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ITEKA RYA MINISITIRI N° 004/25/10/TC RYO KU WA 28/07/2025 RISHYIRAHU IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA GAKENKE Minisitiri w'Imari n'Igenamigambi; Ashingiye ku Itegeko Nshinga rya Repubulika y'u Rwanda; Ashingiye ku Itegeko n° 27/2021 ryo ku wa 10/06/2021 rigenga ubutaka, cyane cyane mu ngingo yaryo ya 59; Bimaze kemezwa n'Inama Njyanama y'Akarere ka Gakenke yateranye ku wa 24/08/2023; Inama y'Abaminisitiri yateranye ku wa 22/05/2024 imaze kubisuzuma no kubyemeza; ATEGETSE: <u>Ingingo ya mbere:</u> Ishyirwaho Hashyizweho igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke.	MINISTERIAL ORDER N° 004/25/10/TC OF 28/07/2025 ESTABLISHING LAND USE AND DEVELOPMENT MASTER PLAN OF GAKENKE DISTRICT The Minister of Finance and Economic Planning; Pursuant to the Constitution of the Republic of Rwanda; Pursuant to Law n° 27/2021 of 10/06/2021 governing land, especially in Article 59; After approval by the Council of Gakenke District, in its meeting of 24/08/2023; After consideration and approval by the Cabinet, in its meeting of 22/05/2024; ORDERS: <u>Article One:</u> Establishment The land use and development master plan of Gakenke District is established.	ARRÊTÉ MINISTÉRIEL N° 004/25/10/TC DU 28/07/2025 ÉTABLISSANT LE SCHEMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE GAKENKE Le Ministre des Finances et de la Planification Économique ; Vu la Constitution de la République du Rwanda ; Vu la Loi n° 27/2021 du 10/06/2021 portant régime foncier, spécialement en son article 59 ; Après adoption par le Conseil du District de Gakenke, en sa réunion du 24/08/2023 ; Après examen et adoption par le Conseil des Ministres, en sa séance du 22/05/2024 ; ARRÊTE : <u>Article premier :</u> Établissement Il est établi le schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke.
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<u>Ingingo ya 2: Ibigize igishushanyo mbonera</u> Igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke, kigizwe n'ibi bikurikira: (a) raporo rusange y'igishushanyo mbonera cy'imikoreshereze n'imitunganyirize y'ubutaka cy'Akarere; (b) amakuru ndangahantu y'igishushanyo mbonera; (c) amabwiriza agenga ishyirwa mu bikorwa ryacyo.	<u>Article 2: Composition</u> The District land use and development master plan of Gakenke District is composed of the following: (a) the main report of the District land use and development master plan; (b) zoning plan; (c) zoning regulations.	<u>Article 2 : Composition</u> Le schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke est composé de ce qui suit : (a) le rapport général du schéma directeur d'utilisation et d'aménagement des terres du District ; (b) le plan de zonage ; (c) le règlement de zonage.
<u>Ingingo ya 3: Itangazwa</u> (1) Raporo rusange y'igishushanyo mbonera cy'imikoreshereze n'imitunganyirize y'ubutaka cy'Akarere ka Gakenke iri ku mugereka w'iri teka. (2) Amakuru ndangahantu y'igishushanyo mbonera cy'Akarere ka Gakenke n'amabwiriza agenga ishyirwa mu bikorwa ryacyo bitangazwa ku rubuga rw'ikoranabuhanga rwagenwe n'urwego rufite imicungire	<u>Article 3: Publication</u> (1) The main report of the land use and development master plan of Gakenke District is annexed to this Order. (2) The zoning plan and zoning regulations of the land use and development master plan of Gakenke District are published on the website designated by the organ in charge of land use management.	<u>Article 3 : Publication</u> (1) Le rapport général du schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke est annexé au présent arrêté. (2) Le plan de zonage et le règlement de zonage du schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke sont publiés sur le site web désigné par l'organe ayant l'utilisation et la gestion des terres dans ses attributions.

n'imikoreshereze by'ubutaka mu nshingano. <u>Ingingo ya 4: Igihe igishushanyo mbonera kimara</u> Igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke gikurikizwa kugeza mu 2050. <u>Ingingo ya 5: Ivugururwa</u> (1) Igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke gishobora kuvugururwa cyose nyuma y'imyaka icumi cyangwa ikindi gihe bibaye ngombwa uhereye ku muni gishyiriweho. (2) Ivugururwa ry'igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke rishobora kandi gukorwa rireba agace gato igihe bibaye ngombwa bitabangamiye iterambere ry'utundi duce kandi hakurikijwe amategeko abigenga. <u>Ingingo ya 6: Ingingo y'ururimi</u> Iri teka ryateguwe mu rurimi rw'Ikinyarwanda.	<u>Article 4: Period of validity</u> The land use and development master plan of Gakenke District is implemented until 2050. <u>Article 5: Revision</u> (1) The land use and development master plan of Gakenke District may be comprehensively reviewed after ten years or whenever considered necessary from the date of its establishment. (2) The revision of land use and development master plan of Gakenke District may also be done on a specific area, when considered necessary, without compromising the development of other areas in accordance with relevant laws. <u>Article 6: Language provision</u> This Order was drafted in Ikinyarwanda.	<u>Article 4 : Période de validité</u> Le schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke est mis en œuvre jusqu'en 2050. <u>Article 5 : Révision</u> (1) Le schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke peut être entièrement révisé après dix ans ou chaque fois que cela est jugé nécessaire à partir du jour de son établissement. (2) La révision du schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke peut également être effectuée sur une zone spécifique, en cas de besoin, sans compromettre le développement des autres zones conformément à la législation en la matière. <u>Article 6 : Disposition linguistique</u> Le présent arrêté a été rédigé en Ikinyarwanda.
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<u>Ingingo ya 7: Gutangira gukurikizwa</u> Iri teka ritangira gukurikizwa ku munsu ritangarijweho mu Igazeti ya Leta ya Repubulika y'u Rwanda. Agaciro karyo gahera ku wa 24/08/2023.	<u>Article 7: Entry into force</u> This Order comes into force on the date of its publication in the Official Gazette of the Republic of Rwanda. It takes effect as of 24/08/2023.	<u>Article 7 : Entrée en vigueur</u> Le présent arrêté entre en vigueur le jour de sa publication au Journal Officiel de la République du Rwanda. Il prend ses effets à partir du 24/08/2023.
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Kigali, 28/07/2025

(sé)

MURANGWA Yusuf

Minisitiri w'Imari n'Igenamigambi
Minister of Finance and Economic Planning
Ministre des Finances et de la Planification Économique

Bibonywe kandi bishyizweho Ikirango cya Repubulika:
Seen and sealed with the Seal of the Republic:
Vu et scellé du Sceau de la République :

(sé)

Dr UGIRASHEBUJA Emmanuel

Minisitiri w'Ubutabera akaba n'Intumwa Nkuru ya Leta
Minister of Justice and Attorney General
Ministre de la Justice et Garde des Sceaux

UMUGEREKA W'ITEKA RYA MINISITIRI N° 004/25/10/TC RYO KU WA 28/07/2025 RISHYIRAHO IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA GAKENKE	ANNEX TO MINISTERIAL ORDER N° 004/25/10/TC OF 28/07/2025 ESTABLISHING LAND USE AND DEVELOPMENT MASTER PLAN OF GAKENKE DISTRICT	ANNEXE À L'ARRÊTÉ MINISTÉRIEL N° 004/25/10/TC DU 28/07/2025 ÉTABLISSANT LE SCHÉMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE GAKENKE
IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA GAKENKE	LAND USE AND DEVELOPMENT MASTER PLAN OF GAKENKE DISTRICT	SCHÉMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE GAKENKE



GAKENKE

District Land Use Plan 2023-2050



“A Vibrant Agro-processing and Mining Hub”

2023

Report Title	Gakenke District Land Use Plan 2023 – 2050
Project title	Gakenke District Land Use Plan Report
Owner	Gakenke District
District Council Approval	24 th August, 2023
Cabinet Approval	22 nd May 2024

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List of Acronyms

ATM:	Automatic Teller Machine
BPMIS:	Building Permitting Management Information System
BRT:	Bus Rapid Transit
CCP:	Continuous Compliant Planning
CICP:	Capital Investment Catalytic Project
DDS:	District Development Strategy
DHS:	Demographic and Health Survey,
DLUP	District Land Use Plan
DU:	Dwelling Unit
ECD:	Early Childhood Development
EDPRS:	Economic Development and Poverty Reduction Strategy
EIA:	Environmental Impact Assessment
ENR:	Environment and natural resources
FMI:	Financial Management Institutions
GDP:	Gross Domestic Product
GGCRS:	Green Growth and Climate Resilient Strategy
GGGI:	Global Green Growth Institute
GIS:	Geographic Information System
GoR:	Government of Rwanda
GPS:	Geographic Positioning System
HCI:	Human Capital Index
HH:	Household
HIC:	Higher Income Country
ICT:	Information Communication and Technology
IDP:	Integrated Development Programme
LED:	Local Economic Development
LG:	Local Government
LUCA:	Land Use Category
LUDP:	Local Urban Development Plan
M&E:	Monitoring and Evaluation
MCC :	Milk Collection Center
MFI :	Microfinance Institutions
MIC:	Middle Income Countries
MoE:	Ministry of Environment
MoH:	Ministry of Health
NLA:	National Land Authority
NLUDMP:	National Land Use and Development Master Plan
NMT:	Non-Motorized Transport
NST:	National Strategy for Transformation
PHC:	Rwanda Population and Housing Census

PUSH:	Population, Urbanization, Settlement and Housing
RAB:	Rwanda Agriculture Board
RDB:	Rwanda Development Board
REMA:	Rwanda Environment Management Authority
RHA:	Rwanda Housing Authority
RHDS:	Rwanda Health Demographic Survey
ROW:	Right of Way
RTDA:	Rwanda Transport Development Agency
SACCO:	Saving and Credit Cooperatives
SDGs:	Sustainable Development Goals
SEZs:	Special Economic Zones
SLFMP:	Sports and Leisure Facilities Management Plan
SME:	Small and Medium Enterprise
SUDS:	Sustainable Urban Drainage Systems
TTC:	Teacher Training College
TVET:	Technical and Vocational Education and Training
UMIC:	Upper Middle-Income Country
UR:	University of Rwanda
USD:	United States Dollar
VTC:	Vocational Training Centers
WASAC:	Water and Sanitation Corporation
WHO:	World Health Organization

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EXECUTIVE SUMMARY

The ambitious targets of Vision 2050 together with the National Land Use Development Master Plan 2020-2050 set the framework for district land use planning in Rwanda. Gakenke District Land Use Plan (DLUP) contributes to the implementation of NLUDMP 2020-2050 adopted by the Cabinet in July 2020.

Gakenke DLUP, along with those for other districts, was primarily initiated to accommodate Rwanda's rapid population growth and accelerate economic development, mainly through organized urbanization and agriculture development. In the case of Gakenke District, the population was recorded at 365,292, with 4.0 % residing in urban areas in 2022. Projections indicate that the population will reach 368,850 with an urbanization rate of 28.2 % by 2035 and 373,000 with an urbanization rate of 54.4 % by 2050.

Gakenke DLUP determines allocation of land to different uses by clustering all thematic areas to efficiently manage the use of resources and guide future development in line with the NLUDMP 2020-2050, thereby promoting social, economic and environmental benefits.

Gakenke District has 704.06 km² surface area of which 56% are planned for agriculture; 21.5% for forests; 9.2% for residential; 5.3% for transportation; 1.7% for wetlands; 2.4% for water bodies; 1.5% for buffer zones; 0.3% for commercial; 0.5% for industry; 0.5% for public utility; 0.7% for public facility; other land uses such as public administration and ecotourism occupy the rest with small percentages each.

Agriculture is a major source of income for Gakenke District population and the sector will remain a major part of any high-growth strategy. An increase of productivity will come from innovations, better technology and a better allocation of resources.

As the vision of Gakenke DLUP is “**A Vibrant Agro-processing and Mining Hub**” Agriculture needs to shift from primarily supplying commodities for domestic use to producing higher-value-added goods as an integral part of food supply chains linked to regional and international markets.

The District will strive for developing an industrial mining sector. Larger-scale private investments should be made in production, processing, and value addition of minerals. (Exports of other high-value minerals.)

Potential touristic sites will be developed and operationalized to provide employment opportunities for the local population and stimulate economic growth in the District. Gakenke District will be internationally known by branding its delicate coffee, minerals, fruits, vegetables and touristic attractions.

Moreover, Gakenke District should prioritize investments in roads, housing, and commercial structures in urban centers and rural settlements to increase densities which increases economies of scale and opportunities for specialization by reducing transport costs, and improves firms' access to critical services and a large pool of labor with varied skills.

Furthermore, Gakenke DLUP planning approach is Normative one; which is opposed to the methodology that believes in the projection of trends, perpetuating « Business as Usual » and ending up with « MORE OF THE SAME ». A successful implementation of this plan requires strong political will and appropriate partnerships involving all relevant stakeholders to ensure that Gakenke District becomes a vibrant agro processing and mining hub.

1. INTRODUCTION

1.1. Background of Gakenke DLUP

Land is part of the common heritage of all Rwandans, the ancestors, present and future generations. Land provides a foundation for economic activity and the functioning of market and non-market institutions. Any country promoting efficient land use and management promotes sustainable development. For the last two decades and a half, the demand for land in Rwanda has increased due to high demographic pressure and resettlement caused by population growth, fragmented land sharing, and land required to spur economic recovery after the Genocide against the Tutsi in 1994.

Urbanization is one of the key drivers to stimulate economic growth. The Government of Rwanda, through Vision 2050, has an ambitious agenda to accelerate economic growth by increasing the annual gross domestic product (GDP) per capita. By achieving this vision, Rwandans will enjoy a higher quality of life with adequate social protection, improved health, disaster risk reduction, and food security.

In January 2011, the cabinet adopted the first version of the National Land Use and Development Master Plan (NLUDMP) to determine the actual land use and prepare for the efficient use of resources and facilitate development in the country. The first version of the Gakenke District Land Use Plan (DLUP) was approved in 2013 but revealed gaps as it emphasized on planning urban areas instead of the whole District. Thus, in 2018, the District scaled-up the planning by developing and approving the Ruli Local Urban Development Plan (LUDP) as one of the emerging centers. These plans have steered land use planning across the District while implementing NLUDMP 2010 - 2020, Vision 2020 and EDPRS II. Vision 2020 was followed by Vision 2050.

Vision 2050 aspires Rwanda to transform its economy and modernize the lives of all Rwandans. It calls for establishing “The Rwanda we want”, meaning prosperity and high quality of life for all Rwandans by 2050. NLUDMP 2020-2050, approved by the Cabinet in July 2020, is a tool for implementing Vision 2050. It has the overall objective of finding solutions to the identified problems and generating specific guidelines for implementation and, mainly, designing a new and updated spatial structure for the nation. All settlements, namely urban, rural, large or small, are part of the national spatial puzzle, including Kigali, the Satellite Cities and the network of Secondary Cities.

In line with the NLUDMP 2020-2050, Rwanda aspires to become an upper middle-income country by 2035 (with a 4,035\$ GDP per Capita) and a high-income economy by 2050 (with a 12,476\$ GDP per Capita). Food security and a knowledge-based economy is deemed the optimal use of land. In

addition, sustainable urban development in combination with biodiversity conservation will reduce citizens' vulnerability to impacts of climate change.

District land use planning ensures the successful achievement of Rwanda's socio-economic transformation and the sustainability of development progress through the optimal and efficient use of land resources. All sectors such as urbanization and settlements, agriculture, infrastructures, forests and other economic sectors need to be planned clearly and effectively to avoid conflicts and to achieve sustainable development of the country through the efficient use of the limited land resources available.

Gakenke DLUP aims to implement the standards, principles, guidelines, development measures and actions mentioned in NLUDMP 2020-2050 needed for a successful socio-economic transformation and the sustainability of development progress in Gakenke District. The DLUP covers both urban and rural areas, and allocates land for various uses in order to effectively manage the available resources and guide future development.

Gakenke DLUP consists of District level zones (Gakenke District Town, and Ruli and Rushashi Rural centers), rural settlement sites, agricultural zones, tourism sites, forests, infrastructure and facilities. The DLUP complies to green principles and climate resilient strategies and alongside zoning regulations. The plan provides a basis for local detailed physical planning, cadastral maintenance and for construction permitting systems.

Gakenke DLUP will be implemented in four phases: **Phase 1:** 2023-2029; **Phase 2:** 2030-2035; **Phase 3:** 2036-2040; **Phase 4:** 2041-2050 (see chapter 5). The areas of the development phases will be based on key priority selected areas and catalytic projects in different sectors. Ownership by the community with novel solutions and higher achievements of goals; alongside law enforcement will help socio economic transformation of Gakenke District.

1.2. Objective and Scope

1.2.1. Objective

Gakenke DLUP aims at allocating land to different uses by clustering all thematic areas in account of managing the efficient use of resources and guide future development in line with the NLUDMP 2020-2050, thereby promoting social, economic and environmental benefits.

Gakenke DLUP gives details in terms of land allocation with specifications and potentialities of the

District, in comparison with the NLUDMP 2020-2050 which gives general guidelines to facilitate the planning balance of land use at national level.

More specifically, Gakenke DLUP aims at:

- To protect and preserve agricultural land;
- To consolidate all planned agricultural land, especially in rural areas;
- To foster residence only in planned settlement;
- To supply planned settlement with improved sustainable infrastructure and facilities;
- To develop mining sector from artisanal to modern mining while ensuring environmental protection;
- To protect environment and natural resources through increased forest cover, well managed wetlands and water bodies, solid and liquid wastes adequately managed and sustainable stormwater management practices;
- To upgrade and promote tourism sites;
- To increase orderly and densified planned human settlement through detailed physical plans in residential areas.

1.2.2. Scope

Gakenke DLUP encompasses the entire District, including both urban and rural areas.

Gakenke DLUP covers all thematic areas including (i) PUSH, population, urbanization, settlements and housing; (ii) spatial economy, employment, manufacturing, mining and industry; (iii) agriculture; (iv) environment and natural resources; (v) tourism and conservation; (vi) transportation; (vii) public facilities and services.

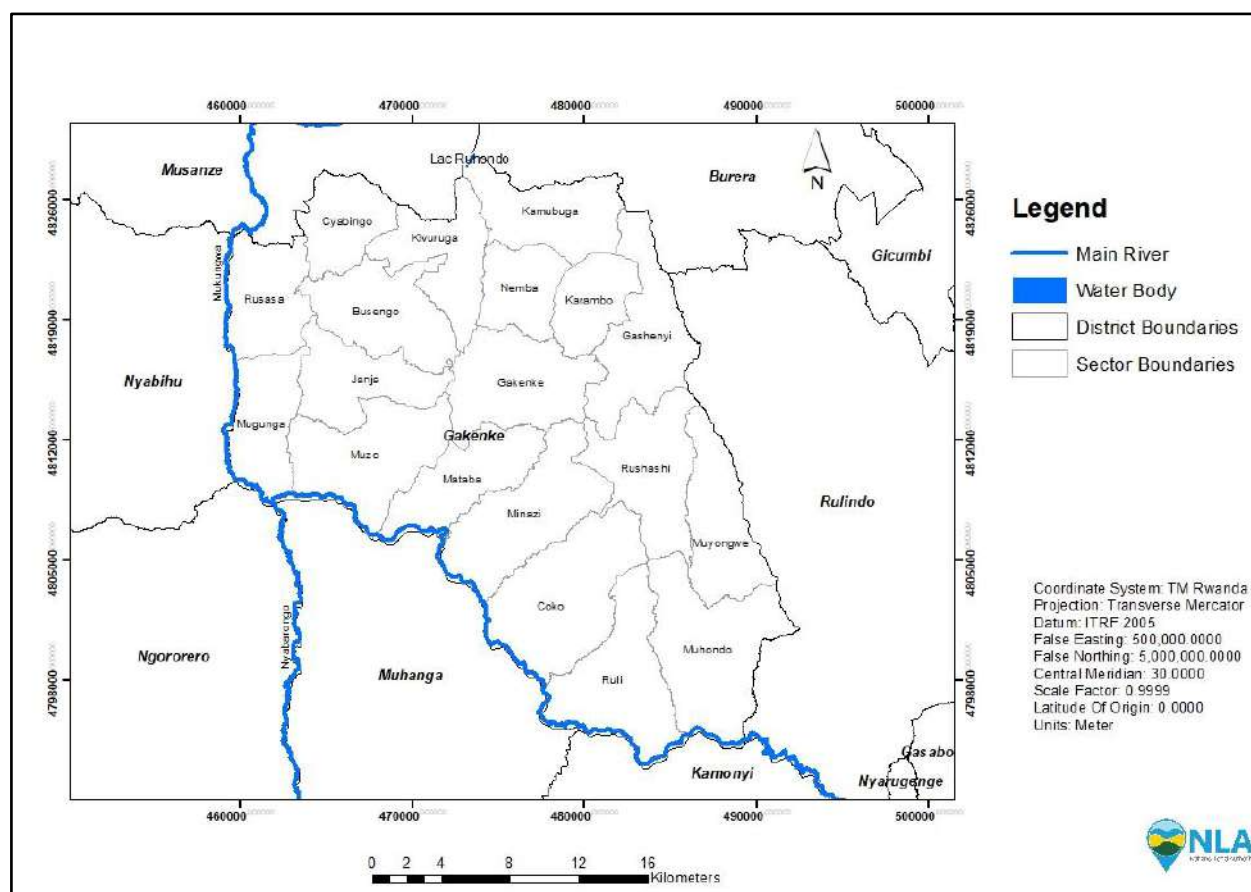
Taking all of these thematic areas together, land has been allocated and zoned for different uses to meet demands and to guide the way forward to the 2050 view in line with the NLUDMP 2020-2050. Figures are summarized and presented in the land use balance sheet.

1.3. General overview of Gakenke District

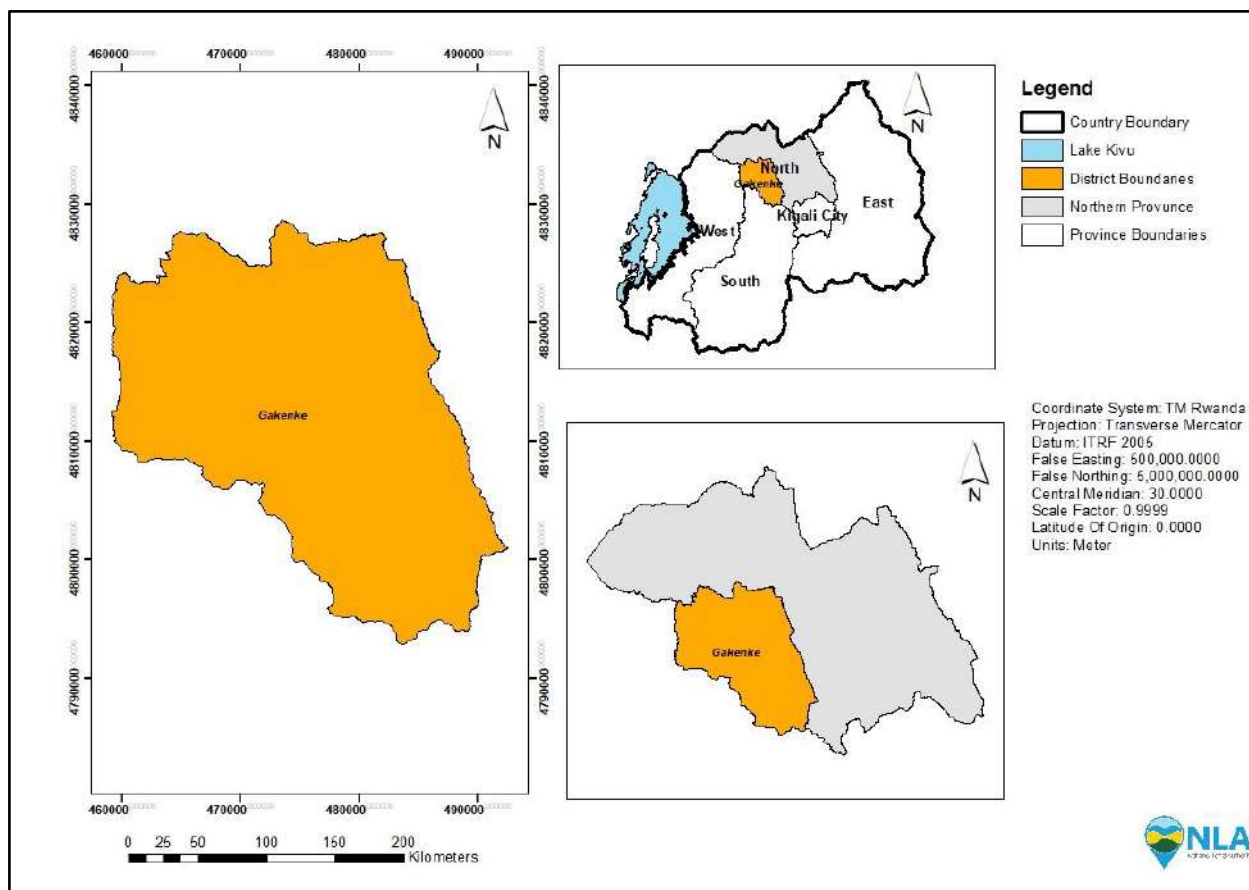
1.3.1. Geographical location of the District

Gakenke District borders Musanze and Burera Districts to the north and the north-east, to Rulindo District to the east, to Kamonyi District to the south, and to Muhanga, Ngororero and Nyabihu Districts to the west. (see figure 2).

Gakenke District is one of five Districts in the Northern Province. The District covers an area of 704 km², with 19 sectors (Gakenke, Coko, Ruli, Muhondo, Rusasa, Cyabingo, Kivuruga, Busengo, Mugunga, Janja, Muzo, Nemba, Kamubuga, Karambo, Gashenyi, Minazi, Rushashi, Muyongwe, Mataba), 97 cells, and 617 villages. The population of Gakenke District is approximately 365,000 with a population density of 520 people/km², making it the least densely populated District in the Northern Province. The following maps show the geographical location and administration of Gakenke District.



Map 1: Gakenke Administrative Map (Source: Gakenke District, Edited by Author; 2022)



Map 2: Location of Gakenke District in the Northern province and sectors within the District (Source: Gakenke District, Edited by author; 2022)

1.3.2. Hydrography

The District has water reserves that can provide enough water for both consumption and agricultural purposes, including substantial rainfall (between 1,100 and 1,500 mm per year), streams and watercourses.

The main rivers are Cyacika, Bahimba, Isumo, Busanane, Kiyebe, Sanzare, Gaseke, Kinoni, Nyamuhanga, Base and Mugobore Rivers. Part of Lake Ruhondo lie within the District, in Kamubuga and Kivuruga Sectors.

Two main rivers go along the district border, Mukungwa River in the west and Nyabarongo River to the south. These rivers pour their water in Akagera River, a tributary to the Nile River. Erosion on steep slopes due to housing primarily on the summits, brings a lot of sediments to the rivers. (Gakenke District, DDS;2018/2024).



1.3.3. Soil and Erosion

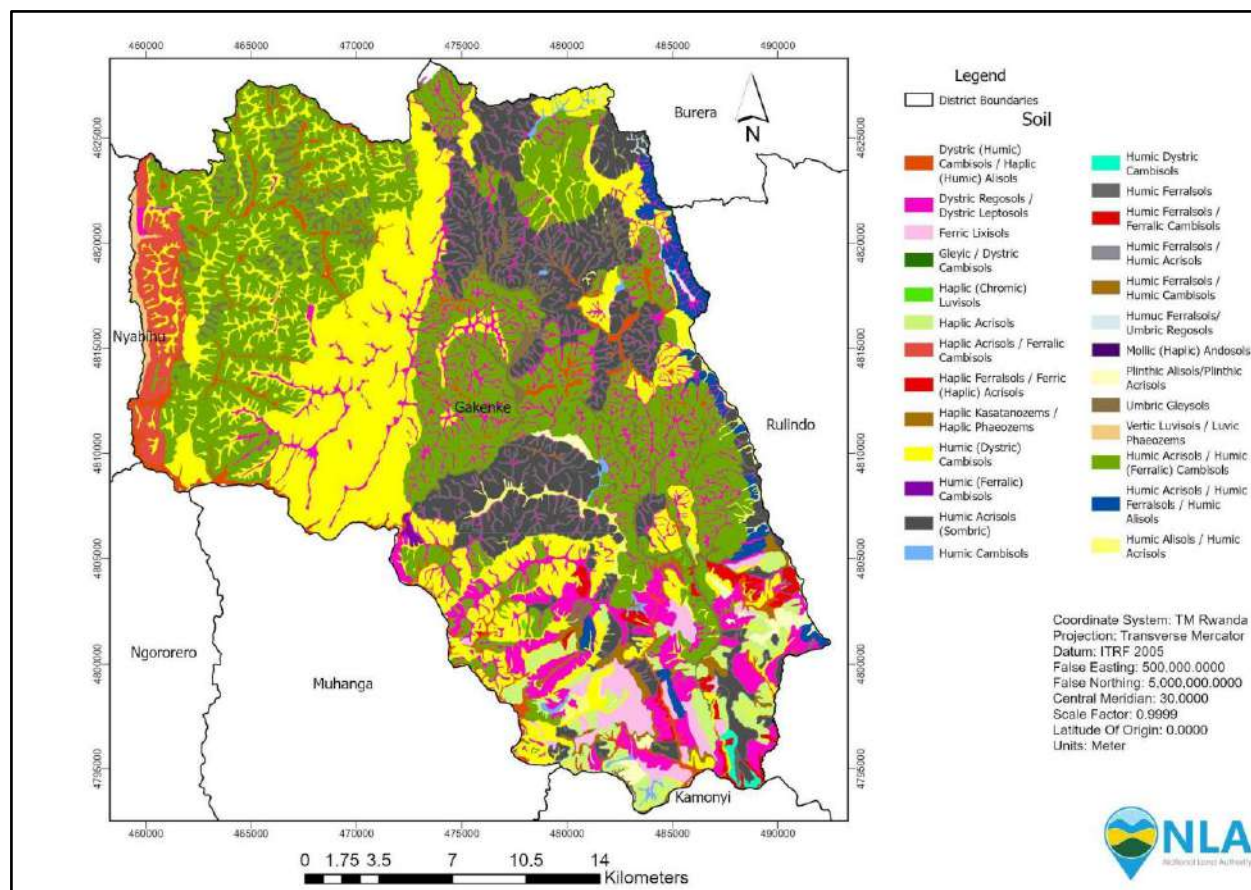
1.3.3.1 Soil in Gakenke District

Gakemke soil is mainly categorized into dystric, ferric, gleyic, haplic, humic, mollic, plinthic, umbric and vertic. (FAO, 2015)

The landscape is mainly composed of a system of hills and minor scarps. On one hand, the subsystem is a moderate relief intensity erosional landscape characterized by narrow elongated top-rounded ridges separated by wide valleys with broad gently sloping sides incised by the tributaries of the main rivers. This land is suitable for vegetables, rice and beans but not for coffee, tea, bananas and maize, and is found in Gashenyi, Gakenke, Nemba and Karambo Sectors.

On the other hand, the subsystem is a high relief intensity erosional landscape formed by a range of restricted sharp-edged summits, steep upper slopes and relatively steep middle and lower slopes with narrow valley floors. This land is suitable for coffee, maize, beans, potatoes, bananas and vegetables. It is found in the Sectors of Ruli, Coko and Minazi.

The vegetation in Gakenke District is composed of eragrostis, a dominant grass (which is an evident sign or characteristic of the high level of deteriorated soil), whereas on different small and high mountains big planted trees are evident. Vegetation is mainly constituted by green crops cultivated in a framework of land use consolidation. On hillsides, the soil is of granite origin whereas in marshlands and valleys, the soil is clay.



Map 4: Gakenke Soil Classification Map (Source: FAO (2015), edited by author; 2022)

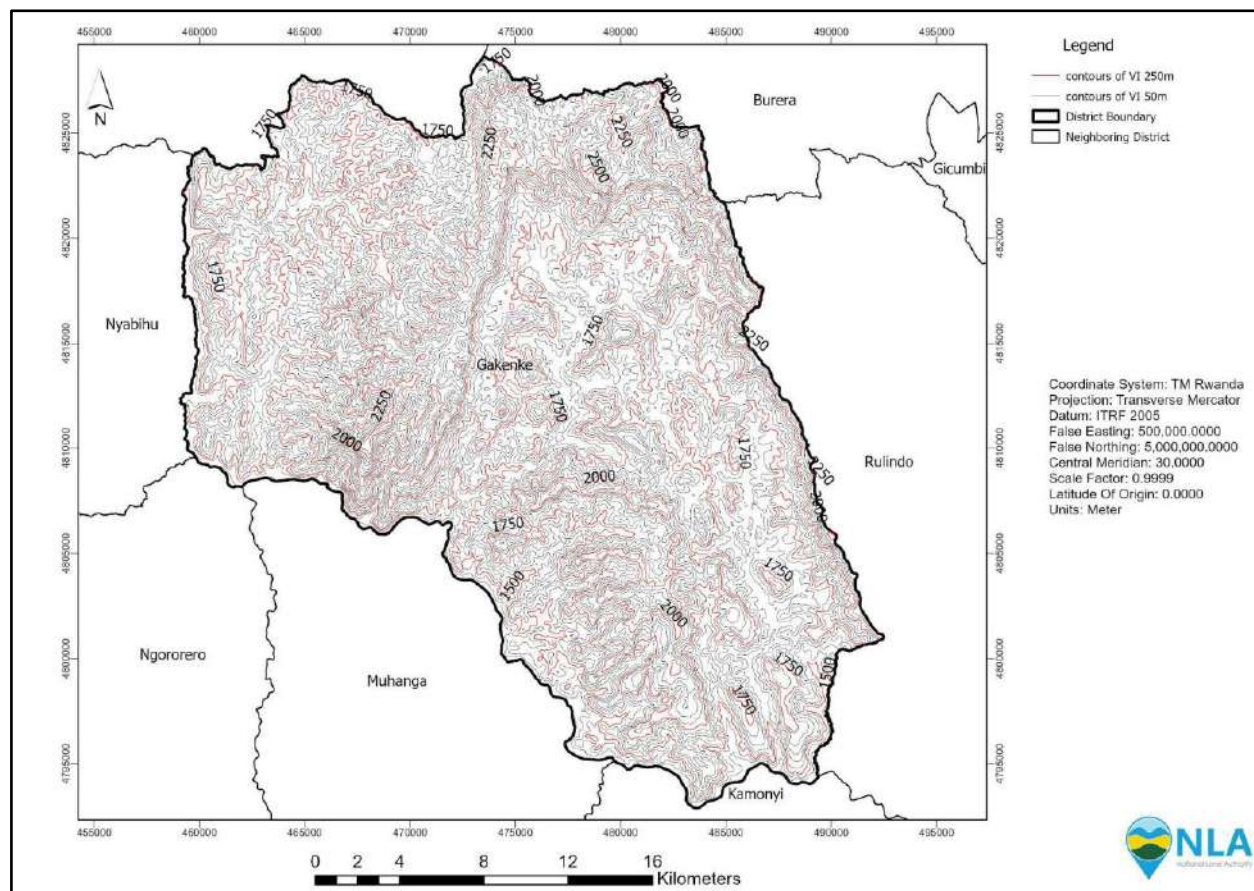
1.3.3.2 Erosion in Gakenke District

Soil erosion and soil nutrient loss are major problems, since most houses are situated on the summit and on the slopes. Due to the accidental relief in Gakenke District, the erosion takes the fertile soil to Mukungwa and Nyabarongo Rivers. The District has to take precautions to contain its soil and to protect it against erosion. (Gakenke District, DDS;2018/2024).

1.3.4. Topography

Gakenke District is characterized by high inclined hills separated by rivers and marshlands. The relief comprises two distinctive areas with the high-altitude region with mountains attaining 2,648 m (Mont Kabuye), and another region characterized by low inclined hills of about 1,700 m of

altitude. Marshlands occupy an area representing 361 ha. These marshlands are generally exploited during the dry season (May-September).



Map 5: Gakenke Slope Analysis Map (Source: Gakenke District, Edited by Author; 2022)

1.3.5. Climate and rainfall

Gakenke District has a humid climate with an average annual temperature between 16°C and 29°C. The humid wind comes from east to west. The rainfalls are relatively abundant, about 1,100 to 1,500 mm per year.

As it is the case in the Northern Province, Gakenke District has four different seasons:

- The small dry season: January-February
- The high rain season: March- May
- The high dry season: June- August
- The small rain season: September- December

The climate makes Gakenke District to be a favorable region for agricultural activities.

1.3.6. Flora and Fauna

1.3.3.1 Flora

Gakenke District boasts a rich diversity of natural flora due to its varied topography, climate, and soil types. The district is characterized by its hilly terrain and numerous rivers, which create microclimates conducive to various plant species. The natural flora vegetation typically found in Gakenke District includes Montane Forest like *hagenia abyssinica*, *Podocarpus milanjanus*, *Juniperus procera* and Understory plants include various ferns, mosses, and shrubs. It also includes bamboo forest mainly along the river dominated by the *Yushania alpina*. Savannah and Grasslands like *Hyparrhenia* species and various herbaceous plants. *Cyperus papyrus* along rivers and wetlands, vegetation includes species.

1.3.3.2 Fauna

Gakenke District hosts a variety of fauna due to its diverse habitats, which range from montane forests to wetlands. Here's a brief overview of the fauna found in the district:

1.3.7. Mammals

- Primates: The area is home to species such as the vervet monkey and occasionally, the Ruwenzori colobus monkey.
- Small Mammals: Includes species like African civet, genets, and various species of bats.
- Rodents: Common species include bush rats and mice.

1.3.8. Birds

- Forest Birds: Species such as the Rwenzori turaco, mountain black boubou, and white-headed wood hoopoe.
- Wetland Birds: In wetland areas, you might find cattle egrets, herons, and kingfishers.
- Raptors: Birds of prey like the African fish eagle and augur buzzard are also present.

1.3.9. Reptiles and Amphibians

- Reptiles: Includes various species of lizards, chameleons, and snakes such as the Rwandan

bush viper.

- Amphibians: Numerous frog species inhabit the district's rivers and wetlands.

1.3.10. Invertebrates

- Insects: A diverse range of insects, including butterflies, beetles, and ants, are common.
- Aquatic Invertebrates: Wetland and riverine areas support species like dragonflies and water beetles.

1.4. Socio Economic Aspects

Gakenke is a rural District whose economy is mostly relying on agriculture and livestock, although it has other economic sectors such as mining, crafts, and trade.

Agricultural activities are based on two types of farming: economic farming (cash crops) and subsistence farming. Coffee, geraniums, vegetables, and fruits are examples of cash crops while, maize, beans, wheat, potato, rice, and cassava are examples of food crops.

Agricultural production is mainly for human consumption, and productivity is still low. Other sectors face challenges too, which form a barrier for socio economic development and poverty reduction.

However, Gakenke District has many potentialities that can spur its economy. Among these are the availability of land suitable for agribusiness activities, marshlands to be used for agriculture, mineral deposits and quarries that can be exploited, attractive tourist sites, and arts and crafts, especially tailoring (Gakenke District, DDS;2018/2024).

1.5. Spatial SWOT Analysis

Spatial SWOT analysis is a methodology to understand the strengths and weaknesses, and for identifying opportunities and threats linked to land use planning and development strategies. The methodology aims to identify synergies between land uses, and help mitigate any negative impact a certain land use can pose on neighboring activities. For Gakenke District, it is a tool to develop land-use planning strategies grouped into four (4) thematic areas: agriculture and livestock, economy, social aspects and environment.

Table 1: SWOT: Agricultural Theme

Positive	Strengths	Weaknesses	Negative
	• Suitable land for cash crops and horticulture • Availability of agro-processing facilities; • Sufficient labor for farming activities; • Feeder roads to facilitate distribution of agriculture yield; • Availability of land consolidation for agriculture; • Soil conservation practices such as terraces and agroforestry;	• Insufficient consolidated land ratio;	

	• Pisciculture.		
	Opportunities	Threats	
	• Potential market for agriculture production based on the geographic location • Planned feeder roads for improving supply chain and distribution; • Potential market of exported crops (cash and horticulture);	• Steep slopes: agriculture land prone to natural disaster (floods, landslide and soil erosion)	

Table 2: SWOT: Economic Theme

Positive	Strengths	Weaknesses	Negative
	• Job creation through mineral and quarry activities; • Tourism generating revenues and incomes; • Existing low standard road network; • Hydro-power generation;	• Traditional mining practices; • Low level of operational touristic sites; • Limited tourism infrastructures and hospitality; • Poor condition of transportation infrastructure; • Inadequate car parking;	
	Opportunities	Threats	
	• Tourism; • Hospitality facilities;	• Seasonal disaster that affects public infrastructure (markets, roads and bridges)	

	• Mining and quarries exploitation; • Planned agro-processing facilities;		
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Table 3: SWOT: Social Theme

Positive	Strengths	Weaknesses	Negative
	• Power distribution infrastructure; • Public facilities (hospitals, playgrounds, churches and schools); • Safe water supply;	• Insufficient cemeteries; • Weak stormwater drainage system; • Poor waste management practices; • Insufficient recreational facilities; • Poor access to public facilities (hospitals, cemeteries, schools);	
	Opportunities	Threats	

	• Opportunity in investing in educational facilities due to overcrowding; • Opportunity in construction and management of cemeteries; • Opportunity in public taps development and management; • Potential investment in construction of affordable houses; • Opportunity in investing in recreation spaces development; • Opportunity in development of public buildings like youth center and bus park;	• Topographic condition that hinders access to public services;	
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Table 4: SWOT: Environment Theme

Positive	Strengths	Weaknesses	Negative
	• Natural resources (forest, mining and quarries, wetlands/swampland and rivers); • Abundant spring water;	• Over exploitation of forest resources; • Inadequate solid and liquid waste management; • Inadequate management of quarries and mining activities; • Habitat loss and fragmentation due to high population density; • Land degradation and water pollution caused by mining and quarries activities;	
	Opportunities	Threats	
	• Potential for ecotourism development in various strategic hilly slopes;	• Floods and landslides caused by seasonal rainfall; • Steep slopes prone to natural disasters (floods,	

	- Planned projects on environmental conservation and landscape restoration; - Investment in reforestation and afforestation projects; - Conservation of natural resources buffer zones;	erosion and landslides); Pollution due to intensive use of chemical fertilizers and pesticides;	
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2. Policy Framework , Regulatory and Sectorial Plan

During the process of elaboration of Gakenke District Land Use Plan (DLUP), reference was made to several policies, laws and regulations and guidelines officially recognized by the Government of Rwanda which regulate land use, development, planning and management in Rwanda, as discussed in this section.

2.1. Policies

- National Land Policy, June 2019, MoE

The revised Land policy of June 2019 focuses on the efficient utilization and management of land to support the national transformation goals without compromising the benefits of future generations. To achieve this objective, the policy outlines actions organized into three core pillars: land use planning, surveying, and mapping; land use management; and land administration. These pillars encompass eight thematic areas:

- (a) Land use planning, surveying, and mapping;
 - (b) Integration of land utilization across various Sectors;
 - (c) Effective land use management;
 - (d) Facilitation of private sector investment in land;
 - (e) Land registration procedures;
 - (f) Administration of land lease fees, real property taxes, and land markets;
 - (g) Ensuring land rights security and managing land disputes;
 - (h) Institutional framework and coordination mechanisms within the land sub-sector.
- National Urbanization Policy, December 2015, MININFRA;
 - National Human Settlement Policy in Rwanda, May 2009, MININFRA;
 - National Housing Policy, March 2015, RHA.

2.2. Laws and Regulations

Law n° 27/2021 of 10/06/2021 governing land in Rwanda, which regulates land affairs, contains detailed provisions concerning land use management and development, as well as the institutional framework and procedures governing the initiation, development, adoption, and establishment of land use and development plans at the district level. This legislation specifically governs land occupancy and construction activities on areas designated for human habitation. Moreover, it encompasses the planning of plots and site development to facilitate the realization of national, City of Kigali, and district land use master plans.

Presidential Order n° 038/01 of 20/05/2022, establishing the National Land Use Development Master Plan, delineates a planning horizon spanning the next three decades. The Order outlines the revision process, ensuring alignment with other plans, and assigns responsible institutions for implementation, emphasizing the pivotal role of all sectors. With the NLUDMP gazetted, the focus now shifts to effectively implementing it through DLUPs and other tools, ensuring strict adherence to alignment principles between NLUDMP and DLUPs. It is against this backdrop, that Gakenke District revised its Land Use Plan, ensuring compliance with the directives set forth in NLUDMP 2050.

Gakenke DLUP was revised taking into consideration other laws related to land management and utilization such as:

- Law n°10/2012 of 02/05/2012 governing urban planning and building in Rwanda. Urban planning should strive for the gradual and adaptable advancement of urban centers within the context of economic and social development policies, incorporating rural planning and environmental preservation objectives;
- Law n°20/2011 of 21/06/2011 governing human habitation in Rwanda. This law governs land occupation and construction on lands reserved for human habitation;
- Ministerial Order n° 04/Cab.M/015 of 18/05/2015 determining urban planning and building in Rwanda;
- Ministerial Order N° 005/MoE/22 of 15/02/2022 determining modalities of change of land use.

2.3. Guidelines

Numerous land use planning guidelines established in previous years remain pertinent and continue to inform current practices. While we can mention a few examples, it's important to note that the list includes:

- Ministerial Instructions relating to the implementation of the National Grouped Settlement Program in Rural Areas (27 May 2009);
- Urban Planning and Building Codes (June 2019, MININFRA);
- Land Use Planning Guidelines (December 2017, NLA);
- Land Readjustment guidelines (October 2021, NLA);
- Land use plans zoning regulations edition 1, November 2022.

oMinisterial Instructions n° 001 of 23/04/2018 determining the management and use of the lands allocated for agriculture and livestock.

2.4. Sectoral Plans

Gakenke District Land Use Plan To effectively integrate sectoral plans elaborated by other sectors to ensure a balanced inclusivity approach. The following are key sectoral plan integrated in Gakenke DLUP:

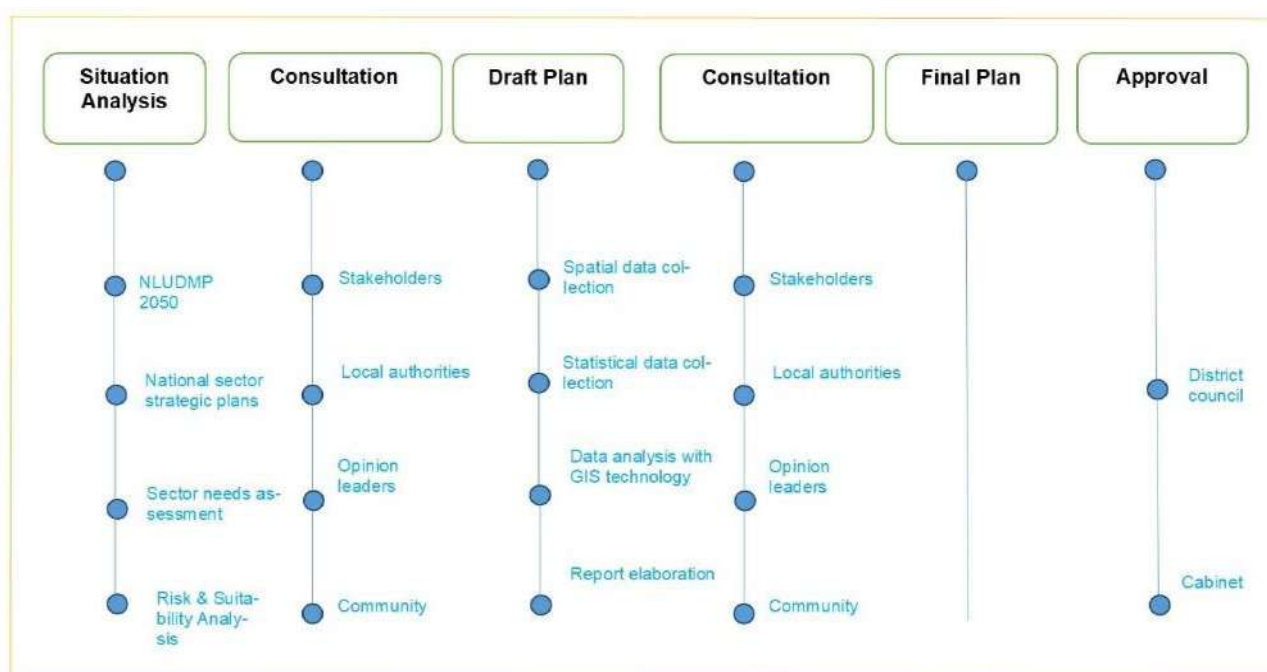
- Strategic Plan for agriculture transformation (2018-24)
- National Transportation Policy and Strategy for Rwanda (April,2021)
- National Wetlands Management Framework for Rwanda (December,2020)
- The state of soil erosion in Control in Rwanda (May,2022)
- Rwanda Irrigation Masterplan (2020)
- Rwanda Transmission Masterplan (2020-2028)
- National Feeder Roads Masterplan (2023)
- Rwanda Forest Cover Report (November,2019)
- Revised Green Growth and Climate Resilience Strategy (September 2022)
- National Determination Contribution (May 2020)
- National Water and Sanitation Policy (October 2023)
- Rwanda Electricity Distribution Master Plan (June 2022)

3. Methodology

The preparation of Gakenke DLUP was a collaborative work between the Gakenke District, the Consultant and National Land Authority (NLA). Gakenke DLUP is aligned with the NLUDMP 2020-2050.

The work started with analyzing the existing situation, comparing the necessary data compared to the available data, defining methodologies to be applied including consultative meetings and investigations to be conducted, dissemination and information sharing for public awareness, and report development. Figure below details the planning process during the elaboration of Gakenke DLUP.

Figure 1: Planning steps used during elaboration of Gakenke DLUP (Source: Author, 2023)



3.1. Consultation

Consultation gave those affected by the DLUP and relevant institutions the ability to influence the plan. These consultations provided a clear understanding of Gakenke DLUP, its targets for the community and the country in a sustainable manner.

In addition, local community, local authorities and relevant stakeholders (direct beneficiaries) have been sensitized on the ownership of the DLUP, on sustainable use of land and zoning for various land use.

3.1.1. Consultation with Local Community

The DLUP is a tool to facilitate the implementation of NLUDMP 2020-2050, and in turn Vision 2050. The aim is to facilitate better land management and the efficient use of available land resources. The community is guided on how to use and manage its land resources within a proper planning framework. In this regard, people and local communities must be given the opportunity to influence and understand the plan in terms of developing their land according to the national vision and long-term plan.

During the elaboration of Gakenke DLUP, community consultation meetings were conducted in each Sector to raise awareness of the plan and its objective. These consultations were also intended to engage the population by helping to clarify their current land issues, assisting in effective data collection and allocation of land to the most suitable areas. In addition, this was an opportunity to explain the purpose of the plan for their future perspectives and their contributions.

From the consultation meetings, the community learned about their responsibilities during the elaboration of the DLUP and reflected on their involvement in the implementation of the plan. The community was given the opportunity to guide the technical team in collecting data from the field and to help integrate their insights so that no developments would be left behind.

Through the consultation meetings, the communities were engaged in the planning process, have learnt the structure of the DLUP in line with NLUDMP 2020-2050, and have understood how it will be implemented.



Figure 2: Consultation with Local Community (Source: Author, Consultation with Local people, June 2022 (Muhondo))

3.1.2. Consultation with Local Authorities

Local authorities are the main implementers and regular supervisors of the DLUP. The consultation with local authorities was aimed at enhancing the understanding of the connection between the DLUP and Vision 2050, as well as between land management and economic development.

Local authorities know their respective communities, area and the terrain, and provide essential information for proper development planning. They know of the potential areas and understand the appropriate development sectors to allocate in each part of the locality. In the case of Gakenke District, the local authorities guided on suitable locations for agriculture, mining, tourism, forestry, etc., and assisted in efficient allocation of land.

In addition, it is beneficial for the local authorities to participate in the planning process as they are responsible for mobilizing the community, for a participatory planning process, and for the successful implementation of the project.

Consultative meetings were held at District level, bringing together different stakeholders in the District, including representatives of Sectors, Cells, Villages, religious figures, civil society organizations, security bodies and private sector to ensure a participatory approach, including discussion and agreement on priority areas and implementation strategy.



Figure 3: Consultation with Local Authorities (Source: Author, Consultative meetings with Local Leaders, June 2022 (Kivuruga Church & District Hall))

3.1.3. Consultation with Different Institutions or National Stakeholders

Various stakeholders at the national level will be involved in the Gakenke DLUP implementation process. Thus, institutional consultation aims to make the different governmental and non-

governmental institutions involved in the project aware of the need to participate in its development and implementation.

The collaboration of the different institutions play an important role in the success of the project in terms of planning, coordination, information sharing, development and implementation. In the case of the DLUP, various institutions work together in accordance with their mandate, with the NLA as the lead institution, to support the overall land use and development project.

During the elaboration of the DLUP, all sectors have to work together as all activities need land to sustain current and future projects that revolve around their mandates. In this case, they have to maximize their demand for land, which may raise land conflicts between various interests.

However, the DLUP is put in place to provide the best land use balance for the different sectors, as all are interdependent during development. The DLUP is a solution to efficiently allocate land to different sectors, to effectively manage the use of available resources by different institutions, to guide the future development of communities, and to promote more social, economic and environmental outcomes.

During Gakenke DLUP, the various institutions involved in the project and consulted by NLA were RDB (field consultation on tourism zone), RHA, RTDA, NISR, LODA, REMA (field consultation on conservation), RWB (field consultation on stormwater management plan), RWFA, FONERWA, WASAC, REG, RAB, and various ministries such as MINEDUC, MINISANTE, MINAGRI, MINISPORT, etc.

During the elaboration of Gakenke DLUP, the institutions and ministries consulted include RHA, REMA, RTDA, REG, RWB, WASAC, NLA, RMB, and MoE. The institutions and ministries, depending on their mandates, have to achieve their objectives in the district concerned, whereby it is necessary to find a good balance in terms of land use. They also provide data on current and future projects that they intend to initiate. Thus, the consultations on the preparation, development and implementation of the DLUP gives understanding to efficient use of land and implications to projects and future prospects of other sectors. These consultations also helped clarify their roles in the planning, elaboration and implementation of the DLUP, and to facilitate and harmonize the implementation of different projects across all sectors. In addition, all sectoral institutions participated in finding the best land balance that supports better management of the limited land available and efficient use of the available resources.

3.2. Data Collection

The elaboration of Gakenke DLUP required both spatial and non-spatial data for spatial and socio-economic analysis.

3.2.1. Primary data collection

3.2.1.1. Field work and study

Based on the desktop analysis, the Consultant and the NLA team together with the District One-Stop Center conducted a field land survey and physical analysis within the priority areas in both urban, rural, and rural settlements sites. For Gakenke District Town, the Sectors of Gakenke, Nemba and Karambo were visited. For the rural centers of Ruli and Rushashi, both Sectors were visited. All potential tourism sites were visited.

Regarding rural settlement sites, all 142 sites were visited with an emphasis on identifying the boundaries and zoning using Geographic Positioning System (GPS) coordinates. Primary data were collected by face-to-face conversations with local communities, as well as through direct observations. Data was analyzed and interpreted by the use of the GIS and new satellite images.

3.2.1.2. Spatial data

Spatial data includes geographic information about the earth and its features. The development of Gakenke DLUP required the collection of spatial data for all areas considered in the land use zoning. The spatial data collected includes existing infrastructure such as roads, electricity, water supply, educational and health facilities, markets, administrative offices, mining sites and concessions, religious facilities etc. In addition, it was necessary to collect data on the location of potential settlements and to delineate their boundaries, from urban to rural areas to form urban systems, identify areas for agriculture and environment.

Spatial data was also necessary to mark areas that were likely to be protected and conserved, such as tourism sites, and disaster-prone areas such as steep slopes or wetlands.

The focus of spatial data collection has been to support the development of Gakenke DLUP with accurate data and to provide a clear understanding of the terrain, and to allocate land for various uses. Spatial data collection was carried out using tools such as Garmin GPS, DGPS, Earth collector, and SW Maps during the fieldwork.

3.2.2. Secondary data collection

3.2.2.1. Statistical data

Statistical data are non-spatial data that consists of information that is independent of any geometric considerations. It includes data that is not demonstrated with location-based and geographic location. Basically, non-spatial data accumulate statistical and quantitative data that provide information about features or phenomena in the form of definitions, explanations and can be displayed in graphs, tables, but not maps.

During the elaboration of Gakenke DLUP, non-spatial data is needed to support the analysis and inform the planning of the district. Statistical data, e.g. on neighborhood level regarding economy, environment and livelihoods, is needed and guides the preparation of the DLUP.

Non-spatial data collected and used during the elaboration of Gakenke DLUP includes demographic statistics including current and projected status, allocation of economic data such as income generation and economic activities, trade (goods and services), security data and its organs, and religious statistical data etc.

Other non-spatial data necessary for the analysis was provided by respective institution, including population data, potential projects, employment by sector, actual average occupancy, number of households within and outside rural settlement sites, main commercial location analysis and type of commercial activity, the relative efficiency of the use of the land, and the number of tourists and outside visitors etc.

In Gakenke District, non-spatial data was collected during fieldwork by visiting each situation on site, and consulting different institutions, local authorities, and non-governmental groups. The non-spatial data adds valuable input in addition to the spatial data and provides information for decision-making in effective planning. The data has also emphasized the need for various efforts in specific sectors.

3.2.2.2. Spatial data

Besides primary spatial data, secondary spatial data was collected from various institutions where existing and proposed data is used to clarify the existing situation and inform the future planning for each sector.

Institutions collaborate to share data in carrying out the projects assigned to them. In regard to the

elaboration of Gakenke DLUP, different institutions provided necessary spatial data related to their projects and informed the allocation of land in the District. For example, Nyabarongo II Multi-Purpose Project in partnership with REG, provided shapefiles related to the project and was used in the spatial analysis for various purposes.

Therefore, all sectoral institutions in Rwanda must situate their projects in the light of the current situation and future prospects. They provide the available data for their projects to support the planning and to accumulate each sector in a balanced way according to their land demands.

During the elaboration of Gakenke DLUP, data was collected from Rwanda Forest Authority, water supply system and associated future projects from WASAC, electricity data from REG, tourism from RDB, transportation from RTDA, rural settlement boundaries and urban master plans from NLA, wetlands and their buffer zones from REMA, and on rivers, lakes and other water bodies from RWB. The accumulation of this data informed the zoning and subsequent implementation support.

3.3. Data Analysis

Data analysis encompasses the process of reviewing, cleaning, transforming, and modeling data with the goal of discovering useful information, drawing conclusions, and supporting decision making. Land use plan data analysis involves applying spatial and non-spatial data on infrastructure, zoning, and other features to describe, illustrate, summarize, and interpret the data. Spatial and non-spatial data are analyzed to generate the land use zoning layers, and for the compilation of tabulations and graphs in the DLUP report. The analysis of spatial and non-spatial data assists in effective land use allocation, effective planning and balancing of different thematic areas. The analysis helped to identify suitable areas for different land uses, e.g. zoning the settlements into convenient locations and allocating other land uses in different areas.

Through data analysis, the urban and rural settlement areas were mapped out and the associated land use zones were planned.

During data analysis, geospatial technology, especially GIS software, were used to acquire data from the field and manipulate it in the office to get a clear representation. With regard to GIS software, the Consultant used ArcGIS 10.8 version, as well as ArcGIS pro, to create the shape files and associated maps for zoning. GIS further helped in creating tabular data by referring to the attribute tables of the geospatial data. These tabulated data were later analyzed using Excel and SPSS to ensure a good and accurate representation in the report.

The results of Gakenke DLUP data analysis represent the distinct land use planning layers for the current and planned land use. The result includes the maps, tables, and graphs that describe the land use planning outcomes in Gakenke District.

Gakenke DLUP Report Compilation

The DLUP report presents all land use planning related concepts, data, and other information that illustrates how land is allocated to support the effective use of resources and guide future development at the district level. The report serves to document the current status and projected situation with respect to land use in the district. The DLUP report compiles the data collected into a single document that represents the district master plan. The document consists of text, maps, tables, diagrams, and other outlines that describe the district in concern given the background of all the issues.

Gakenke DLUP report is structured to give an introduction to the DLUP, the relevant regulatory and policy framework guiding the DLUP, the methodology used, the land use and development planning, implementation strategies, compliance and monitoring, and conclusions and recommendations, and appendices.

4. Gakenke District Land Use and Development Planning

4.1. Visioning and Economic Specialization of Gakenke District

4.1.1. Vision of Gakenke District

The vision of Gakenke District is aligned to the country's aspirations of becoming an upper-middle-income country by 2035, with GDP per capita of over USD 4,036, and a high-income country by 2050, with GDP per capita of over USD 12,476.

According to the Gakenke District Development Strategy (DDS), the District is committed to increase agriculture and livestock production (coffee, fruits, maize, cassava, banana and milk) and improve mining exploitation in partnership with the private sector for socio-economic development. In this regard, the Vision of Gakenke District is to become ***“a vibrant agro-processing and mining hub.”***

This vision will be achieved through novel solutions and higher achievements of goals, the implementation of government policies, service delivery and support to sectors to deliver quality services, especially with regard to the implementation of the land use plan. With Gakenke DLUP, the formulated objectives are specific, measurable, appropriate, realistic and achievable, and time bound (SMART).

These objectives reflected within Gakenke DDS include:

- (i) Developed and increased agriculture production and productivity with improved value chains of coffee, pineapple, passion fruit, and banana,
- (ii) Increased mining production from 2 tons to 8 tons by trimester by using modern machines and skilled labor force,
- (iii) extended road infrastructure network from 31 % (2022) to 100% (2050), (iv) improved urbanization and rural settlement, (v) extended water supply facilities to 100%, (vi) extended energy supply facilities (off grid, on grid) to 100 %,

4.1.1.1. Gakenke District Spatial Strategies

a. To keep agriculture and improve sustainable agro-processing industry

Agriculture is the backbone of the economy in Gakenke District. The District is characterized by fesoils and has a favorable climate, which play a significant role in supporting the agricultural sector.

Gakenke District is known for cultivating a variety of crops. Coffee and tea are significant cash crops and the source of income for the local farmers. In addition, staple crops like maize, beans, and bananas are grown for subsistence and local consumption.

Alongside crop cultivation, livestock is also a part of the agricultural landscape in Gakenke District for meat and dairy production. Livestock farming complements crop agriculture, providing additional income sources and enhancing food security. Keeping agriculture and improving agro processing industries will sustain the economy in 2050.

b. To explore mining and develop sustainable methods of mineral extractions

Gakenke is a District where mining plays a major role in the development. Existing mineral deposits include coltan, wolfram, and cassiterite in addition to a number of quarries which are highly demanded in the construction industry. The most active mining sites are concentrated to the south of the District in Ruli Sector, and COMIKAGI started minerals processing and exporting. The mining sector will be expanded in Gakenke DLUP.

c. To develop sustainable road network connectivity

Development of a sustainable road network, connecting agricultural zones, commercial centers and residential zones is a key to standardizing the economy of Gakenke District. Gakenke has only one asphalt road. Other roads, such as District Road class one, District Road class two, servicing roads and access roads are not paved with low standards. Road reserves have been established and missing roads allocated in Gakenke DLUP.

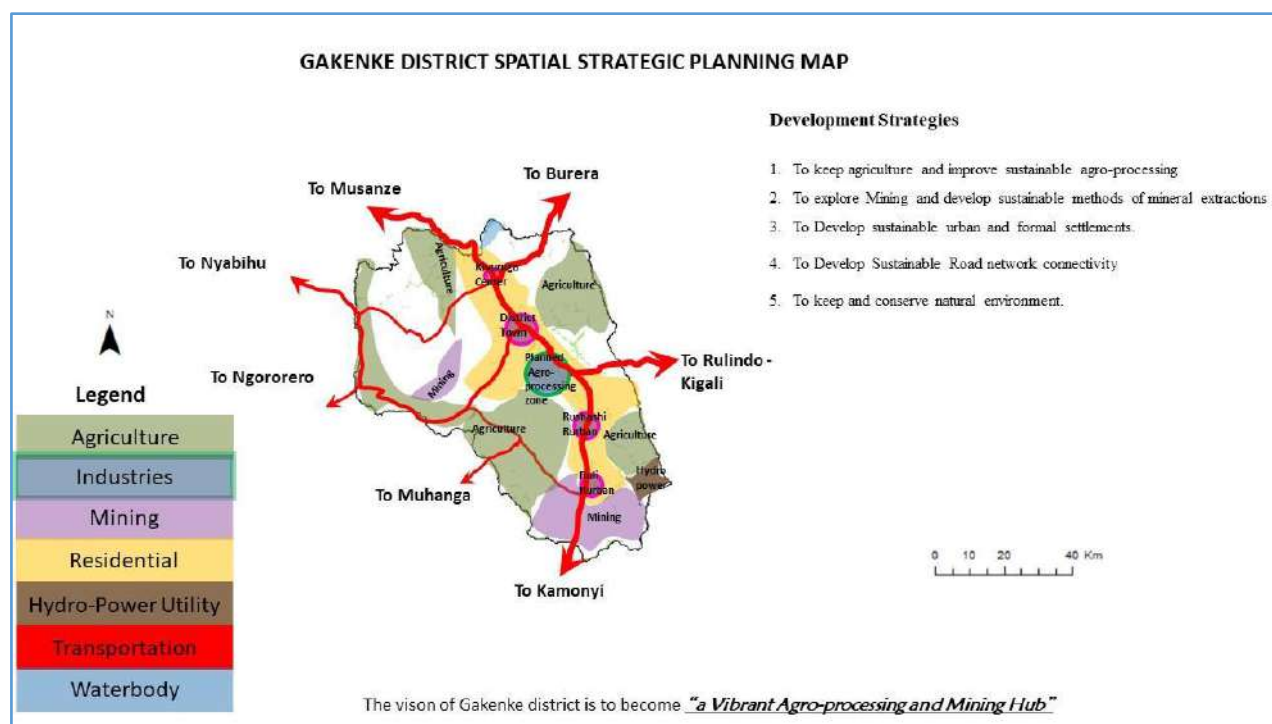
d. To keep and conserve the natural environment

Gakenke is known for its natural environment, rich biodiversity, and vibrant landscapes that offer a unique experience to both residents and visitors. It has several water sources, including rivers, streams and wetlands. The abundance of water supports local agriculture, sustains wildlife, and provides a source of natural beauty throughout the District. The natural environment will be preserved through the implementation of buffers in the DLUP with its corresponding land use suitable for the environment.

e. To develop sustainable urban and formal settlements

Gakenke District is characterized by scattered settlements especially in Busengo, Minazi, Rusasa, Cyabingo, Mataba, Muzo, Gashenyi, Muyongwe, Cyivuruga, Janja, Mugunga, and Rushashi Sectors. In Gakenke DLUP, settlement sites have been established and formally zoned which will be followed by the elaboration of detailed site plans to ensure sustainable development.

Map 6: Gakenke District Spatial Planning Strategies Mapping



Source: NLA, 2023

4.1.2. Gakenke Economic Specialization

4.1.2.1. The economic specialization of Gakenke District

The economic specialization of Gakenke District is based on agriculture (coffee, fruits and vegetables, banana, maize) and mining (extraction and value addition of minerals). The District strives to modernize and increase the agricultural productivity and livestock, modernize mining activities and ensure sustainable management of natural resources and the environment.

Gakenke DLUP supports agriculture, mining and other sectors that promote economic transformation by expanding the land allocated for these sectors. The DLUP guides the development

of agro-business, without negatively affecting other sectors.

The strategic location of Gakenke District, located between Kigali City and Musanze Secondary City, provides an opportunity for trade and logistics of agriculture produce and products, and mining products. The DLUP takes into consideration regional interactions with neighboring Districts and Musanze Secondary City, which will have a special economic zone for general industries.

Figure 4: Coffee and mining (Source: Author, photos taken during field visits in Ruli, November 2022)



4.2. Agriculture

According to NLUDMP 2020-2050, the farmland in Rwanda will not be sufficient to feed the expected population of 22.1 million by 2050. Even if the yields in Rwanda improve to the best practice, the existing farmland cannot provide sufficient food for the projected population due to the topography, the climate, and competition over land.

Referring to NLUDMP 2020-2050, In 2050, farmers should not be more than 30% of the projected population, and agriculture should contribute less than 10% to the GDP. This by increasing the economic growth and importance of other sectors like industry and services.

As per NLUDMP 2020-2050, the agricultural sector will have a high focus on productivity, climate resilience and standards, commercial agro-processing, and agri-businesses. Gakenke DLUP was developed in this direction because of its nature as a rural District where agriculture is the main source of income providing a backbone for the District's economic growth.

4.2.1. Existing Situation of agriculture in Gakenke District in 2023

Gakenke District falls under Land Use Category C (LUCA C). Nationally, LUCA C consists of less

than 3% of prime agricultural land, which is fragmented and covers a small area. It also includes areas of land unsuitable for commercial farming. However, Gakenke's land can still be cultivated in small farms for subsistence purposes or with improvements to become agribusiness viable

Gakenke District is among the Districts in the Northern Province where the land is highly fragmented. More than 60% of households in the District have less than 0.5 ha land. Of cultivating households, 80.5% have less than 0.9 ha land although the agricultural sector covers 82.5% of the total population.

Agriculture in the District is based on two types of crops, economic or cash crops, and subsistence or food crops. Coffee, geraniums, vegetables, and fruits are examples of cash crops while, maize, beans, banana, cassava, wheat, potatoes, and rice are examples of food crops. Agriculture is the main source of income for the majority of the people and accounts 56% of land within the District 394 km²).

Among the agricultural households, different types of agricultural activities are here under detailed in the table :

Table 5: Percentage of HHs practicing different types of agricultural activities

No	Types of Agricultural Activities	Percentage of Agri-Households
1	Crop farming	89%
2	Livestock husbandry	80.70%
3	Horticulture	68.80%
4	Apiculture	1%

Source: RPHC 5,2022

According to the same source, the table 4 reveals the percentage of HHs cultivating different types of crops

Table 6: Percentage of private HHs cultivating different types of crops

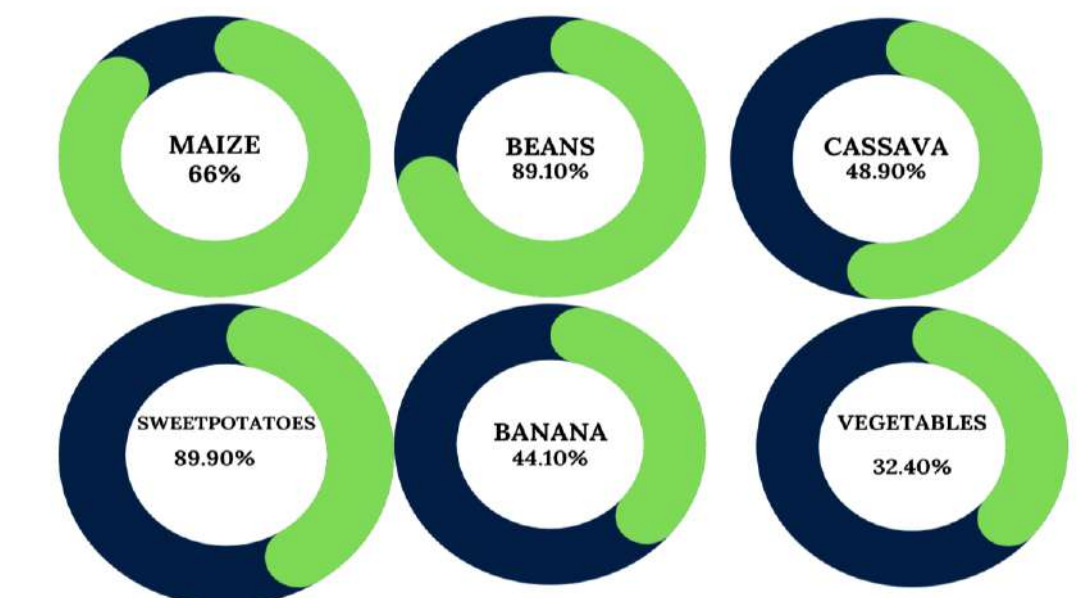
No	Types of Crops	% of agri-households
1	Maize	66%
2	Rice	0.70%

3	Sorghum	2.30%
4	Wheat	1.70%
5	Bean	89.10%
6	Soybean	89.10%
7	Cassava	6.30%
8	Sweet Potato	48.90%
9	Irish Potato	81.90%
10	Yams/Taro	13.90%
11	Banana	25.20%
12	Vegetables	44.10%
13	Fruits	61.70%

Source: RPHC5,2022

Beans and sweet potatoes are the most cultivated crops followed by maize, fruits, cassava, banana and vegetables. The prevalence of crops confirms availability of different food types (energy-giving food, body-building foods and protective foods).

Figure 5: Percentage of main food crops per private HHs cultivating in Gakenke District



Agricultural land consolidation takes place irrespective of the small amount of land or small plots that people hold. Figure 11 shows the spatial distribution of consolidated land. The total surface area for agricultural consolidated land is 7,066 Ha which is almost 18% of the planned agricultural land in the District. However, consolidation should reach 100% before 2030.

In Gakenke District, productivity is still low as shown in Figure 13. Cassava has the highest productivity in terms of tons per hectare. There is a need to increase productivity on all types of crops in the District for food security and to provide raw materials for planned agro processing industries.

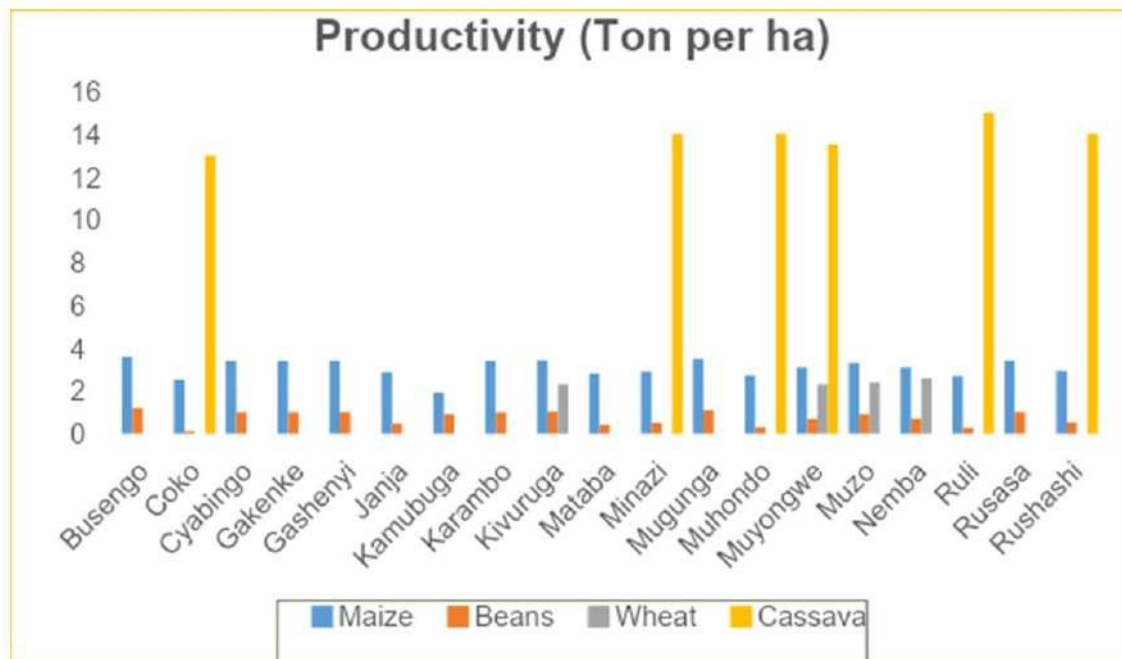


Figure 6: Agriculture Productivity in Gakenke District (Source: Gakenke District, 2022)

The accuracy of agricultural data in Gakenke District is low. It is recommended that the unit of agriculture gather the necessary data regarding agriculture such as production and productivity, by disaggregating different types of crops.



4.2.2. Agriculture land Slope classification of in Gakenke District

The variation in the incline of Gakenke District creates a diversity of land suitable for agriculture. Land with a gentle incline (between 0% and 6%) makes up a significant portion (over 1%) of the district's agricultural area, offering ideal conditions for farming. An even larger area (43.5%) has moderate inclines ranging from 6% to 30%, which is also well-suited for growing crops. Steeper inclines, accounting for 45.4% of the land, can still be used for some agriculture. However, a small area (9.2%) with inclines exceeding 55% is considered environmentally sensitive and should be left undisturbed.

Table 7: Slope level with agricultural land in Gakenke District

Slope level	Hectares of agriculture land/ha	%
Gentle slope	588.6	1.9
Moderate slope	13560.37	43.5
Steep slope	14148.4	45.4
Very steep slope	2847.36	9.2
Total	31144.73	100

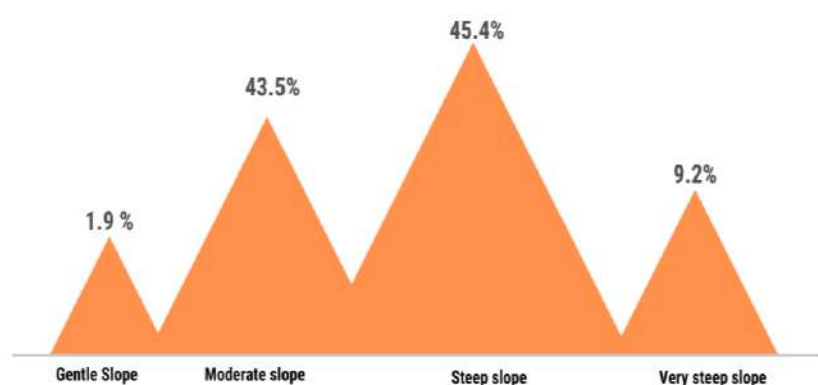


Figure 8: Slope level and percentages in Gakenke District

4.2.3. Gakenke District Agriculture Land Description

Gakenke District appears to have good agricultural potential, with a significant portion of the land being suitable for crops.

4.2.4. Protection measures of agricultural land

NLUDMP 2020-2050 recommends the protection of agricultural land for sustainable food security. Scattered homesteads are to be eliminated gradually by consolidating residents in a few settlement sites, and agriculture zones are to be decongested to allow for the use of technology in agriculture. The average land per farmer ratio should be around 1.5 ha in a consolidated form.

As a rural District, there should be full protection of agricultural land against scattered housing in Gakenke District. Different measures to protect agricultural land are:



Figure 9: Different measures to protect agricultural land

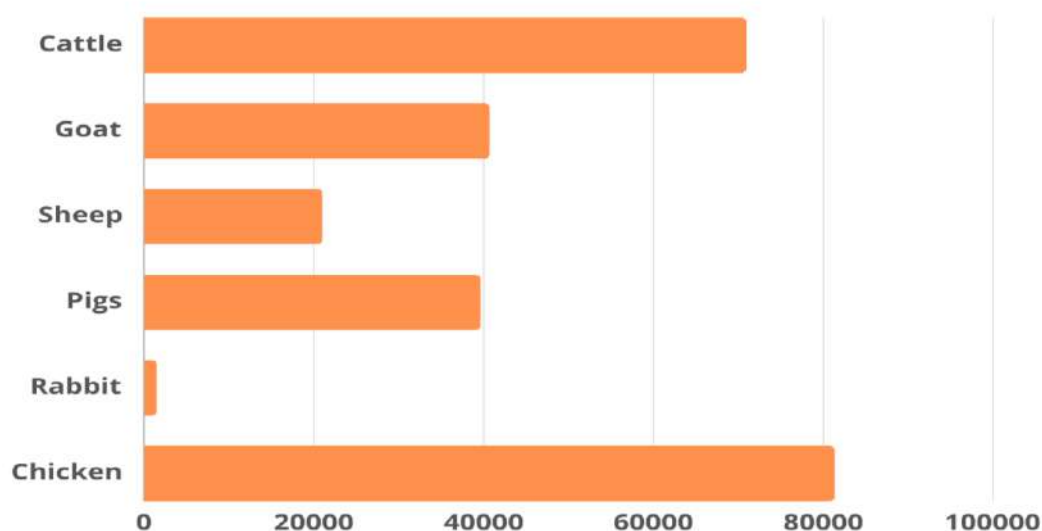
4.2.5. Livestock Farming Analysis and Trends in Gakenke District

According to NLUDMP 2020-2050, livestock products are good for closing dietary gaps in protein consumption and producing higher value products. However, at a very high cost to the land and other natural resources. The availability of sufficient animal feed is a crucial element in raising livestock yields. This means that agricultural land should be protected for the production of feed for farm animals.

In Gakenke District, livestock is an important source of income where each household has at least one animal (EICV5). The District has benefited from the government One-cow per poor family program as well as benefited from NGOs that have supported the program.

According to RPHC5,2022, chickens and cows are the most reared in the District followed by goats, pig and sheep. In the District there are a total of 81,342 chickens, 70,928 cattle, 40,729 goats, 39,640 pigs, 21,060 sheep, and 15,210 rabbits. Chart below details different types of livestock in Gakenke District.

Figure 10: Different types of Livestock owned by private households by District (Urban + Rural)



Source: RPHC5,2022

4.2.6. Planning Perspectives of Agriculture and Livestock Farming

Gakenke District aims at becoming a vibrant agro-processing hub by modernizing agriculture and increasing agricultural productivity and livestock. A number of interventions must be implemented to guarantee agriculture modernization and increase agricultural productivity as well as agro-processing industries. Therefore, the following is recommended:

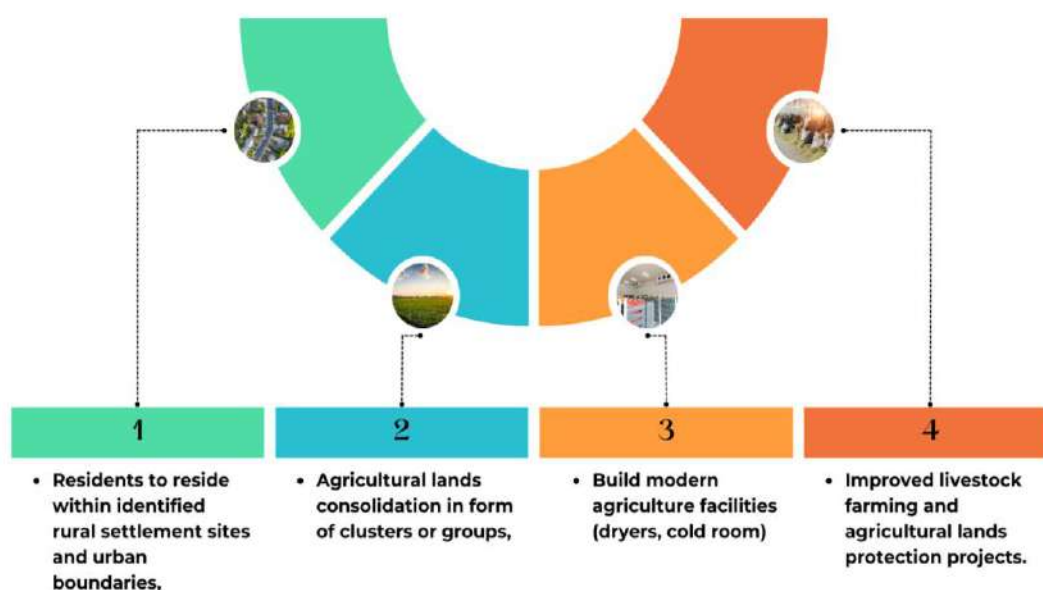


Figure 11: Planning Perspectives of Agriculture and Livestock Farming

4.3. Population, Urbanization, Settlement and Housing

4.3.1. Population

Rwanda has made substantial investments in reproductive health, family planning and maternal and child health programs. These efforts and initiatives have led to the reduction of the fertility rate. If existing interventions are strengthened, and new innovative strategies are established, fertility can be further reduced to achieve the national total fertility rate goal.

With a current annual growth rate of 2.4 %, the population in Rwanda may reach 25.8 million in 2050. However, with the result of family planning, a growth rate of 2.0% can lead to a smaller population of 22.1 million in 2050, which better fits the impending shortage of land in Rwanda with gross density approaching 1,000 people/km², the highest in Africa (RPHC5,2022).

The Government of Rwanda has made family planning a key component of its development agenda and aims at sustaining family planning as the way of controlling the high birth rate. The District and its stakeholders are recommended to increase efforts in sensitizing the local population to family planning approaches.

4.3.1.1. Gakenke District Existing Population

According to the 5th Rwanda Population and Housing Census (PHC5 2022), Gakenke District has a population of 365,292, 47% are female and 53% are male. The population represents 18% of the

total population in the Northern Province and less than 3% of the national population. The population density is 520 people/km².

During a decade, Gakenke District grew with 27,058 new residents. However, migration is negative meaning the influx of migrants is lower than the outflux of migrants. This negatively impacts urbanization.

Table 8: Net lifetime and recent migration in Gakenke District

Types of Migrants	Lifetime Migration	Recent Migration
In migrants	16,810	8,400
Out migrants	138,920	41,564
Net Lifetime Migration	122,110	33,164

Source: RPHC5,2022

Gakenke District is predominantly rural with 96% of its residents living in rural areas and only 4% are living in urban areas. (RPHC5,2022). 15 out of 19 Sectors in the District are entirely rural (Busengo, Kamubuga, Kivuruga, Mataba, Muhondo, Muyongwe, Muzo, Janja, Rusasa, Gashenyi, Cyabingo, Coko, Minazi, Mugunga and Karambo). Gakenke, Kamubuga, Gashenyi, Ruli, Muzo, Busengo and Muhondo Sectors are the most populated with over 20,000 residents each. The less populated Sectors are Karambo and Minazi. Four Sectors, Gakenke, Nemba, Ruli and Rushashi, are recognized as urban areas and are planned to create agglomerations for socio-economic benefits in rural Sectors.

The population is young, with 67% being under the age of 30 and 36% below 15 years. Figure below gives more details.

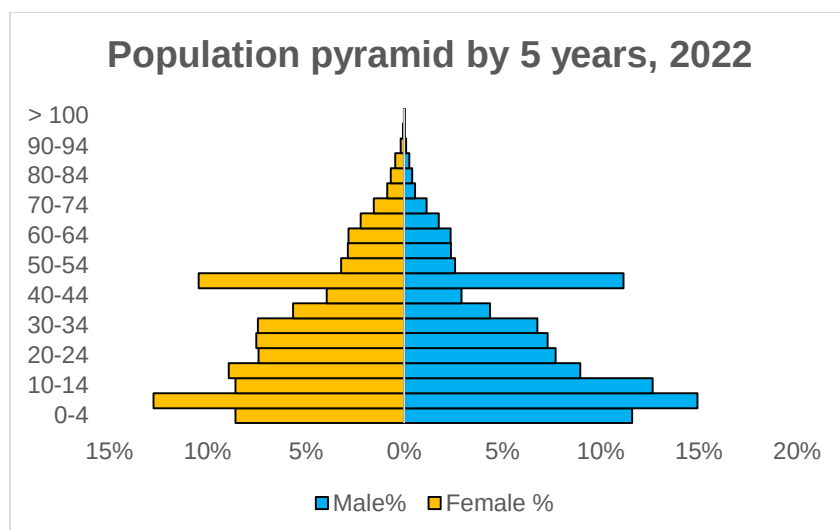


Figure 12: Population Pyramid by 5 Year (Source: Gakenke District, Edited by author, 2022)

4.3.1.2. Projected Population in Gakenke District according to NLUDMP 2020-2050

According to NLUDMP 2020-2050, the total population of Gakenke District is estimated to reach **368,851** inhabitants by 2035 and **373,000** inhabitants by 2050. Of this, **104,039** inhabitants (**28%**) are expected to live in urban areas by 2035, and 203,000 inhabitants (**54.4%**) of the total population by 2050. To enable the projection of population growth in the District, the growth percentage was calculated at 0.1%. This means that the population is projected to grow at an average rate of 0,1% per year over the projection period.

These residents will be settled in Gakenke District Town, in Ruli and Rushashi Rurban Centers and in Rural Settlement Sites within the District. However, the migration trend is expected to continue. Hence, the District is predicted to have a low population increase.

Table 9: details projection of the population by 2035 and 2050.

Sector Name	Type of Sector: Urban; Rural	Pop 2022	HHs 2022	Pop 2035	HHs 2035	Pop 2050	HHs 2050
Busengo	Rural	21,392	5,482	16,162	4,040	10,375	2,594
Coko	Rural	17,942	4,598	13,555	3,389	8,702	2,176
Cyabingo	Rural	18,785	4,814	14,192	3,548	9,111	2,278
Gakenke	Rural & urban	25,325	6,490	68,415	17,104	105,479	26,370
Gashenyi	Rural	22,647	5,803	17,110	4,278	10,984	2,746
Janja	Rural	16,007	4,102	12,094	3,023	7,764	1,941
Kamubuga	Rural	23,336	5,980	17,631	4,408	11,318	2,830
Karambo	Rural	13,617	3,489	10,288	2,572	6,604	1,651
Kivuruga	Rural	19,967	5,117	15,085	3,771	9,684	2,421
Mataba	Rural	15,520	3,977	11,726	2,931	7,527	1,882

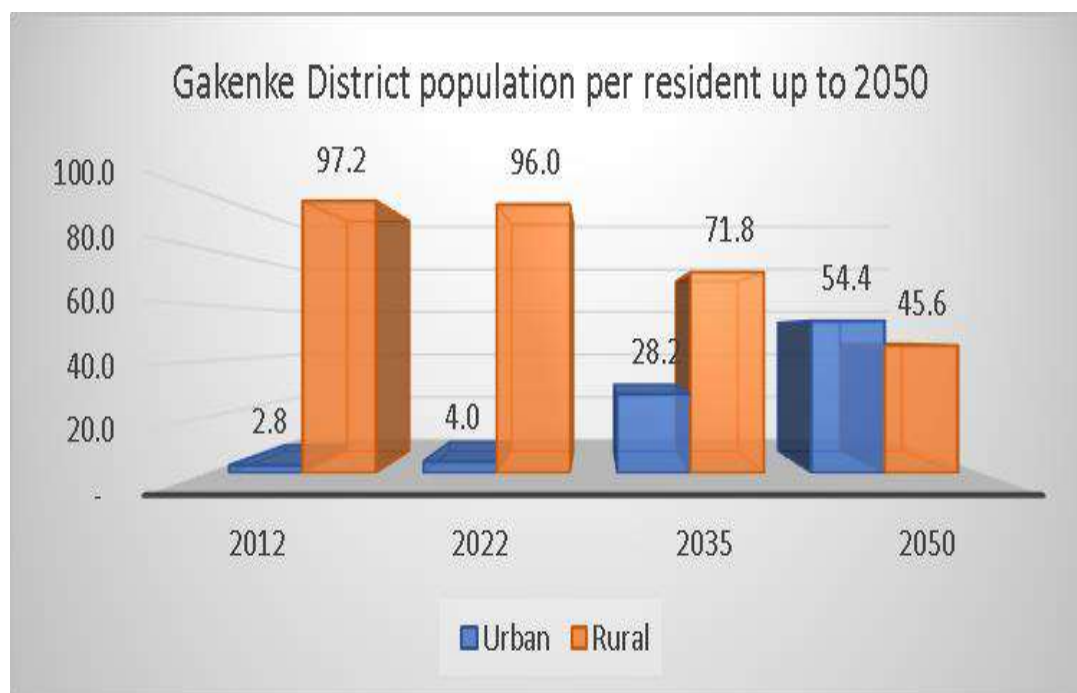
Minazi	Rural	14,193	3,637	10,723	2,681	6,884	1,721
Mugunga	Rural	19,963	5,116	15,082	3,771	9,682	2,421
Muhondo	Rural	21,334	5,467	16,118	4,030	10,347	2,587
Muyongwe	Rural	16,053	4,114	12,128	3,032	7,786	1,946
Muzo	Rural	21,816	5,591	16,482	4,121	10,581	2,645
Nemba	Rural & urban	16,854	4,319	41,136	10,284	61,887	15,472
Ruli	Rural & urban	22,464	5,757	26,752	6,688	42,409	10,602
Rusasa	Rural	19,242	4,931	14,538	3,634	9,333	2,333
Rushashi	Rural & urban	18,835	4,827	19,632	4,908	26,541	6,635
Total		365,292	93,609	368,851	92,213	373,000	93,250

Table 10: Summary of population projection per residence from 2012 up to 2050.

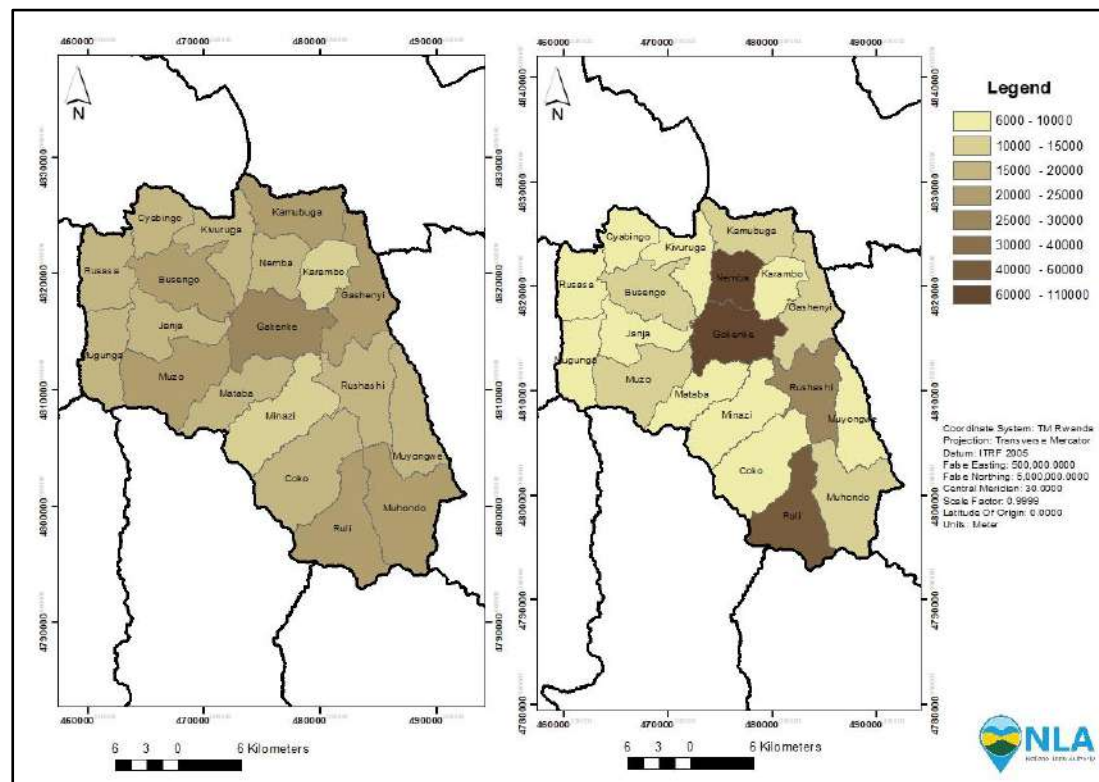
Population/ Year	2012		2022		2035		2050	
	Population	Number of HHs	Population	Number of HHs	Population	Number of HHs	Population	Number of HHs
Total Population	338,234	79,760	365,292	93,609	368,851	92,213	373,000	93,250
Gakenke District Town	9,347	2,434	6,374	1,728	82,500	21,141	150,000	38,439
Ruli Rurban Center	-	-	5,420	1,469	13,876	3,469	34,142	8,536
Rushashi Rurban Center	-	-	2,994	812	7,664	1,964	18,858	4,832
Sub-total(rurban)	-	-	8,414	2,281	21,539	5,433	53,000	13,368
Sub-total(urban)	9,347	2,434	14,788	4,009	104,039	26,574	203,000	51,807
Rural population	328,887	77,326	350,504	89,600	264,811	66,203	170,000	42,500
Gakenke District Town (%)	-	-	1.70%	1.80%	22.40%		40.20%	
Rurban (%)	-	-	2.30%	2.40%	5.80%		14.20%	
Urban (%)	2.80%	3.10%	4.00%	4.30%	28.20%		54.40%	
Rural (%)	97.20%	96.90%	96.00%	95.70%	71.80%		45.60%	
Urban & Rural (%)	100%		100%		100%		100%	

In summarizing the presented table depicting the projected population of Gakenke District, it is noteworthy to observe that the subsequent figure illustrates the anticipated population distribution based on residence. Notably, the rural population constituted 97.2% of the overall population in 2012, followed by a decline to 96% in 2022. Further projections indicate a gradual decrease to 71.8% by the year 2035, ultimately reaching 45.6 % by 2050.

Figure 13: Illustration of Gakenke District population per residence from 2012 up to 2050



Map 7: showing population in 2022 and 2050



4.3.2. Urbanization and Settlement

Urbanization is a process of change by migration. The migration of people who move from rural to urban areas is driving the urbanization in Rwanda, spurred by population growth, socio-economic development, employment opportunities etc. In the District, Gakenke town grows naturally except for the Ruli area, which is dominated by mining activities that attract people and where an emerging urban has been created. Migration reinforces urban centers but, at the same time, deteriorates and weakens rural settlements by lack of investments and employment opportunities (NLUDMP 2020-2050).

The current level of urbanization as per RPHC5,2022 is 28%, and the annual growth rate of urbanization is 4.4%. While the targeted urbanization as per Vision 2050 is 53% by 2035 and 70% by 2050, achieving this target in Gakenke District is a challenge.

The urban population will continuously increase due to employment opportunities in urban areas and limited outward migration, and is expected to reach 28% by 2035 and 54% by 2050. Urbanization must comply with this master plan to promote economy-based urbanization, and the urban population will reside in the Gakenke District Town and the Urban centers of Ruli and Rushashi.

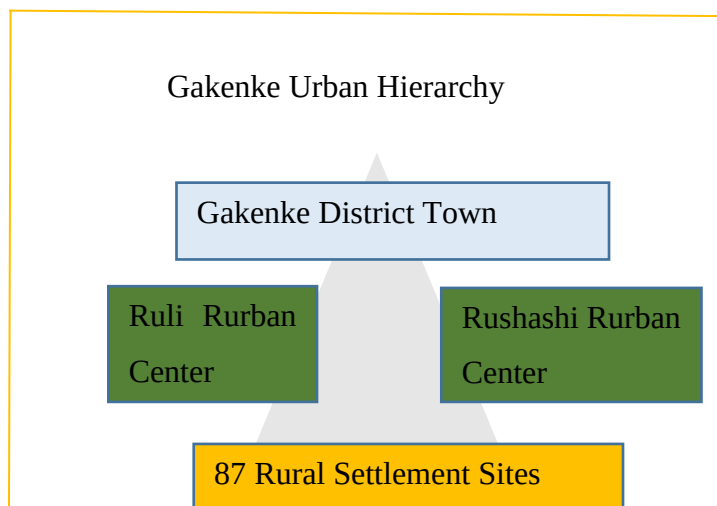
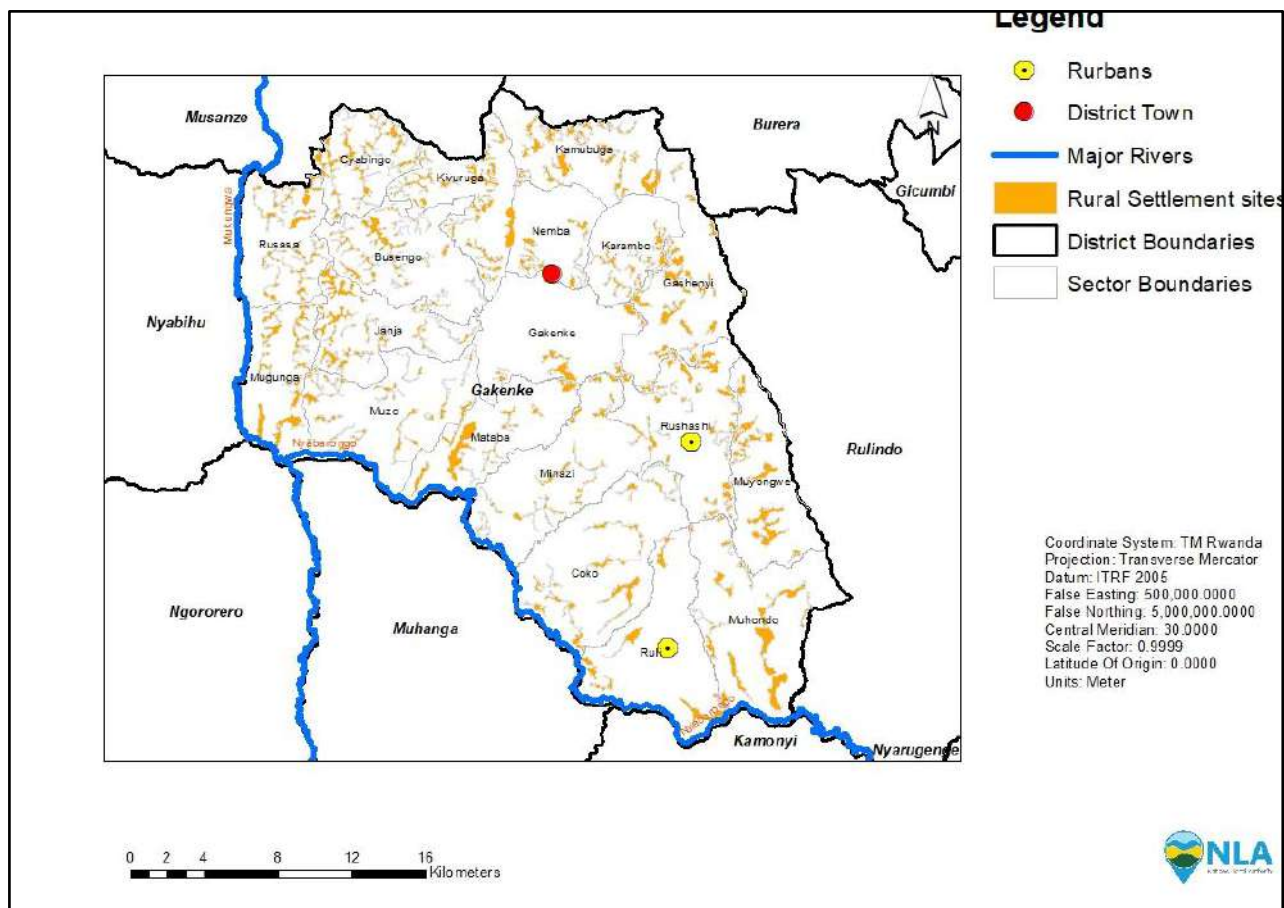


Figure 14: Gakenke Urban Hierarchy (Source: Gakenke District, Edited by Author (2023))



Map 8: Spatial location of Planned urban area and Settlement sites (Source: Gakenke District, Edited by Author (2023))

Based on the NLUDMP 2020-2050, the following are the key directions for Gakenke District:

- The urban population target in Gakenke District Town is 82,500 by 2035 and 150,000 by 2050
- Gakenke District Town target density is 7,000 people/ km²
- The population in Ruli and Rushashi Rural centers is planned to reach 21,539 by 2035 and 53,000 by 2050
- Density in rural settlement sites will increase considerably.

Gakenke DLUP promotes an additional mode of urbanization, “In-Situ Urbanization”. This is a process in which settlements densify and people become urbanized where they are. It transforms clusters of rural settlements into urban centers within the original rural environment.

In-situ urbanization is a solution for both urban and rural areas. However, implementation requires

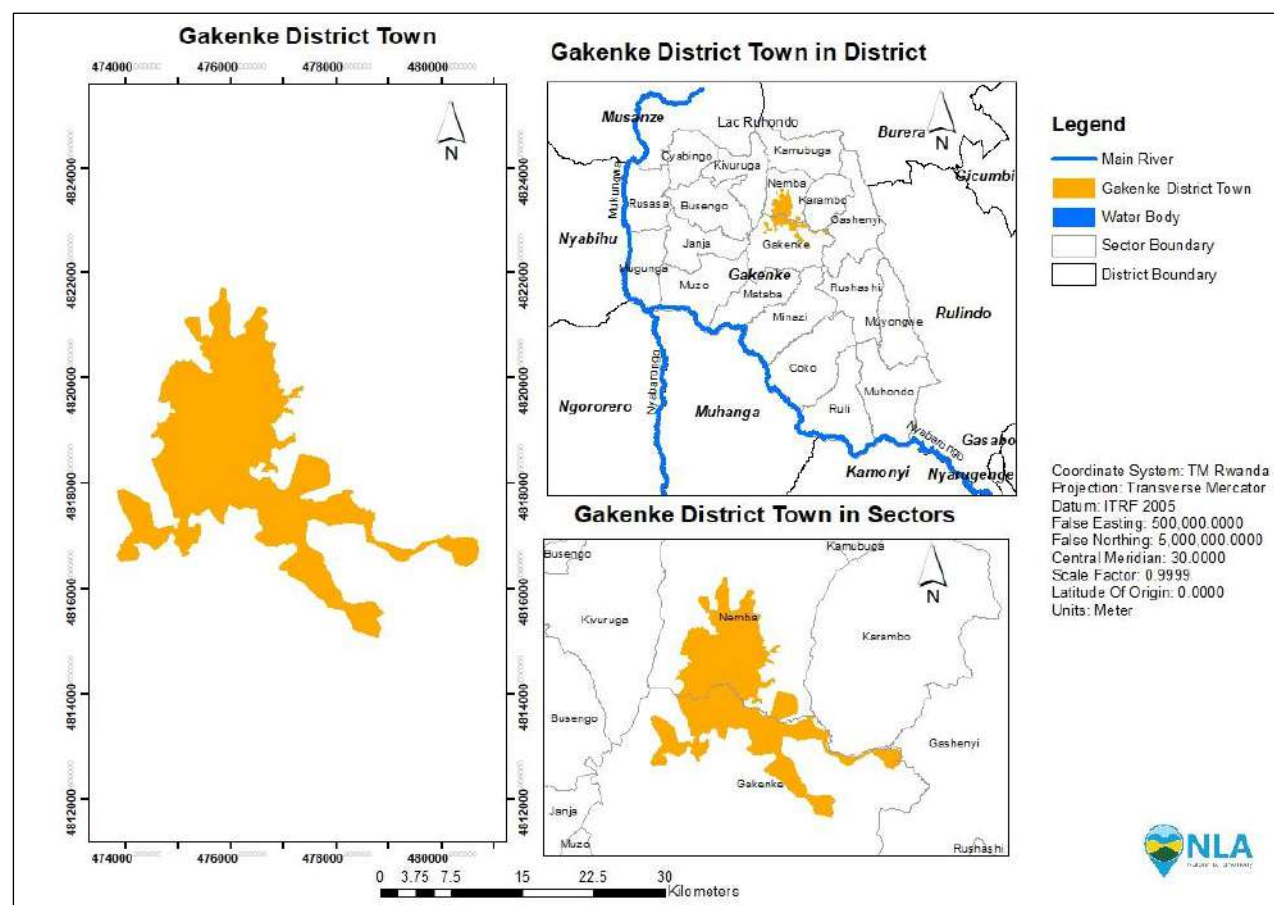
governmental promotion and investments in rural agglomerations. On the other hand, it reduces the costly movements of farmers to cities. Farmers in Gakenke District are encouraged to do only internal migration to reduce pressure on agricultural land and reside in formal settlements (high density settlements).

Modernized agriculture and agro-processing will help to sustain settlements for socio-economic benefits. As a result, the District will urbanize (increased urbanization rate) in a way that is proportionate with the socio-economic development.

4.3.2.1. Gakenke District Town

a. Existing Situation of Gakenke District Town in 2023

Gakenke District Town is one of sixteen District Towns supporting the urbanization hierarchy in Rwanda. Gakenke District Town has an area of 12.2 km² and is composed mainly of Gakenke and Nemba Sectors. The size will be re-assessed during mid-term review of 2035 to be extended to the size recommended by NLUDMP 2020-2050 equaling to 21km². The town has developed as a multi-nodal due to the topography but also following availability of infrastructure like roads, religious and public facilities etc.



Map 9: Gakenke District Town Location (Source: Gakenke District, 2023)

Gakenke District Town residents engage in trade and commerce through shops, small bars and restaurants, and services. There are no hotels and or guest houses. There is a constructed market, micro finance institutions, banks, credit and saving cooperatives.

Gakenke District Town is positioned between Kigali City and Musanze Secondary City. The location provides opportunities to develop trade for agricultural products such as fruits and vegetables, and artisanal and craft products. This location is also an advantage for the promotion of the private sector and possibility of developing other economic sectors like tourism, especially tourists visiting Musanze that may also visit tourism sites in Gakenke District.



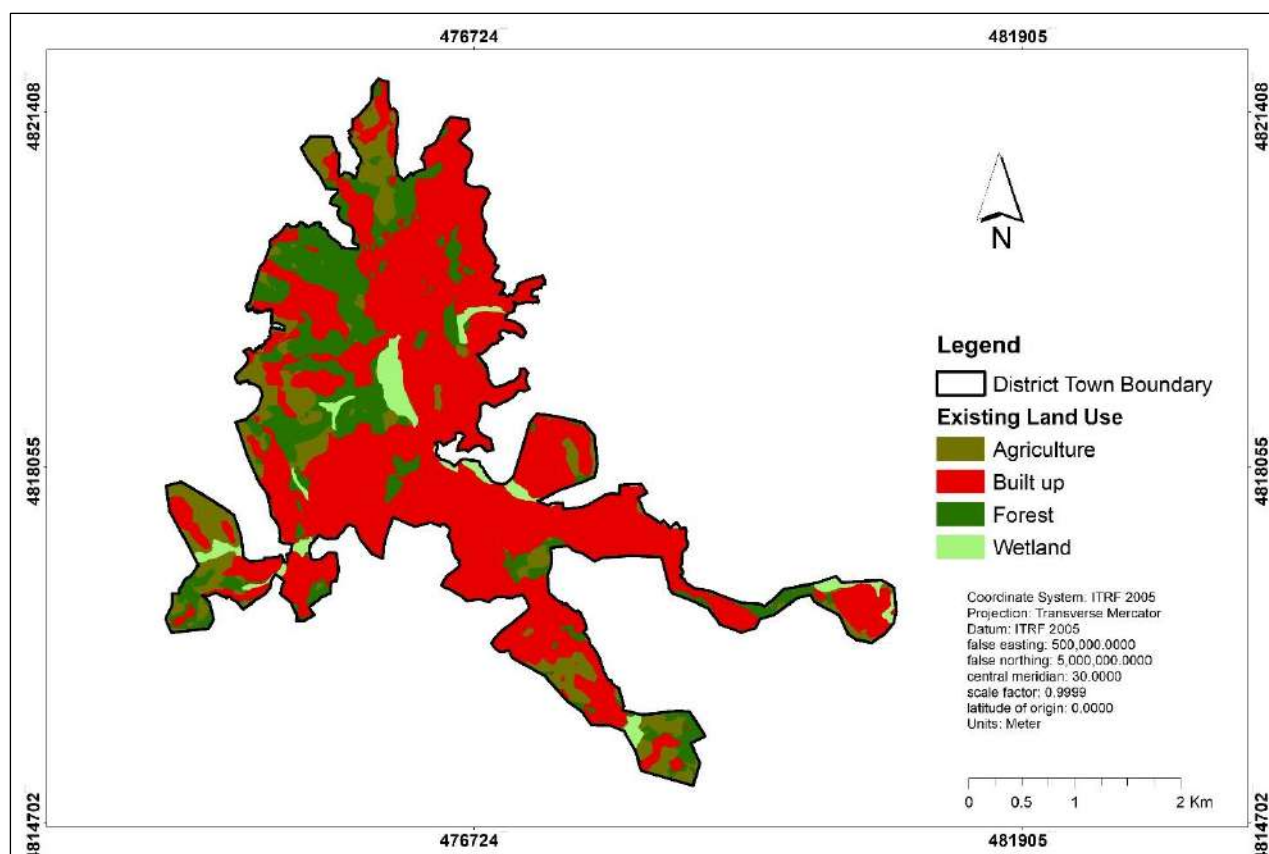
Figure 15: Gakenke District Town Pictures (Source: Author, photos taken during field visits in Gakenke District Town, July 2022)

The existing Gakenke District Town plan consists of an urban development master plan for urban areas including Rusagara I, Rusagara II and Nemba, elaborated in 2019. In addition, a physical plan for one urban residential site in Rusagara I has been elaborated. In 2023, built up area, forest and agriculture are predominant land use in Gakenke District Town where it covers 65.3% , 12.9% and 17.7% respectively of the entire District Town.

Table 11: showing Gakenke District Town Existing land Use balance sheet in 2023

Land Use	Area in Ha	Percentage
Agriculture	157.6	12.9
Built up	799.5	65.3
Forest	216.7	17.7
Wetland	50.4	4.1
Total	1224.2	100.0

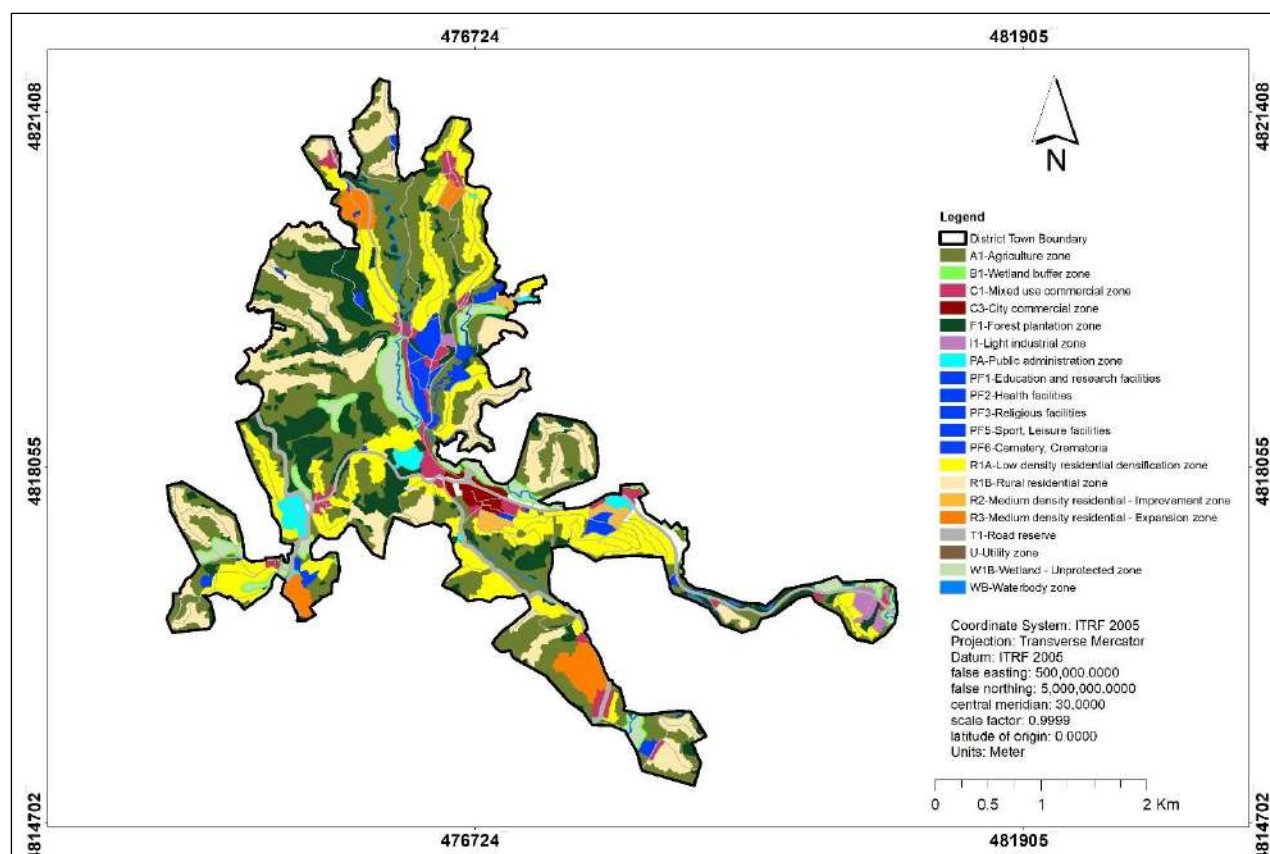
Map 10: showing Gakenke District town existing land use in 2023



b. Gakenke District Town planned land Use

Gakenke DLUP is integrating the proposals for the existing Gakenke District Town master plan for urban development with extension of the urban boundary area to cover the gaps between the existing urban areas of Rusagara I, Rusagara II and Nemba. It also takes into consideration the approved projects and the development trends within Gakenke District Town as discussed in the section of implementation framework in “Capital Improvement and Catalytic Projects (CIP)” subsection. The land use plan provides the development plan till the year 2050. The proposed zoning plan with zoning regulations Edition 1 of November 2022, guides the development for Gakenke District in general and Gakenke District Town particularly.

Further discussions on its implementation phases and implications are detailed in the next chapter related to the implementation of this DLUP. Planned Land Uses are presented in figure below.



Map 11: Gakenke District Town planned land use 2023-2050 (Source: Gakenke District, 2023)

The DLUP caters for the projected population to be settled in Gakenke District Town by 2050. As per NLUDMP 2020- 2050, the urban population target in Gakenke District Town is 82,500 by 2035 and 150,000 by 2050.

Table below presents the projections of Gakenke District Town population by 2035 and 2050 (based on NLUDMP 2020-2050 guidelines).

Table 12: Gakenke District Town population by 2035 and 2050 according to NLUDMP 2020-2050.

Sector	Gakenke District Town 2022				Pop	Pop	HHs	HHs
	Village	Female	Male	Total	2035	2050	2035	2050
Gakenke	Bukanka	125	120	245	3,167	5,757	811	1,475
	Gitenga	193	184	377	4,882	8,877	1,251	2,275
	Gahondo	294	295	588	7,614	13,845	1,951	3,548
	Akarugamba	130	130	260	3,365	6,119	862	1,568
	Kabaya	168	164	333	4,308	7,833	1,104	2,007

	Kageyo	96	98	193	2,504	4,552	642	1,167
	Kivumu	145	139	283	3,667	6,668	940	1,709
	Murambi	116	96	212	2,739	4,981	702	1,276
	Museke	201	200	402	5,199	9,453	1,332	2,422
	Nyamabuye	148	138	286	3,697	6,721	947	1,722
	Sitwe	247	258	505	6,539	11,890	1,676	3,047
	Gakenke town	178	182	360	4,654	8,462	1,193	2,168
	Sub-Total	2,041	2,003	4,043	52,337	95,158	13,412	24,385
Nemba	Buranga	158	147	305	3,947	7,177	1,011	1,839
	Kanzoka	232	220	452	5,847	10,631	1,498	2,724
	Karukara	184	176	360	4,661	8,475	1,195	2,172
	Cyahafi	115	145	260	3,365	6,119	862	1,568
	Gatare	178	171	349	4,522	8,221	1,159	2,107
	Kamuvunyi	167	165	332	4,293	7,806	1,100	2,000
	Kiryamo	126	146	273	3,527	6,413	904	1,644
	Sub-Total	1160	1170	2330	30,163	54,842	7,730	14,054
	G.Total	3,201	3,173	6,374	82,500	150,000	21,141	38,439

Agriculture and transportation cover two thirds of the land, equaling 29.1% and 10.2% respectively, in Gakenke District Town. The residential areas cover 32.4% while forest stands at 12.7%.

Table 13: Proposed Land Use Balance Sheet for Gakenke District Town (Source: Gakenke District; Edited by Author, 2023)

Land Use	Area in Ha	Percentage
Agriculture	361.4	29.1
Buffer	26.6	2.1
Commercial	42.6	3.4
Ecotourism	6.2	0.5
Forest	157.5	12.7
Industry	8.3	0.7
Public Administration	15.4	1.2
Public facilities	1.1	0.1
Public Facility	38.8	3.1
Residential	403.3	32.4
Transportation	127.2	10.3

Utility	0.0	0.0
Waterbody	11.4	0.9
Wetland	44.1	3.5
Total	1243.7	100.0

Gakenke District Town has different catalytic projects intended to accelerate socio-economic development of the town. During the starting phase of implementation, the District will construct paved roads with street lighting in Nemba Sector, modern car parking, renovation of Nemba hospital, upgrading the market and commercial areas.

Detailed physical plans in Kabaya, Nemba and Nyamabuye sites will increase population densities with adequate housing and recreation areas. These sites will be supplied with all necessary amenities such as paved roads, public lights, drainage, and electricity.

These projects, together with a planned light industrial zone, will have economic and financial benefits and will create a shared urban value among Gakenke District Town residents.

4.3.2.2. Gakenke Rurban Centers

The Rurban Centers are emerging centers of linkage between rural and urban areas in Gakenke District. Rurban Centers are classified as urban land with appropriate zoning regulations and planning guidelines mandated to have different land uses such as residential, commercial, tourism and conservation areas, urban farming, urban forest and landscaping, and social services such as sports and recreational facilities, schools and health facilities, transport, religious facilities, etc. It is restricted to establish such facilities outside the urban boundaries.

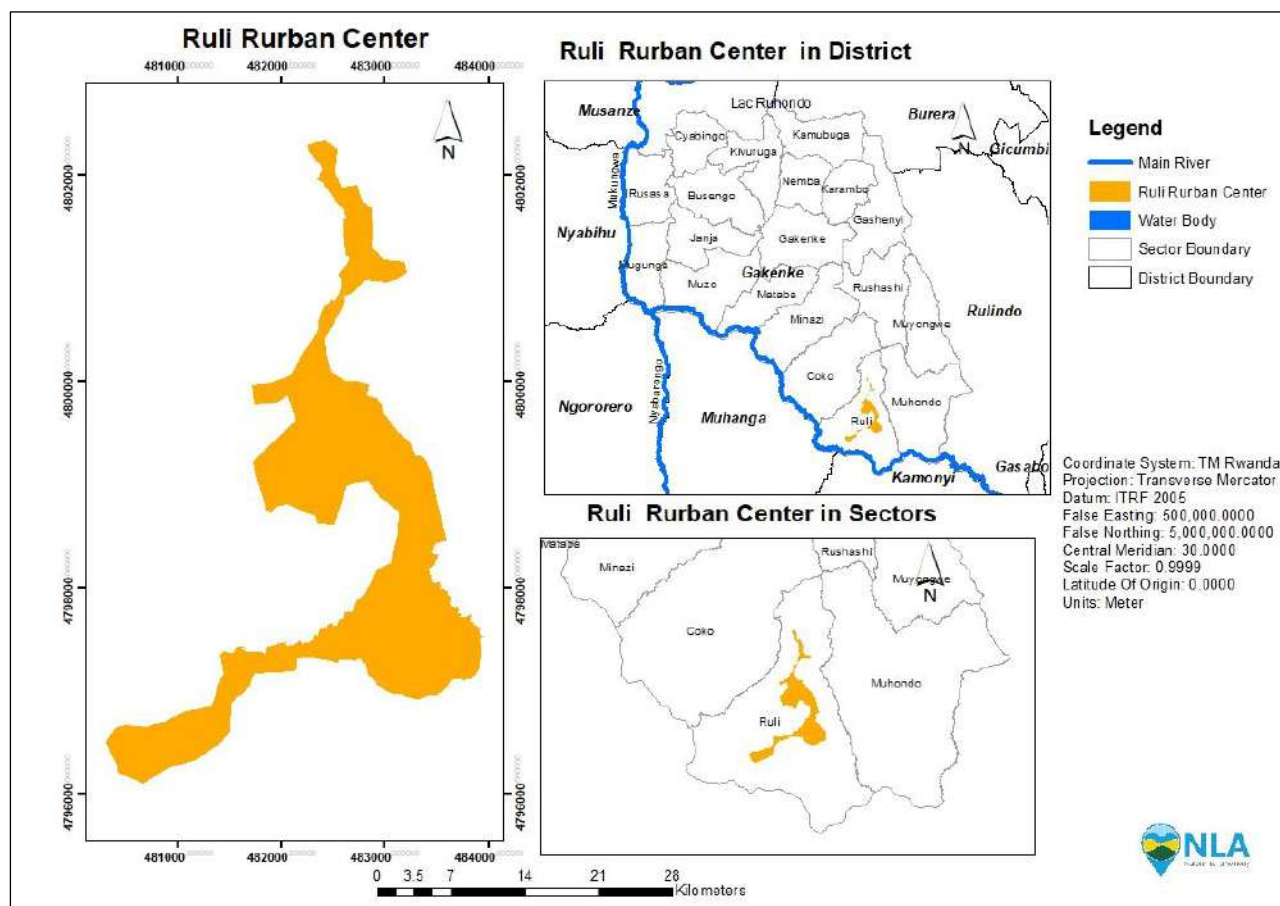
The following factors were considered while selecting the Rurban Centers, taking into consideration the District Council guidance: (i) Emerging existing potential trading centers; (ii) High pressure of growing residential settlements; (iii) Geographic location; and (iv) Existing and developing infrastructures such as roads, water, electricity, health facilities, employment opportunities, education facilities, etc.

As per NLUDMP 2020-2050 guidelines, and consultation with Gakenke District and relevant stakeholders, Ruli and Rushashi are prioritized as Rurban Centers to support the urbanization in Gakenke District. Ruli and Rushashi Rurban Centers have existing trading centers, and large built-up areas can be observed with infrastructure and facilities.

a. Ruli Rurban Center

• Existing Situation of Ruli Rurban Center in 2023

Ruli Rurban Center located in Ruli Sector is one of the emerging centers to which development is evident. The center's development is attributed to its historical background, the arrival of colonists, the Catholic Church, and the presence of mining sites. Ruli center is strategically located on the National Road Giticyinyoni-Ruli-Gakenke.



Map 12: Location map of Ruli Rurban Center (Source: Gakenke District; Edited by Author, 2023)

Ruli Sector is rich in mineral extraction such as coltan, cassiterite and wolfram. There are more than five mining companies or cooperatives operating in Ruli Sector, employing more than three thousand workers in quarries.

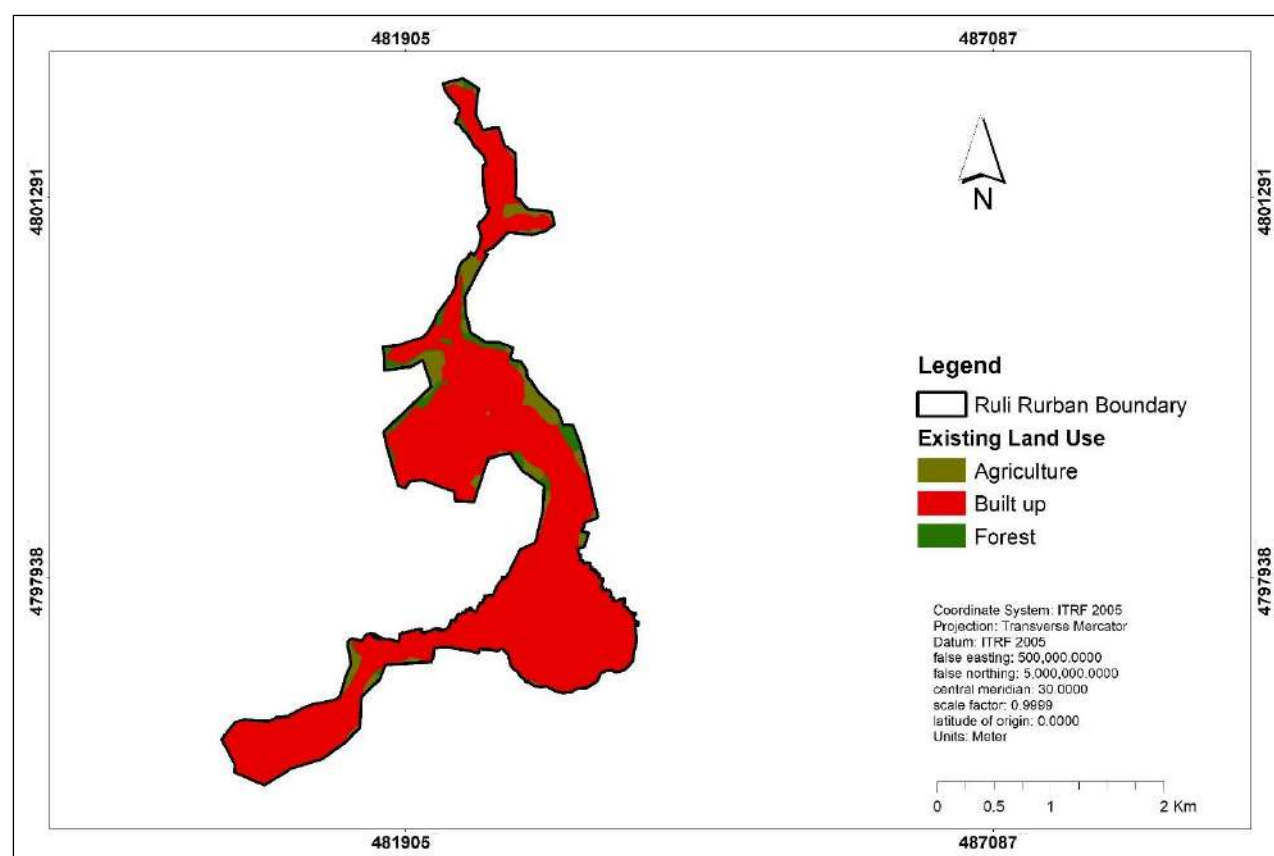
Ruli Rurban center is also known for its hospital and the Higher Institute of Health Sainte Rose de Lima that started as a Hospital Nursing School. The center is attracting residents from neighboring Sectors and those from far to come and settle due to job opportunities mainly in mining, trading, educational and health services, and coffee washing stations. The center accounts for nearly 3,000

employees that are paid on a weekly basis in mining activities. The center also is a hub for micro businesses as there is purchasing capacity of the population.

The existing Ruli Rurban Center urban boundary area is expanded to 470.8 Ha, including undevelopable area like forest, wetlands and risk zones (steep slope). The Rurban is composed of 10 Villages of 3 Cells including Ruli (Bariza, Gahondo, Gataba and Mugambazi Villages), Jango (Gatara, Gihura and Kinyinzo Villages) and Gikingo (Gatwa, Kabingo and Nyamugari Villages) of Ruli Sector. According to existing land use in 2023, built up area cover 88.5%, Agriculture covers 7.6% while forest covers 3.9% of the total area of Ruli Rurban Center.

Land Use	Area in Ha	Percentage
Agriculture	35.8	7.6
Built up	416.8	88.5
Forest	18.2	3.9
Total	470.8	100.0

Table 14: showing existing land use balance sheet of Ruli rurban center in 2023



Map 13: Ruli Rurban Center Existing Land Use in 2023 (Source: Gakenke District, 2022)

Ruli Rurban center has existing educational, religious and health facilities, financial institutions and

microfinances, cooperatives and various infrastructure and facilities such as water and sanitation.

Commercial activities in Ruli Rurban center are based on retail trade and dealings in agriculture products and other food products. There is the main marketplace which is an open-air market and lacks basic amenities such as some buildings, toilets, and water and sanitation mechanisms. People from different sectors come to trade their goods and services, but the market only convenes once a week.

In addition, small bars and restaurants are found in the center. There are some semi-wholesalers of manufactured products and home equipment, small and medium scale enterprises dealing in carpentry, welding, hairdressing and all operate in outdated buildings.

- **Ruli Rurban Center Planned Land Use**

Gakenke DLUP is integrating the proposals from the Ruli Local Urban Development Plan developed in 2019, and aligns with NLUDMP 2020-2050 provisions and guidelines.

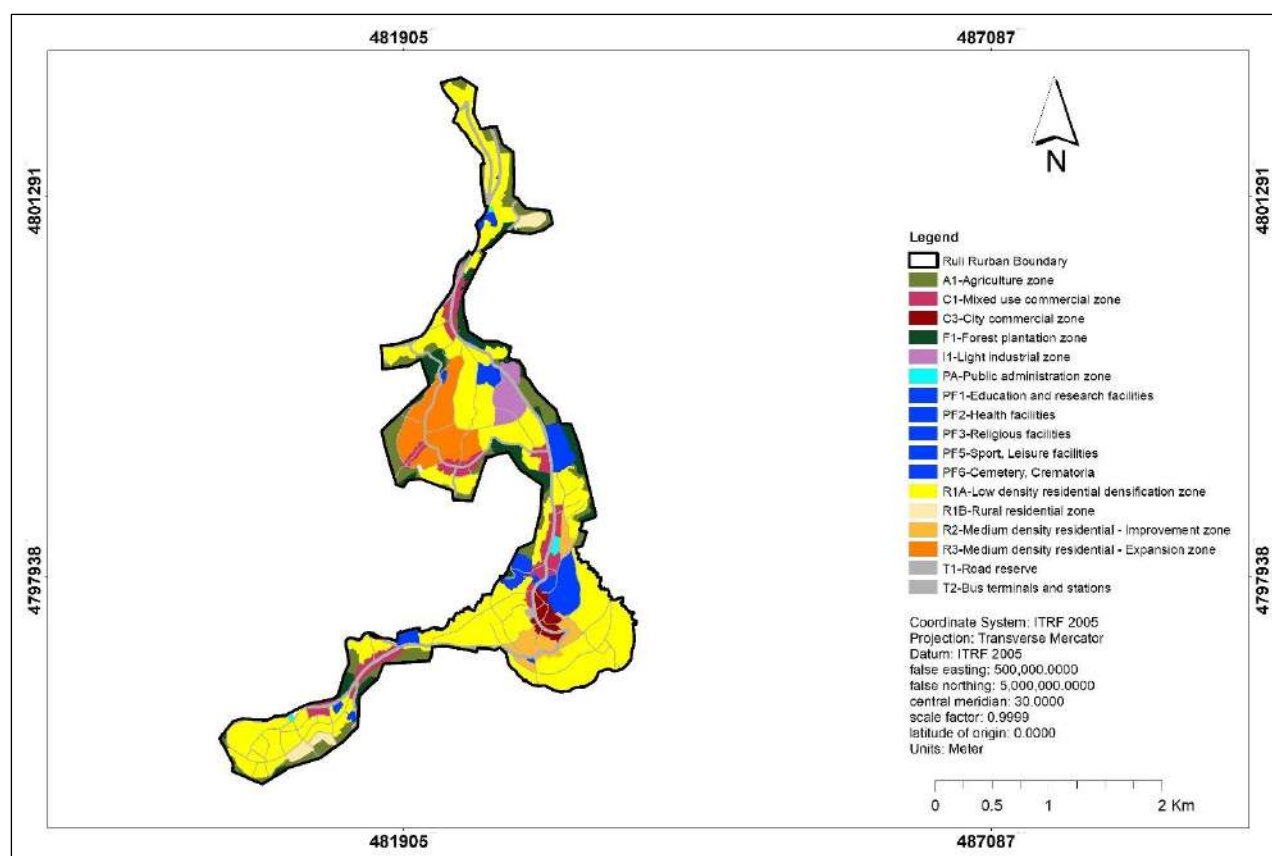
Ruli Rurban Center has an area of 470.8 Ha, it touches in four cells of Ruli Sector namely Busoro (Villages of Congoli, Cyoganyoni and Rugaragara), Jango (Villages of Gatagara, Gihura and Kinyonzo), Gikingo (Villages of Gatwa, Kabingo and Nyamugari) and Ruli Cell (Villages of Bariza, Gataba, Gahondo, Mugambazi and Ngayake). Table below summarizes the administrative entities composing Ruli Rurban Center.

Table 15: Administrative entities composing Ruli Rurban Center (Source: Gakenke District, Edited by Author, 2022)

Sector	Cell	Village
Ruli	Busoro	Congoli
	Busoro	Cyoganyoni
	Busoro	Rugaragara
	Jango	Gatagara
	Jango	Gihura
	Jango	Kinyonzo
	Ruli	Bariza
	Ruli	Gahondo
	Ruli	Gataba
	Ruli	Mugambazi

Ruli	Ngayake
Gakingo	Gatwa
Gakingo	Kabingo
Gakingo	Nyamugari

The proposed land uses for Ruli Rurban Center were analyzed based on intensive field surveys, findings from socio-economic analysis and inputs from consultations with local community and their authorities, Sector Land Managers concerned, District One Stop Center staff and other stakeholders from Ruli Sector. Planned land uses are presented in the figure below:



Map 14: Ruli Rurban Center Planned Land Use 2023-2050 (Source: Gakenke District; Edited by Author, 2023)

The proposed land use plan for Ruli Rurban Center provides the development plan till the year 2050. The proposed plan also takes into consideration the approved projects and the development trends within Ruli Rurban Center as discussed in the section of implementation framework in “Capital Improvement and Catalytic Projects (CIP)” subsection.

According to the NLUDMP 2020-2050, the population projection for Ruli Rurban center is to reach 13,876 by 2035 and 34,142 by 2050, with direct impact on the formulation of plans for the provision

of basic needs such as housing, basic facilities, services and utilities. In Ruli Rurban Center, residential, Transportation and agriculture cover the largest areas, with 53.2% , 13.4% and 10.6% respectively. In addition, forest covers 6.5% of the land.

Table 16: shows population projections in Villages composing Ruli Rurban Center for the year 2035 and the year 2050.

Sector	Ruli Rurban Center; Population 2022				Population 2035	Population 2050	HHS 2035	HHS 2050
	Village	Female	Male	Total				
Ruli	Rugaragara	205	229	434	1,111	2,734	278	684
	Gatwa	244	224	467	1,196	2,942	299	736
	Kabingo	245	218	463	1,184	2,914	296	728
	Nyamugari	171	163	333	853	2,100	213	525
	Gatagara	202	201	403	1,033	2,541	258	635
	Gihura	141	133	274	701	1,724	175	431
	Kinyonzo	225	214	439	1,124	2,767	281	692
	Bariza	336	297	633	1,620	3,985	405	996
	Gahondo	236	217	453	1,159	2,853	290	713
	Gataba	397	364	760	1,946	4,788	486	1197
	Cyoganyoni	187	213	400	1,024	2,519	256	630
	Mugambazi	180	181	361	925	2,276	231	569
Total		2,767	2,654	5420	13,876	34,142	3,469	8,536

Source: RPHC5,2022 (updated by NLA Planning Team)

Table 17: Ruli Rurban Center Planned Land Use Balance (Sheet)

Land Use	Area in Ha	Percentage
Agriculture	50.1	10.6
Commercial	30.4	6.5
Ecotourism	0.3	0.1
Forest	30.6	6.5
Industry	10.5	2.2
Public Administration	1.4	0.3
Public Facility	32.2	6.8
Residential	252.1	53.5
Transportation	63.3	13.4
Total	470.8	100.0

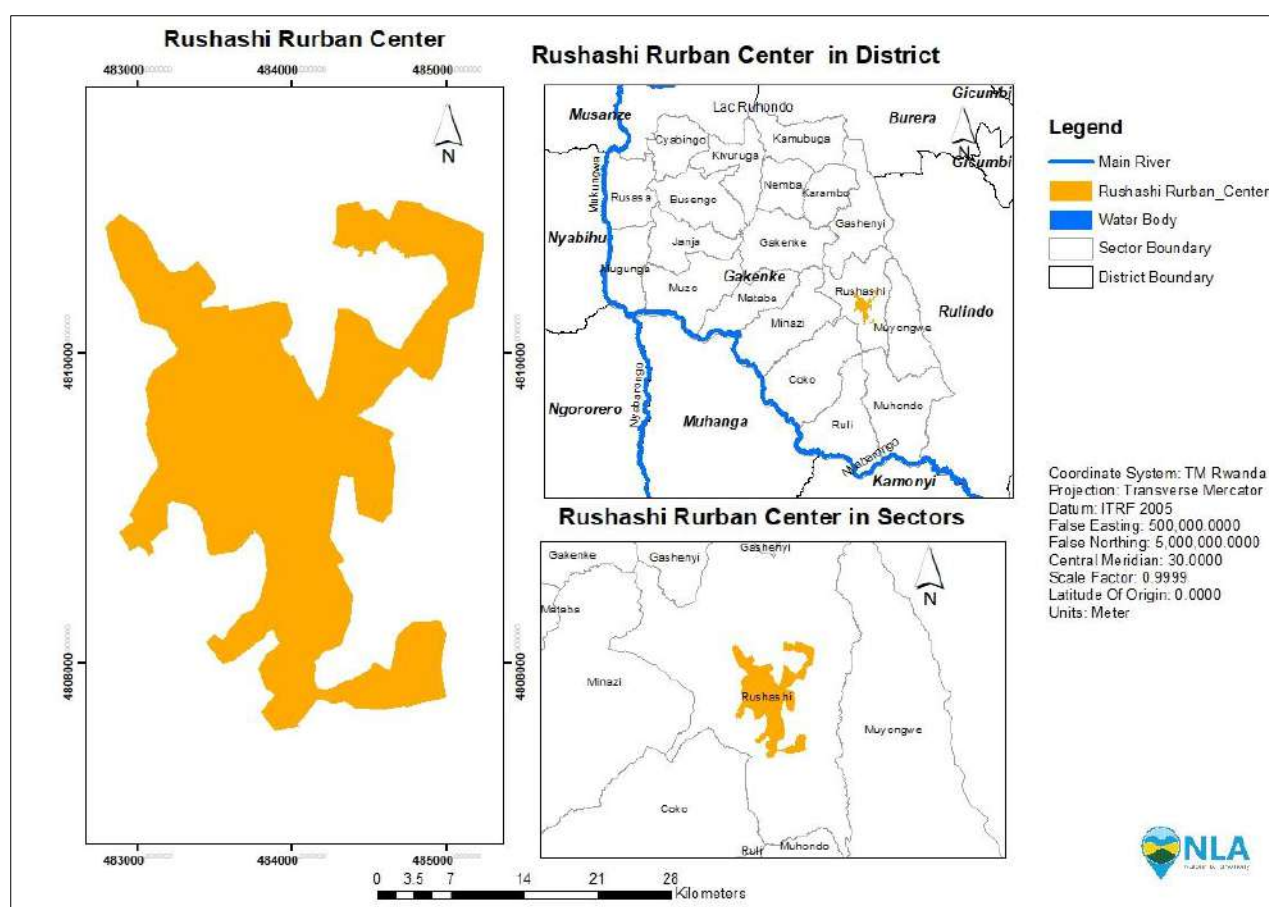
Source: Gakenke District; Edited by Author, 2023

b. Rushashi Rurban Center

• Existing Situation of Rushashi Rurban Center in 2023

Rushashi Rurban Center is located in Rushashi Sector. The center's development is attributed to its historical background as the administrative setting of the former sous-prefecture, courts, and post-office etc. attracted many people to settle in Rushashi and created a center in which development trends are obvious. There are old governmental buildings to be renovated or privatized for beautification of the center.

Rushashi center is strategically located on the National Road Giticyinyoni-Ruli-Rushashi-Gakenke; it is also connected to Rulindo District which makes it easy to reach Kigali City in one hour. The strategic location is a factor for developing trade in Rushash, as goods from Kigali City are stored and supplied to other sectors for retailing. Commercial activities are based on wholesaling and retail trade and dealings in agriculture products and other food products.



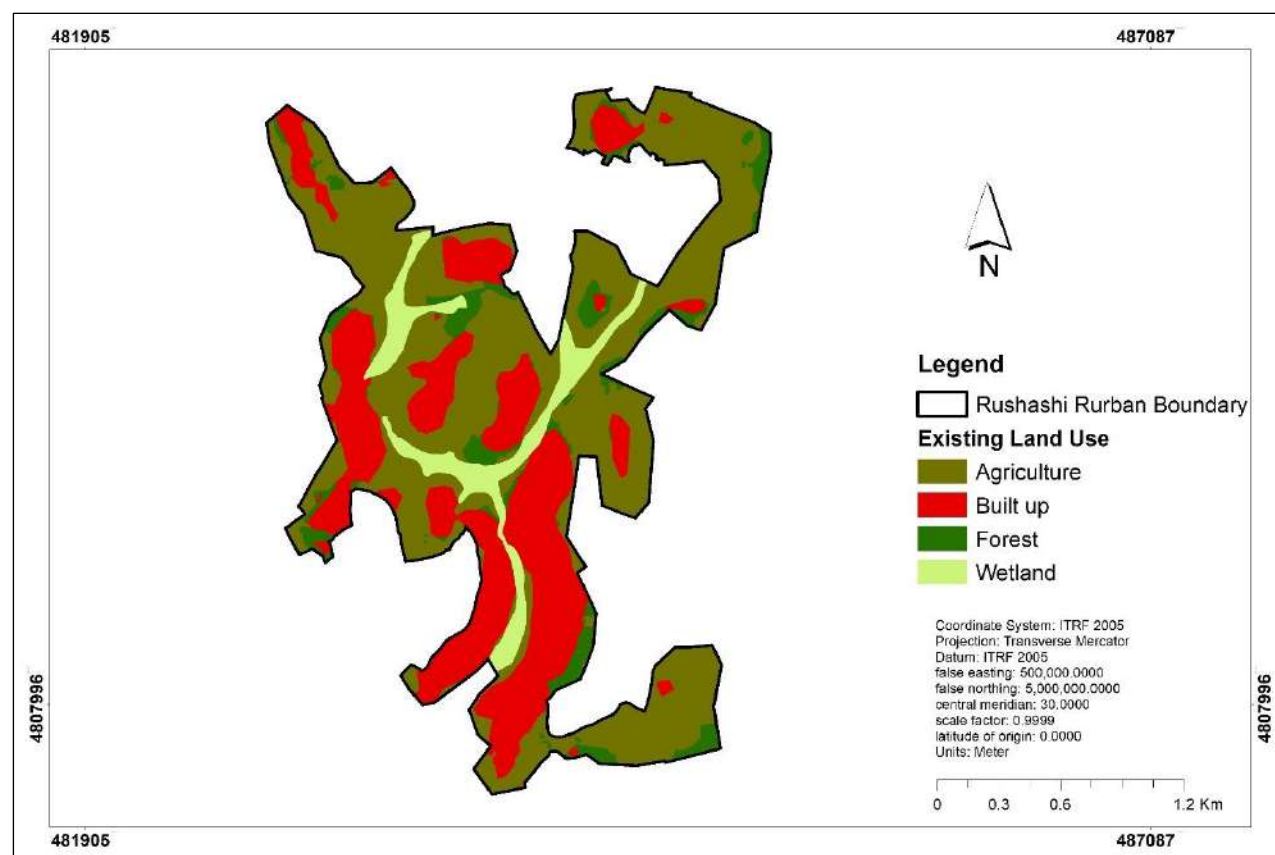
Map 15: Location of Rushashi Rurban Center (Source: Gakenke District; Edited by Author 2023)

There is a constructed market with basic amenities such as buildings, toilets, and water and sanitation facilities. There is however a need to refurbish the market as well as increase the holding capacity. In addition, small bars and restaurants are found in the center. Some semi-wholesalers of manufactured products and home equipment, small and medium scale enterprises dealing in carpentry, welding, and hairdressing all operate in old fashioned buildings.

Rushashi Rurban center has educational facilities and healthcare facilities, financial institutions and microfinances, cooperatives and various infrastructure and facilities such as water and sanitation etc. By existing situation, agriculture and built-up area are predominant land uses covering 54.3 % and 31.3% respectively of the entire Rurban center.

Table 18: showing existing land use balance sheet in Rushashi sector in 2023

Land Use	Area in Ha	Percentage
Agriculture	197.3	54.3
Built up	113.8	31.3
Forest	25.4	7.0
Wetland	26.8	7.4
Total	363.3	100.0



Map 16: Rushashi Rurban Center Existing Land Use in 2023 (Source: Gakenke District, Edited by Author, 2023)

Rushashi Sector has a moderate relief intensity erosional landscape characterized by narrow elongated top-rounded ridges separated by wide valleys with broad gently sloping sides incised by the tributaries of the main rivers suitable for coffee plantations. Hence, the existence of a performing cooperative ABAKUNDAKAWA RUSHASHI with more than 3,000 members with around 2 billion of share capital.

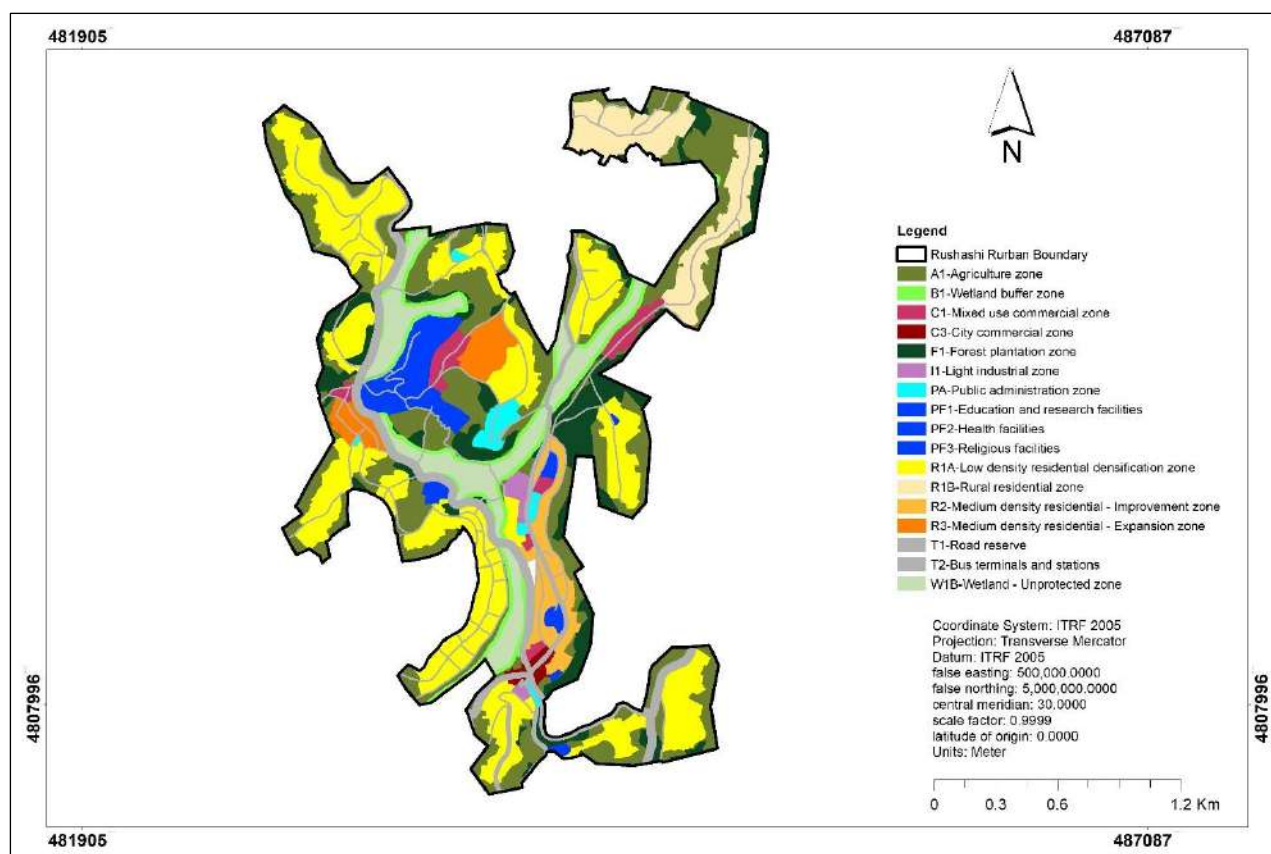
- **Rushashi Rurban Center Planned Land Use**

Rushashi Rurban Center has an area of just under 363.3 ha. It touches on four Cells of Rushashi Sector, namely Burimba (Kabuye and Kara Villages), Joma (Rugarama, Nyagasozi and Kineza Villages), Kageyo (Karambi and Nganzo Villages) and Rwankuba (Karushashi and Ruganda Villages). Table Below summarizes administrative entities composing Rushashi Rurban Center.

Table 19: Administrative entities composing Rushashi Rurban Center (Source: Gakenke District, Edited by Author, 2022)

Sector	Cell	Village
Rushashi	Buriba	Kabuye
	Buriba	Kara
	Joma	Kineza
	Joma	Nyagasozi
	Joma	Rugarama
	Kageyo	Karambi
	Kageyo	Nganzo
	Rwankuba	Karushashi
	Rwankuba	Ruganda

The proposed land uses for Rushashi Rurban Center were analyzed based on intensive field surveys, findings from socio-economic analysis and inputs from consultations with local community and their authorities, Sector Land Managers concerned, District One Stop Center staff and other stakeholders from Rushashi Sector. The proposed land use map is presented in figure below:



Map 17: Rushashi Rurban Center Planned Land Use 2023-2050 (Source: Gakenke District; Edited by Author, 2023)

The proposed land use plan for Rushashi Rurban Center provides the development plan till the year 2050. The proposed plan also takes into consideration the approved projects and the development trends within Rushashi Rurban Center as discussed in the section of implementation framework in “Capital Improvement and Catalytic Projects (CICP)” subsection.

According to the NLUDMP 2020-2050, Rushashi Rurban center is to accommodate a population of 20,000-100,000 by 2050. However, the population projection for Rushashi Rurban Center is 7,644 residents by 2035 and 18,858 residents by 2050. This has a direct impact on the formulation of plans to provide housing, basic facilities, services and utilities.

Table below shows population projections in the villages composing Rushashi Rurban Center for the year 2035 and the year 2050.

Table 20: Population projections in Rushashi Rurban Center

Rushashi Rurban Center; Population 2022					Population 2035	Population 2050	HHS 2035	HHS 2050
Sector	Village	Female	Male	Total				
RUSHASHI	Kara	191	220	411	1052	2,587	269	663
	Kineza	123	133	256	655	1,613	168	413
	Rugarama	240	221	461	1180	2,903	302	744
	Karambi	134	118	252	645	1,588	165	407
	Nganzo	316	292	608	1557	3,831	399	982
	Karushashi	103	113	216	552	1,358	141	348
	Ruganda	160	170	330	845	2,079	216	533
	Kabuye	234	226	460	1178	2,899	302	743
Total		1,502	1,492	2,994	7,664	18,858	1,964	4,832

As per the consolidated land use balance sheet, residential use occupies 35.4% of the total area, whereas agriculture occupies 24% of the land within Rushani Rurban Center.

Table 21: Rushashi Rurban Center Proposed Land Use Balance Sheet (Source: Gakenke District; Edited by Author, 2023)

Land Use	Area in Ha	Percentage
Agriculture	87.2	24.0
Buffer	13.0	3.6
Commercial	8.2	2.3
Ecotourism	0.3	0.1
Forest	31.5	8.7
Industry	2.0	0.6
Public Administration	4.1	1.1
Public Facility	15.4	4.2
Residential	128.6	35.4
Transportation	48.5	13.3
Wetland	24.6	6.8
Total	363.3	100.0

To ensure the sustainable development of this center, a handicraft area (Agakiriro) is recommended in order to promote jobs and creativity in Rushashi Rurban Center. A solid waste disposal site is proposed for smart waste management from commercial business and local communities.

The commitments of the Rushashi Rurban private sector should be supported and facilitated in account of implementing various projects. e.g. commercial complex, modern market, and bus station.

4.3.2.3. Gakenke Rural Settlement Sites

According to NLUDMP 2020-2050, the rural population in 2019 was residing in 13,661 Villages representing 82% of the Rwandan people. However, too many Imidugudu and scattered homesteads in rural areas eliminate economies of scale. Therefore, a transformation of the rural settlement structure is needed in Rwanda.

Urgent actions are needed to consolidate and freeze the rural settlement sites and mitigate sprawl. The 2050 projected rural population of 6.6 million (30%) will be clustered into about 3,000 settlement sites. An average of 1 or 2 settlement site(s) per Cell is required, depending on the topography of the area. Where the topography is not favorable, proposed sites can be shifted to nearby Cells that fulfill the conditions.

Each rural settlement site at Cell level will have public and social amenities such as sports, recreational and leisure spaces, school and ECD, community health post, roads, market, cowsheds, etc. The specific location for these social facilities will be determined by detailed site plans.

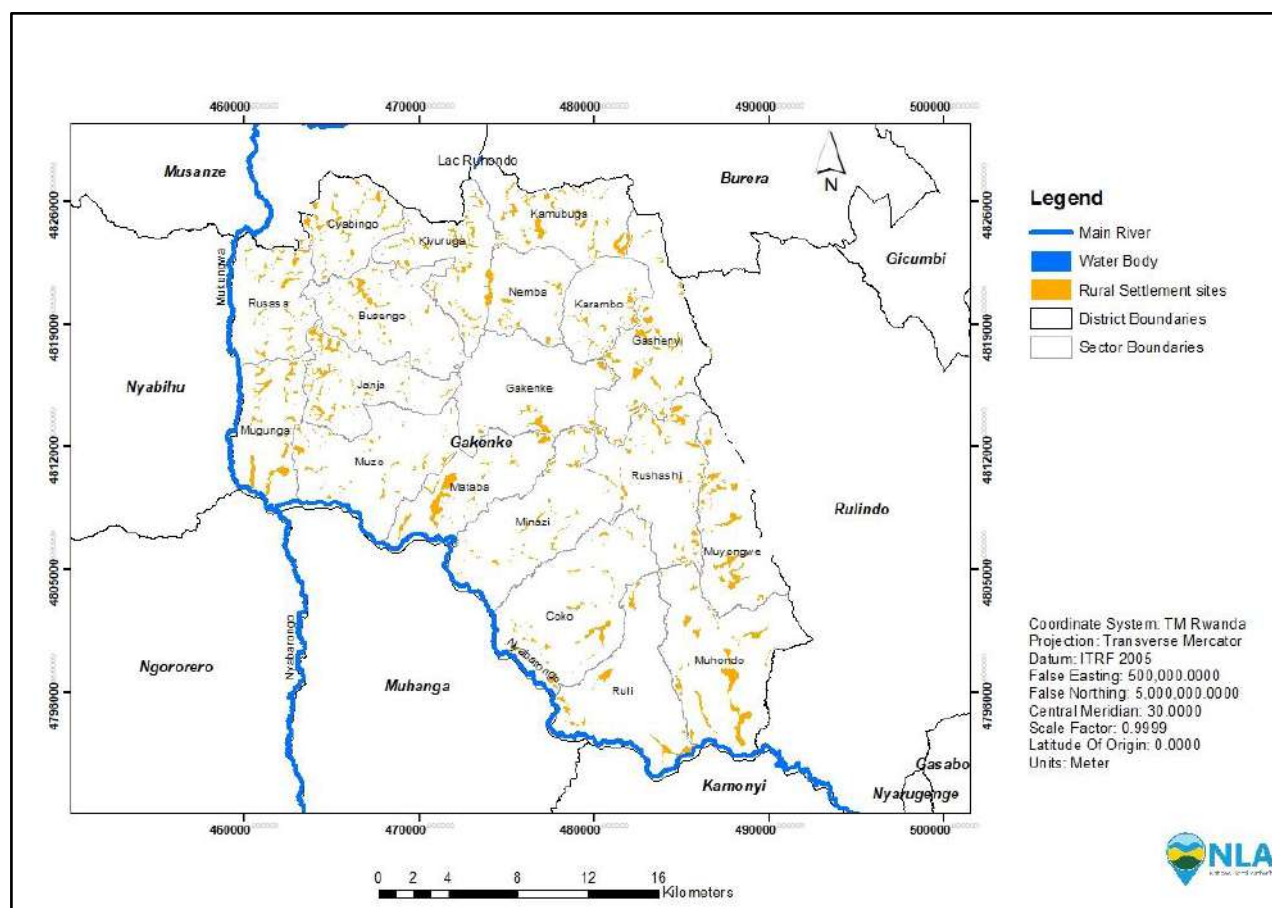
a. Existing situation of Rural Settlement in Gakenke District

In Gakenke District, the rural settlement system is characterized by scattered homesteads as a result of conflicts between residential and agricultural land uses, as people choose to settle near their agricultural land instead of within rural settlement sites. This sprawl phenomenon prevents improvement in agricultural yield and inefficient supply of services and infrastructure.

In 2016, the District identified 265 sites but not settlement clusters in each Sectors. However, in 2021 and in collaboration with NLA, the District enlisted 142 settlement sites based on NLUDMP 2020-2050 parameters and criteria. These sites accumulate a total area of approximately 7,190 ha or 72 km². Due to the steep slopes of Gakenke District, all Sectors do not have the same number of sites as some Cells have more than two rural settlement sites.

b. Planning Perspectives of Gakenke Rural Settlement Sites

The 87 rural settlement sites in the District are spatially distributed in all Sectors. With the rural population projected to 264,811 people by 2035 and reduce to 170,000 people by 2050, the population density within the rural settlements will decrease from 3,682 people/km² in 2035 to 2,364 people/km² in 2050.



Map 18: Spatial distribution of rural settlement sites in Gakenke District (Source: Gakenke District, Edited by Author; 2023)

The country aims at accelerating urbanization to facilitate economic growth. Migration of people who move from rural to urban areas is currently driving the urbanization in Rwanda. Migration reinforces urban centers, but can at the same time deteriorate and weaken rural settlements by lack of investments and employment opportunities.

Therefore, “In-Situ Urbanization” is promoted as an additional mode of urbanization in Gakenke District. This is a process in which people become urbanized where they are. It transforms clusters of rural settlements into urban centers within the original rural environment. On the other hand, it reduces the costly movements of farmers to cities and it prevents social and economic pressures on existing towns.

It is of great importance for Gakenke District and its stakeholders to prioritize investments in the rural system to form clusters of settlements and improve livelihood, housing, education, and healthcare to enhance the urban quality. In-situ urbanization is essential to achieve the national target of 70% urbanization rate by 2050.

Agglomeration and Consolidation Principles

Gakenke rural settlements should be compact and consolidated. All new buildings must be developed within the rural settlement sites. In collaboration with local authorities at Cell and Village level, identified sites will be surrounded by planted trees as a physical feature or barrier to mitigate sprawl. Tree planting along the site boundaries can be promoted during community works including Umuganda.

High density housing models are recommended in rural areas, including exploiting the underground. The size of rural residential plots are 300 m² and dwelling models of 4x1 and 8x1 (and other high-density models) are promoted. Typologies that utilize plots of less than 300 m² are also encouraged.

Agriculture is the main economic activity and source of income for rural populations and must be developed or modernized around rural settlement sites in order to create agglomerations of socio-economic benefits.

4.3.2.4. NLUDMP 2020-2050 National Directives vs Gakenke DLUP 2023-2050 alignment

Changes have been observed in the settlement boundaries initially proposed by the NLUDMP 2020-2050. This is due to the incorporation of participatory planning principles during the DLUP development. This participatory method led to adjustments that are supporting Gakenke's vision. The following table provides remarks on the observed changes about the DLUP proposal vs NLUDMP 2020-2050 proposals.

Settlement Type	NLUDMP 2020-2050 directives					DLUP 2023-2050 proposals			
	Nbr	Area (2035) (km ²)	Area (2050) (km ²)	Pop in 2025 (2050)	Nbr	Area 2035 (km ²)	Pop 2035 (&HHs)	Area 2050 (km ²)	Pop 2050
Gakenke District Town	1	12	21	82,500 (150,000)	1	12.2	82,500	TBD	150, 000
Remarks: The area planned for the District Town (12.2 km ²) is complying to the area recommended by NLUDMP 2020-2050 (12 km ²) in 2035. However, there is an opportunity during a midterm review to re-assess the situation and identify the suitable land for further expansion to reach to the size (21km ²) recommended in 2050.									
Rurbans	2	N/A	8.4	53, 000	2	8.3	21,539	TBD	53, 000
Remarks: Regarding to the area of rurban boundary, the total area planned (8.3km ²) for rurban centres in Gakenke District is aligned with NLUDMP 2020-2050 directives equaling to 8.4 km ² .									
Total Urban areas	3	N/A	29.5	135,500	3	20.5	104,039	TBD	203,000

Rural settlement sites	87	N/A	32km ²	170,000	145	56.9	264811	TBD	170,000
Remarks: The Planned total area of rural settlement site in Gakenke is 56.9km ² . The area and number of rural settlement sites is not aligned with NLUDMP 2020-2050 directives due to this reason, Gakenke is characterized by hills and non-developable land within rural settlement site boundaries like forest and agriculture which led to the creation of new sites to accommodate the future projected population.									

Table 22: NLUDMP 2020-2050 National directives vs Gakenke DLUP 2022-2050 alignment

In 2035, a revision of the DLUP is recommended in order to reassess settlements, potentially leading to adjustments in the size or number, either by increasing or decreasing them as necessary, while taking into consideration the NLUDMP 2020-2050's flexibility on proposal of 10% change in settlement boundaries.

4.3.3. Housing

According to NLUDMP 2020-2050, residential land use is the largest land consumer in every settlement. Therefore, it is essential to base future demands on desired and sustainable housing types that fit the lifestyle of future residents in Gakenke District.

The housing component is driven by the following:

- Characterization of housing typologies in 2050 by spatial and architectural parameters;
- Alignment of housing typologies and settlement categories, for maximum suitability and densification;
- Assessment of the demands for housing types, based on population targets in each District;
- Measurements of land requirements for residential areas in 2050, by the District;
- Extrapolating the land requirements for residential areas to land requirements for entire cities;

The target in the housing sector is a steady annual increase of buildings on one hand, and access to housing mortgages on the other. A second target is to develop new local construction materials and housing typologies. The achievement of these targets will be the backbone for the roll-out of affordable and decent housing countrywide.

4.3.3.1. Existing Housing Situation

Existing housing in Gakenke District, in both urban and rural areas, generally have a basic typology, most commonly beehive-shaped, detached or semi-detached buildings made of mud bricks and wooden poles. Almost 92% of households in Gakenke District own their housing unit, as indicated in the table:

Table 23: Distribution of housing units by tenure of households

No	Type of Tenure of Household	Percentage
1	Owner	91.70%
2	Tenant	4.80%
4	Hire Purchase	0.1%
5	Free lodging	2.90%
6	Other	0.40%

Source: RPHC5,2022

Building materials are primarily constructed with brick walls, with iron sheets or tiles for the roofs. Over 80% of the residential buildings in Gakenke District have earth floors.

Table 24: Distribution of housing units by main material of the floor

No	Main Material of the floor	Percentage
1	Earth	81.8
2	Dung Hardened	0.20%
3	Stones	1%
4	Burnt Bricks	0.30%
5	Ceramic Clays	0.20%
6	Cement	16.70%

Source: RPHC5,2022

Table 25: Distribution of housing units by main material of the roof

No	Main Material of the Roof	Percentage
1	Iron Sheet	62.80%
2	Local Tiles	37%
3	Industrial Tiles	0.20%

Source: RPHC5,2022

Table 26: Distribution of housing units by main material of the wall

No	Main Material of the Wall	Percentage
1	Wood with mud without cement	2.20%
2	Wood with mud and cement	0.90%
3	Sun dried bricks	91.6%
4	Stone	0.70%
5	Burnt dried bricks	4.60%

Source: RPHC5,2022

The following photos show the predominant housing typologies in Gakenke District.



Figure 17: Existing Houses (Source: Photos taken by Author in Ruli sector, 2022)

4.3.3.2. Planned Housing Perspectives

According to NLUDMP 2020-2050, In the year 2050, Gakenke District will host 94,307 dwelling units Whereby 38,439 dwelling units will be hosted in District town, 13,368 dwelling units in Rurbans and 42,500 dwelling units in rural settlements sites.

To comply with NLUDMP 2020-2050 directives of dwelling units to be hosted in 2050, proposed dwelling units were calculated based on land allocated for residential zones in Urban, Rurban and rural settlements areas.

As highlighted in the table below, Dwelling units per residential categories were put in phases to clearly indicate areas that will be reserved for residential zones. In rural settlement sites particularly, phase was planned to host 42,500 dwelling units but based on fact that people will move progressively from rural areas to urban areas looking for employment opportunities in urban areas, the total of 348,176 dwelling units (Minimum density) are reserved and will be diminished to 42,500 dwelling units in 2050, the migration of people from rural areas to urban areas will be assessed during the revision of DLUP in 2035 to determine whether residential areas previously occupied by those who will move to urban areas can be dedicated to agriculture zones.

Table 27. Housing Stock/Proposed Residential zones and Number of Dwelling units

Settlement category	Number of DU by 2050 (NLUDMP 2020-2050)	Residential categories	Area (Ha)	Number of DU (min. density)	Number of DU (Max. density)	Number of DU (Medium density)	% of Areas
District Town	38,439	R1		-	-	-	-
		R1A	178.11	3,562	5,343	4,453	48.10
		R1B	41.30	1,652	2,891	2,271	24.54
		R2	9.47	568	947	758	8.19
		R3	22.20	1,332	1,998	1,776	19.18
Sub-Total			251	7,114	11,179	9,258	100.00
Rurbans	13,368	R1		-	-	-	-
		R1A	142.6	2,853	4,279	3,566	47.50
		R1B	22.1	884	1,548	1,216	16.19
		R2	18.3	1,101	1,835	1,468	19.55
		R3	16.8	1,007	1,510	1,258	16.76
Sub-Total			200	5,845	9,172	7,509	100.00
Rural settlements	42,500	R1A	139.38	2,788	4,181	3,485	0.73
		R1B	8,569	342,766	599,841	471,304	98.58
		R2	8.6	516.1	860.2	688.2	0.14
		R3	35.1	2,106.5	3,159.7	2,633.1	0.55
Sub-Total			8,752	348,177	608,042	478,109	100
Total	94,307		9,203	361,136	628,394	494,876	

Source: Data analysis, 2023

a. Proposed Housing Typologies in Gakenke District

The NLUDMP 2020-2050 recommends mixed-use housing urban development in which different functions such as residential, commercial, cultural, and institutional are mixed in one building, block or neighborhood. These functions should be well integrated physically and functionally. In addition, a mixed-income approach should be promoted whereby low, medium and high-income earners settle in the same neighborhood to minimize social segregation.

- Low-Density Residential Densification Zone (R1A)

The R1A zone is intended for low density residential areas and low-density densification zones. The purpose is to promote more efficient use of land in prime locations of the urban areas by allowing for intensification and mix of uses within the existing low-density housing development. Within the R1A zone, all types of single-family houses are allowed including stand alone, semi-detached, townhouses and row houses, as well as multi-family housing. In addition, complementary commercial and public facilities are allowed as needed.

Prescribed plot size, maximum 300m², is smaller than in the Low-Density Residential Zone (R1) to distinguish the R1A zone as a higher density low rise residential area. The maximum number of stories allowed are three (3), equaling ground, first and second floor (G+2). For single family use a density of maximum 30 DU/Ha is allowed. For mixed-use developments a density of maximum 20 DU/Ha is allowed.



Figure 16: Housing Typologies in R1A (Source: Drawings by NLA Team, 2023)



Figure 17: R1A Site Model (Source: Drawings by NLA Team, 2023)

- Rural Residential Zone (R1B)

The R1B residential zone enables compact developments in rural areas. The zoning is intended to offer low-rise housing as part of the farming community, and complementary public facilities as needed. This zone is mainly proposed in rural settlement areas for the purpose is to create sustainable and compact residential neighborhoods in the rural areas of the city, limiting encroachment towards agricultural land or other land uses. Within the R1B zone, all types of single-family houses are allowed including stand alone, semi-detached, townhouses and row houses, as well as multi-family housing as per the IDP Model Villages. In line with the NLUDMP 2020-2050 guidelines and zoning regulations, maximum plot size is 300m² for single family housing and 500 m² for multi-family housing.

The maximum number of stories allowed are three (3) plus penthouse, equaling ground, first, second floor and penthouse (G+2+P). For single family use a density of 40-70 DU/Ha is allowed. For mixed-use developments a density of 30-50 DU/Ha is allowed.



Figure 18: Housing typology in R1B (Source: Drawings by NLA Team, 2023)

- Low Density Residential Zone (R1)

The R1 zone is intended for single family housing, e.g. stand-alone villa or bungalow, and complementary commercial and public facilities as needed. The zoning is limited to existing consolidated areas with the objective of limiting low-density urban development and encouraging compact and dense developments. In all R1 zones, R1A regulations are permitted (see R1A).

Maximum plot size is 500m². For plots bigger than 500m², existing developments can retain their

use. For plots less than 300m², R1A regulations shall apply. The maximum number of stories allowed are three (3) plus penthouse, equaling ground, first, second floor and penthouse (G+2+P). For single family use a density of maximum 15 DU/Ha is allowed. For mixed-use developments a density of maximum 10 DU/Ha is allowed.



Figure 19: Housing Typologies in R1 (Source: Drawings by NLA Team, 2023)

- Medium Density Residential - Improvement Zone (R2)

The R2 residential zone is intended for upgrading of informal settlements or redevelopment of urban renewal areas, wherever feasible in brownfield sites. A variety in housing typologies and developments are encouraged, intended to stimulate the upgrading, redevelopment, and densification of these areas. Stand-alone single-family housing is however not allowed.

The objective is to improve the overall physical appearance of the area as well as improve living conditions for residents. By enabling upgrades in the short term, and redevelopment through land assembly in the medium-long term, developable land in prime areas of the city can be better utilized to create integrated and affordable neighborhoods and provide adequate infrastructure and public facilities.

Within the R2 zone, multi-family housing as well as single family row houses are allowed. In addition, complementary commercial and public facilities are allowed as needed. The maximum plot size for single family housing (rowhouse) is 200m². For apartment buildings, no maximum plot size is prescribed.

The maximum number of stories allowed are four (4), equaling ground, first, second and third floor (G+3). One (1) extra floor may be permitted if allowed by topographical conditions. For single family use a density of maximum 100 DU/Ha is allowed. For mixed-use developments a density of maximum 70 DU/Ha is allowed.



Figure 20: Housing Typology in R2 (Source: Drawings by NLA Team, 2023)

- Medium Density Residential - Expansion Zone (R3)

The R3 residential zone allows for densification and redevelopment of peri-urban and green field areas and a variety of housing typologies. The zoning is intended to stimulate development of low-cost incremental housing, to facilitate the provision of affordable housing dedicated to the low-income segment of the population. To ensure a mix of use and mix of income, several housing typologies are allowed including self-build to cater for the lowest income segment. The R3 zones are located in peri-urban areas. Within the R3 zone, multi-family housing as well as single family row houses are allowed. In addition, complementary commercial and public facilities are allowed as needed.

The maximum plot size for single family incremental housing is 100m², and 150m² for rowhouses) is 200m². For apartment buildings, no maximum plot size is prescribed. The maximum number of stories allowed are four (4), equaling ground, first, second and third floor (G+3). One (1) extra floor may be permitted if allowed by topographical conditions. For single family use a density of maximum 90 DU/Ha is allowed. For mixed-use developments a density of maximum 70 DU/Ha is allowed.

In all R3 Zones, R2 regulations are permitted.



Figure 21: Housing Typology in R3 (Source: Drawings by NLA Team, 2023)

Note: all proposed typologies in proposed residential zones will have to follow published land use zoning regulations.

4.4. Transportation System in Gakenke District

The socio-economic development of any country depends on various factors, among which the transportation sector is playing a vital role. The movement of people and goods is made possible through various modes of transport. Other sectors, such as trade and tourism, might not be optimized without an effective mobility system.

For Rwanda to achieve its socio-economic development objectives, it is paramount to modernize the transportation infrastructure and services, and to integrate this with other sectors' development framework. The transport development strategies should primarily aim at reducing travel time to facilitate doing business.

4.4.1. Existing Situation of Transportation System in Gakenke District

Road transportation is the most common mode of transportation in Gakenke District. The local population primarily walk or use cars, motorcycles and bicycles for local travel, whereas public transport (buses) and cars are used for longer trips. Trucks are used for logistics and transportation of goods and agricultural produce.

Gakenke District Town is crossed by the National Road linking Kigali City to Musanze and Rubavu

Secondary Cities. Gakenke District Town and Rurban Centers (Ruli and Rushashi) are all connected by unpaved District Road class 1 (DR 47) from Giticyinyoni-Ruli-Rushashi-Gakenke. This road should be paved in order to accelerate growth in the District.

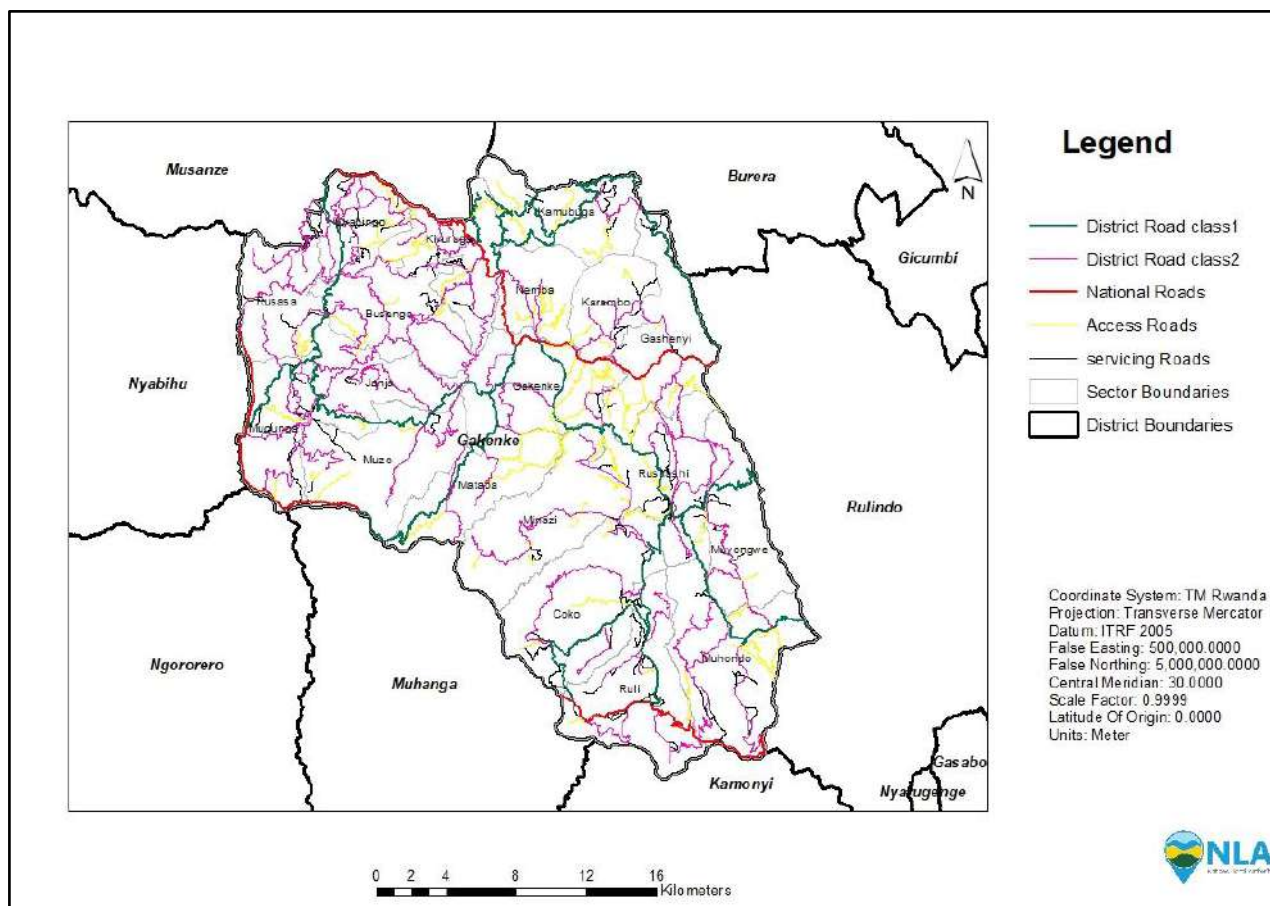
Another important District Road (RD 66) connects Gakenke and Musanze Districts and crosses the Sectors of Gakenke, Mataba, Muzo, Mugunga, Rusasa, Busengo and Cyabingo. Some parts of this road are in bad condition. The District Road (RD 77) connects Rushashi Rurban Center and Rulindo District through the Muyongwe Sector whereas the District Road (RD 38) connects Ruli Rurban Center and Muhanga District. National and District Roads should be paved to accelerate development in the District.

Other non-paved roads, service or access roads, are spatially distributed within rural settlement sites. The table below details the length of roads and their conditions.

Table 28: Gakenke Roads Length and Conditions (Source: RTDA, 2022)

No	Class of Road	Length (Km)	Length Paved	Length Unpaved
1	National Road	60.9	41.8	19.1
2	District Road Class 1	210.8	-	210.8
3	District Road Class 2	434.3	-	434.3
4	Access Road	393.3	-	393.3
5	Servicing Road	113.5	-	113.5
	Total	1,212.80	41.8	1171

Gakenke's economic development relies on the existing transportation system for accessibility and mobility of the residents, and for exchange of goods and services, as shown in the below figure.



Map 19: Existing Road Network in Gakenke District (Source: Gakenke District, Edited by Author; 2022)

4.4.2. Gakenke Proposed Transportation Plan

Improved infrastructure and facilities are the main priority of Gakenke District as stipulated in its vision. The distribution of land transportation network is based on the settlement hierarchy of Gakenke District and on the consolidation principles that NLUDMP 2020-2050 adopts, to reduce the unnecessary cost and length of roads.

Therefore, the main approach of the road network proposal is to keep existing local roads as much as possible and establish a clear hierarchy of the road network. To pave the way to achieve Rwanda's Vision 2050, an upgrade of as many roads as possible to all-season standard is essential. The plan is to improve the overall condition of existing roads through the following priorities:

- Pave other roads (District Roads, access and servicing roads) in Nemba Sector in Gakenke District Town;
- Pave the District Road Class 1 (DR 47) Giticyinyoni-Ruli-Rushashi-Gakenke, as the road

connects Kigali City and Gakenke Urban Centers;

- Upgrade other roads to consolidated agricultural sites, feeder roads to strengthen local rural economies, particularly in areas with high value food crops, export crops, and intensive livestock farming areas;
- Upgrade roads within the designated urban areas, to establish a fine-grained street network in built-up areas and expansion areas as part of the master planning process for cities and towns
- Upgrade roads within different rural settlement sites;
- Upgrade the standard of District Road (RD 66), as the road connects Gakenke and Musanze Districts through Gakenke, Mataba, Muzo, Mugunga, Rusasa, Busengo and Cyabingo Sectors;
- Upgrade the standard of District Road (RD 77) as the road connects Rushashi Rurban Center and Rulindo District through Muyongwe Sector (Kirenge-Rushashi);
- Upgrade the standard of District Road (RD 38), as the road connects Ruli Rurban Center and Muhanga District;

The following table shows the road standards proposed in Gakenke rural and urban areas.

Table 29: Gakenke Recommended Road Network Classification

N°	Road Categories	Proposed Roads Width
1	National Roads	44 m (22 m x 2)
2	District Roads Class 1	44 m (22 m x 2)
3	District Roads Class 2	24 m (12 x 2)
4	Access Roads	12 m (6 x 2)
5	Service Roads	9 m (4.5 x 2)

Source: RTDA, National Roads Code adopted by Gakenke District

According to Article 214/12/2012 of Law No 55/2011 of 14/12/2011 governing roads, the dimensions of the road reserve for the City of Kigali and other urban areas shall be determined in respect of the provisions of the master plan of the City of Kigali or other urban area irrespective of

the road classification. Therefore, Gakenke DLUP determines dimensions of the road reserve for some commercial centers based upon factors agreed during on field consultations with local authorities.

There are four main road classifications; National Roads, District Road Class 1, District Road Class 2 and other roads. According to the Rwanda Road Act of the Official Gazette n° 04 of 23/01/20121, the right of way (ROW) widths are set but flexibility is given on National Roads and District Roads Class 1 in urban areas. The ROW and cross sections of these roads are shown below, for areas where space is limited. In addition, within rural settlement sites without road accessibility a NMT path of 3m is proposed.

Dual carriageway, National Road/High-Capacity: Urban roads in Gakenke District Town, Ruli and Rushashi urban areas (30m ROW)

- Lane width: 3,5m
- Dual carriageway: $3,5 \times 4 = 14\text{m}$
- Shoulder and green space: $3 \times 2 = 6\text{m}$
- Median width = 1m
- Footway in urban conditions: $2 \times 2 = 4\text{m}$
- Road reserve: $2,5 \times 2 = 5\text{m}$

The expected ROW for a dual carriageway urban road is 30m, including a dual carriageway with two lanes per direction.

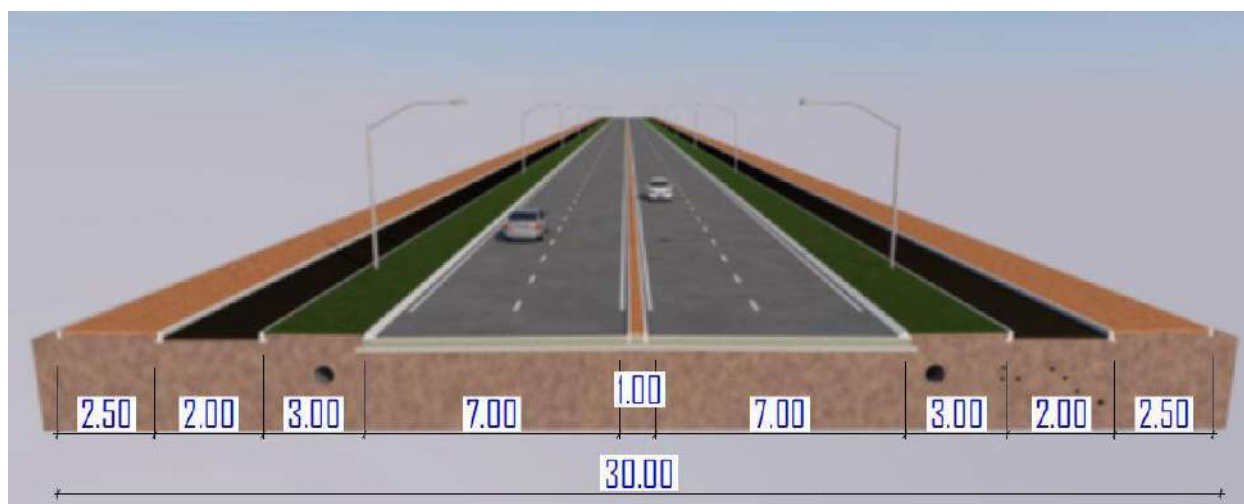


Figure 22: Dual Carriageway, National Road/High-Capacity urban roads in Gakenke District Town, Ruli and Rushashi urban areas (Source: Drawings by NLA Team, 2023)

Single Carriageway, National Road/High-Capacity urban road in Gakenke District Town, Ruli and Rushashi urban areas (23 ROW)

- Lane width: 3,5m
- Single carriageway: $3,5 \times 2 = 7\text{m}$
- Shoulder and green space: $3 \times 2 = 6\text{m}$
- Median width = 1m
- Footway in urban conditions: $2 \times 2 = 4\text{m}$
- Road reserve: $2,5 \times 2 = 5\text{m}$

The expected ROW for a single carriageway urban road is 23m, for a single carriageway with 1 lane per direction.



Figure 23: Single Carriageway National Road/High-Capacity urban road in Gakenke District Town, Ruli and Rushashi urban areas (Source: Drawings by NLA Team, 2023)

Access and Servicing Roads in communities – 9-12,5m for brownfield developments and 12,5m for greenfield developments

- Lane width: $3 \times 2 = 6\text{m}$

- Footpath: $1,5 \times 2 = 3\text{m}$
- Road reserve: $1,5 \times 2 = 3\text{m}$

(12m ROW is acceptable)

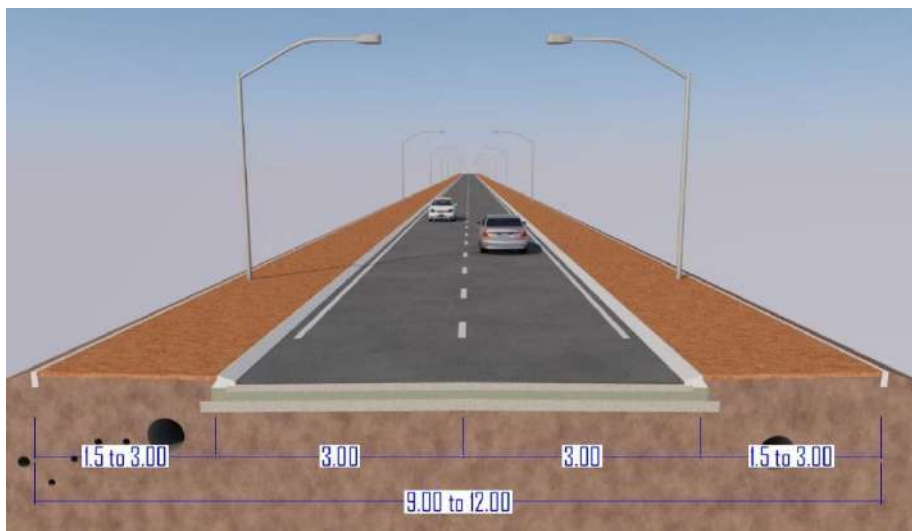


Figure 24: Access and Servicing Roads in communities (Source: Drawings by NLA Team, 2023)

4.4.3. Green Transportation Strategies

Green transport means any mode of transport that is powered by an alternative power source, alternative fuel of physical human force such that, when in operation, it produces minimal or no greenhouse gasses. The benefits of green transportation are a reduced dependence on nonrenewable energy sources and decreased demand on fuel and gasoline. Greenhouse emissions from burning gasoline and diesel contribute to global warming and climate change. The health risks from pollution include increased hospitalizations and deaths. Numerous diseases are linked to air pollution, such as lung cancer, respiratory infection, and stroke and health disease.

In addition, an increase in public transport and NMT will reduce the number of vehicles on the roads and reduce traffic congestion. Compared with private cars, public transportation reduces CO₂ emissions by 45%, decreasing pollutants in the atmosphere and improving air quality. As electric rail travel and electric buses increase in use, the benefits to the environment from public transportation also increase.

For developing countries, it is expected that with an increase in wealth, there could be a shift from NMT to motorized transport.

To ensure that Gakenke District has a sustainable transportation system, the existing culture of walking and cycling needs to be maintained and further encouraged, including:

- Ensuring NMT priority at intersections;
- Improving pedestrian accessibility (e.g. safe crossings, tactile paving, dropped kerbs, disabled access, lighting, etc.);
- Considering NMT only areas within the CBD and other focused areas;
- Providing sufficient and accessible cycle parking facilities (e.g. covered and secure);
- Providing cycle tracks or dedicated segregated infrastructure for bicycling where appropriate;
- Improving signage/wayfinding.

In addition, walking and biking can be promoted by initiatives such as:

- Public health campaigns encouraging walking and cycling;
- Distribution of maps showing safe and convenient walking and biking routes;
- Walking events such as organized walks at lunchtime or after work, pedometer challenges;
- Advice or training on riding skills, use of bike buddies;
- On-site bicycle repair service;
- Cycle maintenance classes;
- Pool bikes and cycle clubs;
- Regular cycling promotion days;
- Promotion of cycle hire schemes and cycle superhighways.

Besides promoting NMT as the preferred mode of transport, reducing the number of trips or the need to travel has a considerable impact on addressing negative impacts linked to transportation, such as congestion and air pollution. Dense, mixed-use, and walkable neighborhoods, where different functions and services are located in close proximity to the private house, enables access primarily

via NMT.

In order to align with the transport goals and objectives, the following key strategies and key performance indicators were developed for the green transport enabling strategy in Gakenke District.

Table 30: Key Strategies of Green Transport Plan (Source: GoR, 2011)

Green Transport Plan – Key Strategies	Key Performance Indicators (KPI)
Develop a city-wide NMT network, which supports the public transport system.	Number of developed NMT network
Develop a Non-Motorized Transport (NMT) network along arterial and collector roads	Number and length of a Non-Motorized Transport (NMT) network section
Develop a strategic approach to providing pedestrian amenities, such as trees and street furniture.	Number and quality of developed road design manuals and guidelines
Develop a pleasant streetscape, especially along the NMT network	Number and quality of developed pleasant streetscape along the NMT network
Develop a well-connected NMT network that utilizes open spaces and the road network	A model design of NMT network that utilizes open spaces and the road network
Develop a pedestrian-friendly street design guidance manual for use in residential and urban commercial settings	Number and quality of developed pedestrian-friendly street design guidance manual, transport legislation and guidelines
Develop a green network connecting green zones through NMT	Number of developed green network connectors

Green Transport Strategies include the provision of NMT infrastructure. NMT supports the public transport system, but also provides an independent mode of transport that is comfortable and safe within the urban centers and across the entire District of Gakenke.

Attractive green transport infrastructure encourages people to walk, which will decrease pressure on the road network, is good for public health, has low capital investment required and very low operation and maintenance costs, and has minimal impacts on the environment.

The importance of NMT and ensuring people continue to embrace a lifestyle with walking and cycling is often underestimated, yet it is critical for sustainable development and growth in Gakenke District. The NMT strategy should be implemented to ensure that all collector and arterial roads have NMT facilities.

Implementation of NMT infrastructure is to be prioritized in areas such as schools, hospitals, public facilities and in the CBD. It is recommended that in order to improve the all-weather roads accessibility, NMT infrastructure is implemented to allow for proper access. All NMT infrastructure must be universally accessible.

4.5. Public Facilities and Services

It is envisioned that with the implementation of the proposed settlement structure, access to public facilities and services will improve as these will be centralized and the services offered within consolidated settlements. The provision of facilities and servicing of sprawled settlements will be discontinued.

4.5.1. Educational Facilities

4.5.1.1. Existing situation on Education Services

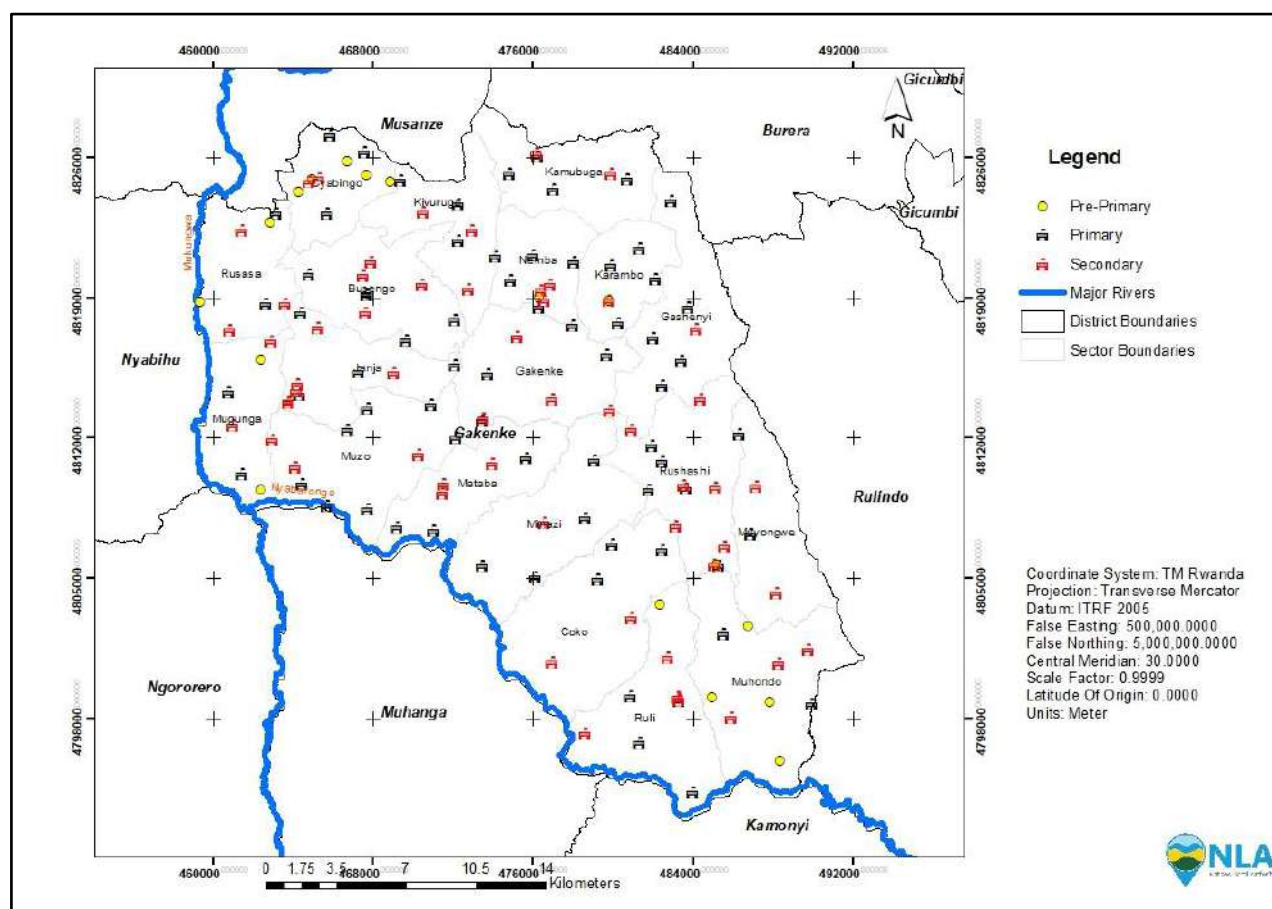
In Gakenke District, the net enrolment rate in primary schools is 96% and secondary school enrolment rate 26.5%. This ranks the District at first position in the Northern Province. Computer literacy rate for persons of 15 years and older stands at 3%.

In 2018/2019, the promotion rate in primary schools were 79%, the repetition rate in primary school was 13% while the dropout rate in primary schools were 8%. In secondary school the promotion rate was 80%, the repetition rate 6%, and the dropout rate was 14.5%.

There are 117 primary schools, 61 secondary schools, 12 Technical and Vocational Education and

Training (TVET) and the University of Nursing in Gakenke District, as per Education Statistics 2019, Ministry of Education, Rwanda.

According to the 2022/2023 Education Statistical Year Book, in the fiscal year 2022/2023, the total number of students in Gakenke District (primary, secondary and TVETs) was 97,389, which equals almost 27% of the total population of the District. The number of teachers was 3,278 which means 1 teacher per 30 pupils, which is a reasonable average for the District. The number of classrooms was 2,242 equaling 43 students/ classroom, which is high compared to the NLUDMP 2020-2050 target of 35 pupils/class.



Map 20: Spatial Distribution of Educational facilities (Source: Gakenke District, 2022)

The pre-primary schools (Early Childhood Development) are spatially distributed in individuals' households and village kitchens. Despite availability of educational infrastructures some of the classrooms are in poor condition and should be rehabilitated.

4.5.1.2. Planned Educational Services

The government's aspirations to reach upper middle-income status by 2035 will require dramatic

improvements in both the amount of and the quality of human capital. Economies that have grown rapidly over an extended period have made substantial investments in the health and education of their citizens (World Bank, 2020). Investments in human capital is a long-term investment, as only a small part of the population enters the labor force each year. The sooner investments in human capital are made, the sooner Rwanda will achieve increased growth.

a. Nursery and Primary Education by 2050

According to NLUDMP 2020-2050, the following standards and parameters have been established for nursery and primary schools.

- ✓ Average class size: 35 pupils/class
- ✓ Average number of students/schools: 840 pupils
- ✓ Required plot size for a nursery school: 0.5 ha
- ✓ Required plot size for a primary school: 1 ha

b. Secondary, Vocational and Technical Education by 2050

According to NLUDMP 2020-2050, the following standards and parameters have been established for secondary education.

- ✓ Enrolment rate will be 90%
- ✓ Average class size: 35 pupils/class;
- ✓ Average number of students/schools: 840 pupils
- ✓ Required plot size for a secondary school: 1,5 ha
- ✓ Required plot size for vocational and technical school: 2 ha

4.5.1.3. Proposed Schools and Planned Perspectives

In the preparation of Gakenke DLUP for the 2050 horizon year, there will be an increase of students with direct impact on the existing schools. There is an urgent need for new classrooms for both primary and secondary schools. Jointly, both public sectors, FBO, NGOs and private sectors must respond to this demand, basing on RPHC5,2022 figures and NLUDMP 20250 guidelines, education facilities for nursery, primary and secondary education projected as follow:

Table 31: Number of nursery schools needed up to 2050

Description	2022	2030	2035	2040	2045	2050
Total Population	365,22	367,478	368,851	370,229	371,612	373,000
Nursery (3-5) years old	27,210	27,373	27,475	27,578	27,681	27,784
Existing Classrooms	191	-	-	-	-	-
Classrooms to be constructed for each planning period	586	5	3	3	3	3
Total number of classrooms at the end of each planning period	777	782	785	788	791	794
Total classrooms to be constructed (Cumulatively)	586	591	594	597	600	603

Source: RPHC5,2022 & NLUDMP 2020-2050 adapted by NLA staff, 2024

Presently, the infrastructures for pre-primary schools (nursery) are insufficient which implies that there is overcrowding in classrooms and effort should be made to promote ECD.

Considering the trend of the population growth, the table above indicates that in Gakenke District 603 new classrooms are to be constructed up to 2050 for pre-primary education.

Table 32: Number of primary schools needed

Description	2022	2030	2035	2040	2045	2050
Total Population	365,292	367,478	368,851	370,229	371,612	373,000
Primary (6-11) years old	51,002	51,307	51,499	51,691	51,884	52,078
Existing Classrooms	1,389	-	-	-	-	-
Classrooms to be constructed for each planning period	68	9	5	5	6	6
Total number of classrooms at the end of each planning period	1,457	1,466	1,471	1,477	1,482	1,488
Total classrooms to be constructed (Cumulatively)	68	77	82	87	93	99

Source: RPHC5,2022 & NLUDMP 2020-2050 adapted by NLA staff, 2024

Considering the trend of the population growth, the table above indicates that in Gakenke District 99 new classrooms are to be constructed up to 2050.

Table 33: Number of secondary schools needed up to 2050

Description	2022	2030	2035	2040	2045	2050
Total Population	365,292	367,478	368,851	370,229	371,612	373,000
Secondary (12-17) years old	52,966	53,283	53,482	53,682	53,882	54,084
Existing classrooms	682	-	-	-	-	-
Classrooms to be constructed for each planning period	831	9	6	6	6	6
Total number of classrooms at the end of each planning period	1,513	1,522	1,528	1,534	1,539	1,545
Total classrooms to be constructed (Cumulatively)	682	691	697	703	709	715
TVET classrooms to be constructed for each planning period (60%)	499	5	4	4	4	4
General secondary classrooms to be constructed for each planning period Classrooms (40%)	333	4	2	2	2	2

Source: RPHC5,2022 & NLUDMP 2020-2050 adapted by NLA staff, 2024

At the secondary school level, there is a need for additional capacity from the year 2022.

In 2022, an additional 35 secondary educational schools were needed. and this number will be sufficient until 2050 and these schools will be sufficient up to 2050 considering very small population growth rate in the District. hence average of 21 in TVETs schools and 16 General Secondary Education schools are to be constructed.

However, it should be noted that the construction of schools will depend on the District planning but also on the reality of the number of students enrolled in the ordinary level. Given that 60% of children will have to attend technical and vocational education, it is imperative to take this into account in planning for future employment opportunities for young people.

4.5.2. Healthcare Facilities

4.5.2.1. Existing Situation on Healthcare Facilities

Gakenke District has various types of healthcare facilities spatially distributed throughout the District, as well as the Higher Institute of Health Sainte Rose de Lima that started as a Hospital Nursing School located in the Ruli sector.

There are three District Hospitals (Nemba, Ruli and Gatonde) that refer to the front-line hospitals in

Gakenke District. The hospitals have their own catchment area, and capacity and facilities to provide secondary medical care to patients requiring hospitalization. These hospitals provide government-defined “Complementary Package of Activities” (CPA). They also provide care to patients referred by the primary health centers.

Besides the District hospitals, there are 23 Health Centers and 66 Health Posts in Gakenke District aimed at increasing access to crucial primary care by reducing barriers such as cost, lack of insurance, and distance for the patients. Tables below provide more information on healthcare facilities in Gakenke District.

Table 34: Health Centers in Gakenke District (Source: Gakenke District, 2022)

No	Name of health Facility	Sector	Cell	Village
1	Nyundo (Gakenke) Health Center	Rusasa	Nyundo	Nyundo
2	Nemba Health Center	Nemba	Mucaca	Cyahafi
3	Nganzo Health Center	Gakenke	Nganzo	Kanyiraman yana
4	Minazi Health Center	Minazi	Munyana	Kanka
5	Muyongwe Health Center	Muyongwe	Gisizi	Kabingo
6	Nyange (Ruli) Health Center	Coko	Nyange	Gaseke
7	Ruli Health Center	Ruli	Ruli	Gataba
8	Coko (Ruli) Health Center	Coko	Nyanza	Gitaba
9	Muhondo (Gakenke) Cs	Muhondo	Ruganda	Mubuga
10	Rwankuba Health Center	Rushashi	Rwankuba	Giheta
11	Rushashi Health Center	Rushashi	Kageyo	Nganzo
12	Rukura Health Center	Gashenyi	Rukura	Kirambo

13	Rutenderi Health Center	Gashenyi	Rutenderi	Murambo
14	Kamubuga Health Center	Kamubuga	Kamubuga	Rugari
15	Rusoro Health Center	Muzo	Kabatezi	Rusororo
16	Rutake Health Center	Janja	Karukungu	Rutake
17	Janja Health Center	Janja	Gatwa	Gitega
18	Gatonde Health Center	Mugunga	Rutabo	Gatonde
19	Cyabingo Health Center	Cyabingo	Muramba	Gahama
20	Bushoka Health Center	Kivuruga	Gasiza	Kamwumba
21	Mataba Health Center	Mataba	Nyundo	Mataba
22	Karambo (Gakenke) Health Center	Karambo	Karambo	Cyumba
23	Busengo Health Center	Busengo	Mwumba	Mugunga

Table 35: Health Post in Gakenke District (Source: Gakenke District, 2022)

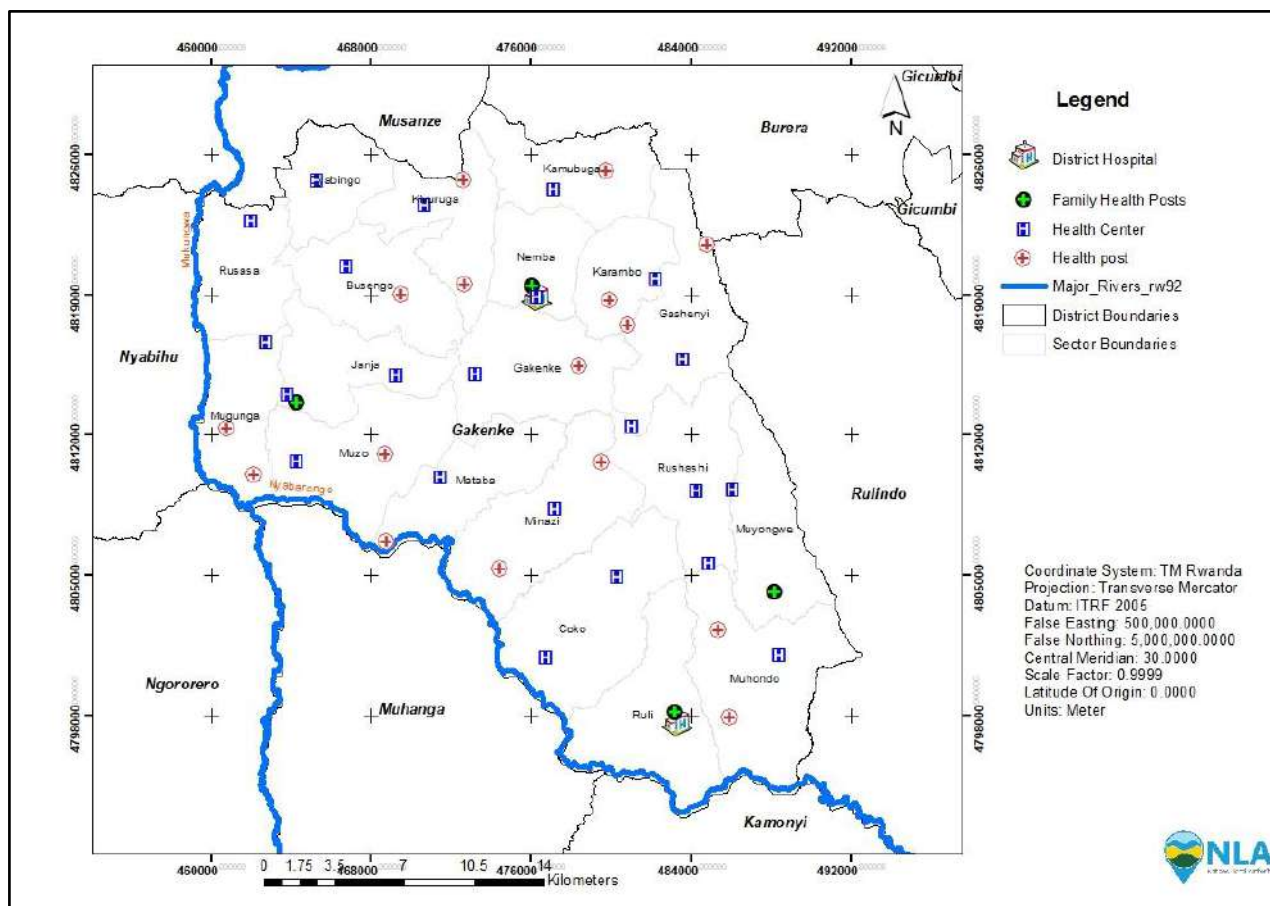
No	Name of health Facility	Sector	Cell	Village
1	Gashyamba Health Post	Janja	Gashyamba	Rwampari
2	Gakindo Health Post	Janja	Gakindo	Bunyironko
3	Gahinga Health Post	Nemba	Gahinga	Bukurura
4	Buranga Health Post	Nemba	Buranga	Muganwa
5	Gisozi Health Post	Nemba	Gisozi	Muganwa
6	Gikombe Health Post	Mataba	Gikombe	Gatovu
7	Buyange Health Post	Mataba	Buyange	Nyamiyaga
8	Mbogo Health Post	Rushashi	Mbogo	Gisanze

9	Joma Health Post	Rushashi	Joma	Nyagasozi
10	Busanane Health Post	Rushashi	Busanane	Gisenyi
11	Bulimba Health Post	Rushashi	Bulimba	Kara
12	Karyango Health Post	Muyongwe	Karyango	Kibingo
13	Nganzo Health Post	Muyongwe	Nganzo	Nganzo
14	Ineza Bumba Health Post	Muyongwe	Bumba	Bumba
15	Mbirima Health Post	Coko	Mbilima	Akanduga
16	Kiruku Health Post	Coko	Kiriku	Rubuguma
17	Taba Health Post	Gashenyi	Taba	Bushita
18	Nyacyina Health Post	Gashenyi	Nyacyina	Buhore
19	Rutabo Health Post	Gashenyi	Rutabo	Rubuga
20	Gataba Health Post	Rusasa	Gataba	Kibaya
21	Kamonyi Health Post	Rusasa	Kamonyi	Gakindo
22	Murambi Health Post	Rusasa	Rutambi	Buharabure
23	Rulembo Health Post	Rusasa	Rurembo	Bushoka
24	Kirebe Health Post	Karambo	Kirebe	Mukunga
25	Kanyanza Health Post	Karambo	Kanyanza	Nyamisabike
26	Rusagara Health Post	Gakenke	Rusagara	Umujiyi wa Gakenke
27	Kagoma Health Post	Gakenke	Kagoma	Murambi
28	Buheta Health Post	Gakenke	Buheta	Buyagiro
29	Kidomo Health Post	Kamubuga	Kidomo	Rutagara

30	Mbatabata Health Post	Kamubuga	Mbatabata	Mbatabata
31	Rukore Health Post	Kamubuga	Rukore	Taba
32	Munyana Health Post	Mugunga	Munyana	Cyarubaye
33	Mutego Health Post	Mugunga	Mutego	Karambo
34	Mugunga Health Post	Mugunga	Nkomane	Kanaba
35	Rwamambe Health Post	Mugunga	Rwamambe	Bushoka
36	Murambi-Minazi Health Post	Minazi	Murambi	Kabuga
37	Raba Health Post	Minazi	Raba	Gitaragwe
38	Gasiho Health Post	Minazi	Gasiho	Gahombo
39	Butare Health Post	Muzo	Mwiyando	Kagano
40	Rwa Health Post	Muzo	Rwa	Nyagahondo
41	Mwumba Health Post	Muzo	Kiryamo	Munyinya
42	Mubuga Health Post	Muzo	Mubuga	Mubuga
43	Kamina Health Post	Busengo	Kamina	Nyarubye
44	Butereri Health Post	Busengo	Butereri	Rwinkuba
45	Kirabo Health Post	Busengo	Kirabo	Kirabo
46	Birambo Health Post	Busengo	Birambo	Kirwa
47	Byibuhiro Health Post	Busengo	Byibuhiro	Gatoki
48	Buhuga Health Post	Kivuruga	Cyintare	Bigogwe
49	Rugimbu Health Post	Kivuruga	Rugimbu	Karuhunge
50	Kamomo Health Post	Kivuruga	Ruhinga	Kamomo

51	Sereri Health Post	Kivuruga	Sereri	Buhayo
52	Gitonde Health Post	Ruli	Jango	Gitonde
53	Busoro Health Post	Ruli	Busoro	Cyoganyoni
54	Rwesero Health Post	Ruli	Rwesero	Nyarunyinya
55	Gikingo Health Post	Ruli	Gikingo	Gatwa
56	Busake Health Post	Muhondo	Busake	Kibirizi
57	Musagara Health Post	Muhondo	Musagara	Cyenda
58	Huro Health Health Post	Muhondo	Huro	Huro
59	Musenyi Health Post	Muhondo	Musenyi	Musenyi
60	Gihinga Health Post	Muhondo	Gihinga	Samuduha
61	Rwinkuba Health Post	Muhondo	Rwinkuba	Kimbogo
62	Bwenda Health Post	Muhondo	Bwenda	Bwenda
63	Muhororo Health Post	Cyabingo	Muhororo	Muhororo
64	Rukore Health Post	Cyabingo	Rukore	Rukore
65	Muhaza Health Post	Cyabingo	Muhaza	Busonga
66	Mutanda Health Post	Cyabingo	Mutanda	Cyabingo

Both Health Centers and Health Posts were established to serve its local population in promoting health and wellness and also providing primary care, and preventive care to the community. Spatial distribution of health facilities is highlighted on figure below:



Map 21: Spatial Distribution of Existing Healthcare Facilities in Gakenke District (Source: Gakenke District)

Within the healthcare sector, issues like home births, quality of and access to healthcare facilities due to geographical difficulties are still big challenges. Also, high population growth and insufficient medical equipment in Health Centers and District Hospitals affects healthcare services within the District.

Gakenke District had the highest percentage (98%) of households with health insurance (Mutuelle de Santé) in the Northern Province. The number of RSSB affiliates and dependents (medical scheme) is 11,463 persons where affiliates are 3,544 and dependents 7,919 (Statistical Year Book, 2022). It is of great importance to continue this achievement by assuring that every individual or household is insured.

4.5.2.2. Planned Healthcare Facilities

An increase of population will have a direct impact on existing healthcare facilities for the whole District. There will be a demand to extend or renovate existing health facilities as well as build new ones. There is a need to build new healthcare facilities as follows:

- 21 Health posts;
- 15 new health centers;
- 1 Referral Hospital.

For any new healthcare facility to be built within urban or rural settlement boundaries, vertical construction of buildings should be mandatory to ensure efficient use of land.

Furthermore, for sustainable healthcare services in Gakenke District, existing health centers must be upgraded with maternity care, health posts must be upgraded and supplied with necessary infrastructure and utilities, and continuous capacity building and incentives for community health workers (Abajyanama b'Ubuzima) are recommended.

4.5.3. Public Administrative Entities

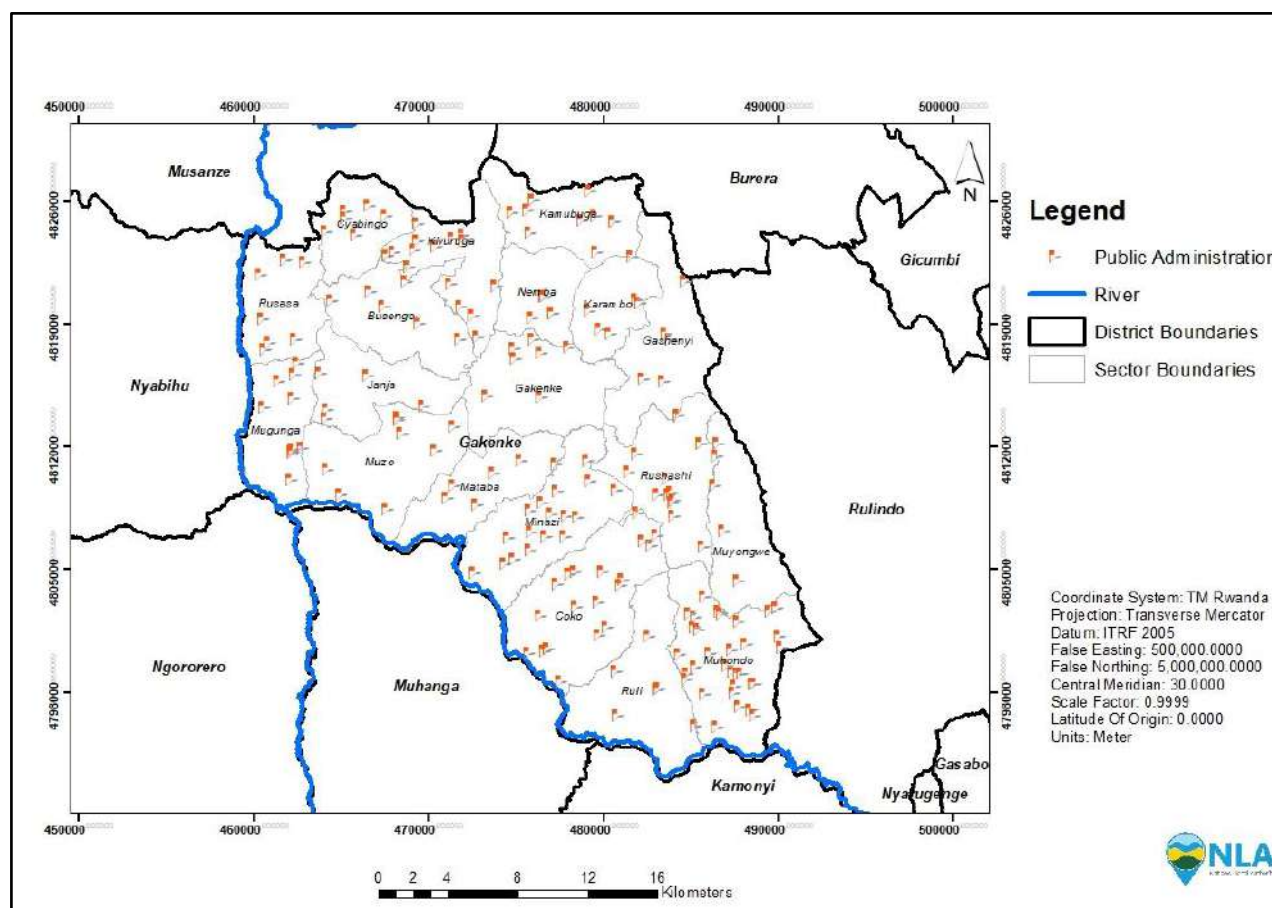
4.5.3.1. Existing situation on public administrative entities

Rwanda is composed of two layers of government - central and local government (Republic of Rwanda Website, 2023). Gakenke District is categorized under local government and is divided into 19 Sectors. Additionally, these Sectors are divided into 97 Cells and lastly, into 617 Villages. All these subdivisions are headed by different people at every level and they all have different roles though directing towards the same cause.

These subdivisions have respective offices spatially distributed in each administrative office, except for at Villages level. This decentralization is due to the willingness of service proximity and the improvement of efficiency in accountable service delivery. This positively impacts social livelihood.

Gakenke DLUP facilitates administrative entities to promote socio economic transformation at all levels. In addition to their role in elaboration of this DLUP, they are also important implementers from empowering local communities on their role for implementation of this DLUP, elaboration of detailed physical plans, issuance of construction permits and other land related matters.

In addition to these administrative entities, the District has police stations, military camps and Yego Center which cater for youth services like the use of the internet among others.



Map 22: Spatial distribution of Gakenke Public Administrative Offices (Source: Gakenke District, Edited by author, 2023)

The map above, generally, locates administrative entities within Gakenke District including District HQ, Sector offices, Cell offices, Village offices, Yego center and multipurpose halls, Military and police station, etc.

4.5.3.2. *Planned perspectives on public administrative entities*

NLUDMP 2020-2050 suggests administrative transformation from a 4 levels hierarchy in 2020 to a 3 levels hierarchy in 2025 including provincial, District, Sector and Cell level. The “Village” becomes redundant due to the decreased number of Imidugudu and the increased size of the settlement itself. The administrative Cell will take over the functions of the administrative Village. Therefore, Gakenke District will continue to have 19 Sectors and 97 Cells only.

As far as services are concerned, the constitution assigns executive powers to local government over services, often implemented in partnership with other government and non-government agencies. Only essential and primary services in health and education are within the responsibility of local organs.

At District level the planned services are planning and overseeing implementation of various plans, monitoring and evaluation, local economic development, construction permits issuances, environmental management, infrastructure and facility services.

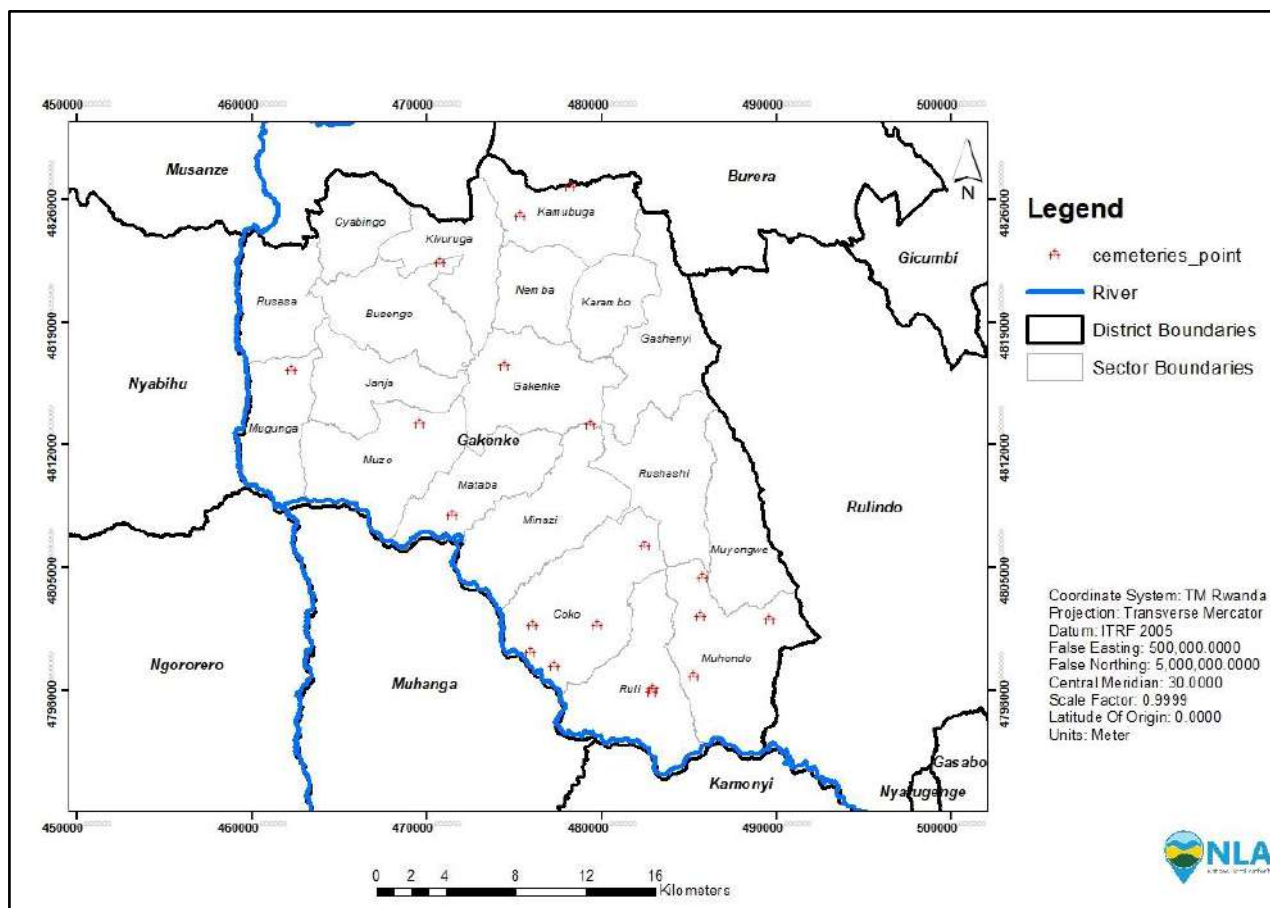
At Sector level, services include land related matters, civil registration, implementation of District plans while at Cell level community organization in matters related to socio economic transformation are emphasized.

4.5.3.3. Existing cemeteries, crematoria and genocide memorial sites

Cemeteries, as other land uses, have land requirements. They must use land more efficiently so as not to conflict with other uses. Gakenke DLUP promotes the effective use of cemeteries to avoid relocation of buried people in years to come.

Gakenke District counts 48 cemeteries (47 public and 1 private). However, these cemeteries are poorly managed. Despite being almost located in forests, they are not fenced. The cemeteries cover a surface area of 123 ha and are still in use. Tombs are not numbered, and there is no register of persons buried in cemeteries which make it difficult to know the number of bodies and tombs therein.

The District has also three genocide memorial sites well-constructed and properly managed. The figure 46 shows spatial distribution of cemeteries and genocide memorial sites



Map 23: Gakenke District Cemeteries and Genocide Memorial Sites (Source: Gakenke District, Edited by Author, 2023)

4.5.3.4. Planned perspectives on cemeteries, crematoria and cultural Heritage

According to the official Gazette n° 18 of 06/05/2013, the law N° 11/2013 of 11/03/2013 determines the organization and use of cemeteries. For public cemeteries, the number, boundaries, surface area and materials constituting their fences shall be determined by the District Council. The existing cemeteries will continue to be used.

Strategies to achieve sustainable cemeteries that are conforming to efficient land use and environment, include site suitability analysis of new cemeteries with proposed number of tombs and enforcement of law governing the organization and use of cemeteries.

As for genocide memorial sites, they will be rehabilitated timely to continuously preserve historical memory.

Recommendations on the cemeteries in Gakenke District

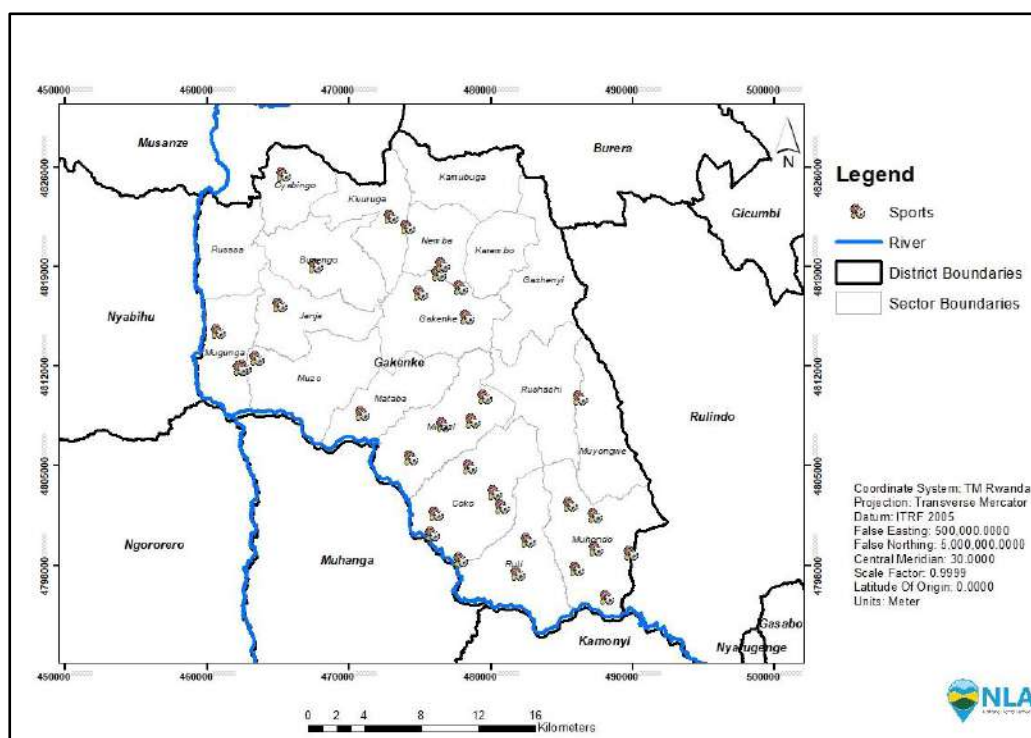
The followings are recommendations that should be taken into consideration in while implementing Gakenke DLUP:

- There should be enough campaign activities to raise awareness as well as facilities for promoting cremation, so that the Rwandan communities adapt to that culture.
- Instead of using tiles and concrete structures while building tombs, there should be a proposal of using natural degrading mechanisms of the human body.
- The improved technology on the vertical burial can be done by layering the coffins into the multi-story and under-ground facilities.
- Putting in place incentives for adopting the new methods in burials

4.5.3.5. Existing sports and leisure facilities

Sports and leisure are important to Rwandans at all levels and categories. Sports are an important part of our lives. It is not just a form of entertainment and leisure but it also promotes physical fitness, social interaction and mental well-being (MINISPOT, 2017). Gakenke DLUP comes to promote sports and leisure facilities to ensure development of available talents while promoting socio economic transformation,

Sports in Gakenke District is developing with a football academy in the Ruli Sector. The District has 28 football fields and 2 volleyball courts. There are no tennis, golf, or gymnastics facilities and no theatre for youth etc. For spatial distribution of sport facilities, see figure.



Map 24: Sport and leisure facilities in Gakenke District (Source: Gakenke District, Edited by Author, 2023)

4.5.3.6. *Planned perspectives on sports and leisure facilities*

As per NLUDMP 2020-2050, Gakenke District Town and the two Rurban Centers are planned for different land uses including social services such as sports and recreational facilities. Existing football fields will be upgraded. Construction of stadiums in Gakenke District Town and Ruli Rurban Center is proposed in Gakenke DLUP.

The proposed strategies to achieve sustainable sports and leisure facilities infrastructures in the District include the development of a Sports and Leisure Facilities Management Plan (SLFMP) which details day to day management of sports infrastructures.

4.6. Public Utilities

4.6.1. Energy

Energy will continue to be a requirement for household and commercial purposes in the future. Evidence shows a strong correlation between the increase in energy consumption and rise in income levels. According to the Vision 2050, per capita consumption of energy will increase from 1,026 kwh in 2035 to 3,080 kwh in 2050. It is anticipated that there could be a need for about 3,788 MW and 13,981 MW of energy capacity in 2035 and 2050, respectively. There will be a high emphasis on an adequate and stable supply of electricity for household and commercial purposes.

Energy is central to Rwanda's economic ambitions and development plans. The sector supports all other sectors, including housing and urbanization, manufacturing, agro-processing, mining, tourism and IT. Hence, a well-functioning, efficient energy sector is vital for achieving the country's national goals.

Energy will support the delivery of Vision 2050 by expanding affordable, reliable access to electricity to both citizens and industrial users, ensuring sustainability in biomass supply and securing supplies of petroleum. International experience has shown that economic development is difficult without a well-functioning energy sector, and without minimum levels of capacity and consumption.

The energy sector in Rwanda is made up of three sub-sectors: power, hydrocarbon and new and renewable sources of energy. Amongst the renewable sources of energy are biomass, solar, peat, wind, geothermal and hydropower. Biomass is the most commonly used and dominates both the demand and supply sides of the Rwandan economy. The table below provides more information on potential energy contributions in the country.

Table 36: Summary of current potential energy contribution in Rwanda (Source: Energy Sector Strategic Plan, MININFRA 2018, www.reg.rw)

Resource potential	Summary of current and potential contribution
Hydropower 313-400 MW	Hydropower has generated the bulk of electricity in Rwanda since the 1960s. Its overall potential is estimated at up to 400 MW, and the current installed hydro capacity is 98.5 MW. As a result of extremely low operational costs however, hydro is still one of the cheapest forms of generation in the long run.
Methane 140-180 MW	Kivu watt, a 27 MW generation facility, has demonstrated the commercial and technical viability of extracting methane from Lake Kivu. Further utilization of methane resources is planned, with significant investor interest.
Peat 121-161 MW	A Peat Master Plan was first developed in 1993. Estimates of potential capacity have since been revised downwards from the initial 700 MW to 121 MW-161 MW in 2016. About 77% of the country's peat reserves are near the Akanyaru and Nyabarongo Rivers and the Rwabusoro Plains.
Geothermal (TBD)	Rwanda's geothermal resource is yet to be established. However, studies have identified Karisimbi, Kinigi, Gisenyi and Bugarama as promising areas, with potentially 47.3 MW of generation available from five promising sites. Further studies, exploration and test sites are required to confirm this. Following Karisimbi unfortunate results, a geothermal master plan was developed in 2015. The geothermal master plan provides potential estimates for each geothermal prospect area and gives a clear plan of priorities for the exploration of potential geothermal sites in the country. The potential was estimated at a maximum 100 MW for the country.
Solar Energy (TBD)	With a potential of 4.5 kWh per m ² per day and approximately 5 peak sun hours, solar energy has a huge potential in Rwanda. Currently, Rwanda's total on-grid installed solar energy is 12.230 MW originating from 5 solar power plants namely Jali

	power plant generating 0.25 MW, Rwamagana Gigawatt generating 8.5 MW, Ndera Solar power plant generating 0.15 MW and the Nasho Solar plant generating 3.3 MW. The Government of Rwanda intends to increase the number of solar power plants to reduce the costs of production and take advantage of available renewable sources in Rwanda. In 2018, the Government signed a Memorandum of Understanding with Mara Corporation Ltd and SB Energy Corp from Mauritius to develop a 30 MW solar plant with a storage facility.
Biomass (TBD)	The current national energy balance statistics show that biomass (mostly wood fuel) accounts for about 83% of the total energy consumption, followed by petroleum at 9.7%, electricity at 1.3% and others at about less than 0.5%. In rural areas, the reliance on biomass is over 90%. Most Rwandans live in rural areas where traditional biomass, mainly wood fuel, has remained the leading source of energy for cooking. Biomass consumption is putting pressure on existing resources, with an estimated 870,000 tons' woody biomass deficit in 2009. Along with this, the use of biomass for fuel is having a harmful effect through health impacts and emissions. To rectify this, the Government is further developing the public sector forestry programs, has licensing for tree harvesting and is diversifying away from traditional wood fuel to look at other forms of biomass such as papyrus and rice and coffee husks, as well as biogas which benefits from the "One cow per poor family" scheme. The Government has put in place strict tree harvesting regulations; only licensed persons with permits are allowed to cut trees, including those from private lands. These measures have helped to reduce deforestation and Rwanda is one of only a handful of countries in Africa where the relationship between charcoal consumption and deforestation no longer exists, Government is to focus on alternative cooking technologies, biogas, LPG, Palettes and briquettes, etc.
Wind Energy (TBD)	Commercially-viable wind power resources are not expected to be significant based on past resource assessments and modeling work. However, MININFRA will continue to assess the potential for wind to contribute to the overall power generation

	efforts
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4.6.1.1. Existing Electricity Distribution Network in Gakenke District

The RPHC5,2022 findings indicate that electricity as the source of lighting is 26.6% of District households, while using a torch or phone is 0.4%. In regards to the use of firewood as primary source for cooking, almost 97% of the households in Gakenke District rely on it, whereas less than 2% of households rely on charcoal.

The main challenge for the District is the high utilization of wood and charcoal as the principal source of energy for cooking and lighting. This adversely affects women and children because they are the ones mainly in charge of fetching firewood.

The results of the fifth population and housing census revealed that almost 50% of households in Gakenke District have access to electricity. The distribution of households by main source of energy for lighting is detailed in table below.

Table 37: Distribution of households by main source of energy for lighting

No	Main Source of Energy for lighting	Percentage
1	Electricity from REG	26.6%
2	Private Hydro Mini-Grid	0.1%
3	Solar Power	23%
4	Generator/ Batteries	1.3%
5	Kerosene/Paraffin	1.4%
6	Biogas	1.2%
7	Candles	6.9%
8	firewood's	39.2%
9	Flashlight/Phone	0.4%
10	Other	0.00%

Source: RPHC5,2022

Almost 40% of households in the District use firewood as the main source of energy for lighting. It is the most used in Gakenke District with several negative impacts on forests. This reveals how more continuous efforts are needed to increase electricity supply in the areas not served currently.

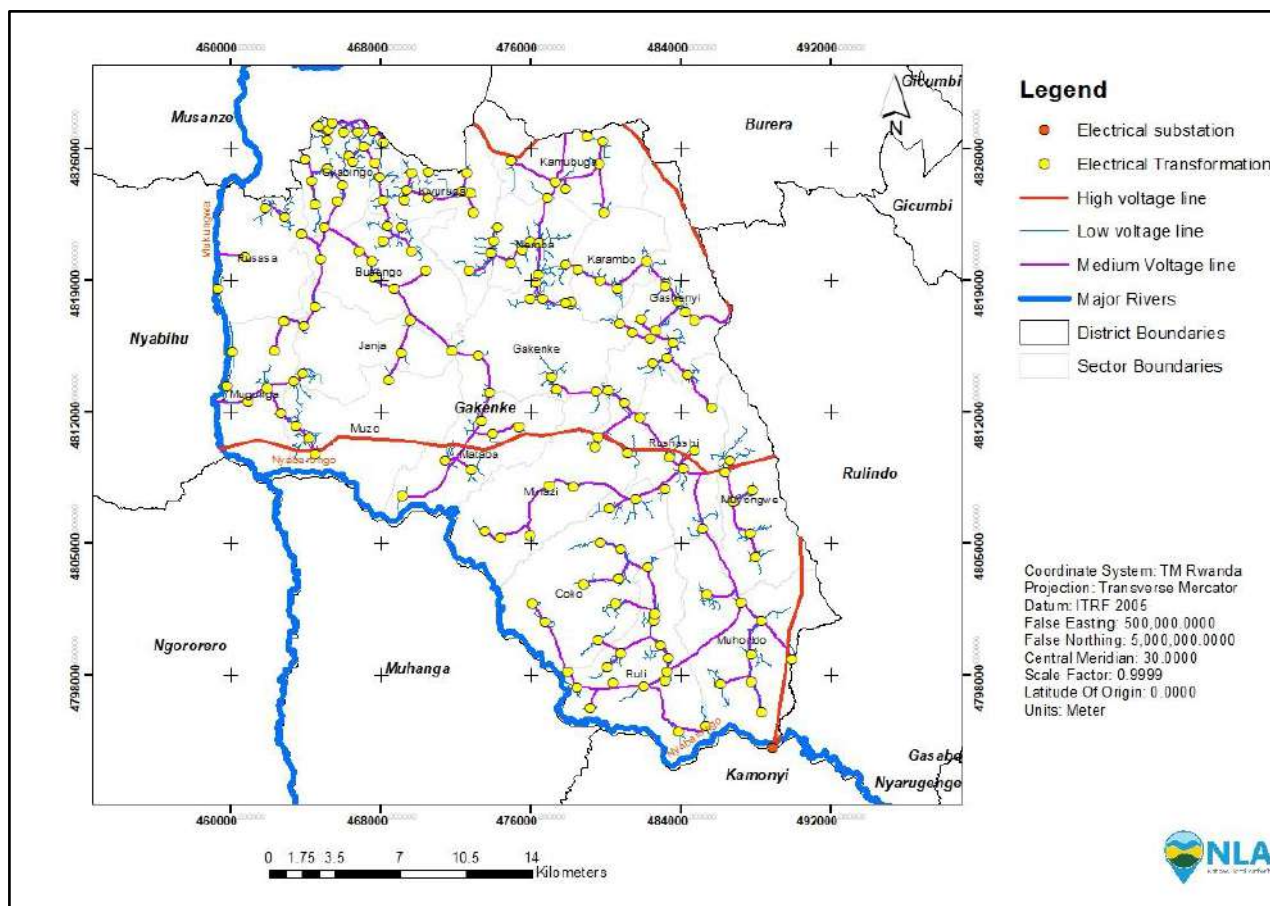
In addition, firewood is used as the main source of energy for cooking which exacerbates the situation of deforestation. Table below shows the percentage of households by the main source of energy for cooking.

Table 38: Distribution of households by main source of energy for cooking

No	Main source of Energy for cooking	percentage
1	Firewood	96.6%
2	Charcoal	2.2%
3	Gas	0.3%
4	Other	0.2%
5	Do not Cook	0.7%
6	Not stated	0%

Source: RPHC5,2022.

Firewood is used as the main source of energy for lighting, cooking and production of charcoal while the use of gas for cooking stands at only 0.3%. This is a threat to forests and a fact in describing the District as rural. Only 26.6% of households use electricity from REG distributed within the District as shown in figure below.



Map 25: Map showing existing Gakenke Energy Distribution Network (Source: Gakenke District, 2022)

The District has got three hydro-powers (Gaseke, Janja and Musarara) that generate energy and together with Nyabarongo II hydropower plant under construction, 100% electricity connection in the whole District is achievable.

4.6.1.2. Planned energy perspectives in Gakenke District

Energy is an accelerator of economic growth through its multiplier effect on SMEs growth and reducing the cost of doing business.

There is a correlation between forecasting future energy consumption and GDP Annual Growth. The current trend of GDP growth of 8% corresponds to an electricity demand growth of 10%, and from the 140 MW peak demand at present, we can make a 30-year projection as follows: $140 \times (1.10)^{30} = 2,443 \text{ MW}$ (+15% for peak demand calculation) = 2,810 MW (a reasonable projection by 2050). In the case of phenomenal GDP growth, reaching a maximum of 10% that would correspond to an electricity demand growth of 15%.

In Gakenke District, 45% of households do not have access to energy, neither to on-grid nor to off-

grid systems. This hinders the development and growth of the District, especially that electricity is an essential driver of modern technology and socio-economic development. Electricity powers small appliances, such as lights and mobile phones, which improve the lives of citizens, as well as industrial processing activities, which contribute to economic value-added products and job creation.

To strike a balance, there should be two possible ways of accessing electricity using both off-grid and on-grid connections. In the context of in-situ urbanization, necessary investments should be made both by the government and non-government entities starting from delimiting rural settlements sites and urban areas.

The reliance on firewood and charcoal is the primary driver of environmental degradation and deforestation. Thus, to promote alternative energy sources for cooking and lighting, biogas digesters have to be installed across the District.

The scaling up of access to electricity in the District will prioritize connecting productive users such as industries, commercial facilities, schools, healthcare centers, and agro-processing plants to drive socioeconomic development. Ongoing efforts to electrify households will continue, aiming to increase coverage by ensuring electricity reaches all urban centers, cells, and settlement sites.

To optimize infrastructure and service delivery, new energy connections for scattered households is discouraged. Instead, residents will be encouraged and supported to relocate to designated urban and rural settlements where utilities are centralized. However, off-grid solutions will be considered for remote rural areas.

4.6.2. Water and sanitation

4.6.2.1. Existing Water Distribution Network

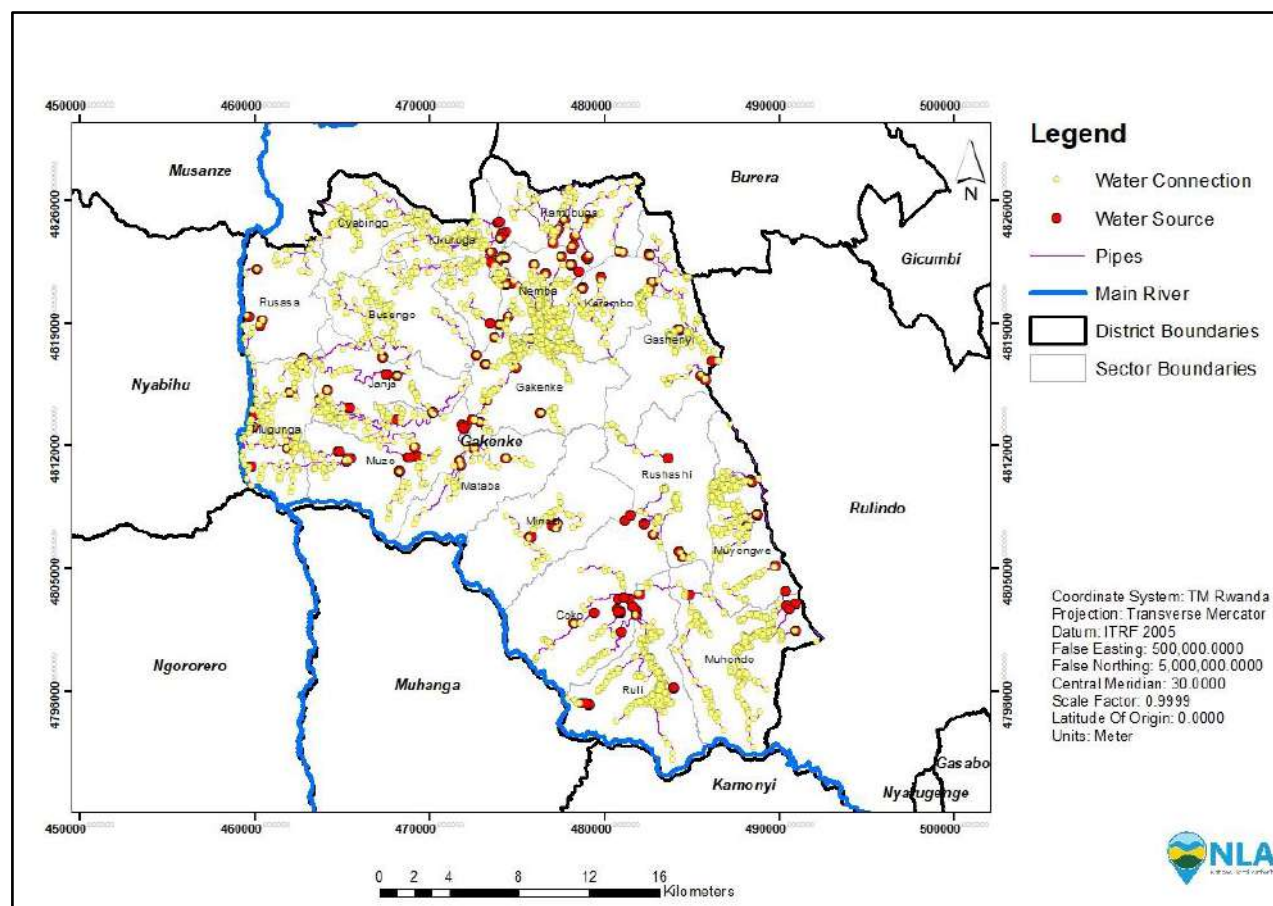
The Water and Sanitation Corporation (WASAC) is the main entity responsible for supplying and managing potable water in the urban and rural areas of Gakenke District. In some cases, operations and maintenance of rural water supply systems and schemes in different parts of the District are carried out by companies or cooperatives, procured by the District.

However, accessibility to clean water and improved sanitation in both rural and urban areas are still a challenge. Some households have to walk long distances to reach water sources and the related negative impacts on child education and health cannot be ruled out.

According to EICV 5, 71% of Gakenke households use improved drinking water sources whereas 29% get their water from unimproved drinking water sources. Most households (51.5%) fetch water from protected springs, 18% from public standpipe, while household connection is very low (1.3%). However, 53% of households are not satisfied with the main drinking water source and 56% confirm that there is no improvement of quality service in water delivery. The average time to access an improved drinking water source is 10.6 minutes, which is higher than the national average (9.6 minutes). As such, 1/3 of households do not use their nearest water source because it is too far and 29% because it is not functioning.

However, current results from RPHC5,2022 revealed that 76.5% of households have access to improved drinking water. Meanwhile, 98% of urban households have access to improved drinking water despite representing only 4% of the total households, whereas 75.5% of rural households have access to improved drinking water. This shows that more effort is needed to supply water in the rural settlement sites of Gakenke District.

As per Gakenke District statistics (2022), the water network length is 911 km with the total network capacity per day of 9,779 m³.



Map 26: Existing water network in Gakenke District (Source: Gakenke District; Edited by Author, 2023)

As for sanitation, the results of EICV 5 revealed that 94.7% of households use an improved type of toilet, and 88.3 % use an improved type not shared with other households. 2.1 % of households have no toilet facility.

In Gakenke District, 87% of households use unshared improved type of toilet, with 81% and 87% respectively in urban and rural areas (RPHC5,2022). The table below shows the percentage of households by type of toilet facility.

Table 39: Distribution of households by type of toilet facility

No	Type of toilet Facility	Percentage
	Not shared flush toilet/WC system	0.5%
	Shared flush toilet/WC system	0.1%
	Not shared pit latrine with constructed floor slab	86.1%
	shared pit latrine with constructed floor slab	7.3%
	Not shared pit latrine without constructed floor slab	4.8%
	Shared pit latrine without floor slap	0.5%
	Other	0.8%

Source: RPHC5,2022

However, in urban areas there is a need to increase the percentage of unshared flush toilets or WC systems as part of improved livelihoods.

4.6.2.2. Planned water perspectives in Gakenke District

The provision of adequate WSS services play a crucial role in preventive healthcare and a prerequisite and a socio-economic development indicator. Safe drinking water is a basic amenity, ranked among the highest priority public services by Rwanda's population.

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 for the sick. WATSAN Strategic Plan (2018-2024).

According to the same source, the international standard minimum quantity of water consumption is 20 liters per capita per day. By this assumption, and the highest scenario of Gakenke District population by 2050 which is 373,000, the minimum quantity of water demand will be 13,442,740 liters or 13,443 m³ per day.

Therefore, this DLUP recommends Gakenke District to undertake the following actions to ensure population water demand satisfaction by 2050:

- Habitation in rural settlement sites and urban centers for easy access of households and supply of water services;
- Promote innovative technological options in form of gravity systems, spring protections; rainwater harvest, extending grid and solar pumping that are cost-effective;
- Rehabilitation and construction of new water supply systems
- Protect all springs that are used for human consumption. Spring protection for piped water schemes should be optimized to make full use of the available discharge and to avoid decreasing yields. Spring protection is the most cost-effective solution, in terms of per capita investment.
- Promote rainwater harvesting; a complementary source of water, which is a viable option given that rainfall is relatively abundant in most regions of Rwanda and Gakenke District in particular;

4.7. Environment and Natural Resources

A healthy environment is a key prerequisite to enhancing quality of life, sustainable economic growth and poverty reduction which constitute a core business of the Gakenke DLUP for the horizon of 2050.

According to NLUDMP 2020-2050, Rwanda is a natural resources-based economy, and therefore issues related to environment and climate change are key priorities and cross-cutting areas that need

to be enhanced. The key to planning and implementing the NLUDMP 2020-2050 is to ensure harmonization of land allocation for each sector while at the same time ensuring that there are targeted efforts to the conservation of natural resources and promotion of their sustainable use.

Therefore, increased public awareness of environmental protection and climate change resilience can be achieved by strengthening environmental committees, raising public awareness, and completing EIAs for all eligible projects. Environmental committees (District and Sector) and clubs should be established or enforced, and trained on environment protection and sustainability to strengthen interventions for environment protection and climate change resilience.

Moreover, the inventory for identifying the biodiversity and valuable ecosystem in the District is required for assuring their protection and management as ecosystems are made up of both biotic and abiotic elements that are essential for the ecosystem's health and economic development.

4.7.1. Forestry

Based on the most recent data on forestry in Rwanda, based on the 2019 forest cover, forest cover is about 7,247 km² which is equivalent to 30.4% of the total land. Specifically, 53.5% of the forest cover are plantations, 23% is wooded savannah in the east, 18% are natural mountain rain-forests, and 6% are shrubs. In addition, bamboo stands occupy 613 hectares and its plantations have mainly grown in the buffer zones of rivers (Rwanda Forest Cover, 2019).

According to the NLUDMP 2020-2050, forests have a significant role to play in Rwanda's national development. They provide 86% of the primary energy source mainly as domestic cooking energy. They hold the base for the country's tourism opportunities, which is estimated to reach USD 620 million in 2023 (Rwanda Development Board Annual Report, 2023). In addition, forests protect watersheds and downstream wetlands, supporting agriculture and generate products of the country's export revenues. Furthermore, forests are a vital component of the life-support system and ecological benefits. Therefore, under the forest resources, the vision of Rwanda is to achieve and sustain forest cover at 30%.

4.7.1.1. Current Situation of Forest in Gakenke District

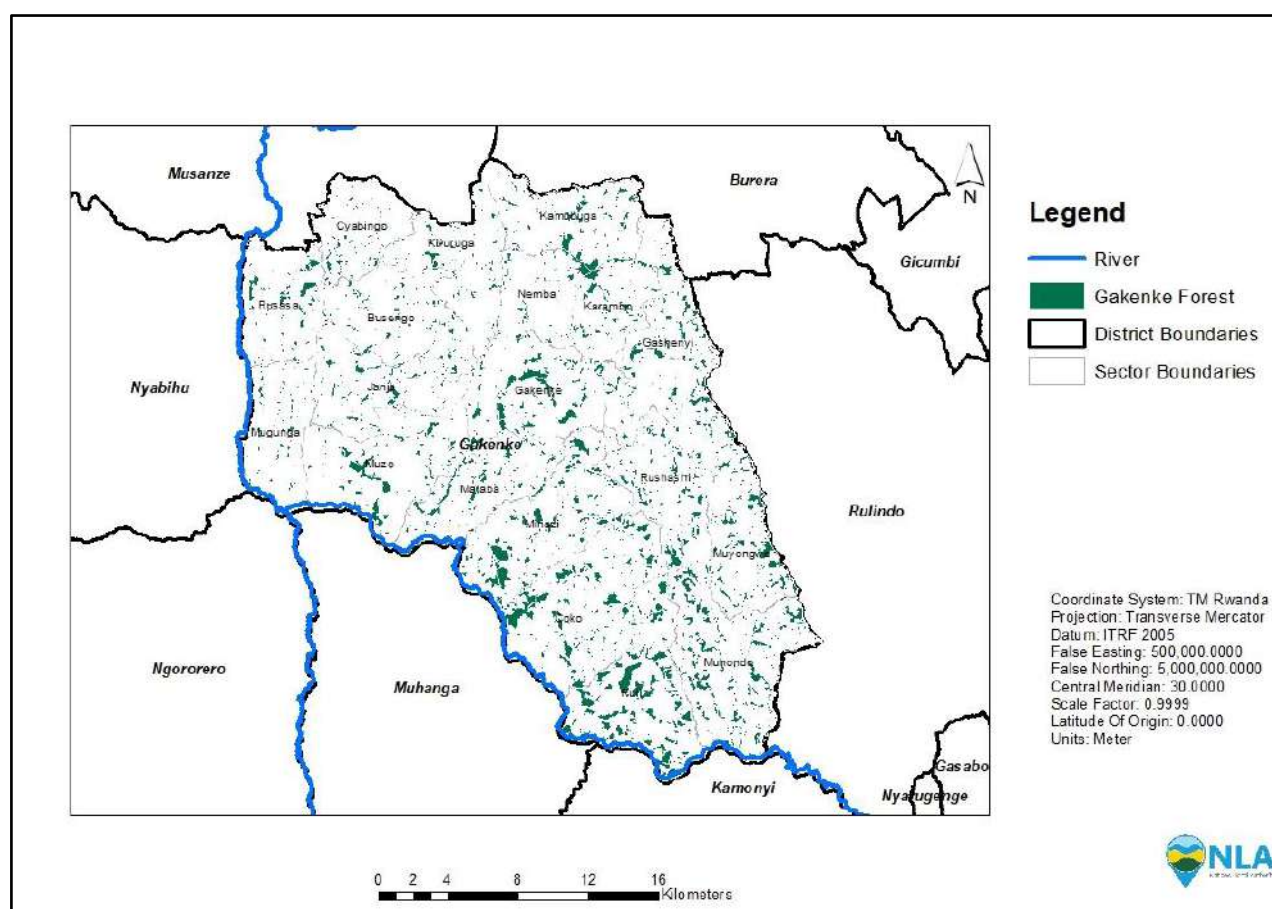
Forests in Gakenke District cover 17,824 ha, about 21.5% of total District land of which forest plantations are 17,780 ha (99.7%) and Natural Forest 124ha (0.3%). The highest forested Sectors are Minazi, Coko, Ruli and Rushashi respectively. However, the least forested sector is Mugunga. Therefore, afforestation is required in Mugunga Sector and forest restoration in other degraded

forests to mitigate erosion risk. (Rwanda Forest Cover, 2019)

According to the same source, Gakenke District suffers from low forest density (below 40% tree density). This has been proved by an assessment of the erosion risk that found that about 592 ha are in need of reforestation of degraded forests. The District Forest Management Plan (DFMP) should identify Gakenke south as areas to restore the productivity of forestland, at the same time afforestation taking place in Mugunga sector to upgrade its forest cover as well.

In terms of the size of forest plantations in Gakenke District, 70% of plantations are large-scale greater than 2 ha per plot with the largest being in Coko (1,770 ha), Minazi (1,659 ha), Muhondo (1,448 ha) and Ruli (1,380 ha) sectors.

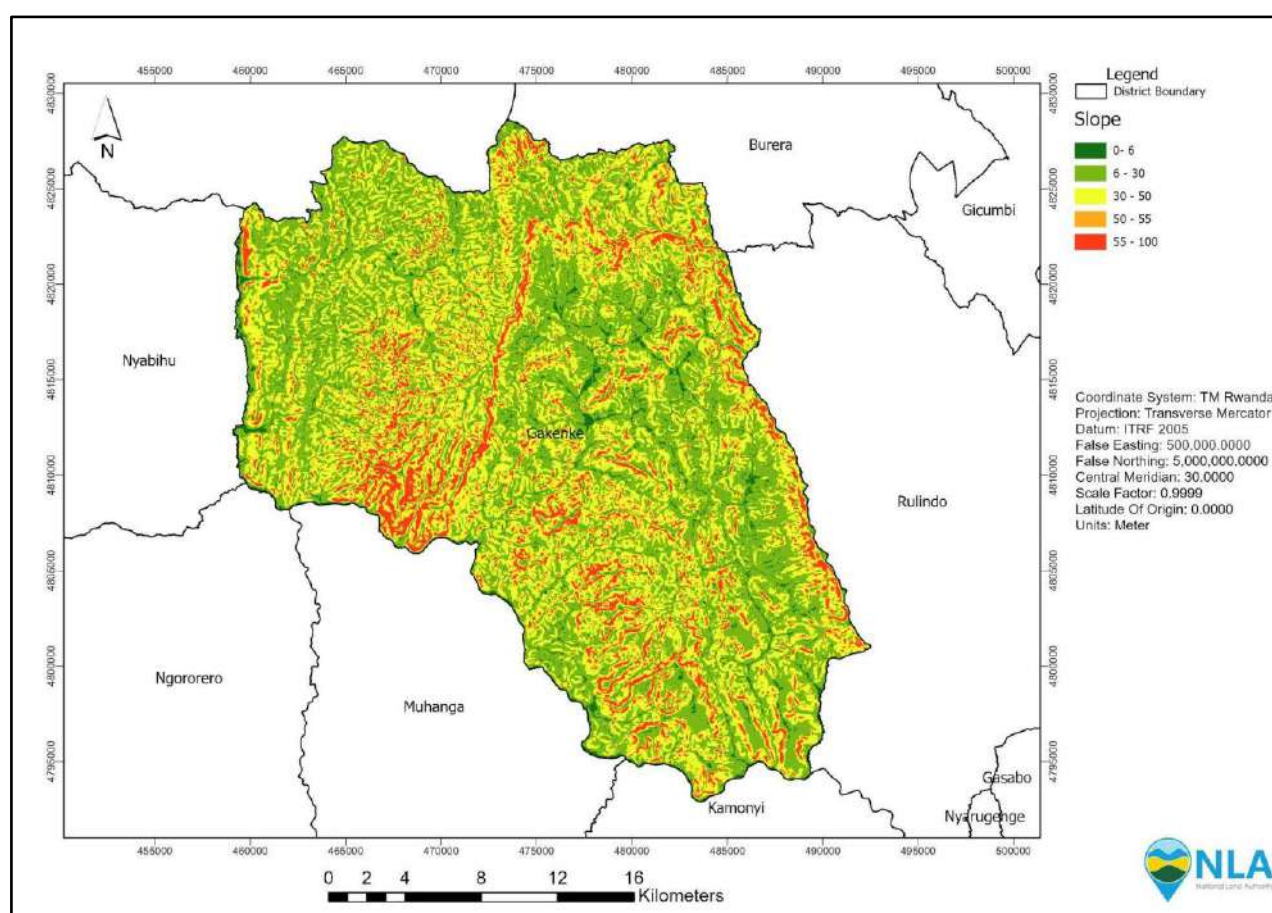
Regarding forest cover change in Gakenke District during the last decade, the results show that afforestation is about 26% against deforestation at 10%. High afforestation is observed in Ruli Sector (35.5%) and Minazi Sector (33%), followed by Muyongwe Sector (31.5%), and Rushashi Sector (31.5%). In other Sectors, afforestation surpassed deforestation during the last decade from 2009. The overall trend is very positive of about 16% increase of forest cover for the past ten years. The figure below shows the forest situation in Gakenke District.



Map 27: Existing Forest Cover in Gakenke Districts (Source: Rwanda Forest Cover , 2019)

4.7.1.2. Forest Planned Perspectives in Gakenke District

The NLUDMP 2020-2050 advocates and recommends for the protection of environmentally sensitive areas and mainstreaming disaster risk reductions in the development process. Therefore, Gakenke DLUP recommends the protection of all existing forests covering 21.5% of the District. The forest cover has been reduced due to land allocated for other land uses, e.g buffer zones, road reserves and mining zones. NLUDMP 2020-2050 recommended that forest cover should be increased by afforestation of high slope areas (above 55%) that are not yet covered by the forest for improving and sustaining the forest cover in the District. However, due to the topography of Gakenke District, with slopes above 55% in most parts of the District, these zones are used for agroforestry and afforestation.



Map 28: High Slope Areas Suitable for Afforestation (Source: NLA Planning team, 2023)

Furthermore, Gakenke District must promote other sources of energy for cooking instead of using firewood and charcoal production, as these are amongst the causes that accelerate deforestation and forest degradation in the District and the country in general.

Gakenke District is vulnerable to natural disaster (landslides) caused by heavy rains, and forests protect fragile land against natural hazards and should therefore be harvested according to the management plan to mitigate the effect of deforestation.

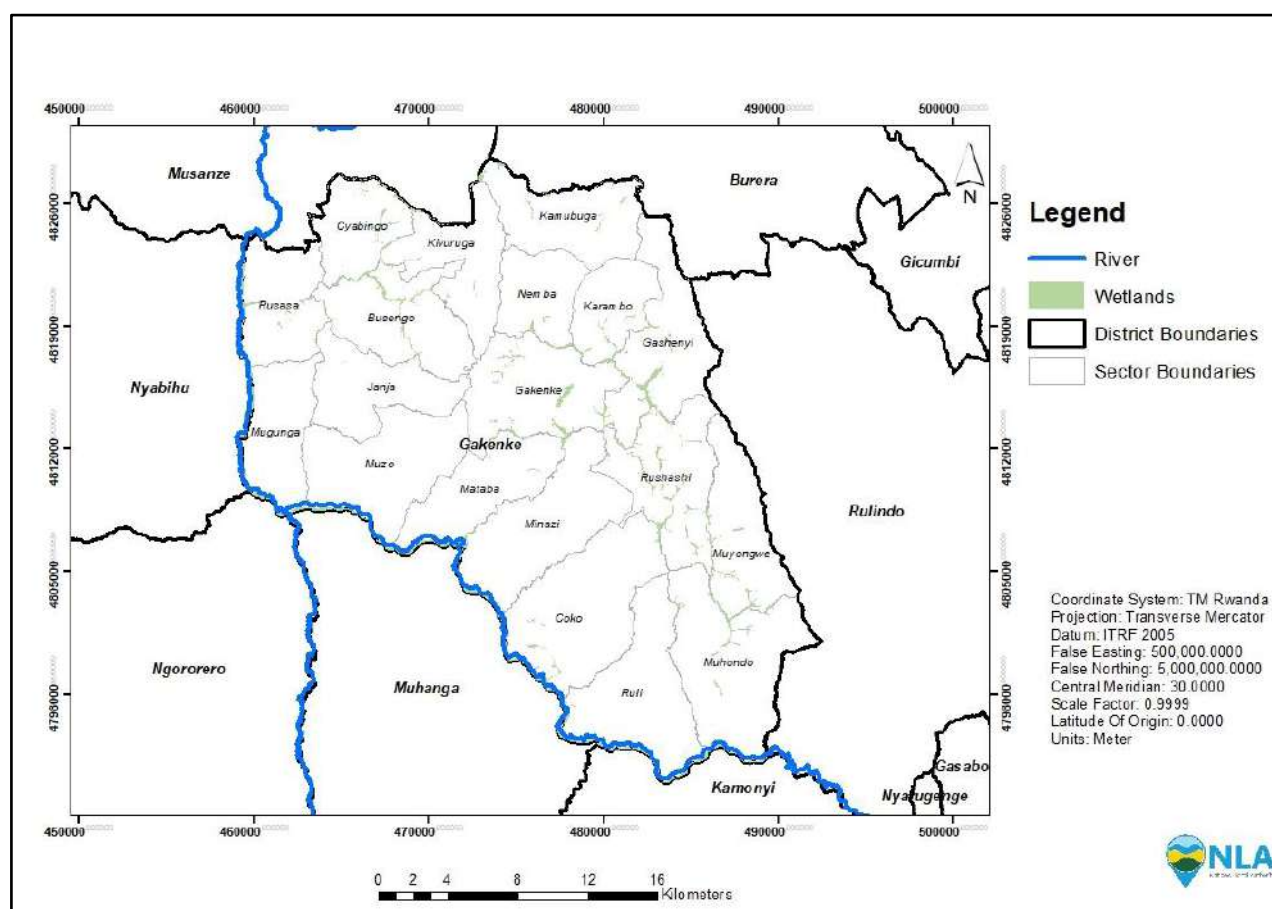
Private forests also should be subject to simplified forest management plans (SFMP) to ensure that such forests are harvested according to the agreed plans within the District, under the supervision of the District Forest Officer (DFO).

4.7.2. Wetlands

4.7.2.1. Existing situation on wetlands in Gakenke District

Gakenke District has 7,020 ha of wetlands, or swamplands. The biggest is the Nyabarongo wetland, measuring 4,850 ha which is managed under conditional operation. Currently, it is under cultivation of crops such as maize, beans, and vegetables and holds biodiversity of insects and amphibians.

A large number of wetlands are concentrated in the Sectors of Rushashi, Gashenyi, Busengo, Gakenke, and Cyabingo and on the western part on the boundary of Mugunga and Rusasa. The location of existing wetlands is shown in the following figure.



Map 29: Existing wetlands in Gakenke District (Source: PM Order, Gakenke District; 2022)

4.7.2.2. Planned Perspectives on Wetlands in Gakenke District

The Prime Minister's Order gazette in 2017 showed the management status of Gakenke District wetlands or swampland, including those with status of use under specific conditions, and those with a status of use without conditions. 21 out of 37 wetlands are managed under conditional use or use under specific conditions, requiring an Environmental Impact Assessment (EIA) and detailed project study to be implemented on specific wetland/swamp land applied for.

The DLUP establishes Wetland Zones to conserve the wetlands and protect ecological integrity of its environmentally sensitive areas from non-sustainable exploitation, for public health safety and for general welfare. The intent is to control and sustainably guide the use of wetlands/swamp land and its environs for social, economic, and cultural purposes.

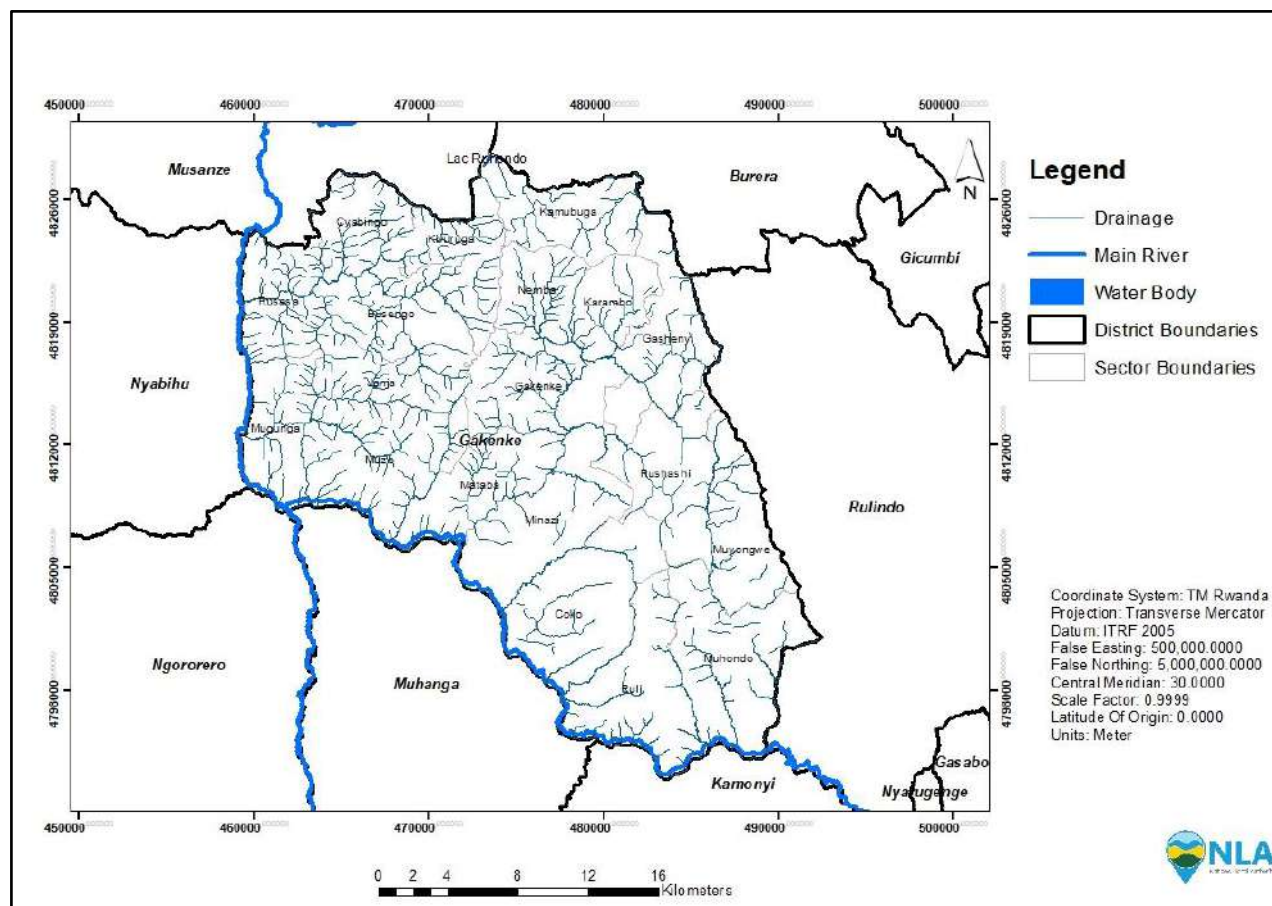
The Gakenke DLUP establishes two wetlands' zones, Unprotected Zone (W1B) and Wetland Buffer Zone (B1). Protection of wetlands, or swampland, must follow current laws and regulations.

4.7.3. Water Bodies

4.7.3.1. Existing Situation on Water Bodies in Gakenke District

Gakenke District has a very small part (59 ha) of Ruhondo Lake, which has its large part in Burera District. The main rivers in the District are Cyacika, Bahimba, Isumo, Busanane, Kiyembe, Sanzare, Gaseke, Kinoni, Nyamuhanga, Base and Mugobore.

Two main rivers flow along the district border, Mukungwa River to the western side of the District, and Nyabarongo River to the South. The last two rivers pour their water in Akagera River, a tributary of Nile River.



Map 30: showing water bodies in Gakenke District

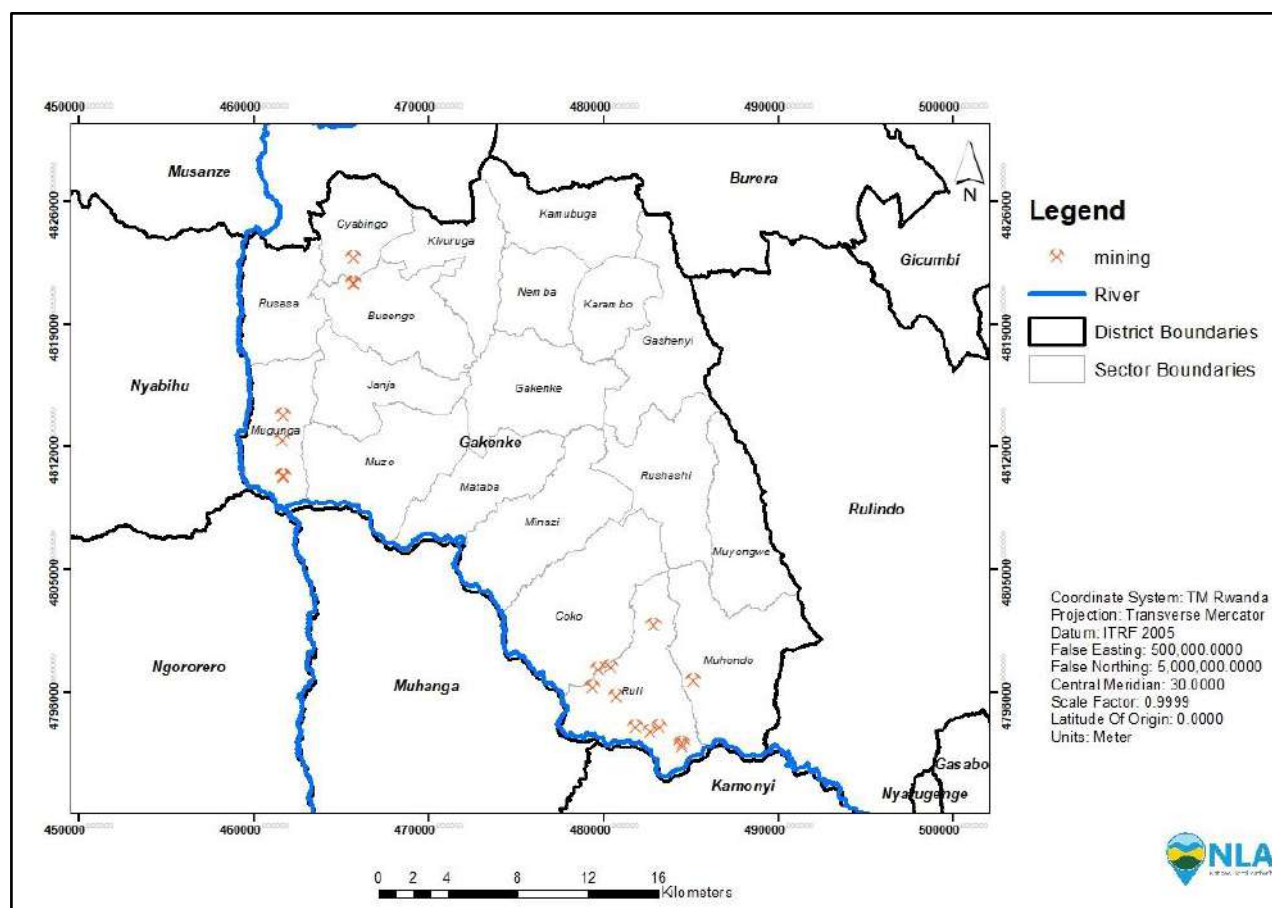
4.7.3.2. Planning Perspective on Water Bodies in Gakenke District

Due to the topography of the District, most houses are situated on the summit and on the slopes of hills. Erosion of slopes and hills transports what would be the fertile soil to Mukungwa and Nyabarongo Rivers, to be taken to the Nile River. Therefore, measures should be taken to mitigate soil erosion and reduce the amount of soil discharged into the rivers, promote sustainable agriculture practices in all sub catchment areas as well as developing terraces in all agriculture land in sloping areas.

4.7.4. Mining

4.7.4.1. Existing situation on Mining in Gakenke District

Gakenke District has mineral deposits including coltan, wolfram, and cassiterite in addition to quarries supplying the construction industry. Active mining sites are concentrated in the south of the District in the Ruli Sector. A company named COMIKAGI is undertaking mineral processing and exporting activities. The figure below shows spatial distribution of mining concessions in the District.



Map 31: Mining perimeters and quarries in Gakenke District (Source: RMB, Edited by Author; March, 2023)

According to RMB (December, 2022), there are 27 actors in mining and quarry activities as listed in table.

Table 40: Mining actors and their location (Source: RMB, 2023)

No	Name of Mining actors	Location/Sectors
1	AFRIMICO	Ruli
2	COMIKAGI	Ruli
3	Cooperative DUSUZUMIMIRIMO	Nemba
4	Cooperative Ubukungu	Kamubuga
5	Cyabingo Mining Company	Cyabingo
6	DRN joint venture	Ruli

7	EFEMIRWA mining	Cyabingo and Busengo
8	Eprocomi	Ruli
9	Ets Sindambiwe Simon	Minazi
10	GESAMIC	Muhondo
11	Great Lakes Minerals International	Cyabingo
12	Hajimana Benoit	Muhondo
13	Igirimbabazi Flavien	Rusasa
14	MM Gakenke Mining	Ruli
15	Mukarwesa	Cyabingo
16	Murehe Mining Company	Cyabingo
17	Ngendambizi Valens	Muhondo
18	Niyigaba Eugene	Mugunga
19	Niyigaba Evariste	Mugunga
20	Nkeshimana Eugene	Muhondo
21	Ruli Mining Trade	Ruli
22	SEMIRWA	Ruli and Coko
23	SINOHYDRO CORPORATION	Muhondo
24	Speck Mineral	Ruli
25	Standard Mining Company	Gashenyi and Rushashi
26	TubeHezaTNganzo	Mugunga
27	Umugwaneza Company	Mugunga

Mining activities involve the excavation of the surface and subsurface to exploit and process

minerals. Therefore, mining activities, by its design, disturb and transform the natural environment. Such disturbance and transformation, in most instances, have a permanent and irreversible impact on ecosystem processes and functioning and the resulting stream of ecosystem goods and services flowing from the impacted site.

Figure 25: Mining activities Photos (Source: Photos taken by author in Ruli sector, November,2022)



According to Gakenke District, the mining sector employs 4,000-5,000 workers with a daily salary between 2,000-3,000 Rwf per day per capita. Most companies buy pre-concentrate from miners, consolidate and in some cases process the production, and sell it on to an exporter (or internal trader). When selling to an exporter, a grade analysis is performed and the exporter informs the company on the price he is offering. In that sense, companies/cooperatives are price takers rather than price setters.

Often, unlike for the company's purchasing prices from miners, selling prices are linked to international market prices while considering the concentrate grade and a treatment charge levied by the exporter (exporters may also reject a mineral lot in case its grade is low). Many companies appear to rely on the analyses supplied by the exporter, even though the assay is the basis for payment.

Besides employment for mining workers, local communities benefit from mining activities through contribution in Girinka program, Ejo Heza and support for vulnerable members of the local community or corporate social responsibility in general.

4.7.4.2. Planned Perspectives on Mining in Gakenke District

Mining is a key sector for Gakenke's development and should be fostered. Gakenke District aims at a vibrant, efficient and responsible mining spurring sustainable economic development of the community.

This DLUP recommends to undertake the following action for a well-developed and sustained mining sector:

- Sensitize the cooperatives and companies to shift from traditional to modern mining;

- Consolidating small mining concessions into District mining blocks to meet national quality standards;
- Value addition and processing of mining products will be the major focus since they indicate high potentials for growth and employment;
- Construction of one mining processing plant in Ruli Sector;
- Construction and operationalization of one stone processing plant (Urugarika) in Mugunga Sector;
- Reforestation of exploited mining sites for the environment protection, biodiversity safeguard and human protection.

The District together with partners should undertake meaningful feasibility studies to ensure sustainability of the proposed project in the mining sector.

4.7.5. Waste Management in Gakenke District

The amount of solid and liquid waste is increasing rapidly as a result of rapid growth and migration from rural to urban centers. The fast-urban population increase has a significant socio-economic and environmental influence on solid waste management techniques.

In Gakenke District, solid waste disposal is a challenge due to the absence of a standard landfill. Efficient collection and disposal of solid waste is critical to protect the environment as well as the health of the population. In order to address these concerns an Integrated Waste Management Plan (IWMP) is required for Gakenke District in both rural and urban areas.

The Rwandan goal is to provide 100% of the population with access to an improved type of sanitation system. Improved sanitation systems are considered to include flush toilets, Ecosan toilets and pit latrines with solid slabs.

4.7.5.1. Solid Waste: Existing Situation

The results from EICV 5 revealed that the most common methods for rubbish disposal used by households is a compost heap (57%) and thrown in fields or bushes (38.9%).

Table 41: Distribution of households by main mode of waste disposal

No	Mode of waste Disposal	Percentage
1	Public Compost dumping	2.5%
2	Household compost dumping	57%

3	Waste collection companies	0.2%
4	Thrown in the HHs fields or bushes	38.9%
5	Burnt	0.4%
6	In a River/stream/drain	0%
7	Other	1%
8	Not stated	0%

Source:EICV5

In Gakenke District, there are no solid waste collection services. Waste from local markets are thrown in fields or bushes and burnt during the evening. Solid waste management in this rural District is characterized by:

- Lack of solid waste collection and transport system in general;
- Lack of waste collection system leading to sanitation challenges at household level, inadequate heap composts;
- Lack of modern sanitary landfill with recycling mechanisms;
- Lack of segregation framework of solid waste at their sources, solid waste mixture;

In general, most of the population dispose of their waste within their own plots. Urban and rural settlement sites dispose waste into fields, even in some commercial areas the waste collection system is inadequate.

4.7.5.2. Solid Waste: Planning Perspectives

The elaboration of Gakenke DLUP discussed the proposals that should be taken into consideration to ensure sustainable solid waste management:

- Construction of landfill in Kivuruga Sector; this landfill will accumulate collected solid waste within the District before being transported to the main regional landfill that is being constructed in Musanze Secondary City;

- Construction of small disposal sites in other areas (Muhondo, Gakenke, Ruli and Rushashi Sector);
- Develop a waste management plan;
- Put in place an efficient waste collection system.

4.7.5.3. *Liquid Waste: Existing Situation*

The current methods of wastewater disposal in Gakenke District include on-site containment systems such as pit latrines and septic tanks found in available institutions and a few households. In most cases, when the pits are full, they are abandoned and replaced with new ones. The maintenance of these facilities on a household level lies with the owner, in both rural and urban areas.

For different institutions such as healthcare and educational facilities, liquid waste is not adequately managed and this has an effect on the health of the neighboring local population. Measures should be taken to efficiently manage liquid waste in different institutions. The table below reveals that almost 47% of households discharge liquid waste in the bushes whereas 38% discharge it in the courtyard.

Table 42: Distribution of households by main mode of sewage disposal

No	Mode of Sewage Disposal	Percentage
1	Sump	4.5%
2	In the courtyard	37.9%
3	Rivulet/Tensch/Channels	0.1%
4	On the street	0.1%
5	Main sewer	2%
6	Casspool	4.9%
7	Bush	46.6%
8	Other	3.7%

Source: RPHC5,2022

The feasibility of a piped wastewater network in Gakenke District is unfeasible, due to low

wastewater flow rates and scattered settlements.

4.7.5.4. *Liquid Waste: Planning Perspectives*

On-site sanitation and semi centralized systems, on a small scale, remain the most viable options for the disposal of wastewater in areas to be developable for physical plans. Only in areas where the population densities are likely to be high, as in urban areas, will it be more practical to build a piped sewer network in the future.

Different institutions (healthcare and educational facilities, administrative entities, etc.) must develop a liquid waste management plan, to be implemented and inspected by the District to ensure compliance and good health of local people.

4.7.6. Stormwater Management

4.7.6.1. *Existing Situation*

In Gakenke District, the rainfall is relatively abundant, despite these rainfalls and eluding erosion with landslides, there is no existing stormwater management plan that should be used to counter strategically heavy rains for the future.

Generally, only the main roads have some kind of drainage system. This includes a series of channels, not all with cover slabs except on the national paved road. Although these systems exist, they are generally in a poor state and require urgent maintenance to ensure sustainability of constructed roads which are being damaged by rainwater flows.

In addition, rainwater harvesting at household level is low and this results in a variety of damages both on the roads and agricultural farms. Some wetlands, settlements and public facilities are often affected by the impact of stormwater because of the lack of the rainwater harvesting systems, improper drainage systems, implementation of terraces program, afforestation, and forest restoration and rehabilitation programs. Poorly maintained stormwater infrastructure causes erosion of usable land, increases flooding, and endangers private and public infrastructure including human life.

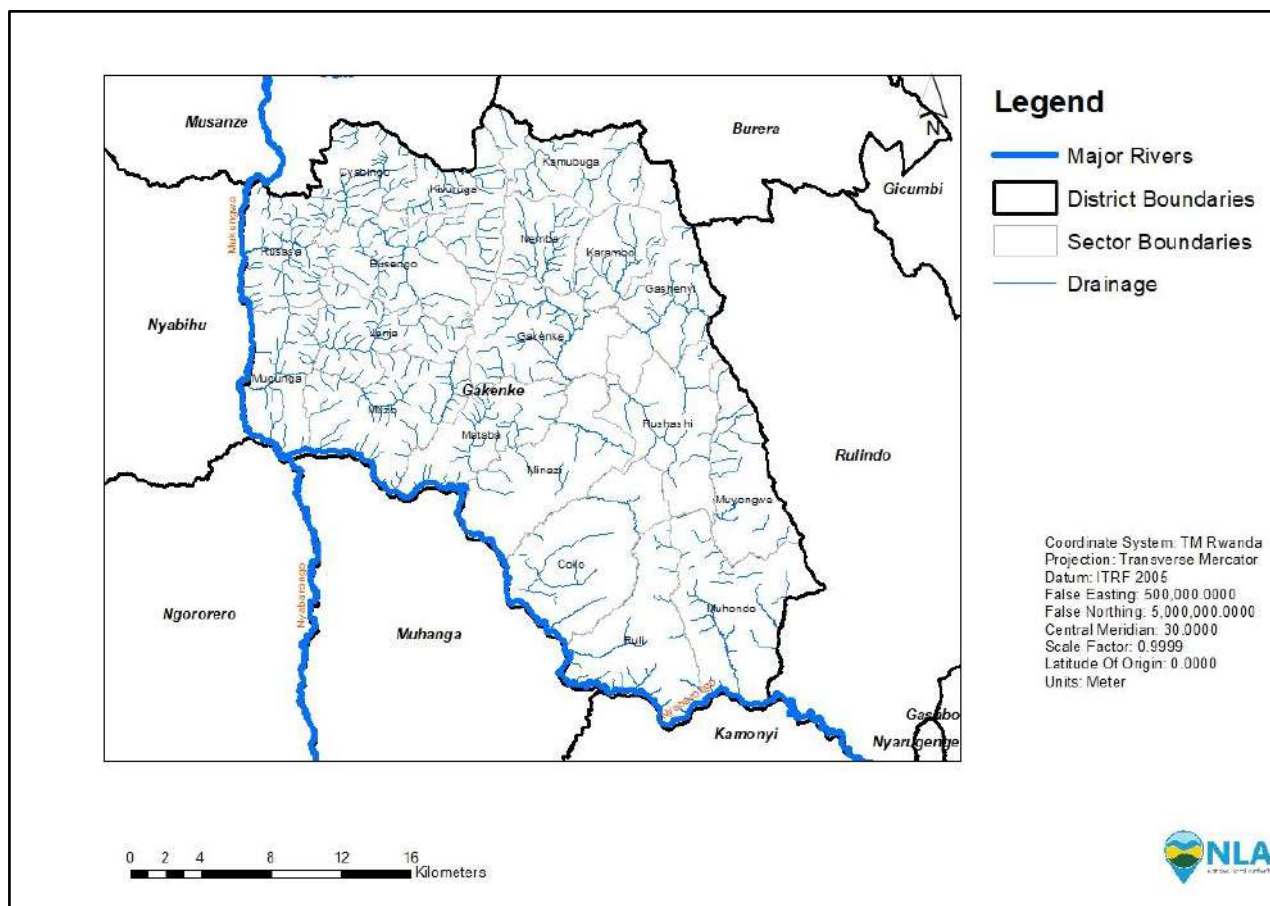
The storm water management system in urban areas of the country consists of drainage channels to divert runoff from urban areas to streams and rivers. However, there are laws, policies, and by laws related to stormwater management. Article 28 of the Law governing roads in Rwanda talks about water drainage system activities related to water drainage systems.

The latest ‘Sanitation Policy and Sanitation implementation strategies’ (2016) includes ‘storm water

management’ as one of the objectives for the policy vision. The policy states that ‘Stormwater shall be understood as a resource. Diversion of stormwater has a series of advantages, including financial, over traditional approaches to stormwater 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’ (Potential for rainwater harvesting in Rwanda).

Some of the key issues to be addressed are:

- Common drainage channels for storm water and wastewater flow, it is affecting the water quality in the public drains and eventually the receiving water bodies.
- Maintenance and upgrading of the damaged channels; damaged channels do not function at their optimum design capacity, which causes localized flooding in the event of heavy rain.
- No provision of storm water harvesting or SUDS to infiltrate runoff. Storm water is presently seen as a liability rather than a resource to be valued.
- No guidelines/standards for stormwater management. Without a standard local design guideline, there is no common basis for designing drains in the new developments or for verifying the adequacy of the drainage capacities of the receiving drains and canals.
- Erosion at the areas with steep slopes. The eroded soil eventually ends up in the water courses and water bodies, thus reducing the drainage capacity and polluting the water environment.



Map 32: Existing Drainage in Gakenke District (Source: Gakenke District; Edited by Author, 2022)

4.7.6.2. Planning Perspectives

Flooding, erosion, and landslide in the District will continue to be managed through establishing modern terraces, water harvesting and construction of gullies. The integrated actions which are proposed during the implementation of NLUDMP 2020-2050 aims to ensure that there are adequate sanitation and stormwater control systems, and recycling programs as well as ensuring that they will be aligned in all land use master plans.

For the sustainable socio-economic development and environmental protection, this scheme of stormwater management system will aim at increasing erosion control, protection of marshlands and buffer zones to boost agricultural productivity as well as improve biodiversity and ecosystem services through proper drainage systems.

4.7.6.3. Criteria to set for Gakenke District Drainage Layout

Topography: Based on DEM (digital elevation model) and contour lines, drainage lines were identified. i.e. storm water will flow from high elevations to low elevations. Drainage channels should follow the topography of the land while respecting the gravity law of nature.

Natural Drainage: Water flows naturally by gravity; all drainage channels have to be overlaid on existing flow directions and flow accumulations.

Land use Zoning: The layout of residential areas should follow the stream features which are shown in this drainage system layout. Agriculture areas are not prioritized, because stormwater will infiltrate cultivated areas.

Stream Network: As it is shown on the following maps, every stream feature ends at streams, rivers or wetlands. This will ease evacuation of storm water without making inadequate expenses while constructing drainage channels.

Rain Water harvesting system: Every building will have a tank or pond to take its roof water and any other storm water from residential areas to public drainage systems.

Catchment restoration and rehabilitation: The implementation of terraces program, afforestation, forest restoration and rehabilitation programs and buffer zone protection from human activities. Hence, these programs will reduce run off by increasing ground water recharge and infiltration.

Hydraulic infrastructures: To reduce or eliminate the landslide and flood risks, retaining walls on the steep slopes and river embankments or levees, and other adequate flood mitigation structures should be implemented respectively.

4.7.6.4. Planning Proposals for Stormwater Management in Gakenke District

- During construction/implementation of the drainage system, a study at a small-scale area will be needed to add more drainage channels within settlements sites.
- All buildings in settlement sites will have a rain water harvesting system that is connected to drainage channels for ease of storm water collection and conveyance.
- Every drainage channel will be constructed by following the topography of Gakenke District. No drainage channel will need excavation against the slope.
- Some adjustments will be needed before implementation to reduce the cost of expropriation that may be needed where drainage channel layouts pass through expensive infrastructures.
- Key priority areas should have more attention depending on planned projects in the area. For

instance, areas with consolidated agricultural land located downstream should be a priority for stormwater management or drainage. A good example is the western part of the District in Mugunga and Rusasa Sectors near Mukungwa river.

Stormwater will flow from upstream sectors to downstream sectors to join Mukungwa River in the west and Nyabarongo River in the south-east. These two rivers join Akagera River which pours into the Nile River.

4.8. Tourism and Conservation

Tourism is considered as one of the vital sectors that are significantly contributing to the socio-economic development of the country through revenues generated by the industry in Rwanda, that contribute to the economic growth as well as in culture heritage and ecosystem conservation Rwanda Tourism Policy, 2009). It is recognized as an essential economic sector with the potential to boost domestic economic growth and development, contribute to poverty reduction, job creation, export growth, and prosperity through revenues generated from the tourism industry.

According to the NLUDMP 2020-2050, the tourism sector remains the country's top foreign exchange earner for more than a decade and is a major drive for Rwanda's economic growth, development and poverty alleviation. Given the above, tourism contribution to Rwanda's economy has been increasing at a high rate due to the stability of the country and has been growing at an average rate of over 10% per year.

The Government of Rwanda has defined new and ambitious goals for the further development of the country and implementation of different strategies such as the NST2, whereby Rwanda has to double tourism revenues and reach 800 million USD by 2024.

Gakenke DLUP, in line with the country's vision to diversify the tourism sector, recommends development of tourism attractions and sites as well as encouraging investments in areas beyond the current tourism hotspots.

4.8.1. Existing Tourist Destinations in Gakenke District

Gakenke District is geographically situated between Kigali, the Volcanoes National Park and the Twin Lakes. This strategic location provides the unique opportunity to develop tourist attractions and encourage tourists visiting, spending time and thus generating revenue for the District. It will be necessary to enhance attractions and market them accordingly. Figure 59 shows the location for

tourist destinations.

Mt. Kabuye site

Apart from the volcanoes, Mount Kabuye is one of the tallest mountains in the country at around 2,700 meters altitude. Virtually all of the volcanoes in the Virunga range exceed Mount Kabuye in height. That being said, Mount Kabuye still provides hikers with a challenging ascent and fantastic views of the surrounding countryside, the entire volcano's region and the Nemba valley, as well as the opportunity to experience quaint rural villages and their friendly occupants.

Mount Kabuye overhangs the northern peripheries of Gakenke District Town, which is about an hour and half from Kigali. It is located 24 km from Musanze Secondary City and about 10 km from Lake Ruhondo. Within approximately two hours' visitors can climb the mountain to the Buranga hill top passing through small tracks.

This has been a recreational and historical site which has been visited since 1985 but in an informal or unorganized way, primarily used for hiking or recreational based tourism with historical features as King Gihanga has lived here. There is the King Cave and Gihanga water spring. The vegetation is dominated by eucalyptus trees and is home to the mountain Nyirarucyaba water spring.

Currently, Mount Kabuye is managed by Beyond the Gorilla, a company which signed a management agreement with Gakenke District in 2017. The operations started after the COVID pandemic, and in peak season between 20 and 30 foreigners visits per month. It is the only tourist

site in use in the District.



Figure 26: On top of Mount Kabuye photos (Source: Author, November; 2022; Mt. Kabuye)

Bagenge's Rock

According to ancient tales, Bagenge's Rock used to move from place to place, destroying everything on its way, sometimes even killing people. One day, King Ruganzu II Ndoli gave it an order to stop moving near Gakenke Market place and since then it has been there. The rock is located on the road side, 62 km from Kigali.



Figure 27: Sign post to Bagenge's Rock (Source: Author, November; 2022, Gakenke District Town)

Mbirima na Matovu site

Mbirima na Matovu historical site is also used for religious tourism. On this site, there was habitation of King MIBAMBWE III SENTABYO who lived there in the years 1741-1746, and NYIRAKIGERI IV MURORUNKWERE mother of KIGERI IV RWABUGIRI lived there during 1853-1895. Gakenke District should document the history behind this site that hosted kings for a long time.

In addition, this site is used by Christians for religious tourism. There is a tree nicknamed “Grace Tree”. Local residents confirm that between 250,000-400,000 visit the area to pray once a year on 15th August. However, the site is not operational as a touristic area.



Figure 28: Mbirima na Matovu historical site photos (Source: Author, November; 2022; Mbirima na Matovu)

Ivubiro rya Huro

The cultural and heritage site combines education and tourism. Culturally, it was used by the King for meteorological purposes. There is a vase with or without water, depending on the season. During the dry season, the vase is empty, but when rainy days are to come, the vase automatically fills up with water. This traditional method of meteorological predictions is efficient and it works today.



Figure 29: Ivubiro rya Huro heritage and cultural site photos (Source: Author, November; 2022; Muhondo Sector)

4.8.2. Planned Tourism Destination in Gakenke District

Tourism will significantly contribute to the development of Gakenke District if properly planned, managed and marketed, especially that many tourists to or from Musanze and Rubavu Secondary Cities pass through Gakenke District. Gakenke tourism sites can become alternatives or choice of destinations and attract tourists arriving in Rwanda. For more productive tourism industry in Gakenke District, the following interventions should be undertaken:

Mount Kabuye site

- Collaboration with Beyond the Gorilla to develop a business plan for Mt. Kabuye Hike. It should indicate target number of visitors, marketing strategies, infrastructure and facilities etc.;
- Undertake a full feasibility study of cable cars at Mount Kabuye in partnership with RDB.

Bagenge's Rock

- Construct hospitality services.

Mbirima na Matovu site

- Undertake full feasibility study for development of Mbirima na Matovu touristic site;
- Upgrade Mbirima na Matovu site according to the best option revealed by the feasibility study;
- Public investments will be required to provide infrastructure such as water supply, distribution of electric power, roads, security etc.;

Ivubiro rya Huro

- Undertake full feasibility study for development of Ivubiro rya Huro touristic site;
- Upgrade Ivubiro rya Huro according to the best option revealed by the feasibility study;
- Document all the necessary for each historical site and strengthen marketing activities.

4.9. Economic Development**4.9.1. National Context on Economic Development**

Rwanda aspires to achieve sustained economic growth over the long term, creating wealth for all Rwandans. The country has set a goal to become an upper-middle-income country by 2035 and a high-income country (HIC) by 2050. This means that by 2035, Rwanda aims to achieve a GDP per capita of over USD 4,036 and a GDP per capita of over USD 12,476 by 2050. Achieving these targets will require high and sustained economic growth, driven by a focus on key sectors such as agriculture, manufacturing, and services.

One of the key pillars of Rwanda's economic development strategy is the promotion of private sector-led growth. This has involved a range of measures to create an enabling environment for businesses to flourish, such as streamlining business registration procedures, improving access to finance, and promoting investment in priority sectors. Additionally, Rwanda has sought to leverage its strategic location within East Africa to position itself as a regional hub for trade and investment.

Achieving Rwanda's economic aspirations will require sustained effort and investment over the long term. The country has made significant progress in recent years, with improvements in key sectors such as agriculture and manufacturing. However, challenges remain, particularly in areas such as infrastructure development and access to finance.

Furthermore, the projected demographic changes will have significant implications for policy development, particularly in areas such as education, healthcare, and employment. The growth in the working-age population presents an opportunity for the country to expand its workforce and drive economic growth, but this will require targeted investments in skills development and job creation.

4.9.2. Existing Employment Opportunities in Gakenke District

The DDS Gakenke report for the period 2018-2024 highlights a range of promising opportunities that can significantly contribute to employment growth by fostering the creation of new jobs. These opportunities encompass various sectors and areas, including:

1. **Exploiting Large Marshlands:** The region possesses vast marshland resources. These marshlands present immense potential for development, which, if properly utilized, can facilitate employment generation.
2. **Harnessing Mineral Deposits and Quarries:** Gakenke District is endowed with diverse mineral deposits. Tapping into these mineral resources and establishing sustainable mining practices can lead to job creation and economic growth.
3. **Capitalizing on Attractive Tourism Sites:** The area has captivating tourism sites, offering a unique opportunity to promote tourism and related industries. By investing in tourism infrastructure, promoting cultural heritage, and enhancing visitor experiences, Gakenke District can stimulate employment opportunities in the tourism sector.
4. **Fostering Arts and Crafts, with a focus on tailoring:** The arts and crafts industry, particularly tailoring, has significant potential for employment creation in Gakenke District.
5. **Coffee Sector:** The presence of external investors in the coffee sector further augments the investment prospects and employment potential in the region.
6. **Benefiting from Enhanced Connectivity:** The accessibility provided by the Kigali-Musanze tarmac road plays a pivotal role in bolstering business development in Gakenke. The road provides easier access to high-value markets in Kigali, Uganda, Gakenke, the Democratic Republic of Congo (DRC), and Musanze, unlocking trade opportunities and facilitating employment growth. By strategically capitalizing on these opportunities, Gakenke District can actively promote employment generation and enhance the overall economic landscape.

4.9.3. Status of employment In Gakenke District

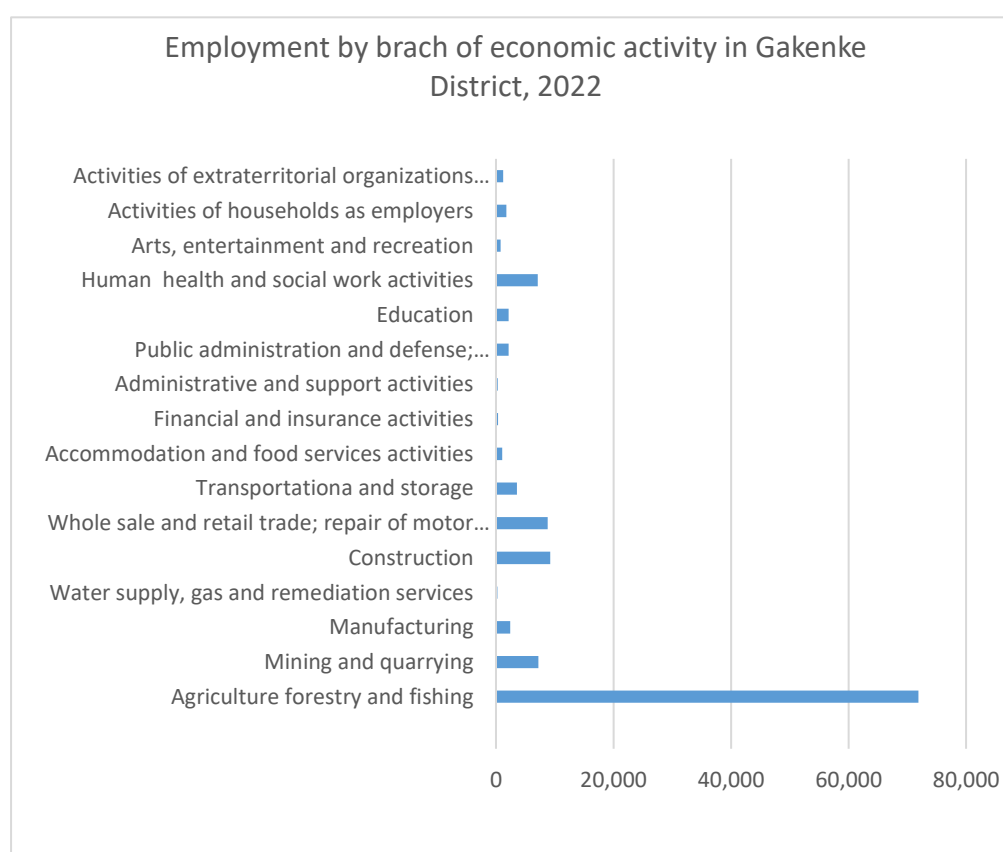
According to the thematic report for economic activity (EICV 5), Gakenke District has a working-age population of 229,000 with a workforce to population ratio of 95%. In terms of job status, 11.5% are engaged in wage farming, 12% in wage non-farming activities. 71% are independent farmers, 5% are independent non-farmers, and 0.3% are unpaid non-farmers. When considering the distribution across broad economic sectors, close to 74% are employed in agriculture, 13% in industry, and 13% in services.

The recent Labour Force Survey of 2022 revealed that the employment-to-population ratio stands at

43% and the unemployment rate is just below **17%**. The survey identified that **134,503** individuals are outside the labor force, while the number of employed individuals is **120,170** with **24,370** falling into the category of unemployed.

To better illustrate the status of employment creation in Gakenke, a graphic representation is provided below:

Figure 30: Employment by area and branch of economic activity in Gakenke District, RLFS 2022



Source: RLFS, 2022, edited by NLA Staff, June 2023

The agriculture sector is the main employment contributor, accounting for close to **60%** of the total job creation. The construction sector generates almost **8%** of the employment opportunities. Wholesale and retail, and repair of motor vehicles and motorcycles contributes **7%**.

The predominance of the agriculture sector in job creation underlines its crucial role in the economy, reflecting the sector's capacity to absorb a substantial portion of the workforce. The significant proportion of jobs generated in this sector highlights the continued reliance on agriculture for

livelihoods, with its inherent importance in supporting food security and sustaining rural communities.

4.9.4. Planning perspective on employment opportunities in Gakenke District

Based on RLFS 2022, the NLUDMP 2020-2050, the employment sectors are grouped into five main categories:

- ❖ Agriculture, forestry and fishing
- ❖ Mining and quarrying
- ❖ Construction
- ❖ Manufacturing
- ❖ Services

The methodology for employment projection in Gakenke District involved cascading the assumptions outlined in NLUDMP 2020-2050 down to the District level taking into consideration the economic specialization of the District, as presented in the table below:

Table 43. Employment projection in Gakenke District by 2050

Sector of activity	Number of employments to be created
Formal employment 2050	220,555
Services	112,483
Agro-processing mills and Udukiri	37,494
Construction	31,826
Agriculture, forestry and fishing	26,180
Mining and quarrying	12,572

Source: Calculation by NLA staff basing on NLUDMP 2020-2050 guidelines, June 2023

By the year 2050, as urbanization expands and job opportunities increase, the service sector is anticipated to play a significant role in employment generation, making up 51% of the total employment to be generated, particularly in commercial activities. Simultaneously, the manufacturing sector is expected to contribute 17% of employment creation. The construction sector

is set to play a crucial role in employment growth by facilitating the development of modern infrastructure, representing around 14 % of the total employment. Despite the availability of arable land and abundant forests, agriculture, forest, and fishing are projected to make up only 12% of total employment. Finally, the mining sector is estimated to contribute 5.7%.

4.9.4.1. *Manufacturing and Industrial Development*

In Gakenke District, there are small-scale agro-processors including small start-up businesses which are under strict rules and regulations to which they must comply. New businesses begin by purchasing and setting up all necessary equipment then apply for operation authorization. The Rwanda Standards Board (RSB) takes samples and conducts tests to ensure the quality of the products, and if approved, the business or production can begin production.

Table 44: showing existing light industries in Gakenke District

No	Sector	Name of Industry	Type of industry	Product fabricated
	Muhondo	Tembera Kawa Yacu/coffee	Light	Coffee
	Ruli	Dukunde Kawa Yacu/coffee		coffee
	Ruli	ARMC/Coffee		coffee
	Ruli	Komikagi processing plant/coltan		coltan
	Ruli	Aheza fortified food ltd/flowers		Fortified flowers
	Rushashi	Abakunda Kawa/coffee		Coffee
	Muyongwe	Tuzamure kawa (Sotikam)/ coffee		coffee
	Muzo	Coadeca/coffee		coffee
	Mataba	Bukonya company/coffee		coffee
	Mataba	Duhaguruke Mataba/Baskets		baskets
	Coko	Dukundekawa (Extension Ruli)/coffee		coffee
	Coko	Twongere Kawa/coffee		coffee

	Rusasa	Ikawa yacu/coffee		Coffee
	Rusasa	Abakunda Kawa (Extension Ruli)/coffee		coffee
	Muzo	Ibyiwacu Ltd/maize flour		maize flour
	Mugunga	Iryamukuru wine/ Banana processing		Banana wine
	Gakenke	Covafga/Pinneapple wine		Pinneapple wine
	Gakenke	Gakenke Slaughterhouse		Meat
	Gakenke	Cootumu/Maize flour		maize flour
	Gakenke	Coopromega/wood processing		wood processing
	Gakenke	Imbaka/honey processing		honey processing
	Kivuruga	Mountain sugarcane ltd/ sugarcane		sugarcane processing

4.9.4.2. Financial Inclusion

According to the 2012 FinScope survey, the level of financial exclusion in Gakenke District was at 40.5%. In the FinScope 2016, the proportion of banked adults in Gakenke District was 18%. The financial inclusion indicators reveal that in Gakenke District only 22% of the banked total population accounts are active, 33% mailbox and 45% dormant. 40% put their savings in a SACCO, while 73% use savings groups.

The findings of FinScope 2020 indicated that the average time taken (in minutes) to access formal financial institutions or services regardless of mode of transportation used is the following: Umurenge SACCO (42:49 minutes), MFIs (51:27 minutes), Bank Branch (51:77 minutes), ATM (54:93 minutes), Bank Agent (51:77 minutes), mobile money agent (26:78 minutes). However, Umurenge SACCO is operating in all administrative Sectors, and other financial institutions are locally available in different sector as detailed in the table:

Table 45: Financial Institution in Gakenke District (Source: Gakenke District, 2022)

Type	Financial Institution	Location / Branch
Bank	Bank of Kigali (BK)	Gakenke Sector
	BPR	Gakenke, Ruli, Rushashi Sectors and Murambo Center
	UNGUKA BANK LTD	Gakenke Sector
MFI	Vision Finance	Gakenke Sector
	RIM	Ruli and Rushashi Sectors
	CLECAM	Gakenke, Janja and Cyabingo Sectors
	CODEMARU	Muhondo Sector

According to the above table, Gakenke District Town and Rurban centers have banks and MFIs. Umurenge SACCO serves Rural Settlement Sites.

4.9.4.3. Cooperatives

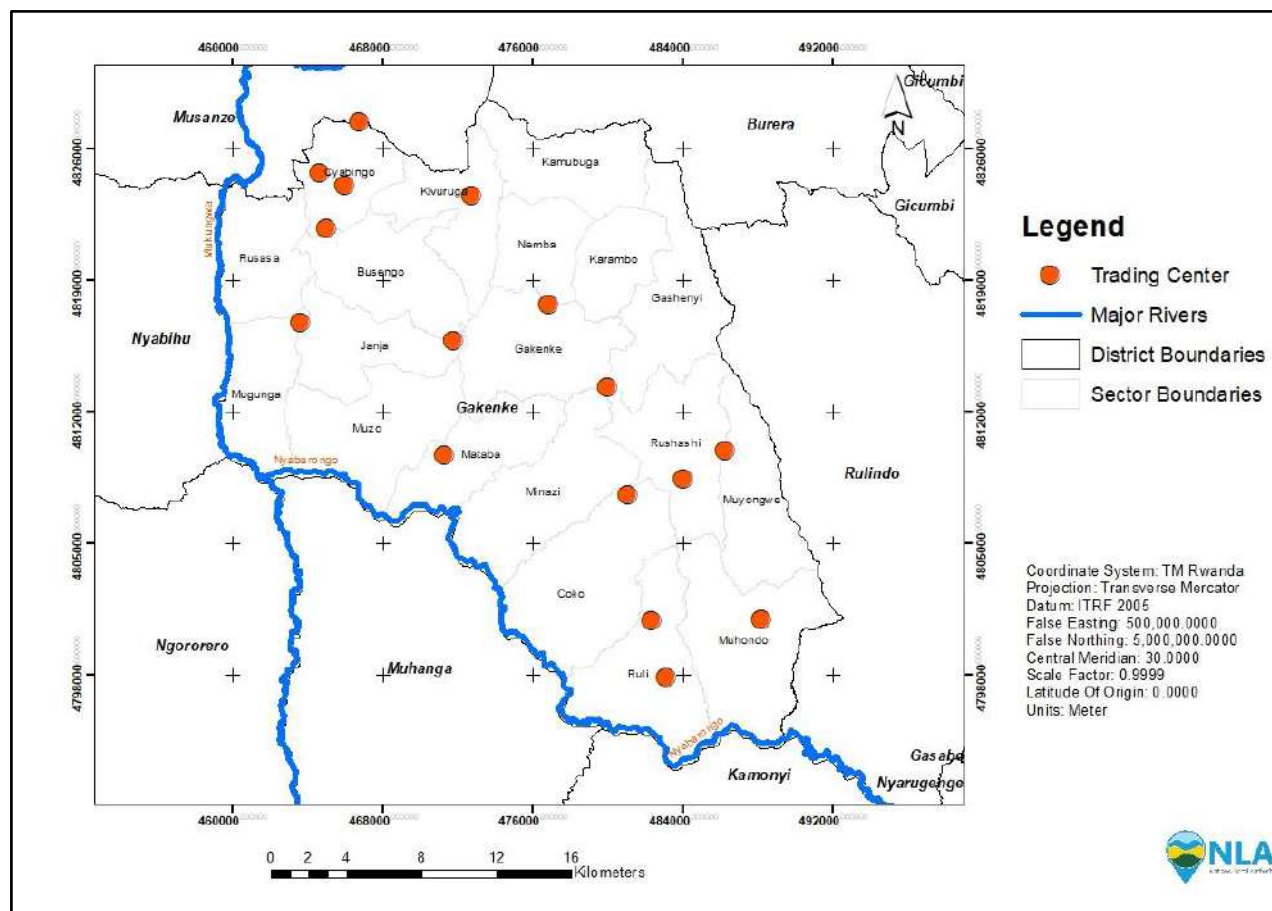
Gakenke District has a total of 223 cooperatives with more than 115,318 members. These cooperatives are gathered under different activities such as agriculture, trade, livestock, handcraft, service, SACCOs and mining. They are located in all Sectors as follows:

Busengo: 7 cooperatives; Cyabingo: 11 cooperatives; Coko: 7 cooperatives; Gakenke: 31 cooperatives; Gashenyi: 18 cooperatives; Janja: 16 cooperatives; Kamubuga: 9 cooperatives; Karambo: 5 cooperatives; Kivuruga: 13 cooperatives; Mataba: 4 cooperatives; Minazi: 5 cooperatives; Mugunga: 12 cooperatives; Muhondo: 15 cooperatives; Muyongwe: 6 cooperatives; Muzo: 18 cooperatives; Nemba: 9 cooperatives; Ruli: 15 cooperatives; Rusasa: 8 cooperatives; Rushashi: 13 cooperatives. (Gakenke District report, 2021)

4.9.4.4. Trade and Commercial Business

Gakenke District has 75 trading centers of which 11 also have a market. These centers host various SMEs involved in trading and business of different commodities and services. However, there is insufficient production of goods and services due to the lack of technology to increase the production.

Map 33: showing Trading centers in Gakenke District



In total, there are close to 4,000 micro enterprises, 304 small enterprises, 47 medium enterprises and 12 large companies in Gakenke District. The 12 largest companies are Utpar/rushashi, Coopaganbu, Intege, Covaf Ga, Tantum ergo, Twongere kawa koko, Land of thousand hills (a.r.m.c), Ikawa yacu, Icyerekezo Gakenke, Tuzamure kawa (Sotikam), Abakunda kawa and Dukunde kawa. (LED Strategy, 2017-2023).

The companies play an important role in the development of the District through local revenues, job creation and service delivery. All combined, in 2022 the District collected almost 1 Billion RWF from the private sector via taxes. More efforts are needed to increase District revenues through sustained growth of private operators. This is achievable, especially that there are factors of production and support of District staff.

4.9.5. Planned Perspectives on Commerce, Manufacturing and Industrial Development

Approximately 382 ha of land has been set aside for Light Industrial use(I1), such as agro-processing plants, industrial bakeries, food processing, wholesale and warehousing, light manufacturing and assembly. In addition, in agricultural land where raw materials are accessible agro processing plants

will be allowed.

In Gakenke District, modernized agriculture will result in high production including raw materials for agro processing plants. Agro processing and mining value chain will result in the creation of new jobs.

4.9.5.1. *Planned Perspectives on Financial Inclusion*

Development of modern finance services is crucial for competitiveness and long-term growth. Countries with better institutions have larger and more dynamic service sectors (Amin and Mattoo, 2008). Measures such as attracting financial institutions in the District, negotiating with financial institutions to design tailored financial products for different categories as well as conducting financial literacy campaigns shall be undertaken to promote the financial sector in the District. The financial institutions should also get negotiated to cover underserved market segments (low-income households and small and medium enterprises [SMEs]) using innovative lending techniques (such as cash-flow-based lending and agent banking). In addition, the adequate long-term financing schemes is a key concern.

4.9.5.2. *Planned Perspectives on Cooperatives*

Gakenke DLUP recommends large awareness campaigns in all cooperatives regarding self-business development, entrepreneurship, cooperative administration and management, land use consolidation, financial literacy campaigns, etc.

4.9.5.3. *Planned Perspectives on Trade and Commercial Business*

The emergence of a vibrant, competitive, and innovation-driven enterprise sector of private firms that responds with agility to emerging domestic and regional opportunities is essential for future growth. Private enterprises create jobs and generate incomes, drive economic transformation, compete in global export markets, and, ultimately, drive aggregate productivity growth and innovation.

Gakenke DLUP has allocated 202 ha for commercial zones both in urban centers and rural settlement sites.

Moreover, the private sector will have to provide much of the huge investment needed to support future growth ambitions, because public investment is already at the limits set by financing options.

Efforts to boost private investment involves also branding the District as earlier discussed and

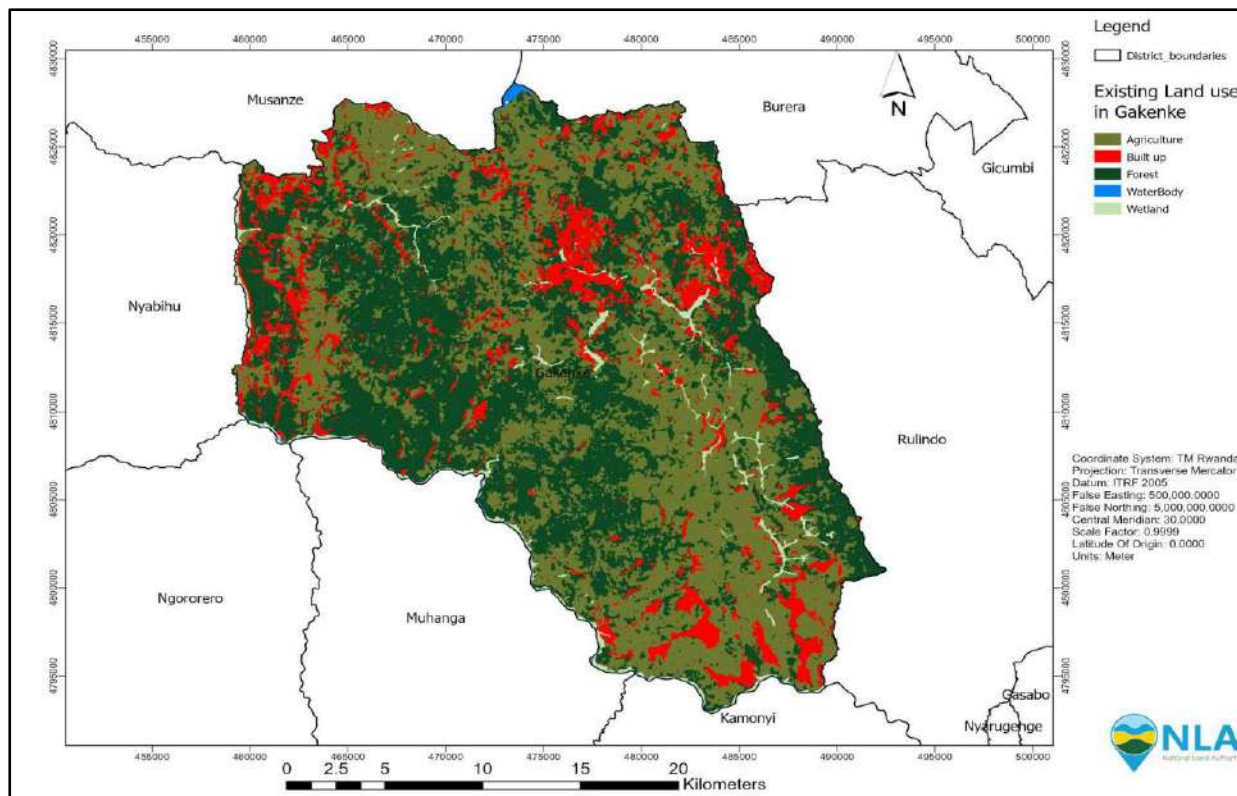
linking entrepreneurs in various fields to the markets. A vibrant private sector in the District shall take advantage of potential growth areas in the District such as mining, tourism, tailoring and craft, agriculture, industries etc. The private sector will not only be key for economic growth, but it will also ensure the emergence of a vibrant middle class of entrepreneurs

In summary, Gakenke District shall nurture an environment that promotes job creation for the population, emphasis on youth; especially the off-farm jobs since they are on average the better paying. This will be achieved by implementing various projects in different sectors and branding the District.

Much priority will also be mindset changing based campaigns towards the attitude of entrepreneurship, acquisition of relevant skills in entrepreneurship, technology and ICT, as well as business development. In addition, mobilization of Youth to join demand driven TVETs, embracing ICT for innovation and labour market interventions that match the needs of the employers and the job seekers shall be part of the strategies the District shall undertake that contribute to this theme.

4.10. Gakenke District Existing situation (2023) vs Planned Land Use (2050)

In 2023, agriculture is the predominant land use covering 57.59% of the area, followed by forest and conservation on 25%. During the elaboration of Gakenke DLUP, various changes have been made to accommodate the District's future population. Settlement sites and urban areas have been defined affecting agricultural land. All unprotected wetlands and buffer zones currently used for agriculture have been zoned as wetland and buffer zones, thus reducing the agricultural land in the zoning plan.

Map 34: Showing Gakenke existing land use 2023.

Shrubs and agroforest zones have been planned as agriculture which reduced forest cover during the elaboration of Gakenke DLUP. In addition, wetland and water bodies have been given a buffer zone which is currently agriculture and forest, this also reduced the current zones of agriculture and forest cover. Therefore, agriculture and livestock has been reduced to 39,727.4ha (56.3%), forest to 15,213.3ha (21.5%). However, built up zones have been increased from 2,325.6ha (7.99%) up to 11730 ha (16.6%).

4.11. Gakenke District Land Use Balance Sheet

Land use zoning means regulating land for future use and development, in which all thematic sectors are allocated land taking into account their future land demands, and in accordance with the needs of the population, in order to manage land resources well and achieve the desired social and environmental outcomes.

During the elaboration of Gakenke DLUP, planned land use has been based on the existing situation of the district. The table 48 indicates the comparison between existing land use balance sheet 2023 vs proposed land use in 2050.

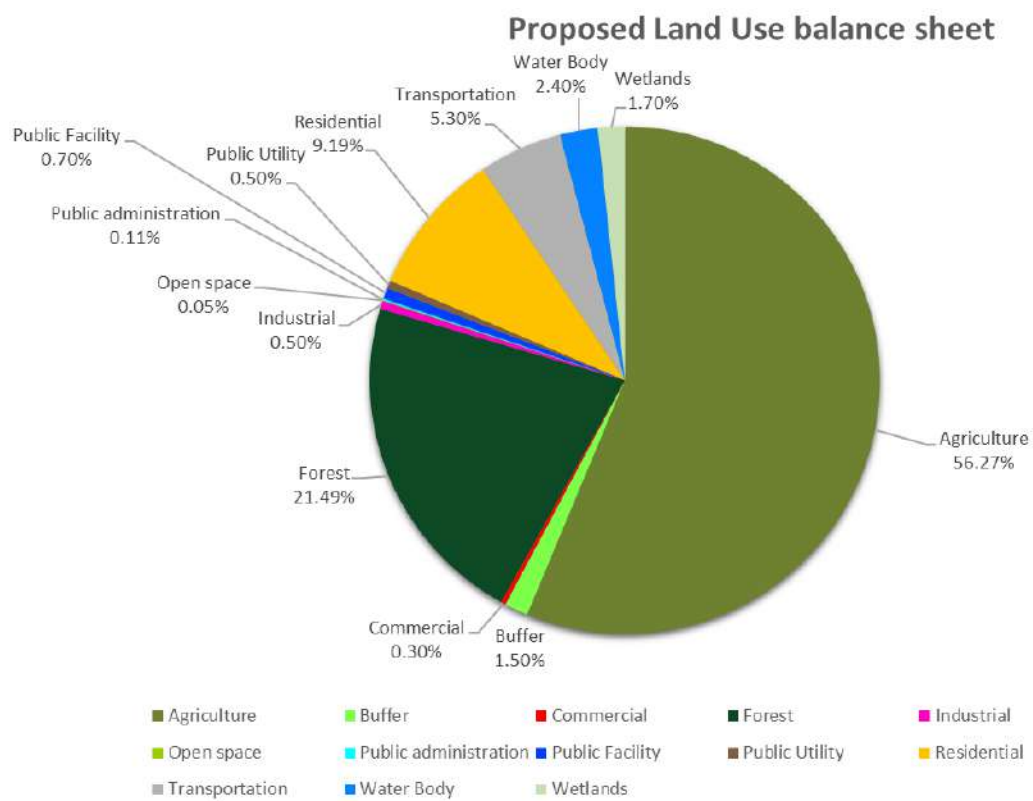
4.11.1 Gakenke District Land Use Balance Sheet 2023-2050

Gakenke District is normally associated with scattered settlement in various sectors. During the elaboration of Gakenke DLUP, agricultural land has been preserved and protected through planned rural settlement sites in 2050. where, scattered homesteads in agricultural land will gradually be relocated into planned settlements and urban areas. In 2023, Agriculture covered 44.2% of the total area of the District, this has been extended to 57.59% of the total district area. Shrubs and scattered trees associated with agricultural crops have been planned as agriculture which keeps forest cover to reduce from 38.7% to 22% of the total District area. Also forest alongside road and river and waterbody, has been allocated in road reserve and buffers zones which keep the forest to 22%. Lastly, built up area has been increased due to planning measures like road size and other land uses proposed like commercial and residential zones in urban areas to accommodate future population.

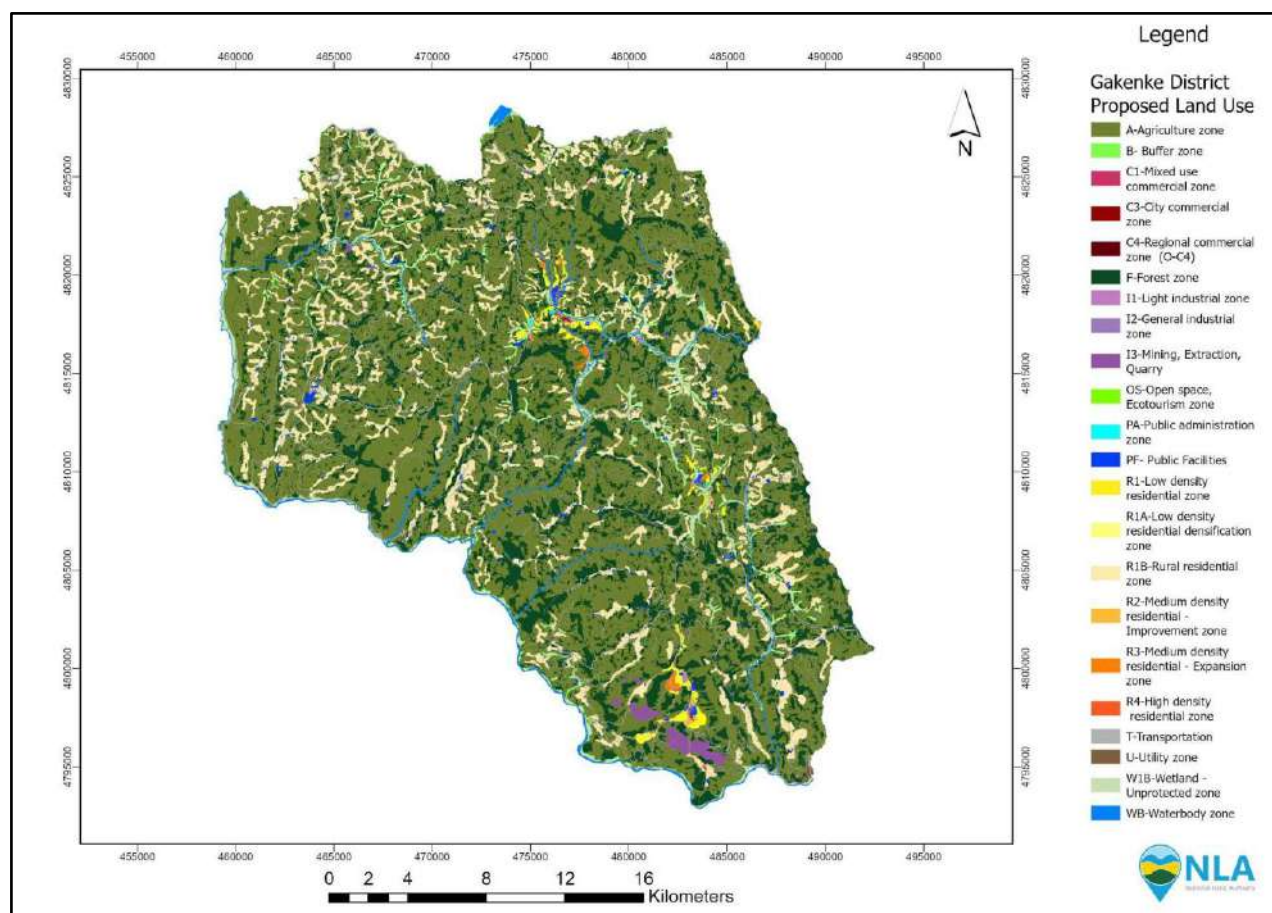
Table 46: Existing vs Planned Land Allocation in Gakenke District 2023 - 2050

S/N	Land Use Category	Existing Situation in 2023		Planned Uses in 2050	
		Area (Ha)	Percentage	Area (Ha)	Percentage
		70406.7	100	70453	100
1	Agriculture	31146.1	44.2	40580.5	57.59
	A1-Agriculture zone			40578.4	57.59
	A2-Livestock zone			2.1	0.003
2	Forest & Conservation			15577.7	22
	Open Space			7.6	0.001
	Forest-F1	27269.7	38.7	15570.1	22
	Settlements & Infrastructures (Builtup)	9987.1	14.1	11461.46	16.617
3	Commercial			201	0.283
4	Industrial			386.67	0.54
	I1-Light industrial zone			29.07	0.04
	I3-Mining, Extraction, Quarry			357.6	0.5
5	Public Administration			55.2	0.07
6	Public Facilities			405.8	1.034
7	Public Utilities				
8	Residential			6552	9.29
9	Transportation			3860.79	5.40
10	Public Utility			32.7	0.04
	Wetlands and Buffers				
11	Swamplands	1633.3	2.31	1506.8	2.1
12	Waterbody	370.31	0.52	534.9	0.75
13	Buffer (Swamplands & water bodies)			758.7	1.01

Figure 45: Gakenke Planned Land Use Balance Sheet (Source: Gakenke District; Edited by Author, 2023)



Map 35: Gakenke District Land Use Map (Source: Gakenke District, Edited by Author, 2023)



5. Implementation Strategies

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5.1. Legal and Institutional Framework

One of the fundamental aspects of achieving the goals as set out in a Gakenke DLUP for a specific spatial space is the implementation of such a plan by the established implementation Agency. The implementation of a Gakenke DLUP, which is the official document (that contains public policy, programs and projects for Gakenke District), is a major determinant of urban and rural development in which Gakenke District has a major role to play. Stakeholders are the key players in the implementation of DLUPs

Table 47. Gakenke District Implementation key actors and their responsibilities

Nº	Actors & Stakeholders	Intervention sector	Responsibilities
1.	Gakenke District	All interventions sectors	Develop working mechanism that brings all actors on board Strengthen capacity building of staff, hold workshops and regular meetings with all District partners to share best practices Facilitate the provision of extension services Mobilize necessary resources for the implementation of the District priorities. Initiate, Coordinate, Monitor and Evaluate the Implementation Phases
2.	MINALOC	All interventions sectors	Ensure that all the guidelines and directives from the central government are fully disseminated to the District Proper use of the public resources Supporting stakeholder coordination in their

			activities at District level
3.	MINECOFIN	Public Financial Management	Leads the resource mobilization, allocation process and approve new innovative financing mechanisms Will assist to link the District strategic outcomes with the NST2 and higher-level plans. Coordinate the transfer of earmarked funds
4.	MININFRA	Transport Urbanization Energy Water and Sanitation	Ensure the sustainable development of infrastructure Overseeing maintenance and development of infrastructure
5.	MINEDUC	Education	Developing and managing Education Monitoring and Evaluation systems Promoting information and technologies in the area of education Promoting information and communication technology as a tool for learning and teaching Overseeing the programs of school construction and equipment Overseeing formal education and continuing training of teaching staff
6.	MoH	Health	Financial accessibility of health services Strengthening referral hospitals, treatment & research centers Institutional capacity building Human Resources Development

7.	MINAGRI	Agriculture	Organization, mobilization and capacity-building for producers and their organizations Promoting the gender approach and reducing vulnerability among disadvantaged groups Diversification and intensification of plant, animal and fish production
8.	MoE/ REMA	Environment and Natural resources	Strengthening climate resilience of communities -Water Resources Management Monitor and assess development programs to ensure compliance with the laws on environment during their preparation and implementation; Advice and technical support to individuals or entities engaged in natural resources management and environmental conservation Monitor and supervise impact assessment
9	MINICOM	Private sector development and employment	Support private sector growth and job creation with a focus on SMEs Build an effective human resource base and institutional capacity for delivery.
10	MINISPORTS	Sports	Ensure that sports and culture policies and strategies are disseminated and appropriately implemented to attain the intended results Supervise the functioning and management of affiliated institutions and agencies of the ministry for efficiency and effectiveness. Promote research and development of cultural and sport activities
11	National Land Authority (NLA)	All Sectors	Overall Monitoring and Evaluation of Gakenke DLUP Implementation Phases Capacity Building of all implementation

			Actors at all levels of Governance Involve public and private investors and developers for Gakenke DLUP Implementation
12	LODA	Private Sector Development & Youth Employment Social protection Urbanization and rural settlements Transport	-Local Economic & Community Development Capacity building of local administrative entities Monitoring and evaluating the implementation process of development programs
13	RHA	Housing Public Building	Monitoring and Inspection of Housing Permitting Effective Management of Public Buildings (Construction, Repair and Maintenance)
14	RAB	Agriculture	Practice modern methods in crop and animal production, research, agricultural extension, education and training of farmers in new technologies.
15.	NAEB	Agriculture	Facilitate the growth of business to diversify agriculture and livestock commodity export revenues.
16.	Rwanda Cooperative agency (RCA)	Agriculture Financial Sector Development Empowerment of Youth, Women and People with Disabilities	Promoting the cooperative organizations sector Promoting business entrepreneurship in the cooperative organizations sector Assisting cooperative organizations in their capacity building through training and seminars of its members and managers Supervising implementation of laws and instructions governing cooperatives

17.	BDF / BRD	Financial sector Development	Promoting SME development through the provision of financial services Accelerate export development, Catalyze agricultural financing; Promote affordable housing, Manage and facilitate financing for education loans; and Increase investments in energy development
18.	REG	Energy	Responsible for maintaining and improving power plants, transmission and distribution networks, as well as delivery of electrical energy to consumers at a sustainable fee Community companies support in small micro hydro power plants
19.	WASAC	Water and Sanitation	To increase the water production, distribution, and performance improvement aimed at provision of quality water and sanitation services
20.	Development Partners (World Bank, Un-Habitat, AFD, etc.)	Urbanization and Rural settlement Upgrading of Informal Settlement Resettlement of People living in High-Risk Zones	Provision of basic infrastructure Technical assistance to support sustainable urban management and capacities at Secondary Cities District level and facilitation of Local Economic Development Financing of Projects for improvement of Living Conditions of Gakenke Population

Source: Tabulated by NLA Team, 2023

5.2. Gakenke DLUP Implementation Framework

Recalling the objective of this DLUP, it aims at allocating land to different uses for the concerned District by clustering all thematic areas in account of managing the efficient use of resources and guide future development in line with the NLUDMP 2020-2050, thereby promoting social, economic and environmental benefits.

Gakenke DLUP emerged with the 2035 target, which is to be revised for the 2050 target, to facilitate the implementation of the NLUDMP 2020 - 2050 in two manageable phases. It gives details in terms of land allocation with specifications and potentialities of the District, in comparison with the NLUDMP 2020-2050 which gives general guidelines to facilitate the planning balance of land use at national level.

Normative approach of planning used here, is opposed to the methodology; which believes in the projection of trends, perpetuating « Business as Usual (BAU) » and ending up with « MORE OF THE SAME ».

However, whatever the approach, successful implementation of plans always requires strong political will, appropriate partnerships involving all relevant stakeholders and three key enabling components:

Enforceable and transparent legal framework. The emphasis should be on the establishment of a system of rules and regulations that provide a solid and predictable long-term legal framework for urban development. Special attention should be paid to accountability, implement ability and the capacity to enforce the legal framework where applicable;

Sound and flexible urban planning and design. Specific attention should be paid to the design of the common space, since it is one of the main contributors to urban value generation, with provision of appropriate street patterns and connectivity and the allocation of open spaces. Equally important is clarity in the layout of the buildable blocks and plots, including appropriate compactness and mixed economic use of the built area, in order to reduce mobility needs and service delivery costs per capita. Finally, the design should facilitate the strengthening of the social mix and interaction and the cultural aspects of the city;

A financial plan for affordability and cost-effectiveness. The successful implementation of an urban plan depends on its sound financial basis, including the ability of initial public investments to generate economic and financial benefits and to cover the running costs. Financial plans should contain a realistic income plan, including the sharing of urban value between all stakeholders, and an expenditure provision to address the requirements of the urban plan. (UN-HABITAT, 2015)

Therefore, Gakenke District must promote appropriate partnerships involving all relevant stakeholders for sustainable development projects.

5.2.1. Gakenke DLUP Spatial Phasing Plan

The implementation plan of Gakenke DLUP outlines the steps to be undertaken toward the accomplishment of the goals and objectives of this DLUP. Implementation, in general, provides the road-map of development on the ground for long, medium or short-term projects.

Gakenke DLUP will be implemented in 4 phases: **Phase 1:** 2023-2029; **Phase 2:** 2030-2035; **Phase 3:** 2036-2040; **Phase 4:** 2041 -2050.

The areas of the development phases will be based on key priority selected areas and catalytic projects in different sectors. Gakenke District will identify all suitable sites for detailed physical plans in residential zones and implement physical plans based on priority areas and available budget in line with the proposed spatial phasing plan.

The phasing plan for Gakenke DLUP provides flexibility to the implementing agencies and stakeholders by prioritizing investment projects for local economic development in Gakenke District for efficient and adequate use of implementation resources and funds to finance the selected priority project.

Each phase has different actions and projects. The sequence and complementarity of all phases pave the way for Gakenke District population to reach upper middle-income level by 2035 and higher income level by 2050.

- **Phase One: 2023-2029**

During the first six years of Phase One (**2023-2029**), the District will concentrate efforts to accelerate the development of Gakenke District Town. At least two key priority areas or sites will be selected for development of detailed physical plans, as prerequisites for issuance of building construction permits. These areas will be supplied with various amenities including roads, storm water drainage, potable water pipes, electricity lines, sewerage and digital infrastructures.

In addition, investments in infrastructure such as paving roads in Nemba Sector and construction of car parks (Ruli, Rushashi and Gakenke District Town) are included in this phase. Moreover, the District will start mobilization with the private sector for development of light industries in the planned zone.

In Rurban Centers, the District will continue the issuance of building construction permits and rehabilitation permits. These centers will identify necessary sites to be developed for physical plans according to the available budget at District level.

In rural areas, basic facilities will continue to be supplied in rural settlement sites and large public mindset changing based campaigns for land use consolidation and creation of agglomerations will be undertaken across the whole District.

However, from Phase One, the DLUP Phasing Plan allows the Implementation Flexibility on phases which provides that the district can allow developments for immediate implementation of any of any phase by issuing of new building construction permits, when the neighborhood is well serviced with roads and other basic public amenities, or when investors commit to distribute all basic infrastructures (Roads, water, electricity, etc.), without a government or public investments.

Consolidated agricultural land and formed groups (“Amatsinda y’Ubugenzi”) will be the main results in the agriculture sector during this phase. Participatory approach must be prioritized to understand farmers’ views for the suitable crops under cultivation in different agriculture seasons. Trials for improved agricultural farming practices will start in this phase.

The District should initiate meetings with stakeholders in mining, agriculture, tourism, tailoring and crafting to assess feasible options for development of these sectors according to the provisions of this DLUP.

This phase will also be characterized by intensive feasibility studies of various development projects in the above listed sectors. Mobilization of the required funds will start and these projects will start being implemented in the next phase.

- **Phase Two 2030-2035**

During phase two (2030-2035), the District and stakeholders will prioritize major investment in roads to spur economic development. The National Road (RN 31) from Giticyinyoni-Ruli-Rushashi-Gakenke Town connecting Kigali City and Gakenke Urban Centers, will be paved and other roads to agricultural consolidated sites will be upgraded or rehabilitated as feeder roads to strengthen local rural economies, particularly in areas with high value main food crops, export crops, and intensive livestock farming.

The agriculture sector will take the lead in this phase. “Amatsinda y’Ubuhinzi” in their respective consolidated sites will be in full practice of farming. Collaboration with different stakeholders for capacity building of farmers and agricultural inputs will be necessary to ensure increased agricultural production.

Necessary feasibility studies for industrial mining should start in this phase followed by construction and operationalization of mining processing. However, capacity building and links between artisanal small miners and processors will be a prerequisite during this course.

Gakenke District will Branding in this phase. Branding of coffee, mining and touristic sites. Implementation of coffee productions, sustainable mining and tourism development will start during this phase and be sustained in the next phase.

- **Phase three: 2036-2040**

By 2035, Gakenke DLUP will be reviewed after evaluation. The three last phases (3 and 4) concern long term projects, and will be detailed at that time. During this phase, District Road (RD 66), the road connecting Gakenke and Musanze Districts through the sectors of Gakenke, Mataba, Muzo, Mugunga, Rusasa, Busengo and Cyabingo will be paved together with District Road (RD 77) connecting Rushashi Rurban Center and Rulindo District through Muyongwe sector (Kirenge-Rushashi) as well as District Road (RD 38), connecting Ruli Rurban Center and Muhanga District. These roads should be paved in earlier years to ensure their full functionality.

- **Phase four: 2041-2050**

Phase four considers the areas for urban expansion and urban peripherals, areas suitable for urban development and rural areas that today are used for agriculture. These areas currently do not have basic services and infrastructures. Issuance of new building construction permits is prohibited in Phase 3, except for large investment cases, where the investors will commit to distribute all basic infrastructure (roads, water, electricity, etc.), without government or public investments. Also, areas detailed with physical plans should be permitted for new construction.

5.2.2. Capital Improvement and Catalytic Projects

1. Sustainable Irrigation and Agricultural Intensification Project

The project aims to improve food security, crop yields, and income generation by implementing irrigation and drainage systems alongside sustainable agricultural practices by improving agricultural farming practices, Branding coffee, mining and touristic sites, Irrigation and drainage projects, construction of terraces and relocation of households from agricultural to settlement sites. The project focuses on vegetable, coffee, banana, and flower plantations, with a strong emphasis on improved farming techniques and the construction of terraces to prevent soil erosion and increase productivity.

2. Development of sustainable Mining hub

The project focuses on sustainable mining and reforestation of exploited mining sites by elaborating full feasibility for development and construction mining processing plant, full feasibility study for developing and constructing stone processing plant in Gakenke District, Reforestation of exploited mining sites for environmental protection, Geological exploration studies of mines in Gakenke District, Rehabilitation of abandoned mining areas, Construction of mining concessions into blocks, etc.

3. Eco-Tourism and Adventure Hub Development

The project aims to establish Gakenke as a top eco-tourism destination. Key components include a cable car system at Mt. Kabuye, offering scenic views and adventure activities like hiking and birdwatching, along with eco-friendly accommodations that showcase sustainable practices. The project will also enhance cultural and historical tourism, offering traditional experiences and heritage tours.

4. Agro-Processing Hub

Development of this project will create an integrated agro-processing zone in Gakenke District Town, focusing on processing key local agricultural products like coffee, banana, vegetables, and fruits. The project will also develop logistics infrastructure to connect farms to local, national, and international markets, positioning Gakenke as a hub for agricultural value addition and export. The

project emphasise on Construction of local industry producing fertilizers

Extension of juice and jam factories, Construction of hulling factories to step up green coffee, Construction of coffee roasting and ground factories, Rehabilitation of coffee washing station

5. The Infrastructure Development

The project will leverage the infrastructure improvements in roads, water supply, and utilities to create a robust agro-logistics network and support the development of irrigation systems. The infrastructure include the upgrading touristic sites in Gakenke District, Developing and construction of a cables car project in Mt Kabuye, Construction of Universities and higher learning institutions, Construction of new classrooms each year, Construction and rehabilitation of TVETs, Construction, extension or renovation of health facilities , Construction or upgrading public administrative offices, Rehabilitation of existing football fields, Develop sports and leisure facilities management plan, Supply and distribution of utilities water, electricity and ICT in the District, etc.

Construction of District Road (RD 66), the road connecting Gakenke and Musanze Districts through the sectors of Gakenke, Mataba, Muzo, Mugunga, Rusasa, Busengo and Cyabingo will be paved together with District Road (RD 77) connecting Rushashi Rurban Center and Rulindo District through Muyongwe sector (Kirenge-Rushashi) as well as District Road (RD 38), connecting Ruli Rurban Center and Muhanga District.

6. Agro-Commercial Hub Development

It will leverage the rehabilitation of markets, upgrading of trading centers, and the development of commercial complexes to create a modernized, efficient agricultural marketing and distribution network. The project also focuses on Construction of livestock markets, Construction and rehabilitation of post harvesting facilities and storages

7. Development of Sports and Recreation Complex

This project aims to rehabilitate existing football fields and develop a comprehensive sports and leisure facilities management plan to enhance sports infrastructure in Gakenke District Town and Ruli Rurban Center.

8. Developing Sustainable Forest-Based Agro-Processing Initiative

This project will integrate forest plantation projects with sustainable forest management and focus on using forest resources to support local industries like wood processing, biomass energy production while ensuring environmental sustainability through a carefully updated District Forest Management Plan.

9. Nyabarongo II Hydro Power Project

The project will have three components; a 43.5 MW hydropower plant, a substation, and a 110KV transmission line covering 19.2 km from the power plant to the Rulindo sub-station. Once commissioned after a construction period of 56 months, the project will reduce reliance on non-renewable energy resources for electricity generation and contribute to the stability of the grid. Additionally, the project is expected to create jobs for Rwandans during and after the construction of the power plant.

1. Resettlement people from high-risk zone

This project focuses on the planned and human resettlement of communities living in high-risk zones in Gakenke and surrounding areas, such as steep slopes, flood-prone zones, and areas vulnerable to landslides or other natural hazards. The objective is to ensure the safety, dignity, and long-term wellbeing of affected populations by relocating them to safer, planned settlements with access to basic services and infrastructure. The project includes risk assessment, stakeholder engagement, provision of housing, and livelihood restoration support. It contributes to disaster risk reduction, climate resilience, and aligns with Rwanda's national housing policy and urban development strategies

2. Sustainable urban and settlement neighborhood development

This project aims to promote inclusive, well-planned, and environmentally sustainable neighborhoods in Gakenke and other urbanizing areas. It focuses on developing mixed-use, climate-resilient, and affordable settlements that integrate housing, green spaces, infrastructure, public services, and mobility networks.

3. Increasing adaptation to climate resilient project

This project aims to enhance the capacity of urban and rural communities in Gakenke and surrounding regions to adapt to the impacts of climate change through the design and implementation of climate-resilient infrastructure and development initiatives. It focuses on integrating climate risk assessments into urban planning, promoting nature-based solutions (such as green infrastructure and reforestation), improving water and energy management, and building resilient housing and public services.

Table 48: Capital Investment Catalytic Projects (CICP)

Projects	Phase 1 (2023-2029)	Phase 2 (2030-2035)	Phase 3 (2036-2040)	Phase 4 (2041-2050)	Responsible Institution
Sustainable Irrigation and Agricultural Intensification Project					RAB, District, Etc
The Infrastructure Development					MININFRA, RTDA, District, PSF, etc
Development of sustainable Mining hub					RMB, District, etc
Eco-Tourism and Adventure Hub Development					RDB, District, etc
Agro-Processing Hub					MINICOM, RAB District, etc
Agro-Commercial Hub Development					MINICOM, RAB, District, etc

Development of Sports and Recreation Complex					MINISPORT and District, etc
Developing Sustainable Forest-Based Agro-Processing Initiative					District, MoE, REMA, RGF, MINICOM, RAB, RFA, etc
Nyabarongo II Hydro Power Project					WASAC, REG, MININFRA, District, etc
Resettlement people from high-risk zone					MINEMA and District, etc
Increasing adaptation to climate resilient project					District, MoE, REMA, RGF, RFA, etc
Sustainable urban and settlement neighborhood development					NLA, MININFRA, RHA, RTDA and District, etc

These initial investments will generate economic and financial benefits to the local community and will create urban value by stimulating economy-based urbanization.

Each financial year will identify necessary projects to be implemented by focusing on meeting standards as set by guidelines and NLUDMP 2020-2050 provisions. These projects include socio economic projects, infrastructure development projects and environmental management projects.

5.2.3. Participatory Land Readjustment Approach & Detailed Physical Plans

Land readjustment of existing plots is recommended to assure rational development. Where the plots are of different quality or value, area or value adjustments are made. The underlying principle is that every owner must be compensated for their land with the equivalent value or with the land of equivalent value, but organized community participatory approaches can work also in Rwanda.

The readjustment of land transforms irregularly shaped plots into regular and standard shape plots with access to infrastructure and services, which contributes to an adequate implementation and thus increases the value of this land.

The communities who are landowners must participate in all phases, including elaboration of site physical plans, data collection and mapping, and site demarcations exercises, with advice of planners and appraisal experts. A land readjustment map and appraisal documents must be approved together with the concerned detailed local plan as one unit. Alternatively, simplified voluntary land exchange processes shall be introduced.

Land readjustment is an essential tool for land consolidation and orderly development. The communities in Gakenke District should have ownership in all phases and must contribute as well as ensuring compliance during development. Any conflicts and disputes that may occur in the process should be resolved between land owners, the site committee established, local Village Chiefs and Cell Leaders.

Gakenke District must identify priority sites to be developed in each financial year, and community approach must be used to ensure successful implementation and management of urban commons developed during physical planning.

5.3. Principles Guiding the Zoning Requirements in cities / urban areas

- **Integrated Development and Urban Resilience**

The integrated approach to urban development promotes appropriate growth of Cities, ensures sustainable mobility, more cohesive communities, and a better environment. By looking at the City in a holistic fashion, it strengthens the urban resilience, known as “the capacity of urban systems, communities, individuals, organizations, and businesses to recover, maintain their function and thrive in the aftermath of a shock or a stress, regardless of its impact, frequency or magnitude”.

These Zoning Regulations enhance this approach and help to build the resilience, providing adequate tools and measures to guide the growth of the City as an urban system, where all components - infrastructural, institutional, economic, and social are taken into consideration.

- **Inclusivity and Community Involvement in the Planning**

Inclusivity and equity in the planning and development process help create more sustainable cities with people getting the right to fully participate in every aspect of social, economic, political, and cultural life and voice their concerns and aspirations to create thriving neighborhoods and communities.

All developments shall consider the needs and aspirations of all groups, including vulnerable groups and people of all abilities, in the design and implementation process. A participatory and bottom-up approach shall be followed involving and engaging the community in the design, development, and monitoring process.

- **Incrementality and Flexibility**

The principle of incrementality is adopted in these Zoning Regulations to allow communities, investors, and developers to develop according to their current financial capacities. The objective is to create a flexible environment where all developments happen in an organic manner, without creating financial overexposure and hence hindering the affordability of the development. At the same time, the incremental approach is designed in such a way that future addition to the development would help achieve the desired density for the specific zone in future years.

Incremental development also allows developers to better adapt to current and future market conditions, thus reducing investment risk and facilitating access to the market to a larger segment

of the population.

Incremental development shall be an opportunity to limit ongoing informal development processes and ensure efficient provision of infrastructure and service delivery and rational land use.

- **Mixed Land Use**

The zoning regulations allow and encourage Integrated and mixed-use development within all zones to create higher density, compact and vibrant places for people from all groups and neighborhoods. Neighborhoods shall showcase a blend of residential, commercial, cultural, public facilities, and micro-enterprises that are accessible and well connected to the transit system. This will enhance inclusivity, bring work closer to homes and reduce disparity and social segregation between different groups.

- **Pedestrian First**

“Cities around the world are recognizing how essential walkability is for the access and health of their citizens, and the economic growth of their cities. All planners, designers and developers shall ensure walkable and integrated neighborhoods that link residences to the public facilities, commercial and recreational areas. The DLUP provides for the City to expand its Non-Motorized Transport (NMT) network to cover the entire City for complete, continuous, and safe walkway and cycleway networks that provide clear protection from motor vehicles and are accessible to people of all groups. Universal designs shall be adopted by removing all physical barriers and providing a safe route for smooth mobility and easy access.

- **Transit Oriented Development (TOD)**

Transit-oriented development (TOD) presents as the best approach for Cities of Rwanda to continue keeping the private vehicle ownership on the low, and to avoid unsustainable, car-dependent, and sprawling settlement. TOD is necessary for inclusivity, equity, and long-term sustainability of the cities. The integrated and transit-oriented development brings people closer to activities, work, home, and public space, providing inclusive access for all, to Citywide opportunities and resources at the lowest financial and environmental cost, and with the highest resilience to climate change and other disasters.

The City provide high-quality, safe, and reliable mass transit system for a sustainable, and equitable development. Mixed-use, integrated, and higher density developments that are well connected with easy walking and cycling connection, and in proximity to reliable transit service to the rest of the City are at the base of this master planning effort.

- **Sustainable Design**

All developments shall be designed and developed with due regards for the environment, by incorporating environmentally friendly and sustainable design practices in both design and construction of the buildings. It shall be of paramount importance to encourage environmentally responsible buildings that are appropriate for the existing urban fabric.

Subject to review and evaluation of developments in certain zones, and in line with GBMC, the District One Stop Center may, at its discretion, grant increases in additional floor area, building height or building coverage for developments that adopt sustainable design technologies or techniques or provide additional benefit to the neighboring communities such as public spaces or recreational areas.

5.4. Gakenke DLUP Monitoring and Evaluation

As per article 69 of the law governing land N° 27/2021 of 10/06/2021, every year, at the latest on 30th September, Districts and the City of Kigali submit to the Minister a monthly-based cumulative inspection and monitoring report of the previous year on the use of individual land and state land. Therefore, Gakenke District, through One Stop Center, must prepare a monthly inspection and monitoring report on the use of individual land and state land. The District must ensure land use compliance for any development on land.

Proper monitoring and implementation of Gakenke DLUP will be continuously conducted. However, the revision may also be done on the specific sector when considered necessary without compromising the development with other sectors. The proposed compliance between the different planning levels is a must in order to avoid any mistakes made in the many plans, policies and projects before caused by lack of compliance. The purpose of this part is to set up administrative and planning tools, in which planning instructions transfer from central level to local level.

A Continuous Compliance Planning principle was adopted to ensure the fulfilment of the chain of planning. Before completion and approval of this plan, no construction permits will be issued until further approval by both Gakenke District Council. Under this principle of CCP, the following measures and procedures are essential in order to achieve the desired compliance in planning process. Providing a non-objection to any change of land use and project by National Land Authority in charge of Land Use Management through the back up coordination force from the Ministry in charge of Lands which will be instrumental in resolving coordination and compliance issues.

NLUDMP 2020-2050 dominance, ensuring that the projects and activities of all Ministries & Authorities comply with this plan. The national development planning and budgeting process should ensure that Sector priorities and investments comply with the NLUDMP 2020-2050. In other words, there must be a balance between economic planning and spatial planning.

Delineate and enforce settlement boundaries. It is recommended that new boundaries will gain legal status only to supply developing needs for a period of the coming 27 years (2023-2050). All master plans shall show implementation phases for midterm review without overpassing this boundary. The areas of the development phases will be adjacent to each other to create a paving system for the efficient use of lands. Consolidation principles in land use planning will be directed towards and applied to all levels and all Sectors of land-use planning. Regular updating of spatial data and base maps through large-scale mapping will greatly support the development of master plans and monitoring of land use.

To improve the adequate performance of Building Permitting Management Information System and its dissemination in all Sectors to serve the urban and rural construction and development permitting in Gakenke District. Strong community outreach program and mind-set change on land use planning in the entire District of Gakenke will be organised continuously in order for community public awareness and ownership.

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Bibonywe kugira ngo bishyirwe ku mugereka w'Iteka rya Minisitiri n° 004/25/10/TC ryo ku wa 28/07/2025 rishyiraho igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Gakenke	Seen to be annexed to Ministerial Order n° 004/25/10/TC of 28/07/2025 establishing land use and development master plan of Gakenke District	Vu pour être annexé à l'Arrêté Ministériel n° 004/25/10/TC du 28/07/2025 établissant le schéma directeur d'utilisation et d'aménagement des terres du District de Gakenke
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Kigali, 28/07/2025

(sé)

MURANGWA Yusuf
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Minister of Finance and Economic Planning
Ministre des Finances et de la Planification Économique

Bibonywe kandi bishyizweho Ikirango cya Repubulika:
Seen and sealed with the Seal of the Republic:
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