sound business model for the DTF business and operation is the use of the business model canvas which has been introduced by *Osterwalder, A. et al in Business Model Generation, 2010*. Each element of the canvas contributes to the holistic business model, which evolves around the so-called Value Proposition, meaning the products and services that are to be delivered to the market, society, or environment. Factors such as Key Activities and Resources form the basis for identifying the main costs of the business, whereas aspects of customer relationships and distribution lead to the revenue streams that are linked to the offered products and services. A business model canvas for practical use can be found in Annex 1.

2.2 The DTF Business Model

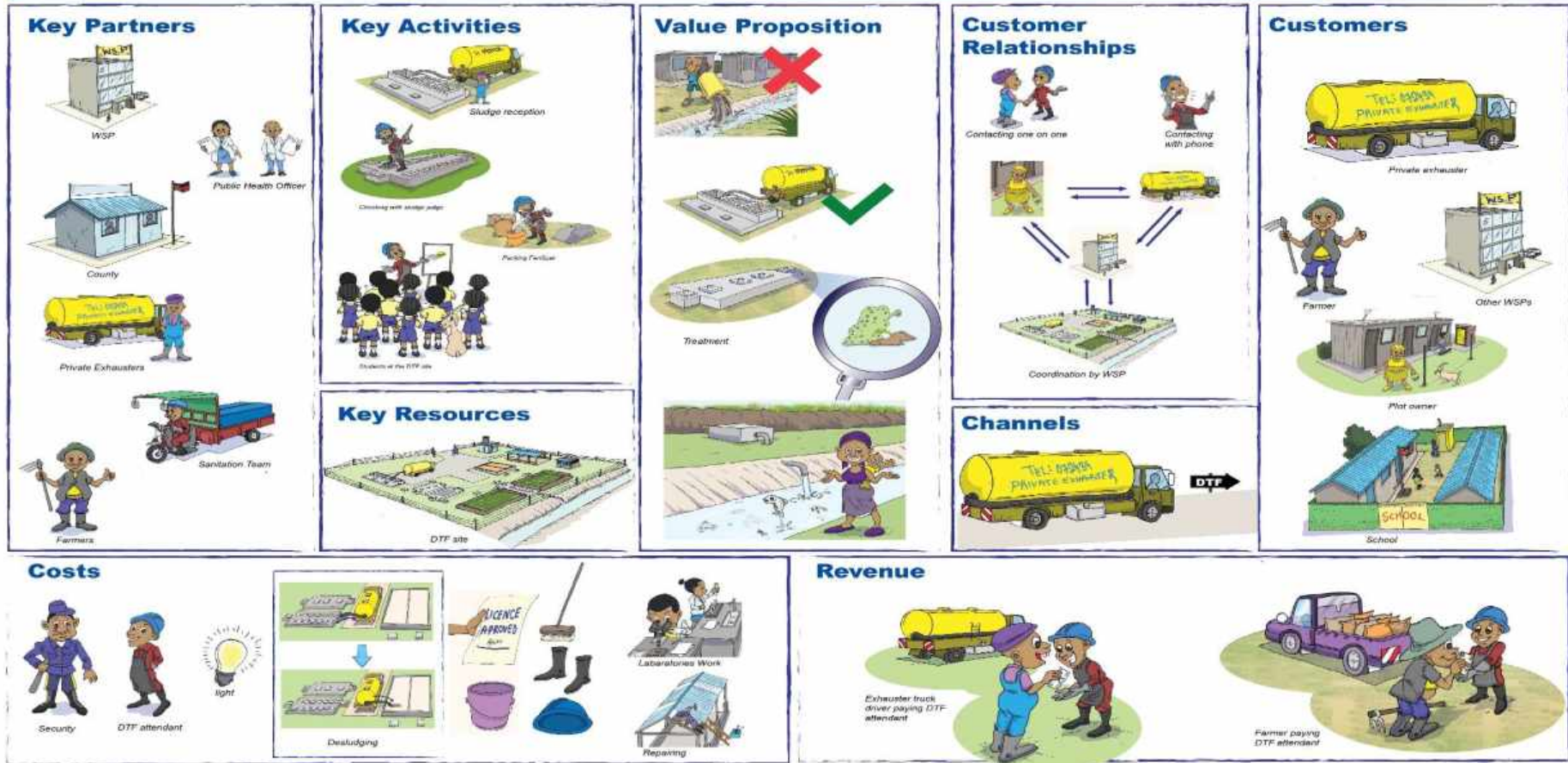
The DTF Business Model can be summed up in the canvas (Figure 1), which will be explained in the following subsections. Please keep in mind that this is just a guiding example and the business model



ISO 9001:2008 CERTIFIED



THE BUSINESS MODEL CANVAS



1 DTF Business Model Canvas



ISO 9001:2008 CERTIFIED



elements for each individual DTF may be extended or reduced by various factors only found in the specific location.

2.2.1 Products and Services: The Value Proposition

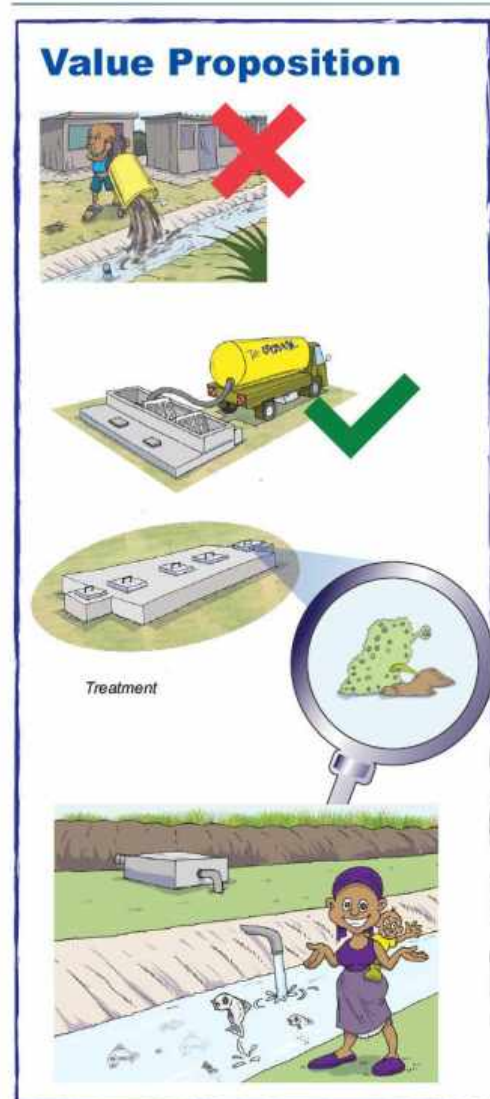
The goal of the DTF is to create **value** by offering crucial services and products to customers and other stakeholders. It is crucial for a business to know **WHAT** they are offering. This includes not only the directly provided services, but also the indirectly created value.

Value Proposition:

- Sludge and wastewater treatment
 - Legal disposal option for human waste through compliance with relevant regulatory bodies
 - Within a convenient distance and vicinity: Exhauster trucks do not have to travel far and save costs
 - Convenience and affordability
- By-products
 - Affordable and organic soil conditioner (dry sludge) and fertilizer (compost) outsmarts other chemical fertilizers in the market
 - Clean effluent suitable for reuse, e.g. irrigation, car wash, general cleaning, etc.

The provided services and products have positive side-effects, which add to the proposed value:

- Sludge and wastewater treatment
 - Improved water quality downstream
 - Improved public health
 - Preserved ecosystem
 - Promotion of innovativeness in faecal sludge and waste water management to stakeholders, e.g. County government, development partners
 - Area becomes more attractive to investors and settlers
- By-products
 - Sustainable agriculture
 - Safer and sustainable fertilizer
 - Improved food production through sustainable fertilizer
 - Crops that are safe for consumption
 - Business opportunities for new partners (private exhausters, Sanitation Teams)



2 Value Proposition

➔ The above given examples are meant as guiding ideas for WSPs and need to be adjusted to the individual environment and situation of each DTF.



ISO 9001:2008 CERTIFIED



2.2.2 Activities and Resources

The **key activities** involved in the above mentioned delivered services and products are diverse in nature. The key activities involved in the treatment of human waste are generally the same for all DTFs. However, depending on the additional services and products delivered and customers relations, the activities can vary.

Example: If a DTF is packaging its fertilizer, the packaging adds to the activities carried out – which ultimately may also result in additional costs.

In order to offer treatment services, a variety of activities need to be carried out daily, quarterly, annually or any other regular basis. Also, it needs to be differentiated between the commissioning phase (start-up period) and the operational phase.

Examples of activities carried out in all DTFs are:

Sludge and wastewater treatment

- Sludge reception
- Scheduling of sludge reception
- Flow management and monitoring
- Desludging
- Maintenance and repairs
- Marketing/branding of DTF
- Effluent quality tests
- Sampling for external laboratory works

By-Products

- Production of compost from dry sludge and organic waste
- Packaging of compost
- Marketing/branding of compost



3 Key Activities

A detailed list of activities can be found in the DTF operator's manual.

In addition, the DTF business has to think about how to distinguish the services and products from existing options in the market (e.g. illegal dumping, other treatment options, conventional fertilizer, etc.). It is key to ensure that potential customers and stakeholders are aware of the value offered by the DTF. Ways to ensure this can be:

- Awareness creation on DTFs, septic tank exhausting, existing exhausters
- DTF site as a training and educational centre for schools and other institutions and groups
- Physical evidence of what you are doing is actually working: awards, people, articles in newspapers/internet
- Marketing of the facility and its products and services
 - Branding material, such as posters, sign posts, beautification of the site, brochures, calendars

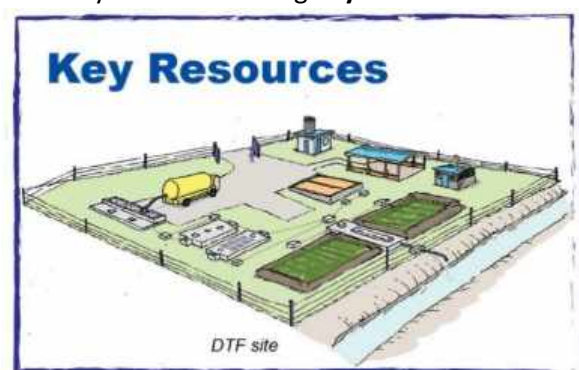
Moreover, the DTF can become more attractive with the following examples:

- After-Sale services
 - Providing equipment for exhausters (e.g. Personal Protective Equipment - PPE)
 - Act as link between customer and exhauster
 - Information sharing through SMS, social media, or other interactive media to inform exhausters about customers in waiting
- Truck washing and cleaning
- Re-use of the effluent, e.g. irrigation (reuse will make DTF more attractive)
- External appraisal and introduction of feedback sessions (ask clients about services provided, to improve on areas of weaknesses)
- Packaging the compost (can be marketed better)

The activities carried out may incur costs that will need to be considered in the overall cost structure of the DTF (see Section 2.2.4).

The treatment services and by-products offered by the DTF rely on the following **key resources**:

- DTF physical structure
- Qualified and well-trained Staff
- Exhauster, PPE, lab equipment, safety equipment
- Water and Electricity
- Tools
- Available guidance from WSP and WSTF (County Resident Monitors – CRMs)



4 Key Resources

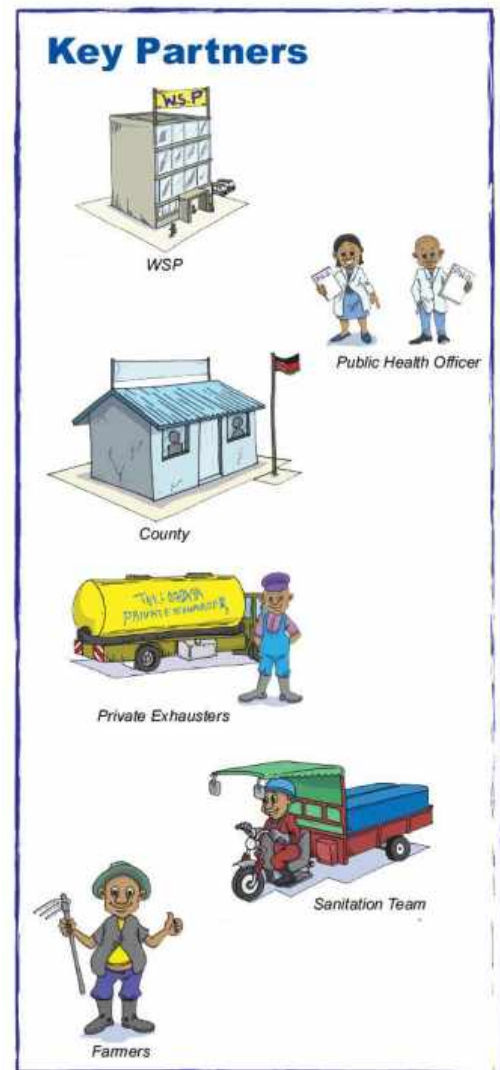
➔ **The above given examples are meant as guiding ideas for WSPs and need to be adjusted to the individual environment and situation of each DTF.**

2.2.3 Partner Network

The WSP, including the DTF operator and all other staff involved in the DTF, will have to interact with various stakeholders and may establish formal and informal partnerships to ensure that the business is operating successfully.

Key partners can be:

- Local Community, CBOs, NGOs, institutions, administration officers, FBOs to ensure acceptance of the DTF within the community or to assist with marketing the treatment service and fertilizer
- Public Health Officer (PHO) to ensure compliance with the law and to address matters of public health. The PHO is in the position to enforce laws against illegal dumping, making sure that DTF is used by private exhausters
- Development Partners (Donors) to potentially fund additional DTFs, to promote the DTF technology
- National authorities (WRMA, WASREB, NEMA, WSB, etc.) to ensure compliance with the law and regulation
- Research institutes and universities to improve human waste treatment through research and innovativeness
- WSTF to assist in technical challenges and advice on operation
- Private exhausters to feed sludge into the system during the pre-commissioning phase and to de-sludge the DTF when necessary
- Sanitation Teams for the operation of the composting area and treatment of UDDT waste and organic waste
- Other WSP staff, e.g. technical manager, financial manager
- Other WSPs and their exhauster truck – if there is no exhauster truck operating in the area of the DTF, it can enter a Memorandum of Understanding with another WSP to station one of their exhausters in the vicinity of the DTF. This may be cheaper than renting an exhauster on demand.



5 Key Partners

- DTF can be operated by external groups, however this is not recommended, due to the novelty of the DTF technology and lack of expertise in the market (Annex 3)

Some of these partnerships may create additional costs, which should be considered in the cost structure (see Section 2.2.4).

➔ **The above given examples are meant as guiding ideas for WSPs and need to be adjusted to the individual environment and situation of each DTF.**



ISO 9001:2008 CERTIFIED

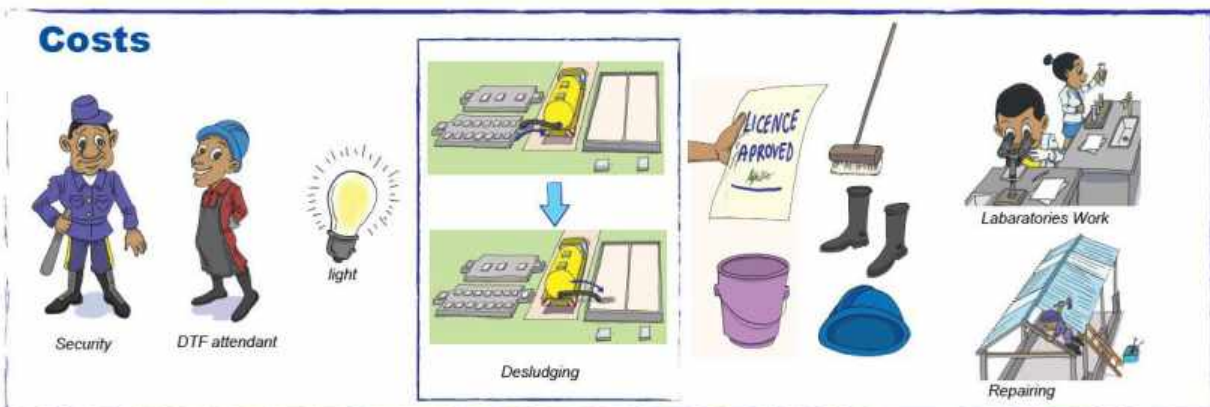


2.2.4 Costs

For the DTF a lean **cost structure** is the key to a successful and sustainable business model. As the single DTF is not expected to be able to scale up (maximum of 10,000 people served – 3 exhauster truck loads per day), the DTF business cannot rely on variable costs, such as economies of scale, where costs would decrease with increased production/activity. Also, the advantage of economies of scope will be limited, as the production of additional products or services is limited at the moment. Consequently, the business model will mainly focus on the fixed costs.

- O&M Costs
 - Lab charges
 - Security
 - De-sludging
 - Salaries
 - Transport
- Admin Costs
 - Transport
 - Billing (Water and electricity)
 - Allowances
 - Vaccinations
 - Detoxicants
 - Training
 - Depreciation Cost
 - Telephone costs
 - Insurance
 - Stationary, printing
- Equipment & Tools Costs
 - PPEs
 - Operational tools (wheelbarrows, shovels, jembe, laboratory equipment etc.)
- Visibility
 - Marketing
 - Sensitization
 - Publicity
 - Awareness creation
 - Visibility
 - CSR
- Statutory charges
 - Licenses
 - Permits
- Capital Cost
- Solid Waste Disposal Cost

A detailed list of all O&M costs can be found in Annex 4 as part of the Discharging Tariff Calculation Tool. Every DTF should review its individual costs, as they may vary from region to region and depending on possible variations in design (e.g. solar power vs. electricity supply from the grid).



6 Costs

Section 4 addresses issues of financial planning and sustainability. Here, different cost scenarios and their point of break even are simulated, as well as the pay-back period of the DTF construction investment. If a WSP has financed the construction of the DTF independently, it has to include the recovery of the approximately KES 8.3 million in its cost calculations.

2.2.5 Know your Customers

The DTF has two types of customers: the customers that are directly engaged with the DTF core business (treatment and fertilizer) and the customers that use the provided additional services (e.g. training, recreation).

Main customers are:

- Plot owners (if the DTF/WSP is operating their own exhauster)
- Private exhausters (if the DTF/WSP is not operating an exhauster)
- Other WSPs that own an exhauster truck
- Farmers

Customers that can benefit from additional services:

- Learning institutions
- Commercial businesses
- Community members
- Governmental institutions
- Industries
- Churches
- General public facilities
- Other WSPs



7 Customers

Depending on whether a WSP owns an exhauster truck, the main customers are either private exhauster trucks or plot owners. If the WSP does not have an in-house exhauster, the DTF will be interacting directly with private exhausters that make use of the treatment services. If the WSP owns and operates an exhauster truck, the interaction shifts to the plot owners and households that pay for emptying tanks or pits. If the latter is the case, it is important for the DTF business to be linked to the emptying business. The DTF tariff needs to be included in the emptying charges of the in-house exhauster in order to recover the O&M and capital costs of the DTF.



ISO 9001:2008 CERTIFIED



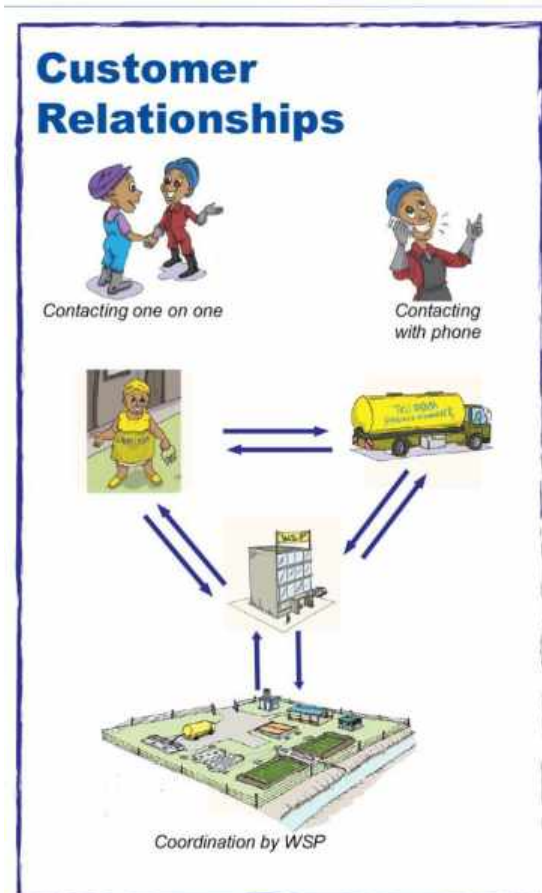
On the output side of the facility exists another customer segment – the consumers of soil conditioner and/or fertilizer. These are mainly small-scale farmers.

Each of these customer segments has different needs and pricing mechanisms which need to be considered in the revenue model. Tariffs for private exhauster trucks may differ from the tariff that is charged from household owners.

The **relations with the different customer** segments vary in nature. They can be direct interaction at the DTF site (if WSP does not own an Exhauster) or at the exhaustion site (if WSP owns an exhauster). Additionally, interaction can take place via direct phone calls, SMS, or social media.

Alternatively, the relation can be linked through a middle-man. The WSP head office could act as the middle man by coordinating and scheduling the emptying/disposal activities.

Scheduling plays a critical role in the operation of the DTF due to its limited capacity of 22m³ per day. Without scheduling the DTF risks to be under or overutilized.. Not meeting the demand would ultimately mean that exhauster trucks would need to be sent away, which can make the DTF generally unattractive and drive customers away. The worst effect can be that the DTF is not regarded as a safe disposal option anymore, encouraging customers to look for other (illegal) disposal options.



8 Customer Relationships

Example: Figure 8 displays a possible customer relation between DTF, Exhauster Operators and Plot owners, with the WSP as the middleman. This scenario can work for both in-house exhausters and private exhausters. Plot owners (or caretakers) inform the WSP about the need to empty a tank or pit. The WSP is aware of the capacity of the DTF and schedules their or a private exhauster to collect the human waste and to transport it to the DTF for disposal and treatment. Alternatively, plot owners could contact the Exhauster Operator (private) directly, who will then confirm the availability of a disposal slot in the schedule with the WSP. The WSP informs the DTF about the incoming waste.

➔ **Please note that this is only an example, which can and should be modified according to each DTF's and WSP's needs and operational environment!**



ISO 9001:2008 CERTIFIED



For customer relations, it is important to have proper communication structures and channels. If communication is poor, customers may be lost. Another factor in the customer relationship can be the role played by the **PHO** and **NEMA**. Their mandate to enforce public health and environmental laws impacts the demand for the DTF treatment services. A reduction of illegal dumping will lead to an increase in demand for the legal disposal offered by the DTF. Hence, the DTF should work closely with the Public Health Offices and NEMA representatives in the County.

The DTF staff has to assist the excavator truck operator with discharging the sludge into the receiving bay in order to ensure proper usage and avoid spillage. Additionally, s/he needs to keep a record of the customer, asking about the origin and quality of the sludge, as well as the name of the customer and truck license plate.

Critical for the customer relationship are marketing and sensitization activities (see Section 2.2.2). For example:

- Awareness creation
- Attractive tariffs
- Barazas, sports, tree planting
- Awards, people, articles in newspapers, internet
- After-sale services
- Cleaning centres
- Providing equipment (PPE)
- Information sharing (SMS, message, social gatherings, making phone calls)
- Offers, pricing psychology
- Enforcement from relevant authorities: NEMA, Public Health, local authorities

2.2.6 Distribution Channels

Depending on the target group and the service/product that is distributed, the channel through which they receive the DTF services and products varies. However, it is foreseen that service delivery is bound by the **location of the DTF**. Excavator trucks will discharge their sludge into the receiving bay after paying a fee. Farmers have to visit the DTF in order to buy the soil conditioner. The Sanitation Team also depends on the physical structure of the composting area, which is located in the vicinity of the DTF structure.



9 Channels

A different distribution channel can be considered, if the DTF business has the resources to provide a delivery service for soil conditioner. If the DTF business owns an excavator truck, the transport services can be in-sourced and the service delivery will be moved up the value chain, with the households or landlords as the direct customers.

The distribution channels can be summed up as follows:



ISO 9001:2008 CERTIFIED

Table 1 Distribution Channels



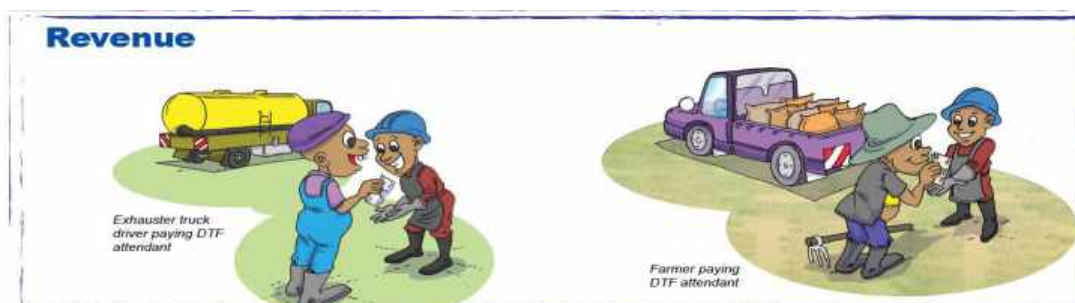
Value created	Emptying, collection (in-house exhauster)	Treatment	Fertilizer/soil conditioner	
Where	Plot level	DTF site	DTF site (pick up)	Farm (delivery)
Channel	Direct	Direct (priv. exhausters) Indirect (plot owners)	Direct	

➔ The above given examples are meant as guiding ideas for WSPs and need to be adjusted to the individual environment and situation of each DTF.

2.2.7 Revenue Streams

The revenue model is based on the different customer segments and should consider all customers' needs. This results in different pricing mechanisms for each customer type. The following list gives some options for pricing models that can be used by the DTF:

- Private exhausters:
 - Charges per load
 - When disposing
 - Pre-paid (e.g. 5 loads)
 - WSP can license private exhausters to provide services within the area of jurisdiction
 - Membership or registration fees
 - For cleaning services: fee for truck wash
- Farmers:
- Plot owners (in-house exhauster):
 - Monthly fees per household: standalone or linked to water bill (this must be justified for people without septic tank)
 - Fee per emptying
- Connected households
 - Fee added to water bill
- Visitors
 - Visiting fee
 - Training fee



10 Revenue



ISO 9001:2008 CERTIFIED



The above described revenue streams are forming the backbone of the DTF business model. However, the WSP should never feel limited to these revenue sources. If other business opportunities appear that are related to the DTF activities, the operator should explore these and consider to broaden the offered services. Examples of additional revenue sources are: services for SafiSan toilets and septic tanks, supplying sanitary items, or any other sanitation related activities.

2.3 Business Model Summary

The above given information is not a set business model, which has to be followed and implemented by every DTF – it is a **guide on how to develop a sound DTF business model**. The proposed elements of each section are guiding ideas. A DTF business should not limit itself to these elements and should constantly explore new opportunities and improvements to the business model. Also, the DTF operator shall keep in mind that some elements are not viable in the given environment a particular DTF is operating in. The sections can never be seen individually, as they are closely interlinked with each other and are highly dependent on each other.

Example: Additional services require additional activities, which are causing additional costs, offer additional revenue streams from additional customers, which need additional channels.

The crux of a business is that **revenue streams** need to **cover the incurred costs!** It is important to regard ALL activities and ALL customers when developing the business model. This means that also marketing and sensitization must be included and should not be regarded as insignificant.

Each section gives examples on how the business can be run. Ultimately, it is upon the DTF operator to decide, based on the environment and market, which activities will be carried out, how revenue will be collected, and so on.

2.4 Scenario Analysis: Emptying activities and the implications

It is important to acknowledge that the operation of an in-house exhauster truck has implications for the general business model, as well as the limited capacity of the DTF and the quality of waste. Table 2 gives a rough overview about these implications and experiences from conventional treatment plants.



ISO 9001:2008 CERTIFIED

Table 2 Implications of Emptying Matters



Scenario/ Issue	Implications for DTF Business Model	Experiences from conventional treatment plants
WSP owned Exhauster	<ul style="list-style-type: none"> + Moves service delivery to the plot level + Effective and efficient in service delivery + More revenue/more profit + Advantages of monopoly + CSR – pro-poor tariff setting due to flexibility in tariff setting by exhauster + Affordable service provision + Sludge quality control is easier + Easy to create awareness - Additional costs and activities, increased workload 	<ul style="list-style-type: none"> • Saving on transportation costs (DTF is closer) • Bureaucracy of the WSP can lead to increased costs: e.g. the exhauster is too old for proper operations, but the board does not buy a new one
Private Exhauster	<ul style="list-style-type: none"> + Compliment in areas of high demand + Assisting in benchmarking and bridging the gap (knowledge gaps) + Consistent revenue to the WSP + Marketing and outreach not internalized by WSP – Saving costs - Risk of non-compliance (regulation) - Risk of cartels - May dictate systems and processes to the WSP's disadvantage - Corruption - Lengthy decision making process for tariff setting 	<ul style="list-style-type: none"> • Monthly payments to avoid corruption at the disposal site • Tracking documents help to know where the waste comes from • All exhausters must be registered • Quality of sludge is wanting <ul style="list-style-type: none"> ○ Bad sludge is being penalized ○ Bad sludge is refused ○ Exhausters are being trained on sludge quality • Pricing conflicts <ul style="list-style-type: none"> ○ Involvement in pricing is needed ○ Stakeholder participation is needed ○ WASPA is lobbying with WASREB • Vested interest • Introduce a link with WSP • Having your own exhauster is better



ISO 9001:2008 CERTIFIED

<p>Limited capacity of DTF</p>	<ul style="list-style-type: none"> • Scheduling is necessary (days/towns...) • Parallel septic tank could hold excess waste • Construct another DTF • Sludge drying bed can be used for thick sludge, where weather conditions allow (dry) • DTF may not meet the demand • Risk of illegal dumping • Sensitization is needed <ul style="list-style-type: none"> ○ For proper communication to avoid miscommunication ○ Make people (exhausters and community) understand the need for a schedule • Develop system for the entire process • Partnerships with other institutions/organizations (e.g. CBOs) to help monitoring toilets – to help with scheduling 	<p>NA</p>
<p>Quality of Waste</p>	<ul style="list-style-type: none"> • Option: Adjusting tariff according to quality of waste • Sensitization and awareness: <ul style="list-style-type: none"> ○ Training forums for community and exhausters ○ Posters, flyers, stickers • Register all exhausters 	<ul style="list-style-type: none"> • Tracking document



3 Financial Planning and Sustainability

3.1 Economic Sustainability

The long-term success of any business relies on its financial viability and long-term planning. Consequently, the DTF business should plan its finances properly. WSPs need to ensure good accounting practices that budget for the occurring DTF operation costs.

Table 3 Estimated DTF O&M Costs

Item	Unit Type	Qty	Frequency per year	Unit Price (KSH)	Annual Costs (KSH)
Labour Costs					
Plant Operator	Item	Ls	320	700	224,500
Security Services	Item	Ls	365	500	182,500
Replacement of Equipment					
PPE	No.		Annex 1 for details		9,745
Security gear	No.		Annex 1 for details		2,550
O&M tools	No.		Annex 1 for details		4,583
Cleaning and gardening tools	No.		Annex 1 for details		2,124
Monitoring and laboratory equipment	No.		Annex 1 for details		23,978
DTF parts	No.		Annex 1 for details		28,557
Consumables					
Electrical items	No.		Annex 1 for details		500
Cleaning products	No.		Annex 1 for details		2,080
Paint & others	No.		Annex 1 for details		8,800
Combustible material	No.	8	48	5	1,920
Laboratory consumables	No.		Annex 1 for details		2,700
Office supplies	No.		Annex 1 for details		14,267
Energy and Water costs					
<i>Lighting of 2 rooms + 2 security light + 3 electrical sockets + instant shower (around 50kWh)</i>					
Grid Connection*	KWh	50	12	11	6,600
OR: Solar Power	KWh	50	12	0	0
<i>Supply of 40L of fresh water daily</i>					
Water delivery through water bowser*	No.	1	25.6	1,000	25,600
OR: Connection to the water supply network	Item	Ls	12	204	2,448
Repairs					
DTF infrastructure			Annex 1 for details		14,650
Services					
Exhausting services	No.	1	0.5	4,000	2,000
External laboratory services*	No.	1	4	15,000	48,000
OR:	No.	1	4	2,000	8,000



ISO 9001:2008 CERTIFIED



Internal laboratory services					
Licenses					
NEMA Certificate	No.	1	1	30,000	30,000
Sub Total (KSH)					567,145
Misc. & contingencies	%	5%		65,529.70	28,357
Total Annual O&M Costs (KSH)					595,502
* Not included in this scenario.					

As shown in Table 4, the estimated total annual costs for a DTF that is powered through the power grid, that receives water through the water supply line, and is using internal laboratory services is around KSH 718,000. This figure may vary in different towns or Counties, depending on the market and environment in which it is operating. Equipment may be more expensive or cheaper, repairs may occur more often in regions with harsher weather conditions. Hence, every DTF should make their own calculations considering their specific environment. Furthermore, cost calculations should be reviewed on a frequent basis to consider national economic effects, such as inflation, supply shortages, etc.

A WSPs should also consider their investment cost recovery plan. This means, annual recovery costs must be calculated additionally to the O&M costs.

Example: *If the company wants to recover KES 8.3 million of DTF investment costs within 20 years, the annual recovery costs will be $8,300,000/20 = \underline{KES 415,000}$*

As mentioned before, it is key to any business to cover its costs (Section 2.2.4). This is where revenue streams (Section 2.2.7) come in. Whichever revenue model the DTF operator chooses, it has to collect enough money to cover the costs and to achieve the targeted margin (cost coverage above 100%). A DTF is likely to combine different revenue streams.

Example: *The WSP does not own an exhauster. Small private exhausters with an average capacity of 7m³ (average) can register with the WSP against an annual fee of KES 8,400 in order to be allowed to access the DTF services. Each time an exhauster disposes human waste at the DTF it pays a disposal fee. Additionally, the DTF can sell fertilizer and charge an entrance fee from visitors. All this combined must cover the costs.*

The *DTF Discharge tariff calculating tool* assists DTF operators to calculate their annual costs and investment capital recovery costs, as well as the disposal fee that needs to be charged to cover these costs. The fee is currently calculated based on the maximum capacity of the DTF (22 m³/day). This equals approximately three (3) small exhauster trucks per day. Hence, it is crucial to reach this capacity and to adjust marketing accordingly and to cooperate with relevant partners (e.g. PHO). The tool calculates the minimum fee that needs to be charged per m³ to cover the DTF annual O&M costs and the yearly investment recovery costs. Furthermore, it allows to calculate the maximum pro-poor margin¹ that will be charged additionally. When calculating the pro-poor margin, the DTF shall liaise with the regulator (WASREB) to ensure pro-poor service delivery while operating above cost coverage.

¹ Pro-poor margin = A margin that ensures revenue collection above cost coverage, but is limited to a certain percentage in order to ensure affordability for poor and vulnerable customers.



ISO 9001:2008 CERTIFIED



Table 5 displays an example on how to calculate the DTF Tariff. The scenario includes the annual recovery cost of KES 415,000 infrastructure investment given in the example above (20 years recovery).

Table 4 Fee Calculation

Fee Calculation		
Total annual volume expected to be treated by DTF*	7,040 m ³	
Annual O&M Costs to be covered (KSH)	595,502	
Annual investment recovery cost (recovery period: 20 years) (KSH)	415,000	
Total Annual costs (KSH)	1,010,502	
Pro-poor margin**	0%	10%
	Minimum fee	Maximum fee
Tariff per m ³	143.54	157.89
Small truck (av. capacity 7.5m ³)***	1,076.53	1,184.18
Medium truck (av. capacity 12.5m ³)***	1,794.22	1,973.64
Large truck (av. capacity 17.5m ³)***	2,511.90	2,763.09
*22m ³ x 320 days – may be increased with new technologies		
**Example – actual pro-poor margin to be set by WASREB		
***Truck sizes may vary		

Although the number of expected disposals into the DTF is based on the maximum capacity of the DTF, it is advisable to look at different scenarios, in which the expected amount of sludge is not achieved. A breakeven analysis is a good tool to identify the implications of various scenarios. The point of break-even is the amount of sludge (unit in m³) which a DTF would need with a given price to recover its costs. This can be used as a basis to calculate the working days based on the actual truck loads per day.

The break-even volume (BEV) is calculated as follows:

$$BEV = \frac{\text{fixed costs}}{\text{revenue per unit} - \text{variable cost per unit}} = \frac{\text{fixed costs}}{\text{unit margin}}$$

As the DTF does not have any variable costs, the unit margin equals the revenue per unit.

Table 6 displays three break-even scenarios, based on the above calculated maximum fee of KES 161.40 (margin of 10%). With reaching the expected 22m³ per day, the business would break even after 291 days. The implications when the expected 22m³ are not met are grave: the business would not be able to cover its annual costs (days to break even exceed one year).



ISO 9001:2008 CERTIFIED



Table 5 Break even with maximum revenue

	Costs to be covered	Maximum revenue per m ³ [KES]	m ³ to break even	m ³ per day	Days to break even
Scenario 1	1,010,502	157.89	6,400	7	914
Scenario 2	1,010,502	157.89	6,400	14	457
Scenario 3	1,010,502	157.89	6,400	22	291

Furthermore, a break-even analysis can assist in calculating the estimated annual cash-flow by considering the remaining days to collect a positive cash flow (Table 7).

Table 6 Break-even and Cash Flow

Costs to be covered	Maximum revenue per m ³ [KES]	m ³ to break even	m ³ per day	Days to break even	Days remaining to collect positive cash flow	Annual cash flow [KES] : Price*m ³ *remaining days
1,032,981	157.89	6,400	22	291	29	101,044

If a DTF does not cover its costs, the operator should review its pricing strategy. When doing so, however, s/he needs to consider the effects on customers: e.g. a price hike may result in fewer customers. Hence, it is crucial to analyse why the DTF does not reach the expected m³ per day, and how additional revenue streams can be exploited.

When deciding on a pricing strategy, it is important to carry out a thorough market analysis. This includes market size, trends, growth rate, profitability, industry cost structure, distribution channels, key success factors and key success details. Furthermore, it is necessary to comply with existing regulations set by WASREB.

DTF Tariff and WSP-owned exhausters

If a WSP owns an exhauster, the DTF fee per m³ should be charged at the point of sludge collection – at the plot level. However, the overall tariff of exhausting should go down, as the overall transport cost should be reduced, due to the proximity of the DTF – less fuel and maintenance needed. Ultimately the cost of exhausting a septic tank should be reduced with the presence of a DTF in the area. Table 8 shows a simplified semantic calculation, in which transport costs have been reduced by 75 per cent.



ISO 9001:2008 CERTIFIED



Table 7 Emptying fee for in-house exhausters with DTF

	Scenario 1	Scenario 2
	Conventional Treatment in other town	DTF in vicinity
Distance	20 km	5 km
Transport Costs*[KES]	4,000	1,000
Other Costs [KES]	4,000	4,000
Other Revenue [KES]	2,000	2,000
Discharge Tariff [KES]	1,000	1,184.18**
Emptying Fee [KES]	11,000	8,184.18
* Transport Costs reduced by 75% **Small Truck with an average capacity of 7.5m ³ Note: All figures are exemplary and simplified		

3.2 Other Sustainability Factors

The sustainability of a business does not only depend on its financial viability, but also on other factors that need not be ignored.

Factors that influence economic sustainability

As briefly mentioned above, it is important to know the market in which the DTF is operating. The business should observe the market constantly in order to react in a timely manner to changes, such as increased supplier prices, new partners, new competitors (legal or illegal human waste disposal), sludge quality.

Furthermore, the discharge tariff should be reviewed on a regular basis in order to ensure continued cost coverage.

In order to sustain its business, the DTF should engage in marketing activities. Particularly in the beginning of operating the facility it is important to build a customer base, so that the DTF can run on its full capacity right from the start. A marketing strategy is built on the so-called 4 P framework (E.J. McCarthy, Basic Marketing: A Managerial Approach, 1964): Figure 11.



11 Building a Marketing Strategy: 4Ps

Further details on marketing mix and strategies for DTFs can be found in the UBSUP document on DTF marketing.

It is key to the success of the DTF business to plan and schedule the sludge reception in an organized and transparent manner. Customers must understand why (limited capacity) scheduling is necessary and why emptying or sludge reception may be delayed. It must also be considered that demand may fluctuate based on external factors, such as weather conditions and payment of the customer's salary/rent in the beginning of the month. Daily record keeping of incoming waste is also important in order to track possible sources of bad sludge.

Monitoring of the treatment process is of utmost importance, as low quality of the effluent released into the environment can lead to sanctions or closure of the business. Moreover, the reputation of the DTF may suffer among the neighbouring communities.



ISO 9001:2008 CERTIFIED



Environmental sustainability

The DTF should operate environmentally sustainable. By nature, the DTF technology contributes positively to the environment by reducing human waste pollution and improving water quality in the area. However, there are many other things that need consideration, such as:

- Solid waste disposal
- Clean energy (e.g. solar vs. diesel generator)
- Landscaping (e.g. grass & trees, bird nesting, erosion control, clean air)

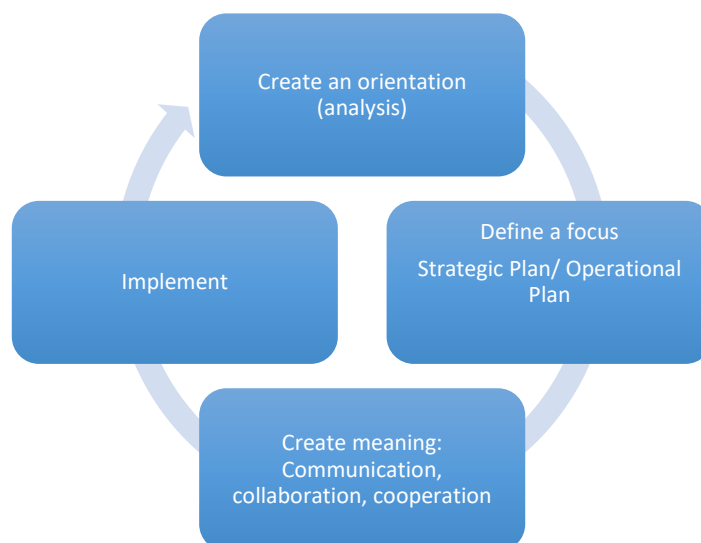
These and other environmental factors also have a positive impact on the economic sustainability, as solar energy is more sustainable or landscaping can attract visitors (see Section 2.2.1)

Social sustainability

Another central factor of sustainability is the social impact that a business has. Particularly, because the DTF is very much associated with the delicate matter of human waste, it has to consider neighbouring communities. To avoid or overcome opposition it is important to integrate community members in the business activities on a regular basis. This can be done through job creation (e.g. security services or landscaping by local community members) and through community education and capacity building (e.g. DTF tours or events on hygiene). Also, the DTF should communicate the benefit it brings to the community, such as improved public health, cheaper emptying, and clean water. Further, it is crucial to immediately address issues that impact the community and seek the dialogue when complaints are arising. The impact of community members on the DTF business should not be underestimated.

Strategy

The WSP should keep in mind that the Business Model chosen is in fact a crucial part of an overall Business Strategy and should be in line with the latter. The strategy describes **the methods a company is using in order to achieve its overall objectives**. Having a sound strategy ensures the sustainability of the business. Figure 12 illustrates the four major processes of strategy Development.



12 Main processes of Strategy Development

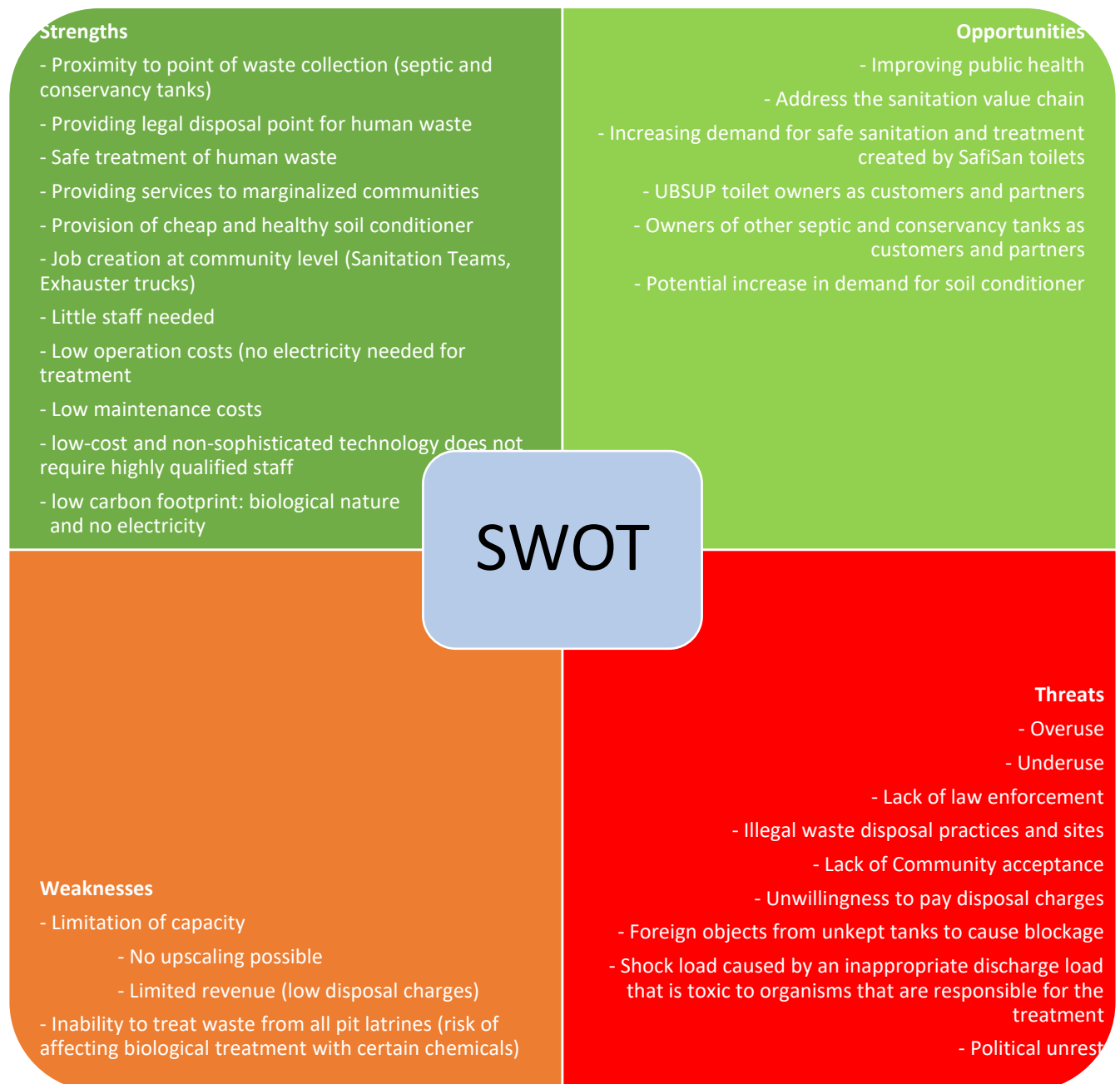


ISO 9001:2008 CERTIFIED



Every WSP should define the key objectives for its DTF individually and decide on the strategy based on the specific situation and environment in which the DTF is operating. A good starting point to develop a business strategy is conducting a so-called SWOT analysis, in which **Strengths**, **Weaknesses**, **Opportunities** and **Threats** of the business are analysed. Figure 13 shows an example of a SWOT analysis for a DTF.

3.3 Create an orientation: SWOT Analysis



13 SWOT Example for a DTF Business

Based on the SWOT analysis a DTF operator can identify how to make use of the DTF's strengths, how to seek possible opportunities, and how to handle weaknesses and mitigate threats.



ISO 9001:2008 CERTIFIED



3.4 Define a Focus: Strategic Plan

The objectives of the DTF is the long-term vision that the business has when fulfilling its mission. The mission and vision go hand-in-hand with the above stated value that is created by the DTF (see 2.2.1). The mission is the purpose of the business, in this case offering human waste treatment services in an underserved area. The vision is what a business aspires to become in the future. It defines the direction in which a business wants to grow. A vision is a clear statement, which each DTF operator should develop for their DTF.

The vision should state the value that is created by the business and can include the following aspects:

- To be a training and educational centre for institutions, schools
- Going green – to be environmental friendly (no plastic trash)
- Key stakeholder involvement: Baraza, sports, CSR, tree planting
- To ensure good customer relations (communication skills, hygiene, record keeping, sober, skilled labourer, Qualified personnel, WSP should offer: continuous training, flexi-time)
- To be the leading Sludge Management Centre in the area/region
- To offer recreational facilities through proper facility maintenance (no spill-over and smell) and landscaping
- Being sensitive to new technology/innovations
- To nurture mutual beneficial partnerships: local community, CBOs, NGOs, institutions, administration officers, FBOs, private exhausters
- To continuously improve services based on client and community feedback

Example: “To be the leading innovation hub for human waste treatment and re-use in Sultan Hamud”.

After having conducted a SWOT analysis and defined its mission and vision, the DTF business can analyse 4 aspects of its business and develop a roadmap and action plan:

- financial (profit)
- customer satisfaction
- internal processes
- innovation

The key to a *successful business* is to make a *profit*, for which you need *happy customers* for *good products or services*, that you produce with *efficient processes*. To keep your customers and to generate new customers, the DTF business needs to be innovative and open for new technologies and approaches.

The analysis of the SWOT outcomes should result in a **roadmap and action plan for future activities** of the DTF.² This will lead to the operational plan of the business.

² A guide for developing a business strategy can be found on:
www.rapid-business-intelligence-success.com/creating-a-business-strategy.html



ISO 9001:2008 CERTIFIED



3.4.1 Risks and Mitigations

The SWOT analysis also helps the operator to identify possible risks based on the identified external threats. In order to address these risks, the DTF operator should develop possible mitigations which should be part of the overall roadmap and integrated in the action plan and operational plan. Possible examples are listed in Table 3.

Table 8 Risks and Mitigations

Risks	Mitigations
Overuse	Scheduling to ensure regulation of incoming sludge. Estimate the demand based on the SafiSan marketing success in a timely manner and apply for an additional DTF in proximity to the SafiSan target area(s).
Underuse	Explore possible reasons for underuse. E.g. lack of awareness - Market the DTF among exhauster trucks and other sanitation entrepreneurs. Competing illegal dumping sites – cooperate with the County’s Public Health Office.
Illegal waste disposal practices and sites	Cooperate closely with County’s Public Health Office.
Lack of Community acceptance	Sensitize through barazas, road shows, open-door events.
Unwillingness of toilet owners to pay disposal charges	Market the benefits of legal human waste disposal, create community awareness to create willingness to pay exhauster trucks accordingly, so that costs can be covered
Lack of demand for by-products	Increase marketing, actively approach potential customers, give initial incentives, e.g. buy one get one for free
Foreign objects causing blockage	Sensitize exhausters on the need of “clean” human waste, Keep record of exhauster trucks and origin of the waste (tracking document).
Theft and vandalism	Maintain the fencing, ensure good security services.
Political unrest	Maintain the fencing, ensure good security services.

3.5 Create Meaning

A plan is just a plan until it has been taken over by others who see it as a meaningful change process. They should become part of the capacity development plan of staff members, as communication, cooperation and collaboration in terms of teams that are high performing and in having good partnerships are absolutely musts for the plan to become successful.

3.6 Implement

When implementing the strategic plan, the key to success is to monitor the implementation. Just as the operational plan needs to be measured based on key success factors, the same must happen for the strategic plan. Based on the monitors achievements and non-achievements, the DTF business can take action in a timely manner to reach its overall goals.



Finance glossary

Break-even Analysis Determines when the business will be able to cover all its expenses and begin to make a profit.

Section 4.1

(more: <https://hbr.org/2014/07/a-quick-guide-to-breakeven-analysis>)

Break-even Volume (BEV) The volume needed to cover costs. (see point of break-even)

$$\text{BEV} = \frac{\text{fixed costs}}{\text{revenue per unit} - \text{variable cost per unit}} = \frac{\text{fixed costs}}{\text{unit margin}}$$

Section 4.1

Business Model A framework in which a company positions itself in terms of how it conducts business to sustain itself by creating, delivering and capture value (economic, social, cultural, etc). The development of a business model is part of the overall business strategy.

Section 2.1

Business Model Canvas Each element of the canvas contributes to the holistic business model, which evolves around the so-called Value Proposition:
Key Activities, Key Resources, Partners, Customers, Customer Relationships, Channels, Costs, Revenue Streams.

Section 2.2

Section 2.3

Annex 1

Business Plan A formal statement of business goals, reasons they are attainable, and plans for reaching them. It may also contain background information about the organization or team attempting to reach those goals.

https://en.wikipedia.org/wiki/Business_plan

Business Strategy Describes the methods a company is using in order to achieve its overall objectives. Having a sound strategy ensures the sustainability of the business. The Business Model chosen is in fact a crucial part of an overall Business Strategy and should be in line with it.

Section 3

www.rapid-business-intelligence-success.com/creating-a-business-strategy.html

Cost and Benefits analysis A systematic approach to estimating the strengths and weaknesses of alternatives (for example in transactions, activities, functional business requirements); it is used to determine options that provide the best approach to achieve benefits while preserving savings.

https://en.wikipedia.org/wiki/Cost%E2%80%93benefit_analysis



ISO 9001:2008 CERTIFIED



Cost recovery

Refers to the deduction of a portion of the cost of an asset, used in a business or for the production of income, over its useful life through depreciation, amortization, or depletion.

Section 4.1

Fixed Costs

Do not change with an increase or decrease in the amount of goods or services produced or sold. Fixed costs are expenses that have to be paid by a company, independent of any business activity.

Section 2.2.4

Marketing Mix (4 Ps)

Is a set of marketing tools that the firm uses to pursue its marketing objectives in the target market. The marketing mix refers to four broad levels of marketing decision, namely: product, price, promotion, and place.

Section 4.2

Point of break-even

The amount of sludge (unit in m³) which a DTF would need with a given price to cover its costs. (see Break-even Volume)

Section 4.1

Profit

A financial gain, especially the difference between the amount earned and the amount spent in buying, operating, or producing something.

Section 4.1

Revenue

The income that a business has from its normal business activities, usually from the sale of goods and services to customers. Revenue is also referred to as sales or turnover.

Section 2.2.7

Section 4.1

SWOT Analysis

Is a crucial part of developing a business strategy. It analyses the Strengths, Weaknesses, Opportunities and Threats of a business.

Section 3.1

Variable Costs

Vary with the level of output:

- economies of scale: a proportionate saving in costs gained by an increased level of production.
- economies of scope: a proportionate saving gained by producing two or more distinct goods, when the cost of doing so is less than that of producing each separately.

Section 2.2.4

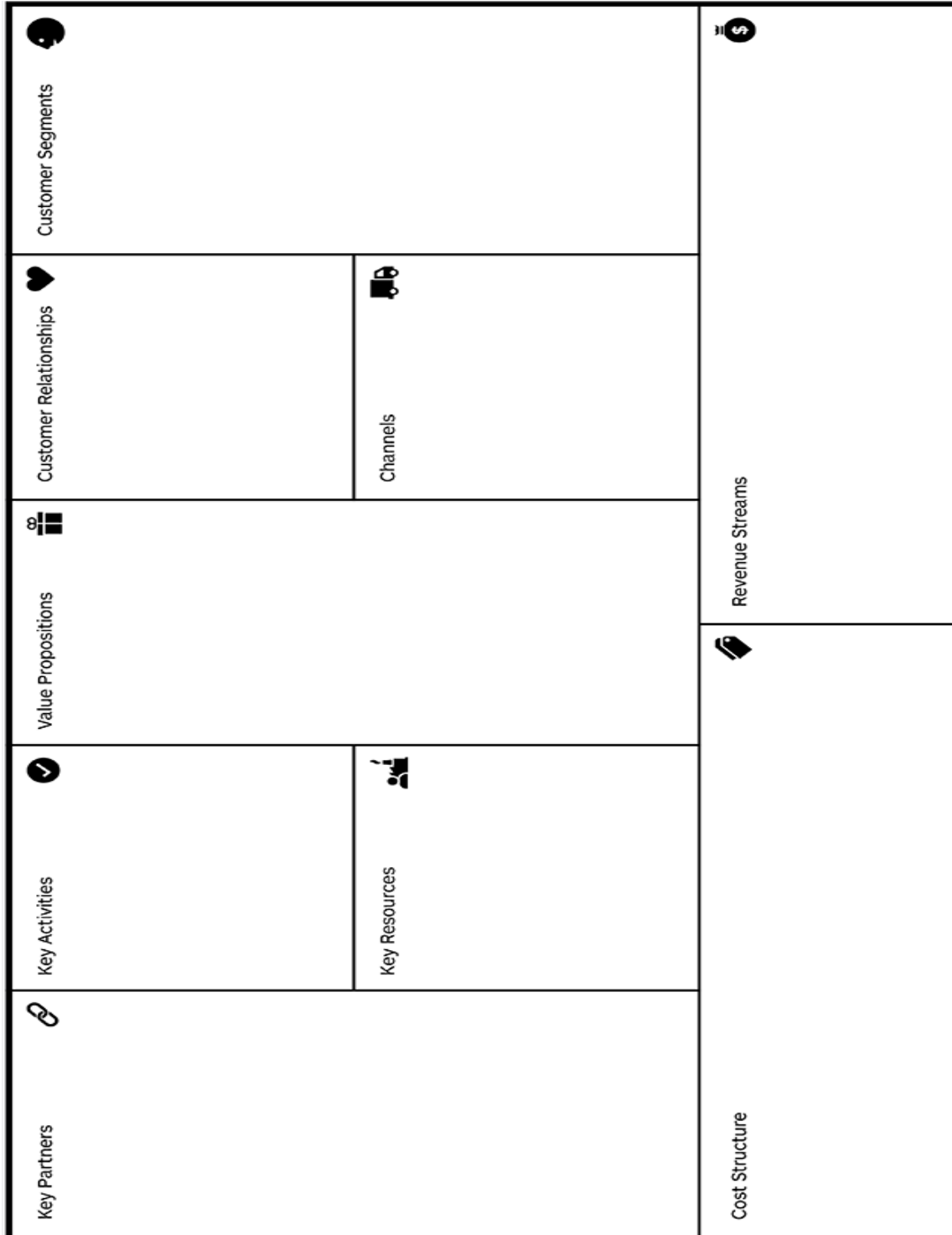


ISO 9001:2008 CERTIFIED



Annex

Annex 1: Business Model Canvas





Annex 2: Discharging Tariff Calculation Tool (simplified)

Discharging Tariff Simplified Calculation Sheet

Answer all nine questions (twelve fields to be filled out) - Discharging tariff will be generated automatically

1. How many days per year is the DTF operational?

320

2. What is the daily cost allocated for the operator(s)'s wage?

700 KES

3. What is the daily cost allocated for security (night/day guard)?

500 KES

4. How does the DTF get its electricity?

Solar Power feed

5. How does the DTF get its water?

Water delivery

If water delivered by water bowser: how much is a single trip to the DTF (to fill the 500L tank)?

1,000 KES

6. How much does the desludging service of a DTF cost?

4,000 KES

7. What laboratory is used for the quarterly test of the DTF effluent?

Internal Laboratory

If effluent quality test is done by an external laboratory: what is the cost of a set of chemical and bacteriological test?

15,000 KES

If effluent quality test is done by an internal laboratory: what is the cost of a set of chemical and bacteriological test?

2,000 KES

8. What is the annual cost for certification and permits related to the operation of a DTF?

100,000 KES

9. What is the total cost invested for the construction and the full operationalisation of a DTF?

8,300,000 KES

Tariffs			
Truck Size	Small	Medium	Large
Total Fee	1,000 KES	1,700 KES	2,500 KES

Description	Annual cost [KES]
Labour	406,500
Replacement of equipment	75,114
Purchase of consummables	31,780
Water and Electricity	25,600
Repairs	15,383
External services	16,000
Licenses	100,000
Capital recovery cost	276,667



ISO 9001:2008 CERTIFIED



Annex 3 Discharge Tariff Calculation Tool (detailed)



ISO 9001:2008 CERTIFIED



Discharging Tariff Calculation Sheet

Read only

All results from this sheet are generated with the data from the other sheets - DO NOT EDIT DATA ON THIS CALCULATION SHEET

If editing is required go to the next sheet - Detailed O&M costs

A. General data

ID	Description	Operational days	Daily capacity [m ³]	Total annual volume [m ³]
A1	Annual volume of wastewater treated in the DTF	320	22	7,040

B. Annual operation & maintenance costs

ID	Description	Unit	Qty	Frequency/year	Unit Price [KES]	Total annual costs [KES]
B1	Labour					
B1.1	Plant operator	item	(*)	320	700	224,000
B1.2	Security services	item	1	365	500	182,500
B1. Labour SUBTOTAL						406,500
B2	Replacement of equipment					
B2.1	Personal Protective Equipment	item	1	1	9,745	9,745
B2.2	Security gear	item	1	1	2,550	2,550
B2.3	O&M tools	item	1	1	4,833	4,833
B2.4	Cleaning and gardening tool	item	1	1	2,124	2,124
B2.5	Laboratory equipment	item	1	1	23,978	23,978
B2.6	DTF parts	item	1	1	23,700	23,700
B2. Replacement of equipment SUBTOTAL (5% contingencies included)						75,114
B3	Consumables					
B3.1	Electrical items	item	1	1	500	500
B3.2	Cleaning products	item	1	1	2,080	2,080
B3.3	Paint & others	item	1	1	8,800	8,800
B3.4	Combustible material	item	1	1	1,920	1,920
B3.5	Laboratory consummables	item	1	1	2,700	2,700
B3.6	Office supplies	item	1	1	14,267	14,267
B3. Consumables SUBTOTAL (5% contingencies included)						31,780
B4	Water and electricity					
B4.1	Electricity supply					
	Grid connection	kWh	50	12	11.00	6,600
	Solar Power feed	kWh	50	12	0.00	-
B4.2	Water supply					
	Water delivery	nr	1	25.60	1,000.00	25,600
	Connection to the water supply network	item	1	12	350.00	4,200
B4. Water and electricity SUBTOTAL						25,600
B5	Repairs					
B5.1	Material and labour needed to repair DTF infrastructure	item	1	1	15,382.50	15,383
B5. Repairs SUBTOTAL (5% contingencies included)						15,383
B6	Services					
B6.1	Exhausting services for desludging of Settler and ABR	nr	1	2.0	4,000	8,000
B6.2	Laboratory services					
	External Laboratory	item	4	4	15,000	60,000
	Internal Laboratory	item	4	4	2,000	8,000
B6. Services SUBTOTAL						16,000
B7	Licenses					
B7.1	NEMA certificate and other permits	item	1	1	100,000	100,000
B7. Licenses SUBTOTAL						100,000
B. Annual O&M costs [KES]						670,376

C. Investment costs

ID	Description	Average economic life time	Total investment costs [KES]	Average replacement costs [KES]
C.1	Average replacement cost	30	8,300,000	276,667
C. Annual average replacement costs for a DTF [KES]				276,667

D. Overall annual costs

ID	Description	Total annual cost [KES]
D. Annual DTF overall costs [KES]		947,043

E. Discharging tariffs

ID	Description	Min. Fee [KES] to cover annual costs	Cost recovery margin	Total Fee [KES]
E1	Tariff per m³			
E1.1	Discharge fee applied to each m ³	135	10%	148
E2	Tariff per truck load			
E2.1	Applied fee applied to small truck (5-9 m ³)	942	10%	1,000
E2.2	Applied fee applied to medium truck (10-14 m ³)	1,614.28	10%	1,700
E2.3	Applied fee applied to large truck (15-20 m ³)	2,354.16	10%	2,500

(*) Is = lump sum



Annex 4: Detailed Costs for Operation and Maintenance

Detailed costs for Operation and Maintenance							
<i>Editing of operation and maintenance costs is permitted in this sheet</i>							
<i>All additions or corrections will be reflected in the tariff displayed in the two other calculation sheets</i>							
<i>The cells highlighted in yellow (linked with the answers from the simplified calculation tool) as well as all formulas are protected and therefore cannot be edited</i>							
B. DTF annual operation & maintenance costs							
ID	Item	Description	Unit	Qty	Frequency/year	Unit Price [KES]	Annual OM Costs [KES]
B1	Labour costs						
B1.1	Plant operator		item	1s	320.00	700	224,000
B1.2	Security services		item	1s	365.00	500	182,500
							-
							-
							-
B1 Labour costs SUBTOTAL							406,500
B2	Replacement of Equipment						
B2.1	Personal Protective Equipment	Overall	nr	2	0.5	1,350	1,350
		Apron	nr	2	0.5	700	700
		Gumboots	nr	2	0.5	915	915
		Rubber gloves	nr	4	1	800	3,200
		Safety goggles	nr	2	1	140	280
		Respiratory mask	nr	2	0.5	2,500	2,500
		Protective helmet	nr	2	0.2	2,000	800
							-
							-
							-
B2.1 PPE SUBTOTAL							9,745
B2.2	Security gear	Harness and safety rope	nr	1	0.1	3,000	300
		First aid kit	nr	1	0.5	2,600	1,300
		Fire extinguisher	nr	1	0.2	4,000	800
		Flash light	nr	1	0.1	1,500	150
							-
							-
							-
B2.2 Security gear SUBTOTAL							2,550
B2.3	O&M tools	High pressure washer	nr	1	0.2	13,000	2,600
		Extension lead	nr	1	0.2	2,000	400
		Cover lifter	nr	1	0.33	1,000	333
		Skimmer	nr	1	0.5	1,500	750
		Ladder	nr	1	0.05	10,000	500
							-
							-
							-
B2.3 O&M Tools SUBTOTAL							4,583
B2.4	Cleaning and gardening tool	Rake	nr	1	0.2	895	179
		Spade	nr	1	0.2	1,625	325
		Panga	nr	1	0.2	900	180
		Steel bucket	nr	2	0.2	900	360
		Wheelbarrow	nr	1	0.2	4,000	800
		Stiff broom	nr	1	0.2	400	80
		Mop	nr	2	0.5	200	200
							-
							-
							-
B2.4 Cleaning and gardening tools SUBTOTAL							2,124



ISO 9001:2008 CERTIFIED



B3.6	Office supplies	Paper ram for forms (80 sheets)	nr	5	1	2,500	12,500
		Punching machine	nr	1	0.1	1,000	100
		Folders	nr	5	0.2	400	400
		Pens	nr	10	1	50	500
		Stamp & ink	nr	1	0.33	2,000	667
		Cissors	nr	1	0.1	1,000	100
							-
							-
							-
B3.6 Office supplies SUBTOTAL							14,267
B.3 Purchase of Consumables SUBTOTAL (5% contingencies included)							31,780
B4	Energy and Water costs						
B4.1	Electricity supply: ligthing of 2 rooms + 2 security light + 3 electrical sockets + instant shower (around 50kWh)						
	Grid connection		KWh	50	12.00	11.00	6,600
	Solar power		KWh	50	12.00	0.00	-
B4.2	Supply of 40L of fresh water daily						
	Water delivery through water bowser		nr	1	26	1,000.00	25,600
	Connection to the water supply network		item	1s	12	350.00	4,200
							-
							-
							-
B.4 Energy and Water costs SUBTOTAL							25,600
B5	Repairs						
B5.1	DTF infrastructure	Fence (1 roll of chain link)	nr	1	0.5	2,000	1,000
		repairs of walls and slab: 1t.					
		Cement, 1t aggregate, 5 bags	item	1s	1	5,250	5,250
		ceement	item	1s	1	5,250	5,250
		Labour	days	14	1	600	8,400
							-
							-
							-
B.5 Repairs SUBTOTAL (5% contingencies included)							15,382.50
B6	Services						
B6.1	Exhausting services	Desludging of the Settler and ABR	nr	1	2	4,000	8,000
B6.2	Laboratory services: testing of sample for BOD, COD, TSS, Nitrogen, Phosphorus, Coliforms, etc.						
	External Laboratory		nr	1	4	15,000	60,000
	Internal Laboratory		nr	1	4	2,000	8,000
							-
							-
							-
B.6 Services SUBTOTAL							16,000
B7	Licenses						
B7.1		NEMA discharging license	nr	1	1	30,000	30,000
							-
							-
							-
B.7 Licenses SUBTOTAL							100,000
TOTAL annual O&M costs [KES]							670,376



ISO 9001:2008 CERTIFIED



Annex 5 External vs. Internal DTF Operation

External Operator/Involvement (operated by external group)	
Pros	Cons
Have the expertise <ul style="list-style-type: none"> - Operator will be chosen based on knowledge 	Mandate for Sanitation lies with WSP Mandate may not be fulfilled by operator. It's the WSP's job.
Value addition <ul style="list-style-type: none"> - Operator will have enough skills 	Sanitation is a sensitive topic Outsider may not take it serious - risk
Revenue <ul style="list-style-type: none"> - Set fee that is paid to WSP 	Regulations are strict Tariff: less control if they are following regulation or not
Complete Sanitation Value Chain <ul style="list-style-type: none"> - From the beginning, the system will run well 	Mismanagement DTF is a WSP's asset – maintaining may not happen with outsourcing
Savings on O&M (stipulated in MoU) <ul style="list-style-type: none"> - Tools will be purchased by external operator (costs are outsourced) 	It is expensive (long-term)
Conflict Resolution <ul style="list-style-type: none"> - Community will be engaged 	MoU with WSTF: WSP indicated that they have the capacity to maintain the DTF
Freeing up of WSP internal resources <ul style="list-style-type: none"> - Costs saved with tools (available for other things) 	Loss of the ownership WSP will not own up to it
Knowledge sharing	Challenges in recruiting a qualified operator Expertise may not be available – this will make it expensive
Reaching other communities that are further away from WSP service area	Challenges in monitoring
If DTF is better known, there will be more opportunities to outsource, because there will be more knowledge and expertise in the market	Corruption
	Accountability (to various stakeholders) WRMA: parameters of effluent may not be measured properly
	Probability of poor record management Pre-commissioning: we need to know what is happening – if records are not kept properly WSP cannot control
	Internal WSP Conflict

Internal operation (WSP) of the DTF	
Pros	Cons
Quality assurance <ul style="list-style-type: none"> - Operations - Maintenance - Monitoring Processes need to be followed	Bearing the risk involved in operation



ISO 9001:2008 CERTIFIED



Effective response time for emerging issues	Less business oriented WSP will be standard oriented, not so business driven
More Revenue - Exhauster discharge - By-products	Adding to O&M costs of the WSP
Sanitation mandate is achieved	Extra supervision - Processes (TM will have to supervise the operator daily) - Staff
Better Control - Revenue collection - Staff - Regulation (effluent quality)	Less Community involvement No awareness with community
Availability of qualified professionals (WSP) (WSPs are already familiar with the DTF concept and operation)	
Political goodwill for facilitation (if you don't have an exhauster, you can lobby with the county – external will have to solve it on their own)	
Less training costs. WSPs already have knowledge and expertise to run a DTF	