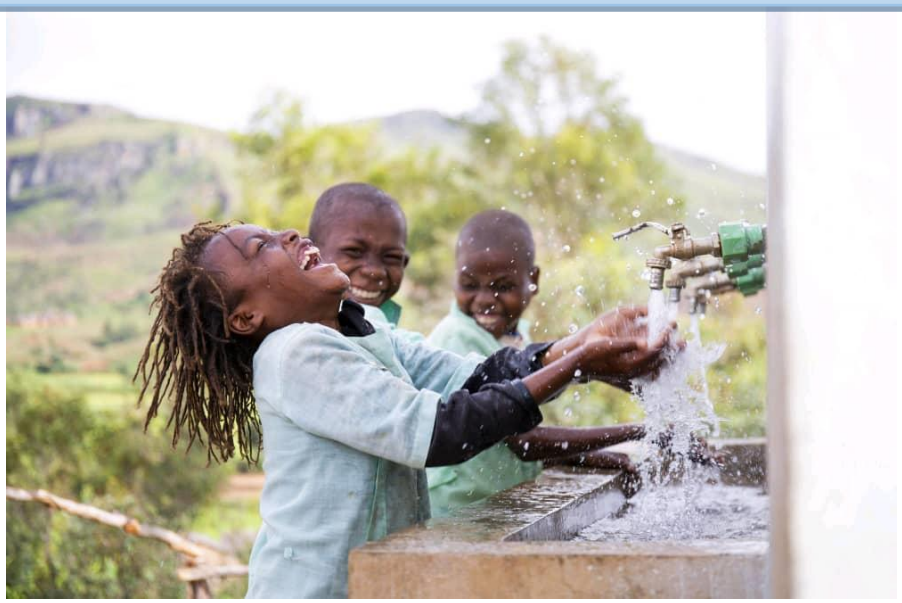
EASTERN PROVINCE

BUGESERA DISTRICT

FINAL DRAFT

WATER SUPPLY, SANITATION AND HYGIENE INVESTMENT PLAN FOR BUGESERA DISTRICT (2020-2024)



WATER SANITATION HYGIENE

Prepared by MININFRA, WASAC Ltd, Bugesera District and WaterAid

September 2019

EXECUTIVE SUMMARY

The District investment plan is one of strategies to ensure universal access to basic water supply and sanitation services in the country including Bugesera district. In order to accelerate the Momentum of exceeding the current status of access to water supply and sanitation, the Government of Rwanda has adopted and embedded District Wide Approach as a systematic approach in the national water and sanitation policies with an ultimate goal of ensuring sustainability, affordability, improving WASH service performance and accountability countrywide. In this effect Donor agencies and other funders equally need to maximize the benefits of their support by harmonizing their programs and Aid modalities (eg through the use of Sector Wide Approach.

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. Bugesera Districts is among piloted districts eye marked to benefit from DWA's program and with the main partners being WASAC and Water Aid which agreed to take the lead and help the district in the process of formulating the District Investment Plan respectively.

This investment plan is the main output of intermediary results of the previous baseline assessment findings which was conducted, presented and discussed at the relevant key stakeholders (MININFRA, WASAC Ltd AND Water Aid).

Although the district seeks to work towards achieving the government's targets of achieving universal access to basic water supply and sanitation by 2024, as indicated in National Strategy Transformation(NST1) and providing safely managed services by 2030, in alignment with the Sustainable Development Goal (SDG) 6 targets, the district has been constrained with unimproved provision of water, sanitation and hygiene services.

The problems have been attributed to two main causes: Among others, there has been insufficient in flow of investment into the WASH programs (water, sanitation and hygiene) firmly founded on a reliable database of needs, resources, systems sectors resulting in growth in coverage lower than is needed to cover replacement of assets and expansion to meet the needs of the increasing population. Secondly the effectiveness rate of coverage due to non- operational and maintenance at a level which is recommendable. Such a plan will allow it and its collaborating partners to have a clear perspective of where these investments are needed most, what their magnitude are and what the timing of their requirements is.

The objective of the project is to assist the sector stakeholders, partners and agencies to better manage the operation and development of sector facilities based on sound Investment Plan and its underlying database and District Development Strategy (DDS), 2018-2024.

The total cost for water supply, sanitation and hygiene investment plan for the district is **FRW 148,209,166,310.** Only 7% of the total cost had been realized by the district and its stakeholders, likewise **93%** will be sourced either from internal or external sources. Big percentage of investment required will be for water supply sector of **RWF 113,116,034,518** occupying **76,3%** meanwhile, amount of **RWF27,370,342,863** equal to **18.4%** will be the investment for sanitation sector and only **RWF 7,722,788,929** equivalent to **5.2%** will be located to hygiene sector.

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CAPEX: Capital Expenditure
OPEX: Operational Expenditure
CAPMANEX: Capital Maintenance and repair Expenditure
WASAC: Water and Sanitation Corporation
MININFRA: Ministry of Infrastructure
NISR: National Institute of Statics Rwanda
RURA: Rwanda Utilities Regulatory Authority
RHA: Rwanda Housing Authority
WHO: World Health Organization
GoR: Government of Rwanda
UNICEF: United Nations International Children's Emergency Fund
SDGs: Sustainable Development Goals
NST: National Strategy for Transformation
DWA: District Wide Approach
EICV: Enquête Intégrale sur les Conditions de Vie des ménages
DDP: District Development Plan
JMP: Joint Monitoring Program
DMA: District Meter Area
WTP: Water Treatment Plant
FSTP: Faecal Sludge Treatment Plant
WASH: Water, Sanitation and Hygiene
MTEF: Medium Term Expenditure Framework
SWOT: Strengths, Weaknesses, Opportunities, and Threats
BEP: Break Even Point
FC: Fix Cost
VC variable Cost

1. INTRODUCTION

This Investment Plan defines the costs of achieving and sustaining the goal and objectives set out for achieving the Sustainable Development Goals (SDGs) in 2030 as well as National Strategy for Transformation (NST 2018/19-2023/24) targets, included in the GoR policies adopted for the National Strategy for Rural Water Supply, Sanitation and Hygiene (WASH), WASH in Schools and WASH in Health Facilities (2016). The Water, Sanitation and hygiene sectors in Rwanda are being guided by the Vision 2050 which is about ensuring high standards of living for all Rwandans; improve quality of life, modern infrastructure, transformation for prosperity. That said, the water, sanitation and hygiene sectors play a critical role in ensuring targets of the Vision 2050, National Strategy for Transformation (NST 2018/19-2023/24) as well as SDGs (2030) targets are attained. The investment plan provides a framework for coordinating and aligning efforts of all actors towards achieving the stated goal and vision for WASH in the District.

Furthermore, the 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 is and also it shows the financing gaps.

The government through its Ministry of Infrastructure has adopted the District Wide Approach, as the best strategy for WASH sustainable, effective performance and accountability programs activities as 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). The goal of the project is to contribute to the increase in the flow of funding to the sector based on improved WASH partners confidence in a solidly founded investment program. The expected long term impact is the increase in coverage rates resulting from increased investment founded on greater knowledge of demand and supply parameters and better planning of development and management of existing facilities in urban and rural areas in Bugesera district. The accelerated rate of implementation will in turn result in improved health and wellbeing due to improved access to sector facilities by population of Bugesera district most of whom are poor. The net result which was eye marked during initial design was a reduction in poverty.

The objective of the project is to assist the sector stakeholders, partners and agencies to better manage the operation and development of sector facilities based on sound Investment Plan and its underlying database and District Development Plan (DDP), 2018-2024. Using Investment Plan sector agencies in Bugesera District will have capacity to manage not only the development of water, sanitation and hygiene facilities in terms of rehabilitation, expansion and construction of new systems but also to operate the existing facilities based on knowledge of their conditions vis-à-vis demands and cost of maintenance and expansion. The tangible product of the proposed preparation of project may be stated as an investment plan capable of channeling scarce resources to areas of greatest need using efficient and effective strategies that focus on maintenance of existing facilities and rapid increase in coverage towards meeting the national goals and targets. This is rendered possible by a sound baseline assessment report compiled and covered the most critical elements; such as available of water resources, existing improved and un-improved sources and other forms of information related to sanitation and hygiene was generated from previous studies and from key respondents of the district

WASH providers and beneficiaries. The demographic component of information was crosschecked against the previous completed 2012 census and official documents available among other include; Bugesera DWA 2017 of household water level of service. The existing estimating models were enhanced based on physical requirement for meeting the targets of water and sanitation of 100% in the country (NST1). The water supply sub-sector targets that population access to effective, efficient and affordable services for improved water supply where water access will be 100% at household level. (SDG 2030). With three existing water supply systems and in addition to already identified three new water supply systems, all if implemented effectively will increase water production in Bugesera district from current quantity of 3,950m3 per day to 18,950m3 per day including current ongoing construction of METITO planned to supply 10,000m3 per day to Bugesera District. However, the designed infrastructure is planned to respond to the demand of 2044, 25years horizon which will increase water supply quantity to 101,270m3 per day. There is also initiative intended to increase rain water harvesting where it will be mandatory to all public institutions to put in place a rain water harvesting facility but also to encourage rain water harvesting at household level.

Costing for sustainable water supply was calculated through the four components of which their costing breakdown is covered on financial budgeted WASH development requirements.

2. METHODOLOGY

In the process of elaborating the District, WASH investment plan data gathering was undertaken using both primary and secondary data collection techniques. Several policy documents were reviewed notably national policies and strategic documents for water supply and sanitation which actually forms broader content of the investment plan. Also, it passed through extensive consultative processes with all stakeholders at ministerial and district level. The WaterAid through its consultant and WASAC Ltd staff played role in availing guidelines and provision of technical support during development of the investment plan. The exercise was coordinated by the planning division at MININFRA.

2.1 Costing approach

The costing approach considers the existing and projected population, technologies needed for WASH service delivery and the costs for providing sustainable WASH services related to the technologies. As far as possible, given serious limitations in the data available, the Investment Plan is based on the Life Cycle Cost approach. It estimates investment requirements, and funding availability from government, development partners and other sources, and financing gaps. It attempts to generate comprehensive estimates of funding requirements by including all capital expenditures (CAPEX), operating, repair and maintenance cost (OPEX), Capital maintenance expenditure and the cost of replacing assets or asset renewal (CAPMANEX) and the costs related to the provision of direct support of the service authority (District officials and other government staff.) This includes activities like monitoring and regulation, provision of technical support, strategic planning, coordination with stakeholders etc

Various techniques were used to estimate expenditure requirements. In some instances, calculations were straightforward and only needed simple formula. Information on the population, and composition and expected life of technologies are needed to determine the physical requirements. This result refers to people who require access because they (a) did not have access to facilities in the initial year, (b) need an upgrade of their existing facilities and/or (c) require replacement of their existing facilities. Estimates are then converted to monetary units by applying the unit costs of facilities.

3. BUGESERA DISTRICT PROFILE

3.1 Geographic Location

Bugesera district is one of the seven districts of the Eastern province of Rwanda. It is located in the South west of the Province. It shares the borders with Kirundo Province of the Republic of Burundi in the South, Ngoma District in the East, Kigali City and Rwamagana in the North.

It is also characterized by a gentle slopes with the highest one ranging between 25 to 55 percent. This classifies the district among the highest suitable for urbanization and other type of infrastructure development, thus an increase of water consumption.

Figure 1: Bugesera District Map

3.2.2 Climate

Bugesera district is a semi humid zone with the mean of annual rainfall varying between 700 to 1000m. It has a pronounced dry season of 4 or more months as it used to have 7 months of drought. It is too dry compared to other region of the country (Balasubramanian &Egli, 1986).

3.2.3 Demography

Bugesera covers a total surface area of 1,337 Km² composed of 15 Sectors, 72 Cells and 581 Villages with total population of 361,914 people where 176,210 are males and 185,704 are females (General Population census, 2012). Its Population Average Annual Growth Rate is 3.1% with a population density of 295 people per km^2. The population of Bugesera district is estimated at 13.9% of the whole Eastern Province population and at 3.4% of the total a population of Rwanda (General population census 2012) whereas according to EICV4 and EICV5, poverty rate is respectively 34% and 40%.

3.2.4 Hydrology

Based on Rwanda Water and forest department Hydrological classification, Bugesera district is divided into 2 Hydrological catchments(MINIRENA-RNRA, 2012). Akanyaru and Upper Akagera. Akanyaru, Akagera and Nyabarongo are the Main 3 rivers composing the hydrological network of the district.

Apart from those rivers, the district has also nine Lakes. Those are Rweru with 1857 ha on Rwandan side, Cyohoha North, Cyohoha South with the total of 630 ha on Rwandan side Gashanga with 232 ha, Kidogo with 220 ha, Rumira with 280 ha, Mirayi with 230 ha, Kirimbi with 230 ha and Gaharwa with 230 ha. Except Rweru, and Cyohoha South, the remaining seven

lakes are the result of the overflow of river Akagera.

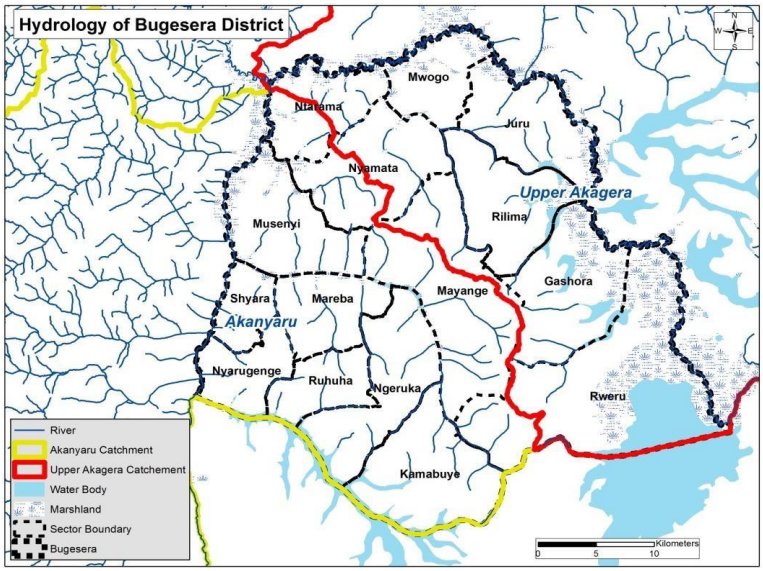

Figure 2: Hydrology of Bugesera district

3.2.6 Urbanization and rural settlement plan of Bugesera

Bugesera District's ultimate target is to increase urban settlement from 3% (EICV3) to 35% by 2030, organized rural settlement for easy service accessibility and urbanizing major trade centers as poles of rural development. This shall be done through completing and implementing local development master plans for towns and trading centers, developing IDP model villages, increasing the urban population and mobilization of the private sector to construct affordable houses in Bugesera and construction and extension of modern markets (Bugesera DDP (2013-2018), July 2013).

According to EICV4, Bugesera is clearly moving from the traditional isolated habitat towards Imidugudu. The report shows that the population who live in Imidugudu increased to 77.9% from 67.4%. Also, 12.9% live in Unplanned clustered rural housing from 19.1% from EICV3, 7.0% isolated rural housing and this shows a decrease from 6.4%; EICV3 and 1.8% live in Unplanned Urban housing(EICV4) from 5.2% as from the report(Bugesera DDS Draft Report, June 2018).

Bugesera has got 7 trading centers (Nyamata, Ruhuha, Gashora, Nyabagendwa, Batima, Kabukuba, and Nemba border) and at least one small trading center in each Sector. However, there are other main centers approved by the District council as urban areas such as Ruhuha, Gashora, Nemba cell and Karumuna**.** The district considers these centers as important niches for its growth (Bugesera DDP (2013-2018), July 2013).

Table 1: Bugesera sectors with their settlements

Nº	Sectors	Planned	Unplanned
1	Gashora	8	6
2	Juru	8	4
4	Mareba	9	5
5	Mayange	5	12
6	Musenyi	4	9
7	Mwogo	8	2
8	Ngeruka	14	12
9	Ntarama	3	6
10	Nyamata	3	14
11	Nyarugenge	3	12
12	Rilima	2	5
13	Rweru	3	11
14	Ruhuha	5	7
15	Shyara	6	7
Total		**98**	**112**

The National Human Settlements Policy (2009) addresses increased land scarcity and the need to optimize productive land use. With this background, the rural population is expected to live in organized clustered settlements, and urbanization rate is meant to increase.

District Vision, Mission, Goal and Objectives components

Vision	Vision of the Bugesera 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).
The mission statement	The general mission of Bugesera 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.
Goal	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, sanitation and Hygiene.
Objectives, component and target	

Water supply	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. 100% of health infrastructure having adequate water supplies facilities for patients, care takers and staff by year 2024. By the end of 2024, improved water supply 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%.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
• Big part of the district has water and sanitation facilities • Detailed studies on water supply system elaborated in partnership with WASAC Ltd and other partners • 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 • Community awareness of use of drinkable water and rainwater harvesting; • Existence of different initiatives to increase water access in rural	• Ineffective framework of operational and maintenance • Limited capacity of Water and Sanitation operationalization by water committees • 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 services. • Inadequate sustainability of the installed infrastructure • Inadequate capacity of institutions involved in the sectors of water and sanitation. • Low per-capita water availability and storage capacity; • Inadequate coordination among WRM actors (Population and other end users-schools, hospitals, etc.) • Limited innovation and modern technology use to recycle used water; • Lack of water network master plan	• Availability of water sources (lakes, rivers, spring.) • Political will for the effective implementation of water supply and sanitation services • 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. • Existence of Local Private Company with expertise hired to manage efficiently Water Supply Systems (WASAC.) • District and population have good will of protecting water resources	• 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. • Decentralized Governance and Service Delivery including water management projects initiations; • Pressure of land leading to destruction of critical watersheds and water catchments;

and urban area in District;	• Limited participation of non-state stakeholders (CSOs, private enterprises) in WRM activities; • Low private sector capacity especially in technical and policy advisory. • Low awareness of water as a finite scarce resource important for life and ecosystem sustenance;	• Decentralized Governance and Service Delivery • Donor commitments to support WRM activities • Alternative energy sources (Solar, methane gas) to pump water;	• Insufficient knowledge and skills in WRM among partner institutions and stakeholders • High levels of poverty and high population density in upstream areas of major basins; • High level of vulnerability to climate change; Over-reliance on rain-fed agriculture

4. WATER SUPPLY AND &DEMAND ANALYSIS

4.1 Water supply services

The main sources of water supply in Bugesera is Ngenda WTP, Rwakibilizi spring and Kanyonyomba water treatment plant, all with daily production of 3,950m3/day meanwhile, total current demand is 21,888.25m3/day while this leaves water deficit of 17,938.25m3/day. This is compared to standards required for the SDGs by 2030, that close to 18% is water supplied compared to actual water demand for population of the District. This indicate that there is a scarce of around 82% that use unimproved water sources such as surface water Only 14% of the district population is estimated to have access to at least basic services; whereby 8% of the population has access to potentially safely managed source (household connection within premises) while 34% use unimproved surface water with 44% having limited access to water supply service.

The figures below show the general picture of Bugesera district on water supply service level and detailed information at sector level.

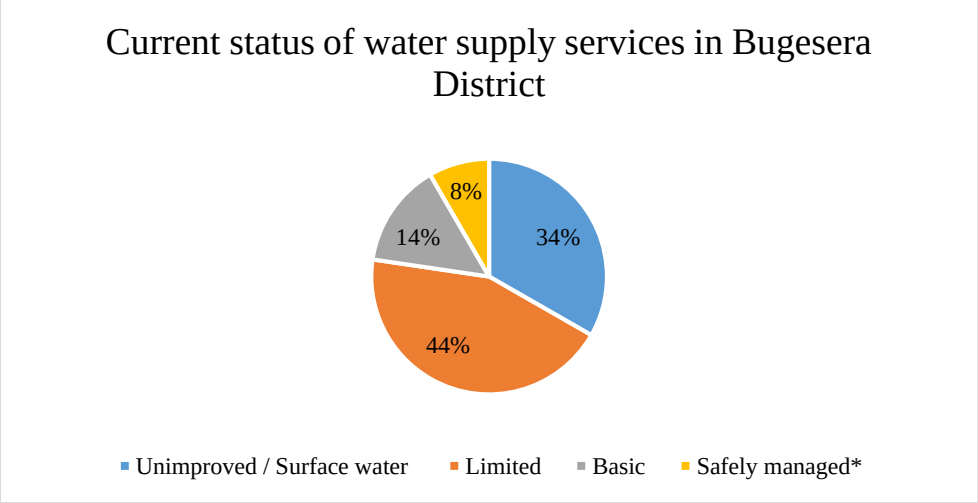

Figure 3: Current status of water supply in Bugesera District

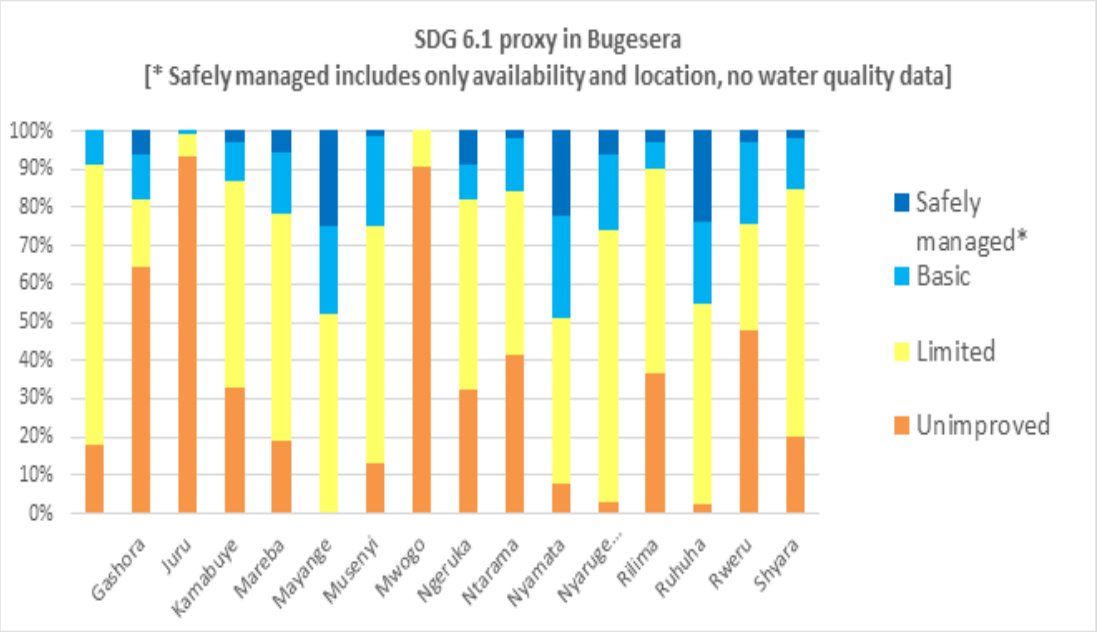

Figure 4: Current status of water supply in Bugesera District on Sector level

4.1.2. Daily water demand

Considering the standards set by World Health Organization (WHO), the quantity of water by 1 person per day is 20 litters. Yet, according to the Large scale study, final report, per capita water demand was increased to 30 l/c/d from year 2022 and 40 l/c/d from year 2030. Hence, 30 l/c/d was used in the horizon of 2024, and 40 l/c/d from 2035; all for rural areas.

For urban areas, quantity of water needed by 1 person per day is 80 l/c/d, hence used from 2019 to 2024; while from 2024 the projection was done using 100 l/c/d, as the directive given by WASAC (National Water Supply Policy, 2016).

For the reason of including all losses and possible future connections, a rate of 15% rate was considered. With respect to growth rates, in 2019 current population numbers are used, while from year 2019 to 2024 the growth rates of 5.56% and 1.56% are used respectively in urban and rural areas, whereas from 2024 to 2044 the growth rates of 4.76% and 1.33% are used respectively in urban and rural areas.

Figure below shows the daily demand (current and forecast in 25 years from year 2019 up to 2044).

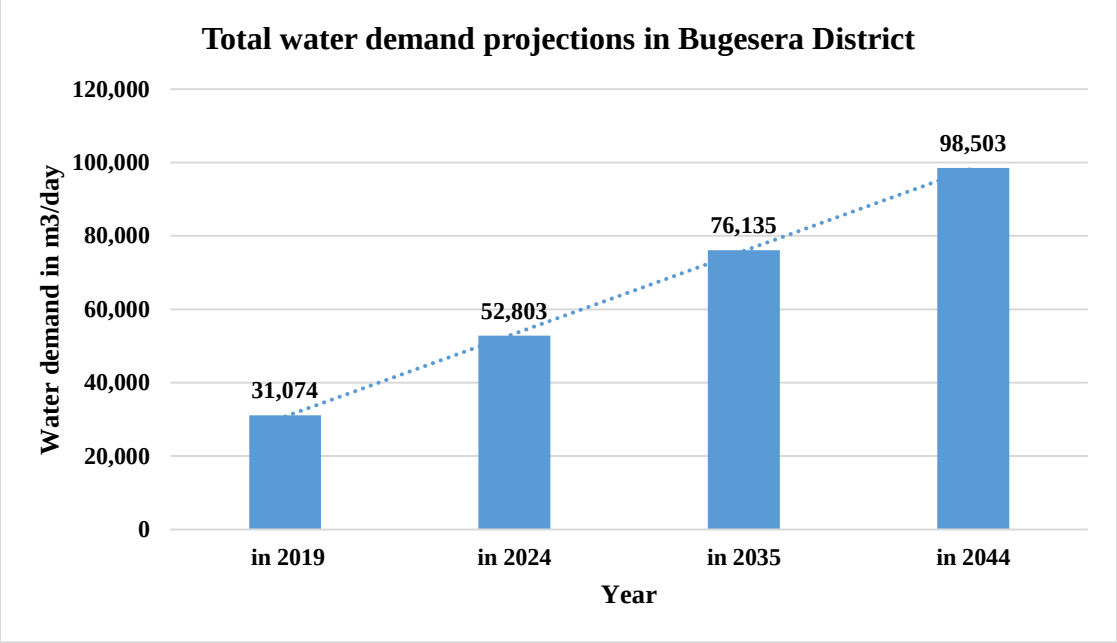

Figure 5: Current and future water demand

According to the figure, Bugesera water demand is 31,074 m^3/day; 52,803 m^3/day; 76,135 m^3/day and 98,503 m^3/day in year 2019, 2024, 2035 and 2044 respectively. Water demand in year 2044, 25 years later from now will triple water demand of year 2019.

Below is the figure illustrating water supply, demand and balance from 2019

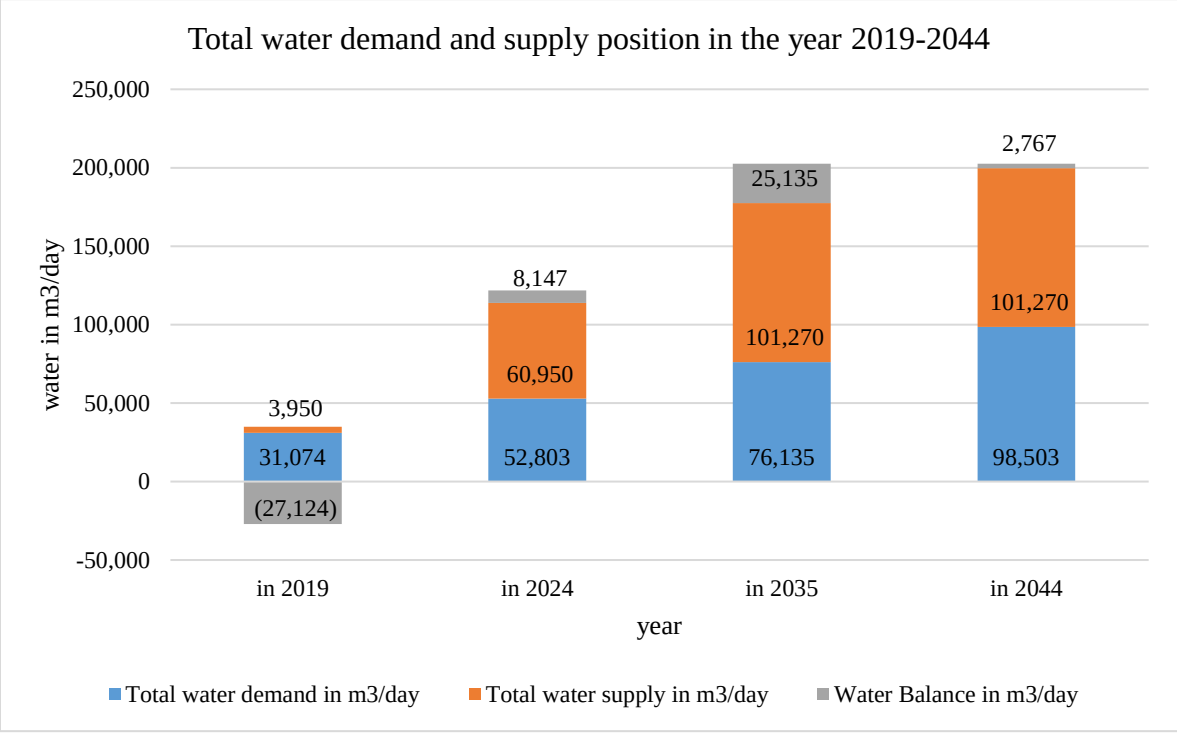

Figure 6: Summary of water demand and water balance

4.1.3 Challenges of water management and planned strategies to overcome them

The main challenges related to water service provision in the District and strategies to overcome them are summarized as follows:

Key challenges in water supply sector	**Planned strategies laid to overcome them**
Water source from lake south Cyohoha and Kanyonyomba river due to their geographical location pose uneconomic implication and as a result water supply provider (WASC Ltd) suffer from high recurrent costs which leads to low operating efficiency and lack savings for future operation, maintenance and replacement of worn out assets.	Alternative policy targets and scenarios have different cost implications, often involving trade-offs. For example, achieving access to water for a given population will have a different cost if achieved through stand posts with an average distance to the user of 1km or 500m, but the quality and level of service will also differ. The policy for water supply services in place should be revised and this scenario be taken into consideration.
There is no accepted model of good practice in place clearly defined in key respects needs with separate consideration over water resource use (water for production vs water for consumption)	Acceptable model, clearly defining the user of these competing forces for water human consumption and for water production should be clearly stated and enforced.
Inadequate budget location for supply of water service and the district exist on a certain level of a financial hand-to-mouth basis reliant on un predictable and inadequate government subsidies. This result into the sector being to some extent, poorly managed and chronically under financed.	Indeed, compared with other networked public services such as electricity, gas and telecommunications water is more capital – intensive, under-financed, less profitable and less appealing to private capital and commercial finance. This investment plan among other strategies for implementation, will lay a strong foundation for new financing strategy aimed at halting deterioration and providing modest improvements. It will require review of set tariff after at least every three years down the road, raising household charges to the highest affordable level, sizeable increasing the budgetary transfers support and attracting international support. The current level of water supply services would also require improving the collection rate of revenue owned, an expansion of metering, better control of leakage and increase quantity of water supply hence raise sales revenue. from economies of scale. This will facilitate the achievement of full Cost Recovery for O&M; replacement, renewals and major water network expansions. Increase private sector involvement in the implementation of water production and distribution. 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 and will be taken into consideration, Ensuring transparency and accountability in procurement, financial management and quality control of implementation. In future, after clientele have grown much market- based finance include loans, bonds or private equity will be sought depending on level of water supply revenues.

4.1.4 Water supply infrastructure

Infrastructure for delivery of water services includes water treatment plants, water springs, boreholes and water solar pumped technology. Some of these facilities have been recently rehabilitated others, newly installed and others not functional for many years and have been abandoned and for that matter, it has been decided worthy to be rehabilitated or required totally replacement as on annex.

4.1.5 Operationalization of water supply

The provision of water service in the district is managed only by WASAC Ltd. The District is responsible for the small water systems like Migina and Rwingeso which are existing in the area.

WASAC Ltd, through the district manage the infrastructure and get the cost recovery by selling water to the people whom are supplied by the water points. The price for selling water is fixed by RURA depending on the production and supply cost for distribution. Due to the consumption rate of private users, the status of the infrastructure and the government of Rwanda recommended WASAC Ltd to revise the price to meet the operational expenditure (OPEX) and Capital Maintenance and repair Expenditure (CAPMANEX) water recovery as the National requirement for water supply sustainability.

5. **Institutional water supply services**

The 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, sanitation and hygiene facilities to the district by 2024.

The intention of this investment plan is to connect all public and private institutions to public water pipeline and with mandatory to collect and install rainwater harvesting systems in every established institution in consideration to those places without rain water harvesting systems in place such as schools, health centers, car parks and markets.

6. ROLES & RESPONSIBILITIES OF STAKEHOLDERS INVOLVED IN WASH PROGRAMS

6.1 Water supply

water supply management is within the remit of WASAC Ltd, however local government plays some key support functions such as performance monitoring and technical supervision.

Some clarity around ownership of assets management – while the local government has by policy the ownership of the assets, assets management, major and minor maintenance is of responsibility of WASAC Ltd. For water supply – such as protected springs and hand pumps, one key challenge

identified is that there is no clear separation of duties and responsibilities between key stakeholders and this lead to ineffective functionality of these assets, as a result, they have day today issues around major repair and maintenance.

Table 2: Roles and responsibilities for water supply in the district

Description	Piped system	Hand pumps& protected springs
Strategic control over water resources	National government	Bugesera district
Owns asset	Bugesera district	Community/Bugesera district
Operating water supply	WASAC Ltd	Community
Sets tariffs	RURA	
Collects users fees	WASAC Ltd	
Manages revenue	WASAC Ltd	
Monitoring performance	Bugesera district	
Carry out major maintenance	WASAC Ltd	Community
Carries out minor maintenance	WASAC Ltd	[Minor repairs communities' communities]
Water quality testing	WASAC Ltd	WASAC Ltd
Selling water & collecting fees	Vendors	

6.1.1 Funding requirements for the water services

This section sets out expenditure levels and access targets for each sub-sector in water and sanitation.

Table 3: Summary of total investment needed for the district as per sector

Sector	RELATED INVESTMENTS				
	CAPEX	OPEX	CAPMANEX	DIRECT SUPPORT COST	Total
GASHORA	3,689,684,063	6,940,566	3,687,376	2,251,678	3,702,563,683
JURU	1,323,588,665	1,468,343	3,687,376	1,007,090	1,329,751,474
KAMABUYE	266,779,620	1,468,343	29,584,696	1,007,090	298,839,749
MAREBA	336,865,983	1,468,343	320,000	1,007,090	339,661,416
MAYANGE	4,384,152,649	1,468,343	33,548,058	1,007,090	4,420,176,140
MUSENYI	124,822,078	1,468,343	81,673,260	1,007,090	208,970,771
MWOGO	506,453,522	1,468,343	1,081,949	1,007,090	510,010,904
NGERUKA	661,150,407	1,468,343	1,889,772	1,007,090	665,515,612
NTARAMA	9,305,476,447	1,468,343	0	2,251,678	9,309,196,468
NYAMATA	2,907,034,356	1,468,343	24026916	1,007,090	2,933,536,705
NYARUGENGE	712,234,604	7,088,556	2,163,880	2,251,678	723,738,718
RILIMA	6,574,773,766	1,468,343	0	2,251,678	6,578,493,787
RUHUHA	2,017,097,243	1,468,343	1,430,848	2,251,678	2,022,248,112
RWERU	1,384,483,613	1,468,343	4,740,304	2,251,678	1,392,943,938
SHYARA	126,459,585	1,734,276	1053536	2,251,678	131,499,075
TOTAL	**34,321,056,601**	**33,383,514**	**188,887,971**	**23,818,466**	**34,567,146,552**

Table 4: Investment cost for Water production and distribution at District level

Name of water supply system	RELATED INVESTMENTS				
	CAPEX	OPEX	CAPMANEX	DIRECT SUPPORT COST	Total
GASHORA INDUSTRIAL ZONE	5,702,974,150	0	0	0	5,702,974,150
MONT NSORO NYAMATA	16,263,576,133	0	0	0	16,263,576,133
AKANTARU WTP	39,951,067,252	0	0	0	39,951,067,252
GATOVU SPRING	1,591,649,263	0	0		1,591,649,263
KARENGE CU	622,624,816	0	0	0	622,624,816
SHORT TERM BOREHOLE REPARATIONS/REBILITATION	382,719,587	368,000	0	25,360	383,112,947
TOTAL	**64,514,611,201**	**368,000**	**0**	**25,360**	**64,515,004,561**

Assumptions:

In the above table, direct support component, salaries of each of the person Identified in the key functions and roles play in providing water supply have been taken into consideration. Also consideration and identification was made for changes required from current time spent to ideal time spent to provide direct support in planning, supervision of new works/ rehabilitation and upgrading, monitoring and evaluation services, coordination of meetings and providing managerial financial services.

Table 5: Funds disbursement and activities projections

	2020	2021	2022	2023	2024
CAPEX	Completion of Kanzenze treatment plant and forwarding infrastructure, completion of Kanyonyomba water network and transferring compact unit from Genda to Karenge.	Construction of new Akanyaru treatment plant	Laying pipe line and other civil works in five sectors and continue construction of AWTP	Construction of new Akanyaru treatment plant and supply electronic and mechanical accessories ,construction of Gatuvu spring water source,rehabilitation of boreholes	Laying pipe line and other civil works in remaining 10 sectors
Total	**19,767,133,560**	**39,951,067,252**	**12,442,678,920**	**13,000,625,453**	**13,674,162,617**
CapManEx of existing infrastructure	Rehabilitation and replacement of water network and related civil works in Gashora, Mayange, Nyamata, and Musenye	Rehabilitation and replacement of water network and related civil works in Juru, Mwogo, and laying pipeline in industrial zone	Rehabilitation and replacement of water network and related civil works in Shyara, Nyarugenge,Ruhuha, Mareba and Musenyi	Rehabilitation and replacement of water network and related civil works in Kamabuye,Ngeruka and Rweru	Rehabilitation and replacement of all water tapes in all sectors
Total	**47,221,993**	**28,333,196**	**18,887,797**	**37,777,594**	**56,666,391**
OPEX	variables expenses	Variables expenses	Variables exepenses	Variables expenses	Variables expenses
	405,018,168	**445,519,985**	**445,519,985**	**445,519,985**	**490,071,983**
Direct Support	Staff and other public facilities are facilitated	Increase the number of Staff and other public facilities are facilitated	Increase the number of Staff and other public facilities are facilitated	Increase the number of Staff and other public facilities are facilitated	Increase the number of Staff and other public facilities are facilitated
	286,125,912	**314,738,503**	**314,738,503**	**314,738,503**	**346,212,353**

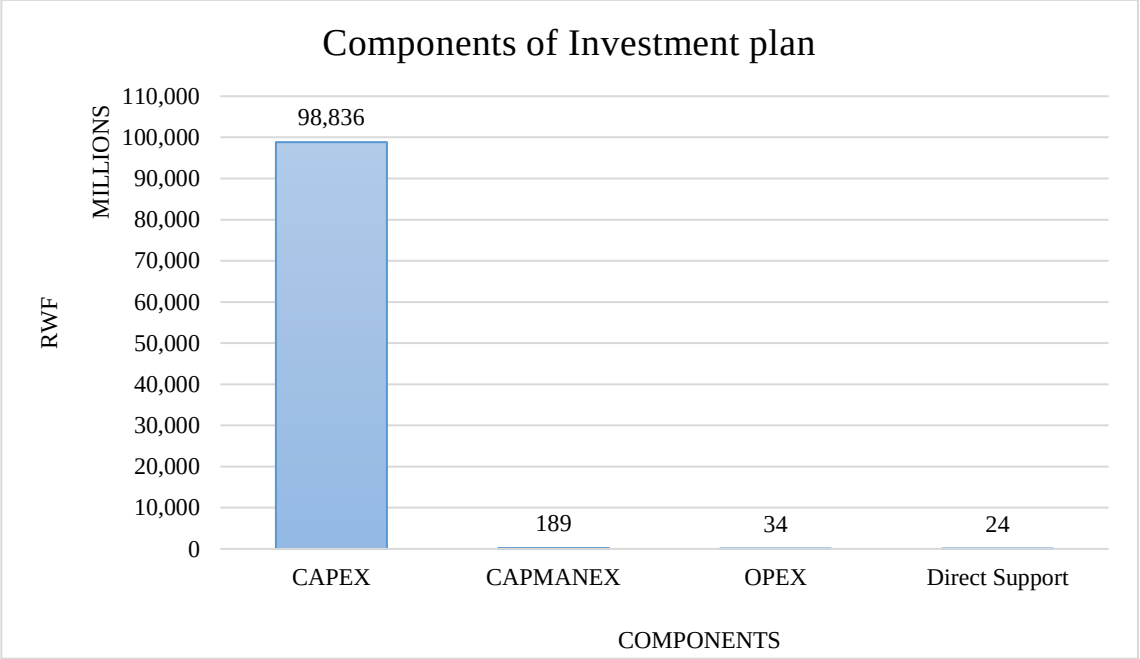

Figure 7: Components of investment plan

Table 6: Plan for Funds disbursement projections for 5 years

	2020	2021	2022	2023	2024
CAPEX	19,767,133,560	12,442,678,920	39,951,067,252	**13,000,625,453**	**13,674,162,617**
CapManEx of planned Infrastructure	47,221,993	28,333,196	18,887,797	37,777,594	56,666,391
OPEX	405,018,168	445,519,985	445,519,985	445,519,985	490,071,983
Direct Support	286,125,912	314,738,503	314,738,503	314,738,503	346,212,353
Subtotal	**20,496,055,234**	**20,565,169,642**	**20,565,169,642**	**20,565,169,642**	**20,641,195,490**
Contigency	**2,049,605,523.4**	**2,056,516,964.2**	**2,056,516,964.2**	**2,056,516,964.2**	**2,064,119,549.0**
Total	**22,545,660,757**	**22,621,686,606**	**22,621,686,606**	**22,621,686,606**	**22,705,315,039**

Table 7: Water supply scheme/infrastructure and related investment cost

Component for total investment plan:	**Amount at (US$M)**	**Amount at (FRWM)**
Component A: CAPEX Investment		
Sub component: New water supply infrastructure, Rehabilitation and extension, preliminary activities and water supply heavy fixed and movable equipment/facilities.	107,430,074	**98,835,667,802**
Component B: CAPMANEX		**188,887,971**
Sub component: Replacement, rehabilitation of water supply infrastructure and upgrading existing water supply infrastructure and studies.	205,313	
Component C: OPEX	2231605	**2,231,605,106**
Sub component: Repair, regular and irregular maintenance and operational expenses.		
Sub component: Repair, regular and irregular maintenance and operational expenses.		
Component D: Direct support	1576554	**1,576,553,774**
Sub component: Staff salaries and general administrative overheads.		
E Contingencies and other unforeseen expenses e.g. inflation and others (10% of total investment)	10,283,276	**10,283,275,965**
Total	113116036	**113,116,035,614**

Note: the estimation cost of opex and capmanex as well as direct support have been calculated for five years.

Assumptions:

- As we increase the number of water treatment plants, also there is an increase of operational expenses. E.g.: during the year 2021 Kanzenze and compact unit will be fully operational while Akanyaru water treatment plant will be so in 2024.
- Overall prioritized funds disbursement projection for five years: The prioritization of water supply project is based on the current implementation contract, water demand and service per sector.
- Extension of network and installation of booster pump to KANYONYOMBA WTP will facilitate to achieve total full capacity utilization hence increase dairy production from current 500m^3 water production to 5000$m^{3,}$ this bring total production of 8450m^3 per day.
- Completion of the existing KANZENZE WTP in order to increase current production from 3950m^3 per day to 18450m^3 per day, of which four sectors will be fully covered.
- Relocation of Mobile treatment plant from Ngenda water treatment plant to Karenge water treatment plant and construction of water supply system from Karenge to Juru will make additional of 2500m3 per day.
- Through the year 2020 to 2021, water supply quantity will increase from the current 3950m3 to 20950m3 almost four times as much as current quantity as the result of ongoing water supply projects which the year 2020 to 2021. Nevertheless, we shall remain with gap

balance of 10124m3, however the new planned projects will recover the balance and exceed the projected demand of water quantity of 52,803 for 2024 by over 191%.

After 2024 upgrading of Akanyaru water treatment plant will be implemented and operational, extract ration of new spring water source which will produce amount of water quantity totaling to 101270m3 which will ensure the total coverage of water supply to all sectors within the District.

Through planned rehabilitation in year 2020 as well as using already existing water network, the following water production and distribution will operate in this way:

- The old Ngenda treatment plant will remain supplying southern and western zones covering six Sectors including, Nyarugenge, Shyara, Ruhuha, Ngeruka, Mareba and Kamabuye.
- The new Kanzenze treatment plant will supply the Northern and Eastern of the District covering four Sectors including, Ntarama, Nyamata, Juru and Mwogo
- Kanyonyomba WTP will supply centre and reinforce Eastern and Southern Zones including Gashora, Mayange, Rilima Rweru and especially National economic zone.
- Construction of Akanyaru new treatment plant will reinforce all the present existing and planned water network for Bugesera District.

With the current human capital available and with the plan in place for succession, management and operationalization plan and conducive political operating environment, put in place, no doubt that the set targets will be achieved in specified time frame.

Based on National target of 100% Basic by 2024, the network is designed for 2044 which require that every installation of water supply infrastructure will respect the projection for 2044 where we expect the total population in Bugesera District to become **1175753** which translate an increase of 264,706. Therefore, this population will demand additional amount of water of 23,368m^3 for nine years (2035-2044).

Within this scenario, the infrastructure target is to increase water production and distribution through:

- ✓ Construction of Akanyaru treatment plant PhaseII,
- ✓ Extraction of four spring water located in Ruhuha ,
- ✓ Relocation of Mobile treatment plant from Ngenda water treatment plant to Karenge water treatment plant and costruction of water supply system from Karenge to Juru

Financial sustainability of Water Supply

Despite notable improvements in water supply services WASAC Ltd, was unable to meet its operating costs and cash flow requirements at appraisal time, let alone provide a sufficient full cost recovery for O&M and capital expenditure to allow for future reinvestments, expansion of systems, and improvement of service quality. This is the reason 'Sustainability' is rated Negligible. Ngenda WTP was used as a sample case study. It was estimated that the current water supply quantity was below breakeven point level by **36,668m^3** per month. This was proved by simple calculation formula for breakeven analysis, where FC was divided by Sales Price/m^3 minus Cost price/m$^{3.}$ Where FC was equal to 4,762,388frw, Sales Price/m^3 was 323frw equally VC/m^3 was 291frw. The minimum production target that should be produced and sold above breakeven point should be more than **148,825m3** per month**.** That WASH investment plan if well implemented will significantly reduce cost per unit of water produced achieved through a given level of coverage and services among others by helping to tap economies of scale. Indeed, there is ongoing projects of new water treatment plants and if implemented will bridge the gap and demonstrate clearly the road for water supply sustainability and affordability by increasing water production currently from **112,157m^3** per month to **555,000** that will also lead to costs- recovery which is by some means is essential for sustainable water supply.

The persistence of consequences of poor cost-recovery in Bugesera District:

All districts including Bugesera District, the issues of cost-recovery and sector sustainability were ignored for a long period. As a result, tariffs set were unrealistic and frequently there was insufficient Government subsidy to make up the shortfall in the costs of the service provided. In consequence, the infrastructure has deteriorated, and service quality has declined.

Inadequate cost-recovery will result in an inability to operate and maintain existing supplies properly with consequent increased of leakage, water supply interruption and likely deterioration in both the quality and quantity of the water supplied. This will lead to increased public health risks, a likely increase in morbidity and mortality rates and an increased burden on the health care system.

Inadequate cost-recovery will also result in an inability to extend water supplies to unserved areas, thus continuing a cycle of inequitable access to water supplies. This not only fails to satisfy the basic human right of all peoples to have access to an adequate water supply (UN, 1977), but will continue to place a continued extra burden on the health care system. It is vital that sufficient resources are raised from existing water supplies not just to ensure their continued functioning, but also to extend services to the urban and rural populations who lack access to an adequate water supply.

Water supply services deterioration caused by poor cost recovery and cost covering known as poor costing cycle for water supply as demonstrated in figure below:

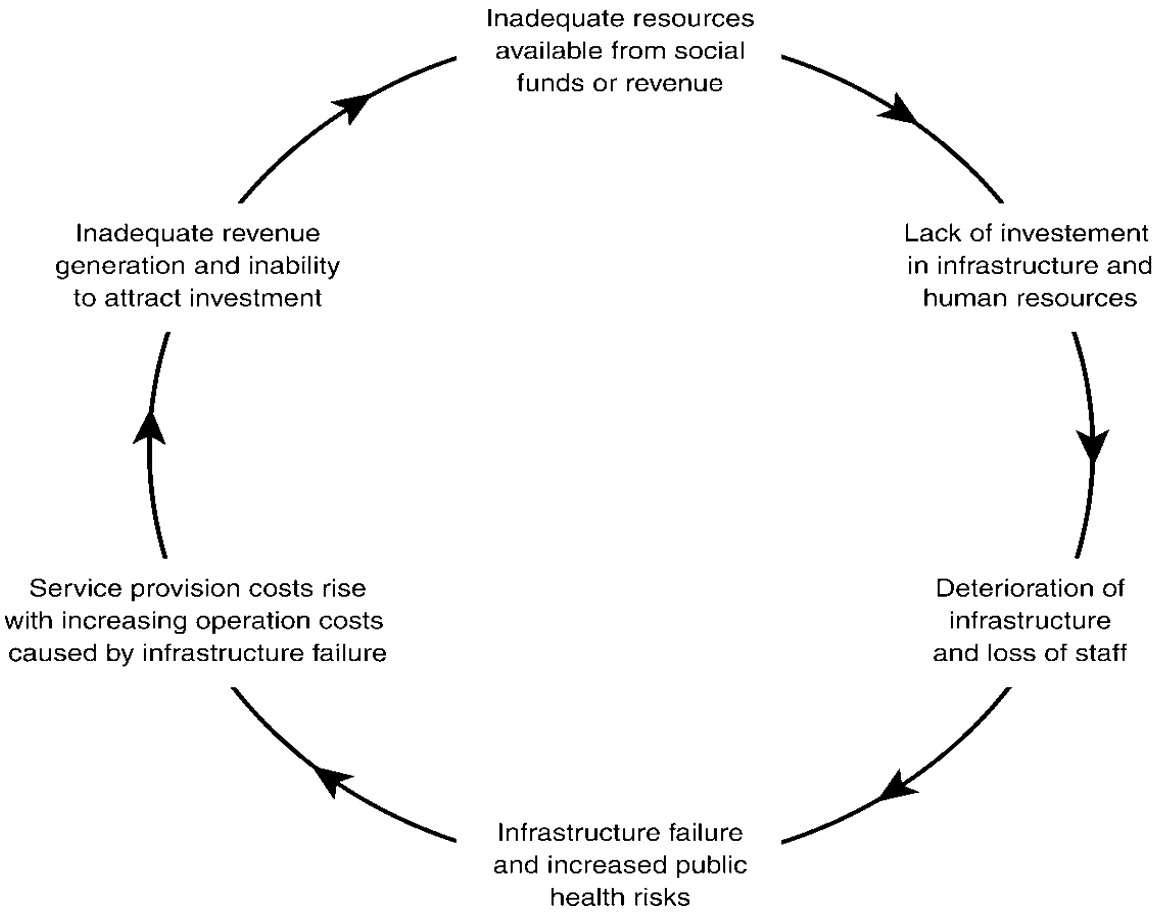

Figure 8: Consequences of poor cost-recovery

Monitoring and evaluation performance indicators for water supply services

Design Summary	**Unit of Measure**	**Performance Targets 2020**	**Performance Targets by 2020/24**	**Performance Targets by 2025/30**	**Performance Targets by 2030/35**	**Performance Targets by 2035/40**
Safely water managed	Percentage of households	10% with safely managed water located in Gashora, Mayenge, Nyamata and Nyarugenge Sectors	15% with safely managed water located in all 15 Sectors	30% with safely managed water located in all 15 Sectors	40% with safely managed water located in all 15 Sectors	50% with safely managed water located in all 15 Sectors
Access to basic water	Percentage of population using basic water	15% of population in District, access to basic water	100% of population in District, access to basic water	100% of population in District, access to basic water	100% of population in District, access to basic water	100% of population in District, access to basic water

Unimproved water supply service	Percentage of population using	65% of population in District, using un improved water sources	0% of population in District, using un improved water sources	0% of population in District, using un improved water sources	0% of population in District, using un improved water sources	0% of population in District, using un improved water sources

6.2. SANITATION SERVICES

At District level, Bugesera district as one of the districts of Eastern Province has less problem of improved sanitation. Currently, 95.29% of the population in Bugesera district has toilet facilities in their houses and the distance from their houses to the toilets; 58.27% is 5m, 27.19% at 10m, 9.42% it is 20m whereas 3.98% is 50m meanwhile 1.15% it is more than 50m. According to WaterAid study of 2017,4.8% of the households in BUGESERA District use improved facilities which are not shared with other households and excreta are safely disposed in situ or transported and treated of to their disposal site. The Fourth Population and housing Census conducted in 2012 in Bugesera showed 86.05% are the main type of toilet facilities used by households is private pit latrine with floor slab and 7.59% use pit latrines without floor slab. (**Source: EICV5)**

6.2.1 Sanitation facilities

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 business centers of the district remain a huge challenge as far as sanitation is concerned.
Small Six out of sixteen markets in Bugesera do not have toilets and those with existing latrines are with no access to roads for vacuum truck for emptying septic tank, so hands (manually) using buckets without any protective equipment do the emptying, and this may contaminate the environment and causes diseases related to inappropriate hygiene and sanitation practices.

6.2.2 Situation analysis for sanitation and hygiene

The two tables below show that only 31% and below 24% of households that have sanitation and hygiene practices respectively, meeting sanitation and hygiene requirements. This shows that population of Bugesera District needs public marketing on sanitation and hygiene promotion campaigns and behavioural change to ensure that every households understands the needs of hygienic sanitation facilities and improve proper hygiene practices in their respective homes.

Table 8: household hygiene level

Hygiene Level of Service	Number of Households	Frequency
No Hygiene Service	218	7.7%
Inadequate Level of Service	479	17.0%
Basic Level of Service	1466	51.9%
Intermediate Level of Service	523	18.5%
High Level of Service	136	4.8%
Total Households	**2822**	**100.0%**
	Intermediate and High Level of Service =	***23.4%***

Table 9: household sanitation level

Sanitation Level of Service	Number of Households	Frequency
No Sanitation Service	201	7.1%
Inadequate Level of Service	103	3.6%
Basic Level of Service	1656	58.7%
Intermediate Level of Service	571	20.2%
High Level of Service	291	10.3%

Total Households	**2822**	**100.0%**
	Intermediate and High Level of Service =	***30.5%***

Based on a 2017 assessment of WASH access completed by WaterAid 660 of public institutions were visited including schools(Primary and secondary), health centres, Government buildings, markets, churches and tax parks as indicated below;

Table 10: Public institution sanitation and hygiene service level

Public institutions level of service	**Number of public institutions**	**Frequency**
No Access to Sanitation or Improved Water	7	1.1%
Inadequate level of Iervices	217	32.9%
Basic Level of Service	375	56.8%
Intermediate Level of Service	61	9.2%
High Level of Services	0	0.0%
Total public Institutions	**660**	**100.0%**

56.8% of public institutions in Bugesera have a basic level of service. The survey indicated that 32.9% of schools and institutions had non-functional water points with challenges around means of managing menstrual hygiene

6.2.3.3 Current Operationalization of Solid waste and Liquid waste

Availability of POs for liquid and solid waste collection and transportation - There is a PO operating in the district for solid waste collection and transportation only. The PO does not address all areas/sectors that need for such a service. The collected solid waste is transported at Bugesera dumpsite for disposal which is not sanitary friendly. There is a plan in place to establish sanitary landfill and feacal sludge treatment plant.

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(solid waste).

A waste generation and characterization study were 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. Even Bugesera District carried out a research which revealed 0.5Kg/day/capita.

Following from key informant interviews and field visits, collection, transportation and disposal of solid waste are the responsibilities of private operator licensed collector to ensure that solid waste (garbage) is collected and conveyed to approve disposal site. However, Sorting and storage of the waste is not done properly at the site. It was also reported that Kanazi dump site (Kanazi Cell, Sumbure 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).

Although Bugesera District has two dumping sites (one in Nyamata sector and another in Ruhuha sector), only one is operational (in Nyamata Sector). This is because in Ruhuha Sector the quantity of wastes generated in still insufficient.

It was observed that this private operator has no trucks designed to collect and transport solid waste in the operational areas. He uses 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 2000 francs per household. However, findings reveal that the district did not provide guidelines on the amount of fees to be collected for which quantity of solid waste generated.

For Waste Water Management and feacal sludge management, at present the Bugesera District 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.

Solid waste management infrastructure - There is an open dumping area for solid waste at Nyamata Sector, Kanazi Cell, where sorting is made on site. The dumpsite is not properly managed and used.

Remarks – Soak pits represents a threat for downstream springs. Open dumping site cause spread of foul-smell to the neighbours during emptying and transporting. The proximity of the solid dumpsite location to households and farmlands is less than 500m with no fencing. There is illegal dumping and scattered waste, unsafe and manual sorting of waste and lack of leachate management system. The District planned to construct a FSTP and Sanitary Landfill in the same location of the existing solid waste dumping area and plan recycling and waste treatment infranstructure.

There is a need for financial investment and devising options for safe waste management for both liquid and solid in proper design, installation technologies in handling, collection, emptying, transportation, disposal and treatment facilities. The government through RURA should finalize very first the process of tariff setting and key WASH stakeholders need to sensitize WASH users on financial implication for a affordability on sanitation and hygiene services.

Quick data collection of waste generation and management should be carried out to establish quantity to establish proper waste management measures.

6.2.3.4 Air Pollution Control

Bugesera District has industrial zone which in few years will generate different kind of wastes that will lead to air pollution. Therefore, there is a need for air pollution quality control.

6.2.3.5 Mining Wastes

Bugesera District has different mining sites. These activities are non-protective and cause silicosis.

There is a need to increase quantity of clean water as well as need to improve the current technology in use.

6.2.3.6 Storm water management

The survey assessed consequences of storm water, which include, Soil erosion, Floods, Filling the water channels, stagnant puddles bring mosquitoes and malaria and others such as Lightening. Storm water runoff causes a range of negative impacts including erosion of lands, damages to

infrastructure, environmental health hazards and pollution of water resources. Majority of population reported about the soil erosion being the most effect caused by storm water in Bugesera District. 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.

6.4 Institutional Sanitation and Hygiene Services

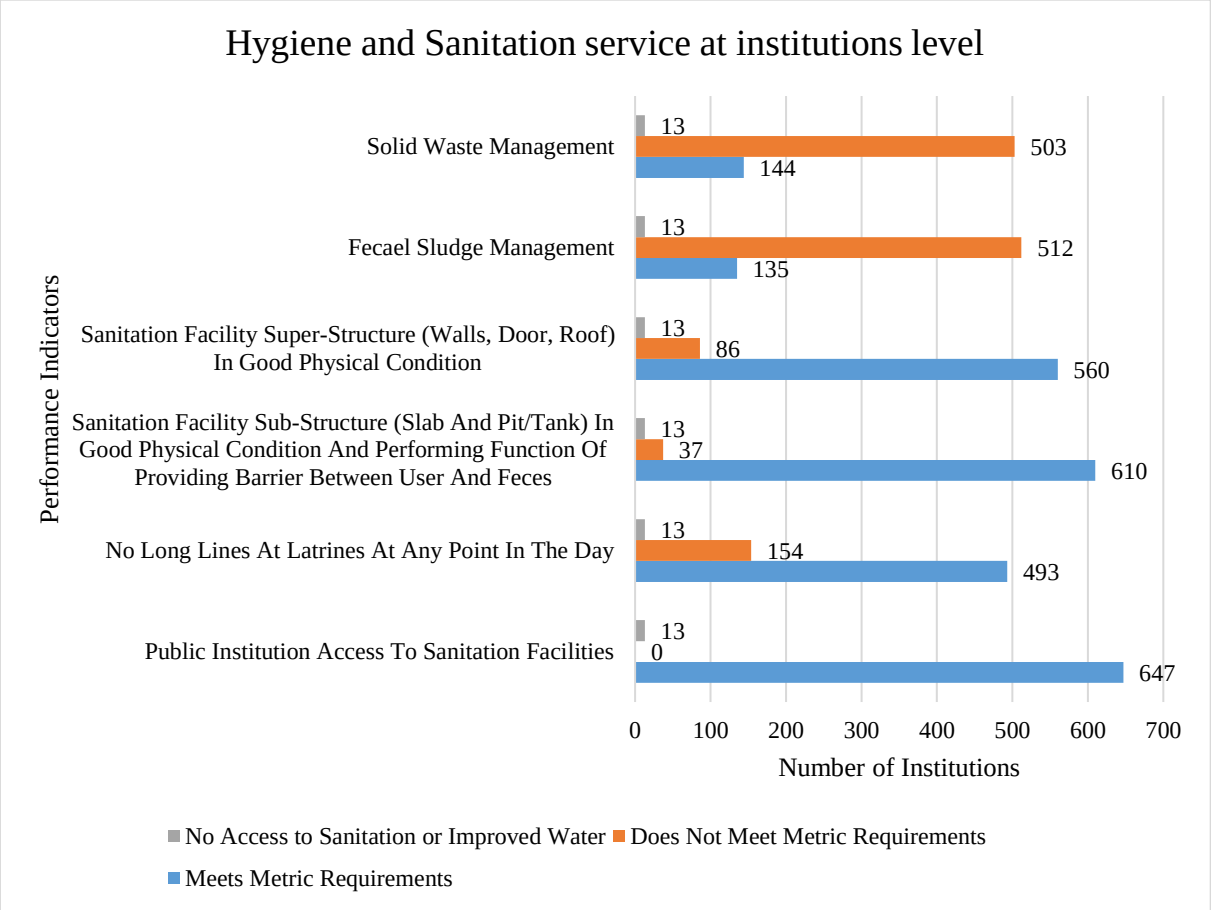

Figure 9: Hygiene and sanitation service at institutions level

The figure above shows the level of hygiene and sanitation at institution level in Bugesera district. It indicates that out of 660 institutions, only 13 have no access to sanitation facilities; i.e. 98% of the institutions in Bugesera have access to sanitation or improved water. However, looking at waste management, we observe shortage of solid waste and feacal sludge management in these institutions. Also there is still some gap in sanitation facilities' physical conditions which can question water safety in this district.

Tariff regularity entity should set tariff on WASH services which can easily address the need to balance affordability and financial sustainability of WASH programs.

6.4.1 Current status of Sanitation at schools

The assessment of needs in public places 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. Bugesera District should develop a plan for emptying school latrines. There should also be operational Manuel and think about after reuse production strategies like generating income of people.

6.4.2 Status of sanitation at health facilities

The assessment was done to 49 health facilities and came up with the estimation cost for rainwater harvesting and toilets. A total of 45 toilets and 37 tanks (25 tanks of 10m3 at health posts and 12 tanks of 75m3-120m3 at health centers) need to be constructed.

Only 15 health facilities out 49 have adequate toilets, meanwhile 12 health facilities have rain water tanks. 37 health facilities lack rain water harvesting tanks. In term of clinic waste treatment, there's needs to construct 20 burning chambers in 20 health facilities out of 49.

6.4.3 Sanitation status in markets

Bugesera District has 13 markets of which 2 need 4 toilets (one toilet has 10 cabins).

10 rainwater harvesting tanks need to be constructed at these markets.

6.5 Sanitation challenges

Key challenges in sanitation and hygiene services sector	**Planned strategies laid to overcome them**
Inadequate budget location for sanitation and hygiene services as a result among others, low priority given to sanitation and hygiene development at all levels	The services of sanitation and hygiene are at boundary of economic and social infrastructure and the result is where sanitation and hygiene are priced below economic level and the sector is poorly managed and chronically under financed. The current three source of revenue is from tariff, taxation and transfer from official development assistance (ODA) . In every financing system, however, tariff revenue is the heart of cost recovery. Recovering operational and maintenance costs is an important principle in most circumstances, since a failure to do this exposes system to a worsening of services and eventually collapse of infrastructure. Mobilization of funds for the time being, can be done through direct ODA, government continue providing subsidies but in order for future financial sustainability, there is a need to set economic tariff other than social as mentioned to take care of O&M expenses and aspire to eventual progress towards covering capital expenses as well. Sanitation and hygiene champions needs to present more case to the local authority for its proper share of budgetary allocations, putting into consideration of new cycle of living and other forces of demand accelerating development ,urbanization and settlement. Ensuring transparency and accountability in procurement, financial management and quality control of implementation.
No direct information about supply and demand quantity of liquid and solid waste generation in Bugesera District	A quick study and assessment should be done to determine quantity of demand and supply which will help to design and develop waste management infrastructure according to the capacity required to handle and make future projections depending on current quantity. It will also help during development of financial and operational model to be adopted.
Limited capacity of the urban authorities to implement waste management in the district.	Investing in the development of capacity for DIP can have high returns. Creating an effective dialogue between WASH sector experts, financial and management specialists entails communicating in language intelligible to the other, and terms which have mutual resonance. Water professionals need to understand more about finance, marketing and operationalization: finance and management specialists should acquire a better understanding of WASH sector. The ambition and modalities chosen for DIP should reflect local needs, expectations and implementation capacities.

	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 include 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.
Lack of existence of regulated tariff set by public utility	In setting tariff, consideration of Recovery for O&M; replacement, renewals and major water sewerage systems network expansions should be borne by tariff and communicated to all service providers and users. Plan for continues research and development of Sanitation and hygiene development and sustainability.

7. FUNDING REQUIREMENTS FOR SANITATION SECTORS

7.1 Financial Resource Requirements for sanitation services to Reach Targets

Table 11: Toilets for public places

INSTITUTIONS	CAPEX	CAPMANEX	OPEX	direct support	TOTAL
School	1,382,250,000	0	0	0	**1,382,250,000**
Health facilities	82,800,000	0	0	0	**82,800,000**
public market	98,653,815	0	0	0	**98,653,815**
mining toilet	18,761,040	0	0	0	**18,761,040**
Mining washing rooms	20,705,832	0	0	0	**20,705,832**
Public Car Parks	70,000,000	0	0	0	**70,000,000**
TOTAL	**1,673,170,687**	-	-	-	**1,673,170,687**

Table 12: Rainwater harvesting Tanks in Public places and households

Institutions	CAPEX	CAPMANEX	OPEX	direct support	TOTAL
School	1,255,800,000	0	0	0	1,255,800,000
Health facilities	100,950,000	0	0	0	100,950,000
public market	78,000,000	0	0	0	78,000,000
household	91,167,852,000	0	0	0	91,167,852,000
Public car Parks	24,000,000	0	0	0	24,000,000
TOTAL	**92,626,602,000**	-	-	-	**92,626,602,000**

Table 13: Waste management system including Landfill in Bugesera District

Landfill site	CAPEX	CAPMANEX	OPEX	DIRECT SUPPORT	Total
Nyamata site	1,934,940,134	30,000,000	18,235,120	4,000,000	**1,987,175,254**
Ruhuha site	1,934,940,134	30,000,000	18,235,120	4,000,000	**1,987,175,254**
Total	**3,869,880,268**	**60,000,000**	**36,470,240**	**8,000,000**	**3,974,350,508**

Table 14: Faecal sludge treatment plant

FSTP	CAPEX	CAPMANEX	OPEX/month	DIRECT SUPPORT/ month	Total
Nyamata site	800,955,344	30,000,000	-	-	830,955,344
Ruhuha site	800,955,344	30,000,000	-	-	830,955,344
Total	**1,601,910,688**	**60,000,000**	**-**	**-**	**1,661,910,688**

Table 15: Financial requirement for Hygiene

District	CAPEX	CAPMANEX	OPEX/month	DIRECT SUPPORT/yearly	Total
Bugesera	-	0	117,000,000	1,300,005,500	**1,417,005,500**

Table 16: Capex for Other Sanitation infrastructures

1	AIR POLLUTION CONTROL	234,567,100
2	E –WASTE	154,002,605
3	. DRAINAGES	1,278,450,000
4	water ponds/	131,594,080
5	SANITATION LABORATORY	1,289,702,350
	Total	**3,088,316,135**

Assumption

The district should be able to have tools to measure the produced waste as different plants and Usine are being installed in Bugesera industrial park thus make easy the monitoring and ensuring safety and since it affects sanitation and hygiene area it is the District responsibility to protect and promote his environment more specifically the population.

Table 17: Overall financial requirement for sanitation and hygiene in Bugesera district

Infrastructures	CAPEX	CAPMANEX	OPEX /yearly	DIRECT SUPPORT /yearly	Total
Toilets	1,673,170,687	0	0	0	1,673,170,687
Rainwater tanks	1,459,602,036	0	0	0	1,459,602,036
Waste management system	3,869,880,268	60,000,000	437,642,880	96,000,000	4,463,523,148
FSTP	1,601,910,688	60,000,000	-	-	1,661,910,688
Hygiene	-	-	769,826,180	1,300,005,500	2,069,831,680
Other facilities	3,088,316,135	-	-	-	3,088,316,135
Continuous research on Sanitation and mobilization campaigns	-	-	-	75,001,915	75,001,915
TOTAL	**11,692,879,814**	**120,000,000**	**1,207,469,060**	**1,471,007,415**	**14,491,356,289**

The District of Bugesera estimates the total financing needs for the sector taking into account CAPEX, CAPMANEX, OPEX and DIRECT SUPPORT costs The District estimates show that with the present level of funding to the sector there will be a considerable financing gap to reach the targets outlined above.

Table 18: Activities prioritized for Sanitation funds disbursement for 5 years

	2020	2021	2022	2023	2024
CAPEX	Construction of first phase waste management in Nyamata, rain water harvesting tank in public institution, construction of public toilet, drainage, pond and dams	Construction of second phase waste management in Nyamata, rain water harvesting tank in public institution, construction of public toilet, drainage and, pond and dams	Construction of third phase waste management in Nyamata, rain water harvesting tank in public institution, construction of public toilet, drainage and, pond and dams	Construction of feacal sludge treatment plant and management, installation of waste quality control laboratory, public toilets, rain water harvesting.	Construction of feacal sludge management, installation of waste quality control laboratory, public toilet, rain water harvesting.
Amount	**2,437,863,529**	**2,437,863,529**	**2,437,863,529**	**2,189,644,614**	**2,189,644,614**
CapManEx of existing infrastructure	Maintenance and rehabilitation of sanitation infrastructure	Maintenance and rehabilitation of sanitation infrastructure	Maintenance and rehabilitation of sanitation infrastructure	Maintenance and rehabilitation of sanitation infrastructure	Maintenance and rehabilitation of sanitation infrastructure
Amount	**20,000,000**	**20,000,000**	**120,000,000**	**220,000,000**	**220,000,000**
OPEX	Daily, monthly and annual cleaning services, waste transportation and reuse.	Daily, monthly and annual cleaning services, waste transportation and reuse.	Daily, monthly and annual cleaning services, waste transportation and reuse.	Daily, monthly and annual cleaning services, waste transportation and reuse.	Daily, monthly and annual cleaning services, waste transportation and reuse.
Amount	**1,207,469,060**	**1,207,469,060**	**1,207,469,060**	**1,251 233,348**	**1,251 233,348**
Direct Support	Community mobilization through CBEH PP, amasibo and continuous hygiene and sanitation research.	Community mobilization through CBEH PP, amasibo and continuous hygiene and sanitation research.	Community mobilization through CBEH PP, amasibo and continuous hygiene and sanitation research.	Community mobilization through CBEH PP, amasibo and continuous hygiene and sanitation research.	Community mobilization through CBEH PP, amasibo and continuous hygiene and sanitation research.
Amount	**1,471,007,415**	**1,471,007,415**	**1,471,007,415**	**1,471,007,415**	**1,471,007,415**

Table 19: Plan for Funds disbursement projections in sanitation and hygiene for 5 years

	2020	2021	2022	2023	2024
CAPEX	2,437,863,529	2,437,863,529	2,437,863,529	2,189,644,614	2,189,644,614
CapManEx of planned Infrastructure	20,000,000	20,000,000	120,000,000	220,000,000	220,000,000
OPEX	1,207,469,060	1,207,469,060	1,207,469,060	1,251,233,348	1,251,233,348
Direct Support	1,471,007,415	1,471,007,415	1,471,007,415	1,618,108,157	1,618,108,157
Subtotal	5,136,340,004	5,136,340,004	5,236,340,004	5,278,986,119	5,278,986,119
Contigency	256,817,000.20	256,817,000	261,817,000.20	263,949,305.95	263,949,305.95
Total	**5,393,157,004**	**5,393,157,004**	**5,498,157,004**	**5,542,935,425**	**5,542,935,425**

Table 21: Sanitation and Hygiene infrastructure related investment cost

Component for total investment plan:	**Amount at (US$M)**	**Amount at (FRWM)**
Component A: CAPEX Investment	12,668,343	11,692,879,815
Sub component: New Construction of sanitation infrastructure, Rehabilitation and extension, preliminary activities, heavy fixed and movable equipment/facilities.		
Component B: CAPMANEX	650,000	600,000,000
Sub component: Maintenance**,** rehabilitation of sanitation infrastructure and upgrading existing sanitation facilities and studies.		
Component C: OPEX	6,635,834	6,124,873,876
Sub component: Daily, monthly and annually cleaning services and water transportation, re-use, recovery and recycling and irregular maintenance and operational expenses.		
Sub component: Repair, regular and irregular maintenance and operational expenses.		
Component D: Direct support	8,287,366	7,649,238,559

Sub component: Community mobilization campaigns**,** awareness, training**, s**taff salaries, continue innovation, technology, research and general administrative overheads.		
Contingencies and other unforeseen expenses e.g. inflation and others (5% of total investment)	1,412,080	1,303,349,612.50
Total	**29,653,675**	**27,370,341,863**

Assumptions: For sanitation infrastructure, fixed assets are permanent established while OPEX and Direct support require recurrent expenses. This has implication on the budget for OPEX and Direct Support since their budget increase annually from start to end.

7.2.Financial sustainability of wastes management

Solid waste management approaches employed in Bugesera District, which included, waste reduction, dumping, recycling and reuse, compositing and incineration /burning. However, recycling and garbage reuse of inorganic materials from solid waste was not well developed by informal sector and such activities were seldom unrecognized, supported, or promoted by the Bugesera District authority as one of the approaches to support garbage management in the area despite having the advantage of:

Reducing costs of the disposal facilities, prolonging the site span, and also reducing the environmental impact of disposal sites as the organics are largely to blame for the polluting of the environment.

In order for community-based waste management to be a success, it must address more than the need for improved environmental management. It must also provide opportunities for income generation and the development of strong community bonds. A number of incomes generating activity initiatives will be made and practiced by the local community. Among them included making of briquettes from waste and organic fertilizers to mention few. Collection, transportation and dumping of solid waste. However, there is need 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.

Table 20: Total annual WASH investment plan to meet NST1 target

Year	**Amount in RWF**
2020	29,493,764,386
2021	21,492,112,454
2022	51,845,949,680
2023	22,266,020,899
2024	23,111,317,889
TOTAL	**148,209,166,310**

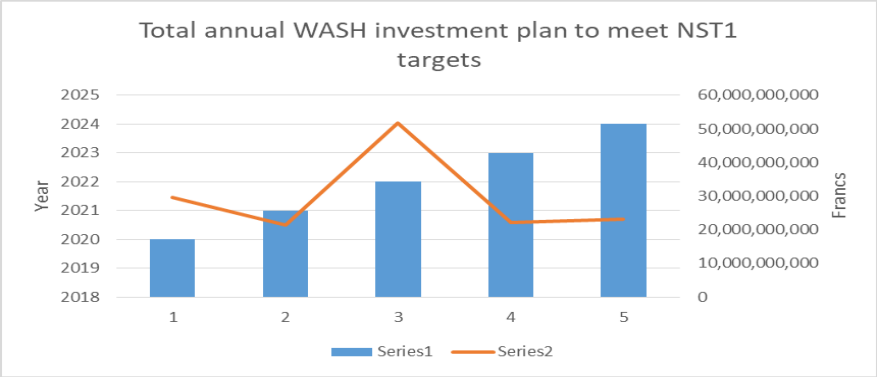

Figure 10: Total annual WASH investment plan to meet NST1 target

Table 21: Total WASH investment per sector

Description	Cost in frw	Percentages %
Water supply	**113,116,034,518**	76.32188841
Sanitation	**27,370,342,863**	18.46737523
Hygiene	**7,722,788,929**	5.210736368
Total	**148,209,166,310**	100

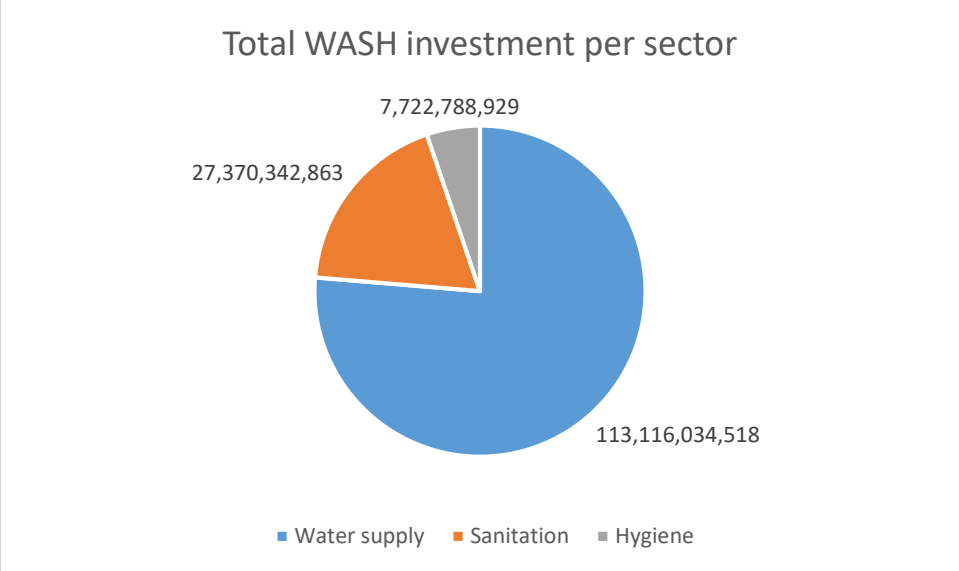

Figure 11 : Fund budgeted according to the sector

8. SOURCES OF FUNDING

The estimates of the government funding are based on projections of the present level of government and donor funding in accordance with the trend over the last years according to the present Medium-Term Expenditure Framework (MTEF) for the first 4 years and thereafter an average 5% annual growth – similar to the development in sector budgets over the last five years. To achieve the sector targets, the funding gap needs to be closed and this is likely to require considerable increases in the GoR, District budgets, development partners viewing their funding as an investment for future added value in terms of Monetary.

Table 22: Sector MTEF allocation in the last 4 years

Annual Budget	total district budget	budget allocated to wash service	Percentage(%)
2016/2017	12,614,173,516	625,029,453	5
2017/208	14,186,323,647	1,224,716,270	9
2018/2019	15,070,325,445	435,498,330	3
2019/2020	20,573,569,144	381,347,912	2
TOTAL	62,444,391,752	2,666,591,965	4

Basing on available data of WASH budget allocation in the District of Bugesera and compare to the required investment for WASH program and with the reference in the district there is still a gap of 25,075,211,488 FRW**,** this translates that the district budget should be increased more than twice, with attention to allocate more than 50% to WASH programs. This require intensive resource mobilization strategies.

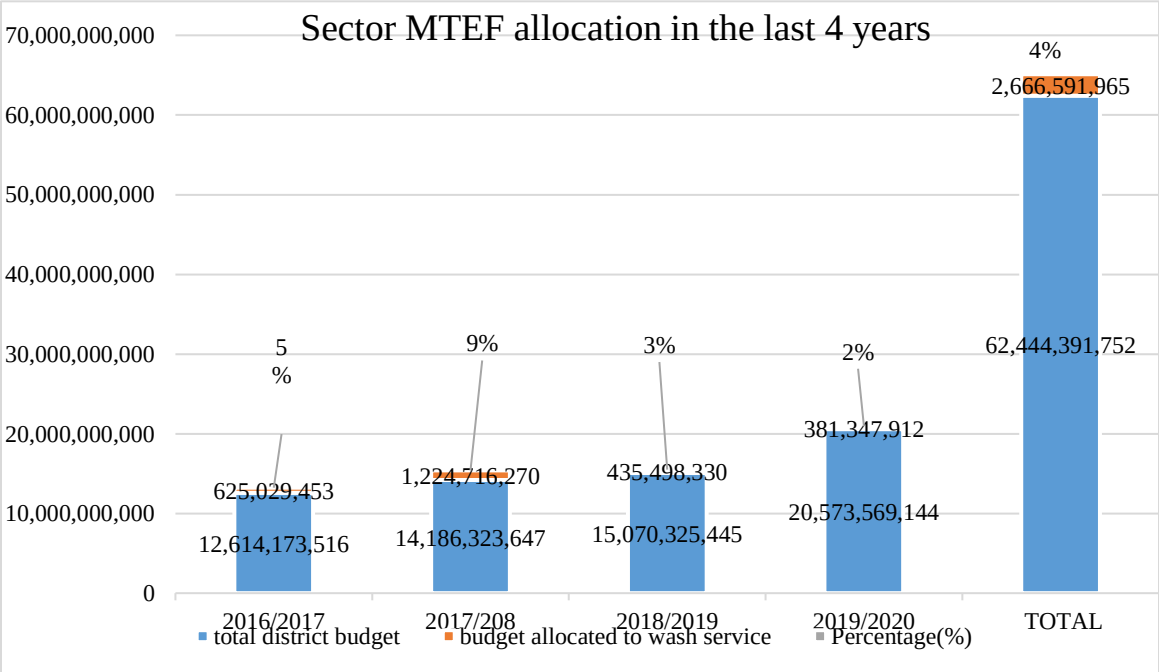

Figure 12: Budget allocation trend in WASH for the last four years

24: Sources of funds for WASH

		Sources of Funds	
Investment components	**Total investment**	**Already realized**	**To be realized**
A. CAPEX	110,528,547,617	7,829,703,848	102,698,843,768.
B. CAPEMANEX	788,887,971	63,225,467	725,661,504.00
C. OPEX	8,356,478,982	842,761,048	7,513,717,934
D. DIRECT SUPPORT	9,225,792,333	382,125,912	8,843,666,421
E. CONTIGENCY	11,586,625,578	0	11,586,625,578
GRAND TOTAL (A+B+C+**D**)=	**140,486,332,481**	**9,117,816,275**	**131,368,515,205**

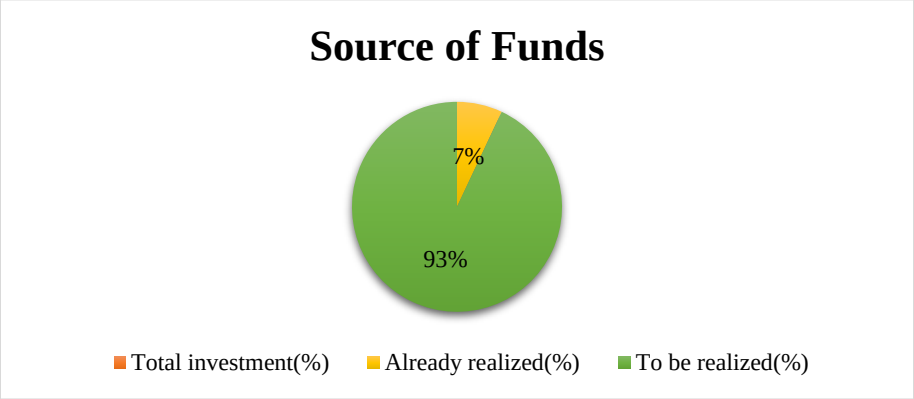

Figure 13: Sources of fund for WASH

Table 23: Roles and responsibilities for Sanitation in Bugesera District

	Sanitation infrastructure	Sanitation services and resources
Strategic control over sanitation services and resources	National government	Bugesera district
Owns asset	Bugesera district	Community/Bugesera district
Operating sanitation services	WASAC/private operator	Community/private operator
Sets tariffs	RURA	
Collects users fees	Private operator	
Manages revenue	RRA/Bugesera district	
Monitoring performance	Bugesera district/WASAC Ltd	
Carry out major maintenance	Bugesera district/WASAC Ltd	Community
Carries out minor maintenance	Bugesera district/WASAC Ltd	[Minor repairs communities' communities]
Waste Water quality testing	WASAC	WASAC
Selling services and products of emptying, collection, transportation and disposal and re-use water & collecting fees	Bugesera district/WASAC Ltd, private operator	Private operator and District

9. DISTRICT WASH MONITORING AND EVALUATION FRAMEWORK

The overall water and sanitation services monitoring and evaluation frame work 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.

Vision, Mission, Goal and Objectives

Vision	Vision of the Bugesera 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).
The mission statement	The general mission of Bugesera 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.
Goal	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, sanitation and Hygiene.
Objectives and target	

Major assumptions considered in order to realize the above-mentioned targets to achieve universal access to improved water supply services:

This hinges under government short, medium and long term development programs

Government's commitment in accelerating the process of WASH development at local and national level and commitment of key stakeholders in implementation of the investment plan. Involvement of key stakeholders in planning instill culture of ownership and enhance successfully implementation of the investment plan.

Conductive political environment thus encourage different partners to fund the DIP

Table 24: Monitoring and Evaluation Logical Framework (Sanitation and hygiene Targets)

Design Summary	**Unit of Measure**	**Performance Targets 2020**	**Performance Targets by 2020/24**	**Performance Targets actors by 2025/30**	**Performance Targets by 2030/35**	**Performance Targets by 2035/40**
Promoting hygiene practices at household level	Per cent of households with improved sanitation facilities	2%	20%	30%	40%	60%
	Per cent of households having a hand-washing facility with water and soap at home	0.5%	10%	20%	30%	50%
Promoting hygiene practices in public institutions	Per cent of schools having a functional hand- washing facility	30%	40%	60%	80%	100%
Promoting hygiene practices in public institutions	Per cent of health centers having gender- and disability- appropriate sanitation facilities	7%	25%	40%	50%	75%
Construction of integrated waste management system	Number of constructed waste management systems	0	1	2	2	2
Establishment of waste management infrastructure facilities	Per cent of households with on-site improved sanitation facilities or septic tanks that have access to safe sludge disposal services	3%	15%	30%	40%	50%
Construction of dams /ponds to retain runoff from public drainage	Number of dams /ponds to retain runoff from public drainage	4	4	5	7	8
Promoting domestic waste recycling, reuse or	Per cent of domestic waste recycled, reused or	10%	15%	25%	35%	50%

properly disposed in urban areas/grouped settlements	properly disposed in urban areas/grouped settlements					
Promoting urban non-organic solid waste recycling (organic, paper, metal, plastic, glass)	per cent of urban non-organic solid waste is recycled (organic, paper, metal, plastic, glass)	2%	10%	25%	30%	40%
Promoting e-waste management facilities	Number of e-waste management facilities	1	1	1	1	3
promoting industries with decentralized /centralized waste-water treatment systems	Percentage of industries with centralized waste-water treatment systems	0%	5%	15%	30%	45%
Public places with rain water harvesting system	Percent Public places with rain water harvesting system	15%	25%	35%	45%	60%
All Mining site with improved sanitation facilities	Number of Mining site with improved sanitation facilities	1	2	4	6	8
Promotion of Menstrual hygiene facilities	Percent of Menstrual hygiene facilities	20%	30%	40%	50%	70%
Development of operational Manuel in each activity	Number of operational Manuel related to activities	3	7	12	15	15
Installation waste laboratory testing including air pollution control	Number of waste laboratory testing including air pollution control	0	0	1	1	1
Construction of Drainage systems	Number of kilometers of drainage facilities constructed	15km	35km	75km	150km	250km

1. SUSTAINABILITY OF WASH INVESTMENT IN DISTRICT

The following are measures to be taken to ensure sustainability:

WASH BOARDS Water users Committees and community based Environmental health promotion program as well as Hygiene committee 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 and sanitation facilities to be provided. The current water supply, sanitation services, hygiene behavior and change practices` strategic and policies considers the Government's intention to optimize the external borrowing over the medium and long term as part of the ongoing effort to maintain fiscal sustainability.

The sustainability of the significant public investment in construction and rehabilitation of infrastructure is undermined by ineffective and underfunded maintenance systems. In that context, water tariff originally set, WASH management practices, compounded with the foreign exchange losses as an external factors was unable to meet its operating costs and cash flow requirements, let alone provide insufficient return on invested capital to allow for future reinvestments, expansion of systems, and improvement of service quality. It was in this regards therefore that the government has recently decided to increase water tariff at least for recovery of operating and maintenance costs. This implies significant capital cash available but does not fully meet total capital investment/assets recovery which may pose critical future total investments. However, if all planned activities were to be implemented and tariff for waste management is set considering fully cost recovery, sales volume of water will be increased. Implying that the operational cost and capital expenditure would be fully covered by the revenue and that resources would be available for future capital expenditures. Hence lay foundation for long and short term sustainability strategy.

11.1 Program Risks

The table below summarizes the most apparent risks associated with the WASH program in Bugesera District. The most significant risk is that Bugesera Districts has insufficient budget especially when come to budget allocation to WASH Sector.

Table 25: Program Risk Matrix

Description	Likelihood	Impact	Mitigating Actions
Insufficient Financial Contributions of Partners	High	Delayed program implementation	- Start funds mobilization as soon as possible; - Implementation
Limited participation of beneficiaries regarding WASH programs	Medium	Hindering delivery of planned activities, slowing down the rate of target achievements. Causing insecurity to WASH infrastructure.	Sensitization campaigns should be promoted.
Drought	Medium	Diminished water production at springs which supply community systems in dry seasons	• 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.
Water pollution	High	Due to fertilizers taking place country wide, waste disposal in water sources storm drainages from public roads the District of Bugesera water intake structures, water pipes, water points can lead to poor water quality.	• To work towards introducing treatment of water (runoff water mainly) contaminated by organic and industrial fertilizers. • Creating ponds and dams to retain storm water outside of water source.

12. 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 Bugesera. The current socio-economic and environmental challenges currently burdening Bugesera district are drivers that encourage rethinking the current approach to rural water management. In this sense, District Wide Approach encourages the district of Bugesera 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 Bugesera 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 Bugesera District.

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ANNEXES

Table 26: Existing water supply asset Inventory

No.	Network Name	Installation Year	Most recent Rehabilitation	Overall status	Notes
1	Ngenda water system + reinforcement of Rwakibilizi spring	1998	2009	In function	
2	Karenge – Juru – Rwamagana	1976	Partial in 2004	Abandoned	• Requires further assessment to investigate cost-benefit for rehabilitation
3	Shyogwe – Mayaga – Bugesera/AIDER	1965	2005	Abandoned	
4	Kanyonyomba Water System	2018		Newly built	• Will contribute to Ngenda system
5	Migina Solar pump borehole	2016		Newly built	Needs filtration technics
6	Rwingeso spring water source	2017		Newly built	• Need water pipeline to connect to the community
7	125 Boreholes	From 1995 to 2009		25 operational, 35 hard water with salt, 65 broken down	• Require management and rehabilitation process
8	9 solar pumped boreholes located in beef zone	2017		Newly built	• Need water quality control

	SCHOOL NAME	SECTOR	Number of students			Total staff				Available (Existing)needs		Remaining needs to Construct (data from Bugesera District)		Unit price		Amount		TOTAL
			Boys	Girls	Total	Male	Female	Total	Total staff and students	VIP toilet	Rain water harvesting tanks	VIP toilet	Rain water harvesting tanks	VIP toilet	Rain water harvesting tanks(10 m3)	VIP toilet	Rain water harvesting tanks	
1	ESPEGA	GASHORA	0	118	118	15	4	19	137	56	8	0	0	14,250,000	7,800,000	-	-	
2	GASHORA GIRLS ACADEMY	GASHORA	0	275	275	18	9	27	302	30	1	0	0	14,250,000	7,800,000	-	-	-
3	KAGASA PRE-PRIMARY (PRIVATE)	GASHORA	27	46	73	0	2	2	75	0	0	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
4	KAGASA	GASHORA	471	459	930	9	6	15	945	**20**	2	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
5	GS DIHIRO	GASHORA	945	983	1928	37	7	44	1,972	**36**	13	2	5	14,250,000	7,800,000	**28,500,000**	**39,000,000**	**67,500,000**
6	GS Mwendo	GASHORA	937	964	1901	16	21	37	1,938	**44**	10	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
7	EP GASHORA	GASHORA	557	571	1128	10	8	18	1,146	**9**	2	3	4	14,250,000	7,800,000	**42,750,000**	**31,200,000**	**73,950,000**
8	CELIPAR	GASHORA	38	30	68	1	2	3	71	**6**	0	0	1		7,800,000	-	**7,800,000**	**7,800,000**

9	E.P MBUYE	JURU	610	638	1248	12	9	21	1,269	**28**	1	1	3	14,250,000	7,800,000	**14,250,000**	**23,400,000**	**37,650,000**
10	EP GATORA	JURU	448	503	951	10	8	18	969	**20**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
11	EP JURU	JURU	551	527	1078	9	10	19	1,097	**29**	4	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
12	EP Rushubi	JURU	591	582	1173	9	7	16	1,189	**24**	2	2	3	14,250,000	7,800,000	**28,500,000**	**23,400,000**	**51,900,000**
13	GS KATARARA	JURU	970	989	1959	27	18	45	2,004	**72**	3	0	4	14,250,000	7,800,000	-	**31,200,000**	**31,200,000**
14	GS RWINUME	JURU	496	498	994	8	2	10	1,004	**37**	3	2	2	14,250,000	7,800,000	**28,500,000**	**15,600,000**	**44,100,000**
15	ES JURU	JURU	75	79	154	12	10	22	176	**36**	6	0	0	14,250,000	7,800,000	-	-	-
16	FRIENDLY MUSOVU	JURU	78	86	164	1	2	3	167	**3**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
17	MURAMBO	KAMABUYE	364	353	717	9	4	13	730	**18**	4	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
18	GS NYAKAYAGA	KAMABUYE	813	875	1688	27	19	46	1,734	**70**	3	0	4	14,250,000	7,800,000	-	**31,200,000**	**31,200,000**
19	EP TUNDA	KAMABUYE	603	632	1235	10	8	18	1,253	**20**	3	2	1	14,250,000	7,800,000	**28,500,000**	**7,800,000**	**36,300,000**
20	EP MURAGO	KAMABUYE	368	374	742	9	6	15	757	**32**	0	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
21	GS BIHARAGU	KAMABUYE	985	948	1933	24	10	34	1,967	**36**	1	3	3	14,250,000	7,800,000	**42,750,000**	**23,400,000**	**66,150,000**
22	EP BUKUMBA	MAREBA	355	341	696	8	3	11	707	**18**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
23	EP RANGO	MAREBA	787	870	1657	15	12	27	1,684	**32**	1	2	2	14,250,000	7,800,000	**28,500,000**	**15,600,000**	**44,100,000**

24	EP GAKOMEYE	MAREBA	703	658	1361	11	11	22	1,383	**30**	4	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
25	GS MAREBA	MAREBA	947	1042	1989	22	26	48	2,037	**41**	5	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
26	EP RUKOYOYO	MAREBA	402	376	778	7	8	15	793	**10**	2	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
27	EP MAYANGE B	MAYANGE	522	481	1003	6	11	17	1,020	**18**	3	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
28	LITTLE ANGELS	MAYANGE	67	68	135	5	2	7	142	**22**	2	0	0	14,250,000	7,800,000	-	-	-
29	EP KIBENGA	MAYANGE	423	475	898	6	4	10	908	**24**	1	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
30	ST RUTH	MAYANGE	111	124	235	11	5	16	251	**23**	4	0	0	14,250,000	7,800,000	-	-	-
31	GS MAYANGE A	MAYANGE	1479	1557	3036	31	23	54	3,090	**60**	5	3	3	14,250,000	7,800,000	**42,750,000**	**23,400,000**	**66,150,000**
32	MBYO P S	MAYANGE	411	477	888	7	6	13	901	**14**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
33	GS KAMABUYE	MAYANGE	862	830	1692	18	19	37	1,729	**60**	7	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
34	MUYENZI	MAYANGE	788	683	1471	8	16	24	1,495	**34**	5	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
35	ES KAMABUYE	MAYANGE	247	200	447	21	8	29	476	**20**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
36	LITTLE ANGELS	MAYANGE	38	49	87	3	2	5	92	**24**	3	0	0	14,250,000	7,800,000	-	-	-
37	UTUNYANGE NURSERY	MAYANGE	21	27	48	1	3	4	52	**4**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
38	INYENYERI	MAYANGE	35	28	63	1	1	2	65	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**

39	KAVUMU NURSERY SCHOOL	MAYANGE	32	36	68	0	2	2	70	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
40	TETA	MAYANGE	13	21	34	0	1	1	35	**1**	0	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
41	CYARUHIRIRA	MAYANGE	20	10	30	1	0	1	31	**1**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
42	GACUCU NURSERY	MAYANGE	34	31	65	1	2	3	68	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
43	GITARAMUKA NURSERY	MAYANGE	22	41	63	0	2	2	65	**2**	3	0	0	14,250,000	7,800,000	-	-	-
44	RWAKARAMIRA	MAYANGE	28	29	57	0	1	1	58	**4**	2	0	0	14,250,000	7,800,000	-	-	-
45	FAITH-HOPE-MAYANGE	MAYANGE	35	36	71	1	2	3	74	**2**	2	0	0	14,250,000	7,800,000	-	-	-
46	RUKINDO	MAYANGE	15	38	53	0	2	2	55	**1**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
47	KABYO NURSARY SCHOOL MAYANGE		20	12	32	0	1	1	33	**1**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
48	GAKINDO	MAYANGE	25	33	58	0	2	2	60	**6**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
49	RUHOREBERO	MAYANGE	24	33	57	4	1	5	62	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
50	GACYAMO	MAYANGE	28	30	58	0	2	2	60	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
51	GS Nyagihunika	Musenyi	539	468	1007	15	10	25	1,032	**22**	2	1	3	14,250,000	7,800,000	**14,250,000**	**23,400,000**	**37,650,000**
52	Gitagata	MUSENYI	571	211	782	7	8	15	797	**40**	4	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**

53	EP RULINDO	MUSENYI	724	780	1504	13	7	20	1,524	**43**	2	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
54	EP Rugeyo	musenyi	241	237	478	4	5	9	487	**8**	1	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
55	GS MUSENYI	MUSENYI	1083	1182	2265	30	25	55	2,320	**74**	6	0	4	14,250,000	7,800,000	-	**31,200,000**	**31,200,000**
56	EP KIGUSA	MUSENYI	705	693	1398	12	6	18	1,416	**39**	6	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**
57	EP GICACA	MUSENYI	931	971	1902	12	9	21	1,923	**46**	2	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
58	E P RURENGE	MWOGO	551	558	1109	8	7	15	1,124	**37**	2	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
59	BRIGHT LIGHT BOARDING SCHOOL	MWOGO	43	37	80	7	6	13	93	**18**	4	0	0	14,250,000	7,800,000	-	-	-
60	GS KAGASA MWOGO	MWOGO	1384	1384	2768	29	18	47	2,815	**70**	11	2	0	14,250,000	7,800,000	**28,500,000**	-	**28,500,000**
61	EP KAGERERO	MWOGO	571	605	1176	6	8	14	1,190	**21**	0	1	3	14,250,000	7,800,000	**14,250,000**	**23,400,000**	**37,650,000**
62	EP KAGASA	NGERUKA	443	481	924	6	9	15	939	**19**	5	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**
63	EP KAGANO	NGERUKA	530	550	1080	13	3	16	1,096	**26**	2	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
64	EP NGERUKA	NGERUKA	674	687	1361	12	11	23	1,384	**20**	4	2	1	14,250,000	7,800,000	**28,500,000**	**7,800,000**	**36,300,000**

65	GS TWIMPALA	NGERUKA	1309	1261	2570	29	16	45	2,615	**32**	7	4	1	14,250,000	7,800,000	**57,000,000**	**7,800,000**	**64,800,000**
66	EP SHAMI	NGERUKA	536	530	1066	10	5	15	1,081	**18**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
67	GS RUTONDE	NGERUKA	606	626	1232	18	11	29	1,261	**26**	4	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
68	G S NTARAMA	NTARAMA	659	667	1326	15	21	36	1,362	**36**	3	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
69	EP NYAMABUYE PRIMARY SCHOOL	NTARAMA	74	67	141	2	2	4	145	**8**	1	0	0	14,250,000	7,800,000	-	-	-
70	GS KIBUNGO	NTARAMA	903	944	1847	16	11	27	1,874	**32**	1	3	3	14,250,000	7,800,000	**42,750,000**	**23,400,000**	**66,150,000**
71	EP CYUGARO	NTARAMA	489	476	965	9	8	17	982	**36**	12	0	0	14,250,000	7,800,000	-	-	-
72	EP NYIRARUKOBWA	NTARAMA	641	558	1199	10	1	11	1,210	**23**	0	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
73	WISDOM	NTARAMA	23	29	52	3	7	10	62	**8**	4	0	0	14,250,000	7,800,000	-	-	-
74	E.P KANAZI	NYAMATA	526	620	1146	10	10	20	1,166	**13**	7	3	1	14,250,000	7,800,000	**42,750,000**	**7,800,000**	**50,550,000**
75	PEFA KANAZI	NYAMATA	160	174	334	5	4	9	343	**8**	3	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**

76	NYAMATA BRIGHT SCHOOL	NYAMATA	279	304	583	18	10	28	611	**20**	2	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
77	Epoir de l'AVENIR	NYAMATA	358	361	719	18	7	25	744	**20**	5	0		14,250,000	7,800,000	-	-	-
78	GS MURAMA	NYAMATA	1194	1233	2427	24	32	56	2,483	**46**	8	3	3	14,250,000	7,800,000	**42,750,000**	**23,400,000**	**66,150,000**
79	VINEYARD CHRISTIAN SCHOOL(VCS)	NYAMATA	107	127	234	8	1	9	243	**11**	4	0	0	14,250,000	7,800,000	-	-	-
80	KARAMBI	Nyamata	204	208	412	2	5	7	419	**22**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
81	Highland	Nyamata	306	315	621	16	14	30	651	**5**	1	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
82	EP KAYENZI	NYAMATA	421	409	830	3	11	14	844	**12**	4	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
83	NYAMATA HIGH SC PRIMARY	NYAMATA	301	342	643	8	6	14	657	**8**	3	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**
84	EP NYIRAMATUNTU	NYAMATA	194	191	385	5	6	11	396	**10**	0	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**

85	ECOLE REINE DES APOTRES	NYAMATA	120	114	234	14	14	28	262	**33**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
86	EP GITWE	NYAMATA	396	423	819	6	6	12	831	**16**	2	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
87	GS MARANYUNDO	NYAMATA	270	254	524	1	11	12	536	**17**	8	0	0	14,250,000	7,800,000	-	-	-
88	ECOLE ST THERESE	NYAMATA	161	132	293	10	4	14	307	**24**	2	0	0	14,250,000	7,800,000	-	-	-
89	RAFIKI FOUNDATION	NYAMATA	144	142	286	18	25	43	329	**31**	24	0	0	14,250,000	7,800,000	-	-	-
90	LES COLOMBES	NYAMATA	146	134	280	8	10	18	298	**11**	1	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
91	GS NYAMATA EPR	NYAMATA	182	189	371	2	6	8	379	**8**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
92	GS NYAMATA CATHOLIQUE	NYAMATA	**1167**	**1230**	2397	28	**35**	63	2,460	**62**	**4**	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
93	MARANYUNDO GIRLS SCHOOLS	NYAMATA	**0**	**380**	380	12	**25**	37	417	**55**	**20**	0	0	14,250,000	7,800,000	-	-	-
94	GS NYAMATA EPR	NYAMATA	**414**	**445**	859	8	**17**	25	884	**25**	**2**	0	1		7,800,000	-	**7,800,000**	**7,800,000**
95	ecole secondaire kanzenze	NYAMATA	**140**	**165**	305	12	**6**	18	323	**12**	**1**	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**

96	NYAMATA TCC	NYAMATA	**131**	**245**	376	14	**7**	21	397	**36**	**4**	0	0	14,250,000	7,800,000	-	-	-
97	MONTFORT SECONDARY SCHOOL	NYAMATA	**209**	**90**	299	13	**4**	17	316	**24**	**5**	0	0	14,250,000	7,800,000	-	-	-
98	NYAMATA HIGH SCHOOL SECONDARY	NYAMATA	**234**	**236**	470	23	**3**	26	496	**22**	**3**	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
99	UMUBYEYI COMMUNITY FOUNDATION	NYAMATA	**46**	**47**	93	3	**3**	6	99	**8**	**2**	0	0	14,250,000	7,800,000	-	-	-
100	SMALDONE		**11**	**13**	24	0	**2**	2	26	**16**	**1**	0	0	14,250,000	7,800,000	-	-	-
101	NYAMATA TSS	NYAMATA	**435**	**176**	611	18	**9**	27	638	**38**	**6**	0	0	14,250,000	7,800,000	-	-	-
102	RUGANDO	NYARUGENGE	597	568	1165	9	10	19	1,184	**32**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
103	KIGARAMA PRIMARY SCHOOL	NYARUGENGE	559	518	1077	10	7	17	1,094	**30**	4	0	0	14,250,000	7,800,000	-	-	-
104	EP Murambi	NYARUGENGE	323	364	687	5	8	13	700	**24**	2	0	0	14,250,000	7,800,000	-	-	-

105	NGENDA	NYARUGENGE	570	614	1184	15	8	23	1,207	**37**	1	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
106	GS KAMABARE	NYARUGENGE	484	534	1018	11	15	26	1,044	**50**	1	0	2	14,250,000	7,800,000	-	**15,600,000**	**15,600,000**
107	EP KARERA	RILIMA	637	700	1337	5	16	21	1,358	**20**	0	2	3	14,250,000	7,800,000	**28,500,000**	**23,400,000**	**51,900,000**
108	FAITH &HOPE	RILIMA	132	136	268	5	6	11	279	**6**	1	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**
109	GS RILIMA CATHOLIQUE	RILIMA	574	622	1196	26	11	37	1,233	**42**	1	0	3	14,250,000	7,800,000	-	**23,400,000**	**23,400,000**
110	EP MERE ELISEA	RILIMA	50	74	124	5	4	9	133	**9**	2	0	0	14,250,000	7,800,000	-	-	-
111	EP GASEKE	RILIMA	81	87	168	2	2	4	172	**24**	2	0	0	14,250,000	7,800,000	-	-	-
112	GS NYABAGENDWA	RILIMA	858	858	1716	11	25	36	1,752	**52**	0	0	4	14,250,000	7,800,000	-	**31,200,000**	**31,200,000**
113	EP KALILISI	RILIMA	341	311	652	7	8	15	667	**21**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
114	GS RILIMA	RILIMA	265	206	471	22	5	27	498	**45**	1	0	2			-	-	-
115	MUNAZI	RUHUHA	523	562	1085	6	13	19	1,104	**18**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
116	KINDAMA PRIMARY SCHOOL	RUHUHA	384	454	838	8	6	14	852	**10**	3	1	0	14,250,000	7,800,000	**14,250,000**	-	**14,250,000**
117	G.S ST TITE BUTERERI	Ruhuha	481	532	1013	13	10	23	1,036	**20**	5	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**

118	GS RUGARAMA	RUHUHA	694	699	1393	13	4	17	1,410	**14**	2	3	2	14,250,000	7,800,000	**42,750,000**	**15,600,000**	**58,350,000**
119	G.S RUHUHA	RUHUHA	1081	1160	2241	26	17	43	2,284	**38**	5	3	3	14,250,000	7,800,000	**42,750,000**	**23,400,000**	**66,150,000**
120	UMURAGE RIGHT SCHOOL	RUHUHA	139	154	293	7	4	11	304	**12**	2	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
121	NEW EXCELLENCE ACADEMY	RUHUHA	181	169	350	7	7	14	364	**12**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
122	St Antoine ITORERO	RUHUHA	52	42	94	1	1	2	96	**6**	2	0	0	14,250,000	7,800,000	-	-	-
123	LYCEE DE LA SAINTE TRINITE APED	RUHUHA	211	145	356	18	2	20	376	**24**	1	0	0	14,250,000	7,800,000	-	-	-
124	GS NYIRAGISEKE	RWERU	859	829	1688	17	13	30	1,718	**26**	1	3	2	14,250,000	7,800,000	**42,750,000**	**15,600,000**	**58,350,000**
125	EP MAZANE	RWERU	142	130	272	7	0	7	279	**8**	1	0	0	14,250,000	7,800,000	-	-	-
126	GS Nkanga	RWERU	1736	1803	3539	44	37	81	3,620	**36**	8	7	2	14,250,000	7,800,000	**99,750,000**	**15,600,000**	**115,350,000**

127	EP RWIMINAZI	RWERU	329	388	717	10	5	15	732	**19**	3	0	0	14,250,000	7,800,000	-	-	-
128	EP SHARITA	RWERU	93	97	190	5	0	5	195	**12**	2	0	0	14,250,000	7,800,000	-	-	-
129	EP Ruzo	RWERU	849	815	1664	14	12	26	1,690	**36**	3	2	0	14,250,000	7,800,000	**28,500,000**	-	**28,500,000**
130	NEMBA P/S	RWERU	219	155	374	4	5	9	383	**20**	3	0	0	14,250,000	7,800,000	-	-	-
131	NYABAGUMA	SHYARA	540	526	1066	8	8	16	1,082	**18**	1	1	2	14,250,000	7,800,000	**14,250,000**	**15,600,000**	**29,850,000**
132	G.S.GIHINGA	SHYARA	1263	1331	2594	16	18	34	2,628	**18**	1	5	4	14,250,000	7,800,000	**71,250,000**	**31,200,000**	**102,450,000**
133	EP RWAMANYONI	SHYARA	383	330	713	9	2	11	724	**12**	1	1	1	14,250,000	7,800,000	**14,250,000**	**7,800,000**	**22,050,000**
134	URUHONGORE	SHYARA	13	14	27	1	2	3	30	**8**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
135	LIGHT ACADEMY	SHYARA	7	12	19	1	1	2	21	**12**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
136	KAMWERU	SHYARA	5	7	12	0	1	1	13	**2**	0	0	1	14,250,000	7,800,000	-	**7,800,000**	**7,800,000**
	TOTAL		####	####	####	841	726	2524	#####	**2028**	389	**98**	**164**			**1,382,250,000**	**1,255,800,000**	**2,638,050,000**
	Note that: we consider a toilet need where there is a demand of seven stances to 13 stances, and was calculated based WHO and UNICEF Standard of 30 pupils using one stance																	
	A rain water harvesting tank have been consider based on pluviometry data, roofing of the school, and the exiting of the population in each school																	