

WESTERN PROVINCE



NGORORERO DISTRICT

**WATER SUPPLY AND SANITATION INVESTMENT
PLAN FOR NGORORERO DISTRICT**



WATER



SANITATION



HYGIENE

PREPARED BY WASAC Staff with support of MININFRA

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SYMBOLS AND ABBREVIATIONS

AfDB	Africa Development Bank
DWA	District Wide Approach
EDPRS	Economic Development and Poverty Reduction Strategy
EICV	Integrated Household Living Conditions Survey
FRW	Rwandan Francs
FY	Fiscal Year
GoR	Government of Rwanda
Km	Kilometer

KPIs	Key Performance Indicators
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MININFRA	Ministry of Infrastructure
MTEF	Medium Term Expenditure Framework
NGOs	Non-governmental Organization
NISR	National institute of statistics
NST1	National Strategies for Transformation
O&M	Operation and Maintenance
PPP	Public-Private-Partnership
Q	Quantity
RURA	Rwanda Utilities Regulatory Authority
SDGs	Sustainable Development Goals
SWAp	Sector Wide Approach
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UNICEF	United Nations International Children's Emergency Fund
WASAC Ltd	Water and Sanitation Corporation Ltd
WASH	Water, Sanitation and Hygiene
WATSAN	Water and Sanitation

EXECUTIVE SUMMARY

District investment plan is a required projection to reach the universal access to basic water supply and sanitation services in the country including Ngororero district. In order to accelerate the Momentum of exceeding the current status of access to water supply and sanitation, the GoR has adopted and embedded District Wide Approach as systematic approach in the national water and sanitation policies with an ultimate goal of ensuring sustainability, improving water and sanitation service performance and accountability countrywide.

The Ministry of Infrastructure is coordinating the implementation of the District Wide Approach that is being piloted in five districts and committed to scaling-up the approach to the remaining districts. The pilot districts includes Ngororero, Karongi, Gicumbi, Nyamagabe and Bugesera Districts with main partners WASAC, Water for People, UNICEF and Water Aid agreed to take the lead and help all mentioned districts the process to formulate the District Investment Plan respectively. Therefore, WASAC in partnership with District and other stakeholders will produce the District Investment for Ngororero District. It is expected that the produced District Investment Plan will entails implementation path, service level, appropriate technologies, synergies and accountability, resources gaps and areas in need of interventions for Water supply and Sanitation in Ngororero District.

The main sources of water supply used in Ngororero district, is improved of which 69.8% is for private households. Meanwhile, at sector level, the high percentages of the private households using water supply from improved sources are Muhororo with 89.2% and Gatumba with 84.4%, while the low percentages are in Sovu that is 51.6%, Muhanda with 54.4% and Kavumu with 54.9% respectively.

In terms of Sanitation access, the main type of toilet facilities used by private households is private pit latrine with 84.1% and shared pit latrine of 9.0%. The main modes of waste disposal used by the households vary by area of residence; Solid wastes management, is practiced by private households through composting, farming, open spaces and private dust bins. Sectors with high percentages of households using compost dumping are Matyazo (63.1%) and Nyange (60.1%). Sectors with high percentages of households disposing their waste on the farms are Sovu (53.7%) and Kageyo (52.7%).

The Government's target in the Vision 2020 is that all households (100%) should have access to safe water and sanitation services and District will ensure that all households have universal access to basic water supply and sanitation services.

The water supply and sanitation Investment Plan is a living plan that will be updated regularly as additional information becomes available and priorities change. Such a plan will allow the districts and its collaborating partners to have a clear perspective of investment needed to the sector. The district investment plan for water supply and sanitation sector is coiled in four components and the Government or partners' support will be instilled according to the mentioned areas of investments. The four components are total rehabilitation of water

supply networks, Partial rehabilitation of water supply networks, Construction of new water supply systems and lastly Construction and establishment of sanitation infrastructure. The Establishment of the sanitation infrastructure will help increase access to improved public toilets for schools, hospitals and other collective sanitation systems including sanitary landfills and sewerage systems in Ngororero to serve sustainably the communities in the District.

This proposed water and sanitation Investment Plan is firmly based on reliable database of needs and resources from a detailed study draft report for drinking water supply in Ngororero District conducted by ENGLS in the year 2015 and National Integrated Water Supply and Sanitation Master plan draft report for November 2018. Other information was gathered through the Household survey data which was conducted in March 2018.

Total cost for the water supply and sanitation investment plan for the district is **FRW 23,487,930,364**, however **3%** of total cost has already been investment, therefore the required total investment necessary for the implementation period of five years will be **FRW 22,854,409,364** which is otherwise **97%** of initial investment

1. INTRODUCTION AND BACKGROUND

The provision of universal access to basic water supply and sanitation services for all Rwandans remains a priority to the Government of Rwanda and its WASH development partners. These commitments are well articulated in the National Strategy for Transformation NST1 (2018-2024), Both National Water Supply and Sanitation policies and their related implementation strategies and the ratified Sustainable Development Goals (SDGs) in 2030.

The District Wide Approach, is a sector-led way of working that seeks to achieve universal access to WASH by creating an environment that compels all players at community, district and national levels (both supply and demand sides) to work in an organized and coordinated manner, develop strategic and operational plans for WASH that are based on agreed needs and priorities, within a controllable development space (district). Thus, the WASH District Wide Approach was one of the programmatic approaches embraced and embedded in the national water and sanitation policies with an ultimate goal of ensuring sustainability and improving sector performance and accountability at local government level. The District Wide Approach (DWA) tool has given Rwanda an opportunity to ensure that it prepares a WASH investment plan, financial monitoring tool geared towards achieving the SDGs 2030.

A pilot project to implement the District Wide Approach was initiated in Five Districts where MININFRA and WASAC Ltd will support the District of Ngororero to design and elaborate water and sanitation investment plan.

The above investment plan will allow the government and its collaborating partners to have a clear perspective of the investment needed, where these investments are needed most, what their magnitudes are and what the timing of their requirements and it shows the financing gaps.

The investment Plan Document will also, present a situational analysis of the sector, implementation strategies and will elaborate comprehensive components addressing infrastructure development requirements. It will be detailed for an initial five years' period and provide a basis for Government and development partners to agree on funding.

Using the WASH sector agencies in Ngororero District will have capacity to manage not only the development of water and sanitation facilities in terms of rehabilitation, expansion and construction of new systems but also to operate existing facilities based on knowledge of their conditions vis-à-vis demands and cost of maintenance and expansion.

The total estimated investment required is **FRW 23,109,409,363** with 71% of this investment to be spent on improved water supply and 14% on improved

sanitation and 15% to be spend on recurring expenses in order to meet long, short and medium-term capital investment for the water and sanitation sector in Ngororero district from 2020 until 2024 and through 2030. In addition, a distinction is made between new investments and replacement investments (expenditures for replacement of existing worn-out facilities). The Plan proposes a phasing of expenditures over the planning period.

2. NGORORERO DISTRICT CURRENT SITUATION ANALYSIS

2.1 Geographic Location

The District of Ngororero is situated in the Western Province. The District shares its borders with the following five Districts: Gakenke (at Northeast), Nyabihu (at North), Karongi (at south), Muhanga (to East) and Rutsiro (to West).

Ngororero district has an area of 679 km² and is divided into 13 sectors: Bwira, Gatumba, Hindiro, Kabaya, Kageyo, Kavumu, Matyazo, Muhanda, Muhororo, Ndaru, Ngororero, Nyange, Sovu, 73 cells and 419 villages or Imidugudu in Kinyarwanda language.

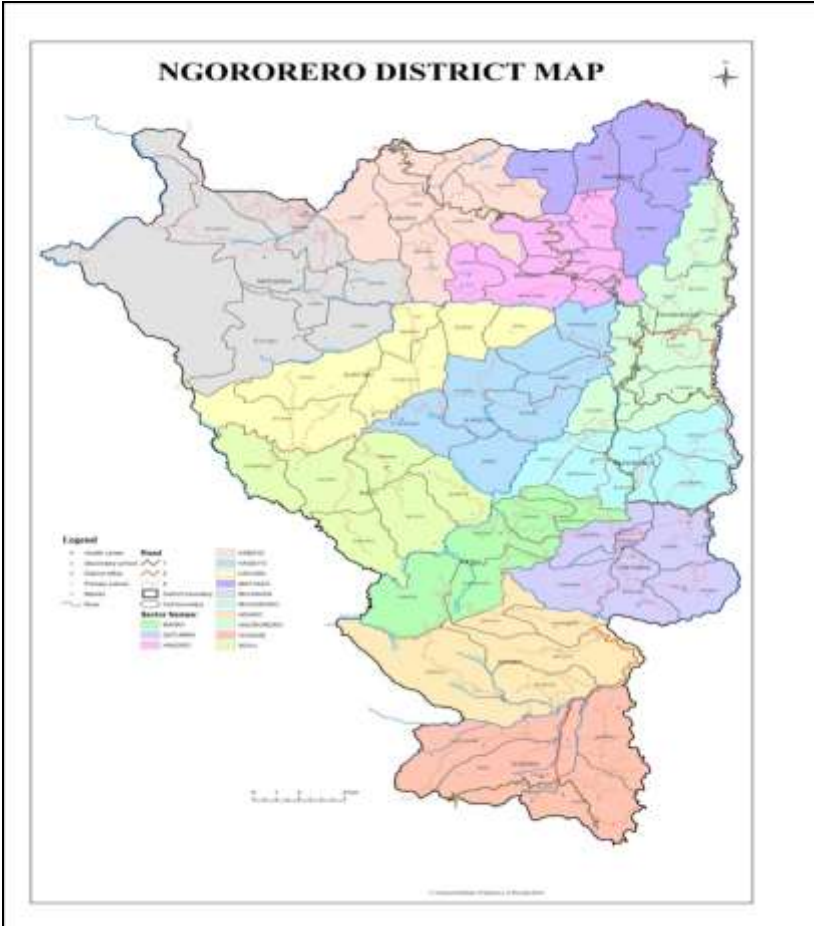


Figure 1 Ngororero district map

2.2 Climate and Hydrography

The Climate of the region is more of the tropical type with 4 seasons (short rainy season of October-December corresponding to the agriculture season A; short dry season from January-February; long rainy season of March-June corresponding to the agriculture season B and long dry season of July-September corresponding to the swamp agriculture season C. Rainfall is regular with a rainfall of 1527.7 mm per year although irregularities are recorded sometimes with weakness or excess in rainfall.

The main rivers in the district are Nyabarongo, Rubagabaga, Mukungwa, Satinsyi, Muhembe, Kibirira, Rukubi, Kintiti, Nyampiri, Mugunda, Giciye, Rucanzogera, Nyantanga and Gasumo. These rivers allow practicing agriculture especially in their swamps during dry seasons (twenty swamps totaling approximately an area of over 1000 ha) and this is an advantage as there is possibility of three agriculture seasons in one-year period. In addition, this offers an opportunity of energy generation through hydropower plants. The District is however required to invest considerable resources in the protection of the riverbanks and watersheds.

2.3 Demography

Reference to the Rwanda housing census (2012), the District spreads over 679 Km², with 333,713 inhabitants and 74,613 households which represent 13.5% of the total population of the Western Province (2,471,239 residents). The population of Ngororero district is predominantly by female where 53.7% are female while 46.3% are male and 3.7% lives in urban while 96.3% lives in rural area. Its population density is 492 inhabitants /Km². Population growth rate is 4.6%. This rate is high compared to national average of 1.8 (NISR, 2012).

Ngororero, Kabaya and Muhanda are the most populated Sectors, respectively with 34,559; 34,085, and 28,247 inhabitants each. They represent 10.4%, 10.2% and 8.5 % of the total population of the district, respectively. Two less populated sectors are Bwira sector with 18,632 inhabitants and Muhororo sector with 21,463 inhabitants. They represent 5.6% and 6.4% of the total resident population of Ngororero district respectively.

3. DISTRICT VISION, MISSION, GOAL AND OBJECTIVES WITH COMPONENTS

The overall water and sanitation services monitoring and evaluation framework is in line with the DDP and District report 2011 which are defined as: “to increase production and improve people's welfare throughout the promotion of socio-economic and cultural activities with the preservation of sustainable environment”, to provide socio-economic basic factors with

quality services and assistance to citizens and stakeholders so that they contribute to the local integrated development. To contribute to the improved socio-economic life of all the District populace by 2030 through the provision of equitable, effective, efficient and affordable services for water and sanitation.

The below table outlines very well the vision, mission statement, goal and specific objectives formulated per each sector to achieve them.

Table 1: District Vision, Mission, Goal and Objectives components

<p>Vision</p>	<p>✓ Vision of the Ngororero District is “to increase production and improve people's welfare throughout the promotion of socio-economic and cultural activities with the preservation of sustainable environment”, (District Report, 2011).</p>
<p>The mission statement</p>	<p>✓ The general mission of Ngororero District is to provide socio-economic basic factors with quality services and assistance to citizens and stakeholders so that they contribute to the local integrated development.</p>
<p>Goal</p>	<p>✓ To contribute to the improved socio-economic life of all the District populace by 2030 through the provision of equitable, effective, efficient and affordable services for water and sanitation.</p>
<p>Objectives and components</p>	
<p>1. Water supply</p>	<p>✓ To contribute to the improved socio-economic life of all the District populace by 2030 through the provision of equitable, effective, efficient and affordable services for water and sanitation.</p> <p>✓ 100% of health infrastructure having adequate water supplies facilities for patients, care takers and staff by year 2024.</p> <p>✓ By the end of 2024, improved water supply</p>

	<p>facilities for the all public places within the district, like tax parks, market places, will be in place and able to increase and to sustain services for water supply, access and coverage by 100%.</p>
<p>2.Sanitation</p>	<ul style="list-style-type: none"> ✓ All the sectors population will dispose the domestic solid waste through effective, efficient and affordable services by 2024 and through 2030 ✓ Increased number of entrepreneurs engaged in income generating activity from waste disposal by year 2024 and through the 2030. ✓ Increasing access to household sanitation and eliminating open defecation by 2024 and through 2030. ✓ All district officials increased their awareness and recognized ventures from waste as not only business opportunities for the local people but also as a waste reduction strategy to get rid of solid waste in the community. ✓ Having achieved 100% of sustainable provision of improved sanitation within easy reach, based on management responsibility and ownership by the users, the district population by the year 2030 with an 80-90% effective use and functionality of facilities for sanitation. ✓ 100% of the schools within the district having and practicing use of safe waste disposal and improved toilets facilities, solid waste disposal facilities for all students, teachers and staff. ✓ 100% Of health centers in the district having improved sanitation facilities with access, affordable and easy reach for waste water drainage, treatment and disposal by year 2030. ✓ By the end of 2024, improved sanitation facilities for all the public places within the district like tax parks, market places, will be in place and able to increase and to sustain services for sanitation and hygiene practices by 100%.

4. SWOT ANALYSIS

The analysis of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) facing the sectors summarizes the situation and the current trends and helps to improve coordination and lift constraints leading to a sub-optimal approach in managing water resources and sanitation, providing basic water and sanitation services. It will also help to generate more synergies through synchronizing priorities and actions within the existing institutional and legal frameworks. This is critical to the success of this investment Plan and capacity building; availability of funds; reform of the laws; stemming the degradation of the water catchments; rain water harvesting and storage; investigating the impacts of increased human population on the demand for freshwater and the management of wastewater.

Table 2: SWOT ANALYSIS FOR WATER SUPPLY AND SANITATION FOR NGORORERO DISTRICT

Strengths	Weaknesses
<ul style="list-style-type: none"> • Big part of the district has water and sanitation facilities • Detailed studies on water supply system elaborated in partnership with WASAC • Updated Water Supply Policy and its implementation strategy • National Sanitation policy and its implementation strategy • Existence of the District WASH Board • Private operators in the district • Existence of Water User Committees • Strong legal framework and policy regime cutting across sectors within water resources management and development 	<ul style="list-style-type: none"> • Ineffective framework of operational and maintenance • Water and Sanitation management committees not operational; • Old infrastructure of Water supply and sanitation • Lack of plans and benchmarks on water resources management and development • Weak financial structure on water supply and sanitation development. • Limited water supply and sanitation. • Inadequate sustainability of the installed infrastructure • Limited private sector capacity • Inadequate capacity of institutions involved in the sectors of water and sanitation.
Opportunities:	Threats

<ul style="list-style-type: none"> • Potential rivers as sources of water; • Political will for the effective implementation of water supply and sanitation • Availability of potential Donors • Pro-active civil society that is aware of the importance of an efficient water resources management • High leaning capacity building institutions are in place. 	<ul style="list-style-type: none"> • Destruction of water catchments, including degradation of land, and growing ecological instability • Incomplete cooperation frameworks for the management of shared waters in the region • Limited active participation of institutions of other sectors to implement a common vision for water and sanitation sectors • Insufficient comprehensive plans and strategies to handle disasters such as, droughts, floods, landslides, etc.
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4.1 Trend in sectors allocation in Ngororero District

In Ngororero District, according to MTEF allocation as shown in the Table 3 for Sector MTEF allocation in the last three years, the resources allocation to the WASH sector during the year 2017/18 was 87,812,092 million RWF and fiscal year 2018/19 it increases up to 560 million RWF. It should be observed that although nominally there seems to be an increase in sectors funding, in real terms the funds are not sufficient due to amongst others the high cost technology options suitable to further increase water and sanitation coverage in the district. This is coupled with a high population increase as well as the rehabilitation costs for old schemes.

Table 3: Sector MTEF allocation in the last 3 years

FY	Districts Budget	Water and Sanitation	Percentage rate W&S
2016-2017	12,635,376,872	66,568,000	0.53
2017-2018	13,863,120,214	87,812,092	0.63
2018-2019	13,941,876,588	560,282,476	4.02

5. WATER AND SANITATION CURRENT COVERAGE

Data on existing coverage in the district is available from detailed studies of drinking water supply in Ngororero District in the year 2015 where some information was updated, and the Household baseline survey data conducted in March 2018. Additional information on water and sanitation in schools, health facilities and other public places (market and tax station park) was provided by

the district. Data for rural and urban areas in the district were all considered as for rural because the big part of the district is rural. The estimates of the present coverage form the basis of Investment plan.

5.1 Water Supply Coverage and status

5.1.0 Definitions

Water supply coverage is percentage of the population having access to a reliable source of water that supplies adequate quantity and adequate quality of water in convenient way. *Water use* refers here as the actual water that has been used for a specific purpose. The user may be within the natural hydrological cycle (e.g. fishing) or it may require a local and temporary utilization (hydropower) or a complete shift in the natural hydrological cycle (drinking water abstracted from a borehole) and also water use depend on flow regime, location and by its physical, biological and chemical qualities.

5.1.1 Water supply coverage

In Ngororero District, 51.2% of the households use improved source of water, 24% get water from unimproved systems (lake, Swamp, River etc) and other 24% get basic service level of water supply means that there is a general problem of irregular service where even those who have taps are prompt to go back to unimproved sources as shown in figure 2. (Baseline survey, 2018)

At sector level, the high percentages of the households using water from improved sources are Muhanda (69.5%), Kabaya (68.2%) and Ngororero (60.3%) while Sectors like sovu have (40%) and Kavumu (38.2%) of its getting water from unimproved sources, Kageyo (35.6 %) and Ndaro (38.1%) thus need attention to improve service. (Baseline survey, 2018)

The figure below shows the general picture of Ngororero district on water supply service level. Access varies across the sectors as illustrated in annex 3.1 with detailed information on all sectors of the district where numbers in bold show the highest percentage in every level.

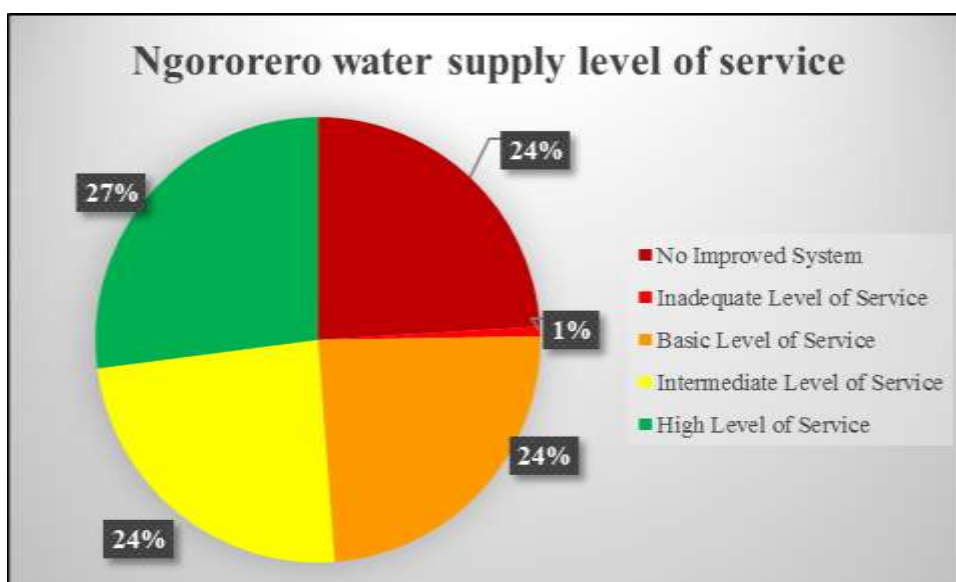


Figure 2: Ngororero water supply level of service

- No improved means, Households get water from unimproved water points such as lakes, Rivers and unimproved springs;
- Inadequate means there is existence of improved services but not working;
- Basic means there is presence of an improved water point that offers service but has issues like breakdown, irregular supply etc;
- Intermediate and high level of service means there is good service from the Water points where households get water from.

5.1.2 Water supply infrastructure development

Ngororero district currently is supplied by old water system moreover, the water sources are not well developed and most population collect water from far away. Some water supply systems have been constructed in way back 1970s and need total rehabilitation where the district has 48 water systems that currently supply clean water all sectors. Given the elevations and topography of the district, most systems are other are. Current water supply systems in Ngororero district are predominantly gravity systems with some pumping systems and there is no boreholes.

Table 4: Number of sources by sector

<i>Sector</i>	<i>Number of Existing sources</i>	<i>Q (l/s)</i>	<i>Number of New sources</i>	<i>Q (l/s)</i>	<i>Total sources</i>	<i>Total Q (l/s)</i>
<i>Kabaya</i>	22	7.06	20	13.87	42	20.93
<i>Matyazo</i>	9	3.19	7	7.1	16	10.29
<i>Hindiro</i>	21	5.18	17	6.46	38	11.64
<i>Ngororero</i>	11	3.64	4	21.9	15	25.54
<i>Muhororo</i>	23	2.801	18	6.176	41	27.106

<i>Gatumba</i>	22	6.59	21	2.72	43	9.31
<i>Ndaro</i>	5	1.19	28	8.18	33	9.73
<i>Nyange</i>	5	5.33	3	1.72	8	7.05
<i>Bwira</i>	5	1.02	14	6.13	19	7.15
<i>Sovu</i>	5	1.57	6	4.39	11	5.96
<i>Kavumu</i>	15	22	7	17.06	22	39.06
<i>Muhanda</i>	5	4.71	2	2.21	7	6.92
<i>Kageyo</i>	8	1.48	2	2.41	10	3.89
Total	156	65.8	149	100.3	305	166.1

From the table above, the main source of water in Ngororero district is surface water, the total existing water source systems 156 and over all sources of water systems totaling to 305 including new ones.

5.1.3 Current status of water supply operationalization in Ngororero District

The provision of water service in rural area is managed in different models including the Public-Private-Partnership (PPP) arrangement (companies, cooperatives, association, individuals). The Districts, responsible for the water systems existing in their areas, usually grant the management of their systems to one or more Private Operators.

The Private Operators have to manage the infrastructures and get the cost recovery by selling the water to the people whom are supplied by the water points.

The price for selling water is fixed by RURA depending on the source of power to transport and distribute water to the community. However, due to the limited financial capacity of the supplied people and the status of the infrastructure (water supply system being managed), the Private Operator may make a request to adjust the price. Not Business-Oriented Associations continue to manage the water systems constructed to feed the community under their management.

It was in this regard that in Ngororero District, there are two Private Operators (MEGACOS Ltd & VISION WORK) licensed by RURA to manage and operate 70 water supply systems networks of which VISION WORKS operates and manage 34 WSS in 7 sectors whereas MEGACOS Ltd operates and manage 36 WSS in 6 sectors. Both Private Operators are claiming not to break-even (do not meet their current operations). From this context, there is need to carry out a thorough a business viability assessment for water supply in Ngororero District before coming to the conclusion for the two operators in question.

5.2 Status of Sanitation in Ngororero district

Ngororero district as one of the districts of western province which is facing problem of lack of improved sanitation. Currently, most population in Ngororero district rely on on-site containment technologies including traditional (unimproved) pit latrines, improved pit latrines (VIP, flush toilet with septic tanks). The Fourth Population and housing Census, conducted in 2012 in Ngororero showed 84.1% are the main type of toilet facilities used by private households is private pit latrine and 9.0% use shared pit latrines

At district level, 54.4% households have toilets that are in good physical condition (acceptable level of services), 39.4% have basic sanitation level and 6% of households do not have toilets. At sector level, the sectors with high percentage of households without sanitation facilities are Sovu (10.6%), Ndaro (10.3%) and Kageyo (9.6%) while Kabaya (66.8%), Ngororero (63.2%) and Gatumba (62.9%) sectors have high percentages of private households using toilets that are in good physical condition. (Baseline survey, 2018)

The figure 3 below shows the general picture of Ngororero district on sanitation service level. Annex 3.2 shows detailed information on all sectors of the district. Therefore, in this investment plan, the District plans to strengthen collaboration amongst the institutions responsible for sanitation, implement demand -led sanitation /social marketing, introduce modernized waste management and treatment while promoting private sector services for sludge collection and disposal, and make advocacy on law enforcement with regard to sanitation and hygiene.

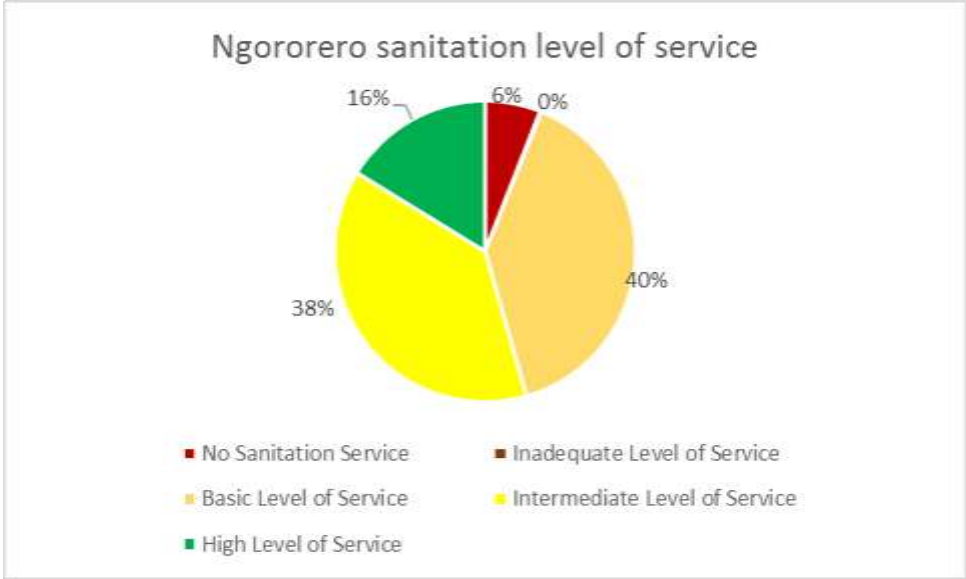


Figure 3 Ngororero sanitation level of service

- No Sanitation Service: Household not have toilets which is usually a result of open defecation;

- Inadequate level of service: Household have toilet but does not ensure hygienic separation of human excreta from human contact (Pit latrine without a slab or platform)
- Basic level of service: Household have toilet but not in good physical condition (neither super- structure nor sub-structure) or are shared pit latrine.
- Intermediate and high level of service: sanitation facility super-structure (Walls, Door, Roof) and Sub-Structure (Slab and Pit/Tank) are in good physical condition where Performing Function of providing barrier between user and feces

Insufficient public latrines in the town of Ngororero and along the trading centres of the district remain a huge challenge as far as sanitation is concerned. Some of existing latrines are with no access to roads for vacuum truck for emptying of septic tank, so hands (manually) using buckets without any protective equipment do the emptying, and this may contaminate the surrounding environment and causes diseases related to inappropriate hygiene and sanitation practices.

5.2.1 Waste infrastructure management

Some years ago, Sanitation infrastructures were few in urban areas as well as in the rural areas in Rwanda. Currently, in Western Province there are no adequate wastewater treatment systems, storm water drainage system, improved latrines and in addition, toilet emptying facilities and faecal treatment mechanisms are not promoted in the province. Note that key barriers to improved latrines and Hygiene in some areas of western province are due to financial constraints, mindset of local population and limited human capacity for sanitation sub-sector.

With regards to the solid waste management system, in Ngororero district, the main modes of waste disposal used by the individual households are composting (50.7%), farms (34.9%), bush (10.9%) and individual dust bins (1.6%) (Detailed study of drinking water supply and sanitation in Ngororero District, horizon 2040 conducted by enterprise du Genie).

The main modes of waste disposal used by the households vary by area of residence. Urban households evacuate their waste mainly in compost (41.6%), on the farms (24.5%), and private dust bins (22.7%), In rural areas, households evacuate their waste mainly on compost dumping (51.1%), on the farms (35.3%) and in the bush (11%). Solid waste collection and disposal is currently problematic since there is no modern landfill for this type of waste, which is generally dumped into the open environment.

For Waste Water Management and faecal sludge management, at present the Western province has no waterborne sewerage system and each household is responsible for its wastewater disposal. The non-domestic sectors such as restaurants, hotels and institutions use septic tanks and other treatment systems, like eco-protection system installed in the market place. The effluent from septic tanks and compact treatment units usually flow into soak-away-pits (infiltration trenches). The district lacks a centralized sewerage system that would bring together a central district sewage control and management station.

Concerning storm water management, the drainage channels and ditches have been constructed along the roads. The existing drainage system covers most of the developed areas but in general, the drainage facilities are not sufficient to evacuate excess storm water thus leads to district experiencing inadequate storm water Management, that later causes soil erosion to the farmers. With no proper water collection channels, the water storm causes landslides and washes away the top soil layers thus later cause erosion.

5.2.2 Current Operationalization of Solid waste

According to Waste-Global Review of Waste Management Report (World Bank Urban Development Series, 2012), the per capita waste (solid) generation for Rwanda is 0.52kg/day and is projected to be 0.85kg/day by 2025. On the other hand, the average per capita waste generation for Africa in general is 0.65kg/day and is projected to be 0.86kg/day by 2025.

A waste generation and characterization study was conducted in Rwanda at various places including the capital city and other district cities. The finding shows that the average per capita waste generation in the targeted cities ranges from 0.56 kg/day to 0.6 kg/day.

Following from key informant interviews and field visits, collection, transportation and disposal of solid waste are the responsibilities of COPEDINGO and KOMEZISUKU KABAYA cooperatives licensed collectors to ensure that solid waste (garbage) is collected and conveyed to approve disposal sites. Sorting and storage of the waste is made on these sites. It was also reported that Kabaya dump site (RUSUSA Cell, Rukaragata Village) is located on the hill side and is not accessible at times, leaving scattered waste being exhibited along the road on the way to the dumpsite (due to inaccessibility of the site during rainy season).

COPEDINGO and KOMEZISUKU KABAYA cooperatives have different areas of operations of which COPEDINGO is currently operating in the center of Ngororero District and KOMEZISUKU KABAYA operating in the Sector of Kabaya. It was observed that none of these cooperatives had trucks

designed to collect and transport solid waste in the operational areas. All of them use open trucks and this kind of transport mechanisms disregard the regulation on which solid waste management should be governed. Generally, the licensed private collectors charge between 500 to 1000 francs per month, per household. However, findings from consultations show that the district did not provide guidelines on the amount of fees to be collected for which quantity of solid waste generated.

In the table below, we report the findings by the Socio Economic and Technical Household Survey of type of solid waste, indicating that most of it (82%) is Bio degradable.

5.3 Institutional Water and Sanitation

Ngororero District Water and Sanitation institutional arrangement has both public and private facilities. This Investment Plan comes in to provide estimated resources to scale out 100% access to water and sanitation facilities to the district.

There is limited reliable information on access rates on water and sanitation in those institutions. The data does not, however, define adequacy in terms of the definitions of service set.

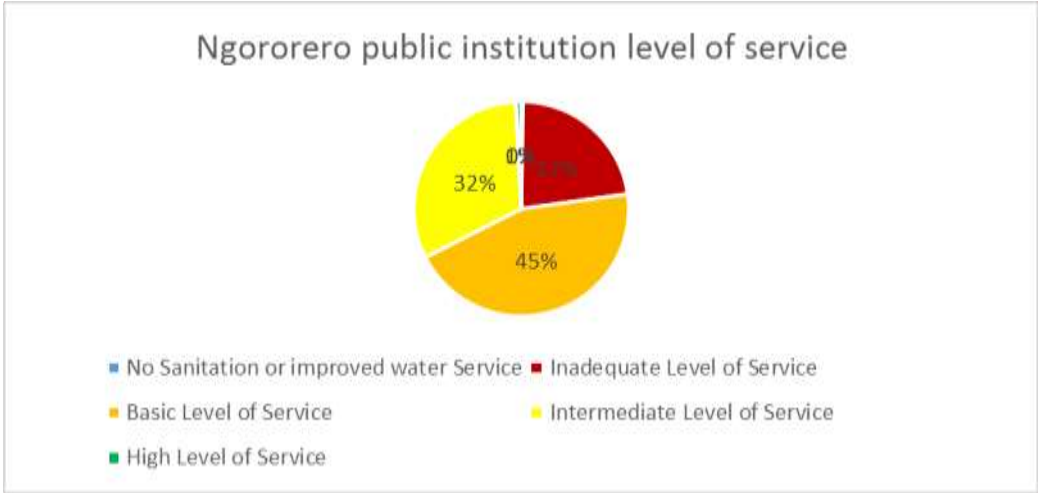


Figure 4: Ngororero Public institution level of service

5.3.1 Current status of Sanitation at schools

The assessment of needs in schools was based on the guidelines of the Ministry of Education that recommend 30 girls’ students per toilet cabin and 40students boys per cabin. It is unfortunate to notice that some schools, even though they have toilets, toilets are in so bad shape that they are almost falling. In this case, totally new toilets were proposed for these schools. While there are likely to be sanitation facilities in many of the schools, district data on the sufficiency and functionality of these facilities in primary, middle and high schools is lacking.

5.3.2 Current status of water supply and rain water harvesting at schools

The assessment conducted with the district regarding rainwater harvesting took into account the years of construction of blocks that did not have rainwater-harvesting systems. Some classrooms are very old, constructed in the early fifties while others have been constructed after the genocide of 1994. Hence, the assessment only took into account the blocks that are new and do not have rainwater harvesting systems. Rainwater harvesting is planned for the schools without water tanks in future.

5.3.3 STATUS OF SANITATION AT HEALTH FACILITIES

The graph below shows that the level of sanitation services in health facilities of Ngororero District. All the thirty health facilities have adequate toilets, meanwhile fifty-three water tanks are available out of seventy-nine water tanks needed for all health facilities.

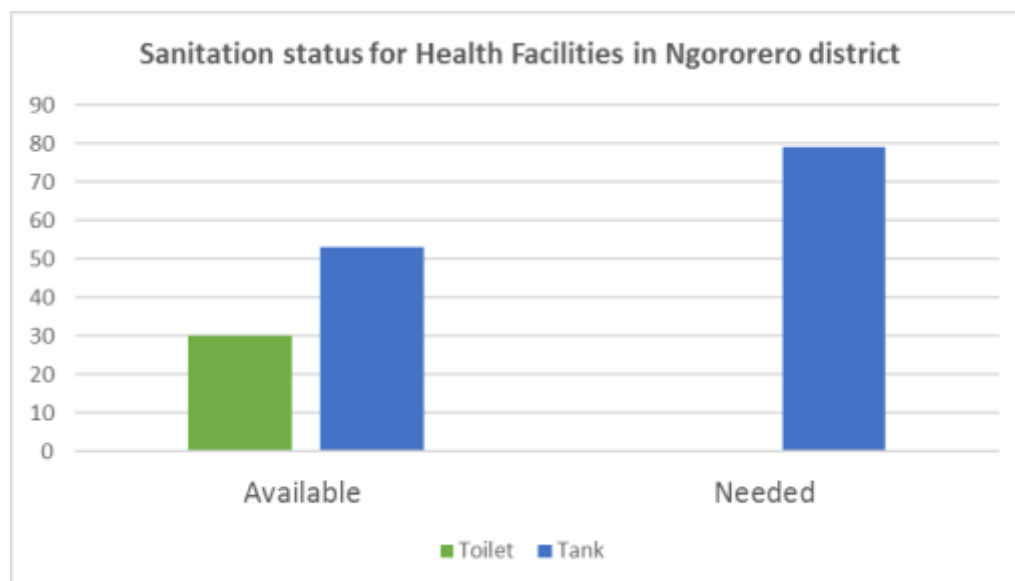


Figure 5: Sanitation status for public places in Ngororero district

5.3.4 SANITATION STATUS IN PUBLIC PLACES

The graph below shows that the level of sanitation services in public places of Ngororero District is still in critical and need improvement.

There are six public toilets, while only thirty-four public toilets are needed. For water tanks, fourteen water tanks are available while eighty eight water tanks are needed.

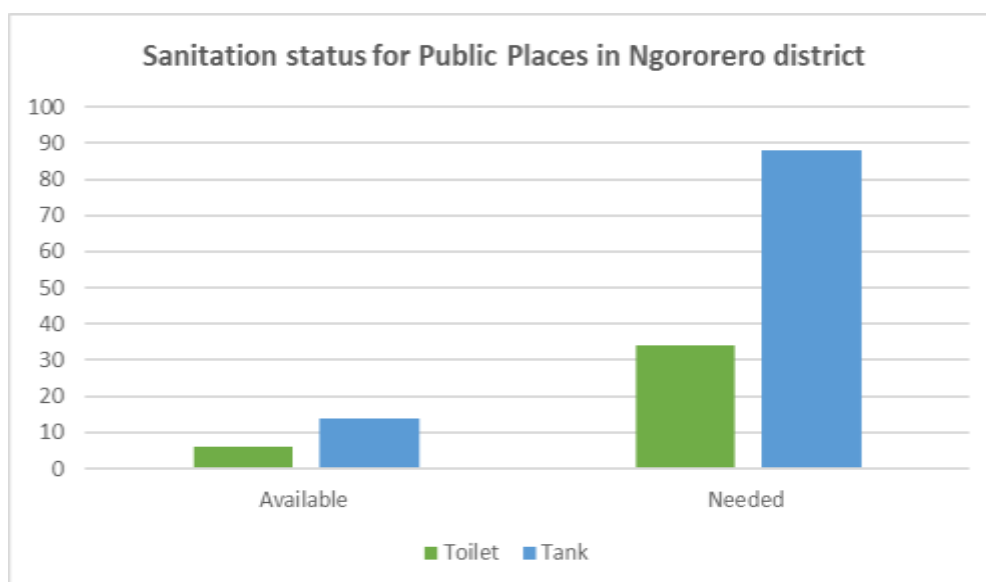


Figure 6: Number of toilets and water tanks available or needed

6. FUNDING REQUIREMENTS FOR THE WATER AND SANITATION SECTORS

Water is considered as first, then sanitation where Public institutions was not forgotten in each sub-sector. Capacity building is also a component of the investment plan.

6.1 Sectors Investment Requirements in Ngororero District

6.1.1 Physical requirements

This section presents the estimated physical requirements for meeting the targets of water and sanitation of 100% in the country (NST1). The units for these requirements are expressed in various ways, depending on the type of physical requirement or service. The specific units are as follows:

- Facilities (toilets or water supply systems or incinerators or wastewater treatment facilities)
- Persons
- Geographical units (villages, Cells, Sectors)

Physical requirements were calculated using the following information:

- Current access rates
- Target or desired access rates
- Existing and projected population estimates
- Expected life of facilities (where necessary)

The limited life of many facilities (e.g. toilets) means that physical requirements will include the replacement of fully depreciated hardware.

a) Water supply services

The water supply sub-sector targets that population access to effective, efficient and affordable services for improved water supply where at least an improved source within 30 minutes' round trip to collect water. (SDG 2030)

To achieve the above targets, the assessment was conducted by the consultant (ENGIN), in coordination with the district and WASAC, identified an implementation plan of 85 water systems of which 21 are new water supply systems, 26 systems for total rehabilitation and 22 for partial rehabilitation will be the reinforcement of Ngororero district for water supply network. All these will increase water production in Ngororero district from current quantity of 5,681.75 m³ per day to 12,355.5 m³ per day.

There is also initiative intended to increase rainwater harvesting where it will be mandatory to all public institutions to put in place a rainwater harvesting facility but also to encourage rainwater harvesting at household level. Table 5 below indicates distances of networks required to ensure water is supplied to population and public institutions in all sectors of Ngororero District.

Table 5: Number of Kilometers required supplying water

<i>Sector</i>	<i>New water systems (km)</i>	<i>Partial Rehabilitation (km)</i>	<i>Total Rehabilitation (km)</i>	<i>Beneficiaries (Households)</i>	<i>Number of schools and health posts /centers</i>	<i>other beneficiaries (schools+ health facilities)</i>
<i>Bwira</i>	48.0	-	6.1	4,080	8	6,012
<i>Gatumba</i>	13.5	28.2	-	5,426	5	3,210
<i>Hindiro</i>	6.3	-	15.5	3,690	2	1,714
<i>Kabaya</i>	62.6	-	20.6	12,088	9	10,592
<i>Kageyo</i>	23.1	-	16.7	3,813	7	6,011
<i>Kavumu</i>	120.9	4.0	24.5	13,204	14	8,820
<i>Matyazo</i>	25.4	15.7	11.6	6,309	6	3,576
<i>Muhanda</i>	5.6	-	20.8	2,567	2	3,226
<i>Muhororo</i>	29.1	7.5	13.2	5,780	7	4,619
<i>Ndaro</i>	53.2	-	13.6	5,821	6	5,547
<i>Ngororero</i>	-	12.7	-	3,398	6	4,210
<i>Nyange</i>	17.2	-	29.8	3,645	6	3,508
<i>Sovu</i>	39.2	14.0	12.7	7,615	14	9,859
Total	444.1	82.1	185.1	77,436.0	92.0	70,904

As clearly indicated in the above table 5:

- A total of 444.1 km will be constructed for New water systems, 82.1 km for Partial rehabilitation and 185.1 km will need total rehabilitation of water supply infrastructure which will provide a total water production of 12,355.5 m³/day;
- A total of 463,342 to 776,026 people will require access of improved water from 2019 to 2030 (reference).
- The sector with the highest requirements (Kabaya, Kavumu, Muhororo and Sovu) have also the biggest number of beneficiaries. Ngororero (the urban sector) which has a lowest number of kilometers, require only partial rehabilitation of water system.

Specific values of the inputs that were used in the calculations are shown in Annex 1 with names of each water supply system and their location.

Table 6: Estimation of water demand projection for Ngororero District

Year	Population projection	Demand m ³ per day
2019	463,342	9,267
2024	585,745	11,715
2030	776,026	31,041.04

Assumption:

- The population projection was based on 2012 RPHC in Ngororero district;
- In 2019 and 2024 water demand per person is 20 l/day in rural areas while in urban areas its 40 l/day per person;
- Additional water demand from Public places (Schools, Hospitals and Health facilities) was not considered.

Comparing water demand projection (11,715 m³/day) in 2024 and water supply (12,355 m³/day), without computing non -revenue, there will be no gap but with computation of non-revenue of 25% , it will automatically not cover all water demand in all the district hence additional water supply capacity is needed.

b) Sanitation services

All the population will live in open defecation free communities; have physical and affordable access to sanitation that is safe, hygienic, secure, socially and culturally acceptable and that provides privacy and ensures dignity; will use and maintain the sanitation facilities; and will dispose of the domestic solid waste through effective, efficient and affordable services and other arrangements for solid waste recycling and disposal (SDG, 2030)

Individual sanitation

The general approach used in the district is that domestic sanitation improvements will be delivered using the awareness campaign to promote the construction of household latrines. This approach is based on raising demand for sanitation in households so that households construct their own improved sanitation. Therefore, the Investment plan does not provide or shows any financial support to household for the construction of latrines or septic tanks and no physical requirement were made for individual sanitation because it will depend on household financial capacity on construction of toilets.

However, from the national sanitation policy, and in line with the SDGs, the following latrine technologies are recommended for households (Study on appropriate low-cost wash technologies, 2018):

- ✓ Improved traditional pit latrine
- ✓ Ventilated improved pit latrine (VIP),
- ✓ Alternating twin ventilated improved pit latrines,
- ✓ Fossa alterna,
- ✓ Ecosan, and
- ✓ Pour-flush toilets

Even if those technologies were recommended, many factors can be considered while choosing the type of sanitation facility to be constructed such as geological conditions and geographical settings of the district, availability of materials to construct the sub-structure as well as the superstructure and financial capacity of the household. The traditional pit latrine is the most frequent due to its easiness in construction and to its flexibility to accommodate local materials and hence, flexible reasonable investment cost.

Assumptions: The number of toilets is based on one per household. It is recognised that this may not fit with cultural practices and limitations of space in some areas, but it is necessary for estimating purposes.

Sanitation in public institution places

Table 7 shows the physical requirements for Sanitation in schools, health facilities and public places. The main points are:

- In estimating physical requirements, the investment plan used the access rates of 100% for those institutions in basis of the ration below in assumptions;
- Data on access to water supply status in those places are not available;

Projections for the number of schools in 2030 are not available, so it is assumed that the number will increase at the same rate as the number of students. This effectively sets the number of students per school in 2030 to be the same as in 2019;

Table 7 Ngororero required Sanitation Facilities

	Number	Estimated total beneficiaries / Per day	New toilets needed	New tanks needed
Hospital	2	430	0	22
Health Centre	15	1,243	0	38
Health post	13	413	0	19
Schools	99	96,057	59	83
Parking lots and markets	11	18,517	34	88
Total			93	250

Assumptions: a toilet cabin is one door

- For Health Facilities (Hospital and Health centre): A toilet has 10 cabins including the disabled, one toilet cabin is used by 25 people per day;
- For health posts (small compared to health centers) without any toilet facility are proposed to have 4 cabins, 2 for men and other 2 for female patients;
- For Schools: A toilet has 13 cabins including one for Disabled students;
- For Public Places: A toilet has 10 cabins including the disabled, 1 toilet cabin is used by 50 people per day and number of tanks is estimated based on the number of blocks.

Waste management

For solid waste management, there is no service or facilities in rural areas at present which involves the collection and disposal of waste in a sanitary landfill as well as for wastewater treatment system.

- All hospitals will have facilities for disposing of clinical and hazardous wastes by 2030;
- There is a need to construct two landfill in urban sectors.

6.1.2 Capital Investment needs for water and sanitation

Ngororero stands to gain substantially if it can increase access to improved water and sanitation.

Increased access to improved water and sanitation saves lives, reduces illness, and frees up time to be spent on work, studies, and childcare. Such increases in access are only possible with increased investment.

This section presents the capital expenditure requirements for the different water and sanitation components of the Investment Plan. These were calculated using the information on physical requirements presented in section above and all results are expressed in Rwandan Francs (FRW) and valued at 2018 prices.

a) Water supply services

Water investments refer to all those investments needed to provide access to safe and reliable water within the district.

Table 8: Summarized Total Investment Cost of Water Supply in Ngororero District

Sector	New water systems (Frw)	Partial Rehabilitation (Frw)	Total Rehabilitation (Frw)	Total cost
Bwira	658,057,457.5	-	130,250,151.3	788,307,609
Gatumba	404,842,371.3	179,432,738.9	-	584,275,110
Hindiro	136,910,831.3	-	366,665,460.0	503,576,291
Kabaya	1,665,341,925.3	-	505,490,898.8	2,170,832,824
Kageyo	297,194,011.3	-	287,067,455.0	584,261,466
Kavumu	5,061,711,346.8	18,698,825.0	438,930,605.0	5,519,340,777
Matyazo	513,628,842.5	116,785,300.0	238,371,522.5	868,785,665
Muhanda	140,692,680.0	-	312,686,540.0	453,379,220
Muhororo	1,325,382,000.0	123,773,215.0	240,695,755.0	1,689,850,970
Ndaro	894,008,280.0	-	296,313,833.8	1,190,322,114
Ngororero	-	196,668,866.8	-	196,668,867
Nyange	249,728,921.3	-	483,377,015.0	733,105,936

Sovu	755,475,250.0	60,947,577.5	113,140,375.0	929,563,203
	12,102,973,917.2	696,306,523.2	3,412,989,611.4	16,212,270,052

Table 8 shows the total investments required to meet the 100% target for water supply for new water supply systems and old ones supposed to be replaced. Approximately 75% (12 billion Frw) of these costs are for constructing new water supply systems.

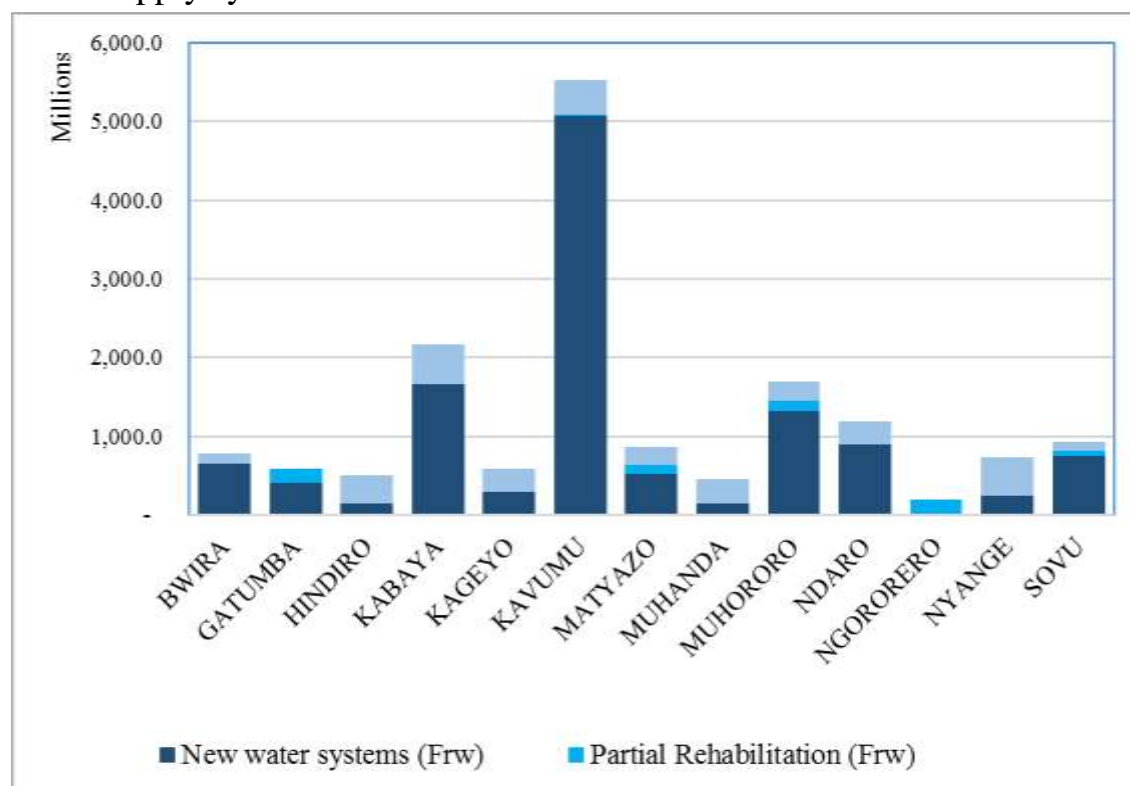


Figure 7: Required expenditures for water supply per sector

b) Sanitation services

Table 9 below shows the investments needed to achieve sanitation targets for Ngororero. The investment is about 3.3 billion RWF of which Capital expenditures for toilets (hardware), tanks for rain water harvesting and waste infrastructure management are expected to be about 1.8 billion RWF, 692 million RWF and 759 million RWF respectively.

Table 9 Summarized Total Investment Cost of sanitation and Rain water harvesting in Ngororero District

Proposed solutions	Toilet	Rain water harvesting	Estimated Cost in FRW
Health facilities	-	237,000,000	237,000,000
Schools	1,180,000,000	190,900,000	1,370,900,000
Public places (Gare and Markets)	680,000,000	264,000,000	944,000,000

Waste management facilities	-	-	759,983,710
Grand Total			3,311,883,710

In fact, the investment cost of providing improved sanitation is relatively low and includes publicly funded sanitation marketing campaigns and the costs of constructing latrines which are borne by households.

6.1.3 Sector management (soft component)

In its effort to improve water supply systems management in rural areas, the government of Rwanda through its ministry of infrastructure, is promoting local institutions involvement into the management by encouraging the creation of District WASH boards across the country. Furthermore, for better water supply and sanitation services delivery, this investment put more emphasis on capacity building, this is done through strong behavior change campaigns, capacity building of institutions and continuous vigorously monitoring of the progress made. All the above is part of the software component.

Below summarizes the support that is to be provided in the coming years in the line with Ngororero WASH Program.

Table 10: Recurrent and soft expenses required for implementation of investment plan

SN	Item	Amount (RWFs)
1	Monitoring and Supervision	195,822,538
2	Assets replacement	976,207,688
3	Capacity development and sanitation campaign	200,000,000
4	Operation, repair and maintenance	1,958,225,376
	Total	3,330,255,602

Table 11: Overall Capital expenditures requirements for WATSAN in FRW

Component	Cost per year	Total cost
-----------	---------------	------------

Pre-investment	126,704,200	633,521,000
Water Supply	3,242,454,010	16,212,270,052
Sanitation	662,376,742	3,311,883,710
Recurrent and soft expenses	666,051,120	3,330,255,602
Total	4,697,586,073	23,487,930,364

In summary, the table below shows that the estimated cost of sustaining all water and sanitation in Ngororero district is about 23.1 billion Frw.

Table 12: Estimated cost of sustaining all water supply and sanitation in Ngororero district.

Particulars	Total investment	Total investment	
		Already realized	To be realized
A. Pre – Investments			
Studies and research	253,521,000	253,521,000	0
Investment plan design and development	80,000,000	80,000,000	0
Design and elaboration of business plan	80,000,000	0	80,000,000
Water production plan	80,000,000	0	80,000,000
Marketing strategic plan	80,000,000	0	80,000,000
Expropriation	60,000,000	10,000,000	50,000,000
SUB TOTAL	633,521,000	343,521,000	290,000,000.
B. Recurring costs(soft components)			
Operation and maintenance (O&M)	1,958,225,376	0	1,958,225,376
monitoring and supervision	195,822,538	0	195,822,538
Capacity building	200,000,000	35,000,000	165,000,000
Replacement of worn assets	976,207,688	0	976,207,688.0
SUB TOTAL	3,330,255,602	35,000,000	3,295,255,602.
C. FIXED ASSETS			
Capital Investment			
Health facilities + construction of new WSS	12,339,973,917	0.00	12,339,973,917.
Schools+ partial rehabilitation	2,067,206,523	0.00	2,067,206,523.00

Markets and tax parks+ total rehabilitation	4,356,989,61 1	0.00	4,356,989,611. 00
FS treatment plant and landfill	759,983,710. 00	0.00	759,983,710.0 0
SUB TOTAL	19,524,153,7 61	0.00	19,524,153,76 1
GRAND TOTAL (A+B+C)=	23,487,930,3 63	378,521,000	23,109,409,36 3

In this funding requirements assessment, accounting for external trends such as population growth, it is estimated that the Sector will need an average annual budget of almost 4.6 billion Rwandan Francs over the next 5 years to 2024. This is about eight times the current funding allocated to water and sanitation investment Fy (2018-2019).

Replacement costs are estimated at average constant rate of 25% per year for new WSS infrastructure, existing WSS for water supply infrastructure and sanitation service provision infrastructure. All capital investment to be built within the Ngororero District water and sanitation investment have assumed lifespans that extend through 2024 and past 2030. Although no replacement costs are incurred through 2024 to 2030 for investments put in place after 2020. It is however significant to reserve 25% of the total amount to be spent on capital investment per year for effectively replacement of aged WSS and sanitation provision infrastructure. As noted above, O&M expenditures on both existing and new investments are assumed to be part of the allocated budget.

Estimates prepared for this Investment Plan suggest that a total of investment **23,109,409,363 Frw** is projected as detailed in both sanitation and water supply tables. This translates into an average of **4,621,881,873 Frw** required per year in order to achieve the expected planned targets, these are larger than budget expenditures of districts during previous years.

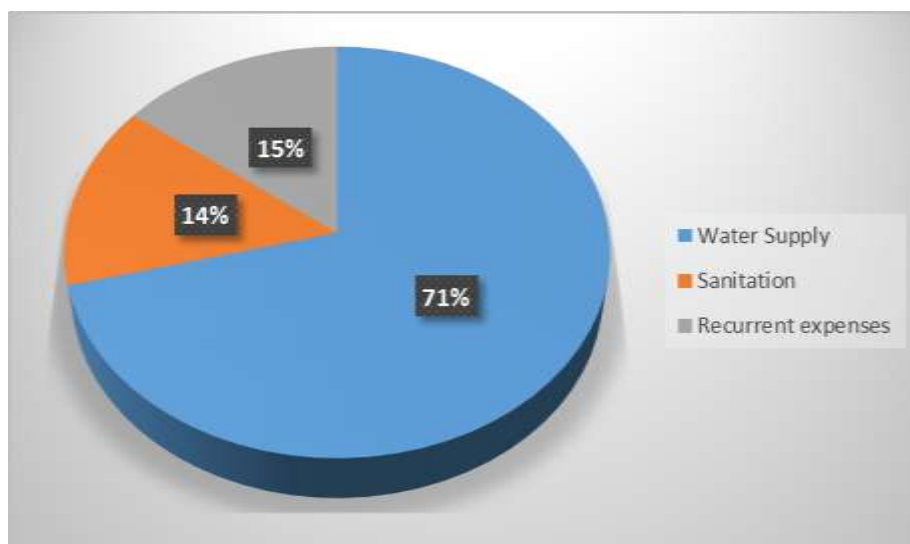


Figure 8: Funding requirement of WASH in Ngororero district

The figure shows that water supply will require about 71% of the total budget, Sanitation 14% and software component is 15%.

Scenario 1: Full Coverage of Water Access and Sanitation Targets for 2024

Table 13: Expenditure Required to Meet Water Access and Sanitation Targets for 2024 (FRW millions) – Scenario 1

	2019/20	2020/21	2021/22	2022/23	2023/24	2019/24
Health facilities	42	42	57	54	42	237
Schools	196	280	320	354	279	1,429
Public places (Gare and Markets)	70	143	223	257	251	944
Waste management facilities	0	350	0	0	350	700
New water systems	1,363	2,072	2,644	2,917	3,108	12,103
Total Rehabilitation	553	646	701	738	775	3,413
Partial rehabilitation	170	170	153	119	85	696
Software components	2,228	2,451	2,696	2,966	3,266	3,593
Total (Frw Millions)	4,622	6154	6794	7405	8156	23115

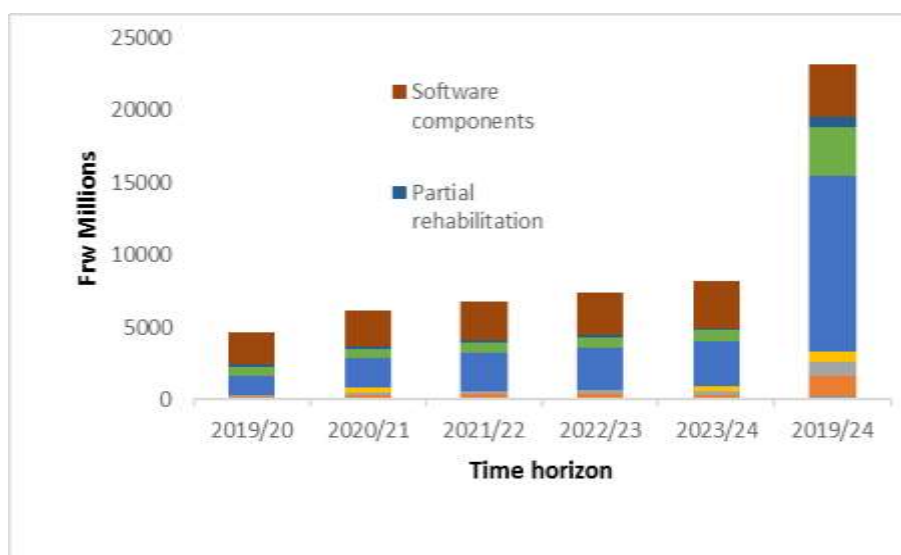


Figure 9: Investment Levels for Scenario 1 in every fiscal
Scenario Two: Full coverage for water and sanitation by 2030

In light of the high levels of annual investment needed in Scenario 1, this scenario scales back investments in line with the prioritization in each sector (water supply, sanitation and software component). Universal access to water is achieved in 2030 rather than 2024.

Table 14: Expenditure Required to Meet Water Access and Sanitation Targets for 2030 (FRW millions) – Scenario 2

	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Health facilities	42	42	57	54	42	0	0	0	0	0	0
Schools	150	190	216	234	239	181	201	18	0	0	0
Public places (Gare and Markets)	78	70	96	104	104	113	113	153	53	0	0
Waste management facilities	0	0	170	180	0	0	0	0	170	0	0
New water systems	0	273	491	681	900	1,227	1,581	1,799	1,772	0	1,663
Total Rehabilitation	369	461	572	572	572	535	332	0	0	0	0
Partial rehabilitation	212	127	127	127	102	0	0	0	0	0	0
Software	1,249	1,374	1,400	800	750	750	700	700	700	700	700

component												
Annual cost	2,100	2,537	3,129	2,752	2,709	2,806	2,927	2,670	2,695	700	2,363	

Table 14 above shows the investments for each year in Scenario 2 (that is full coverage for water and sanitation by 2030), where expenditures were divided into two phases:

Phase 1 (2019-2024): Represents the scaling-up of implementation of the investment plan in which funds about 7,741 million of Rwandan francs are required for capital expenditures, mostly for sanitation and the rehabilitation of water facilities designed to prevent access rates from falling below current levels and the construction of new facilities for sectors with inadequate water service level or which do not have any facility at all.

Phase 2 (2024-2030): In this period there should be the steady completion of the Strategy and Investment Plan. An average of 1,980million FRW/year is needed for capital costs. The increases in capital expenditures is due to the construction of new water system infrastructures.

Figure illustrates the increase of capital expenditures every year and how are in each subsector, investment on new water system infrastructure increase with time which means that the access also increases.

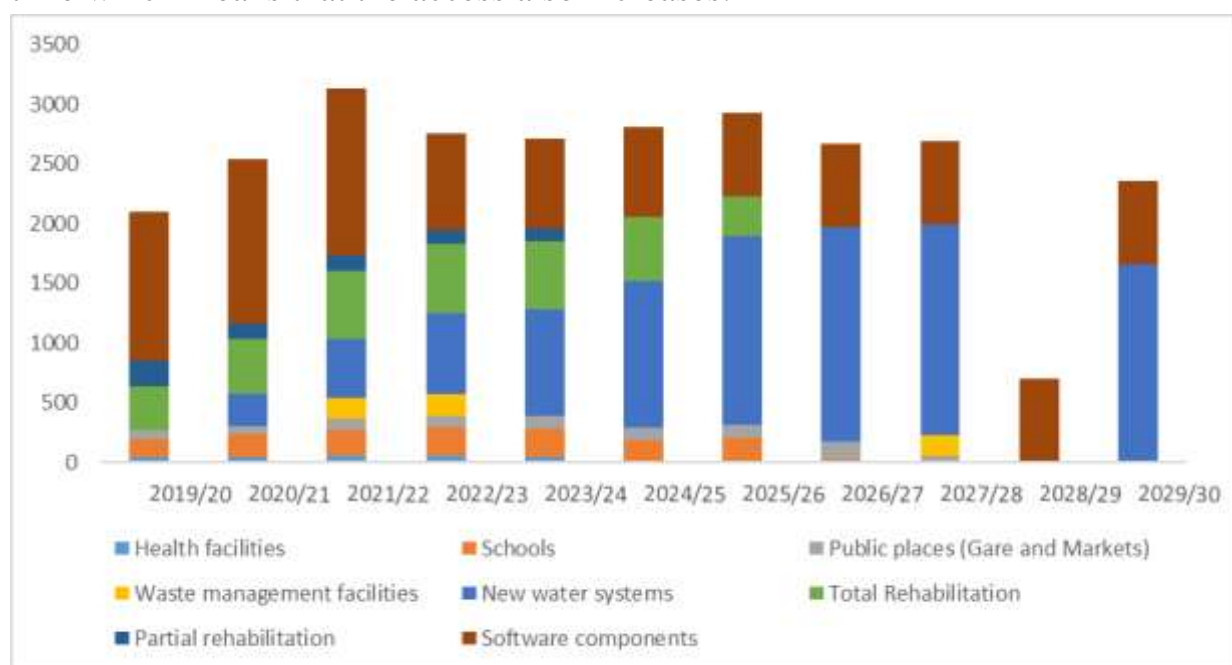


Figure 10: Investment Levels for Scenario 2 in every fiscal year- Full coverage of water and sanitation by 2030

In analysis the above-required amount, this part has outlined a number of scenarios for investment in Ngororero Water and Sanitation Sector. This report suggests that the district should implement Scenario 1, if possible, and fall back

to Scenario 2 if the funds and capacity required for Scenario 1 are not forthcoming:

- Scenario 1: Achieve full coverage for water and access to sanitation by 2024. The benefits to Ngororero from reaching these targets would be huge. To achieve these targets would require large amounts of fund raising and investment expenditure over the period. If these amounts of funding and investment cannot be achieved a scaled back version of this investment plan should be considered;
- Scenario 2: Achieve full coverage for water and access to sanitation by 2030. This scenario delays reaching universal access to water and sanitation till 2030 but will require reasonable annual expenditures which can be feasible.

Most of the recurrent costs are expected to be paid by users of the services. For this to happen, it will be necessary to set tariffs in rural that will cover the operating and maintenance costs of the services.

All the financing will need to take account of the affordability of provision of services, taking into account the high levels of poverty in some rural areas. It may be necessary to provide subsidies in some form to ensure this.

6.2 New Strategic Direction

The provision of adequate Water Supply and S services plays a crucial role in preventive health care and is more generally a pre-requisite. One of the key indicators for socio-economic development is to access drinking water as also a basic amenity, ranked among the highest priority public services by Rwanda's population.

Based on the synthesis of the spirit of the current strategic Policies, the broad mandates and functions of the key sector players, and the need to resonate joint approaches in sector programmes. The water and sanitation sector mandate is therefore, to consolidate collaboration, cooperation, and coordination of programmes, projects and activities, in a sustainable manner to ensure protection and conservation of water resources and good governance in availability, equity, and accessibility, to water for all uses and users.

6.2.1 Sanitation as Business

The government and its partners will assist and improve the district's water supply and rehabilitate and construct a number of public toilet facilities in public institutions. Improved water supply and increased observance of sound environmental sanitation practices is likely to increase demand for fecal sludge collection and disposal services in Ngororero District that may pose serious challenges if nothing is done in the near future. To address these challenges, it is

necessary to establish fecal sludge treatment plant within the district to contribute towards improving access to safe sanitation and improved environmental health in Ngororero District.

This Investment links to all three sustainable implementation plans for improved and access to water and sanitation strategies as follows:

Bankable projects for investments - Strategic investments to improve the environmental quality and social acceptance of public toilets and shared septic tank facilities, and investments to improve faecal sludge management through improved collection, treatment and re-use. In addition, collection of User Fees to raise revenue for improved and sustainable operation and maintenance of facilities; competitive pricing that results in increased revenue from provision of improved faecal sludge collection and treatment services; and revenue derived from sale and re use of end products ensure sustainability.

Enhancing water governance: Adoption of an innovative and pro-poor approach to improve access through capacity building and engagement of WASH committees for provision of sustainable services; raising of public awareness on WASH related environmental issues and increased public private partnership to improve service delivery and overall sector performance.

Promote knowledge management: The investment contributes to peer learning and dissemination of information on best practices among the population of Rwanda.

The project addresses issues relating to cost recovery and sustainability along the value chain. This is illustrated by (a) the management of the landfill and faecal sludge treatment plants in three districts already established under the supervision and shared management responsibility of the WASAC and districts authorities. The private operator is engaged by the district for collection of User Fees, (b) charging of tipping fees at the treatment site for Cesspool truck discharges, and (c) marketing and sale of faecal sludge fertilizer for re-use.

6.2.2 Financial Viability of Water Supply

In the last resort the costs of water were born by the water formed committees at district levels, but it was evidenced that during the operations, these could run shortage of finance, to do even simple repair and maintenance which led to unavailable water to be supplied to community members within the district. Since that time the government engaged and involved private operator on a contract mode of public private partnership which involved putting together the financial needs of water management and distribution.

Water systems should manage their finances to ensure they have enough funds for future needs as well as daily ones. However, many small water systems in

Ngororero struggle with aging and failing infrastructure because their owners and operators did not run them like businesses. When you have enough money, you are better able to ensure safe and reliable drinking water now and in the future. In short, that means you should run your water system like a business.

It was therefore in this regard that prior to development this investment plan, an assessment of the existing water production supply and demand patterns was made. On the supply side, a random sampling was made and one type of small-scale water supply was identified in the sector of Ngororero. As an independent company in charge of supplying water to the entire Ngororero district at a profit, MEGACOS Ltd is responsible for becoming a long-term sustainable business, which implies setting up a clear business strategy and reliable accountancy practices. Contradictory to this, when making quick financial assessment and profitability analysis on their business it was noticed that between September and October, MEGACOS Ltd occurred a loss amounting to (448,612FRW), without even including depreciation of fixed assets that are available for water source in Ngororero sector. Note that they billed 397,488 water users.

However, indeed, as it appears from current business setback, in terms of revenues and costs, immediate action should be taken to make deep diagnosis of the business and provide supporting measures so that it becomes a fully sustainable business. Since MEGACOS Ltd is managing and operating six water supply points in six sectors situated in Ngororero District, it's likely that this private operator can increase his income by enjoying economies of scale and reduction on other management costs. In a business world it is normal that during business introduction stage (first month when the business has just started), the business occurs high expenses with limited sales but as the business get momentum (during business growth stage), the business can now breakeven and even income is increased. This will require counseling the private operator and the need to make a detailed water supply viability assessment study.

6.2.3 Financial Viability of wastes management

In Rwanda, where the government is subsidizing the capital cost, the fee can assume the coverage of operation and maintenance costs. In the case where the wastes management business is left to the private sector, the estimation of the fee needs to be based on full cost coverage (capital + O&M) principle. Those revenues comprise fees for waste management services, revenue from the sale of materials or organic fertilizers extracted from composed manual, recovered gate fees at treatment plants or disposal sites, or transfer/collection and transporting of Solid Waste from sources to dumping place/land fill.

For example, based on the existing prices sales realization are as under: Faecal sludge fertilizer (powered form) cost kg 50frw/kg. Faecal sludge composted

manure (liquid form) cost 30frw/kg. Emptying, transportation and disposal of faecal sludge (average cost for one trip 70,000frw at public, commercial places and 15,000frw per house holds, with assumptions that every house holds' toilet, faecal sludge is emptied once in every 5 years where as at public or commercial place is emptied twice every year. If all these price regimes are respected and mass mobilization and sensitization campaigns of Ngororero District's population are conducted effectively it will be automatic that this business of handling liquid waste can prove to be financial and sustainable business.

The above shows that this activity of waste management does not only benefit community socially but also it can benefit them economically by generating income from transportation services and use of organic fertilizers extracted from composed manure.

7. EXPECTED OUTCOME:

7.1. 70,904 inhabitants from 69 Sectors of Ngororero District have access to improved water through the construction and/or rehabilitation of 711Km of water supply systems.

7.1.2. Sanitary conditions for 96057 students, teachers and staff from 99 schools in Ngororero district are improved through the construction of 59 VIP latrines and avail 83 rain water tanks adaptable to the local regulations and cultural sensitivity in Rwanda.

7.1.3. Adequate number of improved latrines and rain water tanks available for 10 public places and 30 health centers through construction and establishment of 34 VIP toilets and 167 Rain water tanks in Ngororero District.

7.1.4. Sanitary conditions for residents in target community improved through the construction and establishment of FS treatment plant and landfill facilities to increase access to improved sanitation. Awareness level of residents in the target area involved in construction of water and sanitation facilities is increased by 30% and their hygienic behavior changed by the end of 2024.

7.1.5 Improved quality of life, Morbidity rate reduced, Less medical expenses of the people in the Ngaruroro district. Reduced water and sanitation related diseases. Awareness of good hygiene practices increased. Effective and efficient hygiene promotion adopted.

7.1.6 Adequate source of portable water available to the communities within Ngororero District.

Poverty level of the people of Ngororero District reduced.

7.1.7 Increased employment for people in Ngororero District from water and sanitation construction, rehabilitation, repair and maintenance capital investment.

7.2 In order for the program to achieve expected outcome, the program will select and train private operator. Set A user fee which will be charged by the private operator towards operation and maintenance. Part of the profit accruing, 10% of it shall be paid into water and sanitation fund to be established by the District management to further support sectors operations.

Development of re use marketing and sales strategy is necessary to facilitate demand for re use. The District with support of WASAC Ltd and MININFRA shall engage the services of a consultant to carry out studies and to prepare the marketing and sales strategy. Collaboration with the Ministry of Agriculture and other relevant institutions will be necessary. The strategy will target both large- and small-scale farmers and will be refined as progress is made in its implementation.

Establishment of demonstration farms will facilitate confidence building and stimulate demand. It is envisaged that at least three (3) demonstration farms shall be established in collaboration with the Ministry of Agriculture to demonstrate the efficacy of the re use products.

8. SUSTAINABILITY OF THE WATER AND SANITATION INVESTMENT IN NGORORERO DISTRICT.

The following are measures to be taken to ensure sustainability:

WASH BOARDS and Water users Committees would be strengthened and empowered in all the beneficiary communities to take absolute responsibility for the facilities to be provided. The same WASH CLUBS/communities that would benefit from the institutional Latrines/ rain water tanks and WSS that shall be provided and constructed.

Capacity building training would be provided to the WASH BOARD and water user Committees for proper management of the facilities with Technical Assistance from the WASAC Ltd and MININFRA.

Local caretakers from the communities will as well be trained to do routine maintenance on the water facilities to be provided.

User fees will be charged and put in separate account for operation and maintenance. This user fee, which could be paid by any of the following; Monthly or Annual fee, Community fundraising, Pay-as-you-fetch, Donations to community for water and sanitation and Advance payment will be used for water and sanitation activities alone and to run the facilities.

8.1 Program Risks

The table below summarizes the most apparent risks associated with the WASH program in Ngororero District. The most significant risk is the that Ngororero is among the Districts that have higher mountains and expenses landslides in rainy seasons.

Table 15: Program Risk Matrix

Description	Likelihood	Impact	Mitigating Actions
Insufficient Financial Contributions of Partners	Medium	Delayed program implementation	<ul style="list-style-type: none"> - Start funds mobilization as soon as possible; - Implementation
Insufficient Staffing	Medium	Hindering delivery of planned activities as the focal point staff members are not always available.	District WASH Officer should be supported by at least other 2 full time staff to ensure that the WASH program office is fully staffed WASH program outcomes are sustained. District needs to hire 2 additional staff WASH members to support WASH officer.
Drought	Medium	Diminished water production at springs which supply community systems in dry seasons	<ul style="list-style-type: none"> • Improved water sources are protected. • Community are sensitized on local water resources management (LWRM) • Hydrological study and water sources monitoring plan are scheduled to take place in a near future to have a better understanding of groundwater recharge.
Landslides	High	Due to heavy rains that occur every year in the District of Ngororero water intake structures, waterpipes, water points and pumping stations can be flooded or washed away anytime	<ul style="list-style-type: none"> • Keep on-going erosion control by radical terracing and planting trees; • Sound designs to safeguard WASH infrastructures from landslides and floods

9. MONITORING AND EVALUATION

In the line of the program, the following will act as key performance indicators when carrying out monitoring and evaluation to achieve the objectives of providing drinking water and sanitation services to all Rwandans:

- ✓ Increasing number of individual water connections
- ✓ Improving customer satisfaction %
- ✓ Increasing water production and accessibility to sanitation facilities
- ✓ Increasing water supply coverage %

To ensure the progress toward the set targets, a regular follow up is indispensable for the overall success.

In the above spirit, the effective monitoring and progressive evaluation is planned for all projects whether internal projects or external ones. A monitoring calendar would be elaborated which will guide the monitoring of activities for the period in question. This includes the consolidation of status on the projects and analysis of progress against the planned target to evaluate on track, on watch and off-track projects and propose recovery plan for lagging behind projects.

Table 16: Monitoring indicators in the funding requirement analysis

Activity	Outline indicators	Base line	Target	Time frame
Construction of new WSS	Number of Km of new WSS constructed	-	444.1Km	2019-2020
	Number of HH accessing improved water	-	77.436 HH	2019-2020
	Number of schools and health centers accessing improved water Number of productive users	-	70.996(all)	2020-2021
Partial Rehabilitation of WSS	Number of KM rehabilitated	-	82.1 Km	2020-2021
	Number of HH accessing improved water	-	As above	As above
Total	Number of total KM	-	185.1 KM	2021-2022

rehabilitation of WSS	rehabilitated infrastructure			
	Number of HH accessing improved water	-	As above	As above
Construction of Sanitation Infrastructure	Waste management facilities established and managed FS and SW are safely collected and transported. FS treatment plant and land fill are designed, constructed and properly managed. FS waste collectors' association established and strengthened. Private FS operator and staff trained	-	1 FS treatment constructed , and 1 landfill established	2022-2023
		1,823 toilets	2,890 public toilets constructed	2019-2020
		-	10 training, mobilization campaigns and studies conducted	2020-2021
		-	Avail of 2 trucks for Waste management	2022-2023
		-	Provision of 2 drivers and two	2022-2023

			trucks assistants	
		-	Provision of 8 personnel for operational ization and Waste manageme nt	2022-2023
		209	250 water tanks to be provided	2019-2020
Re use		-	Marketing & sales strategy prepared FS fertilizer produced, marketed and sold.	2022-2023

Roles and Responsibilities of Water and Sanitation Stakeholders

The program was prepared by the District of Ngororero and supported by WASAC Ltd. The below are present organizations and their responsibilities for water and sanitation sector stakeholders:

Ministry of Infrastructure (MININFRA): will play a central role as Overall project supervision, coordination, monitoring on effective use of resources as well as human resource capacity development of stakeholders to ensure sustainable water supply and sanitation services in the district of Ngororero. Coordination and mobilization of donors interested in water and sanitation will be its responsibility.

RURA: Supervision for assurance of compliance with laws; regulations and standards related to water supply and sanitation services provision.

WASAC Ltd: It will be responsible for technical support on Ngororero District water supply and sanitation facilities.

Western Province: Will play a coordination, communication and direction on national policies. Coordination of reports on district water supply and sanitation service provision.

Ngororero district: Implementation of water supply and sanitation related plans. It Will provide supervision and management of water and sanitation promotion activities within the district. The district also will facilitate and support community –based organization and formation under water and sanitation promotion activities execution.

Community Involvement: Communities are required to contribute towards investment costs. It was found that once community members are sensitized, they can be able to contribute in either cash or kind, or both depending on the technology used or otherwise. A number of water points were erected with sub-optimal community involvement hence the outcome was not sufficient. This resulted in lack of ownership of the water and sanitation projects with limited understanding of how to run these projects. In this investment plan, community involvement at all stages of program implementation will be strictly followed.

10. CONCLUSION AND RECOMMENDATION

It is the sincere belief of District management that this investment plan is a blue print to the water and sanitation development sustainability. The plan is based on practical and realistic strategies drawn from lessons learnt from over the last decade of existence, evaluation reports and best practices in the industry. One of the key inputs to the plan is the commitment of all water and sanitation stakeholders and partners in the district.

It has also adopted District Wide Approach whose system approach has demonstrated a very important strategy that can lead to sustainable management of water supply and sanitation services in the district of Ngororero. The current socio-economic and environmental challenges currently burdening Ngororero district are drivers that encourage rethinking the current approach to rural water management. In this sense, District Wide Approach encourages the district of Ngororero to think of rural water and sanitation management in a holistic way.

The implementation of this plan will be supported and monitored by the top management team of MININFRA through its implementing agency (WASAC Ltd) to ensure the expected outcomes are realized. MININFRA specifically will be advising the District on any changes in the macro environment to ensure the strategies employed are in line with the prevailing environment.

This investment plan is a clarion call to all Ngororero District stakeholders and well-wishers for support to ensure success. For a country with a long-term view

to water and sanitation development strategy, the DIP provides a clear picture of where resources and efforts should be invested.

The DIP should be as comprehensive as possible, paying due attention to all the aspects and factors necessary to attain WASH services for everyone forever. The possibility of implementing DIP, districts must invest time and funds to enable thorough data collection up to village level. The DIP depends very much on the quality of data collected about the status of services. After finalizing the development of Water supply and sanitation investment plan in Ngororero District, below are a number of recommendations to be followed during the implementation of all proposed interventions:

- Increase private sector involvement in the implementation of water for production and sanitation facilities including use of the public Private Partnership (PPP);
- Consensus on the institutional (schools and Health facilities) roles in funding some activities like construction of sanitation facilities and focus on cost recovery;
- In construction of water infrastructure facilities, consider sectors with high percentage of inadequate level of service in water supply and sanitation;
- All aspects and factors that ensure full coverage, such as: quality, quantity, reduced distances between households and water sources, coordination of sector actors, planning, costs and reliability of the services are very important.;
- Ensuring transparency and accountability in procurement, financial management and quality control of implementation.
- The district and its stakeholders should design and elaborate business plan for these sectors.
- WASH is responsible for asset management, which is, for the development and rehabilitation of water and sewerage facilities, for investment planning and implementation. In order to service debt and to develop their infrastructure WASH should recover their administrative costs through the Regulatory fee they collect from WSSs in their service areas. In fact, they should be able to meet maintenance, operational costs and think of phasing out from heavily reliant on government subsidies.
- Tariff setting is the responsibility of RURA according to operation and maintenance costs. Also Tariffs for sewerage services should also be fixed and ensure full cost recovery of all maintenance, operational and

capital costs that make water supply and sanitation services provision affordable service and sustainable.

- Furthermore, in order for community-based waste management to be a success by utilizing effectively FS treatment plant and land fill facilities, It must consider more than the need for improved environmental management, it must also provide opportunities for income generation and the development of strong community bonds.
- The district should encourage number of incomes generating activity initiatives be made and practiced by the local community. Among them included making of briquettes from waste and organic fertilizers, emptying, collection, transportation and dumping of solid and liquid waste. There is a need therefore, to support the local community with both capacity building in business management, working capital, marketing for their products and the district authorities also need to recognize these ventures as not only business opportunities for the local people but also as a waste reduction strategy to get rid of solid waste in the community.

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LIST OF ANNEX TABLES

Annex 3.1 Service level of access to water per sector in Ngororero District

Sectors	No Improved System	Inadequate Level of Service	Basic Level of Service	Intermediate Level of Service	High Level of Service
Kabaya	6.1%	0.0%	25.7%	32.2%	36.0%
Matyazo	21.4%	3.8%	25.2%	18.3%	31.3%
Hindiro	7.7%	2.6%	45.2%	23.9%	20.6%
Ngororero	20.7%	0.0%	19.0%	28.4%	31.9%
Muhororo	19.5%	0.0%	28.9%	30.9%	20.8%
Gatumba	26.5%	0.0%	24.3%	18.2%	30.9%
Ndaro	38.1%	1.6%	14.3%	25.4%	20.6%
Nyange	25.8%	0.8%	20.5%	23.5%	29.5%
Bwira	27.4%	0.0%	16.8%	28.3%	27.4%
Sovu	40.0%	0.6%	22.5%	15.0%	21.9%
Kavumu	38.2%	0.0%	18.4%	26.3%	17.1%
Muhanda	10.5%	0.0%	20.0%	20.0%	49.5%
Kageyo	35.6%	0.0%	24.4%	21.5%	18.5%

Annex 3.2 Service level of access to sanitation per sector in Ngororero District

Sectors	No sanitation service	Inadequate Level of Service	Basic Level of Service	Intermediate Level of Service	High Level of Service
Kabaya	2.3%	0.0%	30.8%	46.3%	20.6%
Matyazo	3.1%	0.0%	55.7%	33.6%	7.6%
Hindiro	2.6%	0.6%	51.6%	40.0%	5.2%
Ngororero	7.8%	0.0%	29.3%	43.1%	19.8%
Muhororo	3.4%	0.0%	40.9%	37.6%	18.1%
Gatumba	6.1%	0.6%	32.0%	37.0%	24.3%
Ndaro	10.3%	0.0%	42.9%	32.5%	14.3%
Nyange	6.1%	0.0%	43.2%	40.2%	10.6%
Bwira	3.5%	0.0%	42.5%	40.7%	13.3%
Sovu	10.6%	0.0%	28.8%	36.9%	23.8%
Kavumu	7.2%	0.0%	44.7%	30.9%	17.1%
Muhanda	7.4%	1.1%	28.4%	46.3%	16.8%
Kageyo	9.6%	0.0%	45.2%	31.1%	14.1%

Annex 4.1: Need assessments of Water supply infrastructure

No	Name of Network	Sector	Length (Km)	Beneficiaries (Households)	# of schools and health facilities	# of beneficiaries	Estimated cost (Frw)
NEW WATER SUPPLY SYSTEMS							
1	WSS Rukore	Gatumba	3.9	221	-	-	129,336,108.8
2	WSS Rushishi	Gatumba	9.6	859	-	-	275,506,262.5
3	WSS Nyamyotsi	Kabaya	43.9	3,736	2	3,286	1,139,881,555.5
4	WSS Kivugiza	Kageyo	3.4	721	1	721	66,002,335.0
5	WSS Muhembe	Kavumu	115.8	9,842	10	7,463	4,978,287,461.8
6	WSS Mutake	Kavumu	5.1	225	2	30	83,423,885.0
7	WSS Mvumbo	Matyazo	2.2	470	-	-	53,236,088.8
8	WSS Nyagahondo	Matyazo	2.6	310	-	-	54,113,743.8
9	WSS Rwozamenyo	Matyazo	20.6	1,309	-	-	406,279,010.0
10	WSS Nyirantarengwa	Muhanda	5.6	516	-	-	140,692,680.0
11	WSS Gahondo	Muhororo	2.3	310	1	564	64,701,251.3
12	WSS Kibanda	Ndaro	33.2	2,239	1	1,190	494,896,990.0
13	WSS Nyirarongero	Sovu	39.2	3,398	3	3,454	755,475,250.0
14	WSS Kinyovi	Ndaro	7.3	671	2	1,551	117,714,665.0
15	Gasuma Kabaya	Kabaya	18.7	4,810	2	3,310	525,460,369.8
16	WSS Kibanda	Ndaro	12.7	885	-	-	281,396,625.0
17	WSS Ruhondo	Nyange	17.2	1,342	1	854	249,728,921.3
18	WSS Nyagatare	Hindiro	6.3	760	-	-	136,910,831.3

19	WSS Mavumo	Kageyo	19.7	1,250	1	2,120	231,191,676.3
20	WSS Mwogambere	Bwira	48.0	3,713	7	5,055	658,057,457.5
21	WSS Mikingi	Muhororo	26.8	2,300	3	2,255	1,260,680,748.8
NEW WATER SYSTEM			444	39,887	36	31,853	12,102,973,917

No	Name of Network	Sector	Length (Km)	Beneficiaries (Households)	Number of schools and health facilities	# of Beneficiaries	Estimated cost (Frw)
TOTAL REHABILITATION WATER SUPPLY SYSTEMS							
1	WSS Nyagahondo I	Matyazo	3.0	85	2	820	57,668,972.5
2	WSS Runyinya	Hindiro	3.4	1,653	-	-	91,371,625.0
3	WSS Gitaba	Kabaya	1.3	180	1	2,344	45,080,387.5
4	WSS Gitaba	Kabaya	2.3	498	-	-	65,609,838.8
5	WSS Merabuye	Kabaya	5.2	486	1	718	106,544,668.8
6	WSS Mahungubuye	Kabaya	6.4	1,206	3	934	166,332,710.0
7	WSS Nyarushishati	Kabaya	5.4	1,172	-	-	121,923,293.8
8	WSS Bitare	Kageyo	9.4	1,346	2	1,319	145,333,446.25
9	WSS Kazibaziba	Kageyo	3.2	224	2	1,220	56,717,205.0
10	WSS Nyabihanga	Kageyo	1.5	179	1	631	36,707,676.3
11	WSS Nyamata	Kageyo	2.6	93	-	-	48,309,127.5
12	WSS KivugizaI	Kavumu	12.0	1,523	1	664	207,243,110.0
13	WSS KivugizaII	Kavumu	12.5	1,326	1	663	231,687,495.0

14	WSS Gatare	Matyazo	1.8	491	-	-	46,040,337.5
15	WSS NyagahondoII	Matyazo	3.2	189	2	1,750	58,398,352.5
16	WSS Curika	Matyazo	3.6	296	-	-	76,263,860.0
17	WSS Kinyamasuka	Muhanda	20.8	2,051	2	3,226	312,686,540.0
18	WSS Mikingo	Muhororo	5.8	950	-	-	217,054,342.5
19	WSS Nyamugali	Hindiro	12.1	1,277	2	1,714	275,293,835
20	WSS Gaseke	Nyange	21.6	1,621	3	1,376	322,570,213.8
21	WSS Vuganyana	Nyange	8.2	682	2	1,278	160,806,801.3
22	WSS Gisuma	Muhororo	7.4	954	-	-	23,641,412.5
23	WSS Cyahafi	Bwira	6.1	367	1	957	130,250,151.3
24	WSS Bijyojyo	Ndaro	6.9	1,006	1	1,927	113,933,640.0
25	WSS Kabageshi	Ndaro	6.7	1,020	2	879	182,380,193.8
26	WSS Bitare	Sovu	12.7	1,991	4	2,861	113,140,375.0
TOTAL REHABILITATION			185.1	22,866	33	25,281	3,412,989,611

No	Name of Network	Sector	Length (Km)	Beneficiaries (Households)	Number of schools and health facilities	# of Beneficiaries	Estimated cost (Frw)
PARTIAL REHABILITATION WATER SUPPLY SYSTEMS							

1	Nyiraforongo A	Gatumba	6.9	1,107	1	450	80,053,368.8
2	Nyiraforongo B	Gatumba	5.7	631	-	-	25,084,143.8
3	Mwufe-Rubona	Gatumba	12.4	1,228	1	60	24,207,987.5
4	Kirwa	Gatumba	1.8	606	2	2,250	17,116,925.0
5	Rwangara -ADEC	Gatumba	1.4	774	1	450	32,970,313.9
6	WSS Ryabadanga	Muhororo	4.5	415	1	570	81,303,693.8
7	WSS Nyamukongoro	Muhororo	3.0	851	2	1,230	42,469,521.3
8	WSS Ruhunga protestant	Ngororero	0.7	322	1	960	5,117,173.8
9	WSS Cyajongo	Ngororero	2.0	913	3	1,230	30,849,600.0
10	WSS Rwabisiyeti	Ngororero	1.9	545	1	810	33,654,337.5
11	WSS Kankomati	Ngororero	0.6	168	1	1,210	33,569,721.9
12	Cyanjye-Nganzo	Ngororero	3.7	626	-	-	47,425,283.6
13	WSS Kazabagarura	Ngororero	1.1	299	-	-	17,369,325.0
14	Kaseke - Gataba	Ngororero	2.8	525	-	-	28,683,425.0
15	WSS Runaba	Kavumu	4.0	288	-	-	18,698,825.0
16	WSS Mugobati	Sovu	10.6	1,459	5	1,966	34,172,762.5
17	Nyirarongero Kagano	Sovu	3.4	767	2	1,578	26,774,815.0
18	Gakoko - Binana	Matyazo	2.4	627	-	-	19,503,062.5
19	Nduruma-Binama	Matyazo	6.3	756	1	521	38,845,637.5
20	WSS	Matyazo	0.8	221	1	485	23,734,937.5

	Rwamuyogoma							
21	Nyamyishywa – Binana	Matyazo	5.3	1,109	-	-		19,903,237.5
22	WSS Kajagi	Matyazo	0.9	446	-	-		14,798,425.0
PARTIAL REHABILITATION			82.1	14,683	23	13,770		696,306,523.2
GRAND TOTAL		69	711	77,436	92	70,904		16,212,270,052

Annex 4.2: Assessment of needs in schools in terms of toilets and rainwater harvesting systems

N o	Sector	# of Schools	# of beneficiaries	VIP toilet	Rain water tanks	P.U VIP toilet	P.U tanks (10m ³)	Cost of VIP toilet (Frw)	Cost of tanks (Frw)	Grand Total (Frw)
1	BWIRA	6	6,124	5	5	20,000,000	2,300,000	100,000,000	11,500,000	111,500,000
2	GATUMBA	6	6,771	4	8	20,000,000	2,300,000	80,000,000	18,400,000	98,400,000
3	HINDIRO	7	7,393	4	6	20,000,000	2,300,000	80,000,000	13,800,000	93,800,000
4	KABAYA	9	10,964	5	8	20,000,000	2,300,000	100,000,000	18,400,000	118,400,000
5	KAGEYO	7	7,033	8	9	20,000,000	2,300,000	160,000,000	20,700,000	180,700,000
6	KAVUMU	9	6,885	6	9					140,700,000

						20,000,000	2,300,000	120,000,000	20,700,000	
7	MATYAZO	7	6,883	4	8	20,000,000	2,300,000	80,000,000	18,400,000	98,400,000
8	MUHANDA	7	7,142	7	5	20,000,000	2,300,000	140,000,000	11,500,000	151,500,000
9	MUHOROR O	6	5,572	2	3	20,000,000	2,300,000	40,000,000	6,900,000	46,900,000
10	NDARO	5	5,813	2	1	20,000,000	2,300,000	40,000,000	2,300,000	42,300,000
11	NGORORER O	11	10,297	3	4	20,000,000	2,300,000	60,000,000	9,200,000	69,200,000
12	NYANGE	9	6,777	7	10	20,000,000	2,300,000	140,000,000	23,000,000	163,000,000
13	SOVU	10	8,403	2	7	20,000,000	2,300,000	40,000,000	16,100,000	56,100,000
Total		99	96,057	59	83	-	-	1,180,000,000	190,900,000	1,370,900,000

Annex 4.3: Assessment of needs in health facilities

No	Name	Sector	Beneficiaries / per day	# of tanks needed	# of toilets Needed	Unit price tank(20m3)	Unit price toilet	Cost tanks	Cost toilets	Grand total
1	Kabaya Hospital	Kabaya	234	11	0	3,000,000	20,000,000	33,000,000	0	33,000,000
2	Muhororo Hospital	Gatumba	196	11	0	3,000,000	20,000,000	33,000,000	0	33,000,000
3	Gashonyi health center	Matyazo	42	0	0	3,000,000	20,000,000	-	0	-
4	Muramba health center	Hindiro	105	4	0	3,000,000	20,000,000	12,000,000	0	12,000,000
5	Kabaya health center	Kabaya	109	3	0	3,000,000	20,000,000	9,000,000	0	9,000,000
6	Rubaya health center	Muhanda	40	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
7	Ramba health center	Kavumu	128	3	0	3,000,000	20,000,000	9,000,000	0	9,000,000
8	Sovu health center	Sovu	54	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
9	Kageyo health center	Kageyo	44	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000

No	Name	Sector	Beneficiaries / per day	# of tanks needed	# of toilets Needed	Unit price tank(20m3)	Unit price toilet	Cost tanks	Cost toilets	Grand total
10	Rususa health center	Ngororero	99	3	0	3,000,000	20,000,000	9,000,000	0	9,000,000
11	Nyange A health center	Ngororero	101	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
12	Nyange B health center	Nyange	116	3	0	3,000,000	20,000,000	9,000,000	0	9,000,000
13	Ntaganzwa health center	Muhororo	71	5	0	3,000,000	20,000,000	15,000,000	0	15,000,000
14	Muhororo health center	Gatumba	97	4	0	3,000,000	20,000,000	12,000,000	0	12,000,000
15	Rubona health center	Gatumba	47	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
16	Ntobwe health center	Ndaro	98	3	0	3,000,000	20,000,000	9,000,000	0	9,000,000
17	Gashubi health center	Bwira	92	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
18	Kigali health post	Matyazo	15	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
19	Hindiro health post	Hindiro	37	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000

No	Name	Sector	Beneficiaries / per day	# of tanks needed	# of toilets Needed	Unit price tank(20m3)	Unit price toilet	Cost tanks	Cost toilets	Grand total
20	Kajinge health post	Hindiro	14	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
21	Gasiza health post	Muhanda	46	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
22	Gitwa health post	Kavumu	23	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
23	Mutake health post	Kavumu	23	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
24	Rugari health post	Sovu	36	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
25	Bungwe health post	Bwira	37	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
26	Ndaro health post	Ndaro	49	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
27	Kiziguro health post	Ngororero	51	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
28	Ruhunga health post	Ngororero	37	2	0	3,000,000	20,000,000	6,000,000	0	6,000,000
29	Nyamisa health post	Muhororo	21	0	0	3,000,000	20,000,000	-	0	-

No	Name	Sector	Beneficiaries / per day	# of tanks needed	# of toilets Needed	Unit price tank(20m3)	Unit price toilet	Cost tanks	Cost toilets	Grand total
30	Gatumba health post	Gatumba	28	1	0	3,000,000	20,000,000	3,000,000	0	3,000,000
TOTAL			2,090	79	0			237,000,000	-	237,000,000

Annex 4.4: Assessment of needs in other public places

No	Name	Sector	Category of PP	Beneficiaries / per day	# toilets Needed	# tanks Needed	Unit price for tank	Unit price for toilet	Cost for tanks	Cost for toilets (Frw)	Grand total (Frw)
1	Ngororero Market	Ngororero	Market	7,002	13	4	3,000,000	20,000,000	12,000,000	260,000,000	272,000,000
2	Gatega market	Hindiro	Market	55	0	8	3,000,000	20,000,000	24,000,000	-	24,000,000
3	Kabaya market	kabaya	Market	602	1	10	3,000,000	20,000,000	30,000,000	20,000,000	50,000,000
4	Birembo market	Sovu	Market	3,000	5	8	3,000,000	20,000,000	24,000,000	100,000,000	124,000,000
5	Nyange market	Nyange	Market	73	0	9	3,000,000	20,000,000	27,000,000	-	27,000,000
6	Rusumo market	Gatumba	Market	602	0	8	3,000,000	20,000,000	24,000,000	-	24,000,000
7	Cyome market	Gatumba	Market	502	1	10	3,000,000	20,000,000	30,000,000	20,000,000	50,000,000
8	Gashubi market	Bwira	Market	6,002	12	10	3,000,000	20,000,000	30,000,000	240,000,000	270,000,000
9	Igitera cy'inka place	Ndaro	Market	60	1	10	3,000,000	20,000,000	30,000,000	20,000,000	50,000,000

10	Ngororero Gare	Ngororero	Taxi park	115	0	5	3,000,000	20,000,000	15,000,000	-	15,000,000
11	Kabaya Gare	Kabaya	Taxi park	504	1	6	3,000,000	20,000,000	18,000,000	20,000,000	38,000,000
Total				18,517	34	88			264,000,000	680,000,000	944,000,000
									0	0	0