

# Building Entrepreneurship for Water, Liquid and Solid Waste Management in Temeke Municipal Council of Dar-es- Salaam Tanzania. A Social Return on Investment Analysis

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**Abstract:** Social return on investment (SROI) of water sanitation and hygiene projects has not received the attention that projects in other sectors have received primarily because of perceived difficulties in quantifying benefits yet it is an approach that should be mandatory to all projects as it assesses contributions of an investment beyond economic benefits. SROI denotes a methodology that measures return on a project or investment based on experiences or appreciations of stakeholders and the people affected by a particular investment or project. This paper is an expose of benefits created by liquid and solid waste project in Temeke Municipal council of Tanzania. The project “building entrepreneurship capacity for liquid and solid waste businesses’ is primarily focusing on building entrepreneurship skills for liquid and solid waste businesses using a soft loan facility. Core initiatives include but not exclusively limited to constructing a decentralized waste treatment (DEWAT) facility, supporting small scale entrepreneurs (SSE) in the development of market strategy and creating awareness on liquid and solid waste management.

**Keywords:** Social Return on Investment, Solid Waste, entrepreneurship, Slums, Sanitation, Hygiene, Tanzania

## Introduction

WaterAid Tanzania as part of the WaterAid global team responds to the needed efforts in generating credible evidences to inform decision-making processes at all levels of investments. Social return on investment (SROI) is one of suitable approaches for generating credible evidence to inform decisions. The approach provides broader analytical framework for assessing contributions of an investment beyond economic benefits. Given growing concerns to increase effectiveness on development aid, credible evidences on social, economic and environmental benefits should always inform our investment choices. Social return on investment knowledge at WaterAid Tanzania comes at critical time given the limited resources and conflicting priorities within the WASH sector. Sanitation and hygiene services can be looked at both commercial and charity angles. The project on ‘building entrepreneurship capacity for liquid and solid waste businesses’ in unplanned settlements – Temeke Municipal councils (a three years’ commitment funded by COMIC Relief) demonstrates the commercial part of it. The COMIC Relief funded project implemented in Temeke Municipal Council is targeting low-income earners in unplanned settlements. The project is primarily focusing on building entrepreneurship skills for liquid and solid waste businesses along with a soft loan facility. Part of the initiatives, has been around constructing a decentralized waste treatment (DEWAT) facility, supporting small scale entrepreneurs (SSE) in the development of market strategy and created awareness to community members concerning liquid and solid waste management.

SROI is an approach for measuring and accounting a project or investment on social, economic, environmental and possibly other aspects based on experiences or appreciations of stakeholders, the people affected by a particular investment or project<sup>1</sup>. It involves assigning monetary values to outcomes of interest and allows

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<sup>1</sup> Social Return On Investment (2010): A practical guide for the development cooperation sector

establishment of a cost to benefit ratio that stands as a basis for claiming benefit: a ratio of 1:1 implies that for every one £ invested it delivers one £. The SROI study follows systematic approach through a rigorous process of involving stakeholders in deciding the scope (i.e. what should or should not be included in the analysis from the early stage of development) of the study. During that stage, stakeholders reflect on the project/investment concept, review the theory of change and establish course of actions for estimating benefits based on identified (social, environment, economic) streams. The analysis of what should be included in the final report observed all the seven principles, disaggregated below:

1. Stakeholder involvements: Prior to development of theory of change and development of SROI model, a few list of invited stakeholders<sup>2</sup> discussed the context of the study.
2. Understand what changes: The team of stakeholders analyzed how change will happen/happened together with an approach to gather evidences of change (intended & unintended - positive and negative change).
3. Valuation: The team agreed on financial proxies to assign monetary values to outcomes of interest. Many of environmental and social values do not have market values; hence, this process was critical at ensuring there is a dollar sign to every identified benefit/value.
4. Materiality: It would not be feasible to include everything in the final analysis, thus an analysis of what is material to ensure the inclusion to the final SROI model is limited to those that strikes the most.
5. External Contribution: The analysis of multiple players on the changes happening is centric to ensure the project is not over-claiming benefits.
6. Transparency: We endeavor to present our analysis and assumptions openly to other people or stakeholders to gather their opinion and critics.
7. Results verification: we finally performed sensitivity analysis trying to assess where could be sources of biases in case any.

### **Objectives of the Social Returns on Investment Analysis**

Overall objective of this assignment is to assess (forecast and evaluative) benefits created by liquid and solid waste business based on social, environmental and economic approach. Specific objectives of the SROI study are-

- (1) To assess anticipated social, economic and environmental value accrued from the liquid and solid waste businesses
- (2) To assess return per each group of stakeholder
- (3) To analyze contribution of each result area to the various group of stakeholders.

### **Scope of work**

The scope of this exercise involved reviewing the project logic, discussions with stakeholders, development of SROI model, tool development, data collection, and analysis and report production. This assignment involved a thorough reading of various documents, the list includes but not limited to project logical model, grant start-up form, project proposal, CPS theory of change and other reference guide materials. These resources were critical to establish an SROI model for further analysis. Other related tasks involved training research officers on data collection and supporting in data collection. Analysis and presentation of key findings were integral to the final deliverable.

### **Limitation of the study**

The study was limited on several ways, some of limitations affected our ways of analysis while others demanded additional set of questions to address missing link. Below are some of the notable limitation that we would want our readers understand the way we reacted on these:

1. Lack of counterfactual situation to assess what would have happened in the absence of the intervention; the team addressed it by including deadweight. The deadweight calculation is a subtraction factor that takes into account the fact that societies are not static, hence change would have happened anyway (even in absence of the intervention).
2. Lack of historical (trend data – with more than three years prior to intervention) records/data on sanitation and hygiene related illness from the district medical office (DMO) the team had to make several visits and letter to clarify usage of statistics. The team at least obtained data for one year before intervention.
3. Liquid waste is a periodic endeavor, as many interviewed households have never received such service, even then it carries significant assumption to the final analysis, therefore forecast analysis was used to get a sense of what will happen probably over the coming two three years.

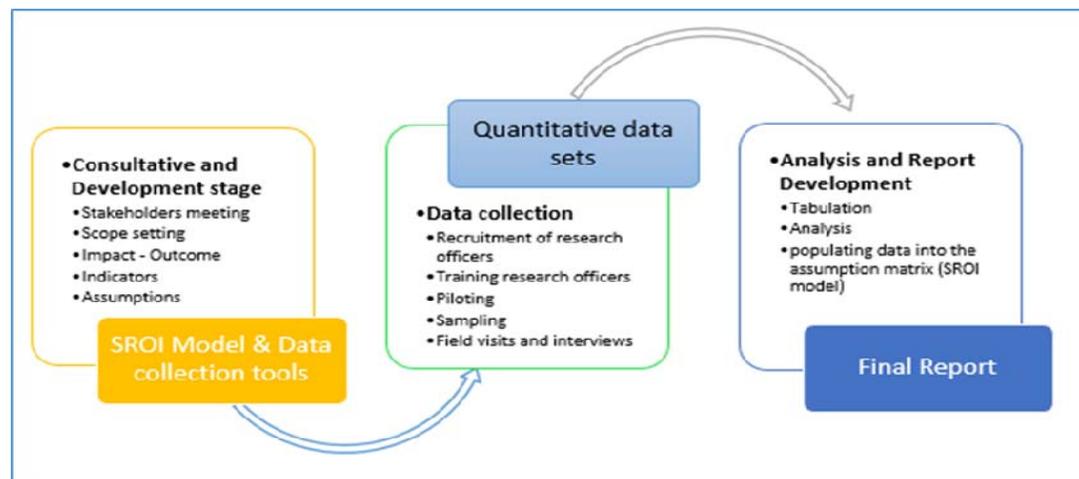
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<sup>2</sup> People's Development Forum, UTT/MFI, Temeke Municipal Council, WaterAid Tanzania, SSE

4. Supervision and monitoring estimates did not receive proper documentation; hence, estimate done using expert judgment as opposed to actual spending.
5. Households use multiple sources for cooking energy, given this, the team decided to ask the main Source of cooking energy, even though this will skew results as differences in two cooking energy may be minimal.

### Methodology

The SROI study took a participatory approach, with several stakeholders' consultative meetings before the development of the model. During this stage however, participants assessed several options, the project had three main components, which are clean water supply, liquid and solid waste management. Decisions made include the omit water component in the final SROI analysis. The SROI study implemented in three stages namely *Consultative and Development stage*, *Data collection stage* and *Analysis & report development*.



### Consultative and Development stage

In the first stage, 'Consultative and Development stage', stakeholders as aforementioned, brainstormed on various options to implement the study. The first process during this stage was stakeholder analysis and engagement into the SROI discussion. During orientation, a two days meeting, stakeholders were trained on the seven principals of SROI and steps in carrying out the SROI study. After the train sessions, stakeholders went on to define scope of the study; the scope was limited to inclusion of liquid and solid waste management in terms of project focus areas. Additionally, stakeholders commended the omission of WaterAid in the SROI analysis on materiality ground. Development of outcome (theory of change), indicators and valuation were integral to the final process in the first stage of the development of SROI model, which is the basis for estimating return on investment. The model puts forth key assumptions that necessitated data collection, from secondary and primary sources. Construction of SROI model took into consideration inputs (all kind of costs associated with the production of goods and services) inasmuch as liquid and solid waste business is concerned.

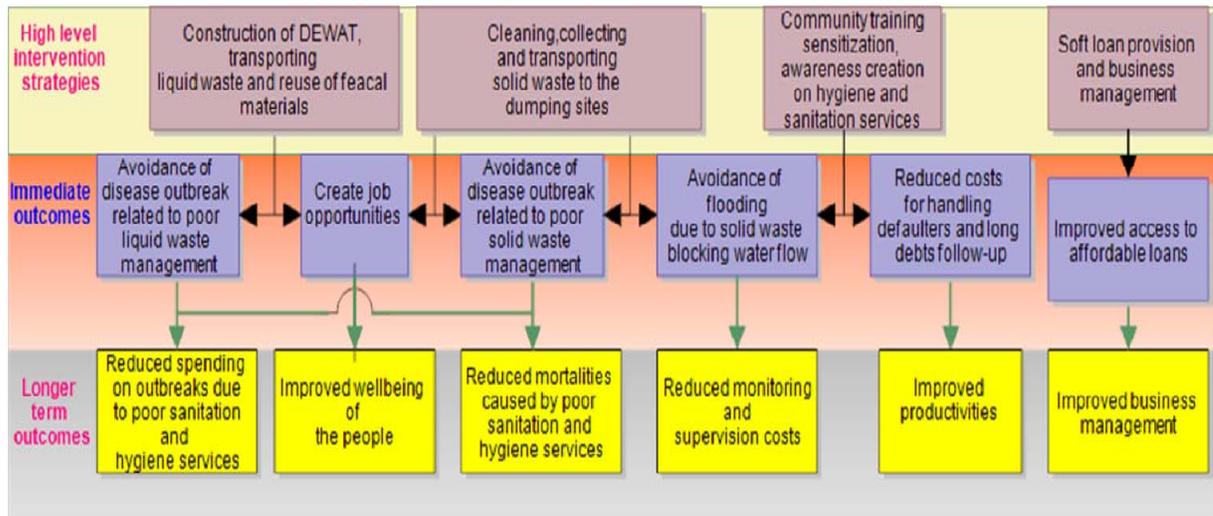
### Stakeholder analysis and engagement

During the constructive and development stage, analysis of stakeholders in terms of key contribution/position to the project went thoroughly. Five stakeholders were assessed material enough for inclusion in the SROI model. Despite some be indirect beneficiaries, but their contributions to the impact/outcomes of the project is notably high. The table below gives reflections regarding various stakeholders who are assessed material enough to take position in the SROI analysis:

Stakeholder	Material to the analysis	Inclusion [direct/ indirect]
SSE	Improved access to DEWAT facility closer to project assisted communities, provision of soft loan and building business skills to SSE will reduce operation expenses and increase productivities in terms of increased # of trips per day and reduced time to transport liquid waste.	Inclusion – direct beneficiary and significant enough to be material
PDF	Improved neighborhood and relationship with donor and avoidance reputational risks will result into DPF increase their chances to collaborate and attract more funds from donors respectively, which will lead into more people helped and create job opportunity	Inclusion – an indirect benefit but significant enough to be material
HHs/Local community	Improved access to affordable liquid and solid waste will results into reduced # of Sanitation and hygiene related illnesses, which will lead into reduced medical expenses and improve wellbeing of the people. Better sanitation and hygiene conditions will also lead to reduced risks to flooding hence reduce costs related to loss of properties	Inclusion –direct beneficiary and significant enough to be material
TMC/State	Improved access to affordable liquid and solid waste will help to control floods and outbreak, help reduce # of sanitation and hygiene related illnesses, reduce # of monitoring and supervision visits due to improved sanitation and hygiene conditions which translate into reduced operation expenses by the municipal on medication, personnel and supervision visits.	Inclusion – an indirect benefit but significant enough to be material
UTT-MFI	Introduction of sanitation loan product will lead to increased # of SSE benefiting from the loan facility; it will also attract development partners to funding the initiative, which will result into collecting profit from serviced loan and help replicate sanitation and hygiene services beyond targeted communities.	Inclusion –direct beneficiary and significant enough to be material

### Theory of change and Wellbeing outcomes

The team of stakeholders discussed and reflected on possible change pathway the project is likely to contribute. The analysis of the change was informed by grounded experiences of stakeholders involved in the processes, with that, project documents such as project proposal, theory of change for the country strategy, the project logic model as well as annual reports. The diagrammatic presentation below, summarizes change pathways for the liquid and solid waste business components



### Outcomes, Indicator descriptions and valuation

The key focus on SROI is to be able to assign monetary values to the goods and services delivered by an intervention/investment. In this case, during consultative and development stage the focus was to try to assign financial values to outcomes that do have current market price. This processes involved developing financial indicators or proxies the later applicable whenever the item does not have market price. The table below gives insight on the results of the consultative discussion with financial indicators (when the outcome of interest has market price) and financial proxies for an outcome without market price.

Stakeholder	Outcome	Indicator description	Financial indicators/proxies
SSE	Improved access to loan by SSE	% of SSE with access to soft loans from financial institution	Money saving due to lending from microfinance institutions with small interest rate
	Reduced costs for emptier to transport liquid waste to DEWAT	Distance saved due to construction of DEWAT at closer vicinity	Average annual cost for transporting liquid waste over a distance of 1km
	Increased income of SSE's	Percentage of SSE with stable growth in their income	Average annual revenues from operations
	Improved business management practices	Average # of productive hours reported saved by SSE due to improved business management practices per year	Average wage for one hour productive work in the private sector (trade)
	Improved social wellbeing	Average # of hours reported spent by workers on improved family life per year	Average amount of money gained from productive work for an average of 8 hours

<b>PDF</b>	Improved neighborhood and relationship with donor	# of grants/funds due to exemplary accomplishment of the WASH project in Temeke Municipal	Average amount of funds gained due to involvement on Sanitation and hygiene services
	Avoidance reputational risks	# of compliance evaluation reports released	Average cost avoided due to poor implementation of the project activities
<b>HHs</b>	Reduced HH spending on solid and sludge management	""% of HH perceiving costs for liquid and solid waste management services are affordable	Average annual cost saving due to services offered by SSE, over the cost of same services offered by local vendors
	Improved wellbeing of the people	% of HHs reporting free of stress due to improved solid and liquid waste management services	Value of number of Quality Adjusted Life Years Saved
	Avoidance of Sanitation and hygiene related illness	% of HHs reporting incidences of sanitation and hygiene related illness 2017/2018) in targeted communities	Average amount of money an individual spends on medication and transportation during recovering from WASH illness
	Increased use of biogas generated from the constructed DEWATs	% of households willing to buy and use biogas generated from the DEWAT	Average cost saving as a result of buying biogas produced at the DEWAT station
	Reduced HH spending on artificial fertilizers	% of HHs reported using artificial fertilizers	Average cost saving as a result of buying organic manure produced at the DEWAT station
	Avoidance of flooding	% of HHs reporting less flooding due to improved sanitation conditions of their neighborhood	Average amount of money equivalent to loss of property due flooding
	Improved access to water for irrigation	% of HHs who are willing to use water for irrigation	Average cost an individual would be willing to spend to buy 20 liters bucket of water for irrigation
	<b>TMC/STATE</b>	Avoidance of municipal expenditures (flood and outbreak control and operations) resulted from poor sanitation and hygiene practices	Average # of avoided monitoring and supervision trips for controlling sanitation and hygiene conditions
Avoidance medical spending as a result of people suffering caused by poor sanitation and hygiene conditions		# of avoided sanitation and hygiene related treatments	Average unit cost of one hospital admission for a person suffering from Sanitation and hygiene related illness
<b>DAWASA/DAWASCO</b>	Increased revenue by DAWASA	Average annual trips SSE discharged liquid wastes at the DEWAT	Average annual income generated by DAWASA in form of fees payable by SSE at the DEWAT
<b>UTT-MFI</b>	Emergent of new sanitation loan products	# of SSE acquiring funds through sanitation loan scheme	Average profit gains due to increased # of SSE securing loan through the sanitation loan scheme

	Increased funding from development partners/donors	# of DP injected funds to UTT	Average amount of funds gained due to involvement on Sanitation and hygiene services
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### Social Returns On Investment Model

During consultative and development stage, the team developed the SROI model based on key analysis and assumptions. The fact that communities are not static, and on ground that other stakeholders (development groups, municipal councils and the like) might have had similar interventions before or during the project implementation which in one way or other could bring change necessitated the inclusion of *deadweight*, *displacement* and *attribution*. Therefore, the model tries to address external contributions to the existing or anticipated changes. Along with that, enrolment to the outcomes of the project may not look linear over the next five years of projected benefit streams. Therefore, we take an account that some existing beneficiaries may withdraw from the benefit streams over time, in view of this, the team included *drop off* factor to discount the most likely to withdraw.

The net value was determined by accounting contributions of the outcomes anticipated from the efforts invested by project intervention by eliminating (much possible) contributions of other players or change that might happen from own initiatives. The analysis has taken into account what could have happened anyway even in absence of the intervention (counterfactual) – this is presented in the model as deadweight. Additionally, we subtracted what could have been the contributions of others (attribution) and the extent to which we have created a net change (displacement). Deadweight and attribution varied with outcome and stakeholder. The analysis presented on a table below, reflects existing findings (from secondary source) and observed facts in this study (primary data) for a particular change and stakeholder under consideration.

- **Deadweight:** What would have happened anyway is a centric question, looking at trend analysis on some variables (indicators) you get a sense that studied communities were not stagnant, there is change happening and that change needs to be honored. During interviews with beneficiaries we used some recall period questions regarding various aspect of social, environmental and economic condition between now and before intervention and what they perceive to be and analysis of secondary data on some outcomes, we are able to appreciate changes due to dynamics within these communities.
- **Attribution:** Even with this project, we realize that some changes are not 100% from project interventions (project activities). Appreciably part of the change is not attributable to project activities, we tried to consult beneficiaries to get a sense of who else is contributing to the change they see.
- **Displacement:** Our analysis has considered displacement in sense that vendors, who in past conducted liquid and solid waste by large are slowly displaced, and this might have negative implications in their livelihood.

Stakeholder	Impact/Change	What would have happened anyway? (Deadweight – counterfactual)	Deadweight [%] estimate Low 0- 30% Medium 30-60% High 60-100%	How much outcome is attributable to the project after considering other actors' roles in contributing to the change – (Attribution)?	Attribution [%] of the project to achieving the outcomes – Low 0- 30% Medium 31-60% High 61-100%
SSE	Improved access to loan by SSE	Sanitation and hygiene receives little recognitions as business category, this limits chances for entrepreneurs to get access to soft loan to initiate or expand solid and liquid waste businesses. However, some form of loan facilities in local/community banks or SACCOS may provide alternative. However, the associated restrictions and demand for collaterals pose limited chances for growth.	Low– 25%	In view of demand to accelerate growth in liquid and solid waste management business, and in response to lack of microfinance institution that could provide soft loan to support SSE, the project initiated this and provided seed funds for ensuing loans, therefore the attribution is high.	High 70%
	Reduced costs for emptier to transport liquid waste to DEWAT	Construction of DEWAT closer to project assisted communities is projected to reduce a significant amount of travel time so distance to discharge liquid waste. The Municipal plan did not have these initiatives in the coming five years; hence, the situation would go unattended for the next five years, with the existing discharging option located far from the project-assisted communities.	Low – 0%	Construction of DEWAT is a 100% commitment of this project, whereas SSE could get access to other discharge facilities, this could not be as closer as the facility constructed within project areas. Therefore, we endeavour to attribute change by 100%	High 100%
	Increased income of SSEs	SSE would have continued to provide these services in absence of soft loan, and even in absence of DEWAT, trend indicates that SSE have been breaking even and registering marginal profits in absence of soft loan and therefore increase in income would have happened anyway. However that could be insignificant, therefore low deadweight	Medium - 15%	Contribution of the project toward income growth of SSE depends on a number of factors, some external to the project and even those that follows within the project influence depend on other intrinsic attributes. Therefore, an average attribution of the change is claimed by this project	Medium – 40%
	Improved business	SSE have shown improvements regarding business management practices, their	Low 25%	Since the start of businesses, the SSE have not gotten any formal or sort of	High 70%

	management practices	track records in terms of breaking even vindicates ample commitments to improve businesses. Although this project is adding significant shift in terms of customer base outlook and marketing strategy coupled with provision of loan management skills, yet there seem to be transformation overtime suggesting growth in business management would not be static.		mentorship program from other actors/stakeholders, therefore improvement of business management is largely attributed to this project, therefore high level rating of the project contribution towards improved business management practices by SSE	
	Improved social wellbeing	Tanzania has registered steady economic growth (approximately 7%) over the past years. Although wellbeing has correlation to access to affordable WASH access. Wellbeing improvements would still be happening regardless of this project.	<b>Medium 45%</b>	Livelihood model provides integration of several factors concerning social wellbeing of the people, although the project adds to improved social wellbeing, there are so many external factors that influence social wellbeing of the people. Hence low contribution of the project	<b>Low – 30%</b>
<b>PDF</b>	Improved neighbourhood and relationship with donor	This project has improved PDF's relationship with donor communities, WASH line ministries and serviced communities. This has increased their confidence in applying similar funding and already have secured funds around 600M Tanzania Shillings, which according to PDF executives they could not qualify if this project was not there.	<b>High: - 80%</b>	PDF attribute this project by 70% to the funding they have secured from other donor within 24 months since started implementing this project. Therefore attribution of this project to the funding is high	<b>High: 70%</b>
<b>HH/ Community members</b>	Reduced HH spending on solid and sludge management	Despite the account that this project is providing affordable access to liquid and solid waste services at community level, HH interviews have suggested that services provided before were also affordable, about 48.2% of respondents felt that costs for liquid and solid waste services have not changed more importantly 38% of respondents felt prices have gone up. With only 6.33% of respondents feeling costs are reduced now	<b>High 86.2%</b>	SSE are not the only service providers for liquid and solid waste management business in project communities. The study indicated that other service providers such as Vendors (38.1%), Municipal councils (9.6%) are providing the same services at competitive prices. About 50.9% of respondents are getting this service from SSE. However, it is only 18.2% of the people serviced by SSE	<b>Low: 20%</b>

	compared to past		perceive there is reduced cost. Hence low attribution.	
Improved wellbeing of the people	Tanzania has registered steady economic growth (approximately 7%) over the past years. Although wellbeing has correlation to access to affordable WASH access. Wellbeing improvements would still be happening regardless of this project.	<b>Medium 45%</b>	Livelihood model provides integration of several factors concerning social wellbeing of the people, although the project adds to improved social wellbeing, there are so many external factors that influence social wellbeing of the people. Hence low contribution of the project	<b>Low – 30%</b>
Avoidance of Sanitation and hygiene related illness	The municipal council have had interventions in project-assisted communities following recurrent of cholera cases in these communities. The abolishment of water tankers and temporal solid waste transfer stations are among remarkable efforts to contend with sanitation and hygiene related illness, this means there could still be a medium level change to target communities in absence of the current project.	<b>Medium 40%</b>	The project primarily is focusing at improved access to liquid and solid waste management that would translate into elimination of sanitation and hygiene related illness based on improved sanitation and hygiene conditions of the targeted communities. The attribution is notably high.	<b>High 70%</b>
Increased use of biogas generated from the constructed DEWATs	This project is contributing significantly on sludge management; the newly constructed DEWAT will provide wastewater treatment options and increase value chain on wastewater. This could not be feasible had this intervention not implemented in targeted communities. Construction of decentralized waste treatment facility will able production of biogas, and will benefit people in targeted communities. During interviews, 42.4% admitted would be willing to use biogas generated from the DEWAT facility. This contribution could not happen in absence of this project.	<b>Low 0%</b>	Given that biogas production would not be possible in absence of the DEWAT, then attribution to the outcome of interest is significant.	<b>High 100%</b>
Reduced HH	This project will provide access to	<b>High 81%</b>	Willingness to buy and use manure	<b>Low 20%</b>

	<p>spending on artificial fertilizers</p>	<p>manure for small-scale farmers (gardeners). In absence of this affordable sources of manure are still available and people are benefiting from the same, the value add with this is reduced costs for buying fertilizers from other sources. However, it requires strong market strategy to bring buy-in of manure form the DEWAT to targeted communities. The current survey indicated that only 17% of the people practice small farming/gardening, of these about 81% already use organic manure, and perceive price being affordable. Therefore, even without a project, over 80% perceive to access affordable organic fertilizers.</p>		<p>produced from the DEWAT is low. Only 38.8% of the people performing small-scale agriculture are willing to buy and use manure from the DEWAT facility. With the fact that more than 80% already use organic fertilizers, attribution to the change is low.</p>	
	<p>Avoidance of flooding</p>	<p>2.9% and 8.2% of all respondents (858) admitted their areas to experience frequent and seasonal flooding respectively. Of these, 44.8% have experienced flooding which resulted to loss of properties over the last 12 months. However, majority (60%) linked flood incidences with unplanned settlement and 20% for solid waste and remaining 20% due to other human intervention. Given this, flooding would have happened anyway even with this project by 80% (combining unplanned settlements and human interventions as were linked to flooding)</p>	<p><b>High 80%</b></p>	<p>There are several causes of flooding; some are due to poor settlement plans, human interventions and blockages of water channels by solid waste. In this survey about 60% of respondents linked flooding with poor settlement planning and 20% linked it with human intervention other than solid waste blockages with remain percent perceiving it linked to solid waste blocking water channels. Due to this, the attribution to total change is low.</p>	<p><b>Low: 20%</b></p>
	<p>Improved access to water for irrigation</p>	<p>Majority (64%) of the people practicing small farming/gardening use reported using irrigation scheme. Due to wide options for irrigation water that include sources such as unprotect shallow wells, streams, seasonal rivers and bore hole at affordable price, access to water for irrigation is notably high even without</p>	<p><b>High 75%</b></p>	<p>Already majority are using water for irrigation, with very few (19.7%) planning to use water from the DEWAT facility for irrigation. Given that majority do not feel comfortable to use water from the DEWAT, the project may need to improve on marketing and community</p>	<p><b>Medium 40%</b></p>

		<p>this project. Although irrigation water from DEWAT provides nutrient options, still majority have access to affordable organic fertilizers. Therefore, deadweight is high.</p>		<p>engagement to ensure beneficiaries accrue to this outcome. Assigned medium level of attribution</p>	
<b>TMC/State</b>	<p>Avoidance of municipal expenditures (flood and outbreak control and operations) resulted from poor sanitation and hygiene practices</p>	<p>The municipal council have had sanitation and hygiene related campaign in response to cholera outbreak. The abolishment of water tankers and temporal solid waste transfer stations meant to reduce risks to sanitation and hygiene related illness. There has been good progress over the last two years even without project activities. The municipal council reduced Sanitation and hygiene related illness from [...] to [...] approximately [...] reduction in illnesses. These changes suggest the municipal would be able to reduce illness even in absence of the project intervention. Medium deadweight</p>	<b>Medium: 45%</b>	<p>The project intends to ensure sustainable access to liquid and solid waste management services by providing stable supply and demand for quality waste businesses in targeted communities This would reduce hands-on/regular follow-ups by the municipal councils. However, it also depends on stability of local institutional structures to support the services of SSE, without which Municipal council could still provide regular visits. Attribution high.</p>	<b>High: 70%</b>
	<p>Avoidance medical spending as a result of people suffering caused by poor sanitation and hygiene conditions</p>	-ditto-	<b>Medium 40%</b>	<p>Understandably, supply of clean and safe water is key in reducing WASH illness. Given this is not a WASH comprehensive package; changes will also be influenced by external factors outside the project influence. Therefore, attribution is medium.</p>	<b>Medium: 45%</b>
	<p>Increased revenue by DAWASA</p>	<p>SSE will for the first time use the DEWAT to discharge liquid waste constructed by project funds. One of the SSE, who according to MoU will get 70% of the service charge and 30% paid to DAWASA, will manage the DEWAT. In the absence of the DEWAT DAWASA could not realize that revenue.</p>	<b>Low 10%</b>	<p>DAWASA is entitled to oversee and regulate functionality of DEWAT. Although operations of the DEWAT is under one SSE, agreements are that 30% of the service charge is payable to DAWASA, hence attribution is highest given that without this project, this service charge would not have happened.</p>	<b>High: 100%</b>

<b>UTT/MFI</b>	Emergent of new sanitation loan products	The emergent of sanitation and hygiene loan facility is a value add to UTT; the microfinance institute is anticipating enrolment of more SSE into this loan scheme. Growth in liquid and solid business will increase productivity in end promote investment in liquid and solid waste management. Given that this loach scheme was not in place before, without this project, emergent and growth of the same would not be possible at this time, hence the deadweight is low.	<b>Low 30%</b>	Sanitation and hygiene loan scheme at UTT is a new scheme, initiated by the project. Seed money was given to UTT to support SSE grow their businesses; hence this could not be linked to external context other than the project itself.	<b>High: 70%</b>
	Increased funding from development partners/donors	Investment in liquid and solid waste management business is catching the interest of development partners; with limited documented evidences on impact, growth has not well steamed. In absence of this project such evidences and learning would not be feasible hence little progress in the area.	<b>Low 20%</b>	-ditto-	<b>High 70%</b>

## Data collection tools

Development of mWater data capture was done during the consultative and development stage. The development of three different set of tools namely SSE tool, Household (HH) survey tool and implementing partner survey tool are among accomplishments of this stage.

Name	Created	Modified	Operations
SSE_Survey	01/24/2018	Last Tuesday at 4:51 PM	
Implementing Partners	01/24/2018	Last Tuesday at 4:50 PM	
HH_Survey	01/04/2018	02/03/2018	

## Data collection

In the second stage of the SROI study centered on '*data collection*'. The process begun by recruiting twelve research officers, trained, piloted data collection tool and started data collection. Research officers with previous experiences in data collection, in particular use of *mWater* application for data collection was a priority. These were trained for two days in skills related to interviews, data handling and cleaning as well as daily upload of data (after quality checks). Training included use of mobile technology in data collection given the data collection tools were electronic version, which necessitated the use of smart phones. The application is a web-based, with offline model that allowed research officers to collect data in absence of internet connectivity. However, internet connection was required during uploading data. Sampling of respondents deployed probability sampling in particular systematic sampling approach to ensure endogenous and exogenous factors are equally distributed. The research team used five household's interval unit from one sampled household to another. Interviews aided by use of mobile phone. Each interview lasted between 20 to 30 minutes, in rare cases a maximum of 45 minutes spent per respondent. Interviewers, switched off internet connection to avoid sending uncompleted or uncheck questionnaires. During the evening, after fieldwork and after a thorough review of the completed tools, research officers put on mobile data to allow synchronization of data. After all teams had completed data collection exercise, synchronization was conducted at the WaterAid Tanzania office. Research officers' mobile phones were connected to WAT Wi-Fi to allow unloaded data synchronized to the database. Sample size of 317 and 548 from Temeke and Kigamboni respectively defined people interviewed during eight days of data collection. The sample size was based on expert judgement, with each street estimated to collect at least 15 households. The study covered 20 streets in Temeke (from the 5 wards) and 25 streets in Kigamboni (from 5 wards) municipal.

## Analysis and report development

Data analysis stage begun with cleaning processes, through running a codebook report. The codebook report provided insight concerning data range. In this way, it was easy to assess outliers and quality of data in general. Data analysis was performed by use of SPSS software, Excel Microsoft office and *mWater*. Relevant literature reviews informed the development of this report.

## Findings

The return efficiency of the liquid and solid waste components were evaluated over a project life of 5 years (1 year during construction and preparatory work) and 4 years of operations. The internal rate of 5.6% based on inflation rate, projected to remain stable over the next four years was used to calculate net present value of the project. The total gross costs estimated at TZS 937, 466, 478.06 Million over the period of five years. The cost reflects all allowable investment costs, operation expenses, assets and liabilities. The estimated total Present Value over the period of five years is TZS 1,851, 700,515.68 billion. Evaluated at a discount rate of 5.6 percent, the net present value (NPV) of the project is TZS 687,262,723.07 Million at IRR equal to 40%.

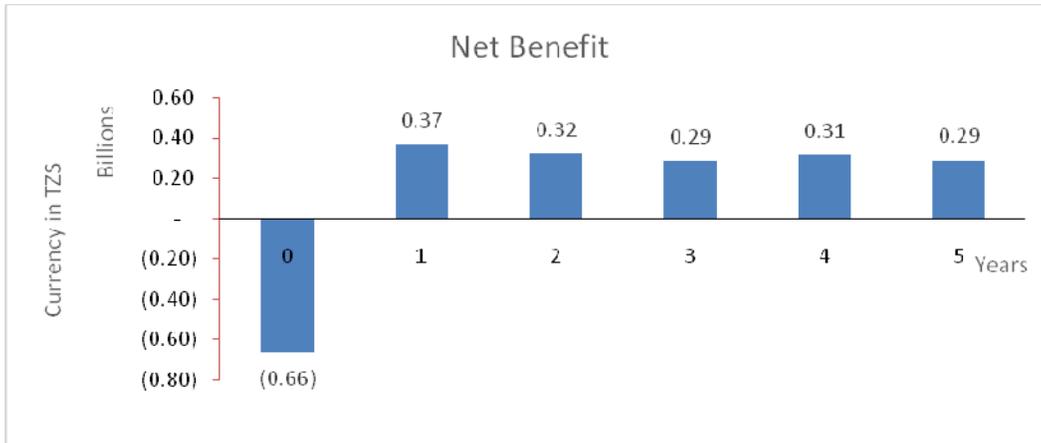
### Project input value

Analysis of total cost for this project reflects upon several critical assumptions. Cost categories includes investment capital (cost), operation costs, loan costs, asset costs, equity and liabilities. Investment capital cost is a combination of funds for feasibility study and design, loan scheme funds and estimated cost funds for construction of DEWAT. This takes 57.4% of the project total costs. Operating costs on other hands include staff salaries labour charges, office rent, fuel costs, truck hiring charges, fuels and car repair and spear parts. DEWAT services (monitoring its functionalities including repair) and bank charges form part of operational costs. Staff salaries is further divided into two; those involved in technical support for the project over those involved in daily operations of the project activities (hired by SSEs). Regarding technical staff, the project advised a proportion of level of efforts with associated salary attributable to liquid and solid waste factored as allowable costs for the same. This is due to fact that some technical staff are engaged in other works apart from liquid and solid waste. Based on that, 50% of the project accountant and project coordinator salaries are included in the analysis as associated costs derived from these staff for liquid and solid waste component given their involvement in other project activities. Market specialist for this project is 100% dedicated to liquid and solid waste businesses, and therefore all of associated salaries included in cost analysis. The project officer contributes 70% of her commitments to liquid and solid waste. Operating costs take 28% of total project costs. Loan and assets costs takes 6% each, loan costs are all loan interests paid to UTT on annual basis whereas asset costs involve estimated value of land. Equity and liabilities include taxes, and outstanding loans, estimated at 2% of total costs. In estimating equity and liabilities, consideration was based on fact that SSE are obliged to pay 20% of annual revenue from operation to Municipal councils as per contract.

Description of cost base	Year 0	Year 1	Year 2	Year 3	Year 4
<b>Total Investment costs</b>	TZS 538,798,000.00	TZS -	TZS -	TZS -	TZS -
<b>Total Operating Costs</b>	TZS 61,079,507.17	TZS 65,115,757.17	TZS 65,317,569.67	TZS 65,529,472.80	TZS 4,672,463.91
<b>Total Loan costs</b>	TZS -	TZS 6,000,000.00	TZS 12,000,000.00	TZS 12,000,000.00	TZS 12,000,000.00
<b>Total assets</b>	TZS 60,000,000.00	TZS -	TZS -	TZS -	TZS -
<b>Total liabilities and Equity</b>	TZS 3,000,000.00	TZS 2,840,909.09	TZS 2,840,909.09	TZS 2,840,909.09	TZS 2,840,909.09
<b>Annual base costs</b>	TZS 662,877,507.17	TZS 73,956,666.26	TZS 80,158,478.76	TZS 80,370,381.89	TZS 19,513,373.00

### Net benefit analysis

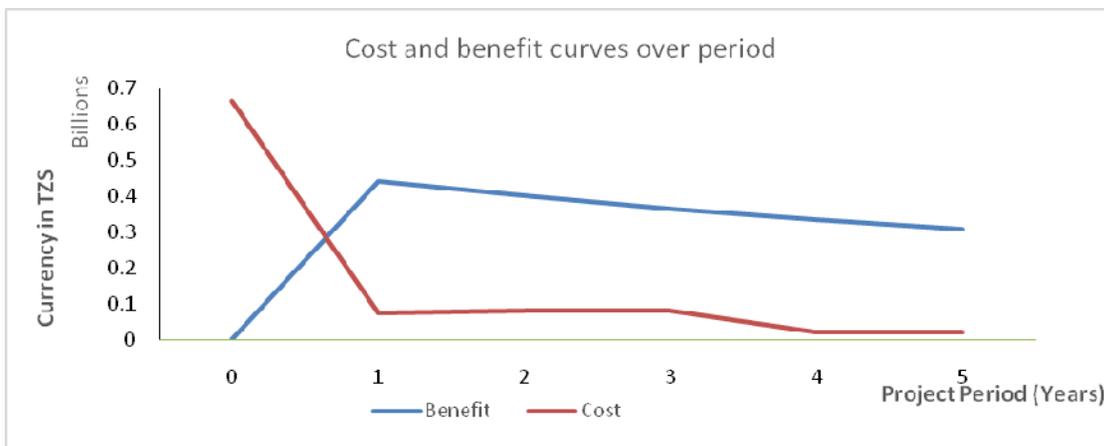
Analysis of cost and benefit indicates that year three and five contain the lowest net benefits, each approximated at 0.29billion. Although year three is projected to register approximately 58million more than year five but the fact that year three will spend 60million more than year five, makes year three the lowest net benefit period of the entire project period. On contrary, year one will register the highest net benefit (0.37billion) of all the entire period of the project life. Total costs during investment period (year 0) amount to 70.67% of the project total costs. In this case, it will require two years for a project to offset all costs during investment period.



Stakeholder	Total Net Present Value of benefits
SSE	TZS 55,221,501.00
PDF	TZS 175,120,121.00
HHS/Local community	TZS 1,274,134,290.96
State	TZS 234,409,719.06
UTT-MFI	TZS 112,814,883.67
<b>All stakeholders</b>	<b>TZS 1,851,700,515.68</b>

SROI Survey 2018: Temeke & Kigamboni

Trend analysis suggests that cost decreases over years and slightly stabilizes in year four and five. Other than investment cost during year 0 of the project, year three and four have third and second largest costs due to fact that in the two years' loan repayment costs is expected to grow up due to estimated raise in amount of loan taken by SSE.

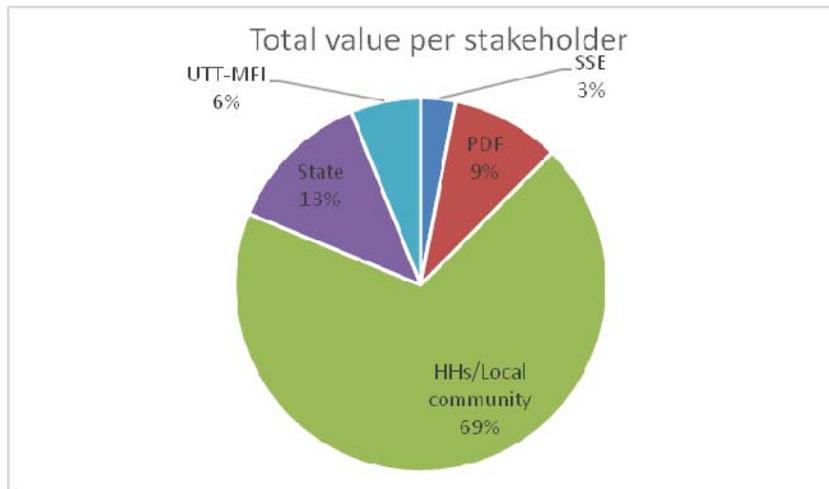


**Net present value per stakeholder group**

Analysis indicates that household member/community members bear the largest (69%) share of the profit accrued from the project activities. The analysis estimated net present value of 1.27 billion over the period of five years will be accrued by community members in Kigamboni and Temeke District. The State (Temeke, Kigamboni Municipal councils and DAWASA) together form second largest share of the benefit, estimated at

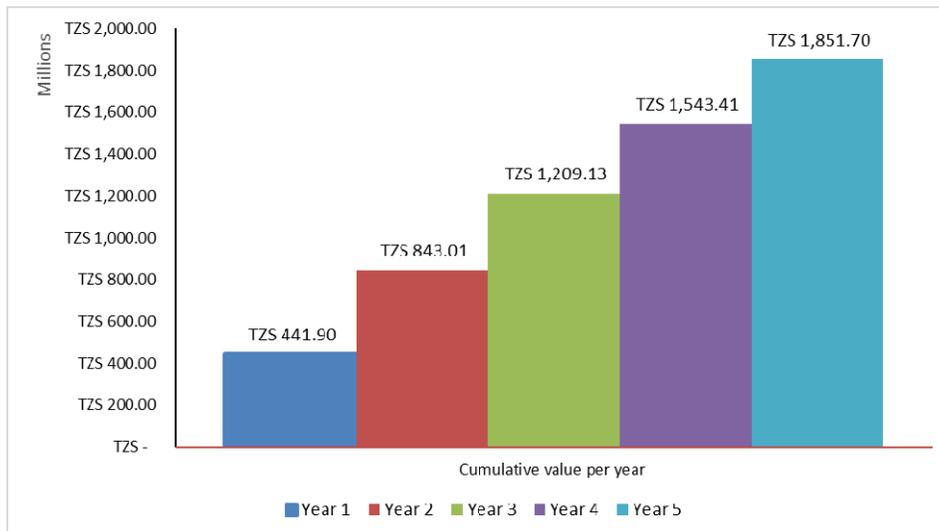
net present value of 234.41 Million. PDF and UTT are third and four respectively. SSE bears the list profit margins of around 55.22 million Tanzanian shillings. Analysis indicates that avoidance of flooding due to solid waste management services carries significant contribution to overall benefits under HHs/Local community members. The analysis indicates that 53.4% (680 million) of total benefits accrued by household members is a direct contribution of flood avoidance.

Despite the fact that PDF has only one outcomes in the model, the associated benefits is considered high due to immediate contribution this project have had in terms of ongoing fundraising mission at the organization. During interviews with PDF in particular senior management team, it was revealed that this project has abled the organization secure funds of about TZS 600million. PDF management is confident that this funds could not be raised should this project not happened. In the discussion, the management attribute 70% of effort in fundraising that resource as direct contribution of the COMIC funded project (this project). Because of that, PDF acquire a third position of total benefit linked to this project.



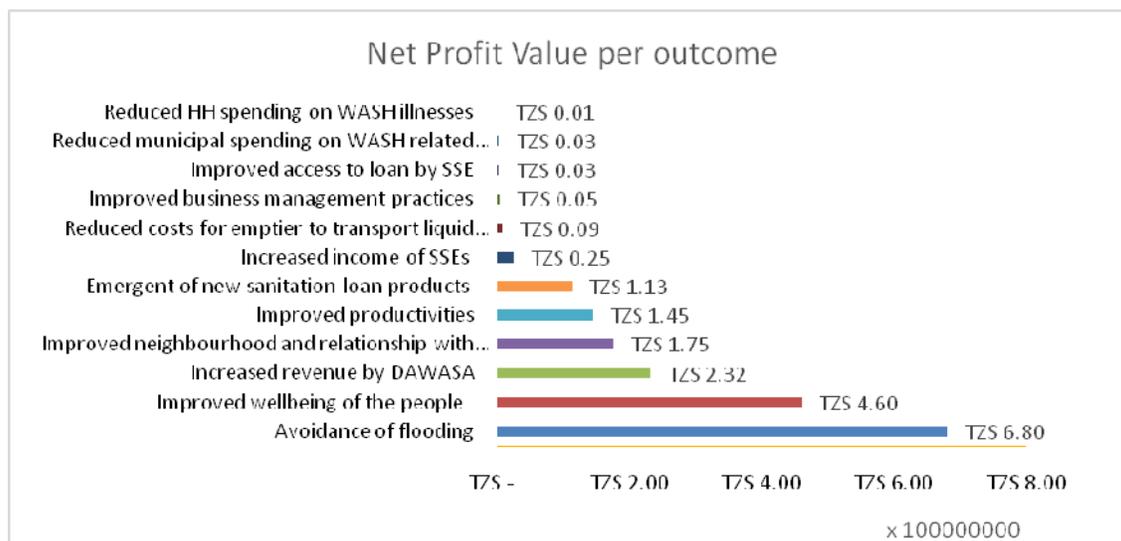
**Project recovering**

The project requires three years to recover all costs including investment cost. The project total cost estimate is around 938 Million over the period of five years; however, analysis indicates that towards the end of year two the project will recover only 843 million, less by 95 million to the total costs. Projections indicates that towards the end of third year, the project will accumulate 1.21 billion, implying that the project will recover all the expenses and register profit. Due to drop off effect, the project estimate to decrease its annual value at an average of 2%.



### Net present value per outcome

In the theory of change descriptions, about six long-term results and six intermediate results identified, making total of twelve outcomes. Analysis of data on various outcomes, indicate that reduced spending on sanitation and hygiene related illnesses bear the less net profit value of all the outcomes. On contrary, avoidance of flooding is a potential outcome with significant value add to the project outcome. This is due to fact that many residents in unplanned settlements in particular Temeke residents face challenge during rainy season. When it rains, floods become common in areas of poor solid waste handling plans as many water channels blocked by solid waste, making running water fail to flow easily.



### Financial proxies' calculations

Description of an outcome	Financial proxy description	Proxy (TZS)
<b>Improved access to loan by SSE</b>	Money saving due to lending from microfinance institutions with small interest rate	555,000.00
<b>Reduced costs for emptier to transport liquid waste to DEWAT</b>	Average annual cost for transporting liquid waste over a distance of 1km	306,000.00
<b>Increased income of SSEs</b>	Average annual revenues from operations	16,606,908.00
<b>Improved business management practices</b>	Average wage for one hour productive work in the private sector (trade)	589.00
<b>Improved social wellbeing</b>	Average amount of money gained from productive work for an average of 8 hours	4,712.00
<b>Improved neighborhood and relationship with donor</b>	Average annual amount of funds gained due to involvement on Sanitation and hygiene services	60,000,000.00
<b>Reduced HH spending on solid and sludge management</b>	Average annual cost saving due to services offered by SSE, over the cost of same services offered by local vendors	24,000.00
<b>Improved wellbeing of the people</b>	Value of number of Quality Adjusted Life Years Saved	60,210.00
<b>Avoidance of Sanitation and hygiene related illness</b>	Average amount of money an individual spends on medication and transportation during recovering from WASH illness	57,376.00
<b>Increased use of biogas generated from the constructed DEWATs</b>	Average cost saving as a result of buying biogas produced at the DEWAT station	11,119.31
<b>Reduced HH spending on artificial fertilizers</b>	Average cost saving as a result of buying organic manure produced at the DEWAT station	5,462.00
<b>Avoidance of flooding</b>	Average amount of money equivalent to loss of property due flooding	427,256.00

<b>Improved access to water for irrigation</b>	Average cost an individual would be willing to spend to buy 20 litre bucket of water for irrigation	1,379.00
<b>Avoidance of municipal expenditures resulted from poor WASH practices</b>	Average cost for one monitoring and supervision trip conducted by the municipal council	1,000,000.00
<b>Avoidance medical spending as a result of people suffering caused by poor WASH conditions</b>	Average unit cost of one hospital admission for a person suffering from Sanitation and hygiene related illness	52,500.00
<b>Increased revenue by DAWASA</b>	Average annual income generated by DAWASA in form of fees payable by SSE at the DEWAT	237,600.00
<b>Emergent of new sanitation loan products</b>	Annual average profit gains due to increased # of SSE securing loan through the sanitation loan scheme	12,000,000.00
<b>Increased funding from development partners/donors</b>	Annual average amount of funds gained due to involvement on Sanitation and hygiene services	15,300,000.00



### Sensitivity analysis of the SROI model

Nesting around various assumptions, deadweight range, drop off effects and attribution, the return on investment analysis provides different viewpoints when these factors are altered. In this analysis, attempt to adjust one or two of the assumptions or variables noticed change on outcomes of the analysis. This means, maximum benefits accrued from liquid and solid waste business depends on several parameters, as evidenced below:

#### Drop off effect

The analysis nested on facts that SSE will not drop from the business throughout the project lifetime. If it happens one of the SSE drops from the project, assessment indicate a significant drop (1%) on net benefits accrued by SSE from 55.22million to 30.35million, with slight decline on SROI from 1.97 to 1.95.

Beneficiary group	Drop off	Net Present Value	Change on SROI
SSE (Current)	0%	TZS 55,221,501.00	1.97
SSE (if adjusted to)	33%	TZS 30,352,950.87	1.95
PDF (Current)	10%	TZS 175,120,121.00	1.97
PDF (If adjusted to)	0%	TZS 210,000,000.00	2.01
HH (Current)	10%	TZS 1,274,134,290.96	1.97
HH (If adjusted to)	0%	TZS 1,527,912,381.34	2.24
State (Current)	10%	TZS 234,409,719.06	1.97
State (If adjusted to)	0%	TZS 281,098,715.10	2.02
UTT (Current)	10%	TZS 112,814,883.67	1.97
UTT (If adjusted to)	0%	TZS 135,285,000.00	2.00

In the analysis above, adjusting drop off from 10% to 0% for households provides an increase of social return on investment from 1.97 to 2.24. When drop off is considered for SSE, the return declines by 0.02 units.

#### Deadweight

In this sensitivity analysis, we considered reducing the deadweight (counterfactual) by 50%, this means, and all estimate changes that could have happened anyway are further reduced half way. The results indicate that SROI change from 1.97 to 2.55.

#### Attribution

When the attribution factor is changed by 50% for all outcomes, the SROI changes from 1.97 to 0.93, claiming the lowest SROI for the project. This indicates that for every 1TZS invested, 0.07TZS is lost.

#### SROI evaluation

Overall, for every 1TZS invested on liquid and solid waste business, a return of approximately 2TZS Shillings was generated. According to sensitivity analysis, SROI can range between 0.93 (in worst-case scenario) to about 2.24 assuming that all enrolled beneficiaries at household levels will continue accruing to benefits of the program.

#### Discussions

The analysis of data indicate that this project is viable, given the potential to recover all costs towards mid of year three. The SROI of 1.97 rests under two important facts, namely consistent enrolment of beneficiaries to the project and the attribution factor does not go below the current attribution value. The project will consider recovering all its expenses given that the current attribution values do not follow below 75% of the indicative attribution rate. In the analysis, households, the primary targeted beneficiaries of the project contain the large proportion of benefit stream. This indicates that the project of this magnitude is a good match to the needs of the citizens and the state in general. Despite SSE registering the lowest benefit of all the stakeholders, they remain to be the main beneficiaries of the project when considering direct financial gains (economic benefits) accrued from project activities.

Analysis of stakeholders and proxies have shown that some of unintended positive impact of the project exerted a huge contribution to the SROI. One of such unintended positive contribution of the project is contribution of this project to fundraising and income opportunities for organizations like PDF, UTT and DAWASA. Whereas construction of DEWAT is targeting to increase effectiveness and efficacy sludge management in unplanned

settlements, the positive implication has been additional income to DAWASA in form of discharge fee. According to agreed terms between DAWASA, DEWAT operator and project team, 30% of charge fee shall be availed to DAWASA on monthly basis. PDF asserted that this project have improved their funding positions. Implementation of this project in urban settlements have added values to the organization and has abled the organization raise funds of about 600million, for a potential project that will see PDF excel in WASH for the next three years. Through this project, UTT is not left behind; the organization has established sanitation loan scheme, which intends to attract more SSE and donors to invest through this loan scheme.

Although the DEWAT will generate manure and water for irrigation suitable for agriculture related activities including gardening, majority (73.13%) of respondents were doubtful to use these by-products. Only 19.7% and 17.7% (n=147) are willing to buy/use manure and water for irrigation respectively generated by the DEWAT. Meaning that production of manure and water for irrigation will certainly not make notable contribution unless people are willing to buy and use these products. Some respondents said they do not plan to buy or use manure from wastewater because they are not sure of the side effects of using manure generated from human faecal materials.

### **Conclusion**

Stakeholders' engagement in the SROI analysis process is critical not only in terms of defining the scope and outcomes of the project but also in broader perspectives in ensuring articulation of key assumptions and risks. The analysis is critical much as many of values included in the model depend on expert judgment given that some social and environmental proxies do not have market values.

Development of theory of change and deciding on those that matters most should be treated with lots of sensitivity analysis to avoid extremes in either ends. The inclusion of outcome and stakeholders in the final analysis should reflect materiality principle. Assessment and review of assumptions should be a continuous process during development stage and analysis stage respectively.

Community members at the households accrue high proportion of benefits (69% of total benefits) as direct contribution of this project. This indicates that the project intended to improve livelihood of the community members than any carder of beneficiaries. Further analysis indicated that the state through municipal and DAWASA are a second largest beneficiary of the project outcomes.

Although SSE are at the center of benefit analysis, their potential to benefit is underrated, this is partly due to underestimation of total reach and lack of clear market plans for increase revenue collection from clients/customers.

### **Recommendations**

The study recommends the following issues as they form important element of the big success:

- i. Given that the benefits of DEWAT go beyond storage of faecal material to production of useful products such as manure and water for irrigation, and given that majority of respondent did not know value add for using such by-products, therefore the study recommends an intensive community engagement/awareness to bridge knowledge gaps on benefits availed by the DEWAT.
- ii. Given that the project intends to reduce use of vendors in the solid and liquid waste businesses and given that the study revealed vendors are still preferable liquid and solid service providers in some communities, it is recommended that strong measures are taken in project assisted communities to ensure services are restricted to SSE only.
- iii. In some communities, liquid and solid waste business are not well perceived due to previous bad experiences, as this remain the same and critical, awareness and community sensitization is important to ensure that members continue to enrol to project benefits.
- iv. Given that benefits of the project over the period of five years is longer enough, the project should advise approaches to motivate customers. This could include but not limited to promotions (discounted services) and advertisements to ensure there are no drop off. If the project sees many drop off, then most likely the benefits of the project will not be realized.
- v. Legal enforcement remains critical at all levels of implementation of the project. During assessment it was found out that some people do not abide to agreement for paying refuse collection fee, and illegal dumping of

waste is still common in many places. In view of these, strong measures should be put in place to ensure defaulters are timely dealt.

### Acknowledgement

This study has been very involving and needed people to dedicate their time, knowledge and experience to make it happen. Authors would like to appreciate the efforts of all those who participated at different stages of the development of this report. The report will not only help to create a benchmark for further studies on social, economic and environmental gains accrued from liquid and solid waste businesses but it will also help government make informed choices to support unplanned settlements and small towns lacking sewage systems.

Authors wish to extend gratitude to the COMIC Relief for financial support and allow this study conducted at this particular phase of the project cycle. It is our sincere hope that the funding has provided a good justification to influence similar interventions elsewhere. We would wish similar funding opportunity given to enable generation of more evidences to attract government attentions.

We would especially like to extend our appreciations to Liza Tong who introduced some of us to social return on investment training, which greatly influenced us to make this commitment happen. Our heartfelt appreciations go to Emma Stewart for great support during tool development, your tireless support, advice and guidance during the entire period of the study.

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