REPUBLIC OF RWANDA

MINISTRY OF INFRASTRUCTURE

WATER AND SANITATION

SECTOR STRATEGIC PLAN 2018 - 2024

Draft Report

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The Water and Sanitation sector in Rwanda is 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 and sanitation sector plays a critical role in ensuring targets of the Vision 2050, National Strategy for Transformation and Prosperity (NST 2018/19-2023/24) as well as SDGs (2030) are attained. In order for this to happen, adequate investment in water and sanitation infrastructure, providing sanitation facilities and promoting hygiene at every level is a prerequisite.

The water and sanitation strategy is expected to be implemented for another period of six years from 2018-2024 in line with achieving broad water supply and sanitation targets of at least basic water supply services for 100% of people by fast-tracking implementation of strategic investment program as well as achieving at least basic household sanitation coverage for 100% of households.

1.2 Methodology

The elaboration of this strategy was undertaken using both primary and secondary data collection techniques. A number of policy documents were reviewed notably national policies and strategic documents for water supply and sanitation which actually forms broader content of the strategy. These approved strategies by cabinet passed through extensive consultative processes with all stakeholders at ministerial and district level. More so, further consultative areas were through the thematic working group meetings, and discussions that involved key collaborative ministries such as MINECOFIN, MINALOC, MINISANTE, MINEDUC, MINERENA, MINEAC, WASAC, REMA, RURA, and RBS. The outcome of these extensive discussions reviewed and updated sector challenges and constraints, proposed priorities and strategies to be pursued in future.

The Ministry of Finance and Economic Planning played role in availing guidelines, format in matrixes forms. The exercise was coordinated by the planning division at MININFRA. A working retreat was organized at Rabavu District. This retreat brought together MININFRA Divisions which included water and sanitation team including WASAC, urbanization, transport and energy. Specifically, for water and sanitation division, the retreat discussed sector challenges, priorities and targets for a sense of direction for the sector. During the retreat cross-cutting areas such as gender, environment, disability, capacity building and social inclusion were discussed.

CHAPTER 2: OVERVIEW OF THE SECTOR AND SUB SECTORS

The chapter highlights the role of water and sanitation sector in socio-economic development, it brings to light key achievements registered during the EDPRS II period as well as key challenges to be addressed by the strategy.

2.1 Water Supply and Social Economic Development

The Economic Development and Poverty Reduction Strategy (2013-2018) recognized that water supply affects broad areas of human life. The provision of adequate WSS services plays a crucial role in preventive health care and a prerequisite and socio-economic development indicator. The safe drinking water is a basic amenity, ranked among the highest priority public services by Rwanda's population[1] . The access to drinking water reduces time spent on fetching water and has a positive impact on school enrolment and attendance especially for girls. Absent, unsafe, and distant water supplies are detrimental to all lives, and especially for women who are normally responsible for water collection and handling for household hygiene and for caring of the sick.

World Health Organization[2] (2015) recognizes that poor water supply and sanitary conditions due to the lack of adequate water supply result in diarrhea, intestinal parasites and environmental enteropathy and have complex and reciprocal links to malnutrition in children. Water, sanitation and hygiene (WASH) affects child's health and nutritional status in three direct pathways namely; i) diarrhoeal diseases, (ii) intestinal parasites and (iii) environmental enteropathy. Furthermore, lack of adequate WASH services increases workload is such a way that women and girls walking long distances in search of water facilities and diverting mothers' time from child care [3] and impacting girls' attendance at school. WSS policy furthermore, reaffirms that malnutrition weakens the body's defences and makes children more vulnerable to disease. At the same time, diarrhoea and intestinal parasites contribute to malnutrition by causing decreased food intake, impaired nutrient absorption and direct nutrient losses. Evidence suggests that a relatively mild infestation of parasites can consume 10 per cent of a child's total energy intake as well as interfere with digestion and absorption. Unsanitary environments due to a lack of adequate water supply also contribute to malnutrition by challenging children's immune systems; nutrients that would otherwise support growth instead support the immune response. Some research has demonstrated a strong relation between diarrhoeal infections in the first two years of life and cognitive functioning when children are between 6 years old and 9 years old. Numerous

1 National Water Supply Policy 2016 page 3
2 www.who.int/water sanitation health/publications/washmmutrition/en/
3 National Water Supply Policy,2016

studies have also reported that malnutrition and stunting have been found to be related to children's mental and social development, in both the short and longer terms

With these challenges caused by water supply and sanitation, the provision of adequate water supply and sanitation services continue to be priorities and core elements of Rwanda's EDPRS III strategies and Vision 2050 indicators as well as the recently endorsed SDGs water supply and sanitation indicators. That said, the Government of Rwanda fully acknowledges the importance of water supply services for human and economic growth and has significantly increased sector funding threefold since 2014 to address and existing investment backlog.[4]

2.2. Sanitation and Social Economic Development

Poor sanitation undermines economic growth and has a detrimental impact on health. Poor sanitation costs many countries in the region and Africa at least 1% of GDP, including Uganda, Tanzania, Ghana, DRC, Nigeria and Zambia[5].

Poor sanitation causes mortality and morbidity and leads to spread of diarrheal diseases as well as schistosomasis (bilharzia) and other disease-causing parasites. The National Sanitation Policy points out that a mild infestation of parasites can consume 10 per cent of a child's total energy intake as well as interfere with digestion and absorption. Unsanitary environments due to a lack of adequate water supply also contribute to malnutrition by challenging children's immune systems; nutrients that would otherwise support growth instead support the immune response. Some research has demonstrated a strong relation between diarrhoeal infections in the first two years of life and cognitive functioning when children are between 6 years old and 9 years old. Furthermore, unhygienic sanitary facilities for excreta disposal, poor management of solid and liquid wastes and inadequate hygienic practices – especially handwashing with soap - are responsible for a large portion of Rwanda's disease burden. Sound environmental health conditions are a key prerequisite to enhance quality of life, to impact positively on sustainable economic growth and to reduce poverty.

2.3 Sector Policy Context

The section describes the policy context within which the sector operates notably the Vision 2050, National Strategy for Transformation and Prosperity (NST), collaborative sector strategies and ratified international commitment notably 2030 Sustainable Development Goals, Paris Declaration on Climate Change (2030), East African Community(EAC) Vision 2050 and African Union Agenda 2063.

4 National Water Supply Policy, 2016
5 World Bank, Economics of Sanitation, Africa: https://www.wsp.org/content/africa-economic-impacts-sanitation

2.3.1 Vision 2050

Vision 2050 is about ensuring high standards of living for all Rwandans and is aimed to shift Rwandan's from the current livelihood to the society everyone wants and proud to belong. In order to realize this Vision, the country will embark on economic transformation, social transformation and governance and justice. The country will increase momentum towards reaching upper middle income by 2030 and high income by 2050. This will require average annual growth of above 10% per cent. Therefore, the Vision 2050 provides the policy context for the sector. WATSAN strategy will contribute to this country ambition by progressively achieving safely managed water and sanitation services for socio-economic development and to all Rwandan's.

2.3.2 National Strategy for Transformation (NST)

The National Strategy for Transformation, Medium Term Strategy (2018-2024) is focused to accelerating the attainment of Rwanda's Vision 2050 ambitions and global commitments. In order to achieve the high-level targets of Economic Transformation and prosperity, water and sanitation sector will contribute to the targets of NSTP as follows;

The sector aims to increase the proportion of the population/households accessing improved source of water from 84.8% (EICV 4) to 100% and the proportion with improved sanitation services/ facilities from 83% (EICV 4) to 100%. It is also envisioned to increase the proportion of the rural population living within 500m of an improved water source from 47.% (EICV4)to 100%, and to raise the proportion of the urban population residing within 200m of an improved water source from 61%(EICV4) to 100%. Furthermore, regarding sanitation, the sector plans to increase the proportion of schools with latrines complying with health norms will reach a target of 100% and the proportion for rural households will increase to 100%.

2.3.3 Sustainable Development Goals

In September 2015, countries adopted the 2030 Agenda for Sustainable Development to end poverty and promote prosperity for all while protecting the environment and addressing climate change.

The new 2030 Agenda has water and sanitation at its core, with a dedicated SDG 6 on water and sanitation and clear linkages to goals relating to health, food security, climate change, resiliency to disasters and ecosystems, among many others.

Reaching the ambitious objectives of the 2030 Agenda demands that we address universal and equitable access to drinking water and sanitation along with issues of quality and supply, in tandem with improved water management to protect ecosystems and build resiliency.

They include two main goals:

GOAL 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all
6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special to the needs of women and girls and those in vulnerable situations
6.3By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials halving the proportion of untreated water and increasing recycling and safe reuse by X% globally
6.4 By 2030,substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people from water scarcity
6.a By 2030, expand international cooperation and capacity building support to developing countries in water and sanitation related water efficiency, wastewater treatment, recycling and reuse technologies
6.b Support and strengthen the participation of local communities for improving water and sanitation

Fig 1 below summarize targets of the SDG 6**;** Ensuring availability and sustainable management of water and sanitation for all

Figure 1: SDG 6 and related targets

Source: National Water Supply Policy, 2016~~5~~

Goal 17: STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT, IN THE CONTEXT OF WATER AND SANITATION.

This strategy will pay special attention to ensure the national targets are aligned to the SDG targets (refer to Annex1)

2.3.4 Health Policy 2014 and Health Sector Strategic Plan

This objective of the Health Policy is centred on the reduction of burden of disease of the most important health problems in Rwanda – i.e., maternal and child health problems, infectious diseases and non-communicable diseases through access to primary health care. Both prevention and treatment and care services are included in these programmes, as well as interventions aimed at improving important health-determining factors, such as behaviour change communication, promotion of adequate nutrition, environmental health and sanitation, and access to safe water.

Policy directions with relevance to the water supply and sanitation sub-sectors include:

a) The health cross-sector collaboration has to be strengthened to tackle multi-factorial determinants affecting the health of the population (poverty reduction, nutrition and food security, water and sanitation, human rights, education and social protection, empowerment of youth and vulnerable populations).
b) Environmental health interventions will be strengthened from the national to the village levels. Hygiene inspections will be decentralized to empower districts and sectors and the Community-Based Environmental Health Promotion Programme will be scaled up to be implemented country-wide.
c) Inter-sectoral collaboration between non-health departments and the MoH is essential for interventions targeting health determinants: water distribution and sanitation systems to meet essential health needs, public hygiene activities (domestic and health-care waste management, health inspections).

2.3.5 Water Resource Policy 2011 and Strategic Plan

According to the Water Resources Management Sub-Sector Strategic Plan (2011–2015), the main drivers for water demand in Rwanda are rapid population growth, poverty and climate change. Environmental degradation in wetlands is high due to uncontrolled poor settlements, and water pollution is abundant especially when it comes to floods, as storm water protection systems and disaster management is barely existent.

Historically, water resources management and water supply and sanitation were managed by one ‘water unit’; however, since the separation of water supply and sanitation (under MININFRA) and water resources management (under MINIRENA, established in 2011) the different mandates are clearly defined and anchored in relevant enabling policies and strategies for each water sub-sector.

Quote from the Water Resources Policy 2011:

> Efficient and equitable water allocation and utilization framework: Under this outcome, sectoral plans for water demand and utilization will be formulated and implemented; Catchment-based Water Allocation Master plan reflecting rights and obligations of water users developed and implemented; a comprehensive strategy for promoting water use efficiency, will be developed. A key target in water conservation and efficient use will be to ensure that all institutions and at least 50% of households have rainwater harvesting facilities.

2.4 Sector Achievement towards EDPRS II targets

The section provides a detailed status of registered achievements for the EDPRS II period as well as key challenges that the sector will continue to tackle/address during the new era of National Strategy for Transformation.

During the EDPRS II period, the WATSAN sector registered enormous achievements as indicated below;

- The Rwanda Cabinet approved national water supply and sanitation policies and their related implementation strategies which provides a sense of clear direction for the sector stakeholders while implementing programs and projects
- The establishment of a SWAp Secretariat is now operational and playing a critical role in sector coordination whereby sector stakeholders are updated on sector progress through sector working group a mechanism that is already institutionalized
- During the EDPRS II, the Government of Rwanda planned to achieve 100% access to improved water, sanitation and hygiene behaviors by 2018. The current progress is as follows;

Table 1 below indicates progressive level of water as defined in terms of proximity to improved water source (improved 500m in rural and 200m in urban respectively. This stands at 47% for rural while 61% urban respectively. For access to improved unshared sanitation facility is still at 64%. Regarding hygiene behaviors, 11% of households having a hand washing place continues to remain a challenge for the rural setting.

Table 1: Water and sanitation achievements against EDPRS 2

Water and sanitation information[6]	Rural	Urban	Average
Households using improved source of water	84%	90%	84.8%
Households using improved sanitation facilities	81%	94%	83%
Households with access to safe water (within 200m distance in urban and within 500m distance in rural)	47.3%	60.5%	-
Households with access to improved unshared sanitation facility	67%	47%	64%
Households where a hand washing place is observed [7]	10%	20%	11%
Households take some measure for rain water harvesting			17%

Source: Rwanda's Household living survey (EVIC$_4$ 2013/14)

Recognizable achievement in rural supply coverage have been registered in the past years but the annual increase of coverage was inadequate to reach the EDRS II target of 100% as visualized below; target for "access to safe water" (improved within stated distance to the home)

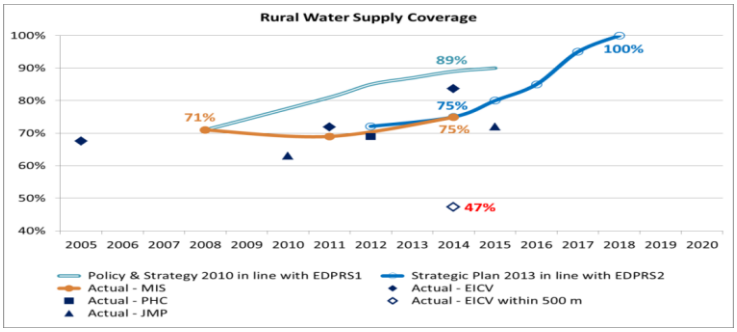

Figure 2: Evolution of rural water supply coverage since 2005 compared with EDPRS 2 targets

Source: National Water Supply Implementation Strategy, 2016

The majority of the population supplied today is served by improved point water source (protected springs, boreholes or wells. However, today most of the conveniently located springs are already protected or equipped with a piped gravity flow scheme. Most of the remaining people will therefore have to be served by piped water schemes involving pumping, including large long-distance projects. Rwanda's hilly terrain requires detailed planning on how the remaining un-served areas can be covered in the most efficient way.

6 Fourth Integrated Living Conditions Survey,2014 (EICV4),
7 Demographic and Health Survey (DHS), 2015

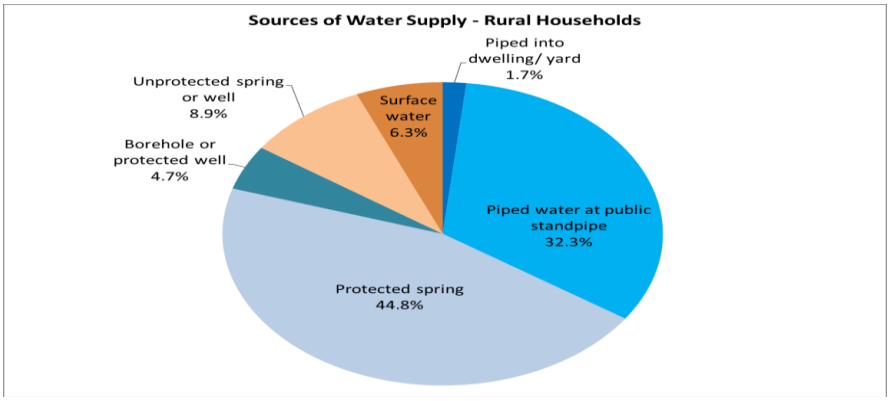

Figure 3: Source of water supply – Rural Households

Source: National Water Supply Implementation Strategy, 2016

- As indicated majority of rural households use protected springs (44.8%), piped water at public standpipe 33.3% , unprotected spring or well 8.9%, surface water (6.3%), borehole or protected well (4.7%) as well as piped into dwelling/yard 1.7%

- Today, Rwanda's rural population is served by more than 1,000[8] piped water systems and approximately 20,000 improved point water sources (protected springs or boreholes and wells equipped with hand pumps), according to the National Inventory of Water and Sanitation Infrastructure.[9] Of these, 27 systems have a length of more than 40 kilometres.

- Initially the introduction in 2004 of delegated management for rural water supply schemes made good progress. More recently, however, progress stalled at a level of about 50 per cent managed by private operators, and it became obvious that the current management model – with each scheme being managed individually – failed to attract professional operators. Most of the operators are small local companies, individuals, cooperatives, associations and religious communities. Typically, contracts stipulate that the operator is in charge of day-to-day operation and maintenance, including fee collection, while the district is in charge of system extensions and major repairs. The delimitation between both responsibilities and the conditions for tariff adjustments are usually not well defined. Payment is based on consumption (water metres, per jerrican sold) and the private operator's remuneration depends on the revenue collected. Districts keep a variable percentage of the fee ('redevance') which is often not kept apart from

8 Some 1,029 systems, according to information provided by RURA in 2015.

9 Monitoring/Evaluation and Management System of Water and Sanitation Sector and National Inventory of Water Supply and Sanitation Infrastructures. MININFRA/AAW Consulting Engineers, October 2009

other district funds. Contract duration is typically between two and five years.

- RURA set up conditions for tariffs adjustments as inflation rate capped at 6.4%, price of fuel capped at 960 Frw/L and Price of electricity capped at 126 Frw/Kwh while Royalty fees is fixed at 10% of water sales
- Licensing water service providers is already on track, majority of operators are licensed and so far 36 licenses were issued
- The most recent RDHS (2014/15), highlights that 91 per cent of the urban households and 69 per cent of rural households use an improved drinking-water source respectively, However, 31 per cent of rural households that had no access to an improved drinking-water source, 16 per cent collect their water from unprotected springs, 13 per cent collect it from surface water and 2 per cent retrieve it from an unprotected well. Regarding the time spent round-trip to obtain drinking water, 55 per cent of households in rural areas take 30 minutes or longer to obtain drinking water.

Urban water supply

Urban water supply services in Rwanda are exclusively provided by WASAC, a public utility operating on a commercial basis. WASAC will therefore be the key implementer of the policy and strategic plan, under the oversight of MININFRA and regulation by RURA. The achievements are registered under the following key performance indicators

Table 2: Trend of key performance indicators during EDPRS II (2013-2018)

Key performance indicators	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Total urban water production capacity (000'm^3 per day)	118.917	123.380	128.326	182.120	237.120
Non-Revenue Water	41%	38.8%	35.5%	38.3%	35%
Revenue from water activities	N/A	N/A	RWF 13.3 billion	RWF 18.2 billion	RWF 21 billion
No. of individual connections	138,506	157,665	175,320	192513	211,000
No. of standpipes	2,776	3,196	4,136	4,571	4,621
Water-quality compliance			95%	96%	100%
Continuity of supply – %	75%	81%	85%	88%	96%
Energy efficiency – %	52.3%	55%	57%	60%	63%

Source: WASAC, 2017

- The trends in annual total urban water production capacity still fall short of the demand for increasing urban population and the growing pace of urbanization. However, there was shift raise in FY 16-17 of 182.320m3/day from 128.326m3/day in FY 15-16. There

was slight decrease in Non-Revenue water from 35.5% in FY 15-16 to 38.3% in FY 16-17. The reasoning behind is that WASAC like other water utilities across the world and mainly in Africa still facing a big challenge of having high Non-Revenue Water. The main causes of water losses are technical (due to leaks and burst of water pipes, old water network and high pressure in the water network) and commercial losses due to (meters inaccuracy, water theft by customers, error in data processing in billing). A large part of WASAC water networks is old and undersized and still not yet rehabilitated due to budget constraint. Several towns across Rwanda are growing and expanding at an unprecedented pace. This rapid urbanization requires infrastructures including roads, water, electricity etc, there have been observed huge roads construction works and broad band expansion across the country which affected the existing water networks and created a lot of leaks and burst of WASAC water network. WASAC water network are not yet automated which delays the detection of leaks and bursts. More to note, there is corresponding trend in No. of individual connections with revenue increases from water revenues as shown in the table above.

- Regarding sanitation, open defecation has practically been eradicated and most of Rwandan households have already financed and built their on-site private sanitation premises, albeit only about two thirds comply with the international standard definitions of an improved sanitation facility. Very few Rwandan households have installed flush toilettes. The prevailing practice remains that water is used for cooking and washing (grey water, discharged mostly on surface) while excreta are disposed with waterless latrines, which is a rational solution considering the scarcity of the average water supply and financial constraints.
- Major hotels, hospitals, office buildings and some industries have installed their own (pre-) treatment systems. Actually, conventional sewerage and treatment systems for Kigali, Gasabo and Kicukiro are in the planning process.
- Waste-sorting, composting and recycling activities have been developed over the past few years. In addition, so far eight (8) modern landfills were constructed, -Eastern province: Kayonza, Ngoma and Nyagatare Districts; -Southern Province: Kamonyi, Ruhango, Nyanza, Huye and Nyamagabe Districts as well as And studies were conducted in Rubavu, Muhanga and Bugesera Districts.
- Community Health Clubs have been established in all of the 30 districts in Rwanda. In addition 98 per cent of all 14,767 villages in Rwanda have registered Community health Clubs (CHCs). Of this number 5,376 villages have trained Village Health Workers (ASOC) who are running health sessions regularly. The remaining districts are set to be trained by 2018. Although sanitation hasn't been the main focus over the past few years, the CHCs provide an excellent platform to promote sanitation improvements.
- Rwanda's schools benefited from the Community Health Clubs (replacing the Hygiène et Assainissement en Milieu Scolaire (HAMS) /(Hygiene and Sanitation in schools) programme that started in 2000) which focuses on behaviour changes in hygiene practice, including considerations for menstrual hygiene.
- Rwanda will not only have to improve, replace or build annually estimated 500,000 facilities at household levels, but also increase hygiene awareness and practices and provide safe (collective) *sanitation services* for several million households throughout the country.

Table 1: Number of latrines/toilets to be built in 2016, 2017 and 2018

Year	Population	Households	New latrines/toilets to be built			
			Deficit	Substitution old	for new households	**Total**
	2,36%	4.3%	**25%**	6.7%		
2016	13,000,000	3,023,256	251,938	151,163	69,767	**472,868**
2017	13,307,087	3,094,671	251,938	154,734	71,415	**478,087**
2018	13,621,427	3,167,774	251,938	158,389	73,102	**483,429**

The indicative calculation for latrine/toilet construction is based on the following assumptions:

Annual growth of population of 2.36 per cent and average number of 4.3 members per household;[10]

(i) An estimated deficit of improved sanitation facilities of about 25 per cent equivalent to approximately 750,000 improved latrines, or 250,000 per year;

(ii) An average lifetime of 15 years for individual pit latrines requiring the annual substitution or reconstruction of about 7 per cent of the existing improved facilities; and

(iii) A new pit latrine/toilet for every new household.

2.5 Main Challenges facing the sector

Despite positive gains, critical challenges remain that continue to prevent Rwanda's Poorest people from gaining sustainable access to even basic water supply and sanitation services and these include; i) the access gap and the related funding gap for increasing the levels of service, particularly in unplanned and scattered settlements in difficult, hilly terrain; ii) depleting water resources, resulting in high costs of service provision; iii) gaps in human resource capacity in areas of planning, project management and operation and maintenance; iv) consolidation and strengthening of institutional responsibilities in the sector; and v) low level of sustainability of WASH services, particularly in rural areas; vi) poor quality toilets, especially in rural areas, in terms of hygiene and structural conditions ; vii) insufficient water and wastewater treatment as well as solid waste management; viii) technical and financial capacity issues from government, private sector, civil society and communities to advance water and sanitation investment as well as operations and maintenance. Capacity issues are also noticed at district level both in terms of human capacity ix) insufficient sector performance and accountability X) weak monitoring system.

Additionally, for sanitation; feasible, affordable and socially acceptable sanitation technologies are not available for all population segments (funding gap and unavailable options for country-wide household financing). Modern sanitation service provision, solid waste and storm water management require efficient institutional capacities and somewhat costly infrastructure.

10 Integrated Household Living Conditions Survey, 2013/14, National Institute of Statistics of Rwanda, 2015.

Investments with high economic but low financial return are usually not very attractive for the private sector and may need public finance and/or subsidies.
Key challenges also include the magnitude of the sanitary improvement agenda over the next few years and the capacity constraints for scaling up the supply side; the combination of sensitization with targeted support for infrastructure development; the enforcement of existing and new regulation (e.g., sludge emptying services, household solid waste separation, storm water standards); limited awareness on hygiene practice; funding requirements (households, private and public sectors); the reformulation of institutional responsibilities and coordination mechanisms; and the lack of a monitoring and reporting system for the sanitation and solid waste sub-sectors.

Climate change is now recognized as one of the defining challenges for the twenty-first century. More frequent and intense extreme weather events have resulted in a higher incidence of flooding, pollution and droughts around the planet. The ensuing adverse impacts on sanitation, for instance on storm water management, industrial waste, e-waste; health-care waste and nuclear/radioactive waste can constitute an increased danger for human health and the environment. In a context of relative uncertainty associated with climate change projections, policy responses shall have to be formulated based on current knowledge to address these consequences.
Climate change considerations may impact the Policy and the Strategy and will strengthen criteria such as sustainability (also related to the SDGs) and resilience.

Additionally, there is insufficient investment in collective sanitation systems for densely populated urban areas, except 3 small sewerage systems in Kigali for about 700 household's and there is still need to focus on behavior changes (HAMS) in hygiene practice including considerations of the hygiene needs of girls and women for menstrual hygiene especially in Rwandan schools.

Storm water management is still faced with various challenges including runoff impact of unmanaged storm water on people and environment which is another critical challenge facing the sector. Poorly maintained infrastructure causes erosion of usable land, increases flooding, and endangers private and public infrastructure including human life. Combined with poor liquid and solid waste collection in urban settlements, runoff also carries pollutants such as hydrocarbons, heavy metals, bacteria, sediment, pesticides and fertilizers into streams or groundwater threatening environmental health. The ongoing fast urban growth in Kigali and other centres increase storm water volumes, erosion risks and the danger of inundations all over the country
Problems arise at all stages of waste collection, storage and disposal. Kigali's waste contains still 70% of organic, biodegradable waste and in rural areas this portion of waste may reach more than 95%. However, waste sorting, composting and recycling activities are at the very beginning and until now, Rwanda did not invest in environmentally safe landfills. The only operating dumpsite in Kigali receives about 400 tons per day of solid, not sorted waste or 140'000 tons per year. Deep seated fires, methane explosions, landslides and leakages threatening rivers and groundwater are some of the common problems of such basic dumpsites.

The challenges are enormous, particular attention should focus on the following;

- Limited access and coverage for the rural population. Only 47.3% (EVIC4) of the population are served within 500meters and slightly less than half of households 49% spent 30minutes or longer for a round-trip to water source[11]
- Due to increase pace of urbanization in Kigali and secondary cities, WASAC is faced with insufficient water production to meet increasing demand. Nevertheless, there is need to ensure demand is well managed through water conservation efforts.
- While funding levels have increased in recent years (US$ xx/year, the current investment levels are inadequate for investing in water supply infrastructure, rehabilitation and making extensions as well sanitation facilities in order to achieve the SDGs targets. .The financing requirements to achieve SDGs targets is projected at aleast US$ 134million is needed each year.
- Lack of master plans is also a key challenge. This limits access to information on exact number of people to be served and the related investment needs. This is a priority to further strengthen strategic planning and decision making.
- Insufficient reliable baseline data as well as lack of comprehensive management information system (MIS) poses a serious challenge for the sector. This undermines harmonized reporting on WATSAN statistics. This clumsy challenge results into inappropriateness in planning and decision making which is not supported by reliable data. The lack of MIS further complicates the timely availability of reliable data.
- Similarly, to water supply , the sanitation sub-sector is faced with insufficient investment especially in establishment collective sanitation systems for the densely urban cities, limited knowledge on behavioral changes towards sanitation and hygiene,
- Storm water management is still faced with various challenges including runoff impact of unmanaged storm water on people and environment is another critical challenge facing the sector
- Combined with poor liquid and solid waste collection in urban settlements, runoff also carries pollutants such as hydrocarbons, heavy metals, bacteria, sediment, pesticides and fertilizers into streams or groundwater threatening environmental health
- Lack of treatment facilities and laboratories to perform water quality analysis
- Capacity issues are also noticed at national and local government levels in terms of institutional and capacity development as well as insufficient sector performance and accountability in addition to weak monitoring system

11 Rwanda DHS, 2014/15

2.6 Shifting to the SDG Vision

The progress achieved towards the EDPRS2 is remarkable and a huge advance for Rwanda. Going forward, as Rwanda is committed to achieving the SDGs, the level of ambition will be raised, requiring a revision of the target.

While the progress towards the MDG target of 'improved' water and sanitation services is nearly achieved, SDG 6 significantly raises the level of ambition and level of service required for achievement of the SDGs. Rwanda's baseline for SDG 6.1 (water) and SDG 6.2 (sanitation), put "basic" water supply service (44%) country-wide while access to the highest level of service – "safely managed" water supply services - is at 13%. The access to "basic" sanitation services country wide is 62% while 57% for rural and 64% for urban. The difference for sanitation is due to large number of urban households (27%) that still share toilets as well as 9% of households in rural areas sharing toilets.

CHAPTER 3: THE STRATEGIC FRAMEWORK

The chapter tackles the Vision and mission statements for water supply and sanitation sub-sectors, sector objectives to be pursued, sector outcomes as well as strategic actions contributing to the realization of National Strategy for Transformation

3.1 Vision, Mission for Water Supply and Sanitation Sector

Vision of Water Supply

The vision of the water supply is to;

Ensure sustainable, equitable, reliable and affordable access to safe drinking water for all Rwandans as a contribution to improving public health and socio-economic development

Vision of sanitation sub-sector

Ensure sustainable, equitable and affordable access to safe sanitation and waste management services for all Rwandans, as a contribution to poverty reduction, public health, economic development and environmental protection

Mission of water supply and sanitation sector

The mission of the water supply and sanitation sector and its key stakeholders (national, local, public and private) is to:

Promote plan, build and operate water and sanitation services in a sustainable, efficient and equitable manner, core instruments, capacities and administrative processes will be established/revised to ensure effective sector programme management AND water and sanitation sector programming steering

3.2 WATSAN Envisaged Strategic Objectives

In order to achieve the Vision and Mission of WATSAN sector, 10 strategic objectives are identified in the strategy to provide the main orientation and as well implementation plan. These objectives are in line with the progressive realization of the SDGs.

For water supply, “basic” means access to an improved source within 30 minutes of the household while the higher level of ‘safely managed’ services addresses the elements of quality, availability and on premises.

Drinking water	Strategic Objectives for Water services
Safe, basic drinking services	1. Achieve and sustain safe and “basic” water supply coverage to 100% of households
Safely managed drinking water services	2. Achieve and sustain safely managed drinking water services for XX of rural and XX of urban households by 2024.
Institutional settings	3. Achieve and sustain “basic” water service for 100% schools, 100% health facilities and public places
Sanitation and hygiene	Strategic Objectives for Sanitation services
Basic household sanitation	4. Achieve and sustain “basic” household sanitation coverage to 100 per cent by 2020 primarily by promoting hygiene behaviour change. 5. Achieve and sustain 100% of household have a basic hand washing facility with soap and water available at home
Institutional settings	6. Achieve and sustain 100% of basic sanitation for schools, health facilities and other public institutions and locations.
Safely managed sanitation	7. Achieve and sustain 100% of urban and 100% of rural households have access to safely managed sanitation services
Storm water management	8. Achieve 80% of rainwater is harvested in urban areas
Solid waste management	9. Ensure 100% of storm water is considered in the master plans of the urban areas
E-waste, industrial waste, nuclear waste and health-care waste	10. Achieve 80 % of domestic solid waste is recycled, reused or disposed properly in the urban and peri-urban areas
	11. Achieve 40 % of solid waste collected and recycled
	12. Achieve at least 50 % of the generated e-waste is recycled and turned into usable materials
	13. Achieve 30 % of industries will have networks connected to the special centralized sewerage system designed to treat such waste.
	14. Achieve 60% of all hospitals have their own waste water treatment plants
	15. Achieve availability of 5 incinerators in each province mandated to burn the unconformable health care waste (medical, used materials from theater, etc)
WATSAN institutional sector framework	16. Achieve a comprehensive, robust framework for water supply and sanitation resulting in clear institutional roles and coordination mechanisms,

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	adequate capacity at national and sub-national levels to plan, manage and maintain services, and adequate financing, resulting in the achievement of the sub-sector targets.

3.3 Strategic Outcomes for the next five Years

The following section details in narrative form the proposed strategic outcomes and actions required to implement the WATSAN strategic objectives. These strategic outcomes are elaborated below;

3.3.1 Strategic outcome: Improved water supply for All Rwandans

The following strategic interventions will be implemented during the course of the strategy

3.3.1.1 Increased access to safe, sustainable and affordable basic water supply in rural areas

Achieving 100% coverage of safe and basic water supply services % in rural areas by 2024 requires increasing access to an improved, safe water supply to households and communities, within 30 minutes of the home and or 500meters. This requires at least 7 percentage points increase every year around 700,000 people to be served every year[12]. The following strategic actions will be pursued which includes;

The WSS sector will aim to be involved in site development for new Imidugudu from the beginning and will actively participate in joint planning mechanisms with the urbanization and rural settlement sector.

The development of master plan for all provinces is critical during this strategy as it will reveal related investment needs for further strategic planning. More so, the management information system needs to be strengthened to allow clear monitoring of increasing rural water supply coverage.

The strategic action for increasing water supply coverage will be aimed at mobilisation of investment for water supply infrastructure, rehabilitation and extension of water supply systems. It is envisaged to carry out construction, extension, rehabilitation of 1,851 Km in rural areas over the period of the strategy

Delivery of safe water means that water will be free from e.coli contamination at the source,

[12] Rwanda ,National water supply strategy, 2016

requiring a mix of water treatment solutions along with water safety planning at community level.

The increasing access to safe water in rural areas will require a clear monitoring of rural water supply coverage which will be reached upon by strengthened management information system

3.3.1.2 Increased funding for rural water supply

The provision of safe water supply in rural areas requires government and development partner's commitment in investment. The nature of investment is very costly in terms of rehabilitation, extension services and new construction. The total cost needed is Rwf 133 billion (US$177 million) this was calculated based on assumption considering high per capita investment rate of RwF 60,000 (US& 60) on grounds that more people will be supplied by piped water.

Given that the habitat structure is changing, it is safe to assume that few people (or Imidugudu) can be served by point water sources (protected springs or hand pumps). Possible user contributions were not considered, as they do not represent a substantial saving on capital investment.[13]. The investment will spur the rehabilitation of existing water sources both piped water schemes and point water sources. The works will include construction, extension, rehabilitation of 1,937 Km in city of Kigali and urban areas

3.3.1.3 Improved capacities at decentralised level for rural water management

WASAC is the main player in providing universal water supply by handling large rural projects. The WATSAN Division is responsible for oversight regarding the implementation of these project as well as districts ensuring that these projects realise the intended project objectives. WASAC has the responsibility to ensure districts have the capacity in implementing these projects. It will be vital to continue strengthening decentralised capacities in areas of implementation, technical support as well as monitoring framework. That said, All districts will be staffed with at least one skilled water and sanitation engineer. There will be need to provide technical support arrangements as well as for quality assurance (design review) and monitoring capacities. This support will be provided by the WASAC Rural Water Services Directorate at the centre.

Building on the private operator model, improved service delivery models will be developed with the private sector at sub-national levels. This will be done in coordination and collaboration with WASAC, RURA and MINILOC to increase capacity to plan, manage and oversee construction as well as operation and maintenance

[13] Rwanda National water supply Strategy,2016

3.3.1.4 Enhanced, Standardization and innovative technological options

The choice of appropriate technologies and service standards, sound planning and high-quality execution are important prerequisites for cost efficiency, sustainability and financial viability. The sector will address this by providing guidance and design standards for a range of technology options, and by exploring innovative options.

Affordability is a main concern in rural water supply. In general, technical solutions and service levels shall be selected by involving the beneficiaries, explaining the financial implications. Low-cost technologies shall be preferred wherever possible.

The Water and Sanitation (WATSAN) sector will set and disseminate technical guidelines, defining requirements for different service levels, different types of habitat and different types of technologies and water sources.

Gravity systems will be preferred wherever feasible, even if the initial investment cost is higher than for a pumped system. Spring protection is the most cost-effective solution, in terms of per capita investment. Districts will therefore be encouraged to protect all springs that are used for human consumption. Spring protection for piped water schemes will be optimized to make full use of the available discharge and to avoid decreasing yields.

Rainwater harvesting, which is a viable option given that rainfall is relatively abundant in most regions of Rwanda, will mainly be promoted as a complementary source of water. Rainwater harvesting techniques and options (individual vs. collective) shall be studied and appropriate design guidelines shall be produced for each climatic region of Rwanda.

Extending the power grid and solar pumping will be promoted as alternatives to diesel pumping, which tends to be unsustainable due to excessive fuel and maintenance costs. To be sustainable, the promotion of solar pumping will have to be done in a systematic way, considering the needs for spare part supply, support capacities, etc.

3.3.1.5 Promoted household connections

Less than 2 per cent of Rwanda's rural population have access to water within their premises (household connection), according to the EICV 4 of 2013/14. Actual water consumption is therefore typically of the order of 6 to 8 litres per capita per day.[14] This is inadequate compared with the international standard of minimum of 20 litres per capita per day for basic access, let

[14] This estimate is made based on consultations with private operators and their practical experience and analysis of water sales. This estimated range is also in line with international literature.

alone going beyond the minimum.[15] This low consumption poses a threat to people's health as well as to the sustainability of water services as water sales are very low (sales at public tap stands: 3 to 5 litres per capita per day) – risking the financial viability of rural water supply schemes. The sector will therefore consider ways to increase the number of household connections (such as subsidized connection fees, promotion of private connections at the planning stage) and will consider the promotion of yard taps (several families sharing a connection close to the homes).

3.3.1.6 Mobilized private-sector investments in rural water infrastructure

Currently rural water supply is primarily funded through the public and donor funds with a small amount financed through user fees. The potential for private investment in new rural water supply schemes, where high upfront investments are required while the revenue and customer base is small, is limited.

The situation is more promising when it comes to extensions or rehabilitations of existing schemes and service level upgrades. The type and duration of delegated management contracts shall be reviewed to mobilize this type of investments by private scheme operators.

Given the economic reality in rural areas, it must be expected that subsidies of 80–90 per cent of the investment will be required while only a small fraction can be recovered from the future users. However, a variety of financing mechanisms, including public-private partnerships (PPP) and Water and Sanitation Fund will be reviewed to maximize the leveraging of public funds to attract other types of finance. One promising PPP modality is output-based aid. The output-based aid scheme is a form of PPP that requires the private sector to design, implement and co-finance investments, and operate the built infrastructure during a certain number of years. Instead of contracting a private operator after commissioning of the scheme, a package consisting of design, construction and operation will be procured. Under this arrangement, the successful bidder is the one requesting the lowest public subsidies. Subsidies are paid based on the delivery of the agreed output (hence the name).

It is critical to ensure that the necessary regulatory framework is in place before piloting build-and-operate contracts. Private infrastructure will have to comply with the same standards, policy requirements, and tariff and consumer protection regulations as public investments.

As the existing commercial bank system does not offer appropriate conditions (long-term, low-interest loans), the available loan financing options will be explored, in cooperation with the Rwanda Development Board (RDB).

In the future, once the sector develops beyond basic service delivery, more and more demand can

[15] Reference: <www.who.int/water_sanitation_health/diseases/WSH03.02.pdf>.

be expected for this type of financing.

Other types of non-government investments to be encouraged and co-financed are:

1. Investments by religious communities, which are often ready to co-finance public systems that supply their infrastructure;
2. Community self-help initiatives (e.g., to install rainwater harvesting facilities, self-supply), to be financed through micro-finance schemes.

3.3.1.7 Improved functionality and sustainability of Rural WS infrastructure

In the past, insufficient O&M arrangements led to a short lifespan of the infrastructure and to cyclic rehabilitation efforts. Still today, a major part of the existing rural water schemes needs rehabilitation and a high percentage is currently non-functional. Therefore, it planned to rehabilitate 430 Non-functional rural water supply systems

The main prerequisites for sustainable service delivery are:

1. clear institutional responsibilities;
2. quality of design and construction;
3. adequate management capacities and technical maintenance skills;
4. financial viability and affordability of the chosen service level;
5. tariffs allowing for cost recovery;
6. effective fee collection based on consumption;
7. accumulation of funds for major repairs and the replacement of equipment; and
8. Availability of funding for the replacement of key assets after the end of design life.

The sector's strategy to achieve this is delegated management through PPPs, including the development of an effective regulation system. Other management models are not excluded but are subject to the same regulation and operational efficiency criteria.

3.3.1.8 Clustered service areas and setting up an enhanced O&M framework

Many of the weaknesses related to a large number of operators each managing a small service area with a very limited customer base and revenue. Even if the districts, RURA and WASAC could provide the resources to monitor, regulate and support each of these schemes, the existing model will not allow for economies of scale. It will not attract professional service providers or private investments.

It is therefore intended to reduce the number of operators per district to between one and three

Districts will be trained as asset holders and contract managers.

Contracts will be reviewed and enhanced to include agreed performance targets. Longer-term contracts for well-performing operators will be piloted as soon as the new framework is consolidated.

WASAC/Rural Water Supply and Sanitation Services and RURA will support the development of the new framework by developing standard contracts, advising on procurement and contract management issues, setting up a licensing system, and helping to clarify the mutual responsibilities between local authorities, private operators and consumers.

To facilitate information flow between the stakeholders, there are plans to set up a Web-based O&M monitoring system to keep track of O&M performance, contracts and asset management status, to be used for follow-up and benchmarking. This monitoring system will be jointly developed and used by WASAC/Rural Water Supply and Sanitation Services, RURA and the districts. Appropriate management arrangements to ensure system reliability and stability as well as high data quality (data validation) need to be agreed between these stakeholders.

3.3.1.9 Increased tariffs and cost recovery

Rural water supply tariffs have to be balanced to reconcile the interests of (1) cost recovery, (2) affordability for the rural poor, and (3) attractiveness for private operators.

Updated tariff guidelines will address the following issues:

a) Level of cost recovery, financial model to be used;
b) Cost components and minimum accounting standards;
c) Grouping of schemes with different cost structures;
d) Subsidies and cross-subsidies;
e) Mechanisms for tariff adjustments; and
f) Amount, earmarking, accumulation and use of the reserve (‘redevance’) to be set aside by the districts for major repairs, refurbishments and extensions.

Three levels of cost recovery shall be distinguished:

Levels of Cost Recovery
Level 1: Running costs for operating the water system (staff, energy, consumables)
Level 2: Running costs + all repairs (including replacement of electro-mechanical equipment)
Level 3: Running costs + all repairs + depreciation of assets

Rural water supply shall aim cost recovery at Level 2. Level 1 would not ensure the sustainability of operations, while Level 3 would not be affordable in terms of tariffs.

Under the current delegated management contracts, usually the private operator is in charge of running costs (Level 1) while the district is supposed to pay for major repairs (Level 2) and

system extensions. There is need (i) to clearly define the mutual obligations and the thresholds, and (2) to regulate the fee paid to the districts and its use (to be earmarked and kept on separate accounts).

Progress towards cost recovery will be measured as collected revenue as percentage of Level 1 running costs.

Experience shows that even cost recovery at Level 2 may be difficult to achieve for systems involving diesel pumping. These types of systems will be discouraged by promoting instead electrical or solar pumping. In certain cases, subsidies or cross-subsidies may be needed to keep local tariffs affordable.

3.3.1.10 Improved functionality through capacity building programmes

All main actors of the PPP model – WASH Board members, district and WASAC staff as well as private operators – will benefit from a comprehensive capacity-building programme. Private operators, in this context, are any operators working under delegated management contracts, not necessarily private companies.

The programme will include the following modules but emphasis will be placed on offering on the job training courses

Table 4: Capacity-building programme for improved functionality

For districts	For private operators
1 Organization of delegated management in rural water supply (structures, procedures and responsibilities)	A Technical management of rural water supply systems (O&M)
2 Procurement of delegated management contracts	B Administrative and financial management of rural water supply systems
3 Monitoring and supervision of private operators (contractual obligations, reporting, performance monitoring, auditing, etc.)	C Commercial management and customer relations

Additionally, working to strengthen mechanisms for users to hold the private operators to account will be important to improve service provision. As such, efforts will be made to engage and train the community to support the District's monitoring effort and ensure a mechanism for user feedback

3.3.1.11 Improved water quality surveillance

At present, the water quality of rural sources of drinking supply is usually verified at the time of planning or commissioning but not monitored later on. The dominant problem is local contamination (damaged spring protection, lacking protection of the catchment area, lack of drainage, reservoirs, broken pipes, etc.), while the general quality of ground water resources is good. To detect local contaminations, it is mandatory to set up a water quality monitoring system. In order to operationalize a water and sanitation Laboratory shall be constructed

Water quality monitoring will follow a three-tier approach:

- Self-monitoring by the private operators. It will be mandatory for private operators that apply for managing the new clustered service areas to provide the necessary equipment (testing kits) and skills for self-monitoring;
- Oversight by WASAC, which can combine this activity with its urban water-quality monitoring activities; and
- External spot checks commissioned by RURA using independent laboratories.

Water-quality standards and the sampling system (frequency, number of parameters to be measured) should be realistic, that is, affordable. Field inspections should combine water sampling (at different points of the water systems) and physical inspections of the local conditions (catchment area, distance of latrines, fencing, drainage, etc.).

WASAC, in cooperation with the Ministry of Health and RURA, will develop a concept, guidelines and field capacities for regular water quality surveillance. This will also include the preparation of Water Safety Plans. Guidelines for water quality monitoring are being done by RURA and soon will be shared with all stakeholders for consultation.

3.3.2 Strategic outcome: Sustained, safe and affordable "basic" water supply services in urban areas for all

This strategic outcome on sustained, safe, accessible, reliable and affordable urban water supply will be attained through realizing the following outputs as well as required strategic actions;

3.3.2.1 Increased Urban Water Supply coverage

Urban water supply services in Rwanda are exclusively provided by WASAC, a public utility operating on a commercial basis. WASAC will therefore be the key implementer of the policy and strategic plan, under the oversight of MININFRA and regulation by RURA.

A mapping exercise will be conducted to establish a reliable new baseline on urban supply coverage as well as mapping of unserved areas including informal settlements to inform planning for existing coverage gap.

3.3.2.2 Efficiency in cost recovery vs affordability of urban water supply services

Urban water tariffs will be calculated to achieve cost recovery, initially at Level 2 (*ref page 24*). Subsidies, if any, shall be targeted towards ensuring affordable basic service for the urban poor. Social block tariffs will be maintained with a cross-subsidized tariff for the basic consumption blocks (0 to 5 and 5 to 20 m^3).

Particular efforts will be made to extend water supply services to low-income households. Where extensions to poor peri-urban areas are demonstrably not financially viable, public subsidies will be considered.

The policy and practice for the management of public tap stands (water kiosks) shall be reviewed and optimized.

3.3.3.3 Optimised operational efficiency and loss reduction

WASAC will continue implementing its loss reduction programme to reduce the overall 35 per cent non-revenue water: The strategic actions are installation of District Metered Area (DMA), rehabilitation and network upgrade in the city of Kigali and use of robust technologies for leak detection

3.3.3.4 Increased water production and distribution capacities

The current water production is insufficient to meet the demand of water use in Kigali city, the production of about 90,000 m^3/day covers almost three quarters of the demand of 120,000 m^3/day. However, major strategic actions will be pursued such as;

The sector will mobilise Investors to invest in water supply projects that will increase water production countrywide, including a bigger water supply project that plans to take water from Mutobo in Musanze District to Kigali, with a planned capacity of 120,000 m^3/day. Thus, it is planned to increase daily water production capacity from 182,120 to 303,120 m3 per day

Coordination between urban planning and water supply services is a key issue. To implement the necessary extensions of production and distribution capacities, it is essential to prepare water supply master plans for each of the towns, and most importantly for Kigali City. These plans will outline the staged development of sources of supply, and will include a monitoring programme to survey these sources prior to its development. Alternative sources and technologies will be ranked to minimize the costs of energy and imported chemicals.

The upgrading and renewal of existing distribution networks is a priority for Kigali City and other secondary cities. This action should be strengthened by a better management system/reducing non-revenue water targeting specifically the leaks control over the entire networks which is currently very weak.

3.3.3: Strategic outcome: Sustained safe and reliable water supply services for schools, health facilities and public places

The sector will actively provide adequate water supply services to health facilities, schools and other public places, in cooperation with the ministries and other stakeholders concerned. The following outputs shall be realised

3.3.3.1 Extended water supply services in schools, health facilities and Public places

MININFRA will continue to partner with the ministries in charge of education and health as well as other sectors to undertake an assessment of water supply and demand through: (1) observing current water use; (2) examining the condition of existing facilities; and (3) identifying appropriate water supply technologies.

Well-built public water supply infrastructure and facilities and those that meet norms and standards and are convenient for disabled people in places of high frequencies, such as markets, car parks and local administrative offices shall allow promotion of public health and lower the risks for diseases. Special emphasis shall be given to the proper management of water supply facilities/infrastructure in public places, most especially by the beneficiaries and/or private sector.

The stocktaking of water supply in schools, health facilities and public places, as well as water availability and usage, will be essential to making informed policy decisions with respect to provision of water supply services.

Water supply service providers shall ensure sustainability of water supply services for schools and health facilities taking into consideration their social nature.

3.3.3.2 Developed water supply services in schools, health facilities and Public places

Multi-year action plans for water supply in schools, health facilities and public places shall be developed by the concerned ministries and other stakeholders. Where such action plans are already available, there shall be updated with reference to the needs assessment results. Annual water supply needs shall be prepared and submitted to the ministry in charge of economic planning and the ministry in charge of water supply to enable informed and targeted planning. Water supply projects shall be designed in a way that schools, health facilities and other public places in the project intervention area are served.

3.3.4 Strategic outcome: sustained and improved "basic" household sanitation for all

This shift of responsibilities requires strengthening the operative capacity of the districts. In the future, districts must assume distinct responsibilities for (a) the coordination of the *household sanitation supporting programmes*; (b) the *provision of services* directly or by delegation to the private sector; and (c) eventually the implementation and management of *urban sewerage systems* in highly densified areas.

While the latter can be hosted within an infrastructure department, household sanitation requires the establishment of a new special supporting unit that coordinates its efforts with MOH (Community-Based Environmental Health Promotion Programme, CBEHPP) and takes into account both sanitation hardware and software. The new district sanitation programmes shall prioritize urbanized areas and grouped settlements (Imidugudu).[16]

3.3.4.1 Enhanced On-site sanitation programmes through enabled environment

For household sanitation, the service consists of a balanced distribution of tasks and responsibilities between households and community. To achieve a goal of sustainable access it is necessary to develop the two sides of the service, demand and supply:

a) The first priority is to generate **demand** for household sanitation services. Three mechanisms for the demand generation are:
   i. *Awareness rising*, through campaigns or education (schools). Environmental health promotion must enhance awareness of the Rwandan population about the invisible risks related to excreta and waste and generate or enhance demand for a higher level of hygiene practice and sanitation improvements.

      The Ministry of Health (MoH) CBEHPP, with its community health club methodology, shall become the strategic vehicle for systematic nationwide promotion of environmental health outcomes. The programme will address improved personal and domestic hygiene and sanitation: safe excreta disposal, hand washing with soap, safe water handling, food hygiene, menstrual hygiene management, indoor air pollution and vector control.

   ii. *Marketing* of technical options: to support demand-creation, the awareness must be raised of the affordable and safe sanitation technical options available to thousands of households and businesses for both upgrading and construction of new on-site facilities. Marketing requires both comprehensive information on available products and services across the full supply chain including advice, construction guidelines and services, materials and access to finance to boost implementation among the lower-income quintiles of the population. Sanitary improvements are mandatory, but successful sanitation practice has shown that the initiative of the clients is the strongest prerequisite for ownership and sustainability (demand-oriented and household-centred approach).

16 National Human Settlement Policy, MININFRA, 2015.

Marketing aims at informing households about the available solutions in their local market in order to meet the demand generated (*see above*). Marketing sanitation is done through actions of social and/or commercial marketing.

To be effective, marketing will be based on the existing services: it is no use promoting solutions that cannot be accessed (= built, used and maintained) by households.

Sanitation is still a wallflower, but must become visible and tangible: Given the magnitude of private sanitation improvements planned (400,000 latrines annually), each district will need a powerful marketing and communication tool, e.g., in the form of a *"District Sanitation Centre*". The concept can be implemented in each district, able to reach about 300,000 inhabitants each.

A "District Sanitation Centre" (including, ideally, a showroom of some feasible technical solutions) is not a recipe and has to be adapted to the context. It can integrate and focus on all key supporting activities for households and the private sector described below in a modular way. It can support the dissemination of technical know-how, visualize comfort and price options, provide services and material supplies, and support technology development and training opportunities.

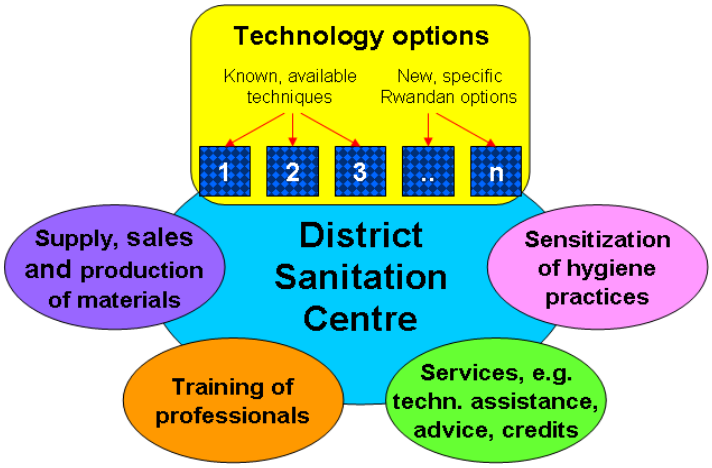

Figure 1: The manifold dimensions of a District Sanitation Centre (©Ecopsis)

The content of a showroom will vary in function of the local focus and priorities. First of all, it shall visualize different technical options of sanitation and hand-washing facilities to visiting households and professional builders. As any other shop, the centre shall inform visitors about techniques, construction methods, prices and conditions.

Technical solutions may include composting facilities such as alternating twin-pit VIP latrines, fossa alterna, ecological sanitation, arbour loo and pour-flush toilets (as well as rainwater harvesting). Collective latrines including biogas facilities are considered feasible solutions in densified settlements. An adequate set may include both waterless

latrines and flush toilets, covering preferences of all rural and urban inhabitants. If conceived and built like an exhibition sanitation park in some locations, Rwandan technicians can improve existing and develop new technical low-cost solutions, and show them to the public.

A "District Sanitation Centre" can serve for the training of awareness trainers or to link environmental health awareness campaigns with discovering feasible physical sanitation solutions, thus optimizing the sensitization impact. It may be conceived as a centre hosting other related services such as exposition, production and sales of materials, transportation logistics, credit and subsidy approval agency, or as a training facility for professionals. Some district may even integrate the offices of their new sanitation services in the sanitation centre.

A "District Sanitation Centre" can be operated by the district, by a private entrepreneur or under a public-private partnership (PPP) scheme – e.g., with a distributor of construction materials, or be located within a vocational school.

All districts should implement their own sanitation service for the supporting activities for on-site sanitation within their territories.

iii. *Enforcement of the regulation*. Promoting awareness messages about the importance of hygiene and have a latrine certainly have an impact and are necessary for behaviour change. However, regulation can complement these efforts to ensure that behaviour change is installed in a sustainable way.[17]

Individual sanitation includes a dimension of "common good". Users must comply with obligations to the community, to protect their neighbours, the community, and the natural resources in order to comply with the SDGs.

Therefore, each user carries a responsibility to keep his or her facilities running. Instead, the community can (and should) monitor the proper use of services. The monitoring also applies to service providers (sludge management, masons, etc.).

The enforcement of a local sanitation regulation is important for the sustainability of individual sanitation. In the absence of enforcement, the community will tend to abandon the new practices and the use of facilities. In contrast, the enforcement will maintain service coverage (including sustainable use and access) to an acceptable level.

As such, enforcement of regulation creates a real demand and will motivate households in investing and maintaining their facility in proper conditions.

It should be emphasized that regulation can be of different kinds, including:

- Formal, such as municipal or district regulation; and
- Informal, enforced by the community itself – for instance, through the sanitation committee, health centre or even by the school.

1. The second priority is to make sure that households are able to **access the products and services** they demand in order to ensure sustainable and hygiene construction and maintenance of toilets. These include:

17 Enforcement of sanitation regulation is a *must* in all human societies, whatever the level of education and awareness of the population.

i. *Labor and services*: Investments in construction have an important multiplier effect on income and employment. Putting in place the national sanitation strategy, Rwanda's construction sector can experience substantial growth. The private formal and informal planning and construction sector will be challenged to rapidly enhance its service and production capacity to meet demand for the new on-site sanitation improvements in general and collective systems in urban areas.

   Thus, the sector requires training of more qualified craftsmen, such as masons, and adequate sanitary technology know-how should be introduced as per 2016 in the curriculum of vocational schools.

ii. *Material*: Households need to access to materials and products to build and keep their facilities operational. Depending on the local environment and construction standards, these materials may be cement, bricks, tiles, doors, locks, etc. It has been proven that the availability and affordability of such materials is an important use for sustainable access. Such materials can be provided by different types of actors: community, associative, municipal, private sector.

Further, few products are widely available in Rwanda that are affordable to the poor. This market gap is an obstacle to ensuring household has a toilet that meets hygenic and structural standards. Efforts will be made to encourage innovative products and business models which can increase the market availability of the various components required for a sustainable, hygienic toilet.

iii. *Operation & Maintenance* (O&M): To comply with the SDGs, the local capacity for operating and maintaining the individual sanitation facilities should be increased. This includes construction capacities and material. It also includes the provision of faecal sludge management.

iv. *Financial services*: Traditional pit latrines certainly have an economic value, but often they have been built without cash outlay by the household using family labour and locally available material for the construction. On the other hand, improved sanitation facilities require cash for some industrially produced materials and sometimes for qualified craftsmen. Credit mechanisms, subsidized or not, allow spreading credit reimbursements over time in accordance with local monetary income conditions. Credit mechanism can target individual households or communities and associations, for instance, as a guarantee fund for microfinance organizations, or in order to reduce the cost of material provided by local shops. Subsidies can also be considered, however, in order to support and not to jeopardize market and business development, subsidies shall be *targeted*. Subsidies can then boost sanitation demand and should be considered for the following reasons: (a) Expenditures in sanitation generate an impressive economic return on investment and subsequent health benefits are a foundation for economic development and poverty reduction; and (b) Although willing to improve, rural and peri-urban lower income households sometimes do not have sufficient cash or savings to invest upfront.

   Only in very specific and well identified cases subsidies can be used in order to support households in difficult environmental conditions and for which the construction costs of latrines will be higher than the average cost (e.g., difficult geological conditions, flooding risks). Pro-poor subsidies shall be designed for limited periods, allowing for full impact

accountability, and effectiveness shall be evaluated annually.

As a rule of thumb, subsidies are most efficient if they create incentive for the realization of latent demand, the mobilization of household efforts, the promotion of a specific type of sanitation system, and the conformity of the works with improved sanitation standards.

Output-base aid schemes do strengthen demand but shall be targeted above all to the development of the professional construction sector at the district level for individual and collective sanitation works.

Progress of health improvements as a result of improved hygiene practice and sanitation are difficult to measure without comprehensive impact analysis and over short periods. The number of households with improved or hygienic latrines or toilets is an overall indicator of achievements, but interpretation shall consider the other indicators in this section.

The number of districts with active village Community Health Clubs, marketing campaigns rolled out and subsidy systems in place will provide clear indication of the strategy's overall progress. The same applies to the indicator on the development of the private sector: training courses accomplished should be directly correlated to the increase in national coverage. However, the relevance, efficiency and impact of these activities are to be evaluated at district level.

Annual workshops at provincial or national levels will gather and discuss manifold lessons learned from sanitation centres, public and private projects about adequate on-site sanitation technologies, service provision, dissemination and support practices. Cost reduction of technologies shall be a major concern in sanitation research and development, and improved, low-cost on-site latrines, such as VIP, ecological sanitation or pit latrines with a slab, must be made available for less than RWF 200,000 for a majority of households.

At a later stage, more data may be available and allow measuring the efficiency of state activity supporting individual on-site sanitation: public spending related to the growth of improved sanitation facilities and health indicators.

3.3.5 Strategic outcome: Improved and promoted basic sanitation for other public institutions and locations

3.3.5.1 Enhanced Institutional sanitation

The initiative aims at decreasing water- and sanitation-related diseases and its main objective is to speed up behaviour change in terms of sanitation and hygiene via the school population. The approach includes sensitization and mobilization of the Rwandan community to live hygiene culture, and sustainable improvements of water and sanitation infrastructures. Without its own budget, the programme operates under the umbrella of other water and sanitation projects.

For similar reasons, health facilities and other public institutions countrywide shall demonstrate best practices in hygiene and sanitation, including menstrual requirements for women. Public

places with poor water, sanitation and hygiene conditions, and intensive levels of person-to-person contact remain high risk environments for the population. Construction or rehabilitation programmes of public facilities shall therefore always include an environmental health promotion component.

Community health clubs shall be promoted as well as the construction of sanitary facilities in public buildings. Affordable and adequate technical options shall be developed and implementation supported by MINEDUC, MoH and the districts under their respective programmes.

The promotion of sanitation marts by the private sector shall facilitate the availability and access to sanitation materials and equipment.

Strong emphasis has to be given to the management of public sanitary facilities – e.g., at market places. All too often operation and maintenance are neglected, putting users of well-built facilities at high risk. If districts or sectors do not have the management capacity, such facilities can be leased out to Non-Governmental Organizations (NGOs) or the private sector for better operation under a PPP arrangement.

All institutions shall give clear priority to guaranteed safe water for drinking and hand-washing facilities, while excreta disposal can be either water-borne toilets or waterless latrines.[18]

Community health clubs shall continue to be operated under the umbrella of all school-related water supply and sanitation programmes. The corresponding hygiene and sanitation committees at sector and school levels are of particular importance for the implementation of this combined soft- and hardware strategy, additionally providing learning from failures and success stories.

The first indicator used – the number of public (and private) schools with improved sanitary facilities – shall reflect not only the physical achievements but, combined with the following indicator (HAMS), shall reflect the improvement of the overall environmental health conditions. The HAMS indicator of actively functioning committees shall demonstrate to what extent the objective of accelerating behaviour change has been reached by operating, monitoring and evaluating school committees.

Sanitary facilities at health centres shall be improved in accordance with the stipulations of the National Environmental Health Policy. The indicator on the number of health facilities with improved sanitary conditions shall demonstrate the physical evidence, while the soft component on hygiene promotion is assumed to be covered by MoH's own activities.

Of particular interest are the sanitary improvements in public places or buildings, such as administrations, stadiums and market places, which are partially under the responsibility of districts. Albeit this indicator does not refer to the total number of public places to be built, the quantity achieved is to be understood as a first step towards lowering public health risks.

18 Rwanda's Building Control Regulation, 2015, already stipulates that schools and workplaces without sewer systems and less than 75 litres per person per day, the disposal of foul water shall be by waterless latrines.

3.3.6 Strategic outcome: Developed safe, well regulated and affordable off-site sanitation services

3.3.6.1 Sustained Collective Sanitation

Household pit latrines are the most common household sanitation solution in Rwanda, with XX% of the population using improved pit latrines. Currently common practice is to simply cap latrines when they are full and build a new pit. However, as land becomes more scarce and space for a second pit becomes unfeasible, emptying full pits will need to become more common practice. Therefore a key strategy from 2018-2024 is to increase the availability of safe emptying of pits and the subsequent transporting, treatment and disposal of fecal waste. Thus, the Government has to complement private endeavours and promote and provide directly or indirectly sludge emptying services and sewerage systems, as shown below.

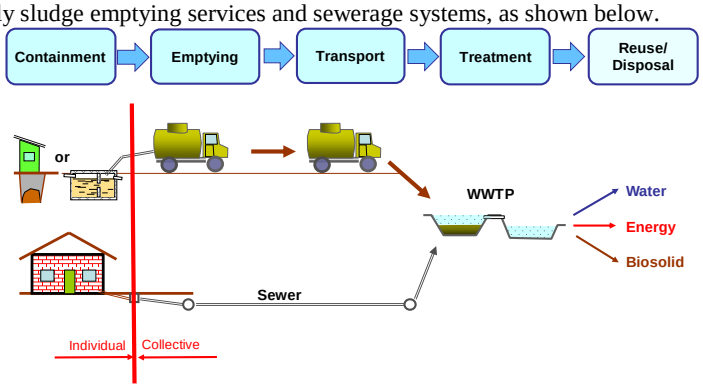

Figure 2: Complementary on- and off-site, individual and collective sanitation systems (©Ecopsis)

Today, only a few hotels, hospitals and small residential areas in Kigali have constructed sewers and wastewater treatment plants.[19] Domestic and industrial sludge is seldom disposed of in a safe manner and the country has little experience in planning, regulating, enforcing, financing and providing collective sanitation services. Specific institutional structures have to be in place at national and district levels in order to guide these activities and to create mechanisms to develop and strengthen the sector progressively and to successively learn from failures and successes.

Sanitation development is essentially multi-sectoral. Successful delivery of collective sanitation requires a clear understanding of the roles and responsibilities of the various actors, both in terms of their mandates and their inputs. Under the leadership of MININFRA/the Agency, the institutional structures concerned include other ministries, regulating, financing and implementing agencies, local government structures and utilities responsible for sanitation,

[19] This proofs that a sanitation demand and commitment exists. However, the Rwandan offer or supply side is still weak and most of these entities had to seek foreign engineering advice.

hygiene promotion and water supply, as well as NGOs and communities.

The private sector will have a crucial role in the construction, provision and eventually financing of collective sanitation services.[20] With regard to operation, the private sector may perform as private operators or under a PPP scheme.

Collective sanitation often requires substantial upfront investments for public infrastructure, and cost efficiency must be a major concern. As it is the case in other sectors, overall costs are a function of the balance between costs of construction, equipment, O&M and organizational skills. The more efficient the organization, the lower the hardware costs can be kept, or, with a given budget, the higher coverage can be achieved. The state must create the enabling environment, including capacity building and financing, to optimize and fully leverage public sanitation expenditures in terms of local job creation, technology development and improvement of sanitation service delivery. High-tech turnkey options built by foreign contractors may not contribute much to develop Rwanda's own collective sanitation capacity unless carefully configured under this perspective.

Collective (and individual) sanitation is the responsibility of many different agents. It is therefore necessary to regulate sanitation in order to ensure that the recipients of sanitation get the same benefits and that the objectives of the various agencies are met by all public and private service providers. The harmonization and updating of the regulatory framework, norms and standards for effluents, sanitation services and facilities shall be done in realistic steps, ensuring above all that the necessary enforcement capacity is implemented in parallel. The Agencies, Rwanda Utilities Regulatory Authority (RURA) and Rwanda Environment Management Authority (REMA), shall coordinate their regulative and enforcing activities in sanitation.

As is the case for the promotion of individual sanitation, the new attempt to enhance collective off-site sanitation conditions must address software and hardware aspects, hygiene education as well as infrastructure.

Sludge emptying services: Septic tanks need periodic emptying of the sludge. Manual tank emptying and uncontrolled dumping of the sludge constitute a major risk for public health. Kigali's city administration provides a mechanized sludge emptying service to public institutions only and the sludge is discharged at the waste dumpsite of Nduba. Other urban centres do not have a service yet.

While the provision of the sludge emptying service and disposal sites can be operated by public and/or private operators, the administration must develop the regulatory, enforcing and supporting framework – e.g., inventory of premises with septic tanks, certification of public and private operators, standards for equipment and protection, service pricing (tariffs), inspection, professional training of operators, labour safety regulations, building standards for sludge disposal sites, effluent standards for different uses of treated wastewater,[21] and operational and effluent control of sites.

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20 Rwanda National Construction Policy, MININFRA 2008; Government shall decrease involvement of the public sector in actual service delivery and effectively disengage from the implementation of physical infrastructure construction. Capacity building, the use of appropriate technologies and access to credit facilities are among the main objectives.

21 For example, based on WHO guidelines for the safe use of wastewater, excreta and greywater, WHO 2006, vol. 1–4.

All sanitation master plans must reference sludge disposal site and services. Sludge disposal sites shall be constructed in all major urban areas with premises using septic tanks for wastewater. MININFRA shall prepare guidelines for construction as well as for operation and maintenance favouring low-cost, gravity-based technologies without energy consumption. Disposal sites for faecal sludge can be built as stand-alone solutions or in connection with wastewater treatment plants.

The guidelines shall also indicate cheap and easy-to-execute alternative techniques for temporary safe sludge disposal until full studies have been carried out and funding made available. Private-sector investments shall be encouraged, e.g., by facilitating access to financing (investment only), import or other tax reductions and training opportunities.

Collective sewerage systems: There are few collective sewerage technology options available and all are water-borne systems: Condominial (including simplified), small bore (or settled or solid-free) and conventional sewerage. Cost being a crucial factor, conventional sewerage can normally be eliminated from further consideration on the grounds of its very high costs per connection.[22]

Condominial sewerage was developed in Brazil and it has gained ground in Latin America, South and West Africa and Asia. The condominial approach combines a technical and a social dimension, resulting (a) in 50– 80 per cent lower capital and operating costs[23] than conventional gravity sewers and (b) in higher ownership and hygiene behaviour changes due to community involvement.

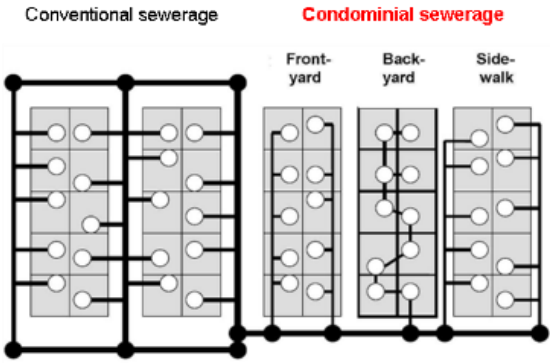

Figure 3: Comparison of conventional and condominial sewerage systems

"Condominiums" are the "neighborhood" units and the social dimension means that the service provider must interact with the beneficiary communities from the very beginning of the planning process, and these contribute to the project with delivering constructions permits for networks on private or community-owned lots.

22 Or, within a given investment budget, the condominial approach then allows for more connections.
23 Compendium of Sanitation Systems and Technologies, EAWAG-Sandec, 2015; and Water Supply and Sanitation Options for Small Urban Centres in Developing Countries, UN-Habitat, 2006.

Communities can participate in the design process, and in the construction and maintenance, thereby lowering their monetary monthly costs for wastewater service. The preparatory community involvement is the ideal opportunity to promote not only hygiene practice and sanitary education, but also to address drainage and solid waste issues.

Condominial sewerage is technically a network of small diameter pipes laid at shallow depth, mostly on private ground before joining the public primary network.[24] It becomes affordable and even cheaper than on-site solutions in areas with a density of more than 150 people per hectare, but needs a wastewater generation of not less than 40–50 litres per person per day.[25] Due to multiple design options and easy construction, the highly flexible system works for poor and rich areas and has turned out to be often the only affordable solution to provide sanitation services in unstructured, very high density settlements in difficult topographic situations.

Rwandan hydraulic design standards shall be adapted to take into account best practice in condominial and simplified sewerage design, such as sewer gradients and diameters.

Settled or small bore sewerage (solid-free): Settled sewerage is a sewer system that conveys only septic tank effluents or grey water. Without solid sewage, these less expensive sewers can be designed differently and executed where existing toilets (with septic tanks) or waterless latrines are already providing a safe level of on-site service.

Wastewater treatment: Wastewater should be treated prior to surface discharge or reuse in agriculture and/or aquaculture. Treatment usually means a reduction in biodegradable organic material and suspended solids, and some nutrients such as nitrogen and phosphorous. However, the large centralized sewage facilities corresponding to full treatment standards require very high financial, material and human resources.

Rwanda's priority shall be on how to control pathogenic and hazardous/toxic material. Therefore, treatment processes shall first be geared towards environmental health protection and then on natural resources protection. The overall level of environmental health and environmental protection is directly correlated to the standards that a country can afford to pay and maintain for liquid (and solid) waste treatment, which stresses the need for clear priorities.[26] Low-cost treatment options shall be implemented that have low O&M requirements and maximize the utilization of the potential resources, principally irrigation water and nutrients. Decentralized solutions shall be evaluated systematically and energetic resources optimized, if possible.

Preliminary and primary treatment shall remove gross solids and reduce the polluting load. Anaerobic techniques are suitable secondary treatment stages for the treatment of pathogenic material with significant application potential for reuse of treated effluents in irrigation.[27]

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24 Simplified sewerage is designed, like conventional sewerage, to receive unsettled wastewater and the design procedure ensures its blockage-free operation by using a minimum tractive tension (rather than a minimum self-cleansing velocity) of 1N/m^2 which is achieved at least once a day at peak flow.

25 The Rwanda Building Control Regulation, MININFRA, 2015, requires for all buildings with a piped water supply system capable of providing not less than 75 litres per person per day a water-borne system of excreta disposal and the adequate discharge.

26 Usually between 1–2 per cent of gross domestic product.

27 Example: The Valle Mezquital represents the world's largest area of wastewater irrigated agriculture. Some 83,000 hectares are irrigated annually using 1,900 million m^3 raw, untreated wastewater from the metropolitan area of Mexico City. Via the irrigation, the wastewater receives a natural land treatment, which is estimated to be equivalent or even superior to conventional secondary treatment. However, recent data on pathogen incidence

Tertiary treatment for removal of specific pollutants may be integrated into the planning concept but realized after environmental health protection objectives are met and operating sustainability is confirmed.

The overall approach for urban wastewater treatment shall take into consideration industrial effluent loads such as hydrocarbons and heavy metals and elaborate a concept including the necessary industrial pre-treatment options. The same applies to other heavy polluters such as slaughterhouses and hospitals. If these polluters are not connected to a sewerage system, adequate decentralized on-site solutions shall be implemented.

Project selection criteria: Sewerage and treatment systems shall be evaluated with regard to technical complexity and appropriateness, easiness of operation and maintenance, opportunities to include hygiene promotion, level of job generation and capacity-building needs, and environmental impact. Comparative financial analysis of project options shall assess all capital and recurrent costs and be based on life cycle cost calculation: 20–30 years for wastewater treatment plants and 50–60 years for sewer systems.

The Water and Sanitation Corporation, (WASAC) shall build the first public sewerage system in Kigali and develop Rwanda's sanitation O&M know-how. By achieving sound service delivery performance, including operating and financial efficiency as well as transparency and accountability also in its sewerage division, WASAC shall be able to source capital investments from Rwanda's domestic financial market by 2015.

Sanitation guidelines for Imidugudu shall consider both on-site options as well as decentralized collective systems, e.g., for grey water with subsequent treatment for irrigation reuse.

Tariff structure for collective sanitation services: The determination of tariffs implies that sanitation service costs are known. Providers must put in place an analytical accountancy system and enforcement and audit procedures have to be implemented. WASAC shall provide accounting guidelines for sludge emptying/disposal services and sewerage operators.

Full *cost recovery* based on the 'user pays' principle shall be the target for collective service provision and means that beneficiaries will pay for construction and O&M costs. However, for similar reasons as for on-site sanitation support, such as promotion of public health, cost recovery through monthly billing shall start to recoup sewerage operating costs only. This implies that capital costs are temporarily subsidized through taxes, donor grants or cross subsidization among users in place. However, recovery of capital costs (depreciation or replacement costs) shall progressively be introduced over a period of five years after the beginning of operation.

Awareness campaigns to households on safe hygiene practice shall include information about investment and operating costs of sewerage in order to increase cost understanding and willingness to pay.

In order to improve collective sanitation, the sector shall ensure the construction of Kigali centralised sewerage system, construction of 5 faecal sludge treatment plants as well as rehabilitation and upgrading of 18 semi-centralised sewerage systems in estates

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underscore the importance of wastewater treatment before land application. (In Romero, H., The Mezquital Valley, Mexico, 1997).

Emerging innovative technologies and business models which value human waste are also beginning to make traction across Africa in countries such as Kenya, Ghana and South Africa. While these models have not gone to significant scale yet, Rwanda can explore ways to apply these technologies and business models to the Rwanda context and be a part of the waste solution in the next six years.

3.3.7 Strategic outcome: Enhanced storm water management in urban areas

The focus of the storm water strategy in urban areas must be on alleviating existing and preventing future problems through careful design, planning and only complementary drainage networks. Successful affordable management of storm water needs a long-term coordinated approach to integrate best practice as well as community and business involvement and education programmes.

3.3.7.1 Improved Storm water management

Storm water shall be understood as a resource. Diversion of storm water has a series of advantages, including financial, over traditional approaches to storm water management, which usually gave priority to costly network constructions. "Water sensitive urban design" or "Low Impact Development" are approaches to urban planning and design that integrate management of the total water cycle into urban development. The approach also includes methods such as porous pavements, infiltration and rain harvesting systems, swale and wetlands, which shall be incorporated in development of new and upgrades of existing infrastructure. It will also ensure the construction of 4 modern land fill.

Under this strategic objective, the following strategic actions will be pursued;

A national task force under the lead of MININFRA/the Authority shall formulate responsibilities and tasks, coordinate the relevant national and district stakeholders, set the objectives and implementation methods, revise or elaborate standards and norms, and develop guidelines for urban storm water management. Additionally, the task force shall define the terms of reference for the storm water component in urban sanitation master plans considering its correlation with wastewater and solid waste management. Kigali's 2008 storm water master plan[28] shall be updated with the perspective of the new guidelines. Planning, design and implementation shall encompass the following elements:

a. *Risk assessment*: A detailed analysis of the probability of natural events or system failures and the social, economic and environmental consequences of such events shall be carried out in urban areas. This allows identifying an overall risk profile of the catchment areas and basing priorities of intervention upon.

   Albeit the level of flood risk is mitigated by Rwanda's topography and geology, an

[28] Plan d'assainissement du plan directeur des eaux pluviales et des eaux usées de Kigali, Electrogaz et MININFRA, 2008. Proposed investments until 2015: US$18 million.

additional risk map of critical flood areas (flooding from rivers and storm water runoffs) shall be drawn to help local authorities to (a) understand the risks when considering where settlements, business and other developments should be built or relocated and (b) strengthen the country's preparedness and response for emergencies. Analysis shall consider the likelihood and consequences and magnitude of events.

b. *Best practices for storm water design standards, land use and urban planning*: Water-sensitive urban design offers an alternative to the traditional view of storm water merely as a nuisance. It seeks to minimize the extent of impervious surface and mitigate changes to the natural water balance, by temporarily storing the water close to where it falls and slowly releasing it into the ground or natural waterways.

   The incorporation of storm water and rainwater harvesting in the construction permit is a very important measure in order to enforce the reduction of the flow of storm water and rain water at the compound level.

   Demand for new and improved drainage systems in the future will depend on activities such as urban consolidation, Greenfield developments and expansion of commercial and industrial areas, reducing the area of pervious surface available to soak up the water if no preventive provisions are taken.

   By integrating major and minor flow paths in the landscape and adopting a range of low-cost, low-impact development design techniques, the country can reduce the extent of the storm water drainage and the size of the drains required. These techniques include detention and retention systems to lower peak flows, and grassed swale drain and vegetation to facilitate water infiltration and pollutant filtration. Costly construction shall remain the second option.

   Drawing standards for storm water infrastructure shall be revised or formulated in line with adequate Rwandan standards and practice – i.e., in accordance with local coefficients of runoff, storm frequencies, socially acceptable risk levels and economically affordable standards.[29] Communities shall be involved in planning, building and maintenance of drainage systems.

c. *Water quality and environmental protection*: Increased flood volumes, peak discharges and higher water flows in urban areas cause a significant increase in the amount of pollutants carried by the water. Appropriate techniques to correct deficiencies of the storm water drainage system shall be developed which also take into account concerns of litter, pollution and water quality.

d. *Network capacity and maintenance*: Age, level of maintenance and the increase in the density of residential development have a direct impact on the capacity of the existing storm water drainage system. The process of urbanization replaces the absorbent soil surfaces with impervious roofs and pavements, which leads to an increase in the volume of storm water runoff. An evaluation of the existing drainage system as the "last line of defence" shall assess the components having the highest risk of failure and the capacity to handle current and future demand. Based on this analysis, improvements, extensions and costs can be determined considering risks and updated design standards.

[29] Rwanda Building Control Regulations, MININFRA, 2015; Requirements for Building Applications.

The regular and ongoing maintenance of the drainage network is essential to maintain its efficiency and to reduce impacts. As highlighted by studies on Kigali's drainage system, litter easily obstructs the system in the valleys. Inspection and maintenance must be organized and shall involve the local communities.

e. *Awareness and education*: People need to recognize that human activities have increasing polluting consequences and other environmental sensitive impacts. Education and awareness programmes shall be carried out to improve understanding about storm water and encourage a sense of responsibility. Schools shall be the primary target audiences.

3.3.8 Strategic outcome: Integrated solid water management for human health and the environment

Formatted: Heading 3

3.3.9.1 Integrated Solid water management

An integrated approach to solid waste management must mobilize all public and private stakeholders and consider the relevant financial, technical, cultural, organizational and legal aspects. A clear division of responsibilities in terms of regulating, monitoring, promoting and operating functions shall be established among public entities at national and district levels as well as among private business, communities and households.

Waste management shall aim at full cost recovery and encourage private and community initiatives for financing and operating waste management operations.

The existing legislation and regulatory framework shall be updated and establish minimum levels of service and environmental protection. Such levels can be scaled up over time, but shall remain realistic – i.e., technically, socially and economically enforceable at each stage of development. Enforcement should be accompanied by user-friendly advice and guidance and must address aspects such as operating licenses, producer responsibilities, landfill regulation, tariffs, disposal of hazardous, industrial and agricultural waste, illegal dumping, prosecution and recovery of clean-up costs.

Under this strategic objective, the following strategic actions will be pursued;

Waste reduction, prevention and minimization: Waste prevention is at the top of the **Waste Hierarchy** and the number one priority for integrated solid waste management.

It emphasizes the need to move waste management away from landfill towards more sustainable and less environmentally harmful practices, and emphasizes avoiding waste generation, reducing the quantity and hazardous nature of waste at source and reusing products before they enter the waste stream.

The concept of "life cycle of materials" supports a broader consideration of how waste can be minimized and recovered at every stage of the process. In the transition towards efficient

resource management, waste strategy needs to focus on those key stages of the life cycle which have the greatest influence on waste generation and recycling. The following categories shall be assessed: commercial and industrial waste, construction, demolition and excavation waste, hazardous waste, agricultural waste, packaging, electrical waste and electronic equipment, end-of-life vehicles, tires and batteries.

The Waste Hierarchy implies that there is an order of priorities when planning for waste management:

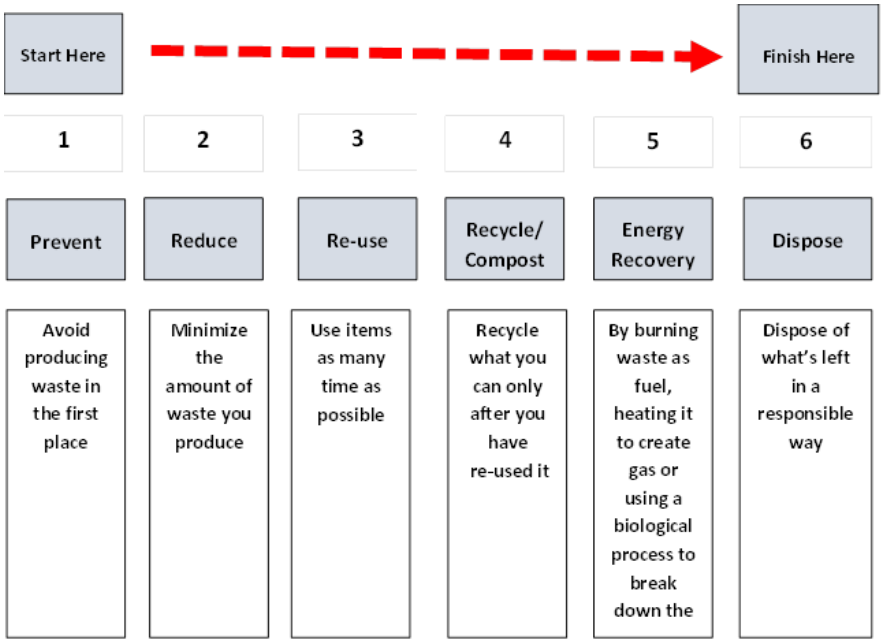


Figure 4: Sequence of the Waste Hierarchy [adapted from Staffordshire County Council, UK]

- Stage 1 "**Prevent**" aims at motivating waste producers for less waste. Prevention of waste is important in manufacturing. Purchasing products that incorporate waste reduction features or those that can be given an extended life support source reduction of waste. Two incentives shall sustain the minimization policy. At the very front-end, the "polluter-pays" principle holds that importers, manufacturers and distributors who profit from waste generating activities shall pay for the costs of pollution. The complementary incentive, the "user-pays" principle implies that those who use a service should pay for it proportionally.
- Stage 2 "**Reduce**" means reducing waste at the source. It can take many different forms, including reusing or donating items, buying in bulk, reducing packaging, redesigning products, and reducing toxicity. Several initiatives can support legal enforcement and

encourage businesses to accept increased liability and to lower waste generation, such as setting prevention and reduction targets through voluntary agreements, partnerships with professional institutions and associations, targeted awareness campaigns, waste audits and promotion of the “clean production” concept.

The mobilization of public and political support is as crucial to both financing waste management and keeping waste minimization as cost-effective as possible. Successful waste minimization relies on support, acceptance and commitment from the community, individuals and organizations within the community. As for hygiene education, schools shall be a primary target group for waste education. This has to be addressed by developing a behaviour change model including resourcing education, research, awareness campaigns, reward schemes, dissemination of good practice and support for community initiatives and promotion.

- Stage 3 "**Re-use**" implies that waste can be turned into a value worth using for the same or another use.
- Stage 4 "**Recycling and composting**" are a series of activities that includes the collection of used, reused or unused items that would otherwise be considered waste; sorting and processing the recyclable products into raw materials; and remanufacturing the recycled raw materials into new products. Consumers provide the last link in recycling by purchasing products made from recycled content. Recycling also can include composting of food scraps, garden trimmings and other organic materials. Recycling prevents the emission of many greenhouse gases and water pollutants, saves energy, supplies valuable raw materials to industry, creates jobs, stimulates the development of greener technologies, conserves resources and reduces the need for new landfill sites and combustors.

  Recycling can reduce waste in landfills as well as provide economic, environmental and social positives. The state shall assist private-sector and community initiatives in establishing markets for recyclable products, with priority for materials that are currently being recycled and/or can find sustained market demand. Such support may include training and the provision of reimbursable funding or grants.

  Complementarily, the segregation of waste at source and separate collection of recyclable and compostable waste must be promoted and shall be implemented first within the institutional sector.

  Advice, assistance, practical demonstration, pamphlets and educational materials are means to promote the benefits and techniques of home composting and worm farming as alternatives to disposal via public collection. Schoolchildren may cultivate their potage and learn about composting.
- Stage 5 "**Energy Recovery**" from waste is the conversion of non-recyclable waste materials into useable heat, electricity or fuel through a variety of processes, including combustion, gasification, pyrolization, anaerobic digestion and landfill gas recovery. This process is often called Waste –to- energy (WtE).

  Organic waste represents the majority of the waste to dumpsites. Additionally, an unknown portion of organics is composted or buried by households and businesses on their premises. At the dumpsites, organic garden waste and paper are the source of most of the damaging

leachate, greenhouse gases and odours, but they also represent a valuable resource which should be recovered, e.g., composted or transformed into briquettes.

- Stage 6 "**Disposal**" is the least-favoured option and should only be applied to the remaining section of waste that was not managed through previous stages. This stage includes landfills treatment facilities.

  Due to high transportation costs, collection efficiency is crucial and shall be optimized through a system of kerbsides, transfer stations and adequate means of transportation for each stage. Kerbsides shall be equipped for waste separation and its management can be outsourced to local waste collectors. Private and community initiatives are to be encouraged also outside Kigali in secondary urban centres.

  A range of technologies is available to reduce the amount of waste in landfills, including anaerobic digestion, composting, mechanical, biological and thermal treatment. Some techniques allow energy recovering from waste and can contribute to meeting fuel demand.

  Uncontrolled dumpsites shall cease to operate and be replaced with environmentally sound landfills. Identification of future landfill sites and technologies shall be undertaken based on selection processes considering technical, financial, social and operational criteria. A site shall host sufficient volume.

  New developments in low-cost landfill technology and operation shall be continually investigated. Landfill operators shall establish partnerships with Rwandan scientific institutions for quality control and operational performance. Landfills shall monitor types and quantities of waste supplied from different sources, while general urban waste surveys can be carried out periodically.

  Due to the elevated and often concentrated environmental risks, a map and register of hazardous industrial and medical waste producers and products shall be established and include actual techniques and equipment used for disposal, e.g., incinerators. To comply with environmental legislation, guidelines are to be edited for safe waste handling, storage, transport, treatment and drop-off or disposal for each category of hazardous waste. A Technical Advisory Network shall be set up in collaboration with Rwanda's scientific institutions that, considering the level of risk, shall monitor premises and activities and establish emergency plans to remedy or mitigate adverse impacts.

  The full application of the Waste Hierarchy will have a significant impact on the cost of public services. In specific circumstances (for instance, in some industries) prevention, reuse and recycling may eventually lead to zero waste processing, in which there are no waste produced at all.

  Should all preventive measures be applied and prove to be successful, then the cost of public services (and, more importantly, the cost of sustainable O&M) will be considerably reduced.

  Conversely, should no prevention measures be implemented, and no use made of household responsibility and ability to reduce waste at source, then the cost of public services will remain a very heavy burden on public finances. By combining both the Waste Hierarchy and the household responsibility approach it is possible to identify potential opportunities for optimized solid waste management. This list of actions is not exhaustive, but will illustrate the kind of measures that need to be taken for each priority. Government institutions,

Districts and Development partners may identify additional measures suitable for the local conditions.

3.3.9. Strategic outcome: Sustained and safe management of e-waste, Industrial wastes, nuclear waste and health-care waste

3.3.9.1 Improved E-waste management

The increased usage of electrical and electronic equipment would subsequently generate increased volumes of e-waste. Moreover, the current lack of infrastructure to handle e-waste in Rwanda has motivated institutions and private persons to store outdated equipment, which also needs to be managed in an environmentally safe manner. To ensure a safer environment and good health for the community, the specific e-waste policy as well as the e-waste regulations shall be finalized to enhance e-waste management. The appropriate Legal and regulatory framework for electronic waste management shall be established.

Given the challenge of lack of infrastructure for e-waste handling and management, facilitation of establishment of such Infrastructure will be pertinent. Enticement of the private sector will be central to putting in place the e-waste Management infrastructure and resource mobilization for sustainable management of e-waste.

E-waste management awareness campaigns and environmental health promotion shall enhance awareness of the Rwandan population about the risks associated with e-waste.

3.3.9.2 Enhanced Industrial waste management

Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, industries, mills and mining operations.

Waste from industrial firms is a particularly damaging problem for the water sources in the country. This waste shall need to be mitigated through the promotion of treatment and through the cleaner production process. The Government of Rwanda, particularly local government in collaboration with the regulatory authority, shall have a big role to play in the regulation of pollution as well as provision of infrastructure for mitigation and the treatment of waste.

Important strides have been made where most industries have been placed in the appropriate industrial zones to ensure the protection of the environment as well as human health. Challenges still linger with respect to industrial waste management infrastructure. A specific industrial waste management policy as well as the regulatory tools shall be developed followed by ensuring that industrial parks are constructed with centralized wastewater treatment plants.

3.3.9.3 Improved Health-care waste management

The policy framework for health-care waste exists whereby the National Policy on Injection Safety, Prevention of Transmission of Nosocomial Infections and Healthcare Waste Management (2009), National Guidelines on Health Care Waste Management, Health Policy 2014 and Health Sector Strategic Plan (2012–2018) have been developed.

Special health-care waste disposal sites shall be constructed and special transportation facilities for health-care waste shall be availed due its impact on human health and the environment. The law governing health-care waste management will need to be developed as well to ensure effective waste management.

3.3.10. Strategic outcome: Sustained Capacity Development for water and sanitation services

In the recent past, the WSS sector has undergone significant institutional changes including the creation of WASAC, the systematic introduction of delegated management (PPP), the emerging role of RURA in regulation, the overall move towards a SWAp with the creation of a SWAp Secretariat and the delegation of implementation responsibilities to the districts. In addition to ensuring the smooth cooperation of government entities, the sector is also further strengthening mechanisms to consult and involve non-government stakeholders, and to ensure sector-specific monitoring and knowledge management.

3.3.10.1 Water Supply Law elaborated

There is a consensus among key stakeholders in the Water Supply sub-sector that there is a need for a comprehensive review and update of the current legislation on water supply with the aim to publish a coherent and update date law on water supply. These needs for a water supply law can be summarised as follows:

a) Establish legally binding services management requirements to ensure sustainability of water systems;
b) Determine clear formal roles and responsibilities for policy implementation;
c) Definition of the legal requirements for mandatory water safety plan implementation and water quality monitoring programmes/routines;
d) Strict application of water tariffs, especially in rural areas by service providers, will only be possible with a Water Supply Law; and
e) The elaboration of a Water Supply Law will also go a long way in strengthening the enabling legal framework for private-sector participation in the Water Supply sub-sector.

3.3.10.2 Improved capacity development, professional training and education

In order to address the capacity development challenges in the sector in a systematic way, MININFRA will formulate a comprehensive capacity development programme supported by harmonized funding arrangements and administered by the SWAp secretariat.

Programs for capacity development will be framed around:

- education and training;
- continued professional development; and
- the enabling environment for service delivery.

Since districts are the key institutions responsible for service delivery in the Water Supply sub-sector, it is essential to ensure that these programmes enable district capacity to be enhanced, either directly or through cascading the outcomes of support to central government.

There are three priority areas in which the capacity development programme will invest, including:

a) Gap filling around existing education and training programme initiatives

These capacity development programmes will therefore be closely coordinated with initiatives of the Workforce Development Authority (WDA) and the Integrated Polytechnic Regional Centres and build on Technical Vocational Education and Training (TVET).

Such programmes will also provide technical assistance in support of the vocational colleges and universities as appropriate. This would include help with curriculum development (BSc and MSc) and, crucially, quality control.

Programmed training will also be provided – e.g., for newly recruited water and sanitation professionals at the district level who are required to plan and oversee the implementation of district-level WSS programmes.

b) Continuing professional development (CPD)

In addition to the urgent need to recruit additional qualified personnel to the sector, there is also a need to provide CPD to those staff already in posts. CPD is important to increase staff skills, knowledge and understanding. The key areas for CPD relate to the core functions around service delivery. A few examples would be:

i. programme management;
ii. performance measurement;
iii. monitoring, analysis and reporting;
iv. technical planning;
v. specific technical skills; and
vi. budgeting and financial planning.

c) Enabling environment

An important way to contribute to the improvement of the enabling environment is through providing a funding window that provides overall sector-wide support. Appropriate activities are those related to:

i. studies in support of Joint Sector Review undertakings;
ii. policy and strategy development;
iii. sector coordination and sector reviews;
iv. participating in sector events on request at short notice; and
v. pilot studies to promote sector reform.

3.3.10.3 Strengthened WASAC's Rural Directorate

The directorate of Rural Water Supply and Sanitation is an entity with development objectives aimed at strengthening decentralized capacities, implementing projects and reaching strategic targets in rural areas. It is not a water supply operator, does not have revenue, and channels or monitors the use of government subsidies for water and sanitation in rural areas. This focus is different from WASAC/Urban which is a water supply and sewerage corporation that operates based on commercial principles.

Given the double challenge of accelerating implementation of new infrastructure and strengthening the management and O&M systems of existing schemes, the current capacities of WASAC's directorate of Rural Water Services are not sufficient. The districts need intensive support both in terms of sector development and direct support for O&M to ensure functionality.

3.3.10.4 Enhanced Research and Knowledge Management

The strategy to promote innovation and build a knowledge base relies on two main components: (1) cooperation with research organizations and (2) improved knowledge management, aiming to make experience readily available to all sector stakeholders.

Cooperation with research organizations – such as the National University of Rwanda (NUR), College of Science and Technology (CST), and Kigali Health Institute (KHI) – will involve the promotion and support of applied research and thesis in relevant fields. Support can include the provision of data, sensitization of stakeholders, guidance, as well as financial support for expenditures such as data collection, travel and subsistence.

Applied research will focus on innovative technologies and approaches, which are not necessarily new but are not yet standard in Rwanda, and hence will be tested and adapted for Rwandan conditions.

Other research will aim to measure the impact of water and sanitation inventories at the beneficiary level, including unintended impacts, longer-term impacts and impacts on cross-cutting issues: impacts on the role and living conditions of women, vulnerable people, on water resources, etc. These scientific impact evaluations are not to be confused with standard evaluations which are part of the project cycle. Data will be disaggregated in order to capture effects on women, children and the poor.

Finally, the implications of climate change are another expected focus of research.

Knowledge management will initially focus on making the existing experience available. One of the first steps will be to create, based on the existing inventory, a national database of water supply and sanitation facilities containing key data on technologies, operational status and

benchmarking data, including reference to related studies and evaluation reports.

3.3.10.5 Potential Studies planned in WASH Sector

In order to take appropriate decisions based on factual and reliable data in WASH sector, the following studies will be pursued over the period of the strategy

- Development of Rwanda Sewerage Connection Policy and Strategy;
- Assessment on the Access to Safely managed WASH Services in Rural Areas in Rwanda;
- Review of the Rural Water Tariff in Rwanda;
- Sewerage Tariff Study in Rwanda;
- Development of a Pro-poor Strategy for Water Supply and Sanitation Services in Rwanda;
- Study on the Customer Satisfaction Index (CSI) of the Rural Water Services Provision in Rwanda;
- Study on potential and options to leverage private capital investments in Rwanda.

3.4 CROSS CUTTING AREAS

The strategy takes into account cross-cutting areas. The sector will ensure the importance of cross-cutting areas in the provision of water adequate water supply and sanitation services. The following cross-cutting areas will be address which include environment and water resources management, Gender, social inclusion, climate change and disaster risk reduction and capacity development

3.4.1 Gender

In the Water Supply sub-sector, a gender-conscious approach assumes special significance because, according to the traditional division of labour, women are in charge of providing water in the household, hygiene and health care. Women are therefore most affected when water supplies fail and sanitation is poor. On the other hand, women are typically under-represented in decision-making, in the management of water and sanitation infrastructure, and in training and educational activities.

Water supply interventions are known to have a positive impact on women, by improving living conditions, reducing the workload (time to fetch water, caring of the sick), improving hygienic conditions in schools and potentially enhancing women's participation and empowerment. The strong involvement of women tends to be beneficial for the sustainability of water and sanitation infrastructure since for the cited reasons women have a strong and immediate interest in reliably functioning facilities.

Global experience also suggests that gender equality must go beyond addressing equal access to domestic water and sanitation services only. It is important that policies and strategies should target economic equality through water for productive uses, equality in decision-making, equality in contracts, employment opportunities in senior positions of water institutions, opportunities for consultancy and the general business opportunities around water and sanitation infrastructure development as a whole.

The WSS sector undertakes to ensure by appropriate guidelines and indicators that:

a) Women have equal chances for employment and career opportunities in both public and private institutions;
b) women are adequately represented in decision-making processes as well as in training programmes;
c) participation of women in committees and in the management of water schemes, including in high-level positions, is promoted;
d) the needs, priorities and interests of women are taken into account in all planning processes, implementation strategies, training materials, etc.; and
e) local implementation partners are sensitized and trained on gender issues.

3.4.2 Social Inclusion

Water Supply sub-sector development implies social responsibility, as access to safe water and basic sanitation concerns human rights and affects the living conditions of all. The planning and implementation guidelines will therefore take these implications into account rather than focusing on monetary or efficiency criteria alone.

The WSS sector will endeavour that all population groups, including vulnerable households, children, elderly and disabled persons benefit from its interventions. This implies that due attention is given to the aspect of affordability and that the specific needs of these disadvantaged population groups are taken into account.

The sector will actively provide adequate WSS services to health institutions and schools, in cooperation with the ministries concerned.

WSS interventions will contribute to socio-economic development by creating jobs in the private sector and by improving living conditions (in particular in rural areas, thus making them more attractive for investors, professionals, etc.). Implementation guidelines will promote local job generation, equal economic opportunities for women (and gender equality) and inclusion of disadvantaged groups of society.

3.4.3 Environment and Climate Change

Water and sanitation are environmental issues to their very core, and together constitute one of the top drivers of development. They matter to the environment as water and sanitation provision have an impact on the health of the environment, through downstream pollution in rivers and lakes, hence degrade wildlife habitats and contribute to human health problems.

The WSS sector will ensure that all WSS projects and programmes abide by the relevant water resources and environmental laws of Rwanda. It will set up procedures and safeguards to make sure that all measures comply with the standards, permits and regulations defined by the institutions in charge of protecting natural resources and environment with respect to: (i) the rational and sustainable utilization of water resources; and (ii) environmental protection and conservation of water resources.

Environmental sustainability should be an integral part of the design, implementation, operation, and maintenance of sanitary facilities. Water and sanitation projects will provide a framework for systematically addressing environmental issues, through environmental impact assessment (EIA) that shows main environmental issues and provides a plan for mitigating or addressing them and proposing a monitoring framework. This will help establishing compliance with the country's environmental policy.

For medium to large-size projects, the environmental law requires an Environmental Impact Assessment (EIA). For smaller projects, the water & sanitation sector will develop guidelines defining environmental safeguards, to be approved by RDB. For larger interventions, collaboration with RDB/REMA will also include monitoring of real impact during work and operations.

Water-quality monitoring needs to be strengthened and the development of water safety plans should be promoted. The Water Safety Plan approach is based on four principles:

1) Risk assessment: identification of hazard sources and prioritization of risks;
2) Definition of critical control points to be monitored;
3) Management of the water supply from catchment to consumer; and
4) Stakeholder engagement through specific communication at local and district levels.

Where all risks cannot immediately be addressed – for instance, as a result of limited resources – incremental improvements should systematically be implemented over time. The WSP approach introduces processes to validate and verify the effectiveness of management control systems in ensuring drinking-water quality and safety. Water safety plan success depends strongly on the involvement of the community and the water utility/service provider, and needs to be linked with sanitation master plans, including information on the location of sludge disposal and effluents of waste water treatment plants.

In order to improve collective sanitation, the sector shall ensure the construction of Kigali centralised sewerage system, construction of 5 faecal sludge treatment plants as well as rehabilitation and upgrading of 18 semi-centralised sewerage systems in estates.
Households in urban areas with access to collective sewerage system and households with on-site improved sanitation facilities will increase to 20% and 50% respectively.
The sector will put effort to increase the managed e-waste to 12% and recycling of solid waste in urban areas to 35%.

Along with food and shelter, safe water and sanitation are the highest priority interventions in emergency situations. Unless adequate water and sanitation services are quickly provided to emergency-affected populations and their families, disease and death will follow. And unless safe water is provided and good hygiene is consistently practiced by affected people, the danger of diarrhoea, cholera and other disease outbreaks will persist. Readiness is of critical importance when disaster strikes in and **emergency preparedness planning is an essential part of disaster risk reduction activities**. Preparedness planning includes the development of a roster for emergency staff deployment, pre-positioning of strategic supplies and preparation of pre-approved contracts with vendors (such as water trucking companies) and suppliers, as well as advance coordination arrangements led by the Government of Rwanda

CHAPTER 4: IMPLEMENTATION PLAN FOR THE STRATEGY

4.1 Governance and Coordination

The water and sanitation strategy will be governed and coordinated by WATSAN Division to ensure the overall coordination and provide strategic guidance towards the implementation of strategy which includes water supply, storm waste management, solid waste management, waste water management as well ensuring that laws, policies and regulations are adhered to. The core functions will include among others programming and general monitoring and evaluation of projects, decision making towards setting priorities of program interventions as well as providing capacity building. The division will ensure WASAC implements its mandate of providing water supply and sanitation services to the population.

4.2 WATSAN SWAps Secretariat

The implementation of the present policy for WSS services shall be based on a sectoral approach (SWAp). Formally agreed between MININFRA and its key development partners (multilateral agencies and bilateral donors), the SWAp is understood as an inclusive process involving all relevant stakeholders, including government institutions, civil society (NGOs), the private sector and user communities.

In developing the SWAp a gradual approach will be adopted, based on successive steps, depending on the readiness of key partners and aligned with the build-up of national and decentralized capacities. Harmonized action will be advocated on the basis of its added value to sector stakeholders (efficiency, lesser transaction costs, coherent monitoring, etc.), but with a medium-term focus on the creation of sustainable structures and capacities, reducing parallel implementation arrangements and modalities. Special emphasis will be paid in the SWAp dialogue to ensure that districts will have access to predictable harmonized finance.

Partners agree on joint objectives, principles and operating procedures. A joint financing mechanism based on government systems will be created but does not exclude other aid modalities as long as the agreed principles are observed.

In the context of a SWAp, the WSS sector attaches importance to creating a sector community that involves all stakeholders including, but not limited to, central and local government institutions, development partners, NGOs, user communities, researchers and the private sector. Communication will be maintained through regular Sector Working Group meetings and annual joint sector reviews, as well as by a dedicated website maintained by the SWAp Secretariat. All sector actors, including NGOs, shall adhere to joint reporting standards and requirements. The

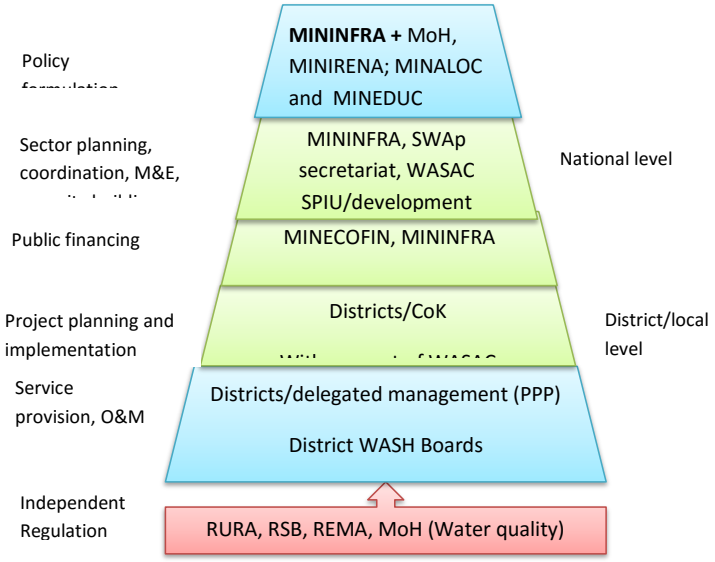
communication strategy addressing the general public will include messages on good practices, hygiene awareness and user rights and responsibilities, to be disseminated through different media and specific materials for schools.

4.3 Thematic Working Groups

The thematic working groups for water and sanitation will be instrumental in providing the technical direction of the strategy which will include among others provision of technical support in assisting the secretariat in the presentations and quality data management and harmonization, reviewing existing technologies used in water and sanitation development and advising on appropriate technologies to use, conduct joint field visits for successful projects and best practice and experiences as well as sharing lessons learned. In addition, thematic working Groups will monitor water quality supply systems and sanitation facilities in rural water areas. These functions will include quality control and assurance, monitoring water and sanitation construction materials, identifying sector funding source and advice on resource mobilisation mechanism, support in capacity building initiatives

4.4 Institutional arrangement for water supply sub-sector

The schematic below provides an overview of the key roles and responsibilities of the public institutions involved in the WSS sector.



The schematic is intentionally simplified and shows public entities only whereas detailed

institutional roles are contained in Table 5 below:

Table 5: Roles and Responsibilities in water supply services

S/N	Institution/community	Roles and responsibilities
1	MININFRA	Formulation of national policies and strategies; operational sector planning, M&E; coordination of sector stakeholders; support to districts (including rural infrastructure development and PPP arrangements); management of the harmonised financing mechanism.
	WASAC	Implementation of water supply policies and strategies (both urban and rural); operational sector planning, M&E; coordination of sector stakeholders; support to districts (including rural infrastructure development and PPP arrangements); management of the harmonised financing mechanism. Preparation of guidelines and standards; capacity building; applied research and knowledge management.
3	RURA	Independent regulation of the water supply sub-sector. The functions of the regulator cover the following aspects of regulation: technical, economic, legal and consumer protection.
4	MINECOFIN	Coordinates the national budgeting, planning and financing framework, with a strong role in related aspects of the WS services Subsector sector.
6	MoH (Environmental Health)	Has the lead in household sanitation and hygiene promotion
7	MINEDUC	Partner for educational programmes (development of relevant curricula in coordination with MININFRA) and school water supply programmes
8.	MINALOC	Support and ensure WATSAN projects/ programmes are implemented at district level
9	Ministry of Agriculture (MINAGRI)	Partner for water supply to livestock, especially through dams; coffee washing stations
10	REG (Rwanda Energy Group)	Connecting the pumping stations and water treatment plants to the electricity grid
11	District local governments, City of Kigali	Responsible for the provision of access to basic water supply services. Implementation of water supply and contracting private operators for infrastructure O&M; prepare and implement consolidated district development plans.
12	Communities	To be involved in project identification, planning and commissioning and better services for construction and O&M as a matter of policy; form user committees to represent consumer interests; (community management).

S/N	Institution/community	Roles and responsibilities
13	Private sector	Participates in the execution of projects (consulting firms, contractors) as well as in infrastructure operation and maintenance (private operators, through delegated management, contracted by the districts). The informal sector and SME provide sanitation services (sludge emptying), carry out most of the individual sanitary Improvements throughout the country and are active in solid waste management (collection, recycling). Rwanda Private Sector Federation (PSF) has an important role in technical and vocational training and business development support.
14	Development partners	Support sector development in accordance with the principles agreed for the SWAP; contribute to financing sector projects through a variety of aid modalities.
15	Civil society/non-governmental organizations (NGOs)	Contribute to the implementation of water supply projects; support the SWAp in coordination mechanisms at the national and district levels.

4. 5 Institutional arrangement for Sanitation sub-sector

The implementation of sanitation interventions also requires joint responsibility of various governments' institutions including several ministries and national autonomous entities as well as local governments – in general under the overall oversight of MININFRA. Government bodies, development partners and non-government stakeholders will cooperate in a SWAp framework, agreed in 2015 but to be fully operationalized in 2016 and beyond.

MININFRA shall lead the institutional reform process and will host a regular Sector Working Group that ensures coordination and monitoring of the sector programme, including dialogue and communication with other sector stakeholders (in particular local governments, other sector institutions, cross-sectoral planning and regulatory bodies, NGOs and the private sector). MININFRA shall present a report on policy/strategy implementation to the Sector Working Group on a six-month basis.

A specific Working Group as a sub-group of the Sector Working Group will be set up for coordination and development of the solid waste and storm water management sub-sectors.

The schemas below provide an overview of the key roles and responsibilities of the public institutions involved in each of the sanitation components for rural and urban areas.

Table 6: Institutional Responsibilities for sanitation subsector

Institutional Responsibilities - Sanitation (management excreta and wastewater		
Solutions/Facilities	Institutional Sanitation	
Responsibilities	Institutional level	
	(Latrines + toilets in schools, health centers	
Planning (Policy, strategy	MININFRA, MoH, MINEDUC, MINALOC	
Legislation	MININFRA, MoH, MINEDUC, MINEDUC	
Standards	MININFRA, REMA, RSB	
Master plans	MOH, MINEDUC, MINALOC	
Coordination	MININFRA	
Demand generation		
Awareness	MoH, MINEDUC, MINALOC (Districts	
Marketing	MoH, MINEDUC, MINALOC (Districts	
Enforcement	MoH, MINEDUC, MINALOC (Districts	
Access provision		
Equipment, Material	Shops, Trade	
TVET	MINEDUC	
Construction	Masons + contractors (hired by institutions	
O&M	MoH, MINEDUC, MINALOC (Districts)	
Financial (CAPEX	MoH, MINEDUC, MINALOC (Districts)	
Sanitary inspection	MoH	
M&E	MoH, MINEDUC, MINALOC (Districts), NIS	
Institutional Responsibilities - Drainage / Storm Water		
Solutions / Facilities	Household level	Public/off-site
	Rain harvesting, surface permeability, storm water storage	Urban planning/land use, retention measures, drainage systems
Planning (Policy, strategy)	MININFRA with contributions from MINALOC , REMA	
Legislation	MININFRA, MINALOC, REMA, RURA	
Standards	MININFRA, REMA, RURA	
Master plans	DISTRICTS with support from MININFRA	
Coordination	Taskforce from MININFRA and MINALOC	
Demand generation		
Awareness	Districts	
Marketing	Districts	Service providers, CoK, districts

Enforcement	Districts	REMA, RURA, Districts
Access provision		
Equipment, Material	Shops, traders	Districts
Construction	Mason(hired by households)	Service providers, CoK, District Contractors, private operators
O&M	Households	Service providers, CoK, District Contractors, private operators
Financial (CAPEX)	Households	District with Contractors, private
M&E	-	Districts
Institutional Responsibilities- Solid Waste Management		
Solutions/facilities	Solid Waste Management	
Responsibilities	Household	Public/off-site
	Separation of waste, composting , recycling	Reduction, selective collection, transport, recycling, reuse, safe disposal
Planning (Policy, strategy	MININFRA, collaboration with MINALOC,REMA and Districts	
Legislation	MININFRA, MINALOC, REMA	
Standards	MININFRA, RURA, RSB, REMA	
Master plans	Districts with support from MININFRA	
Coordination	Task force from MINALOC	
Demand generation		
Awareness	Districts, REMA	
Marketing	Districts, REMA	Service providers, CoK, Districts
Enforcement	Districts, REMA	REMA, RURA, CoK, Districts
Access provision		
Equipment, Material	Shops, traders	CoK, District Contractors, private operators(condominials)

Construction	Maison(hired by households)	CoK, District Contractors, private operators(condominials)
Business Development	MINICOM	
O&M	Households	Districts with contractors, private operators (condominals)
Financial (CAPEX	Households	Districts with contractors, private operators (condominals) households pay tariff

In all areas, the district administrations and the City of Kigali shall assume a leading role in the execution and supervision of activities within their territory and must develop the appropriate management capacities. RURA, REMA and RSB are the main independent national regulating bodies, while the subsequent enforcing functions and responsibilities have to be defined carefully by the task forces of each area.

CHAPTER 5: MONITORING &EVALUATION AND RESULTS-BASED MANAGEMENT

5.1 Evaluation of the Plan

The implementation course, the evaluation of WATSAN strategic plan will be carried out to measure progress on the set milestones. The assessment of the impact evaluation on the programmatic intervention will be conducted. The WATSAN Division and its stakeholders will develop a clear annual monitoring and evaluation indicators and reporting mechanisms. The M&E framework (see list of appendix on matrixes) will guide data collection and analysis and dissemination of information to enable the accurate tracking of progress and on-going decision making. The following review will be conducted throughout the lifespan of the strategy

5.2 Annual Assessment

Each year a comprehensive assessment of achievements and challenges being faced in implementing the Strategic Plan will be conducted. This will provide WATSAN Division and its stakeholders an opportunity to assess progress against the results framework. This will be spearheaded by the WATSAN Division will also oversee the mid-term review and end-line evaluations and financial audits.

5.3 Mid-Term Review

Mid-term review will be conducted after two and half years of the implementation of the Strategy. This will bring together key stakeholders at all levels to appraise progress in the implementation of strategies. It will require revisiting where necessary or reach consensus on the measures to achieve the set targets in the strategy.

5.4 Final Evaluation of the Strategic Plan

After five years, WATSAN will organize a comprehensive external evaluation of the implementation of the Strategic Plan to determine the outcomes set against the specific objectives and overall goal. This will be the first step towards developing a next generation of WATSAN Strategic Plan.

5.5 Reporting

The implementation of this strategy will be a basis for providing periodic reporting requirements in form of annual WATSAN outputs and activities reports publication and posted on the website.

- Existing monitoring and evaluation mechanisms: The joint Review of the water supply and sanitation sector signified more systematic review process. The Joint Sector Reviews WATSAN sector performance in terms of policy, planning, budget execution and progress against set indicators. This forum involves the participation of large range of government institutions including line ministries, agencies, development partners , NGO (both international and local), cluster meetings, Ministry of infrastructure management meetings, District joint reviews are all mechanisms put in place in order to enable Monitoring and Evaluation of WATSAN policies and strategies. The performance of the sector is evaluated against research reports, joint field monitoring of water and sanitation projects at the district levels, sector indicators, target completion and visits to WATSAN projects/programmes. Working in tandem with development partners, the performance review informs future policy, work programming at sector and district levels.
-

5.6 New Innovations and programmatic approaches

Within this WATSAN sector strategy, key innovations have been put in place to ensure effective M&E framework

- WATSAN Management Information System
- WASH District Wide Approach

5.2.1. WATSAN Management Information System

The Ministry of Infrastructure WATSAN Division has engaged consultants who are developing a Management Information System (MIS) to strengthen policy implementation through evidenced based decision making and enhanced monitoring and evaluation at multiple levels. The MIS shall enable Ministry of Infrastructure to monitor and evaluate WATSAN activities at public schools, health centers, districts and national levels and be able to aggregate and disaggregate critical information by various criteria. The system will address a key challenge of uncoordinated reporting were WATSAN sector coordinated by the secretariat will collaborate with the National Institute of Statistics to ensure compatibility and synergies between both types of information collection. The sector MIS will be linked to Rwanda's cross-sectoral planning and reporting systems such as the EDPRS Monitoring Matrix. It will also inform coordination forums such as the Sector Implementation Group, forum of the Secretary Generals, Development Partners Coordination Group and Cabinet.

5.2.2 WASH District Wide Approach

The WASH District Wide Approach is programmatic approach of choice that aimed to coordinate all stakeholders in each districts to determine agreed WASH priorities, targets and performance indicators. The district leadership is the Centre piece to ensure implementation of the approach. This will ensure efficiency in bottom- up planning and data collection which will input the above mention WASH Management Information System. The end-result is the availability of detailed WASH investment plans for each district that will play vital role and inform resource mobilisation in implementing WASH projects/ programmes

CHAP 6. COSTING AND FINANCING OF WATSAN STRATEGIC PLAN

The Government of Rwanda has been instrumental in financing the WATSAN urban and rural projects to improve the provision of services. The costing section presents estimated requirements in terms of financial resources needed to implement WATSAN strategic plan. It is based on assumptions, on input and activity costing scenario that was provided by Ministry of finance and economic planning. This costing provides a broad sense of direction over the next six years and a basis of resource mobilisation to fully implement the strategic objectives and priorities.

6.1 Funding assumptions for water-supply sub-sector

- **Rural water supply new infrastructure :** The bulk of new infrastructure and major rehabilitation works will continue to be funded by the Government of Rwanda and its development partners and NGOs will contribute to infrastructure development
- Rural water supply O&M costs will be covered by user fees, Tariffs will be set to ensure the financial viability and sustainability of scheme operations, at a level of cost recovery that includes major repairs and replacement of electro-mechanical equipment but not asset depreciation
- **Urban water supply**: The operational costs of urban water supply shall be entirely covered by user fees, with the long-term objective to achieve full cost recovery. In the short and medium term, extensions of the production and distribution capacities will be funded by the Government, but the utility will be encouraged and supported to identify other sources of funding, such as loans. The opportunities to mobilize private investment (e.g., in bulk water supply) will be explored.

6.2 Funding assumptions for sanitation –sub sector

- It is assumed that cost estimates are indicative pending a more detailed cost evaluations through a study on cost effective financial model by type of activity and intervention
- The funding stream for sanitation will be through government budget and development partners
- Private investments by households or companies and costs covered by fees such as O&M costs are not indicated
- **Individual sanitation**: Private households, institutions, industries and trade shall finance their sanitation facilities
- **Institutional sanitation**: Building and maintenance of these sanitary facilities fall under the responsibilities of the respective institutions (MoH, MINEDUC, MINALOC/Districts) that shall provide the necessary financing for improvements, hygiene promotion and proper maintenance

- **Collective sanitation**: Public infrastructures such as sewerage systems and sludge disposals require substantial upfront investments as well as operating funds. Funds will be channelled through WASAC as well as PPP arrangements
- **Storm water households:** business and institutions shall finance and build a major portion of local infrastructure inside their premises by integrating adequate design and planning for storm water
- **Electronic waste, industrial waste, radioactive waste and industrial waste management:** Building and maintenance of the sanitary facilities fall under the responsibilities of the respective institutions (MYICT, MINEACOM, MININFRA MINIRENA and MoH) that shall provide the necessary financing for both policy and waste management guidelines development, as well as the construction of waste management facilities

6.3 Sources of funding for financing the WATSAN SSP 2018-2024

This strategy will be financed through two main sources of funding, domestic resources as well as financial support from development partners/NGOs

- ✓ **Domestic Resources:** The Government of Rwanda finances WATSAN through the medium term framework which is a budget planning tool.
- ✓ **Development partner resources**: The main development partner to finance development projects will be African Development Bank, JICA etc
- ✓ **The private sector** These will be motivated to invest in water and sanitation sector through investing in potential water and sanitation projects
- ✓ **Decentralized Entities:** The districts will also secure funding from earmarked transfers from central government channeled through LODA

6.4 Expenditure projections for WATSAN sector 2018-2024

The total cost to implement WATSAN strategic plan for the next 6 years is estimated at 609 billion Rwf which corresponds to approximately to 742 $USD millions(at an exchange rate of exchange rate of 852 Rwfs/1USD).

As shown in the table below WATSAN outcome related to improved and sustained urban and rural households access to safe drinking water takes up the biggest portion of the projected budget of 78% to ensure that basic water services are delivered to the communities by Construction, extension, rehabilitation of 1,851 Km in rural areas, construction, extension, rehabilitation of 1,937 Km in city of Kigali and other towns and Rehabilitation of 430 Non-functional rural water supply systems country wide. The funds will be used as well to increase daily water production capacity from182, 120 to 303,120 m3 per day

In order for the sector to improve and sustain access to basic sanitation services, 17.2% of the estimated budget will be spent on the construction of Kigali feacal sludge treatment plant. In additional funds will be spent on establishing waste management facilities by construction of central sewerage systems, faecal sludge management and modern landfills in secondary cities of Karongi, Rabavu, Rusizi and Musanze.

Sustainability of water supply and sanitation services is critical for the sector. Thus, the sector will be positioned to strengthen and enhance capacity development and innovative approaches over the period of the strategy. Within the framework of Capacity Development 9% of the entire budget will be spent on staff capacity enhancement, establishment of WATSAN centralized Management Information systems, WASH-DWA implementation in all districts and national water supply and sanitation master plans as well as feasibility studies and national sector guidelines

6.4.1 Expenditure Projections for WATSAN implementation 2018-2024

STRATEGIC OUTCOMES	WATSAN Strategic Intervenations/activities	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL COST	% share
OUTCOME 1: WATSAN Division Policy coordination and M&E of Watsan programs/projects		1,585,626,180	1,585,626,180	1,599,282,180	1,599,282,180	1,599,282,180	1,599,282,180	9,568,381,080	1.5
1.1	Policy coordination, M&E of WATSAN programs/projects	288,707,688	288,707,688	299,207,688	299,207,688	299,207,688	299,207,688	1,774,246,128	
1.2	WATSAN Secretariat	63,120,000	63,120,000	66,276,000	66,276,000	66,276,000	66,276,000	391,344,000	
1.3	WASAC Co Ltd (wage bill)	1,233,798,492	1,233,798,492	1,233,798,492	1,233,798,492	1,233,798,492	1,233,798,492	7,402,790,952	
OUTCOME 2:Improved and Sustained urban and rural households access to safe drinking water		84,802,509,102	100,603,010,177	108,204,225,137	78,466,356,163	85,503,081,270	35,383,818,252	492,963,000,101	78.0
2.1	Construction, extension and rehabilitation of 1,851 Km in rural areas	26,502,509,927	31,903,016,075	44,704,222,689	35,366,366,308	32,503,074,370	13,883,810,632	170,979,189,369	
2.2	Construction, extension, rehabilitation of 2,093 Km in city of Kigali and other towns	33,399,997,360	48,899,993,970	32,000,002,580	30,499,991,340	41,000,007,230	21,500,007,620	185,799,992,480	
2.3	Increase daily water production capacity from 182,120 to 303,120 m3 per day	16,500,001,815	1,800,000,132	1,499,999,868	4,499,998,515	11,999,999,670	0	36,300,000,000	
2.4	Rehabilitation of 430 Non-functional rural water supply systems country wide	8,400,000,000	18,000,000,000	30,000,000,000	8,100,000,000	0	0	64,500,000,000	
OUTCOME 3 : Improved and Sustained household access to basic sanitation Services		48,068,480,000	30,208,860,000	30,208,860,000	0	0	0	108,486,200,000	17.2
3.1	Construction of kigali centralised sewerage	48,068,480,000	30,208,860,000	30,208,860,000	0	0	0	108,486,200,000	
OUTCOME 4 :Integrated and sustained Waste Management Services		6,756,294,928	6,205,152,393	0	0	0	0	12,961,447,321	2.0
4.1	Construction of Kigali feacal sludge treatment plant	4,550,310,000	3,046,175,000	0	0	0	0	7,596,485,000	
4.2	Construction of 4 FSTPs and 4 modern land fills	2,105,984,928	3,158,977,393	0	0	0	0	5,264,962,321	
4.3	Enhanced Appropriate technologies on waste water and fecal sludge management	100,000,000	0	0	0	0	0	100,000,000	
Outcone 7: Improved and promoted basic sanitation for other public institutions and locations		402,576,117	1,022,443,331	1,533,664,997	0	0	0	2,958,684,445	0.5
7.1	Study for rehabilitation and upgrading of semi-centralized sewerage system.	147,467,788	0	0	0	0	0	**147,467,788**	
7.2	Rehabilitation and upgrading of 12 semi-centralized sewerage systems in Estates	255,108,329	1,022,443,331	1,533,664,997	0	0	0	**2,811,216,657**	
OUTCOME 8 :WATSAN Capacity Development and innovative approaches		3,222,111,724	1,472,524,669	688,962,729	0	0	0	5,383,599,122	0.9
8.1	Staff capacity enhanced to deliver quality programs	67,500,000	0	0	0	0	0	67,500,000	
8.2	Establishment of WATSAN centralised Management Information systems	0	0	600,000,000	0	0	0	600,000,000	
8.3	Implementation of WASH-District Wide Approach Intiative in all districts	236,875,800	1,184,379,000	0	0	0	0	1,421,254,800	
8.4	Development of National water Supply and Sanitation Master Plans	2,122,329,002	154,701,576	0	0	0	0	2,277,030,578	
8.5	WASAC Strategic Capacity building plan developed and implemented	222,406,922	133,444,093	88,962,729	0	0	0	444,813,744	
8.7	WATSAN Strategic feasibility studies and National Guidelines	573,000,000	0	0	0	0	0	573,000,000	
Totals		144,837,598,051	141,097,616,750	142,234,995,043	80,065,638,343	87,102,363,450	36,983,100,432	632,321,312,069	100.0

LIST OF APPENDIX

Annex 1: Water and Sanitation Sector Monitoring and Indicator Matrix:

Indicators	Baseline	Targets						
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
% of population using an improved water source	85	100	100	100	100	100	100	100
% of population using an improved water source in rural areas	TBD							
% of population using an improved water source in urban areas	TBD							
% of urban households using an improved water source within 500m	60.5	80	100	100	100	100	100	100
% of urban households using an improved water source within 200m								
% of population using an improved water source within 30 minutes round-trip in rural areas	TBD							
% of population using an improved water source within 30 minutes round-trip in Urban areas	N/A	80	82	90	95	100	100	100
% of population using an improved water source within 30 minutes round-trip in rural areas	TBD							
% of households with improved water source in dwellings /yard in urban areas	8.1	15	17	20	25	27	30	35
% of households with improved water source in dwellings /yard in rural areas	TBD							
% of households with water available when needed in rural	TBD							
% of households with water available when needed in rural	TBD							
% of population using an improved source which is of free contamination at the point of delivery in urban areas	22.7	22.9	23.1	23.3	23.5	24	25	30
% of population using an improved source which is of free contamination at the point of delivery in rural areas	TBD							
% of fully functional water system in urban areas	62	65	72	80	86	90	95	100
Total urban water production capacity (000'm^3 per day)	182	237	242	257	297	303	303	
% of rural improved water sources functional at the time of spot check	75	80	85	90	100	100	100	100

% of public rural water supply systems managed by a contracted private operator	70	80	90	100	100	100	100	100
% cost recovery (revenue / O&M costs) for rural piped water schemes	90	100	110	120	120	120	120	120
(%) non-revenue water (WASAC)	35.5	33.5	31	30	28	25	24	22
Number of districts with functional District water boards	15	30	30	30	30	30	30	30
percentage (%) of districts with at least 1 qualified WSS engineer	15	20	30	30	30	30	30	30
% women represented in key positions of water user committees	N/A	30	30	30	30	30	30	30
Parity female to male headed households using basic sanitation services								
% of population using basic sanitation facilities	83.4	100	100	100	100	100	100	100
% of population with basic on-site sanitation facilities which safely contain waste in situ in rural	TBD							
% of population with basic on-site sanitation facilities which safely contain waste in situ in urban	TBD							
% of households with access to collective sewerage services	2	2	2	5	5	5	20	20
% of households with on-site improved sanitation facilities or septic tank have access to safe sludge disposal services in urban	N/A	10	20	35	45	50	50	50
% of households with on-site improved sanitation facilities or septic tank have access to safe sludge disposal services in rural	TBD							
% of key positions in the Water Sector institutions held by women								
Percentage (%) of health centres with improved WS facilities	63	70	80	90	100	100	100	100
Percentage (%) of health centres with improved Sanitation facilities	TBD							
Percentage (%) of schools with improved WS facilities	34.5	44	60	75	100	100	100	100
Percentage (%) of schools with improved Sanitation facilities	TBD							
% of urban population in areas covered by master plans with storm water considerations	N/A	20	40	50	60	70	80	90
% of solid waste collected and recycled	N/A	5	10	20	25	30	35	40
Percentage of nuclear/ radioactive waste safely managed	N/A	TBD						

% of investments for e-waste management in youth and information and communication technology sector	2	3	5	7	8	10	12	14
Number of industrial waste management tools developed	N/A	TBD						
% of households sorting waste	N/A	TBD						
% of households contracted with service providers collecting and transporting waste	N/A	TBD						
% of Districts with appropriate solid waste disposal facilities/ modern Landfills	N/A							
% of industries with centralized wastewater treatment systems	10	15	20	25	30	35	40	45

ANNEX 2 : PRIORITY ACTIONS MATRIX TEMPLATE

SSP Priority Outcome indicator	Priority action Description	TARGET (Annual Priority action)					
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
% of urban and rural households with access to drinking water	Construction, extension, rehabilitation of 1,937 Km in city of Kigali and other towns	133 km constructed and 189 km rehabilitated in urban areas	180 km constructed and 274 km rehabilitated in urban areas	130 km constructed and 396 km rehabilitated in urban areas	150 km constructed and 145 km rehabilitated in urban areas	140 km constructed and 130 km rehabilitated in urban areas	115 km constructed and 95 km rehabilitated in urban areas
	Construction, extension, rehabilitation of 1,851 Km in rural areas	76.5 km rehabilitated in rural areas and 188.5 of new WSS constructed	117 km rehabilitated in rural areas and 202 of new WSS constructed	50 km rehabilitated in rural areas and 397 of new WSS constructed	356 km of new WSS constructed in rural areas	40 km rehabilitated in rural areas and 285 of new WSS constructed	19 km rehabilitated in rural areas and 120 of new WSS constructed
	Increase daily water production capacity from 182,120 to 303,120 m3 per day	production capacity Increased by 55 000 m3/d	production capacity Increased by 5000m3/d	production capacity Increased by 15000 m3/d	production capacity Increased by 6000 m3/d	production capacity Increased by 40 000 m3/d	
Number of nonfunction rural water supply system rehabilitated	Rehabilitation of 430 Non-functional rural water supply systems	56 nonfunctional rural water supply systems rehabilitated	120 nonfunctional rural water supply systems rehabilitated	200 nonfunctional rural water supply systems rehabilitated	54 nonfunctional rural water supply systems rehabilitated		
Effective institutional and staff capacities	WASH MIS developed and operationalized	WASH MIS developed	WASH MIS operationalized	WASH MIS operationalized and improved	WASH MIS operationalized and	WASH MIS operationalized and	WASH MIS operationalized and

SSP Priority Outcome indicator	Priority action Description	TARGET (Annual Priority action)					
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
					improved	improved	improved
	District wide approach implemented in all District	District Investment plans developed	Integrated action plan for water and sanitation developed	Integrated action plan for water and sanitation Implemented	Integrated action plan for water and sanitation updated and Implemented	Integrated action plan for water and sanitation updated and Implemented	Integrated action plan for water and sanitation updated and Implemented
	Strategic Capacity building plan developed and implemented	Capacity gap assessment completed	Strategic Capacity building plan developed	20% of Strategic Capacity building plan implemented	40% of Strategic Capacity building plan implemented	60% of Strategic Capacity building plan implemented	80% of Strategic Capacity building plan implemented
	Water and sanitation Laboratory constructed and operationalized	Design completed	Works completed at 50%	Works completed at 100%	Laboratory equipment provided	Laboratory operational	
Population using at least basic sanitation facilities	Construction of Kigali centralized sewerage system	10% of works completed	40% of works completed	70% of works completed	100% of works completed		
	Construction of 5 feacal sludge treatment plants	1 Feacal sludge treatment plant constructed	1 Feacal sludge treatment plant constructed	2 Feacal sludge treatment plant constructed	2 Feacal sludge treatment plant constructed		
	Construction of 4 modern land fill		1 modern landfill constructed	2 modern landfills constructed	2 modern landfills constructed		

SSP Priority Outcome indicator	Priority action Description	TARGET (Annual Priority action)					
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
	Rehabilitation and upgrading of 18 semi-centralized sewerage systems in Estates	8 semi centralized sewerage systems rehabilitated	5 semi centralized sewerage systems rehabilitated	5 semi centralized sewerage systems rehabilitated			
	Development of National Sanitation Master Plan	Inception report	Study completed				

Alignment with NST Results, Policy Matrix and SDG 2030

WATSAN sector aligned to several documents containing a wider number of indicators that are key to show progress in implementation. The EDPRS Results and Policy Matrix have taken into consideration future targets and indicators in line with the SDGs and a list of joint monitoring programmes, new indicators which eventually could be used for monitoring the proposed SDGs in all countries

The WATSAN SSP is aligned with the global targets, definitions and monitoring of SDG 6.1 and 6.2, as determined by the official monitor – the WHO/UNICEF Joint Monitoring Program on Drinking Water and Sanitation (JMP). The Sector Working Group (SWG) and in collaboration with the National Institute of Statistics, will continue to harmonize indicators for water supply and sanitation, especially within the development of the forthcoming Management Information System.

SDG Target 6.1 – "By 2030, achieve universal and equitable access to safe and affordable drinking water for all"

Target language	Normative definitions of target elements
6.1 – By 2030, achieve	
universal	Implies all exposures and settings including households, schools, health facilities, workplaces, etc.
and ***equitable***	Implies progressive reduction and elimination of inequalities between population sub-groups
Access	Implies sufficient water to meet domestic needs is reliably available close to home
to ***safe***	Safe drinking water is free from pathogens and elevated levels of toxic chemicals at all times
and ***affordable***	Payment for services does not present a barrier to access or prevent people meeting other basic human needs
drinking water	Water used for drinking, cooking, food preparation and personal hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people living with disabilities

SDG Target 6.2 – "By 2030, achieve adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations".

Target language	Normative definition of target elements
6.2 – By 2030, achieve	
access (for all)	Implies facilities close to home that can be easily reached and used when needed
to ***adequate***	Implies a system which hygienically separates excreta from human contact as well as safe disposal of excreta in situ, or transport to a treatment plant
and ***equitable***	Implies progressive reduction and elimination of inequalities between population sub-groups
sanitation	Sanitation is the provision of facilities and services for safe management and disposal of human urine and faeces
and ***hygiene***	Hygiene is the conditions and practices that help maintain health and prevent spread of disease including hand washing, menstrual hygiene management and food hygiene
for all	Suitable for use by men, women, girls and boys of all ages including people living with disabilities
end ***open defecation***	Excreta of adults or children are: deposited (directly or after being covered by a layer of earth) in the bush, a field, a beach, or other open area; discharged directly into a drainage channel, river, sea, or other water body; or are wrapped in temporary material and discarded
paying special attention to the ***needs of women and girls***	Implies reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity; special attention should be given to the needs of women and girls in 'high use' settings such as schools and workplaces, and 'high risk' settings such as health-care facilities and detention centres
and ***those in vulnerable situations***	Implies attention to specific WASH needs found in 'special cases' including refugee camps, detention centres, mass gatherings and pilgrimages

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