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ITEKA RYA MINISITIRI N° 005/25/10/TC RYO KU WA 28/07/2025 RISHYIRAHU IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA NYARUGURU 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 Nyaruguru yateranye ku wa 01/09/2023; Inama y'Abaminisitiri yateranye ku wa 22/05/2024 imaze kubisuzuma no kubyemeza; ATEGETSE: <u>Ingingo ya mbere: Ishyirwaho</u> Hashyizweho igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Nyaruguru.	MINISTERIAL ORDER N° 005/25/10/TC OF 28/07/2025 ESTABLISHING LAND USE AND DEVELOPMENT MASTER PLAN OF NYARUGURU 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 Nyaruguru District, in its meeting of 01/09/2023; After consideration and approval by the Cabinet, in its meeting of 22/05/2024; ORDERS: <u>Article One: Establishment</u> The land use and development master plan of Nyaruguru District is established.	ARRÊTÉ MINISTÉRIEL N° 005/25/10/TC DU 28/07/2025 ÉTABLISSANT LE SCHEMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE NYARUGURU 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 Nyaruguru, en sa réunion du 01/09/2023; Après examen et adoption par le Conseil des Ministres, en sa séance du 22/05/2024; ARRÊTE: <u>Article premier: Établissement</u> Il est établi le schéma directeur d'utilisation et d'aménagement des terres du District de Nyaruguru.
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<u>Ingingo ya 2: Ibigize igishushanyo mbonera</u> Igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Nyaruguru, 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 Nyaruguru 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 Nyaruguru 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 Nyaruguru iri ku mugereka w'iri teka. (2) Amakuru ndangahantu y'igishushanyo mbonera cy'Akarere ka Nyaruguru 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 Nyaruguru District is annexed to this Order. (2) The zoning plan and zoning regulations of the land use and development master plan of Nyaruguru 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 Nyaruguru 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 Nyaruguru sont publiés sur le site web désigné par

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 Nyaruguru gikurikizwa kugeza mu 2050. <u>Ingingo ya 5: Ivugururwa</u> (1) Igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Nyaruguru 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 Nyaruguru 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 Nyaruguru District is implemented until 2050. <u>Article 5: Revision</u> (1) The land use and development master plan of Nyaruguru 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 Nyaruguru 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.	l'organe ayant l'utilisation et la gestion des terres dans ses attributions. <u>Article 4: Période de validité</u> Le schéma directeur d'utilisation et d'aménagement des terres du District de Nyaruguru 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 Nyaruguru 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 Nyaruguru 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 01/09/2023.	<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 01/09/2023.	<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 01/09/2023.
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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 :

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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° 005/25/10/TC RYO KU WA 28/07/2025 RISHYIRAHU IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA NYARUGURU	ANNEX TO MINISTERIAL ORDER N° 005/25/10/TC OF 28/07/2025 ESTABLISHING LAND USE AND DEVELOPMENT MASTER PLAN OF NYARUGURU DISTRICT	ANNEXE À L'ARRÊTÉ MINISTÉRIEL N° 005/25/10/TC DU 28/07/2025 ÉTABLISSANT LE SCHÉMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE NYARUGURU
IGISHUSHANYO MBONERA CY'IMIKORESHEREZE N'IMITUNGANYIRIZE BY'UBUTAKA CY'AKARERE KA NYARUGURU	LAND USE AND DEVELOPMENT MASTER PLAN OF NYARUGURU DISTRICT	SCHÉMA DIRECTEUR D'UTILISATION ET D'AMÉNAGEMENT DES TERRES DU DISTRICT DE NYARUGURU



NYARUGURU

District Land Use Plan 2023-2050



“Religious Tourism and Tea Industry Hub”

2023

Report Title	Nyaruguru District Land Use Plan 2023 – 2050
Project title	Nyaruguru District Land Use Plan Report
Owner	Nyaruguru District
District Council Approval	1 st September, 2023
Cabinet’s Approval	22 nd May, 2024

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ABBREVIATIONS

CBD : Commercial Business District

CPI : City Prosperity Index

DDS : District Development Strategy

DLUP : District Land Use Plan

EICV : Enquête Intégrale Sur Les Conditions De Vie Des Ménages (Integrated Household Living Conditions Survey)

GCC LTD: Glory Construction Company Ltd

GDP : Gross Domestic Product

GHG : Greenhouse Gases

GIS: Geographic Information System

GOR: Government of Rwanda

HC: Health Center

HH: Household

HP: Health Post

HQ: Head Quarter

LED: Local Economic Development

NISUS: National Informal Settlement Upgrading Strategy

NLA: National Land Authority

NLUDMP 2020-2050: National Land Use and Development Master Plan

NR9: National Road 9

NST: National Strategy for Transformation

RHA: Rwanda Housing Authority

ROW: Right of Way

SACCO: Saving and Credit Cooperative

SCON: Services Company Out growers Nyaruguru

SKM: Square Kilometer

SYB: Statistical year book

TVET: Technical and Vocational Education Training

UN HABITAT: United Nations Human Settlements Programme

UPC: Urban Planning Code

WHO: World Health Organization

EXECUTIVE SUMMARY

The ambitious objectives of Vision 2050 can be accomplished by employing appropriate methodologies and strategies. The Nyaruguru District Land Use Plan (DLUP) serves as a practical tool for executing the National Land Use and Development Master Plan (NLUDMP 2020-2050) adopted by the Cabinet in July 2020, which is integral to the realization of Vision 2050.

The Nyaruguru DLUP entails the systematic allocation of land for different purposes, taking into consideration diverse thematic areas and optimizing resource utilization. Its primary objective is to guide future development in alignment with the National Land Use and Development Master Plan, while concurrently fostering social, economic, and environmental advantages.

With a total surface area of 1012 Km², Nyaruguru District has precisely defined land allocations within the DLUP framework. Approximately 33.7% of the land is designated for agricultural use, acknowledging its significant contribution as a primary income source for the local population. Forests encompass 55% of the land (Rwanda forest cover mapping, 2019), emphasizing the preservation of valuable natural resources. Settlements and infrastructures account for 8.8%, swamplands, water bodies, and buffer zones encompass 7.99% of the land.

Recognizing the pivotal role of agriculture in Nyaruguru District's economic landscape, the DLUP emphasizes the need for productivity-enhancing innovations and optimal resource allocation. The objective is to transition from primarily catering to domestic demand for commodities to producing higher-value-added goods integrated into regional and international food supply chains.

Furthermore, the DLUP acknowledges the tourism prospects in Nyaruguru District and outlines plans for the development and operation of potential tourist sites. This strategic approach seeks to generate employment opportunities and foster economic growth. To effectively leverage these opportunities, Nyaruguru District must prioritize branding its distinctive products, such as coffee, minerals, fruits, vegetables, and tourist attractions. Such branding initiatives will not only create new job opportunities but also enhance income levels for all stakeholders involved.

To support the district's overall development and economic progress, the DLUP emphasizes the importance of investments in crucial infrastructure elements such as roads, housing, and commercial structures. By prioritizing these aspects in both urban centers and rural settlements, the plan aims to enhance population densities, thereby facilitating knowledge transfer, optimizing economies of scale,

reducing transportation costs, and improving access to essential services and a diverse labor force with varied skill sets.

In terms of planning approach, the Nyaruguru DLUP adopts a normative perspective, consciously moving away from conventional "Business as Usual" practices. Irrespective of the chosen approach, successful implementation of the plan necessitates strong political will and effective collaboration among all relevant stakeholders. Through cohesive efforts, the vision of sustainable and inclusive Development in Nyaruguru District can be effectively realized, ultimately benefiting the entire population and ensuring a prosperous future.

1. INTRODUCTION

1.1 Background of Nyaruguru DLUP

Nyaruguru District is one of the Eight (8) Districts of the Southern Province of the Republic of Rwanda. With 14 Sectors: Cyahinda, Busanze, Kibeho, Mata, Munini, Kivu, Ngera, Ngoma, Nyabimata, Nyagisozi, Muganza, Ruheru, Ruramba and Rusenge. Its capital is Kibeho, a pilgrimage site of the Catholic Church. Nyaruguru is surrounded by Huye, Nyamagabe, Gisagara, and Rusizi Districts.

It is mountainous and holds a part of Nyungwe's montane forest, one of Rwanda's most popular tourist destinations and a home to chimpanzees and many other species of primates. Nyaruguru District covers 1,012 km² with a population of 294,334 inhabitants in 2012 and 318,126 inhabitants by 2022; the population is predominantly rural, where 288,412 inhabitants (representing 98% of the total population) lived in rural areas in 2012 compared to 322,034 inhabitants representing 97.6% in 2022. (NISR) whose 47.4 percent of them being under the age of 19. Nyaruguru District is populated by 91,444 Households.

The National Land Use and Development Master Plan (NLUDMP 2020-2050) is one of the most prioritized plans stemming from Vision 2050. It is a national spatial plan (location/ space-based) that is structured around the following thematic areas. The main target of NLUDMP 2020-2050 is to find the best land-use balance sheet based on spatial and economic analysis to address the shortage of land as well as focus on economic and services development. It has been developed in harmony with the Vision 2050, NST1, the new Land Law, the Secondary City Approach, and Green Growth Policies.

To efficiently implement the NLUDMP 2020-2050, there is a need to adopt its recommendations at the district level to ensure the control of compliance with NLUDMP 2020-2050 predictions Vision 2050 desires to accelerate urbanization to 70%.

Economic Specialization: Religious Tourism Base. Home to the famous Kibeho sanctuary Notre Dame with its historical background related to the appearance of the Virgin Mary. Kibeho attracts over 50,000 people every year from religious pilgrimages, 5 hectares of land has been demarcated for tourism development. There is also great potential for mining and light manufacturing.

Moreover, meeting such recommendations requires planning and monitoring of rational use of the land at national level as well as at district level to reach the target of Middle-income countries by 2035 and high-income country status by 2050

To achieve the NLUDMP 2020-2050 targets in Nyaruguru District Well-planned urbanization and other sectoral uses may help to achieve the proper use of land, other natural resources of investment into infrastructure services and may help initiate local economic development hence the government of Rwanda (GoR), according to NLUDMP 2020-2050 there is an ambitious objective of accelerating the urbanization to achieve an urban population of 70% by 2050.

This urbanization target is linked to the achievement of socio-economic development targets like increased access to sanitation facilities, clean water, electricity and increasing the average annual growth of gross domestic product, and the annual GDP per capita, hence the need for getting proactively prepared to accommodate the expected urbanization growth.

Thus, to attain these aspirations and promote sustainable urban development for the anticipated rapid urban growth, appropriate highly visionary land use planning and development tools need to be established. These tools guided by the strategic vision and branding of the respective cities may include plans, proposals, development and design guidelines, and/or strategies for Green and Sustainable urban development, including: urban renewal/transformation, restructuring, regeneration or upgrading, as well as for urban extension zones of the urban planning area, equipped to mitigate proliferation of informal settlements and promote access to urban social services, infrastructure, amenities and utilities.

It is in this regard the Government of Rwanda (GoR) through the Ministry of Environment and its implementing agency National Land Authority (NLA) pursues the elaboration of integrated urban and rural planning documents to ensure a future orderly growth and development of Rwanda's urban areas for a sustainable socio-economic living and development of the country and its citizens. For this particular case, GLORY CONSTRUCTION COMPANY LTD (GCC) Ltd was hired to support the District of Nyaruguru in the elaboration of District conceptual master plan and review and update of Nyaruguru local- urban development plan and availing some detailed physical plans in new residential areas in Nyaruguru town.

The covered tasks include; Site visits of urban area, rural urban areas and all rural settlements sites in all Nyaruguru Sectors and Inception meeting with clients representatives from the Nyaruguru District, review of existing situation on infrastructures coverage through Sector's Land Managers; Review of

documentation on policies, laws, regulations and guidelines related to land use planning and Management Master Plan; Analysis of both the short- and long-term changes that will occur in Nyaruguru Sector; Preparing stakeholders to be part of the planning and implementation process and the final presentation Nyaruguru Zoning plan

1.2 Scope and objectives

1.2.1 Objectives

The District Land Use Plan (DLUP) aims at allocating land to different uses within the district by clustering all thematic areas, so as to manage the efficient use of resources and guide future development in line with the NLUDMP 2020-2050, thereby promoting social, economic and environmental benefits.

The District Land Use Plan (DLUP) is a document that outlines the goals, strategies, and actions that a District or local government plans to take in order to manage land use within its jurisdiction. The plan is typically developed by the National Land Authority (NLA) in consultation with the district or local government and other stakeholders such as community, organizations, private sector and government agencies

Nyaruguru DLUP emerged with the 2050 targets to facilitate the implementation of the NLUDMP 2020-2050. The DLUP gives details in terms of land allocation with specifications and potentialities of the district, unlike the NLUDMP 2020-2050 which gives general guidelines to facilitate the planning balance of land use at national level.

1.2.2 Scope

The DLUP is focused on the whole District, consisting of both urban and rural components. Nyaruguru DLUP covers all thematic areas including (i) PUSH, which stands for population, urbanization, settlements and housing; (ii) spatial economy, which stands for 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 coverage areas together, land has been allocated to different uses while zoning to feed each sector depending on its land demands and developing an effective land use balance sheet to guide the way forward to the 2035 view in line with the NLUDMP 2020-2050.

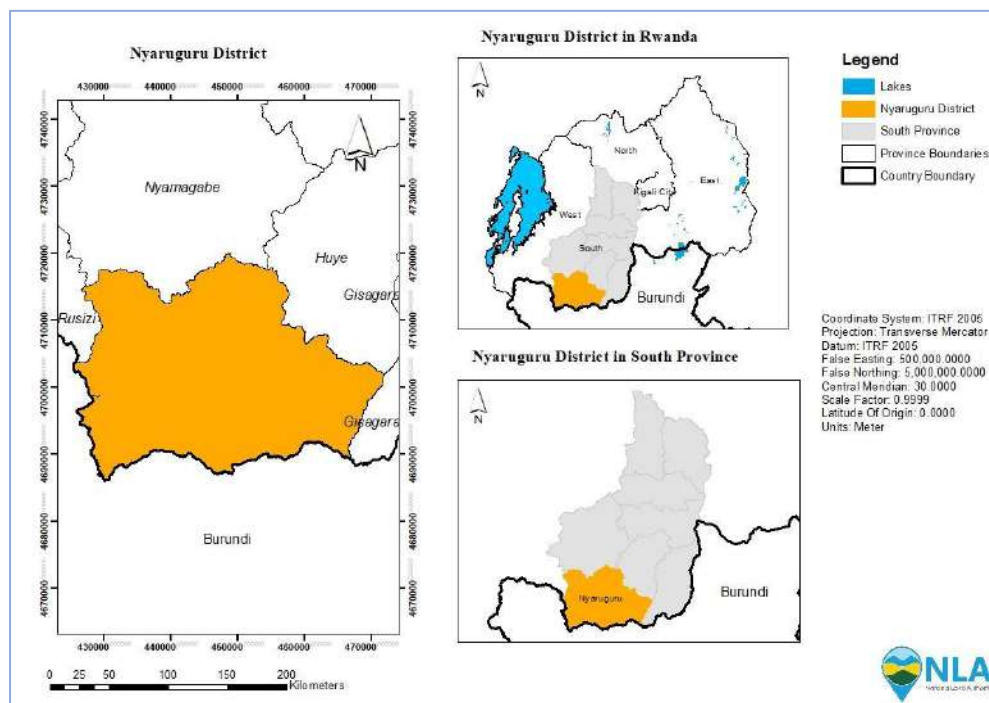
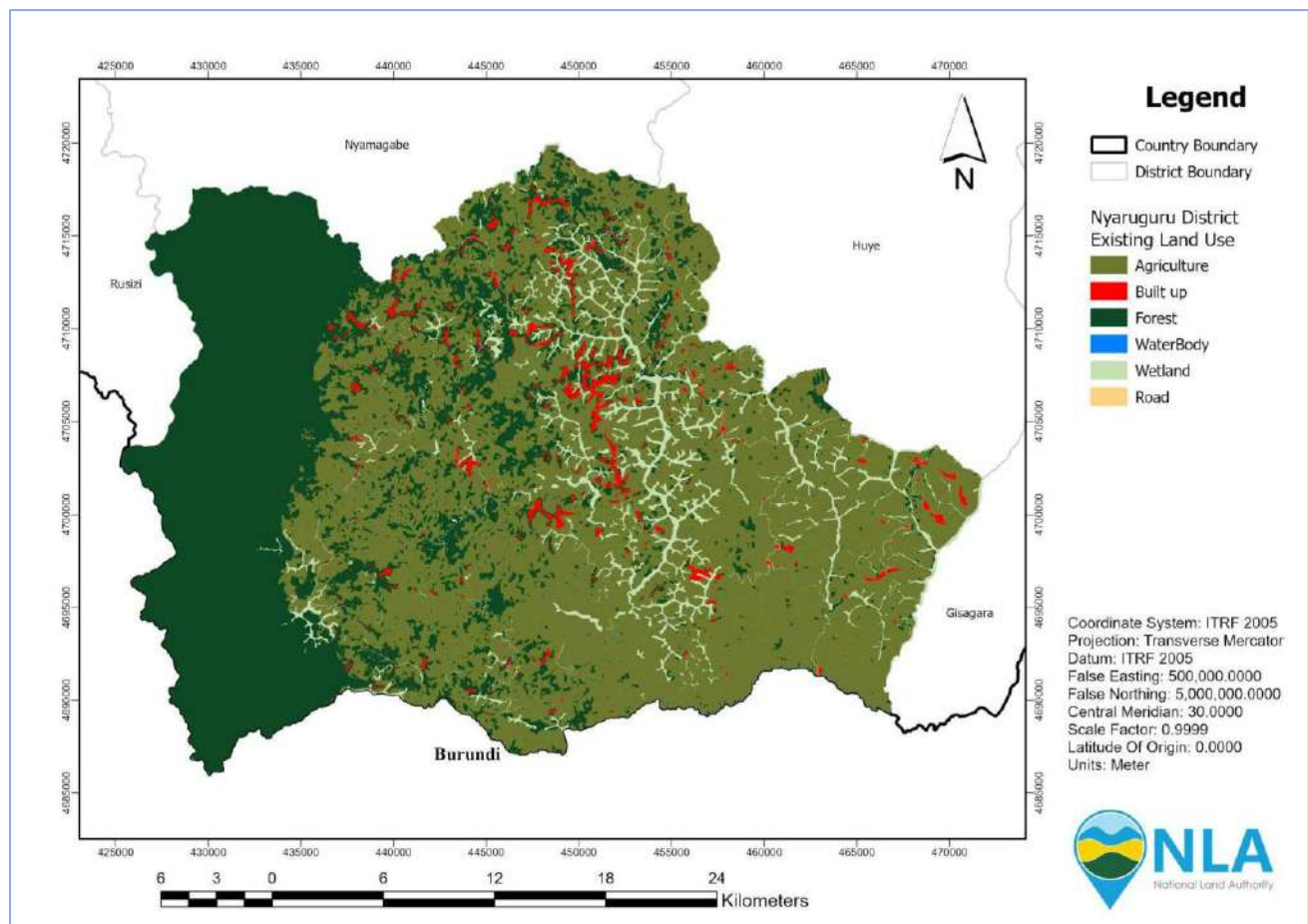
1.3 District description

1.3.1 Geographical location of the district

Nyaruguru District is located in the Southern Province. In the East, Nyaruguru District borders with the District of Huye and Gisagara District, in the North the District borders with Nyamagabe. In the West, it shares its borders with the Western Province (Rusizi District) and the Republic of Burundi in the South. The District of Nyaruguru has a surface area of 1,012 km² and it is composed of 14 sectors which are: Busanze, Cyahinda, Kibeho, Kivu, Mata, Muganza, Munini, Ngera, Ngoma, Nyabimata, Nyagisozi, Ruheru, Ruramba and Rusenge. Nyaruguru District is made of 72 cells and 332 villages. It is mountainous, containing part of the Nyungwe National Park, one of Rwanda's most popular tourist destinations and Tea plantations; Its connectivity to Burundi Border, Huye Secondary city town and Nyungwe National Park make the district having more development opportunities.

The main town of Nyaruguru District is Kibeho with an area of 1,606Ha which is the main urban settlement area. Nyaruguru District has 175 rural settlement sites and two (2) urbans; Cyahinda Rurban with the area of 296Ha and Munini rurban with the area of 295Ha.

These urbans play the role of increasing the urban population at the district level as population outlets, because they have the potential to grow faster than other trade centers in Nyaruguru District.



Map 1. Location of Nyaruguru District

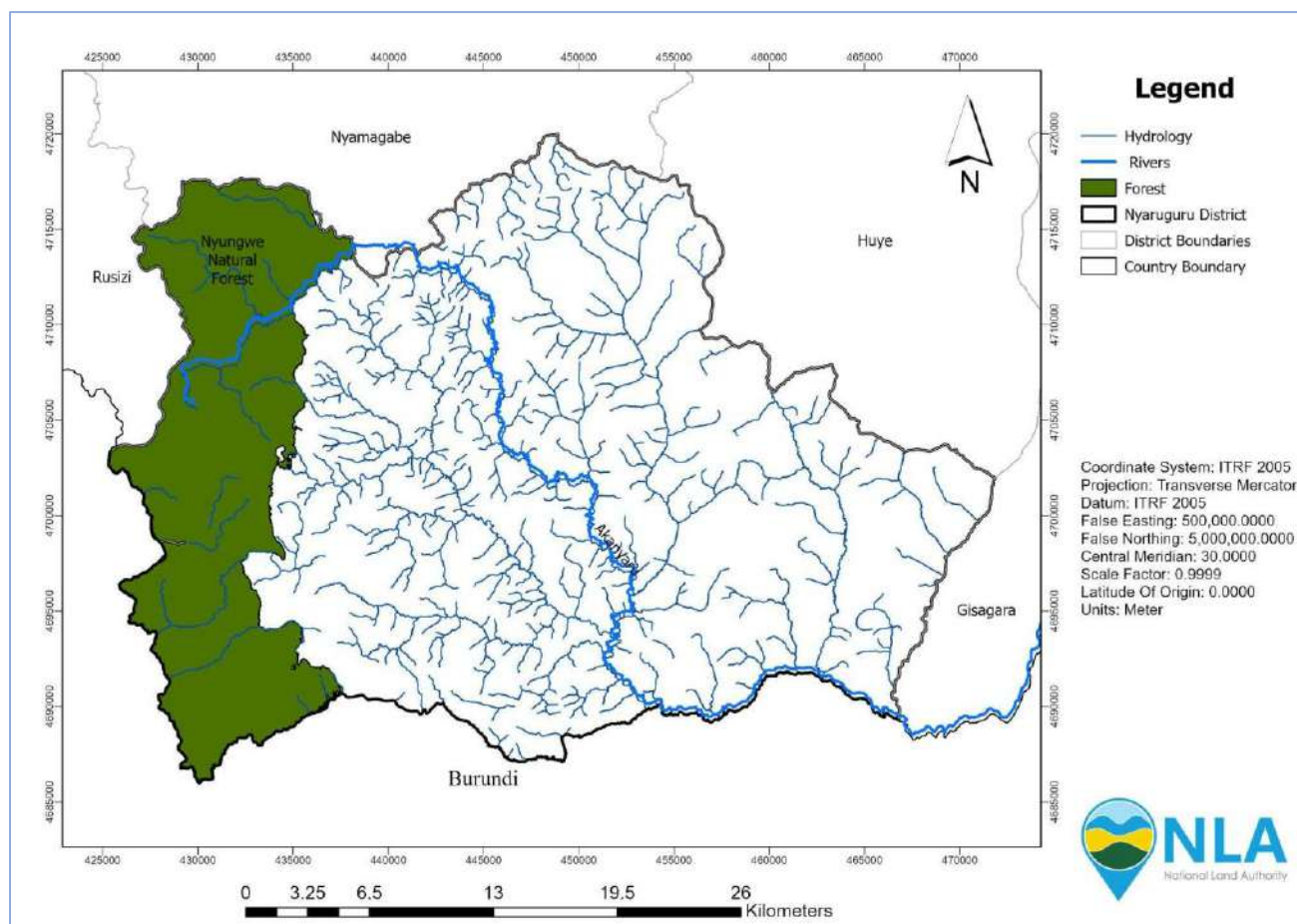


Figure 1. Tea Plantation in Nyaruguru District

1.3.2 Hydrography

The hydrographic network of Nyaruguru District is very rich and vast, with the main water bodies being Akanyaru River, a tributary of Akagera River and constituting the border of Rwanda and Burundi.

Nyaruguru District is composed of a network of internal rivers that would facilitate agriculture and livestock as well as increment of the power plant to increase the electricity access. The following main river network includes: Nshili river, Nshili river, Giswi river, Simbuka river, Akanyaru river, Migendo rivers, Rwerere River, Kaburantwa river.



Map 2. Nyaruguru hydrological Map

1.3.3 Soil and erosion

In General, Rwanda has a complex geological history which presents itself in varied topographic profiles from the mountainous Northwest to the grassland of Akagera in the East. The oldest rocks of Rwanda are the Paleoproterozoic migmatites, gneisses and mica schists overlain by the Mesoproterozoic Kibaran Belt. The folded and metamorphosed sediments of the Kibaran Belt are primarily schists and quartzites introduced by granites and cover most of Rwanda, including Nyaruguru District.

The district land soils are generally clay and sandy with some aggregate of stones. The soil analysis of the district is generally acidic with pH between 5 and 5.5. Such soil needs amendment with lime. The staple crop that grows in Nyaruguru include Irish potatoes, maize, wheat, sweet potatoes, climbing beans and cash crops mainly coffee and tea.

The landscape of Nyaruguru District influences the climate and rain fall. The rainfall in the District of Nyaruguru varies between 1,000 and 1,250mm and the temperature varies between 12°C and 25°C

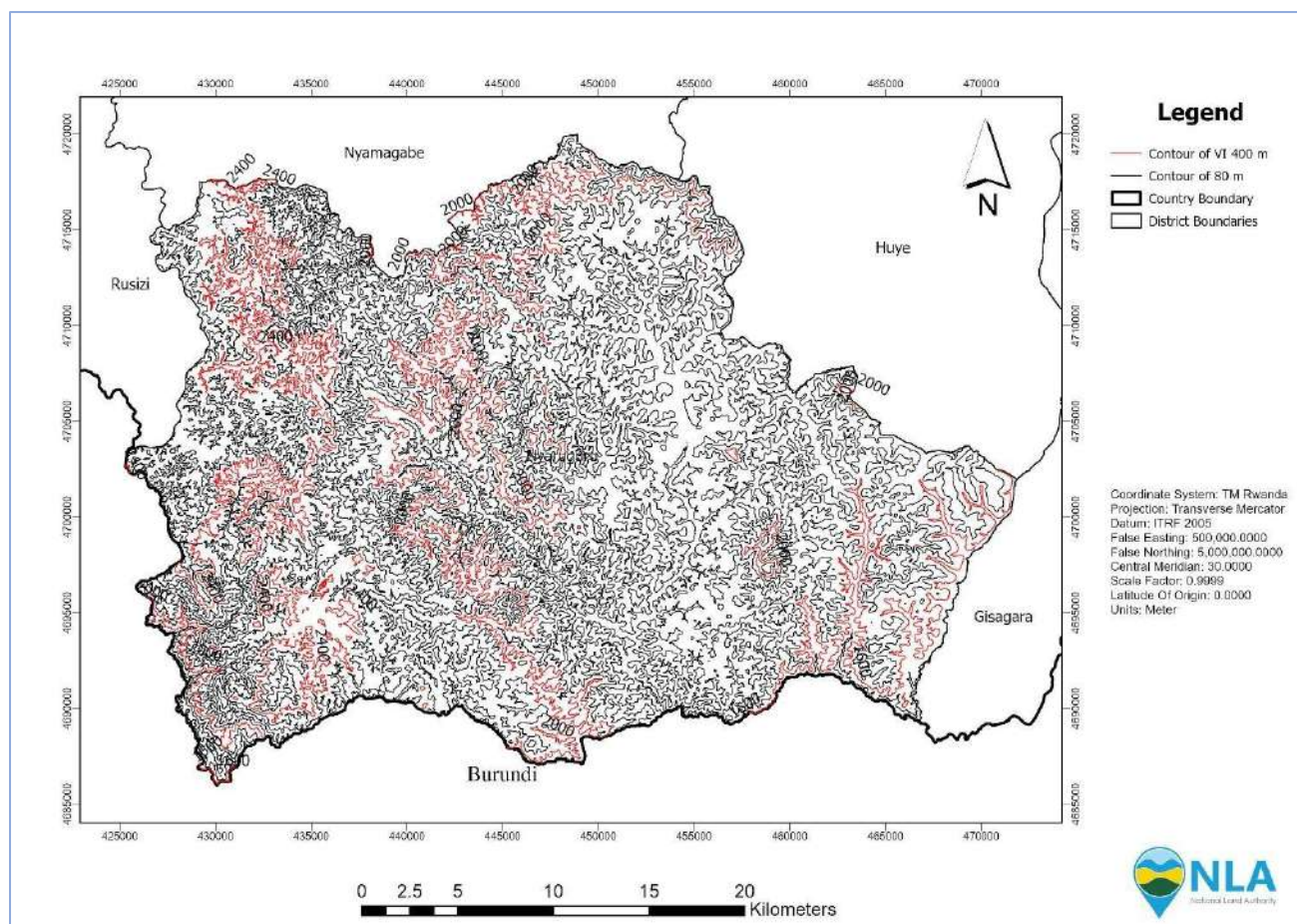
which is averaged to almost 19°C. In general, the district climate is characterized by four seasons namely the great dry season starting from June to August, the great rain season that commences from March to May, then the small dry season which begins from Mid-January to February and lastly the small rain season which ranges from September to mid-January.

The Existence of high mountains create valleys and or wetlands which can experience erosion and flooding in heavy rain period. Wetlands and buffers cover 6.5% (66 km²) of The District area

1.3.4 Topography

Nyaruguru District topography is characterised generally by the Congo-Nile Crest mountains in the west and west-northern parts of the district, with the peak at 2,767m of altitude. These high mountains start from Nyungwe National Park in the Sectors of Ruheru, Nyabimata, Muganza and Kivu, and continue towards the volcanoes area in the north of the country, with some peaks branching towards the north- eastern part of the District in the Sectors of Ruramba and Mata to form a mountainous ridge known as “IBISI” culminating at 2,300 m

Nyaruguru District is a mountainous region characterized by steeper slopes, with an altitude of 1500-2300m.



Map 3. Nyaruguru topographic map

1.3.5 Flora and Fauna

a) Plants diversity

Nyaruguru District is covered with diverse ecosystems that include both natural and artificial ecosystems. The natural ecosystem consists of Nyungwe National Park and wetlands. The forested areas and agro-ecosystems dominate the artificial ecosystems. All these ecosystems are very rich with flora.

The coverage of forests in Nyaruguru District is 55% of the total surface (Rwanda forest cover mapping, 2019). These are dominated by the Nyungwe national park with a percentage of 27.7% and private eucalyptus plantations. Tea and coffee plantations also occupy vast parts of the land surface. The remaining area is covered with other crops (seasonal crops and coffee) and small pastures.

The plants of Nyungwe forest include a vast diversity of species, with more than 1000 species, with 137 endemic species, including many rare or threatened species, such as *Entandophragma excelsa* (Umuyove), *Newtonia buchananii* (Umukereko), *Pentadesma reyndersii* (Umwasa), *Prunus africana* (Umwumba), *Symphonia globulifera* (Umushishi), etc. The forest also hosts more than 250 species endemics to the Albertine Rift. Seasonal crops include beans, maize, wheat, sweet potato, irish potato and sorghum. Tea and coffee are the major cash crops. Forest plantations are dominated with *Eucalyptus*. Agroforestry trees such as *Grevillea*, *Calliandra*, *Leucaena*, etc are found in croplands.

b) Wildlife: mammals, birds and herpetofauna

Most wildlife found in the district are those hosted in Nyungwe National Park. The park is home to 14 species of primates, including large troops of colobus monkeys. Other main mammals include L’Hoest’s Monkey – *Cercopithecus lhoesti*, Owl-faced Monkey – *Cercopithecus hamlyni*, Golden Monkey – *Cercopithecus mitis kandti*, Vervet Monkey – *Chlorocebus pygerythrus*, Olive Baboons – *Papio anubis* and Chimpanzees

– *Pantroglyotes*. Other main mammals include squirrels, bush pigs, duikers and servals.

For birds, more than 280 avian species are known to be present. They include species such as turacos, hornbills, eagles, francolins, sunbirds, wagtails.... (25 of those species are endemic to Albertine Rift). There are also 43 species of reptiles, 8 of which are endemic. Thirty-one species of amphibians are present, with 15 endemic species. There are innumerable invertebrate species present, and Nyungwe is especially known for its abundant butterfly populations. *Eucalyptus* plantations found in the area are habitat for a good number of birds.

1.3.6 Socio-Economic Status

According to EICV 5 District Profile, Nyaruguru District is among the districts with a high percentage of extreme-poverty and poor population categories. The poverty incidence is 47.9% of the population under poverty line while the poverty incidence at national level is 39.1% and 20.1% who are in extreme poverty which is also above 16.3%, the national figure. Compared to other Districts in Rwanda, Nyaruguru District ranks fourth by percentage of population identified as poor or extremely poor.

1.3.6.1 Employment

Mostly the population of Nyaruguru District rely on substance agriculture with 98 % out of the total population. Among this, 72% are independent farmers, wage non-farm is estimates to 11% while wage farm is 9% and the rest 6% are independent non-farmers.

Key District Economic potentialities

Currently the District is fast developing in different areas. Among its economic potentialities as describe by the Local Economic Development (LED) strategies includes;

- All Sectors of Nyaruguru District are ***Suitable land for Coffee and tea*** due to the climate and soil acidity of Nyaruguru District which is supportive for tea and coffee and it is already well integrated in the national supply chain.
- ***Existence of Large land for crop production*** with Favorable climate for crop production which gives the district the possibility of becoming a national food basket.
- ***Existence of Touristic sites***; which includes Pilgrimage center of Kibeho, Vatican- recognized miracle site, for pilgrimage opportunities and Nyungwe National Park being popular tourist destination.
- ***Forests and Timber production*** due to existing several forests ready to be harvested, large tracts of land for forestry and experienced lumberjacks
- ***Apiculture***; due to Favorable climate for beekeeping, availability of Land drills and presence of Skilled beekeepers.
- ***Existence of Rivers for Energy generation*** where there are different hydro-power stations working.
- ***Existence of Rivers and Water Springs*** to produce electricity Possibility of small processing units Mountain springs for easy drinking water supply by gravity system.

1.3.6.2 Commerce

Based on the employment information, 6% of Nyaruguru District population working class are independent non-farmers (i.e. businesses), these businesses include mainly commercial activities which are based on different commercial centers and Markets within the District.

In the Urban area, commercial activities are found in Kibeho modern Market, and commercial mixed-use activities along the road, and Ndago market and commercial centers.

Apart from Nyaruguru urban area, about 21 existing trade centers were identified and others have been proposed during the elaboration of the district land use plan. The location of existing trade centers is as Follow:

- Busanze Sector:

- _ Runyombyi Cell: Runyombyi trade center

- _ Nkanda Cell: Gatunda trade center

- _ Kirarangombe Cell: Gisenyi trade center

- Cyahinda Sector

- _ Rutobwe Cell : Viro Trade center

- _ Muhambara Cell: Kubitiro Trade center

- Kivu Sector:

- _ Rugerero Cell: Rugerero trade center

- _ Kivu Cell: Rusuzumiro trade center

- Mata Sector

- _ Murambi Cell: Murambi trade center

- - _ Gorwe Cell: Gorwe trade center *Muganza*

Sector

- _ Muganza Cell: Kamirabagenzi trade center

- Munini Sector:

- _ Nyarure Cell: Kamana trade center

- Ngera Sector:

- _ Nyanza Cell: Nyanza trade center

_ Kiyonza Cell: Kiyonza trade center

- Nyagisozi Sector:

_ Nyagisozi Cell: Ryabidandi trade center

_ Maraba Cell: Birambo trade center

- Ruheru Sector

_ Ryenzi Cell: Remera trade center

_ Remera Cell: Gisanze trade center

_ Kabere Cell: Mujeni trade center

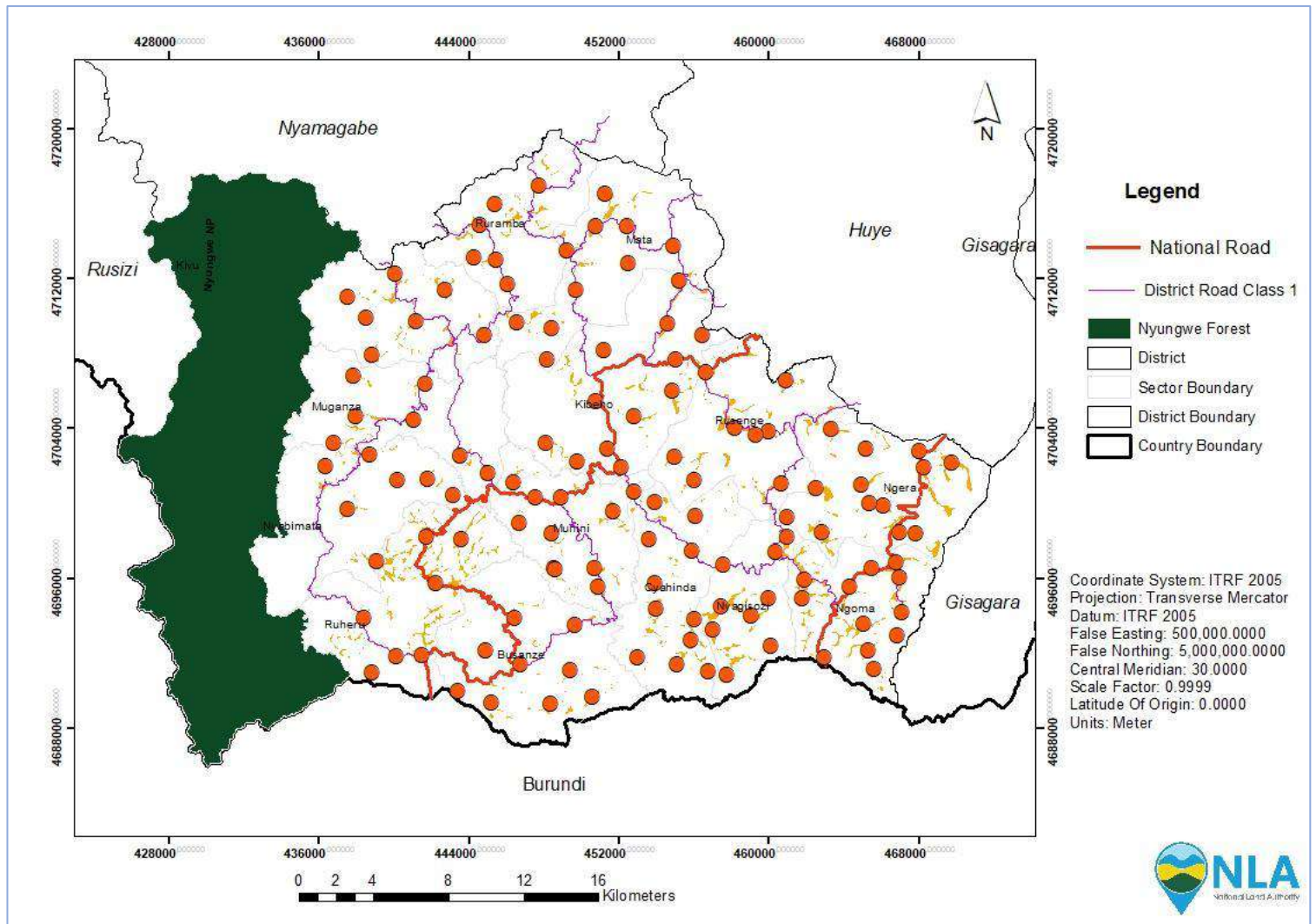
- Ruramba Sector

_ Ruramba Cell: Ruramba trade center

- Rusenge Sector:

_ Raranzige Cell: Rugalika trade center

_ Bunge Cell: Bunge Trade center



Map 4: Nyaruguru Trading centers Spatial distribution

1.3.7 SWOT analysis

• Agriculture

Strengths	Weaknesses
-Suitable land for cash crops (coffee and tea) -Existing agro processing industries (Nshili, Mata, Katerra) -Existence of terraces supporting agricultural activities on high slopes -Favorable weather for cash and food crops -Existence of rivers that might support in irrigation system -Existence of apiculture (bee keeping) in Busanze, Ruheru, Nyabimata, Kivu -Existence of unprotected wetlands used for agriculture -Existing feeder roads supporting agricultural activities	-Land use conflicts between forest and agricultural land -Existence of soil erosion caused by soil type and topography -some feeder roads are in poor condition -acidic soil which leads to high costs of agricultural inputs -Wetlands are
Opportunities	Threats
-Opportunity for hillside irrigation due to the existence of rivers -potential investment in tea and coffee farming and post-harvesting handling	-topography which is vulnerable to landslide and soil erosion

• Economy

Strengths	Weakness
-Existence of touristic and heritage sites (kibeho holy land, nyungwe forest, ikibuye cya shali) -Road connectivity which stimulates the trade and economic development	-Cross border trading at low scale -Insufficiency of hospitality facilities (hotels, restaurants, accommodations, etc)

-Existence of markets,Trade centers and cross-border markets for commercial purpose -Presence of light industries(udukiro,tea factories) -Existing financial institutions(banks,microfinances) -Existence of forestry resources(wood charcoal) -Existence of quarrying activities -Geographical location bordering with Burundi	-Poor management of heritage sites -Urban sprawl and concentration of developments along roads -Majority of business establishments are micro enterprises -Insufficiency of modern markets -Poor conditions of roads -Low level of PPP projects in economic projects
Opportunities	Threats
-Road upgrading projects including roads around Nyungwe forest, ... -Planned light industrial zones that will sustain the economic development -Planned cluster of Kibeho holy land touristic projects -Potentiality for development of other touristic	-Disasters leading to the destructions of infrastructures -Topographic conditions leading to landslides and soil

• **Environment**

Strengths	Weaknesses
-Natural resources (Forest, Park,) -Presence of ecosystem conservation in Nyungwe National Park -Presence of various spring water -Existing of drainage channels -Presence of water, soil conservation practices	-Poor management of natural resources especially forest, wetlands, and rivers -Intensive use of non-renewable source of energy which leads to deforestation -Lack of waste management facilities within the district -Low level of stormwater management facilities
Opportunities	Threats
-Planned environmental projects -planned project for afforestation and reafforestation	-Landslides -Soil erosion

-Ongoing projects of terraces within the district - Wetland restoration and conservation (Isoko ya Bikira Mariya) -Sustainable use of unprotected wetlands and buffer zones)	
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• **Society**

Strength	Weaknesses
-Availability of public facilities (health, Education) -Administrative offices are in place to support institutional development -Existence of playgrounds and youth centers -Existence of historical sites (Kibuye cya shali) -predominance of young population as source of labor force -Existence of integrated Development Program (IDP model villages) -Existence of religious facilities (Kibeho) which facilitate spiritually and contribute to the implementation of government programs -Existence of cemeteries	-Low skilled, unemployed population are engaging in low-income activities. -Based on existing population size, public facilities are not enough (health, education) -Mismanagement of cemeteries within the district -Lack of public administration offices in some places (village offices) -Insufficient playgrounds and funds to promote talent detection and development of the district's residents -Insufficient of public utilities
Opportunity	Threats
-Improvement of public facilities -Planned space for the development of sport and leisure facilities	-Topographic conditions

-Improvement of cultural exchange between Nyaruguru residents and Burundians -Influence of Huye secondary city on the lifestyle of Nyaruguru residents.	
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Table 1. Overall SWOT Analysis for Nyaruguru District

2. REGULATORY AND POLICY FRAMEWORK

This chapter describes the relevant Laws, policies, regulations and guidelines applicable to development of master plans and land use development in different Districts of Rwanda.

2.1 Policies

National Land Policy, June 2019, MoE

The revised land policy 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

- Presidential Order n° 038/01 of 20/05/2022 establishing NLUDMP 2020-2050. The Presidential Order establishes the NLUDMP 2020-2050, 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 2020-2050 gazetted, the focus now shifts to effectively implementing it through DLUPs and other tools, ensuring strict adherence to alignment principles between NLUDMP 2020-2050 and DLUPs. It is against this backdrop that Nyaruguru District revised its Land Use Plan, ensuring compliance with the directives set forth in NLUDMP 2020-2050.
- Law n° 27/2021 of 10/06/2021 governing land.
- The law governing land in Rwanda 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. The 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.
- Nyaruguru DLUP was revised taking into consideration additional 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 No 005/MoE/22 of 15/02/2022 determining modalities of change of land use.
- Land use plans zoning regulations edition 1, November 2022.

2.3 Sectoral Plans

- 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 Master Plan (2020)
- Rwanda Transmission master plan (2022-2030)
- National Feeder Roads Master Plan (2023)
- Rwanda Forest Cover Mapping Report (November,2019)
- Revised Green Growth and climate Resilience Strategy (September,2022)
- National Determined Contribution (May,2020)
- National Water Sanitation Policy (October,2023)
- Rwanda Electricity Distribution Master Plan (June,2022)

2.4 Guidelines

- Numerous land use planning guidelines established in previous years remain pertinent and continue to inform current practices, e.g.:
- 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);
- Ministerial Instructions no.001 of 23/04/2018 determining the management and use of the lands allocated for agriculture and livestock.

3. METHODOLOGY

In order to develop a land use and management master plan of Nyaruguru District that is relevant and reflects the current situation faced by Nyaruguru District's settlement, in-depth analysis of various planning issues affecting the area is undertaken.

The preparation of Nyaruguru DLUP was a collaborative work between Nyaruguru District, GLORY CONSTRUCTION COMPANY LTD and National Land Authority (NLA). Nyaruguru DLUP has been elaborated in the framework of alignment with the NLUDMP 2020-2050 2050 provisions.

The roadmap was defined and followed up; the work started by analyzing the status quo, necessary data vis à vis available data, methodologies to be applied, including consultative meetings and investigations to be conducted, dissemination and information sharing for public awareness, and report development.

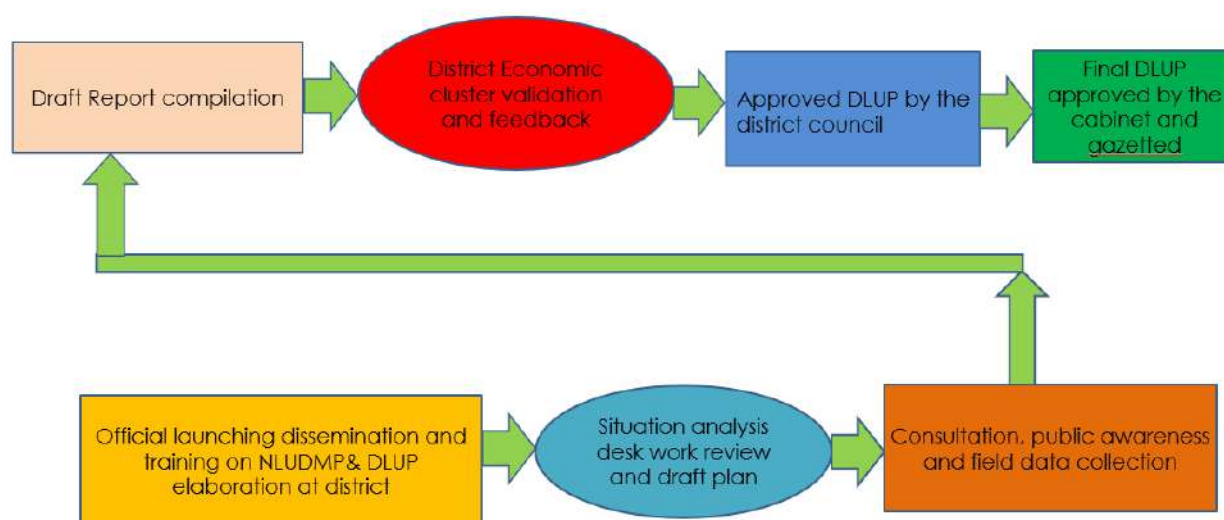


Figure 2. Planning steps used during elaboration of Nyaruguru DLUP

3.1 Consultation meetings

Consultation gave those affected by the DLUP and relevant experts from different institutions the ability to influence, and feed their own ideas into the proposals as they emerged. These consultations provided a clear understanding of Nyaruguru District Land Use Plan, 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 ownership of the DLUP, to get their mindset changed on the use of land and contributed in zoning for planned land use.

3.1.1 Consultation with Local community

This involves a 3-stage process namely: public display and information dissemination; conduct of hearings and consultations. The process has been conducted with the aim to inform the general public and ensure an objective and participatory review of the draft LUP and to encourage ownership of the plan and gain support for its implementation. GIS will be used to translate the plan into a format that will be understood by the stakeholders. The information products in the above step will be printed out and displayed and/or be included in a PowerPoint presentation.

To ensure a certain level of transparency in the development of a District land use plan at all levels of planning, the following will be adhered to:

- Conducting consultative meetings with community, the private sector and other local organizations, the consultative meetings will be conducted at Sectors' level and Cells were found necessary.

In addition, During the assignment, representatives of communities and stakeholders will be attending validation workshops and participate at each step of the assignment, so that in the future they will be able to work together with District and Sectors' staff in the implementation while knowing different points considered in the land use and management master plan production and physical plan development.

- Furthermore, in order to promote Inclusivity and equity in the DLUP development process, all developments shall consider the needs and aspirations of all groups, including vulnerable groups and people of all abilities. A participatory and bottom-up approach shall be followed involving and engaging stakeholders in the DLUP development. It is in this regard that a variety of people will be interviewed to ensure that land use and management master plan in Nyaruguru District meets the highest standards with respect to social inclusion, equitable development, gender sensitive, child-friendly cities and family cohesion, while paying also attention to the market dynamics and innovative practices in land use and management master plan development.



Figure 3. Consultative meetings with local community

3.1.2 Consultation with Different Institutions or National stakeholders

Various stakeholders at the national level will be involved in Nyaruguru 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 plays an important role in the success of the projects as they need each other in terms of planning, development and implementation. In the case of the District Land Use Plan, various institutions work together in accordance with their mandates to support the overall land use and development project.

During the elaboration of the District Land Use Plan, all sectors have to work together and all need land to sustain their current and future projects that revolve around their mandates. In this case, they all have to maximize their demands for land, which may raise land conflicts in their interests.

However, the District Land Use Plan was put in place with the aim of providing 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 desirable social, economic and environmental outcomes.

Elaboration of Nyaruguru DLUP, will consult institutions and ministries including RHA, REMA, RTDA, REG, RWB, WASAC, NLA, RMB, MoE etc. These institutions and ministries, depending on their mandates, have to achieve their objectives in Nyaruguru District, so it is necessary to find the best balance on land use to guide them and get their ideas feeding the project.

They also provided data on their current and future projects that they intend to initiate. Thus, the consultations on the preparation, development and implementation of the District Land Use Plan helped them to understand the efficient use of land and not to hamper the projects and prospects of other sectors.

These consultations also helped them to understand their role in the planning, elaboration and implementation of the District Land Use Plan. It will facilitate harmony in the implementation of different projects across all sectors.

Therefore, the outcome of these institutional consultation meetings on Nyaruguru District Land Use Plan goes in the direction of an inclusive planning where no sector is lagging the 2050 target. In addition, all sectoral institutions participated together 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 Nyaruguru District Land Use Plan required both spatial and non-spatial data for spatial analysis and socio-economic analysis.

3.2.1 Spatial data collection

Spatial data includes geographic information about the earth and its features. A pair of latitude and longitude coordinates defines a specific location on the earth. Development of Nyaruguru District Land Use Plan required the collection of spatial data for all areas considered in the land use zoning. The spatial data used in the elaboration of the Nyaruguru District Land Use Plan covers existing infrastructure such as roads, electricity, water supply, educational and Healthcare facilities, markets, administrative offices, mining sites and concessions, religious facilities etc.

In addition to this infrastructure, 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, agriculture and environment.

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

The focus of spatial data collection has been to support the development of Nyaruguru DLUP with accurate data and a clear understanding of the terrain and has been used to allocate land uses. During

fieldwork, Spatial data collection was carried out using tools such as Earth collector, SW Maps and so on.

3.2.2 Non-spatial data collection

Non-spatial data (such as attribute or characteristic data) 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.

When elaborating the DLUP, non-spatial data are needed to support the analysis and compilation of the report since the land use plan is composed of various data. Statistical data on the neighborhood regarding the economy, environment and livelihoods are needed and considered for the preparation of Nyaruguru DLUP.

The non-spatial data that was collected and used during the elaboration of Nyaruguru DLUP includes demographic statistics that account for the current and projected status, allocation of economic data across Nyaruguru such as people's income generation, economic activities that support the society's livelihoods, trade in terms of movement of goods and services, security data and its organs, religious statistical data and its movements, etc.

These data were essential to support the elaboration of Nyaruguru DLUP where each situation was taken into account to guide the development of all sectors.

In Nyaruguru District, non-spatial data was collected in terms of fieldwork by visiting each situation on site, and some was also collected in a collateral way by consulting different offices for institutions, local authorities, and nongovernmental groups. This data helps to fill in gaps in spatial data and provides information for decision-making in effective planning. The data has also contributed to the awareness of the importance of efforts in specific sectors.

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 and the related land use zones were planned. Steep slope zones were identified, where forest plantations were allocated, and disaster-prone areas were identified. The analysis of spatial and non-spatial guided efficient land use and planning of different thematic areas.

For the 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 technical team used ArcGIS 10.8 version, as well as ArcGIS pro, to create shape files and associated maps for zoning. GIS further helped in creating tabular data by referring to the attribute tables of the geospatial data.

The results of Nyaruguru DLUP data analysis represent the distinct land use planning layers for the current and planned land use allocations. The result includes the maps, tables, and graphs that describe the land use planning outcomes in Nyaruguru District. Therefore, Nyaruguru DLUP data analysis findings were used to generate the report and are intended to be used separately as maps, tables, and graphs to support the presentation of the land use plan to end users and implementers.

Nyaruguru DLUP Report Compilation

The District Land Use Plan Report represents a document that brings together all land use planning related concepts, data, and other information that illustrates how land use is allocated, supports effective use of resources on the land, and guides future development at the district level.

The DLUP report serves to document the current status and projected situation with respect to land use in the district. During the development of the DLUP, data collected both in collateral and on-site was compiled into a single document that represents the district master plan. This document consists of text, maps, tables, diagrams, and other outlines that describe the district in concern given the background of all the issues.

The DLUP report describes the district in terms of location, topography, soils, hydrography, climate, and other physical features, and later in terms of opportunities and constraints.

In addition to these characteristics, the DLUP report also shows the planning situation of the district considering PUSH (population, urbanization, settlement and housing), spatial economy (mining, trade, industrialization, agriculture, etc.), tourism and conservation, infrastructure and services, and environment.

Elaboration of the Nyaruguru DLUP report was done since the beginning of data collection, but it was extensively done after substantial field work in the office that the report could be improved.

For two weeks, NLA staff, in collaboration with district staff, met at the NLA office to develop the report. A rigorous internal validation was conducted and they provided input to improve the structure and quality of the report.

The retreat with the district and relevant stakeholders was held in Rwamagana district to harmonize the report and collect comments from various partners. The outcome of the retreat was constructive comments, gathering of various data to fill the gaps, and the good structure of the report.

Nyaruguru DLUP report is structured in such a way that it starts with the introduction, then continues with the regulatory and policy framework, methodology, Nyaruguru land use and development planning, implementation strategies, compliance and monitoring, conclusions and recommendations, and appendices.

4. NYARUGURU DISTRICT LAND USE AND DEVELOPMENT PLANNING

4.1 Visioning and economic specialization

The district's vision is ***“Religious tourism & tea industry hub”***. The district's economy is envisioned to gradually transform from subsistence agriculture to economic agriculture which is made possible by the existence of sufficient land consolidated coupled with Favorable climate for crop production.

A number of key economic drivers have been identified for Nyaruguru District for productive primary sector and stronger secondary and tertiary sector economies. These include increasing productivity in agriculture, livestock and agro- processing industries; promoting greens jobs and Religious tourism base, as a part of its green initiatives towards *“A District that actively enhances people's quality of life, economic development, local participation and sustainable development as well as better service delivery for its population both men and women”*; support trade, education and medical services with integrated smart technology development.

In the tourism Sector there is an increase of tourists attracted by *the famous* Pilgrimage center of Kibeho, Vatican- recognized miracle site, with its historical background related to the apparition of the Virgin Mary. Kibeho attracts over 50,000 people every year from religious pilgrimages, the extra 5-hectare land has been demarcated by NLUDMP 2020-2050 for tourism development. There will be an increase of employment and a boost of Economic development of the district at large.

In addition, Nyaruguru District is in Land use categories C (LUCA C), which is a blend of open landscape elements, including grasslands and different forests. LUCA C contains prime agricultural lands, which are small and disjointed and areas not suitable for commercial use. These lands can still be cultivated in small farms, either subsistence or technically improved.

The future outlook of Nyaruguru District town presents its economic potential, population, income and employment growth based on the district level's high growth scenario projections.

4.2 Population, Urbanization, Settlement and Housing (PUSH)

4.2.1 Population

4.2.1.1 Existing population

a) Nyaruguru District population per sex

According to RPHC 4&5, the population of Nyaruguru District increased from 294,334 in 2012 to 318,126 in 2022. This represents an annual population growth rate of approximately 0.79 % over the ten-year period. The population is predominantly rural, with a rural population of 97.6% of the total population in 2022. Additionally, the female population is slightly higher than the male population, with females representing 52.7% of the total population in 2022, compared to 52% in 2012.

The number of housing units in the District increased from 57,397 in 2012 to 74,745 in 2022. This represents an increase of approximately 30.2% over the ten-year period. The number of private households increased from 63,613 in 2012 to 73,805 in 2022. The population density in Nyaruguru District increased from 291 inhabitants/km² in 2012 to 409 inhabitants/km² in 2022. This indicates that the District has become more densely populated over the ten-year period.

Table 1: Population distribution of Nyaruguru by sex and private households (NISR 2012 and 2022)

Sector Name	Type of Sector: Urban; Rural	2012 Census			Househ olds per Sector year 2012	2022 Census			Househ olds per Sector year 2022
		Counts				Counts			
		Male	Female	Total	Number	Male	Female	Total	Number
Busanze	Rural	13,006	14,184	27,190	5,727	14,369	15,426	29,795	6,741
Cyahinda	Rural	10,078	11,299	21,377	4,624	11,952	12,977	24,929	5,495
Kibeho	Rural & urban	10,300	11,156	21,456	4,789	12,326	13,559	25,885	6,329
Kivu	Rural	8,460	9,259	17,719	3,702	9,536	10,276	19,812	4,403
Mata	Rural	6,644	7,256	13,900	3,033	7,780	8,337	16,117	3,923
Muganza	Rural	9,057	10,151	19,208	4,113	10,201	11,182	21,383	4,821
Munini	Rural	7,600	8,394	15,994	3,420	9,642	10,118	19,760	4,499
Ngera	Rural	10,371	12,069	22,440	5,180	11,477	12,765	24,242	6,003

Ngoma	Rural	10,847	12,103	22,950	5,206	11,514	12,844	24,358	5,952
Nyabimata	Rural	7,918	9,035	16,953	3,694	8,850	9,993	18,843	4,293
Nyagisozi	Rural	8,682	9,593	18,275	4,014	9,470	10,204	19,674	4,640
Ruheru	Rural	16,837	18,762	35,599	7,081	13,095	14,617	27,712	6,104
Ruramba	Rural	8,113	9,013	17,126	3,584	8,915	9,790	18,705	4,325
Rusenge	Rural	11,366	12,781	24,147	5,446	12,853	14,058	26,911	6,277
Total		139,279	155,055	294,334	63,613	151,980	166,146	318,126	73,805

Sources: RPHC4&5, 2012&2022

According to the data presented in the table, Ruheru Sector had the highest population count of 35,599 inhabitants in 2012, whereas Busanze Sector had the highest population count of 29,795 inhabitants in 2022. Mata Sector is the least populated Sector with 13,900 inhabitants in 2012, and 16,117 inhabitants in 2022.

b) Population status per Age group composition

Analysing the population of Nyaruguru District from the perspective of age group composition in 2012 and 2022, reveals a predominantly youthful population in both years. The proportion of children aged 0-17 years accounted for 51.2% of the total population in 2012, compared to 47.2% in 2022. This decline suggests a reduction in the fertility rate and a consequent narrowing of the population base over the years. Concurrently, the elderly population aged 60 years and above represented only 5.9% of the total population in 2012, increasing to 8.2% in 2022, reflecting an upward trend in life expectancy.

When considering the combined ratio of children and elderly individuals to the total population, it amounts to 57.1% in 2012, and 55.4% in 2022, which signifies a high dependency ratio. This indicates that a significant portion of the population relies on support from the working-age population. Consequently, this demographic composition poses challenges and considerations in terms of resource allocation, healthcare, social welfare, and other relevant sectors.

4.2.1.2 Projected population

a) Population projection in Nyaruguru District According to NLUDMP 2020-2050

According to the NLUDMP 2020-2050 projection, the total population of Nyaruguru District is estimated to reach 386,186 inhabitants by 2035 and 483,0000 inhabitants by the year 2050. Of this,

41.8% of the total population are expected to live in urban areas by 2035, and 62.7% by 2050. To enable the projection of population growth in each Sector, the growth percentage was calculated at 1.5%. This means that the population is projected to grow at an average rate of 1.5% per year over the projection period, more details are given in graph below:

Table 2: NLUDMP 2020-2050 growth projection of Nyaruguru District

Sector	Type of Sector	Population 2022	HHs 2022	Population 2035	HHs 2035	Population 2050	HHs 2050
Busanze	Rural	29,795	6,741	21,557	5,389	17,273	4,318
Cyahinda	Rural & Urban	24,929	5,495	26,361	6,590	32,798	8,199
Kibeho	Rural & Urban	25,885	6,329	150,699	37,675	260,577	65,144
Kivu	Rural	19,812	4,403	14,334	3,583	11,486	2,871
Mata	Rural	16,117	3,923	11,661	2,915	9,344	2,336
Muganza	Rural	21,383	4,821	15,471	3,868	12,397	3,099
Munini	Rural & Urban	19,760	4,499	25,760	6,440	36,717	9,179
Ngera	Rural	24,242	6,003	17,539	4,385	14,054	3,514
Ngoma	Rural	24,358	5,952	17,623	4,406	14,121	3,530
Nyabimata	Rural	18,843	4,293	13,633	3,408	10,924	2,731
Nyagisozi	Rural & Urban	19,674	4,640	18,496	4,624	20,799	5,200
Ruheru	Rural	27,712	6,104	20,050	5,012	16,066	4,016
Ruramba	Rural	18,705	4,325	13,533	3,383	10,844	2,711
Rusenge	Rural	26,911	6,277	19,470	4,868	15,601	3,900
Total		318,126	73,805	386,186	96,546	483,000	120,750

Source: RPHC5,2022 and NLUDMP 2020-2050 guidelines

Table 3: Population projection in Nyaruguru District per residence according to NLUDMP 2020-2050

Population/ Year	2012		2022		2035		2050	
	Population	Number of HHs	Population	Number of HHs	Population	Number of HHs	Population	Number of HHs
Total Population	294,334	63,613	318,126	73,805	386,186	96,546	483,000	120,750
Nyaruguru District Town	5,922	1,346	7,641	1,910	137,500	34,375	250,000	62,500
Munini Rurban Center	-	-	-	-	11,464	2,866	25,262	6,315
Cyahinda Rurban Center	-	-	-	-	12,588	3,147	27,738	6,935
Sub- total(rurban)	-	-	-	-	24,051	6,013	53,000	13,250
Sub- total(urban)	5,922	1,346	7,641	1,910	161,551	40,388	303,000	75,750
Rural population	288,412	62,267	310,485	71,895	224,635	56,159	180,000	45,000
District town(%)	-	-	2.4%	2.6%	35.6%	35.6%	51.8%	51.8%
Rurban (%)	-	-	0.0%	0.0%	6.2%		11.0%	
Urban (%)	2.0%	2.1%	2.4%	2.6%	41.8%		62.7%	
Rural (%)	98.0%	97.9%	97.6%	97.4%	58.2%		37.3%	
Urban + Rural (%)	100%		100%		100%		100%	

Source: RPHC5&4,2012&2022 and NLUDMP 2020-2050 guidelines

4.2.2 Urbanization and Settlement

Hierarchy of settlements is one of the most important considerations while developing a master plan. Nyaruguru District Land Use Plan is composed of Urban Development Plans (Nyaruguru District

Town; Munini and Cyahinda Rurban Centers) and Rural Development Plans(Rural Settlement Sites). The figure below is the organized urban hierarchy in Nyaruguru District.

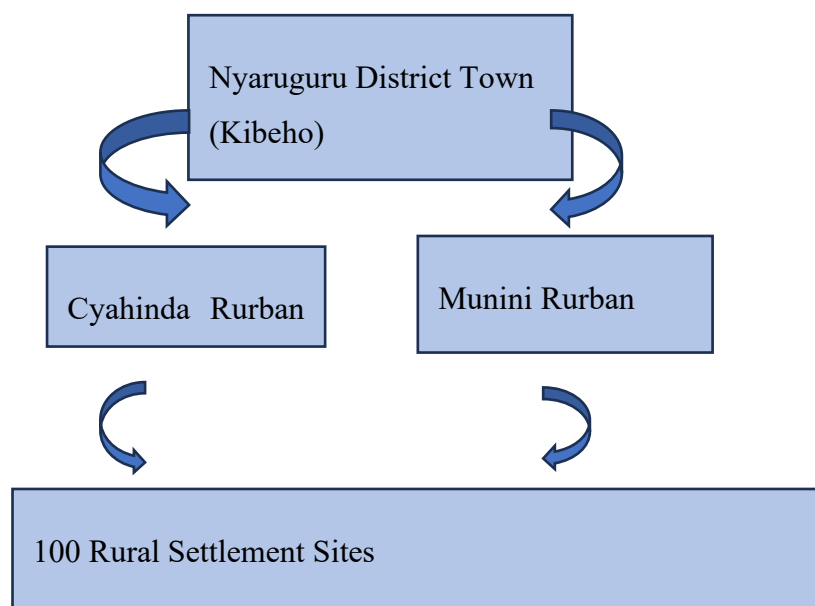


Figure 4: Nyaruguru Urban Hierarchy

4.2.2.1 Nyaruguru District Town

4.2.2.1.1 Existing Situation of Nyaruguru District Town

Nyaruguru District town is one of sixteen District towns, which are not included in other ranks (satellite and secondary cities) supporting the urbanization hierarchy in Rwanda. Nyaruguru District Town has an area of 19.9km² and is composed mainly of Kibeho and Munini sectors where many activities including economic, social, sporting and religious are concentrated.

Nyaruguru District Town population indulges in trade and commerce through shops, small bars and restaurants; services and professions. In terms of hotels and guest houses, the town has some but not enough. There is a constructed market, micro finance institutions, banks and credit and saving cooperatives.

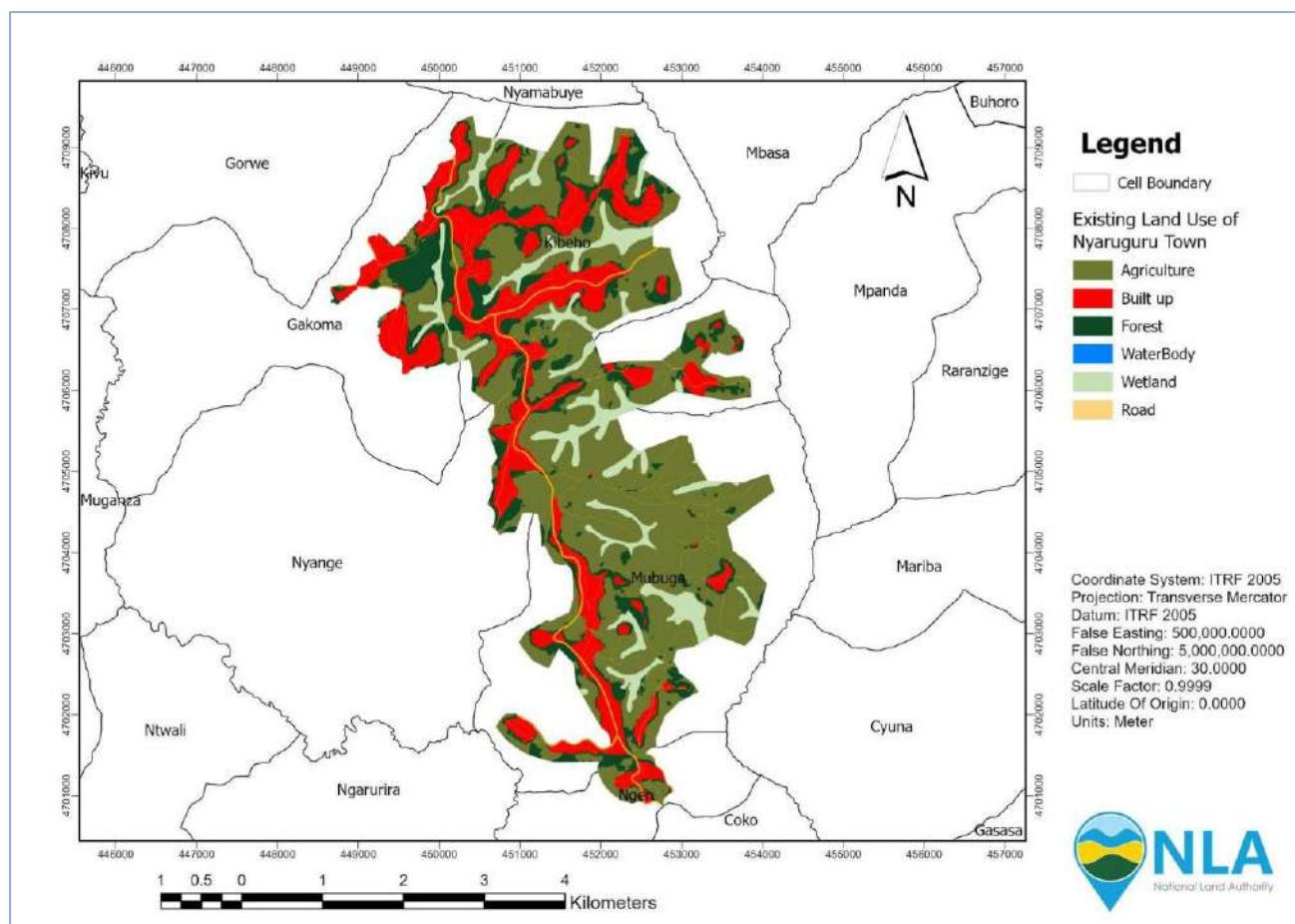
Nyaruguru District Town is positioned between Huye City and at the border to Burundi; and this position provides opportunities to develop cross-border trade, trade of agricultural products such as cash crops and food crops including fruits, vegetables, sweet potatoes; and artisanal and craft products. This position is also an advantage for the promotion of the private sector and possibility of developing other economic sectors like tourism, especially that of tourists visiting Kibeho, the holy land.



Figure 5: Kibeho, holy land

The existing Nyaruguru District Town plan consists of an urban development master plan for some urban areas including Kibeho; all elaborated in 2019. In addition, in Rebero physical plans for one Urban Residential Site have been elaborated.

Below map shows the location of Nyaruguru District.

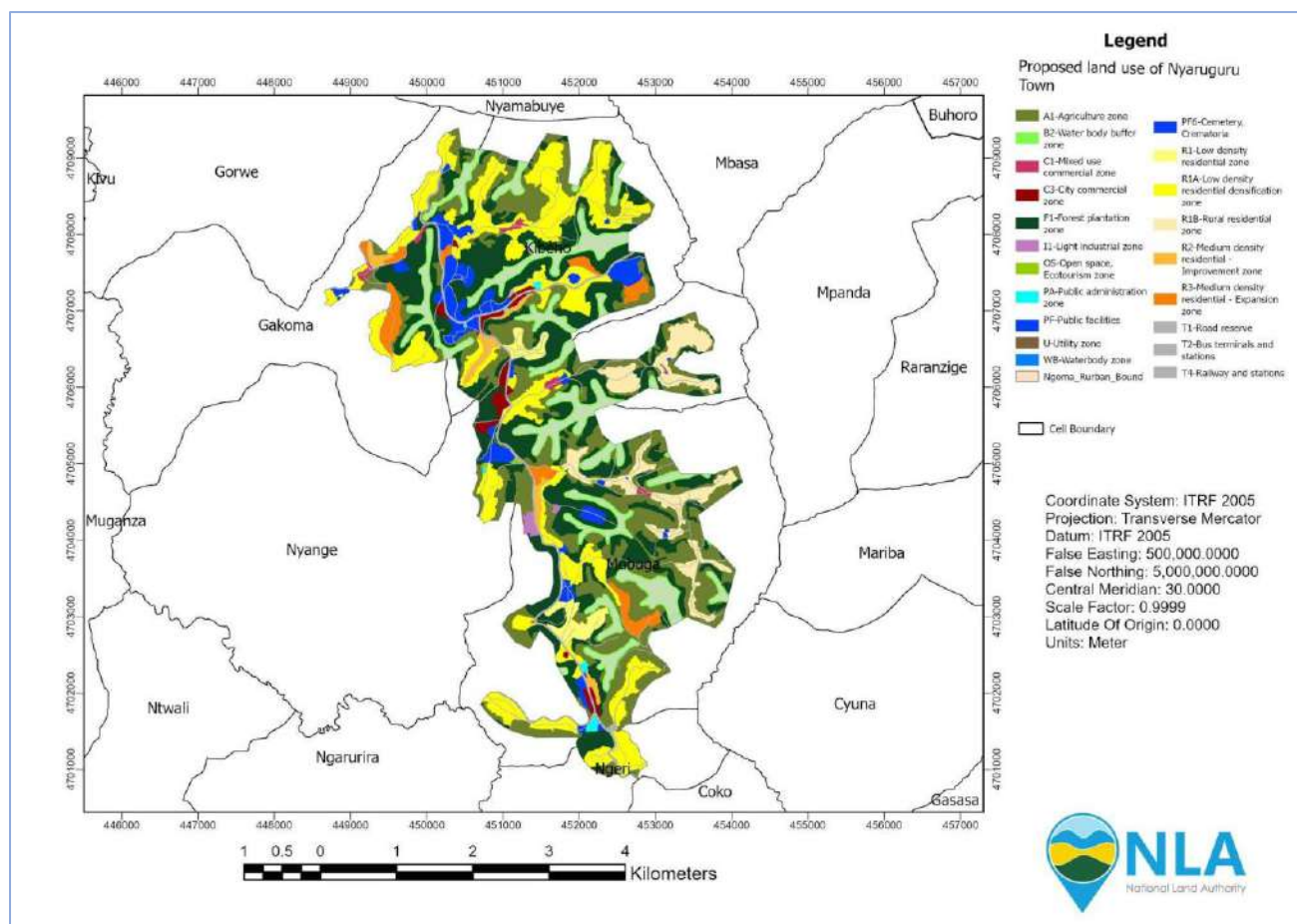


Map 5: location of Nyaruguru District.

4.2.2.1.2 Nyaruguru District Town Planned Land Use

Nyaruguru District Land Use Plan (DLUP) is integrating the proposals from the existing Nyaruguru District Town Master Plan for urban development with some extension of the urban boundary area and covers the gaps between existing urban areas of Rebero and the kibeho holy land. Further discussions on its implementation phases will be applied according to priorities.

The proposed Land Uses for Nyaruguru District Town 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 Nyaruguru District. Planned Land Uses presented on the following map:



Map 6: Nyaruguru District Town Planned Land Use (2022-2035)

4.2.2.1.3 Nyaruguru District Town balance sheet

Land use	area(ha)	Percentage 100
A1-Agriculture	493.01	24.73
B1-Buffer	95.02	4.76
C1-Mixed use commercial zone	9.55	0.47
C3-City commercial zone	23.2	1.16
F1-Forest Plantation zone	496	24.88
I1-Light industrial zone	5.04	0.25
ET-Ecotourism and Open space zone	1.45	0.07
PA-Public Administration	4.61	0.23
PF1-Education and research facilities	23.7	1.18
PF2-Health facilities	3.39	0.17
PF3-Religious facilities	37.47	1.87
PF4-Cultural, Heritage, Memorial sites	0.55	0.02
PF5-Sport, Leisure facilities	18.41	0.92
PF6-Cemetery, Crematoria	5.05	0.25
R1-Low density residential zone	29.93	1.5
R1A-Low density residential densification zone	323.31	16.21
R1B-Rural residential zone	89.44	4.48
R2-Medium density residential - Improvement :	21.27	1.06
R3-Medium density residential - Expansion zon	46.94	2.35
T1-Road reserve	102.19	5.12
T2-Bus terminals and stations	0.36	0.01
T3-Airports, Ports and Connected facilities	0.9	0.04
W1B- wetland unprotected zone	162.56	8.15
Total	1993.35	100

Table 4: Nyaruguru District Town balance sheet

The proposed Land Use Plan for Nyaruguru District Town provides the development plan till the year 2050. The proposed plan also takes into consideration the approved projects and the development trends within Nyaruguru District Town as discussed in the section of implementation framework in “Capital Improvement Projects (CIP)” subsection.

The proposed zoning plan with zoning regulations Edition 1 of November 2022; guide the development direction for Nyaruguru District in general and Nyaruguru District Town named as Kibeho particularly.

This DLUP caters for the ultimate projected population in the district to be settled in Nyaruguru District Town by 2050. Below table highlights the projections of Nyaruguru District Town population by 2035 and 2050.

Sector			pop 2022	HHS 2022	pop 2035	HHS 2035	pop 2050	HHS 2050
Munini	Ngeri	Ndago	742	213	7,758	2,230	14,105	4,054
Kibeho	Gakoma	Nyagishayo	984	283	10,281	2,955	18,693	5,373
		Viro	1,069	307	11,178	3,213	20,324	5,842
	Kibeho	Agateko	1,225	352	12,801	3,680	23,274	6,690
		Akajonge	1,600	460	16,722	4,807	30,403	8,739
		Sinayi	1,852	532	19,363	5,566	35,205	10,119
	Mubuga	Mubuga	1,367	393	14,293	4,108	25,987	7,470
		Nyarusovu	1,268	364	13,254	3,810	24,099	6,927
		Uwintobo	1,570	451	16,409	4,717	29,835	8,576
	Nyange	Agateko	1,477	425	15,442	4,439	28,076	8,070
Total			13,154	3,781	137,500	39,524	250,000	71,861

Table 5: Nyaruguru District Town population by 2035 and 2050

As per NLUDMP 2020-2050 2050, the urban population target in Nyaruguru District Town is 137,500 by 2035 and 250,000 by 2050. The land use balance sheet in Nyaruguru District Town reveals that R1A covers 16.21% of all land uses with an area of 323.31ha, followed by R1B with 89.44ha, R1 with 29.93ha, R2 covers 21.27 ha and C1 area covers 9.55ha; The total area of the district town is 19.9 sq km.

In addition, Nyaruguru District Town had different catalytic projects intended to accelerate socio economic development of the Town.

Furthermore, detailed physical plans in the area will increase population densities with adequate housing and recreational areas. This site will be supplied with all necessary amenities such as paved roads, public lights, drainage, electricity...All the projects with planned light industrial zones will have economic and financial benefits and will create a shared urban value among Nyaruguru District Town residents.

4.2.2.2 Nyaruguru Rurban Centers

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

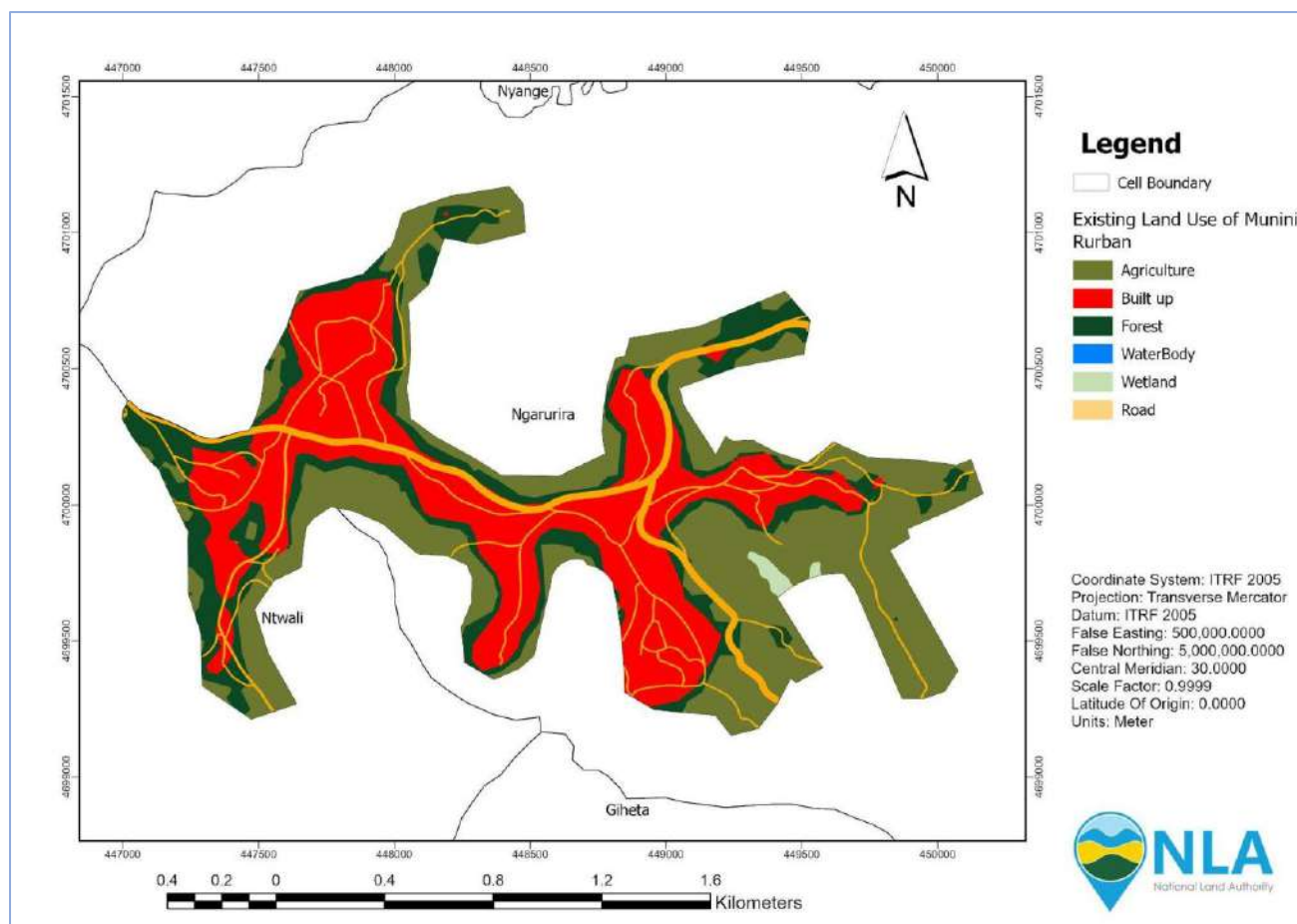
The following factors were considered while selecting Rurban centers taking into consideration the district council guidance as follows: (i) Emerging potential trading centers; (ii) High pressure of growing residential settlements; (iii) Geographic location; (iv) Existing and developing infrastructures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

As per NLUDMP 2020-2050 2050 guidelines, consultation with Nyaruguru District and relevant stakeholders; Munini and Cyahinda are prioritized as the Rurban Centers to support urbanization rate development in Nyaruguru District. Munini and Cyahinda Rurban Centers are where the existing trading centers are located and large built-up areas can be observed with infrastructure and facilities.

4.2.2.2.1 Munini Rurban Center

a. Existing Situation of Munini Rurban Center

Munini Rurban Centre located in Munini Sector in Nyaruguru District is one of the emerging centers to which development is evident. The center's development is attributed to its historical background, it was an administrative headquarters many years ago which attracted people to it. Munini center is strategically sited since it is on the national road from Huye-Kibeho-Munini



Map 7: Location of Munini Rurban Center

Munini sector is rich in commercial activities, Tea plantation and it is also known for its district hospital. EKATERA Company, serves and provides jobs for farmers and daily workers in tea plantations.

Munini rurban is attracting population from neighboring sectors and those from far to come and settle due to job opportunities mainly in tea plantation, Trading, Educational and health services, tea factories. The center accounts for a big number of employees that are paid on a weekly basis in tea plantation activities. The center also is a good hub for micro businesses as there is purchasing capacity of the population. The existing Munini Rurban center urban boundary area expands to 240 Ha including undevelopable area like forest, wetlands and is composed of 5 villages of 2 cells, those cells are Ntwali, Ngarurira and the villages are: Agatare, Ntwari, Uwumuko, Akarehe, Gisizi and Gitega

Munini Rurban center has educational facilities, religious facilities, Healthcare facilities, financial institutions and microfinances, cooperatives and various infrastructure and facilities such as water and sanitation facilities, etc.

Commercial activities in Munini Rurban center are based on retail trade and dealings in agricultural products and other food products. There is also the main marketplace in Munini center which is well constructed with basic amenities such as some buildings, toilets, water and sanitation mechanisms and the presence of an IDP model village. In this market people from different sectors come to trade their goods and services

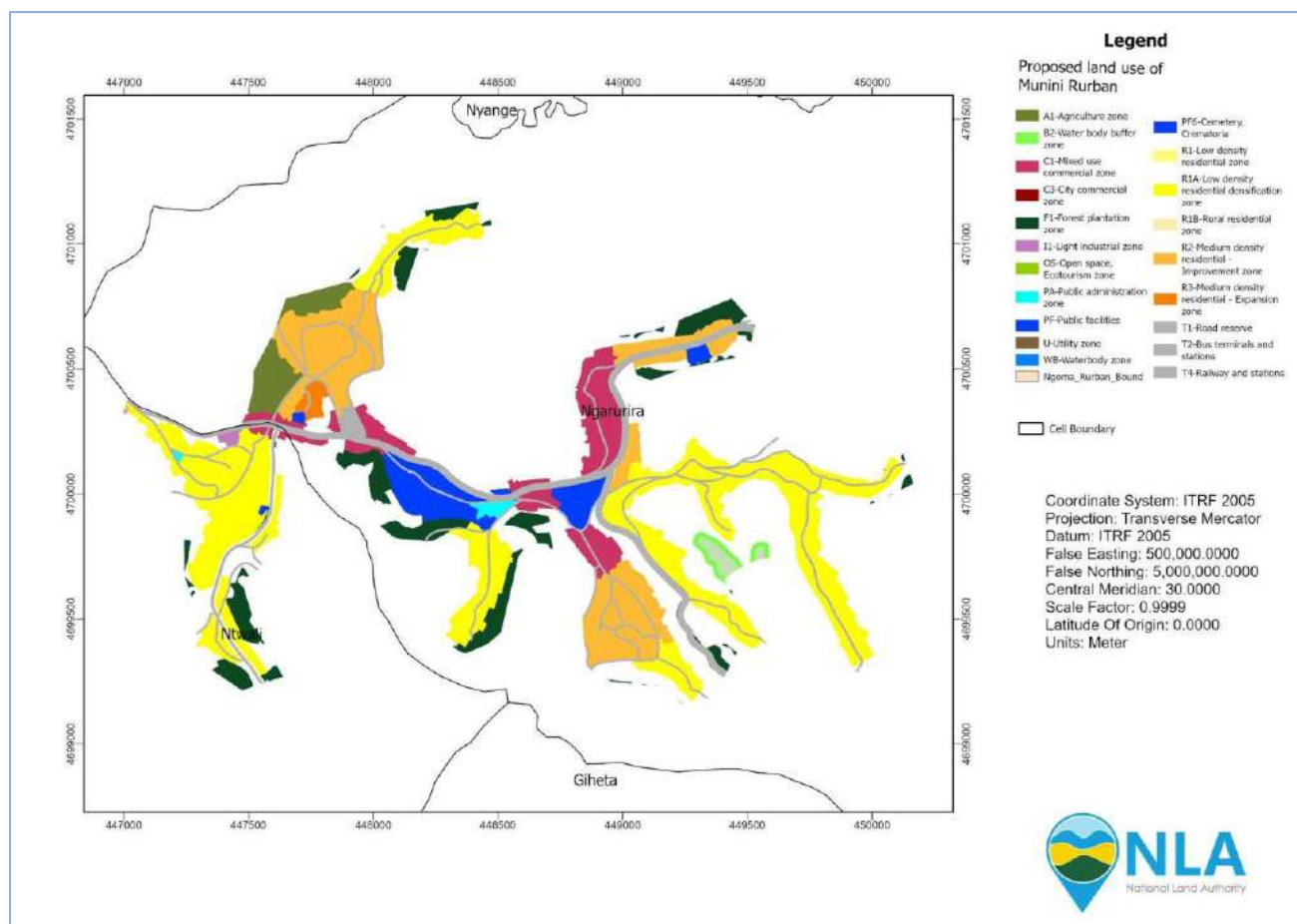
In addition, small bars and restaurants are also found in the center. There are also some semi-wholesalers of manufactured products and home equipment, small and medium scale enterprises dealing in carpentry, welding, hairdressing and all operate in old fashioned housing types.

b. Munini Rurban Center Planned Land Use

Nyaruguru District Land Use Plan (DLUP) is integrating the proposals from the existing Munini Local Urban Development Plan developed in 2019 with more emphasis on NLUDMP 2020-2050 provisions and guidelines especially that the previous plan was based on outdated Vision 2020.

Munini Rurban Center has an area of **240.1Ha**; it touches in two cells of Munini Sector namely Ngarurira and Ntwali

The proposed Land Uses for Munini 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 Munini Sector. Planned Land Uses presented on the following map:



Map 8: Munini Rural-urban Center Planned Land Use (2023-2050)

The proposed Land Use Plan for Munini Rurban Center provides the development plan till the year 2050 and will be revised in 2035. The proposed plan also takes into consideration the approved projects and the development trends within Munini Rural-urban Center as discussed in the section of implementation framework in “Capital Improvement Projects (CIP)” subsection. During the starting phase of implementation, the district constructed paved roads, Construction of MUNINI TEA FACTORY in MUNINI Sector (Planned), Meanwhile, the population projection for Munini Rurban Center is to reach a total number of 12,100 inhabitants by 2035 and 22,000 inhabitants by 2050 with direct impact on the formulation of Munini Rurban plan in terms of all basic population needs: housing, basic facilities, services and utilities. Proposed land use balance sheet in Munini Rurban Center reveals that R1A covers 56.28 ha, R2 lays on 25.02ha, C1 covers 13.34 ha and R3 covers 1.17ha and agriculture is the most to cover the large land,36% .

Land use	area(ha)	Percentage 100
A1-Agriculture	88.74	36.07
A2-Livestock zone	0.05	2.37
B1-Buffer	1.24	0.5
C1-Mixed use commercial zone	13.34	5.42
F1-Forest Plantation zone	16.19	6.58
I1-Light industrial zone	0.38	0.15
PA-Public Administration	0.86	0.35
PF1-Education and research facilities	2.62	1.06
PF2-Health facilities	5.94	2.41
PF3-Religious facilities	0.69	0.28
PF5-Sport, Leisure facilities	0.17	0.07
R1A-Low density residential densification zone	56.28	22.88
R2-Medium density residential - Improvement :	25.02	10.17
R3-Medium density residential - Expansion zon	1.17	0.47
T1-Road reserve	25.51	10.37
T2-Bus terminals and stations	0.73	0.3
W1B- wetland unprotected zone	1.17	0.47
Total	240.1	100

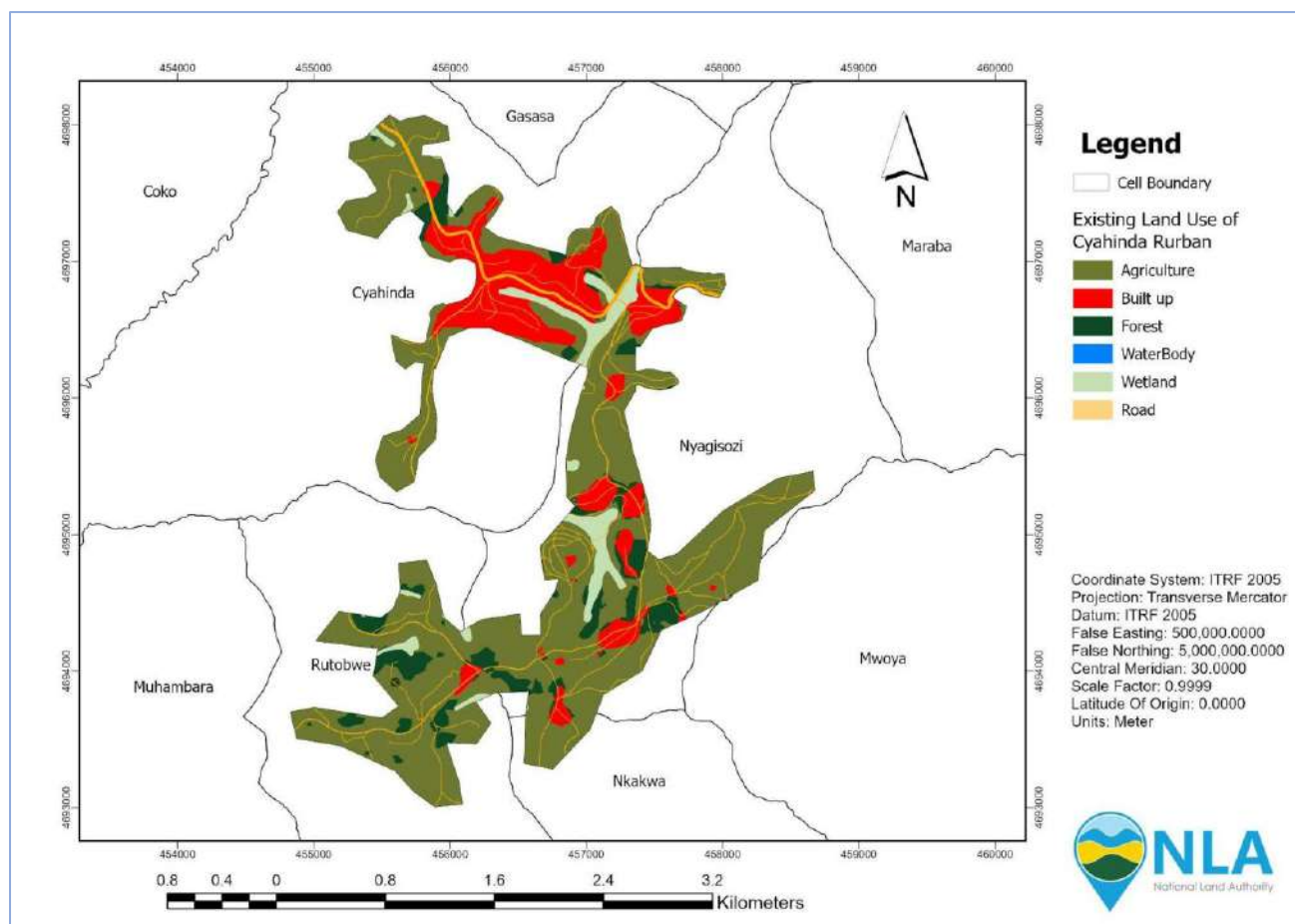
Table 6: Munini Proposed Land use balance sheet

4.2.2.2.2 Cyahinda Rurban Center

a. Existing Situation of Cyahinda Rurban Center

Cyahinda Rurban Centre is located in Cyahinda Sector in Nyaruguru District. The center's development is attributed to its historical background; Administrative Center of former Komini Nyakizu, Religious activities are historical pull factors which attract people to settle in Cyahinda Rurban center.

There are also education facilities like TTC Cyahinda, paved roads which promote the trade and investors; Cyahinda center is strategically located since it is on the road Kibeho-Cyahinda; it is also connected to Nyaruguru District town which make it easier to reach to district office and big services available in the kibeho Town.



Map 9: Location of Cyahinda Rural-urban Center

This strategic location is a factor for developing trade in Cyahinda; goods from kibeho town are stored there to be supplied to the other sectors for retailing. Commercial activities are based on wholesaling and retail trade and dealings in agriculture products and other food products.

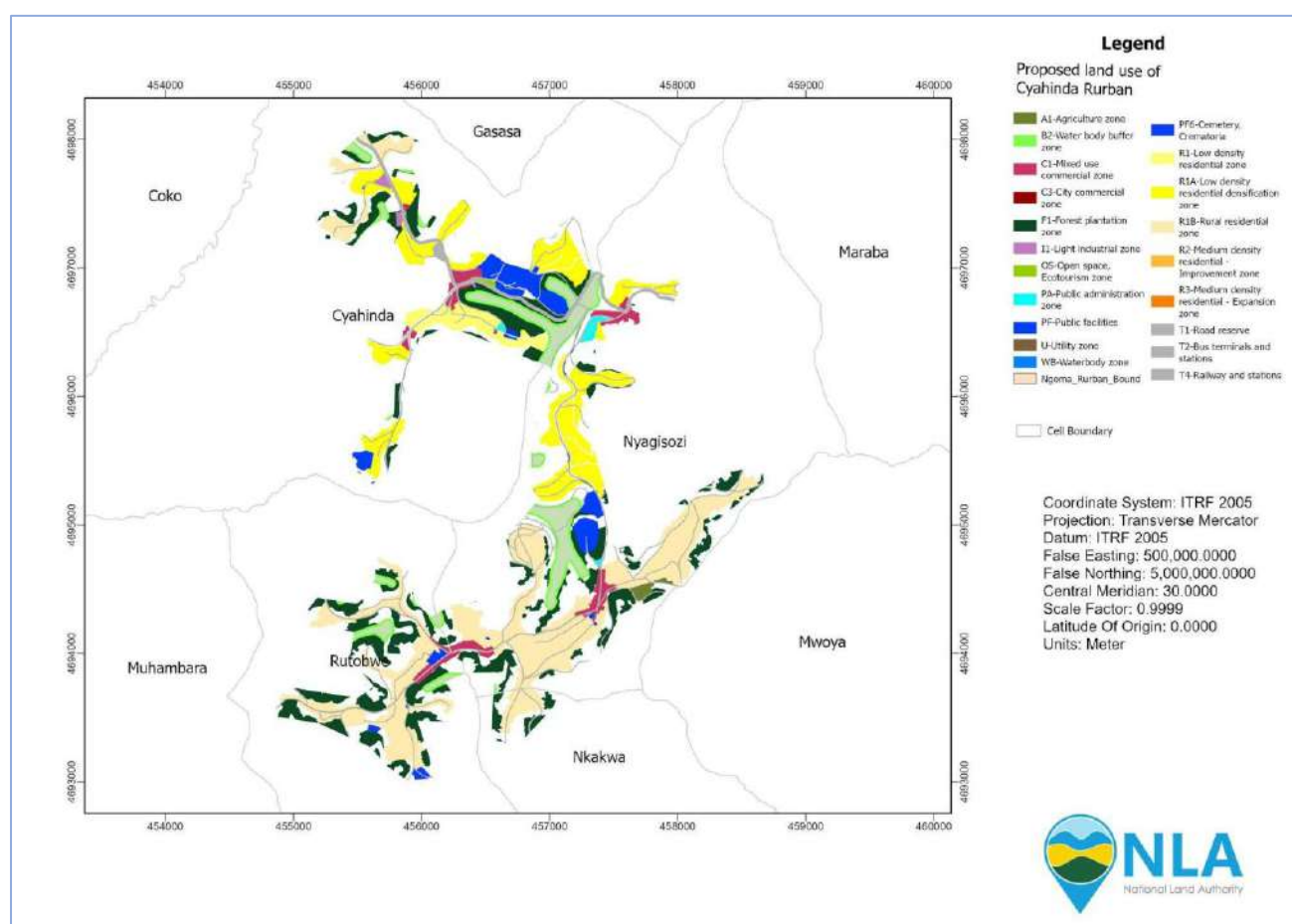
In addition, small bars and restaurants are also found in the center. There are also some semi-wholesalers of manufactured products and home equipment, small and medium scale enterprises dealing in carpentry, welding, hairdressing and all operate in old fashioned housing types.

Cyahinda Rural-urban center has educational facilities, Healthcare facilities, financial institutions and microfinances, cooperatives and various infrastructure and facilities such as water and sanitation facilities, etc.

b. Cyahinda Rurban Center Planned Land Use

Cyahinda Rurban Center has an area of **586.32 Ha**; it touches in one cell of Cyahinda Sector namely Cyahinda (Cyahinda, Kinyaga and Saburunduru villages); and extended in one Cell of Nyagisozi Sector namely Nyagisozi (Ryabidandi and Muriza villages)

The proposed Land Uses for Cyahinda 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 Cyahinda Sector. Planned Land Uses presented on the following map:



Map 10: Cyahinda Rural-urban Center Planned Land Use (2022-2050)

The proposed Land Use Plan for Cyahinda Rurban Center provides the development plan till the year 2050, which will be revised in 2035. The proposed plan also takes into consideration the approved projects and the development trends within Cyahinda Rurban Center as discussed in the section of

implementation framework in “Capital Improvement Projects (CIP)” subsection. These projects will generate a shared Rurban value between the local population and all stakeholders.

According to the NLUDMP 2020-2050, Cyahinda Rurban center is planned for 12,588 population by 2035 and 27,738 population by 2050 with direct impact on the formulation Cyahinda Rurban plan in terms of all basic population needs: housing, basic facilities, services and utilities.

Land use	area(ha)	Percentage 100
A1-Agriculture	172.29	29.38
B1-Buffer	18.15	3.09
C1-Mixed use commercial zone	14.34	2.44
F1-Forest Plantation zone	91.6	15.62
ET-ET-Ecotourism and Open space zone	0.42	0.07
I1-Light industrial zone	1.2	0.2
PA-Public Administration	1.98	0.33
PF1-Education and research facilities	12.87	2.19
PF2-Health facilities	1.33	0.22
PF3-Religious facilities	6.27	1.06
PF4-PF4-Cultural, Heritage, Memorial sites	1.21	0.2
PF5-Sport, Leisure facilities	0.6	0.1
PF6-Cemetery, Crematoria	0.47	0.08
R1A-Low density residential densification zone	63.34	10.8
R1-Low density residential zone	13.09	2.23
R1B-Rural residential zone	111.39	18.99
T1-Road reserve	48.33	8.24
T2-Bus terminals and stations	0.55	0.09
W1B- wetland unprotected zone	26.89	4.58
Total	586.32	100

Table 7. Cyahinda proposed land use balance sheet

Proposed land use balance sheet in Cyahinda Rurban Center reveals that R1A is on 63.34 ha, R1 covers 13.09ha, and C1 covers 14.34 ha of all land uses. To ensure a sustainable development of this center, a mixed-use commercial zone is recommended in this center to promote the economic development of Cyahinda, improved agricultural techniques are also recommended since Cyahinda has much potential for growing food crops such as Irish potatoes.

Commitments of private sector from Cyahinda Rurban Center are highly recommended as those projects will support and facilitate in account of implementing various projects (commercial complex, modern market, etc.) that will boost the economic development of Cyahinda Rurban center

4.2.2.2.3 Nyaruguru Rural Settlement Sites

According to NLUDMP 2020-2050 2050, the rural population contained in 2019 about 13,661 villages and 82% of the Rwandan people. However, there are too many villages and scattered homesteads in rural areas which contribute to eliminating economies of scale; therefore, the transformation of rural settlement structure is the most needed in Rwanda.

Therefore, urgent actions are needed to consolidate and freeze the rural settlement sites sprawl. Rural settlements will feed urban areas. The 2050 projected population of 6.6M (30%) will be clustered into about 3000 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 other 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 a detailed site plan.

a. Existing situation of Rural Settlement Sites in Nyaruguru District

In Nyaruguru District, the rural settlement system is characterized by scattered homesteads; a result of conflicts between residential and agricultural land uses. 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.

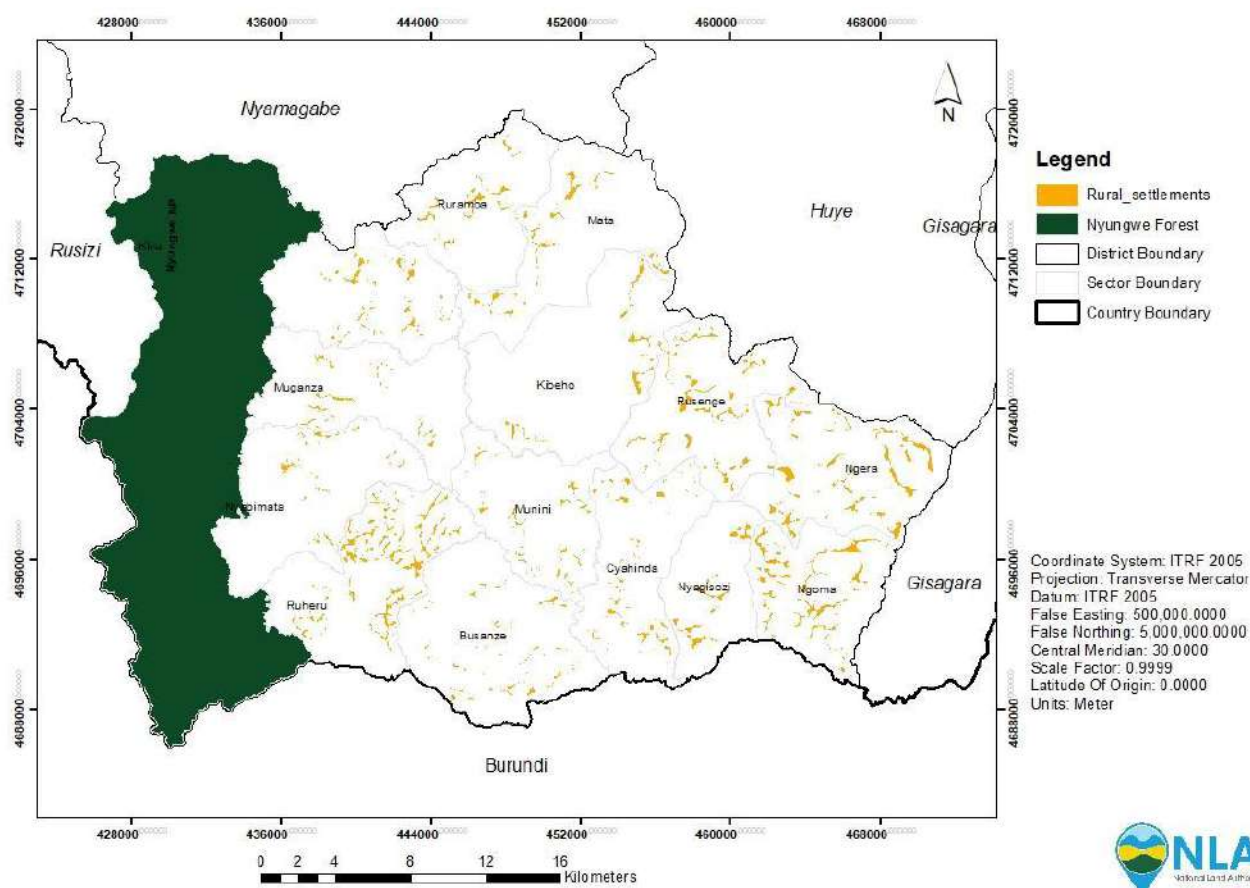
The district has identified 175 sites in June 2016 but there are no real clusters of settlements formed in all sectors. However, during the elaboration of Nyaruguru DLUP, due to the topography of Nyaruguru District, all sectors do not have the same number of sites and some cells have more than two sites.

b. Planning Perspectives of Nyaruguru Rural Settlement Sites

During elaboration of Nyaruguru DLUP, all 175 identified sites have been revisited to assess physical conditions on the ground. This due diligence has been conducted together with sector land managers

and other local authorities at cell and village level; and resulted in resizing of the identified Rural Settlement Sites boundaries.

Due to convincing reasons and factors, some minor adjustments have been made on rural settlement sites as a result of promoted participatory approach of planning and the sites came from 175 to 100. The figure below indicates planned rural settlement sites.



Map 11: Spatial distribution of Rural Settlement Sites in Nyaruguru District

Nyaruguru rural settlement sites are 100 spatially distributed in all sectors comprising the district and occupy the boundaries of 56.43 km² surface area that must settle 180,000 of Nyaruguru population by 2050.

Based on Nyaruguru District population projection and considering the medium scenario; the rural population is projected at 230,765 inhabitants by 2035. It means that 58.4% will be clustered into rural settlement sites.

However, the country aims at accelerating urbanization (the process of change by migration); the migration of people who move from rural to urban areas is currently the only urbanization modality in Rwanda; Migration reinforces urban centers but, at the same time, deteriorates and weakens rural settlements by lack of investments and employment opportunities.

Therefore, Nyaruguru DLUP promotes an additional mode of urbanization for Nyaruguru: “In-Situ Urbanization,” which 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 poor farmers to cities. It prevents social and economic pressures in existing towns.

It is of great importance for Nyaruguru District and its stakeholders to prioritize investments in the rural system to form real clusters of settlements and improve livelihood, housing, education, health to enhance such urbanization quality. The only chance to achieve a 70% urbanization rate, as Vision 2050 requires, is by encouraging in situ urbanization.

c. Agglomeration and Consolidation Principles

Nyaruguru rural settlements should be compact and consolidated to significant and continuous agricultural lands: the result is higher yields and higher revenue to farmers. All new houses must be developed within rural settlement sites. In collaboration with local authorities at cell and village level, identified sites will be surrounded by planted trees(green belt) as physical features or signs to avoid any cheating by resistance to change.

Local authorities at cell and village level will be supplied with technological tools (google earth or SW maps) and they will plant trees along site boundaries together with local population during community works including Umuganda.

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.

High density housing models are very recommended in rural areas, including exploiting the underground. The size of rural residence is 300 m² and the dwelling models of 4x1 and 8x1 (and other high-density models) are promoted. Dwelling models that utilize less than 300 m² are also encouraged. 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 Nyaruguru's vision. The following table provides remarks on the observed changes about the DLUP proposal vs NLUDMP 2020-2050 proposals.

Planned dwelling units (%)	Urbanization 2022 (Census)	Urbanization / 2035	Urbanization-2050	DLUP (2050)
Urban area (Town & Rurbans) (%)	2.40	41.83	62.73	22.28
Rural Settlement sites (%)	97.60	58.17	37.27	77.72
Total	100%	100%	100%	100%

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.

4.2.3 Housing

According to NLUDMP 2020-2050, housing 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 Nyaruguru District. Within this context, the size, model, and tenure of dwelling needed for 2050 are essential.

Six purposes drive the housing sector component:

- Characterization of housing types in 2050 by spatial and architectural parameters;
- Match between housing types 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;
- Feeding all this information into 2050 National Land Use and development Master Plan, making room for settlements of all kinds.

The target in the housing sector is a steady annual increase of building 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.

The NLUDMP 2020-2050 recommends considering mixed-use housing urban development in which a real estate in a city or suburb can blend different functions such as residential, commercial, cultural, institutional, etc. into one block. These functions should be applied in urban and rural areas where the houses are improved from the colonial construction technology and are built in a classic modern way with a foundation of stones and earth, and walls be well integrated physically and functionally. Flexibility regarding type of housing shall be recognized (for example single units, semi detached, low houses and apartment blocks).

The NLUDMP 2020-2050 recommends the consideration of a mixed-income approach whereby low, medium and high-income earners should be settling together in the same neighborhood to minimize settlement segregation.

4.2.3.1 Existing Housing Situation



Figure 6: Existing housing typologies

The existing condition of houses in Nyaruguru District both in urban, Rurban and rural settlements are detached and semi-detached houses with basic typology of a structure, most commonly beehive-shaped, made of mud bricks and poles, and covered with roof. The following images show predominant housing typologies in Nyaruguru District.

Construction materials being used are locally available especially that many houses are built in mud bricks, trees or cooked bricks, in between blocks from sand and cement, roofs with wooden construction, and iron sheets exported from various countries.

4.2.3.2 Planned Housing Perspectives

An assessment of future housing demands in each settlement and sustainable housing types has been undertaken based on population targets in each settlement. Five housing categories were proposed to be considered by local-level planning to achieve the desired consolidation and agglomeration as presented in the figure below:

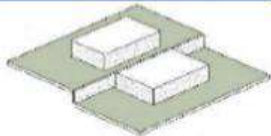
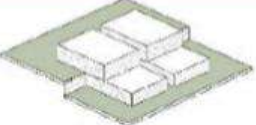
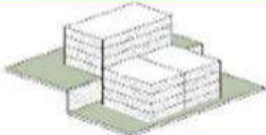
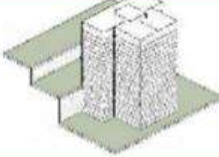
Total 2050		5,500,000 units (2.5M in 2019)
A+		1,656,000 units
1		830,000 Buildings
A		2,175,000 units
1-2		550,000 Buildings
B		1,000,000 units
3-4		11,000 Buildings
C		370,000 units
5-9		40,000 Buildings
D		245,000 units
10-22		11,000 Buildings

Figure 7: Dwelling units needed in Rwanda by 2050

4.2.3.2.1 Proposed Housing Typologies in Nyaruguru District

The NLUDMP 2020-2050 proposes that given the future demographic trends and the high housing needs that require a large housing stock and space, it is strongly recommended to develop vertical housing infrastructure in urban and rural areas in the form of multi-family apartments and socio-economic infrastructure.

As presented on the figure above, the NLUDMP 2020-2050 recommends A+, A, B, C, D. as housing typologies to achieve the optimal and efficient use of land in Rwanda. These typologies have been translated into more comprehensive residential and housing typologies, as established by Land use and zoning regulations to guide the development of residential areas across the country. Thus, the DLUP implemented NLUDMP 2020-2050 proposed densification by grouping them into different residential categories as Low density (R1, R1A), Medium density (R1B, R2, R3), High density (R4) and zones established to create high flexibility in the mix of uses (C1 and C3).

Related Zone/DLUP	R1	R1A	R1B	R2	R3	R4
Densities	10-15.	20-30	40-70	60-100	60-90	90+n
Lot size -M2	500 (G+2+P max)	300 (G+2+P max)	150 (G+2 max)	200 (G+3 max)	100 (G+3 max)	750 G+n

Table 8: Residential zone categories with respective densification

According to NLUDMP 2020-2050, by 2050, Nyaruguru District will have 120,750 dwelling units whereby 62,500 dwelling units will be located in Nyaruguru District Town, 13,250 units in Rural Centers, and 45,000 units in rural settlement sites.

To comply with NLUDMP 2020-2050 directives of dwelling units by 2050, proposed dwelling units were calculated based on land allocated for residential zones in urban, rural and rural settlements areas. As highlighted in the table below, dwelling units are presented per residential category to clearly indicate the areas that will be reserved for residential zones.

In urban areas, based on projections of households as per NLUDM 2020-2050, Nyaruguru District will have 75,750 dwelling units by 2050 as there will be a movement of people from rural areas to urban

areas. The DLUP enables 21,423 dwelling units (high density) which will be assessed in 2035 for further extension of the urban area.

According to RHPC 2022, Nyaruguru District has the lowest urbanization rate in the country at 2.4%. The NLUDMP 2020-2050 initially proposed 62,500 dwelling units for the district town, 13,250 for rural centers, and 45,000 for rural settlement sites by 2050. However, due to the low urbanization rate, the DLUP recommended a phased approach, allocating 9,559 units to the district town, 4,306 to rural centers, and 188,612 to rural settlement sites (all at minimum density). The 2035 DLUP review will adjust these figures, increasing urban dwelling units while reducing those in rural settlements.

Table 9. Housing Stock/Proposed Residential zones and Number of Dwelling units

Settlement category	No. of DU by 2050 (NLUDMP 2020-2050)	Residential category	Area (ha)	No. of DU (min. density)	No. of DU (medium density)	No. of DU (max. density)	%
District Town	62,500	R1	29.93	299	374	449	3.10
		R1A	295.98	5,920	7,399	8,879	61.23
		R1B	10.38	415	571	726	4.72
		R2	16.76	1,006	1,341	1,676	11.10
		R3	31.99	1,919	2,399	2,879	19.85
Sub-Total			385.04	9,559	12,084	14,609	100.00
Rurban Centers	13,250	R1	13.09	131	164	196	2.94
		R1A	109.14	2,183	2,729	3,274	49.08
		R1B	10.38	415	571	727	10.27
		R2	25.11	1,507	2,009	2,511	36.13
		R3	1.17	70	88	105	1.58
Sub-Total			158.89	4,306	5,559	6,813	100.00
Sub-Total (Town+Rurban)	75,750		543.93	13,865	17,644	21,423	
Rural settlements	45,000	R1	10.02	100	125	150	0.05
		R1A	143.69	2,874	3,592	4,311	1.39
		R1B	4,603	184,110	253,151	322,192	97.81
		R2	9.2	553	738	922	0.29

		R3	17.9	1,074	1,343	1,611	0.52
Sub-Total			4,784	188,612	258,824	329,037	100
Total	120,750		5,328	202,476	276,468	350,460	

a) Rural Residential Zone (R1B)

R1B is a residential zone offering compact developments in rural areas. The R1B Zone is intended to offer low-rise housing as part of the farming community and complementary public facilities as needed.

The purpose is to create a sustainable and compact residential settlement in the rural areas of the city, limiting encroachment towards the fertile agricultural land. The density in R1B is 20-30 DU/Ha for single houses (Single Use) and 15-20 DU/ha (considering when a building is partially occupied by other uses).





Figure 8: Housing Typology in R1B

b) Low-Density Residential Densification Zone (R1A)

R1A is a residential zone for semi-detached houses, single-family townhouses, multifamily Houses, and low-rise developments. The R1A zone is intended to offer low and medium rise housing and complementary commercial and public facilities as needed.

The lot sizes in R1A zone are smaller than in Low Density Residential Zones (R1), to distinguish the R1A zone as a higher density low rise residential neighborhood. The purpose is to promote more efficient use of the lands in prime areas of the City by allowing for intensification and mix of uses of the existing low-density housing development.

In this zoning; R1A we have different typologies of building such as Low houses, G+1 and G+2 that are designed to fit in the plot of 300m².



Figure 9: Housing Typology in R1A

For low house:

In this typology of low houses or cadaster in R1A is a building for one single family that will have the design for one floor building with roof on top. The building will have self-contained services needed in the home life of the family.

c) Low Density Residential Zone (R1)

In R1 the building is the same characteristic as the building from R1A they differ to the plot size that is 500 m² and with ameliorated aesthetic on the design of buildings in this zoning area of R1.



Figure 10: Housing Typology in R1

d) Medium Density Residential - Improvement Zone (R2)

R2 is essentially planned for upgradation of unplanned settlements or redevelopment of urban renewal areas, wherever feasible in the brownfield sites. Variety in the housing types and planned development is expected to stimulate the upgrading, redevelopment, and intensification of these housing areas.

Its intent is to improve the overall physical and living conditions of the identified unplanned settlements through upgradation in the short term, and redevelopment through land assembly in the medium-long term, to better utilize the developable land in prime areas of the city for creating integrated and affordable neighborhoods and provide adequate infrastructure and public facilities.



Figure 11: Housing Typology in R2

e) Medium Density Residential - Expansion Zone (R3)

R3 is established to allow for intensification and redevelopment of peri-urban and green field areas through extensive housing strategies to provide a variety of housing solutions. This zone is expected to stimulate development of low-cost incremental housing in special redevelopment or greenfield areas.

The purpose of R3 zone is to facilitate the provision of housing dedicated to the low-income segment of the population, by providing low-rise, higher-intensity developments in green field sites of the City. To ensure a mix of use and mix of income, several housing solutions are allowed.

The R3 zones are located in peri-urban areas, in close proximity to the proposed transit corridors, hence a minimum development quantum is required. In all R3 zones, R2 regulations are permitted. All proposed typologies in proposed residential zones will have to follow published land use zoning regulations.



Figure 12. Housing Typology in R3

4.2.3.3 Strategies to achieve sustainable housing in Nyaruguru District

Sustainable housing is a way of designing, building, and operating homes that reduces their environmental impact. It refers to a building which uses efficient energy, water, and materials to reduce the impact on the environment through location, design, construction, operation, maintenance and demolition. This includes design measures such as orientation of the building, natural ventilation, natural daylight intake, external shading, and materials selection, and planning aspects such as mixed use and mixed income developments.

Buildings are large consumers of energy. Proper orientation of a building provides opportunities to minimise heat gain and lowers operational costs. Natural ventilation in combination with external shading (louvres, trees and vegetation) provides a good indoor environment and reduces the need for air conditioning. Natural daylight intake reduces the energy consumption for artificial lighting. Selection of materials plays a big role in energy consumption throughout the lifespan of the building. Locally produced building materials reduce the need for transportation, with impact on both climate and affordability. Local building materials and techniques can also sustain a local or regional building culture. In addition, aspects such as landscaping and permeable paving to allow for natural infiltration, rainwater harvesting, and planting of trees and other vegetation should be considered.

Mixed-use and mixed income housing developments and neighbourhoods can contribute to reducing energy consumption through reduced need to travel for work, leisure, or services.

4.2.4 Urban Design for Nyaruguru District

Urban design refers to understanding the connections between people and places and creating sustainable solutions to meet the complex requirements of our outdoor environments by providing environmental planning and design communities interconnected, promotes sustainability and helps create healthier, more beautiful and more livable neighborhoods.

Where urban and landscape design are mostly found in developed countries where in Africa are incorporated into design of public infrastructure. However, several, they take as for rich people while others could be integrated to the communities by challenging and expanding opportunities of implementing beautification practices and sustainable design (Arkansas, 2015).

Unfortunately, awareness of modern urban and landscape design was almost absent in Rwanda until the late 20th century (Seburanga, 2013). Today, houses with surrounding decorative and amenity plants have been developed, and greenery has been developed along houses and roads. In Nyaruguru District, urban design is developing within professionals, like green transportation along the roads (greenery and bicycle lane) but with less mixed-use development and lower vertical building which could be a best way to achieve sustainable urban design and landscape in Nyaruguru District for Kibeho, Ndago, Munini and Cyahinda.

4.2.4.1 The impact of Urban Design on Social and Economic Livelihood in Nyaruguru District

In fact, with liable landscape development, it fights pollutants and encourages city dwellers to spend time outside, which is better for their health and for the community.

Through urban design it shows and controls flood risk through identification and show opportunities. It improves legibility and wayfinding through phasing implementation and provides an opportunity for active frontage commercial building.

Nyaruguru DLUP provides a big opportunity for promoting landscape development in zoning and regulation not only that but also zones phases for implementation. It increases the level of implementation where it shows public and private investors to implement the catalytic project and

other infrastructure and utilities are provided. Within urban design the Kibeho, Ndago in Town brings life by promoting sustainable design community and environmental planning.

Urban design and landscape development are opportunities for this Nyaruguru DLUP in order to meet the complex requirements of outdoor environments by providing a life in Nyaruguru. In this part we will have an Urban design of Kibeho, Ndago in towns, Munini Rurban and Cyahinda Rurban by identifying a big complex mix use, commercial and touristic areas as potential to provide sustainable Cities that have good open spaces, streetscape, liable signage, lighting and welcoming cities.

The Urban Design Area for Nyaruguru District includes the Central Business District, the urban hillock (pole of urban growth), the modern market, the agri-market and the bus terminus. The site selected after a number of interactions with the city authorities, has diverse proposals by various authorities. Thus, each development within the boundary provides a distinct opportunity for developing the city center's-built environment. It measures about 76 Ha. This area is referred to as "Urban Design Area " throughout this report.

4.2.4.2 Existing Landscape Structures in Nyaruguru District

The Landscape structure in Nyaruguru District is composed of Topography, Open spaces, streetscape, wetlands, connectivity, sign and legibility, utilities, buildings and landmarks, recreational activities and vibrancy.

- **Topography:** Nyaruguru is located on the hills that could provide an opportunity for landscape structure.
- **Open space:** open spaces in Nyaruguru are still insufficient and existing open spaces are not well managed to be highly used and mostly found in public office buildings and religious facilities.
- **Streetscape:** streetscape in Nyaruguru is still in poor condition, where there is no designed well softscape integration to the roads.
- **Wetland:** there is a place that could be integrated to landscape especially in the holy land to provide sustainable town.
- **Connectivity:** Nyaruguru is well connected through transport but still to enhance through satisfy the nodes.
- **Sign and legibility:** Nyaruguru has signage which is not well welcoming and visible at all.
- **Utilities:** Nyaruguru has utilities that have to be improved and provide sufficient ones.

- **Buildings and Landmarks:** Nyaruguru has many landmarks that could be a potential to Urban Design where in Nyaruguru District town, we have: Kibeho, Ndago, Kibeho holy land, Radio Maria, Nyaruguru Modern Market, District office.

In **Munini** we have: Munini Hospital, Munini IDP model village, Agakiriro

Cyahinda: Cyahinda Memorial, Cyahinda health center

- **Recreational activities and vibrancy:** Regarding reactional and vibrancy in Nyaruguru are key to produce a sustainable town.

A. Landscape Structures in Nyaruguru District Town

The Landscape Structures in Kibeho Town are not well developed according to its topography and wetland as an opportunity. The CBD is not well developed as complex requirement of outdoor design community and environment planning, where there are no vibrate due to lack of mixed-use development and integration of greening in the Cities. As town locate in the hill would be an opportunity to create good landscape.

However, towns locate on topography there is no integration of that topography in developing urban and landscape structure. There is no developed streetscape, lighting for secondary roads and high-rise building to accumulate a vibrate town.

B. Landscape Structures in Munini Rurban Center

Landscape structures are well natural creates an opportunity to Munini Rurban Center due to its location and social economic activities that carried out on this area. Munini has started to develop integrated project small, but without mixed use development to produce a liable landscape. But they have started developing public facilities and infrastructure to produce more sustainable Rurban.

Munini Rurban will be an opportunity to provide streetscape, opens space, mixed use development, lighting and connectivity to produce sustainable community design and environmental diversity.

C. Landscape Structures in Cyahinda Rurban Center

Cyahinda is a Rurban Center that have a big potential in landscape through its location and topography. Existing landscape structures in Cyahinda Rurban Center are commercial areas, schools, Memorial

and religious facilities integrated with Healthcare facilities but lack serviced infrastructure to be promoted to a big scale.

Cyahinda Rurban doesn't have lighting, managed public open spaces, no frontage design, no parking, no integration between the commercial areas, residential and ecotourism areas. However, Cyahinda could be well integrated to another level regarding urban and landscape structure for promoting Nyaruguru District.

4.2.4.3 The impact of Landscape Structures on Social and Economic Livelihood in Nyaruguru District

Nyaruguru District Landscape Structure has some linkage to neighboring districts like Huye, Gisagara, and Rusizi there is a linkage to commercial, Transport and Tourism.

This Landscape Structure provides a big role on social livelihood for attractive and active emergency trading center, planting and green infrastructure to reduce flooding in the risk areas, promote land consolidation and incremental development, improve legibility and wayfinding.

4.2.4.4 Proposed Urban Design and Landscape in Nyaruguru District

The PUSH program must be streamlined and have in place use of green planning, and technology approaches used in the urban development programs, i.e., enhance the green city concepts in the developments. Where green transportation system, green infrastructure is recommended for all the urban developments, there should be identification and strengthening of the value of greenbelts and green spaces to promote sustainable and affordable City.

Urban design and Landscape structure plan derived can proudly be said as an outcome of a bottom up approach. Along with addressing the city requirements, the Urban Design area intends to increase tourist stay, enhancing commercial by:

- Diversifying Kibeho tourism products;
- Curating the commercial programs through tourism.

In Nyaruguru District, the urban planning approaches will be promotion of affordable housing, recreational activities and sport for all, installation of public lighting, greening, mix use development and mix income development.

According to the development of Nyaruguru District, the people need to have affordable housing related to mixed use and mixed income development in order to achieve sustainable community. Within those community needs recreational areas like Playground and open spaces for entertainment, healing and leisure. Not only that but also needs vibrant city which promotes social economic in the district and other green infrastructure to satisfy Nyaruguru population. In fact, in Rural settlement must have public facilities and recreational facilities that have all accessory to serve the concerned areas. However, in Urban areas must be beyond that according to facilities for promoting social cohesion. There will be welcoming signage of the city, recreational, opens space with urban furniture that promote sustainable city.

To achieve sustainable landscape structure in Nyaruguru District some measures would be recommended such as:

To promote the mixed-use income development with different typologies that allow incremental development to settle in densification but in sustainable ways this will promote investors.



Figure 13: Urban design in Nyaruguru, Showing densification (Source: Drawings by NLA Engineering Team, 2023)

To provide green transportation that show a well-designed streetscape include public lighting, green areas, carriage, bicycle lane, paths and drainage areas. However, some public furniture must be introduced to allow social cohesion and a vibrant city.

According to the topography of Nyaruguru landform conservation strategies to avoid uncontrolled site benching and leveling should be promoted and avoid new developed informal settlements except upgrading existing ones.

To promote social activities by providing recreational and sport facilities in Nyaruguru District. Not only that but also promote the areas as tourist areas like lake shore of Nyaruguru and introduce activities and uses to make the garden safe, active and multifunctional in all times.

Propose a new road network that optimizes the road infrastructure and provides alternative parking sites with improved public transport in the way of mobility. Where the city must easily promote legibility and wayfinding.





Figure 13: Urban design in Nyaruguru District

4.3 Transportation

4.3.1 Existing situation

Currently, Nyaruguru District is crossed by a macadamized road which serves as the national road from Huye to Burundi. In addition, Nyaruguru District has a newly constructed road from Huye to

Kibeho which serves as public transport from Huye taxi park to Kibeho Taxi Park to the District, the Road cross cuts the district and meets the National Road from Huye to Burundi.

Furthermore, there are different feeder roads under construction in the district, which will facilitate the internal movement in the district and transport of agricultural inputs and harvest to markets; the communication with other Districts.

The feeder roads to be developed are:

- ***Ndago- Cyahinda- Nyagisozi- Ngoma:*** This alignment starts from Ndago where the District Headquarters of Nyaruguru is located. This alignment begins in a 4 legged junction with National Road 9 and Road 13. This is predominantly a hillside alignment and generally follows an ascending gradient towards fold and descend towards trough.

- ***Kibeho- Mata- Ruramba :*** This Road begins from National Road NR9 at

Kibeho which is about 7km south of Nyaruguru District headquarters. Kibeho is the most important business center and also a lot of religious tourists arrive here. From here, the road traverses generally in the northern direction and ends at a minor bridge where the alignment meets the Nyaruguru Nyamagabe District boundary.

- ***Munini- Kamana- Giswi- Gatunda-Remera :*** The road starts at Munini, a T junction on National road 9(NR9). Munini is located about 6.5 km from the District Headquarters and is reached by NR9 from Ndago. This road forms an important links in the road network of Nyaruguru as it connects Sheke on Sheke- Akanyaru- Cyahinda road at km6+500, Giswi on Ryabidandi- Viro-Akanyaru- Giswi road at km9+500 and

Runyombyi on Runyombyi (Ryagwiza)

– Nteko- Kirarangombe- Nkanda road at km13+550 before meeting National Road 9 at Remera. This road also provides a shorter connectivity to Remera from Munini compared to NR9. It runs in the southern direction up to Giswi and then traverses in the south western direction to reach Remera.

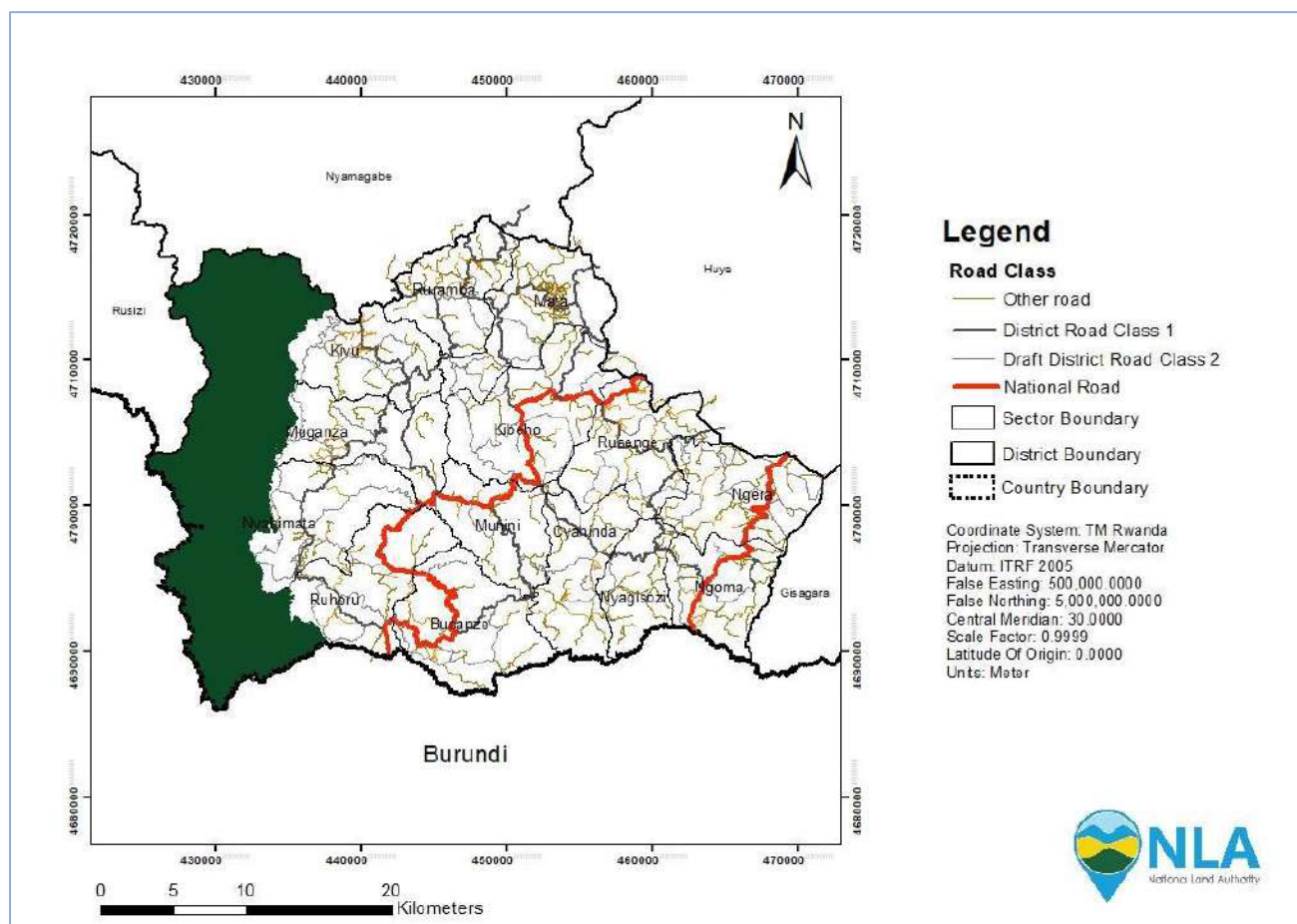
- ***Nshili- Rugogwe- Kabere- Nshili Tea Factory- Kabere:*** This road alignment starts from Ruheru on NR9 and ends at Giswi on NR9. Giswi is on the north east of Reheru but this alignment follows a longer route traversing in the north western direction up to Nshili Tea factory and then proceeds to Rugogwe in the north east direction and finally runs towards south west direction to reach

Giswi. Even though Giswi is shorter through NR9, this alignment has its importance as it provides National Road connectivity to Munini- Muganza- Rukore- Bigugu-Nyabimata road and Ruyenzi-Uwimbogo-Remera road which are otherwise not properly connected.

- ***Muganza-Buruhukiro-Rubumburi-Rugerero- RDB(Nyungwe)*** : About 10 km of this road passes through Nyungwe National Park buffer zone. Muganza is about 13.5km from District Headquarters and is reached by NR9 and a District road. This alignment is on hilly terrain mainly following hillside alignment.
- ***Munini- Muganza- Rukore- Bigugu-Nyabimata:*** This Road starts from Rukore on end of Muganza-Buruhukiro-Rubumburi-Rugerero-RDB(Nyungwe) road and ends at Giswi on NR9. This alignment also gives an exit route to traffic from Muganza-Buruhukiro-Rubumburi-Rugerero-RDB(Nyungwe) road. This road passes through the forest buffer zone of Nyungwe National Park from Rukore for 1.08 km distance and then runs through a populated area.
- ***Ryabidandi- Viro- Akanyaru- Giswi:*** Giswi is on Munini- Kamana- Giswi-Gatunda- Remera Road and is about 15km from District Headquarters and is reached by travelling through NR9. This alignment traverses in East direction up to 7.5km and then proceeds to northern direction to reach Ryabidandi on Ndago-Cyahinda- Nyagisozi- Ngoma road.
- ***Sheke- Akanyaru- Cyahinda:*** Cyahinda is on Ndago- Cyahinda- Nyagisozi- Ngoma road and is about 7 km from District headquarters. This alignment traverses towards south west up to 6km and then proceeds to north western direction to reach Sheke on Munini- Kamana- Giswi-Gatunda- Remera Road.
- ***Rusenge-Cyahinda:*** Cyahinda is on Ndago- Cyahinda- Nyagisozi- Ngoma road and is about 7 km from District headquarters. This alignment traverses North to reach Rusenge Sector on NR9.
- ***Huye - Rusenge - Ngera - Nyagisozi:*** Nyagisozi is on Ndago- Cyahinda-Nyagisozi- Ngoma road and is about 14 km from District Headquarters. This alignment traverses North East and ends on a bridge located on Huye border near Gishamvu. From the end point, road further proceeds towards Huye District.
- ***Ruyenzi- Uwimbogo- Remera:*** Alignment starts from Nishli Tea Factory which is about 500m from Nshili- Rugogwe-Kabere- Nshili Tea Factory-Kabere Road. This alignment runs generally in the northern direction to Remera on NR9. This alignment predominantly passing through tea plantation area.
- ***Ndago- Akavuguto- Rusenge:*** This alignment starts from Ndago, the district headquarters of Nyaruguru and runs generally towards eastern direction to Rusenge on Rusenge- Cyahinda road.

Rusenge is also connected through NR9 but this route together with last leg of Rusenge- Cyahinda road alignment forms an alternative connection.

- **Runyombyi (Ryagwiza) – Nteko-Kirarangombe- Nkanda:** This road starts from Nkanda and follows the ascending direction towards Runyombyi on Munini- Kamana- Giswi- Gatunda-Remera Road.



Map 12. Transportation Network Map

4.3.2 Planning perspectives

In order to develop green urban development in Nyaruguru District, Transport systems that are accessible, safe, environmentally friendly and affordable will be developed. The Rwandan rapid economic development and reliance on fossil fuels/petroleum-based modes of transport has direct links to air quality and greenhouse gas (GHG) emissions, climate change, and decreased quality of life.

Low-carbon transport solutions support reducing reliance on petroleum-based modes of transport and increased emphasis and encouragement of non-motorized and low-carbon transport.

Central to low-carbon transport solutions is Transit Oriented Development (TOD) that considers mass transit/multimodal transport hubs supported by high-density residential and mixed-use development along corridors and activity nodes/centers. Well-integrated transit and land development facilitates urban forms that reduce the need for travel by private motorized modes. Enhancing urban areas through good design that create spaces that are accessible, walkable, include city greening, green infrastructure (e.g., flood control), and serviced by efficient public transport become attractive places for people to live while simultaneously helping reduce local pollution and GHG emissions and improving living conditions.

The Rwandan Public Transport Policy forms the guideline development for the public transport plan for Nyaruguru discussed in the following paragraphs. The following table proposes road standards in Nyaruguru roads being in rural and urban areas.

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	Street service Roads	9 m (4.5 X 2)

Table 10: Nyaruguru Recommended Road Network Classification

However, according to the Article 214/12/2012 of the 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, Nyaruguru DLUP determined dimensions of the road reserve for some commercial centers based upon convincing factors agreed during on field consultations with local authorities.

▪ **ROW Cross-sections**

There are mainly four road classifications: National roads, District Road Class 1 & 2 and other roads. According to Law N°55/2011 of 14/12/2011 governing roads in Rwanda, the 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 calculated and shown below for the different scenarios for areas with and without available space.

Dual carriage National Road/ High-Capacity urban roads of Nyaruguru CBD, Munini and Cyahinda urban areas of 28m ROW.

- o Lane Width: 3.5m
- o Dual carriageway: $3.5 \times 4 = 14\text{m}$,
- o Shoulder and Green space: $3 \times 2 = 6\text{m}$,
- o Median width = 1m,
- o Footway in urban conditions: $2 \times 2 = 4\text{m}$
- o Road reserve: $1.5 \times 2 = 3\text{m}$

The expected ROW for a dual carriageway urban road will require $14 + 6 + 1 + 4 + 3 = 28\text{m}$, for a dual carriageway with 2 lanes per direction.

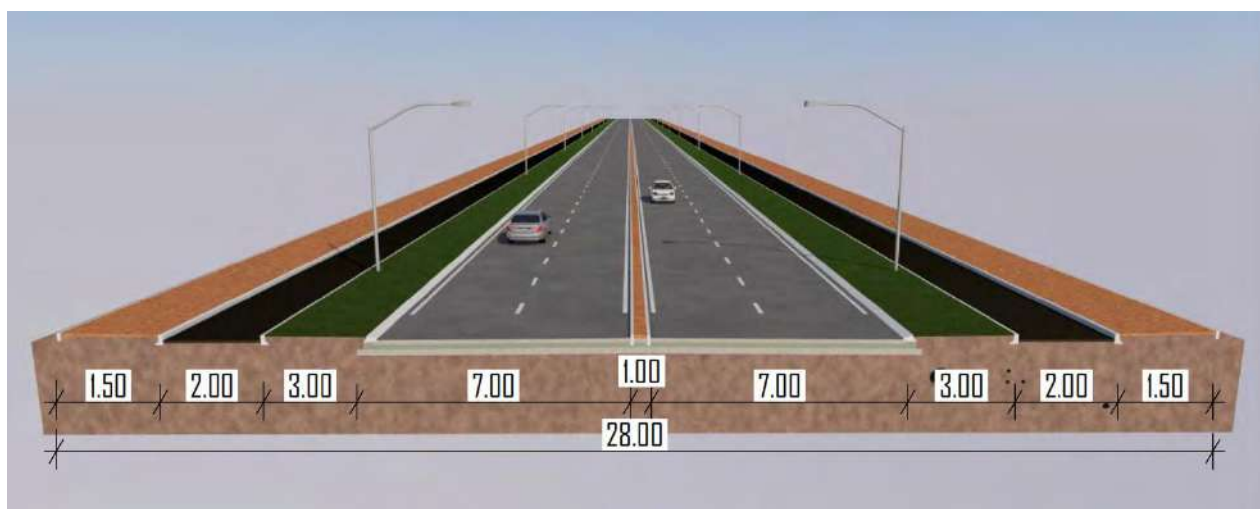


Figure 14: Dual carriage National Road/ High-Capacity urban roads of Nyaruguru CBD, Munini and Cyahinda urban areas of 28m ROW.

- o Lane Width: 3.5m
- o Single carriageway: $3.5 \times 2 = 7\text{m}$,

- o Shoulder and Green space: $3 \times 2 = 6\text{m}$,
- o Median width = 1m ,
- o Footway in urban conditions: $2 \times 2 = 4\text{m}$
- o Road reserve: $2.5 \times 2 = 5\text{m}$

The expected ROW for a dual carriageway urban road will require $7+6+1+4+5 = 23\text{m}$, for a dual carriageway with 2 lanes per direction.

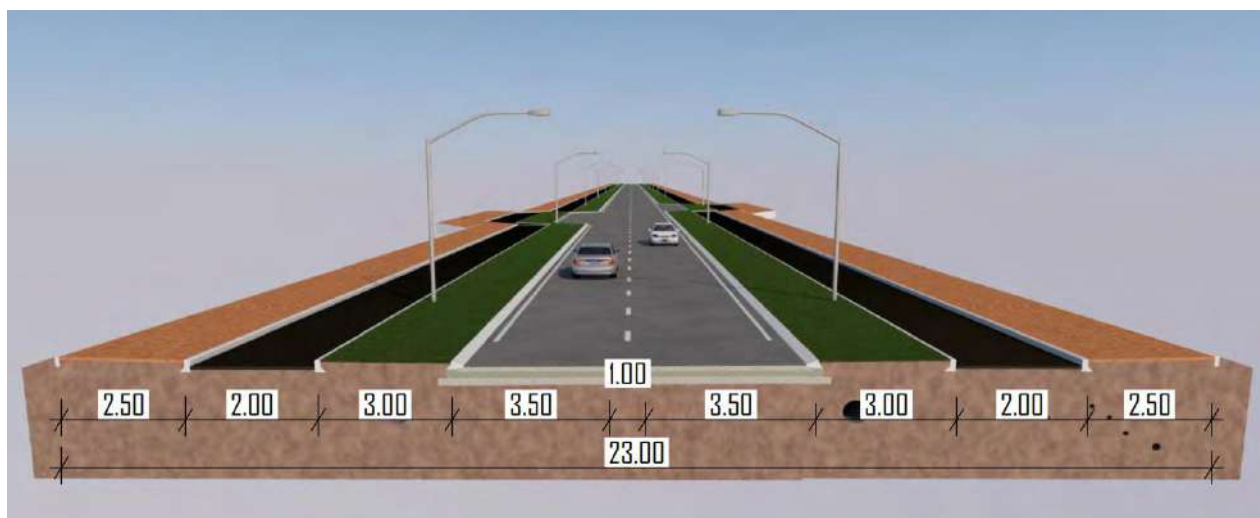


Figure 15: Single carriage National Road/ High-Capacity urban roads of Nyaruguru CBD, Munini and Cyahinda urban areas of 23m ROW.

Primary local road in communities – 8-12.5m for Brown and 12.5 for Greenfield.

- o Lane Width $3 \times 2 = 6\text{m}$
- o Footpath $1.5 \times 2 = 3\text{m}$
- o Road Reserve $1.5 \times 2 = 3\text{m}$

This is $6+3+3 = 12\text{m}$ ROW is acceptable.

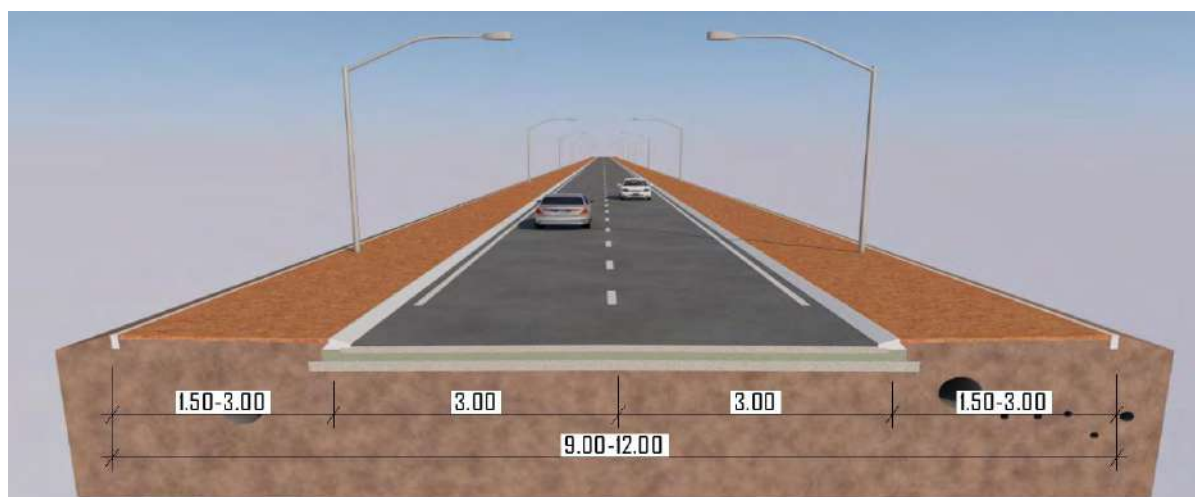


Figure 16: Primary local road in communities – 8-12.5m for Brown and 12.5 for Greenfield.

- NMT – 3m for rural settlement sites without road accessibility

Footway $1.5 \times 2 = 3\text{m}$

4.4 Public facilities

Public facilities are defined as institutional responses to basic human needs, such as Healthcare facilities, Education and Research facilities, religious facilities, recreation, Cultural/memorial sites and Cemetery/ Crematoria. Public facilities contribute to the quality of life for both individuals and groups in the community. They provide convenient and efficient services, a sense of identity, and define the visual character of the city.

4.4.1 Healthcare facilities

4.4.1.1 Existing Situation of Healthcare facilities

Rwanda's health system has observed several transformations that were translated into a significant improvement in geographical and financial access to medical facilities in the country. Modern equipment has been available for the proper diagnosis and treatment of diseases. With over 84% of Rwandans insured by the Mutuelle de Santé, Rwanda has ensured that the citizens have access to primary health care, which aims to guarantee access to health care for all.

RHPC (2022), indicates that life expectancy has increased from 51.2 years in 2002 to 69.6 years in 2022. The crude death rates declined from 17.1 deaths per 1000 population in 1978 to 6.3 per 1,000 population in 2022. Over 90% of children are vaccinated in Rwanda. These and more achievements

hinge on efficient health service delivery. Currently the number of hospitals has increased from 34 in 1994, to 48, including 8 national referral hospitals, 4 provincial hospitals and 36 district hospitals. (NLUDMP 2020-2050).

Vision 2050 offers a comprehensive health care system, including quality care for non-communicable diseases and common place screening for preventable forms of diseases. Health service delivery systems will further be decentralized down to community levels, with patients receiving primary care near home and increasingly able to get specialized treatment at decentralized levels.

Nyaruguru District has healthcare facilities of various hierarchies that are evenly spatially distributed throughout the district. There is one District Hospital (Munini District Hospital) that refers to the front-line hospital in Nyaruguru District. That hospital serves a whole district surrounding, and with competence and facilities for providing secondary medical care to patients requiring hospitalization and the knowledge of experienced doctors.

The hospital provides “Complementary package of activities” (CPA) and treatment of complicated cases compared to other Healthcare facilities located in Nyaruguru District. It also provides care to patients referred by the primary health centers as well as carrying out planning activities for the district health and supervising district health personnel.

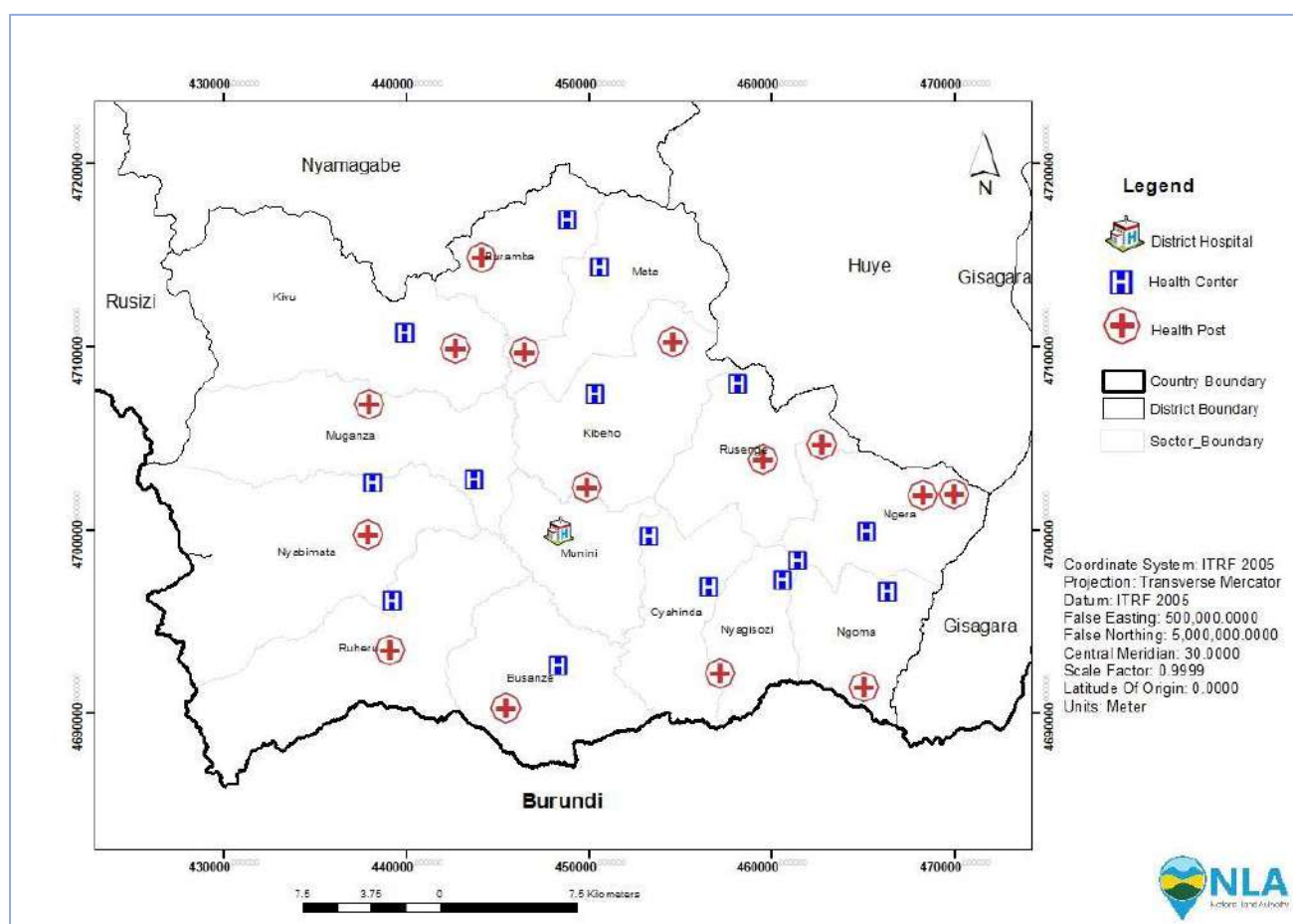


Figure 17: Munini District Hospital

Beside the Munini District Hospital, there are 15 Health Centers and 33 Health Posts were constructed in Nyaruguru District aiming at increasing access to essential primary care by reducing barriers such as cost, lack of insurance, and long distance done by the patients looking for health care facilities.

Within the health sector, problems like mothers giving birth at homes, quality and access of healthcare facilities in rural areas are still a big challenge. Also, high population growth and insufficient medical equipment in Health Centers and District Hospital are challenges affecting health services within the district.

Nyaruguru District has the percentage of households with health insurance (Mutuelle de Santé) 88% and the number of RSSB medical insurance scheme is 12,727 people where affiliates are 4,448 and dependents 8,279. (SYB,2021). It is of great importance to continue this achievement by assuring that every individual or household is insured.



Map 13: Existing Healthcare facilities distribution Map

4.4.1.2 NLUDMP 2020-2050 recommendations in line with healthcare Services

According to National Land use and Development Master Plan (NLUDMP 2020-2050, 2020-2050), it is proposed the following health standards structures:

- Community health organized in all clustered rural settlements sites;

- Provincial Hospital :2 Per Province
- District Hospitals :2 in each district
- Health centers :2 in each sector of the district
- 1 Health Post for future proposed village sites
- Any new health facility to be built within urban and rural settlement boundaries and vertical construction of buildings should be recommended.

4.4.2 Educational facilities

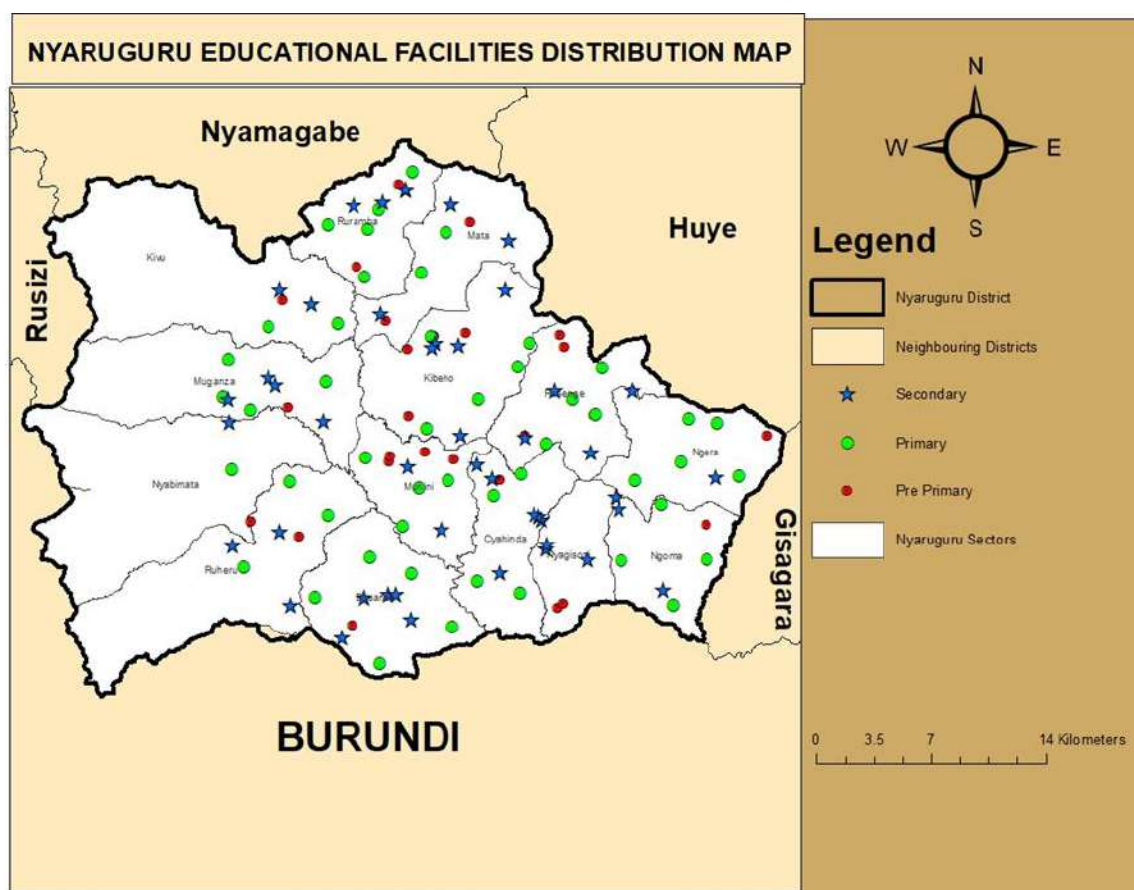
4.4.2.1 Existing Situation Educational Services

In Nyaruguru District, the net attendance rate in primary schools is 86.5% and secondary schools enrolment rate is 19.4%. These percentages rank the district at the first position in the Southern Province. Computer literacy rate for persons of 15 years and older stands at 5.8% (EICV5). The percentage of promotion rate in primary school was 64.7%, the percentage of repetition rate in primary school 31.3%. The percentage of promotion rate in secondary school was 84.8%, and the percentage of repetition rate in secondary school was 5.4% (EICV5).

According to Nyaruguru District Development Plan 2018, the number of students (primary, secondary and TVETs) was 91,727 pupils: almost 26% of the total population. The number of classrooms per school was 10, which means one class has 77 pupils in primary and 38 pupils per class in secondary, a reasonable average for the district. The number of pupils per school equals 798 pupils in primary school and 369 pupils in secondary.

Regarding the numbers of educational facilities, In 2022, there were 222 pre-primary classrooms, 1,236 primary school classrooms, 598 general and professional secondary school classrooms and 83 TVET school classrooms, as per 2022/23 education statistical yearbook, MINEDUC.

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 bad condition and their rehabilitation must come to a start.



Map 14: Nyaruguru Educational facilities Distribution Map

4.4.2.2 Planned Educational Services

The government's targets to reach upper middle-income status by 2035 will involve intense improvements in both the amount 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).

a) NLUDMP 2020-2050 Recommendations in Education Sector

i) Nursery and Primary Education by 2050

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

- Average class size: 35 pupils/class
- Average school size: 840 pupils
- Required size for a nursery school: 0.5Ha;
- Required size for a primary school: 1Ha.

ii) Secondary, Vocational and technical Education by 2050

According to NLUDMP 2050, the following standards and parameters have been established for secondary education, which will support to reform the quality and quantity.

- Enrolment rate will be 90 %;
- Average class size: 35 pupils/class;
- Average school size: 840 pupils;
- Required size for a secondary school: 1.5 Ha;
- Required size for vocational and technical school: 2 Ha.

The education level in Rwanda remains low despite the policies such as mandatory education for nursery school is organized in a single cycle of three (3) years. A pre-primary cycle (Nursery) admits children aged at least three (3) years old and completes nursery school at least 5 years, A child starts primary school at the age of at least six (6) years old and primary schools are organized in a single cycle of six (6) years. It indicated that the child completes primary school at age 11. A learner begins secondary education at the age of at least twelve (12) years old, Secondary education is provided through the two (2) cycles include the first cycle of ordinary level of education which lasts for three (3) years and the second cycle of secondary education is comprised of three (3) fields of study such as professional courses, various combination of courses like sciences, humanities, languages in addition with Technical and vocational education. Each cycle of secondary education lasts for three years and is completed by a national examination with the award of a certificate. (Law determining the organization of education, 2021)

In the preparation of Nyaruguru DLUP for the 2050 horizon year, there will be an increase of students with direct impacts on existing schools for the whole District. There is a serious demand for nursery, primary and secondary new classrooms. Jointly both public, FBO, NGOs and private sectors have to be aware of such a situation to urgently respond to this future demand. According to the statistical projections, the following tables reflect the increase in numbers of classrooms up to the year 2050.

The projection of education facilities and the calculation of classrooms needed to accommodate all school-age children to implement the Education for all policy will be applied on the total population with RPHC5, 2022 and 2022/23 Education Statistical Yearbook as base.

b) Projected number of education facilities in Primary education*Table 11. Needed classrooms for nursery education from 2022 up to 2050*

Pre-primary education						
Description	2022	2030	2035	2040	2045	2050
Total Population	318,126	358,437	386,186	416,083	448,295	483,000
Pre-primary (3-5) years old	26,624	29,998	32,320	34,822	37,518	40,422
Existing Classrooms	222	-	-	-	-	-
Classrooms to be constructed for each planning period	539	96	66	71	77	83
Total number of classrooms at the end of each planning period	761	857	923	995	1,072	1,155
Total classrooms to be constructed (Cumulatively)	539	635	701	773	850	933

Source: RPHC5,2022; 2022/23 Education Statistical YearBook and NLUDMP 2020-20250

Considering the trend of population growth and number of children who would be aged 3-5 years old the projected information for pre-primary level in Nyaruguru District will need 933 classrooms by 2050 which will be necessary to reduce the overcrowding and promote early education for the children.

c) Projected number of education facilities in primary education*Table 12. Needed classrooms for primary education from 2022 up to 2050*

Primary Education						
Description	2022	2030	2035	2040	2045	2050
Total Population	318,126	358,437	386,186	416,083	448,295	483,000
Primary (6-11) years old	49,035	55,248	59,526	64,134	69,099	74,448
Existing Classrooms	1,236	-	-	-	-	-
Classrooms to be constructed for each planning period	165	178	122	132	142	153
Total number of classrooms at the end of each planning period	1,401	1,579	1,701	1,832	1,974	2,127

Total classrooms to be constructed (Cumulatively)	165	343	465	596	738	891
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Source: RPHC5,2022; 2022/23 Education Statistical YearBook and NLUDMP 2020-20250

Conferring to the projected results, this table presents the inadequate of classrooms in primary level from 2022 to 2050 as the population growth rises, there will be increase of children who joins the primary schools which implies that 891new classrooms will be needed in order to satisfy the standards of 35 children per classroom.

d) Projected number of education facilities in secondary education

Table 13. Number of Secondary schools needed up to 2050.

Secondary Education						
Description	2022	2030	2035	2040	2045	2050
Total Population	318,126	358,437	386,186	416,083	448,295	483,000
Secondary (12-17) years old	50,347	56,727	61,118	65,850	70,948	76,440
Existing secondary education classrooms	681	-	-	-	-	-
Classrooms to be constructed for each planning period	757	182	125	135	146	157
Total number of classrooms at the end of each planning period	1,438	1,621	1,746	1,881	2,027	2,184
Total classrooms to be constructed (Cumulatively)	757	940	1,065	1,200	1,346	1,503
Required TVET Classrooms (60%)	454	564	639	720	808	902
Required General secondary Classrooms (40%)	303	376	426	480	538	601

Source: RPHC5,2022; 2022/23 Education Statistical Yearbook and NLUDMP 2020-20250

Referring to the table above, if the existing schools meet the NLUDMP 2020-2050 standards, i.e. 35 children per class and 840 children per school, there will be construction for new classrooms and extension of different schools. This will need to build an average of 902 classrooms for TVETs and 601 for General Education by 2050.

Therefore, both public, churches, non-governmental organizations and private sectors have to be conscious of such a situation to directly respond to this future demand by investing in education. Vertical construction of school buildings is required to reduce high densification of pupils in schools.

4.4.3 Public Administrative Entities for Nyaruguru

Public administration is a field in which leaders serve communities to advance the common good and a positive change effect. Public administration is a cooperative effort of a group of people in pursuit of a common objective in the process of managing public affairs.

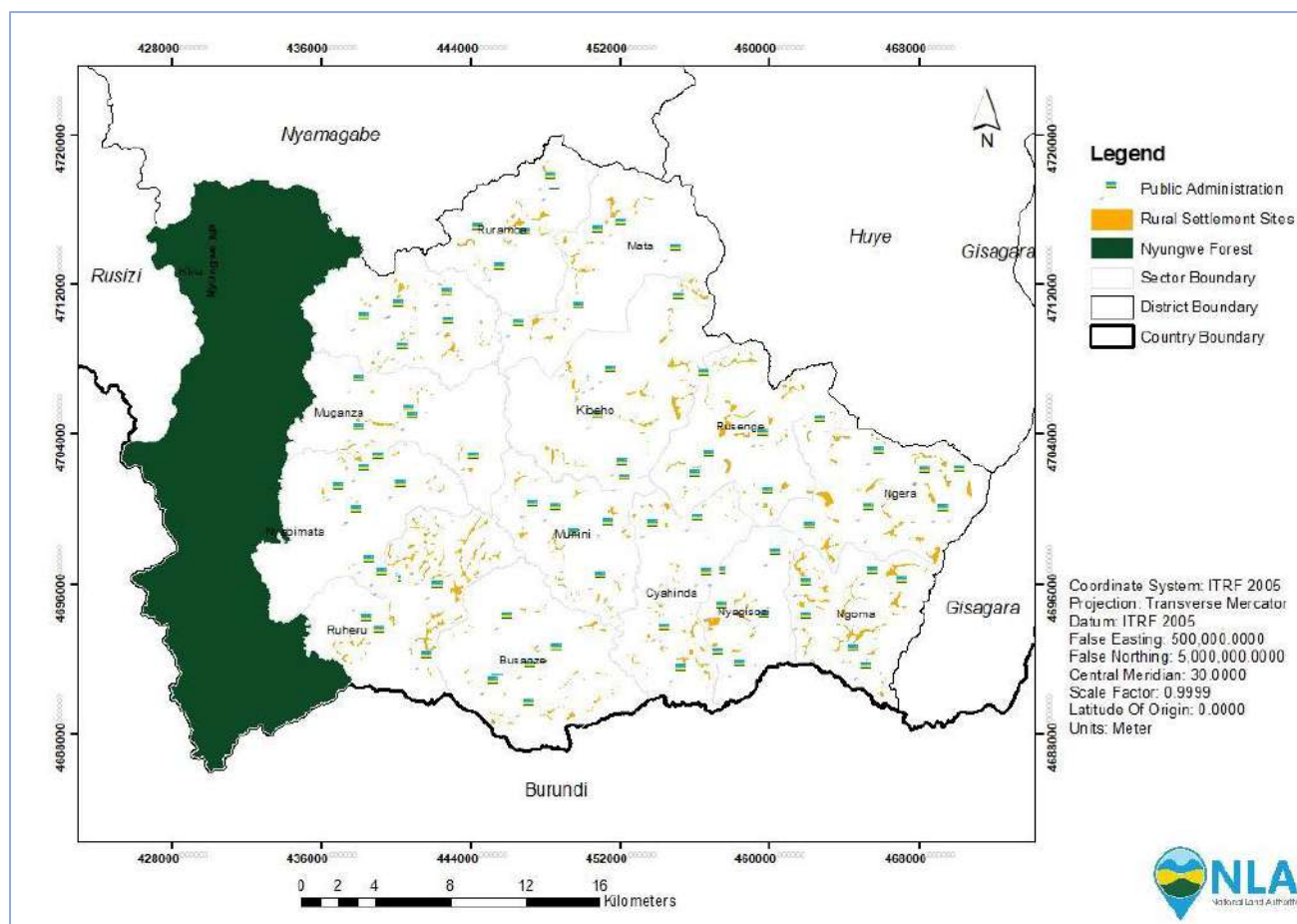
Administrative planning is more productively defined as a process than as an administrative function, a process which intends to be used to help leaders decide on priorities or actions on the allocation of resources.

4.4.3.1 Existing Public Administrative Entities

In Nyaruguru District, there are 14 sector offices which are Busanze, Nyagisozi, Kibeho, Cyahinda, Munini, Mata, Nyabimata, Ngoma, Ngera, Ruheru, Ruramba, Rusenge, Muganza and Kivu. 72 cell offices, and 332 villages but only 6 cells have no cells offices and other obstacles, most of cell offices do not have electricity. Cells like Shororo, Uwumusebeya, Nyamirama, Kimina, Cyankirankora need to be reconstructed and to be upgraded by increasing their sizes because they are too old and small to host all staff members and their documents.

Nyaruguru District town counts different existing public administration and government setups like Kibeho Primary Court, Nyaruguru District correction service, District Office, sector office, cells and village offices, Police and RIB headquarters, public facilities like Munini District Hospital.

A variety of public administration facilities exist in Nyaruguru District and were visited and mapped during data collection in order to keep the existing situation for further decision-making. Spatial location of different public offices has been well identified.



Map 15: Map of existing location of public administration

4.4.3.2 Planned Public Administrative Services

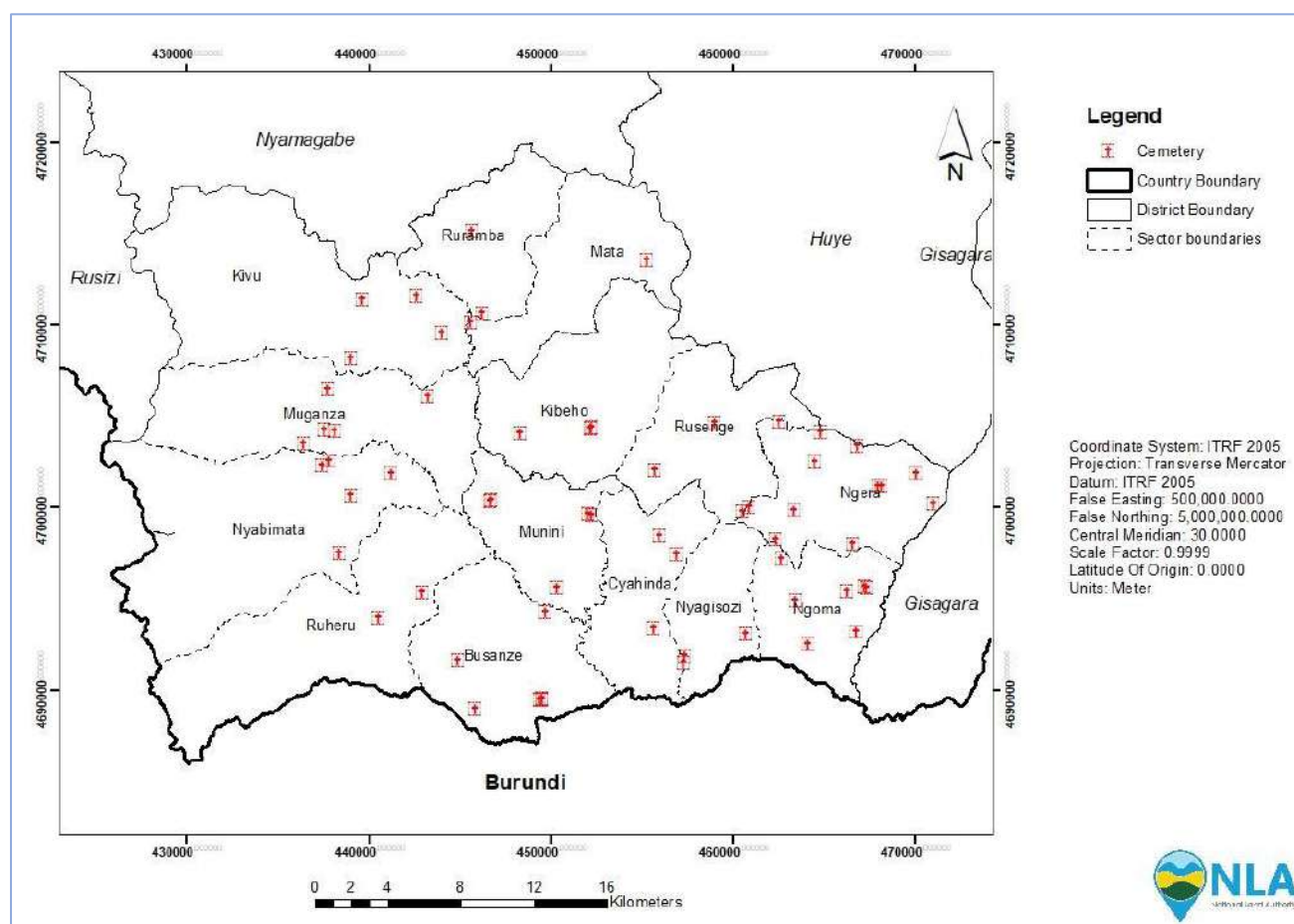
In the preparation of Nyaruguru DLUP for the 2050 horizon year, the recommendations for Decentralization of public services will be emphasized and implemented at local level for the purposes of citizen-based governance.

There are cells with no offices and in preparation of Nyaruguru DLUP Planned for constructing the new cell offices and upgrading the buildings of some offices.

4.4.4 Cemetery and Crematoria

Nyaruguru District has 67 Cemeteries located in different Cells; However, some Cells do not have cemetery.

4.4.4.1 Spatial distribution of cemeteries in Nyaruguru District



Map 16: Spatial distribution of cemeteries in Nyaruguru District

4.4.4.2 Planning perspectives of cemeteries in Nyaruguru District

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 Nyaruguru District

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

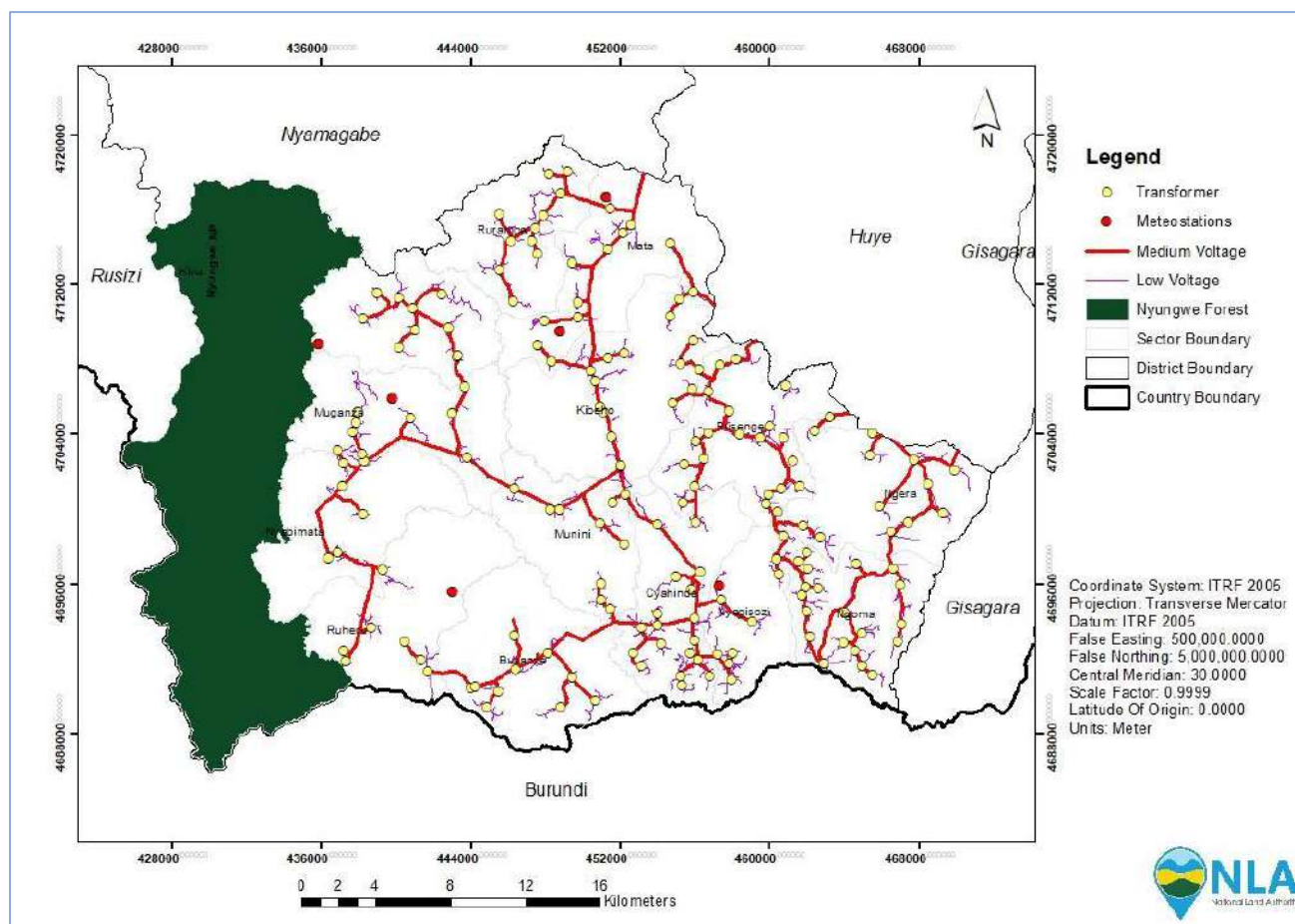
- There should be enough campaign activities to raise awareness as well as facilities for promoting cremation, so that the Rwandan communities adapt to that culture.
- Instead of using tiles and concrete structures while building tombs, there should be a proposal of using natural degrading mechanisms 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 incentives in place for adopting the new methods in burials

4.5 Public utilities

4.5.1 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.

According to RPHC (2022), 65.8% of households in Nyaruguru District have access to electricity. The primary sources of energy for lighting include electricity from REG (32%), solar power (33%), flashlights or phone flashlights (19.6%), and firewood (10.4%). For cooking, firewood is the dominant energy source, used by 95.4% of households, followed by charcoal at 3.3%.



Map 18. Electricity distribution map

Table 14: 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	Kivuwatt, 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 m² 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

4.5.2 Water

Water and sanitation are a critical component of the development of a Nation. WASAC, the body responsible for water and sanitation, has two sources of water where they have treatment plants. The supply and management of potable water in the urban, rural urban and rural areas of Nyaruguru District mainly is in charge of Water and Sanitation Corporation (WASAC). In some cases, operations and maintenance of rural water supply systems and schemes in different parts of the district are carried out by private companies.

S/ N	Network Name	Type	Served Sectors	Ownership	Network Length (km)	Capacity (m3/ day)
1	AGAKOMA-MUNINI	Gravity	Munini	DISTRICT	1.743	21.6
2	KABIRIZI-NDAGO	Gravity	Munini, Kibeho	DISTRICT	8.202	17.28
3	BISHAKA-ZIRAMBI	Gravity	Ruheru	DISTRICT	3.945	43.2
4	AGATARE	Gravity	Rusenge	DISTRICT	2.067	69.12
5	UMUHAGA	Gravity	Rusenge	DISTRICT	2.787	17.28
6	KAZIBAZIBA	Gravity	Ruramba, Mata, Kibeho	DISTRICT	49.1	224.64
7	NYAKAGEZI	Gravity	Karama, Kibeho, Rusenge	DISTRICT	37.36	95.04
8	AKABONOBONO	Gravity	Mata, Kibeho	DISTRICT	14.31	138.24
9	NYARUGANO-RWAMIKO	Gravity	Ruramba, Mata	DISTRICT	16.92	146.88
10	NYAMUNYURA-MATA	Gravity	Ruramba, Mata	DISTRICT	14.67	103.68

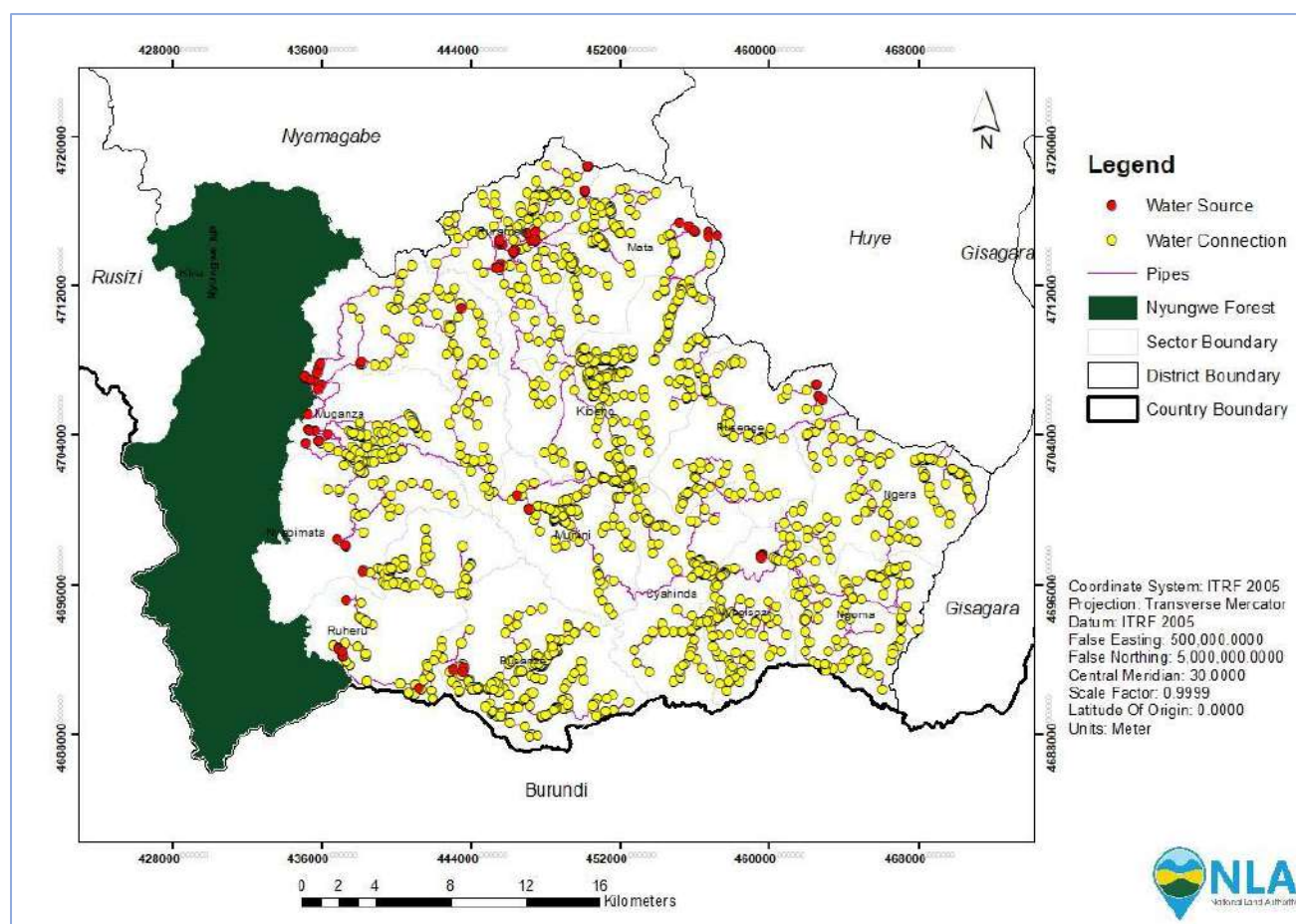
11	NYUNGWE-NDAGO-COKO	Gravity	Kivu, Muganza, Ruramba, Mata, Kibeho, Munini, Cyahinda	DISTRICT	176.2	933.16
12	NYARUHONDO-RURAMBA	Gravity	Ruramba	DISTRICT	9.76	51.84
13	KIREKIRE-TANGABO 1	Gravity	Muganza	DISTRICT	4.3	43.2
14	MISHUNGERO	Gravity	Ruheru	DISTRICT	21.26	69.12
15	KIREKIRE-TANGABO 2	Gravity	Muganza	DISTRICT	16.72	60.48
16	KINTARE	Gravity	Kivu	DISTRICT	7.91	25.92
17	RUSUZUMIRO	Gravity	Kivu	DISTRICT	4.72	8.64
18	CYAHAFI-BUSANZE	Gravity	Ruheru, Busanze	DISTRICT	67.95	371.52
19	YANZA	Pumping	Ruheru	DISTRICT	19.02	388.8
20	KABERE-GIHEMVU	Gravity	Nyabimata	DISTRICT	17.2	216
21	MARABA-KIBANGU	Gravity	Nyagisozi, Ngoma	DISTRICT	14.3	103.68
22	IBISI-GASASA	Gravity	Mata	DISTRICT	7.048	129.6
23	MATA GRAVITY	Gravity	Mata	WASAC	2.077	34.56

24	KIREKIRE – NYABIMATA	Gravity	Muganza, Nyabimata	WASAC	8.708	51.84
25	MATA COMPLEX SYSTEM	Complex	Rusenge, Ngera, Ngoma, Gishamvu, Mukura, Nyanza	WASAC	135.06	509.76
26	NYABIMATA- COMPLEX SYSTEM	Complex	Muganza, Munini, Cyahinda, Nyagisozi, Ngoma, Ngera, Kigembe, Mukindo	WASAC	311.78	1036.8
Total					975.117	4911.88

Table 15: water distribution network available in Nyaruguru District and their daily capacity supply.

Table 15 briefly describes the water distribution systems in all NYARUGURU Sectors, their length, operational status, capacity and total daily water supply capacity of all Nyaruguru networks. Nyaruguru District has 26 operational water distribution networks consisting of 23 gravity water distribution networks, 2 water complex system distribution networks (gravity combined with pumping system) and one pumping water distribution network. Daily water supply capacity of all water networks in Nyaruguru District is about 4911.88 m³/day.

A big part of Nyaruguru District is covered by water connection, each sector has at least one water distribution system. However, there is shortage of water in different parts especially in Cyahinda, Ngoma Ngera and Nyagisozi sectors due to insufficient water pipelines and insufficient capacity of current water networks.



Map 17: the water distribution network.

4.5.2.1 Water supply and demand for Nyaruguru District

Nyaruguru District	2022	2035	2050
Urban population	13154	137500	250000
Urban water demand per day in m ³ (80l/p/d)	1052.32	11000	20000
Rurban population	9788	27122	49314
Rurban water demand per day in m ³ (60l/p/d)	587.28	1627.32	2958.84
Rural population	295184	230766	179999
Rural water demand per day in m ³ (40l/p/d)	11807.36	9230.64	7199.96
Total water demand per day in m ³ per day	13446.96	21857.96	30158.8
Total population	318126	395388	479313

Table 17: current and future water demand.

According to WASAC, the average consumption of water in the district is divided into 3 categories: urban area, rurban areas and rural areas. The water supply in Nyaruguru District is about 4,912 m³ per

day. Based on Table1, the current water demand (2022) of the residents in Nyaruguru District is about 13,030 m³ per day.

If there are no efforts to increase the water supply from 2022 (4,912 m³/day), the district will have the following deficits in water supply:

Current water availability (2022) = 4,912 m³/day -13,030 m³/day = -8,118 m³/day.

Water demand by 2035 = 4,912 m³/day – 21,428 m³/day = -16,516m³/day.

Water demand by 2050 = 4,912 m³/day – 30,380 m³/day = -25,468 m³/day.

The above indicates the deficit in water supply by 2022, 2035 and 2050 to meet the water demand of the population.

4.5.2.2 Planning Perspectives in Water Supply in Nyaruguru District

The provision of adequate water supply services plays a crucial role in preventive health care and is a prerequisite for socio-economic development. Safe drinking water is a basic amenity, ranked among the highest priority public services by Rwanda's population. Lack of water can impact the implementation of Nyaruguru DLUP in various ways such as socio-economic and environmental including:

- Job creation
- Health and quality of life
- Effects on climate change

In addition, a building permit that requires implementation of rainwater harvesting mechanisms in all institutions and rural areas should be mandatory. To protect water sources from polluted runoff, the concept of green infrastructure should be applied.

Based on the water balance of Nyaruguru District, currently (2022) there is a gap in water supply of 8,118 m³ per day. Moreover, there will be a gap in water supply of 16,516m³/day in 2035 and 25,468 m³/day by 2050.

Therefore, Nyaruguru District should undertake the following actions to ensure water supply for the projected population by 2035:

- Promote innovative technological options in the form of gravity systems, extending the grid and solar pumping that are cost-effective and eco-friendly.
- To rehabilitate and construct 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, where possible all administrative and public facilities (school, hospitals) should be constructed with rainwater harvesting systems.
- To increase water accessibility where standpipe should be placed within 500m from all settlements in Rural areas and 200m in the parts of Rurban areas which have been zoned under R1A.(Water sanitation)
- Reuse of greywater, especially in gardens.

4.6 Agriculture

4.6.1 Existing situation

The population of Nyaruguru mostly rely on subsistence agriculture with 98 % out of the total population. Among these, 72% are independent farmers, non-farm wage is estimated to be 11% while wage farm is 9% and the rest 6% are independent non-farmers.

Because of potential investors and suitable land for tea plantations occupy vast parts of the land surface, coffee is not cultivated on the large part of land in Nyaruguru District but according to the MINAGRI report, by 2022 coffee will be highly suitable in Nyaruguru District land. The remaining area is covered with other crops (seasonal crops) and small pastures.

Rwanda has made remarkable progress as highlighted by the rapid economic growth and sharp reductions in poverty. The agricultural sector has remained pivotal in improving the livelihoods of Rwandans and sustaining the country's economy. The agricultural sector accounts for nearly 30% of the national Gross domestic product (MINAGRI-Rwanda's Agriculture Sector transformation journey over the last 27 years)

Agriculture plays a significant role in Rwanda's national planning. One of the pillars of Rwanda's VISION 2050 is Agriculture nearly 15 times more productive than today, high value, and market-

driven. 30% of Rwandans (6.6M people from about 1.65M households) will live in rural settlements, and 17.5% of employment will be engaged with agriculture, namely 2,294,693 farmers, 1.4 farmers per rural household moreover Agriculture is the backbone of Rwanda's economy and the majority of households in Rwanda are currently engaged in some sort of crop or livestock production activities (NLUDMP 2020-2050, 2020-2050). In recent years, the Government of Rwanda has implemented several ambitious programs to increase the productivity of the agriculture sector (Strategic Plan For Agriculture Transformation, SPAT4)

There are major challenges that Rwandan agriculture is facing, which affect general performance of this sector in Rwanda as whole and in Nyaruguru in particular:

1. Unpredictable climatic patterns that have detrimental effects on agricultural productivity
2. Acidic soil that require high agricultural input and the soil is fragile and prone to landslides
3. Unsustainable land use and management practices
4. Sloping regions prone to erosion, Soil erosion and land degradation/ the main issues of sloppy areas that are exposed to erosion. However, pressure on land is extremely high and the shrinking of agricultural land is a main concern for the Government of Rwanda. Two main levels of problem are to be better analyzed and addressed for effective agricultural land use planning, efficient and sustainable exploitation and protection:
 - (i) Inappropriate use of agricultural land resulting in under and over-exploitation, loss of fertility, soil erosion and loss of protective vegetation, landslides and
 - (ii) Occupation of high potential by physical infrastructures or urban and settlements sprawling.

The persistence of those problems seems essentially to depend on poor compliance by and conflicting interests between central government institutions and districts to directives, guidelines and standards related to land use planning and managements provided by the NLUDMP 2020-2050 and District Land Use Plans (DLUPs) and the unclear definition of urban and agricultural lands in the DLUP. (ATLAS, 2019).

The current agricultural land area for Nyaruguru District is estimated at 48,700 hectares, while upland for agriculture 42,753 and 4,118 hectares in the marshlands. Other important land uses for Nyaruguru using the same source are Protected Wetlands 305 Hectares, forest of 26,904 hectares, Area above

55% slope without forest 4,147 and National Park National Parks 21,703 Hectares (Atlas of Rwanda, 2019).

Agriculture in Nyaruguru District mostly depends on rainfed. Water is not always available for farming purposes due to lack of irrigation infrastructure and equipment helping all farmers who are in need. The landscape of the Nyaruguru District is much diversified, with the hills taking the aspect of peaks. The high mountains forming the Congo-Nile Crest are found in the western part of Nyaruguru District in Nyungwe National Park. These mountains form a branch towards the north-east via the north of the district to form a chain of mountains known as “IBISI”, located in the Sectors of Ruramba and Mata. The annual average temperature is around 20°C; the annual rainfall varies between 1,000 and 1,250mm depending on the altitude (District Monograph, 2012)

Agriculture, through its economic, social and ecological functions, presents potentials for contributing to some of the targets of the 11th Sustainable Development Goal (SDG) at the same time meeting its second SDG which is to end hunger, achieve food security, improve nutrition and promote sustainable agriculture.

Nyaruguru District’s key priorities on economic transformation for the NST1 are modernized agriculture, diversification of economic base, private sector development, infrastructure development and urbanization and green economy.

To promote the acceleration of agricultural growth, improvement of citizens’ livelihood, increased shared prosperity to farmers, and private sector investment opportunities in the agriculture sector through an array of tailored incentives.

Agriculture modernization requires using agriculture technologies to increase agriculture production in quality and quantity.

4.6.2 Future of agriculture in Nyaruguru Districts

The main priorities will be to increase area covered by radical terraces, land consolidation as well as improvement of agriculture through the use of fertilizer and selected seeds. On the other hand, the improvement of livestock by increasing improved cows and small stock to upgrade their production (DDS, Nyaruguru District).

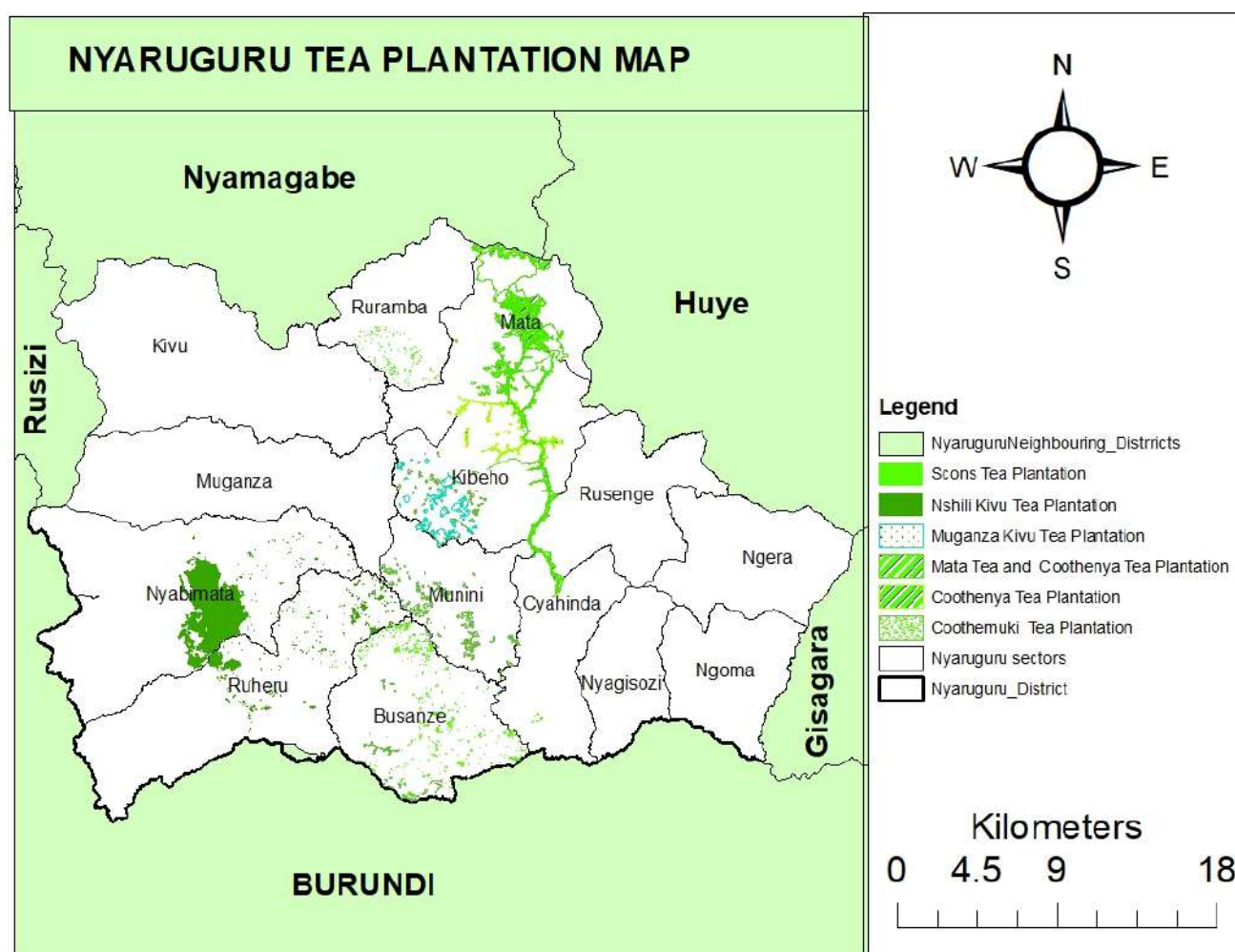
Regarding the zoning, Land allocated to agriculture and livestock versus to other land uses will be 34,014 Ha (33.7%) of Nyaruguru District land

According to RWANDA AGRICULTURAL SPATIAL PLANNING (RASP) report, Land qualities required by major crops grown in NYARUGURU area are (Beans, Maize, Tea, Coffee, Banana, Potatoes, and vegetables), Coffee is very suitable in all sectors of Nyaruguru District except in marshland, Maize crop is not suitable in marshland but marginally suitable in other part of the land, Beans crop is moderately suitable in marshland and moderate suitable in other part of the land in all sectors, potatoes are not suitable in the marshland and marginally suitable in other part of the land, Tea is among the cash crop in Rwanda and is highly suitable in all sectors of Nyaruguru District especially area around NYUNGWE National park

The land suitability can be described in terms of the land use requirements or the qualities the land needs for sustained production.

The suitability classes depend on the most limiting climate, individual landscape or soil parameters. The suitability classes for sum of basic cations (SBC), slope gradient, drainage, texture and structure, soil depth, flooding and climate (rainfall and temperature) will define the actual suitability. The evaluation of the suitability of the four last variables determines the potential suitability, provided the soil is deep enough to correct the slope gradient through terracing.

According to Rwanda Agriculture and Animal Resources Development Board in Nyaruguru District there are different crops that are suitable to the land such as maize (*Zea mays*), beans (*Phaseolus vulgaris*) and sweet potatoes (*Ipomoea batatas*), sorghum (*Sorghum bicolor*), cassava (*Manihot esculenta*), Banana (*Musa*), Arabica Coffee (*Coffea arabica*), and Tea (*Camellia sinensis*), considering the socio-economic importance of these crops in Rwanda and in Nyaruguru District in particular, additionally sectors located near NYUNGWE Park like KIVU, MUGANZA, NYABIMATA and RUHERU are highly suitable with Tea crop.



Map 18: Nyaruguru Tea Plantation Map

It is recommended to enhance diverse land protection measures, including the implementation of terraces, agroforestry practices, and the expansion of agricultural land use consolidation.

4.7 Environment and natural resources

4.7.1 Forestry

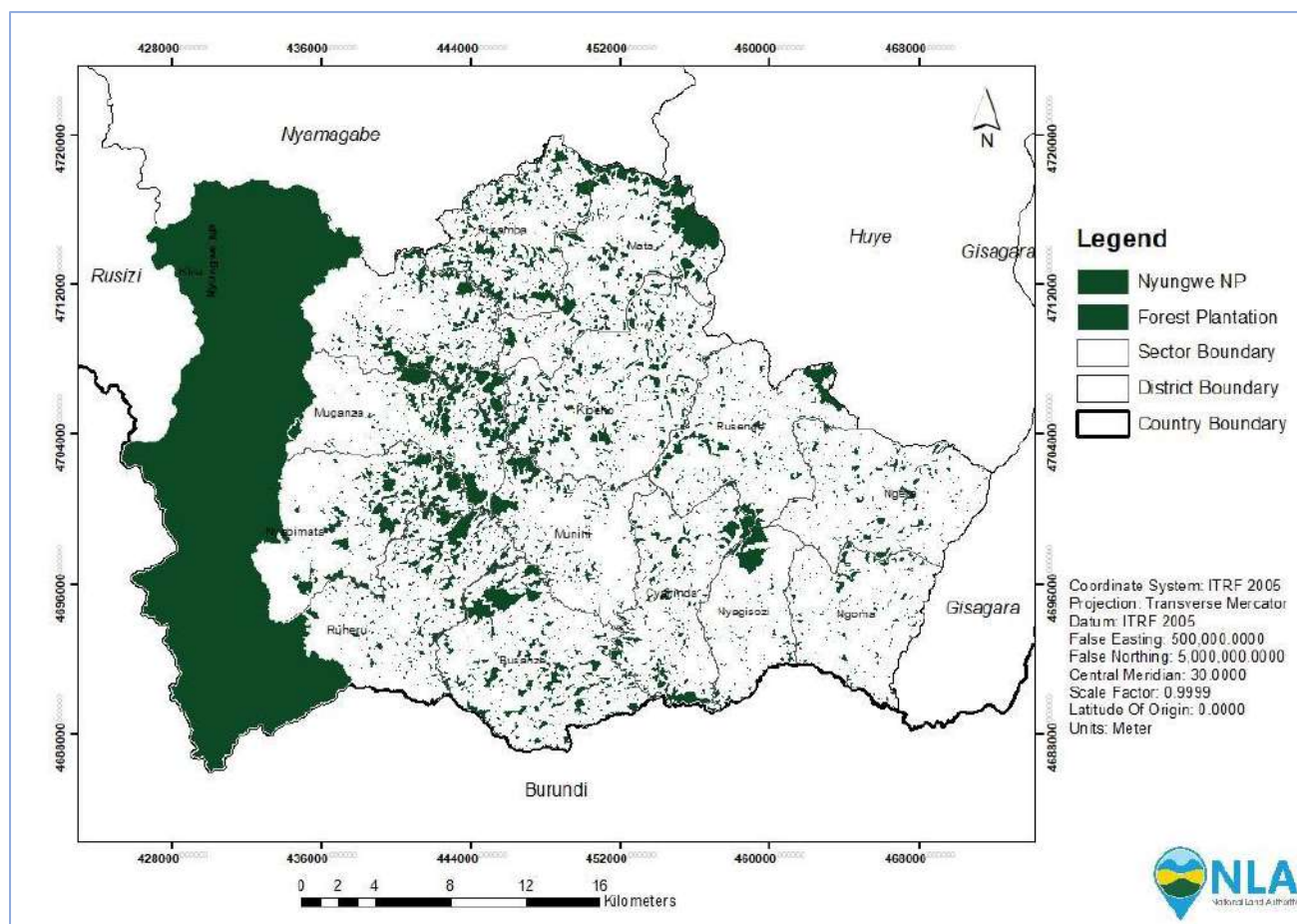
4.7.1.1 Existing Situation

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 in 2013 generated USD 294 million and are targeted to increase to over USD 600 million by 2020 (Forest Investment Program for Rwanda, 2017). In addition, forests protect

watersheds and downstream wetlands, supporting agriculture and generating products of the country's export revenues.

Further, forests are a vital component of the life-support system and ecological benefits. Under the forest resources, the vision of Rwanda is to achieve and sustain forest cover at 30%. The most recent data on forestry in Rwanda based on the 2019 forest cover informed that the Rwanda forest cover is about 7,246 km² which is equivalent to 30.4% of the dry land. Specifically, 53.5% of the forest cover are plantations, 23.3% is wooded savannah in the East, 18.1% are natural mountain rain-forests, and 6.1% are shrubs. In addition, Bamboo stands occupy only 613 hectares and its plantations have mainly grown in the buffer zones of rivers (Rwanda Forest Cover, 2019).

In terms of the forest density and tree cover, about 318,434 hectares are very dense forests (44%), 234,004 hectares are moderately dense (32%), 146,222 hectares are sparse (20%) and only 26,035 hectares are much degraded (4%). Southern and Western Provinces contain 50% of total forests of which 174,199 hectares are in Western Province and 177,537 hectares are in Southern Province. Eastern province takes up to 38% of the total forest land (274,630 hectares). Northern Province contains only 85,688 hectares and Kigali city remains only with 12,641 hectares (Rwanda Forest Cover, 2019).



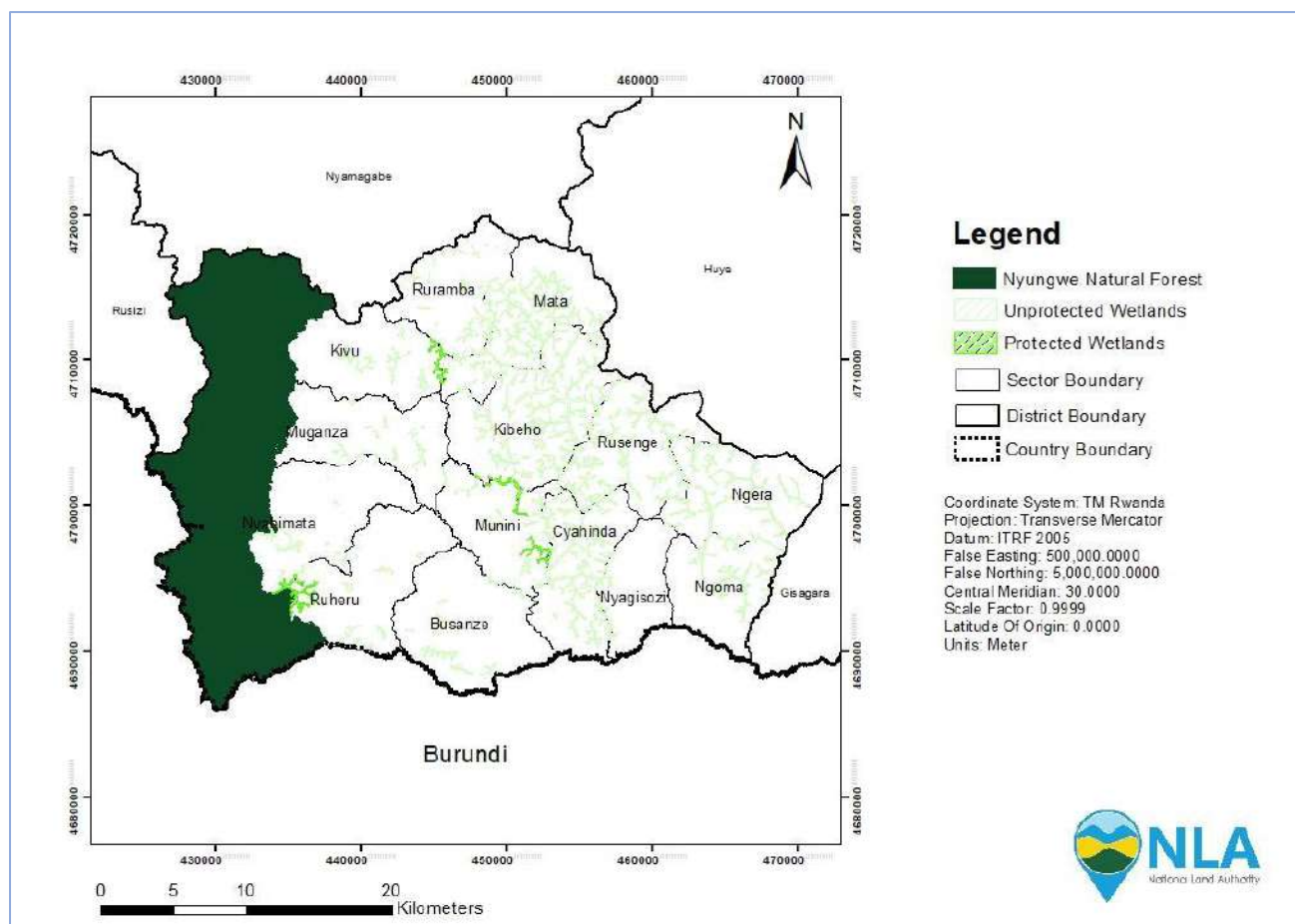
Map 21. Nyaruguru District Forests map

4.7.2 Wetlands

4.7.2.1 Existing Situation of wetlands in Nyaruguru District

Nyaruguru District is a mountainous region consisting of hills taking the aspects of peaks. It is the home of the chain of high mountains. The altitude of the district varies between 1500 and 2300 m.

It Consists of eighty-two (82) wetlands in total with 4,031 Ha and 4,031 ha of their buffer zones. Two Wetlands namely Akanyaru Amont and Buvuje_Bwuje are under full protection covering 304.5 ha and 3851 ha are under sustainable exploitation. The Existence of a chain of high mountains creates valleys and or wetlands which can experience erosion and flooding in heavy rain periods.



Map 19. Nyaruguru District wetlands map

4.7.2.2 Planned Perspectives

With emphasis on the integration of wetland conservation and buffer zone protection into land use planning processes, there is a promotion of the adaptation of sustainable development practices such as: zoning regulations and setback requirements, to safeguard buffer zones from encroachment and detrimental land uses.

Nyaruguru District's wetlands are designated/zoned for agriculture and conservation taking into consideration its sustainable use and others are protected, where existing wetlands should be used as recommendation as follows:

Protection of the wetlands marked to be preserved.

- Opening up for conditional use of the unprotected wetlands for agriculture (following the laid down guidelines)

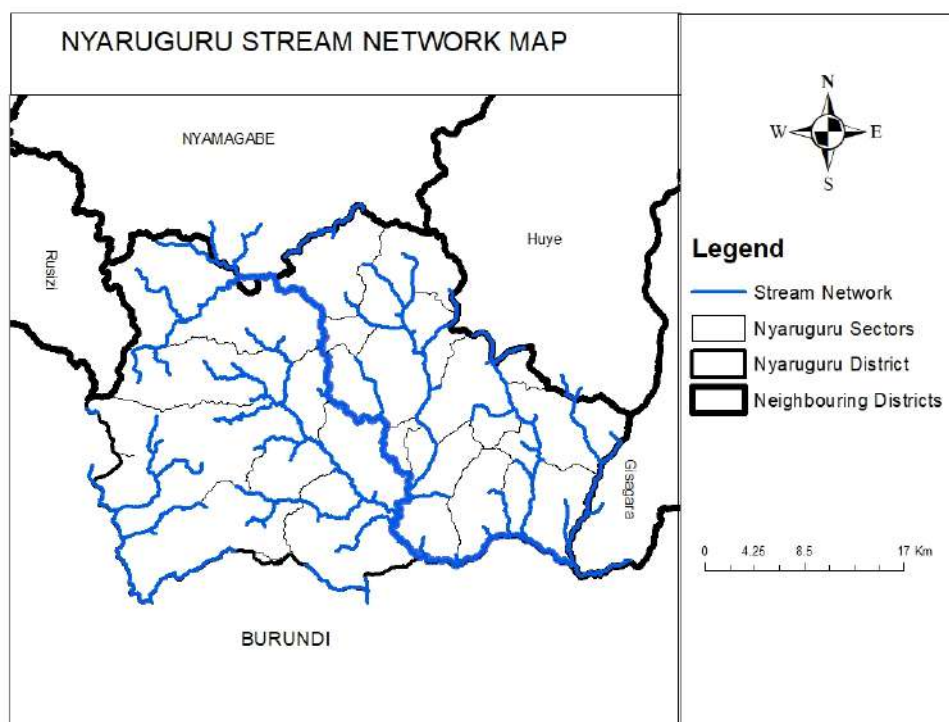
- Opening up and leaving some wetlands parts of the wetlands to be used conditionally for other uses, e.g., Recreation, research, tourism, etc
- Conservation of all the buffers zones for wetlands have their use guided by the above uses.
- There is a need for deep researches on the Systematic restoration of degraded wetlands in the country,
- For the wetlands which are identified for conditional use, their proposed use(s) should be guided by undertaking Environmental Impact Assessment (EIA) to ensure their sustainable utilization.

4.7.3 Waterbodies

4.7.3.1 Existing Situation of water bodies in Nyaruguru District

The Water bodies network of Nyaruguru District is very rich and vast, with the main water bodies being Akanyaru River, a tributary of Akagera River and constituting the border of Rwanda and Burundi.

The hydrographic network of the Nyaruguru District belongs to the Nile Basin within the Akanyaru level 1 catchment. It is composed of a network of internal rivers that would facilitate agriculture and livestock as well as increment of the power plant to increase the electricity access. The following main river network includes: Nshili river, Nshili river, Giswi river, Simbuka river, Akanyaru river, Migendo rivers, Rwerere River, Kaburantwa river.



Map 23. Water bodies map in Nyaruguru District

4.7.3.2 Planning perspectives for water bodies reservation

Water bodies have to be protected for their economic and ecological value. Moreover, there is a need to ensure that all water bodies and their buffer zones are fully protected. Particularly, by applying the prohibition of settlements within 10 meters of the Akanyaru River as well for the other rivers within the district. However, certain encroachment from agricultural activities have been developed within the buffer zone of Nyaruguru's water bodies, which poses an impact on the water resources. Buffer zones may be used for forestry, tourism, and conservation efforts depending on the results of their assessment.

4.7.4 Mining

4.7.4.1 Existing Situation

The mining products in Rwanda are mainly the so-called 3T's which are tin, tungsten and tantalum metal ores (respectively cassiterite, columbite-tantalite and wolframite minerals) (MINIRENA 2013). Wolframite which is often associated with cassiterite and is an iron manganese tungstate mineral from which tungsten (W) is derived. Columbite and tantalite is a solid solution with respectively Nb- and Ta- end members coexisting in nature in the form of columbite-tantalite. Other key minerals being

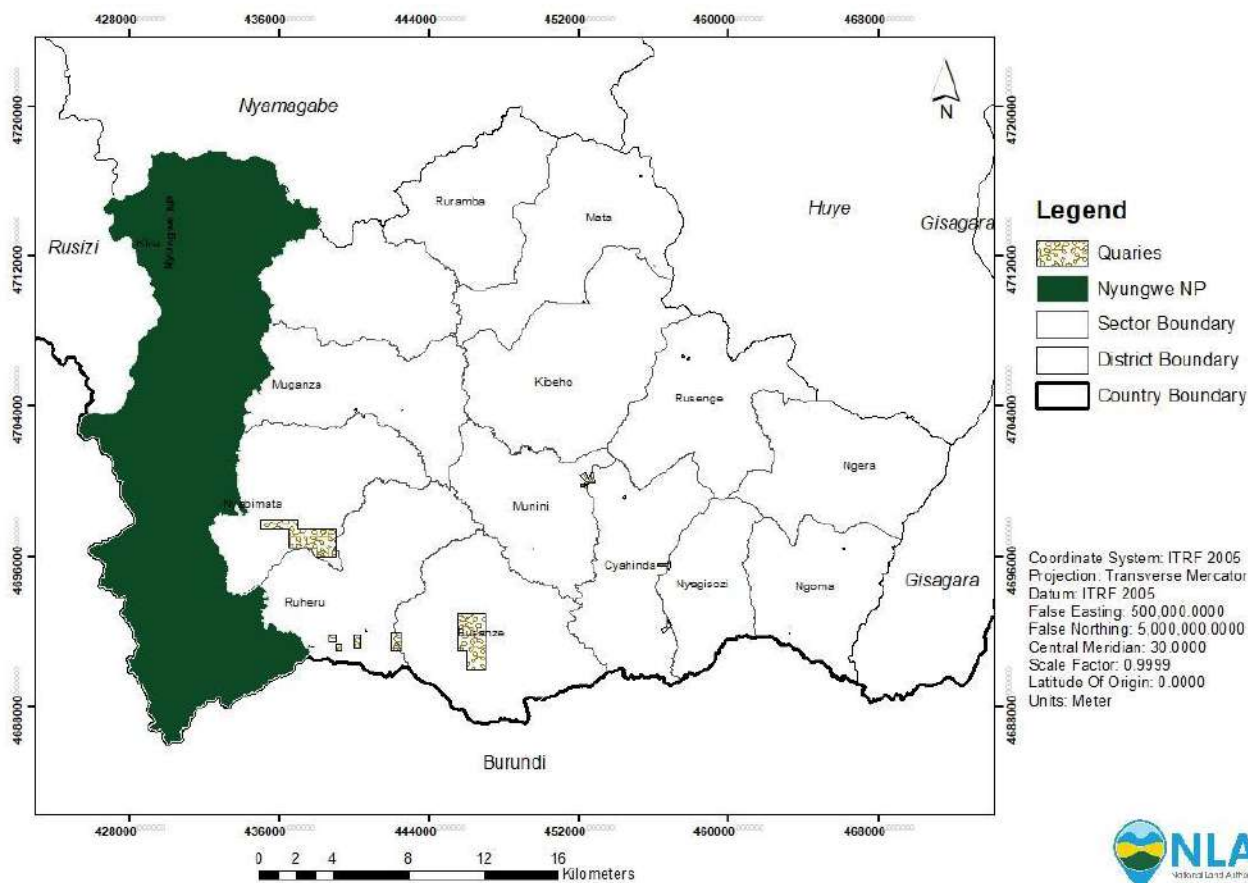
mined in Rwanda are gold, sapphires, amblygonite, spodumene, beryl and semi-precious stones such as tourmaline, topaz, corundum, chiastolite, amethyst, opal, agate and flint (REMA 2015; Yager 2016).

These minerals are mined in Rwanda for more than 80 years (Dusková & Macháček 2014). The mineral exploration started in the 1920's. The deposits of cassiterite have been discovered for the first time in Rwinkwavu and Rutongo in 1930's. From that period, mineral exploration has been intensified in Bisesero and Gatumba and as well as in Musha-Ntunga, Mugesera and Bugesera between 1931 and 1941. Another discovery of cassiterite, columbite-tantalite and wolframite were made at Rutsiro in 1933. Between 1940 and 1950, wolframite was discovered in Gifurwe, Nyakabingo and Bugarama (IM International Consulting Group 2016). The post-independence discoveries include thorium and uranium at Karago in Nyabihu district and *Nshiri in Nyaruguru District*; monazite in Musebeya (Nyamagabe District); Gold in Nyungwe area (astride Nyamagabe, Rusizi and Nyamasheke Districts), wolframite in Rutsiro, Musanze, Burera, Gakenke, Rwamagana, and Rulindo Districts; and cassiterite and tantalite in Muhanga, Karongi, Ngoma, Nyagatare and Rusizi between 1968 and 1985. Between 1978 and 1979, more discoveries comprising gold were made in Miyove and Kinyami in Gicumbi District, few micro- diamonds were discovered during the UNDP project at Gatebe in Gicumbi District, and wolframite near Bugarama, Gifurwe in Burera District, and Nyakabingo in Rulindo District.

Rwanda is situated in a large belt hosting a significant metallogenic collection of numerous ore deposits including Nb, Ta,

Sn, W, Au. The basic ore geology of this belt has been summarized in three main types: (i) Pegmatite hosted tin and tantalum mineralization, (ii) Hydrothermal tin and tungsten mineralization in quartz veins, and (iii) Hydrothermal gold quartz vein and breccia related mineralization (Pohl 1987; Pohl, Biryabarema, & Lehmann 2013). In Rwanda, most economically pegmatite can be classified as Li-Cs-Ta bearing, while intensely altered pegmatites tend to bear smaller grained barren rocks and target minerals (Varlamoff 1972). Tantalite, Tin, and Tungsten exploited in Rwanda have the features.

Under the new mining policy (RMB 2018a), the RMB is encouraging mining operators to embrace value addition of mineral resources and increase export revenues to achieve the NTS1 target of US\$1.5 Billion mining exports revenues by 2024. As of August 2018, the total number of mine sites that were extracting the 3T's was estimated to be 3,041. The mine sites comprising both cassiterite and coltan were (1,942), followed by cassiterite mines (487), wolfram mines (275), and coltan mines (237) (RMB 2018b).



Map 24: Nyaruguru District Mining And Quarry Sites

4.7.4.2 Planning Perspectives

Through the Rwanda Mines, Petroleum and Gas Board (RMB), the mining sector and the Government of Rwanda (GoR), Rwanda has high hopes for the mining sector to contribute to national development, such as the creation and maintenance of a significant number of off-farm jobs, export revenues, and foreign direct investments (Rwanda 2017). It is against this backdrop that the GoR has strived to promote and regulate the mining sector for transformation, growth and development, and ensure that all Rwandans derive sustainable benefit from the country's mineral wealth (Rwanda 2018).

Rwanda's Vision 2020 thus identified natural resources as one of three cross-cutting issues

(the others being gender equality, and science, technology and ICT) to usher in economic development. Rwanda (2000) defines cross-cutting as goals to be pursued, but they also contribute to the development of other pillars and overall goals of the Vision.

Rwanda's 30-year Vision for the period up to 2050 (Rwanda 2017) outlines a strategic pathway built around economic, social, and transformational governance pillars. The economic transformation pillar proposes to accelerate inclusive economic growth and development founded on the private sector, knowledge and Rwanda's natural resources.

The economic transformation pillar of Vision 2050 has six objectives. Three of them are directly related to mining, namely: *export promotion and expansion, job creation, and sustainable exploitation of natural resources*. Priority strategic sectors with high potential for growth and employment including mining will be developed and supported. Sector development intervention packages will combine direct support (such as public co- investment) and indirect support through tailored regulatory reform. The GoR has vowed to invest resources into mining exploration and engage the private sector in extraction, value addition and in- country processing in a bid to attain a structural shift in the export promotion and expansion (Rwanda 2017).

National strategy for transformation (version 1 (NST1) has identified the mining sector as one of the pillars for achieving the goals of NST1. Preliminary studies (Rwanda 2017) indicated potential significant reserves in rare earth minerals, petroleum and gas that offer potential if they are fully explored and exploited. In addition, considering the existing reserves in energy generation, processing and value addition, mineral products present viable investment opportunities.

Based on the logical framework for Nyaruguru District. It presents all the planned activities and projects to be performed within the period of six years for the District Development Plan including mining Sector.

4.7.5 Green Urbanization

4.7.5.1 Existing Situation

Urbanization is a process of the population moving from rural to urban areas, where the negative associations to urbanization (urban sprawl, informal settlements, inefficient, public services, and traffic and congestion) are sustainably prevented to account for poverty alleviation and the protection and preservation of the environment.

In Nyaruguru District, Urbanization and rural settlements are still low where only 0.2% of Nyaruguru District population is located in urban areas; and those living in urban areas are also living in scattered settlements.

4.7.5.2 Planning Perspectives of green urbanization in Nyaruguru District

In alignment with NST1 aiming at Accelerating Sustainable Urbanization from 17.3% (2013/14) to 35% by 2024; Nyaruguru District aims at Increasing male and female headed households living in planned settlement through; Mobilizing male and female HHs leaving in scattered areas; Assisting vulnerable families to find houses in planned settlements; Moving HHs from high-risk zones; Establishing Green space in urban and semi areas and developing and enforcing of land use master plan.

Based on the logical framework for Nyaruguru District. It presents all the planned activities and projects to be performed within the period of six years for the District Development Plan including Urbanization Sector.

4.7.6 Waste Management

The main objective of solid waste management is to collect, treat and dispose in an environmentally and socially satisfactory manner using the most economical means available.

The responsibility of providing solid waste management services normally rests with local authorities although the emerging trend is involvement of private waste collectors with households bearing the cost. As cities grow both spatially and economically, business activity and consumption patterns drive up solid waste quantities. At the same time, increased traffic congestion adversely affects the productivity of the solid waste fleet.

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

4.7.6.1 Existing Situation of solid waste in Nyaruguru District

Generally, Nyaruguru District does not have a waste management system; In Nyaruguru District, solid waste disposal is one of the challenging issues due to large solid waste quantities, causing its management to be challenged.

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 Nyaruguru District in both rural and urban areas.

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 Nyaruguru District. The waste disposal site found is not sufficient compared to the waste generated in Kibeho town commercial area.



Figure 23: temporal disposal area of kibeho town

Types of Waste Generated in Nyaruguru District

Different types of waste are generated in Nyaruguru District and are classified into 3 main categories:

- **Organic Waste** – The biodegradable waste is the main type of waste generated in both Urban areas and Rural areas Nyaruguru District considering the consumption factor. Examples of organic waste are food waste, biomass and garden waste. They are usually disposed of directly into the open land in some areas or used as compost. Recycling and re-use of the organic waste have been initiated through the district but still at very low levels.
- **Non-organic Waste** – Electronic, Plastic, paper, glass, metal, and combustibles are the most common materials for the non-biodegradable waste. These are found in Kibeho Town commercial areas. Recycling of non-organic waste is not common in the district. However, there is a national ban on the use of plastic bags which has helped to reduce the volume of non-organic waste in the city.
- **Hazardous Waste** – Any waste that poses threat to human health and the environment is classified as hazardous waste. They are mainly generated by Munini hospital, industries and other facilities. Currently, hazardous waste is disposed of at incinerators and is not taken to a dump site.

Types of solid waste Generated in Nyaruguru District.

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Hazardous Waste: Any waste that poses threat to human health and the environment is classified as hazardous waste. They are mainly generated by hospitals, industries, and other facilities. Currently, hazardous waste is disposed of at incinerators and is not taken to a dump site.

In some urban areas (market area) of Nyaruguru District, solid waste is collected and transported to the landfill nearby while in rural areas, solid waste is dumped in open areas and others used as compost. There is no proper waste treatment facility to sort and treat the waste before disposal at the landfill in Nyaruguru District.

4.7.6.2 Planning Perspectives

The DLUP Team has analyzed the location of the existing solid waste collection site which is deemed unsuitable. A new location is proposed at Kibeho, Mubuga Cell for the construction of a collection center for facilitating solid waste management within the district. However, in order to prevent waste from being dumped, an efficient waste collection system must be in place, along with a public awareness campaign in urban areas and the main emerging center. Moreover, recycling practices must be introduced in all settlements for the aim of resource sustainability as well as land use efficiency.

We recommend that the Collection Center at Kibeho should comply with the collection according to the types of waste generated such as organic, recyclable, and hazardous waste to favor their transportation to the regional landfill site. Implementing waste segregation at the household and community levels can facilitate more efficient collection and disposal processes. It should emphasize

the need for coordination and collaboration between relevant government agencies, stakeholders, and communities to ensure a comprehensive and sustainable approach to waste management.

The district and relevant stakeholders should strongly support in prioritizing public awareness campaigns, education, and community engagement initiatives to promote waste reduction, proper waste disposal, and recycling practices. Encouraging behavior change and fostering a sense of ownership among citizens can significantly contribute to the success of waste management efforts.

The amount of solid and liquid waste is increasing rapidly due to 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. 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.

4.7.6.3 wastewater

According to the report scenario selected, it aims to achieve a goal of 100% access to safely managed service by 2030 and to maintain 100% access to this service through the 2050 project horizon. This as per the report notes that an implementation of fecal sludge management chain including:

- Collection facilities: ensure the equipment of the households with improved and not shared latrines.
- Transportation facilities: develop the activity of transportation of fecal sludge.
- Treatment facilities: implement a fecal sludge treatment plant.

a) Existing Situation in Nyaruguru District

The current methods of wastewater disposal in Nyaruguru District include on-site containment systems such as pit latrines (at households' level) and septic tanks in institutions (hospitals, schools and commercial buildings and few households with high living standards). 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.

The implementation of a piped wastewater network is not technically or economically feasible in most parts of Nyaruguru, due to low wastewater flow rates and scattered settlements.

Non-domestic wastewater is discharged untreated into stormwater channels, this contaminates the stream channels and leads to the clogging of channels due to sedimentation and debris disposal in the channel downstream. Besides being an environmental hazard, this puts additional strain on the limited stormwater infrastructure that is not sized to also accommodate wastewater.

b) Key Issues

Some of the key issues to be addressed by the Nyaruguru District relating to wastewater management are discussed below. Moreover, the recommendations to address these issues have been made by the project team and are presented later in this report.

I. Direct discharge of sewage into the existing water bodies - This not only contaminates the water quality of the resource, but also poses a threat to public health. The district needs to progressively phase out septic tanks in urban areas and provide adequate sewer connections and treatment plants to curb the problem of sewer discharge into water sources.

II. Contamination of ground water by pit latrines - As the sewage infiltrates the soil, it needs time to be treated by the organisms and cations in the ground.

Most of the contamination cases occur at areas with high water tables or near water bodies when the sewage has shorter retention time in the soil. Due to the density of development, this is more of a concern in urban areas. Phasing out of pit latrines in these areas will assist in significantly improving the current water quality. In rural areas careful consideration needs to be given for the placement of pit latrines in order to minimize the associated risks.

4.7.6.4 Planning Proposals for wastewater management in Nyaruguru District

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

Careful water source monitoring is required due to industries providing high levels of pollutants as waste-products of their businesses. The provision of training to District technicians on sustainable wastewater management measures needs to be implemented.

The National Integrated Comprehensive Water Supply and Sanitation Master Plans aligned with the planning process for a centralized sewerage system should imply the assessment of the existing urban

infrastructure, population density, and projected growth. It would include identifying suitable routes for sewer pipelines, determining the capacity of treatment plants, and considering environmental factors. We recommend Comprehensive feasibility studies and cost-benefit analyses in line with this masterplan to be conducted to ensure the system's sustainability and long-term effectiveness in different parts of the country including Nyaruguru District.

We recommend that the Waste Management Plan would recognize that a centralized sewerage system may not be feasible or cost-effective for all areas in Nyaruguru District. There should be an assessment on the remaining areas to determine suitable on-site sanitation solutions, such as improved pit latrines, decentralized wastewater treatment systems, or other appropriate technologies. The plan would consider factors such as population density, geographic conditions, cultural practices, and community preferences to identify the most suitable options.

4.7.7 Stormwater Management

Flooding, erosion, and landslide records in the district will continuously be managed through establishing modern terraces, water harvesting and construction of gullies. The following actions are proposed during the implementation of NLUDMP 2020-2050 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.

Some wetlands and settlements are often affected by the impact of stormwater and public facilities lack the rainwater harvesting system, drainage system and implementation of terraces program, afforestation, and restoring forest cover scheme will aim at increasing erosion control, protection of marshlands and buffer zones establishment to boost agricultural productivity as well as improve biodiversity and ecosystem services.

4.7.7.1 Existing Situation of stormwater in Nyaruguru District

The road drainage system is a mechanism to effectively collect and divert all water that is gathered around the road. If adequately designed, it can help to manage a large part of the runoff from the catchment uphill of the road and avoid water logging upstream of the road.

During the Field Visit, Kibeho town road drainage is constructed with their covers in an adequate way. However, varying degrees of water-related road drainage channels have been observed along the roads; gully development along roads that are lacking in water guidance structures and running across erosive

thick soils, erosion downstream of drifts and culverts, and water-related slope failures are the most dominant forms of road damage.



Figure 24. improper road drainage channels in rural area and urban

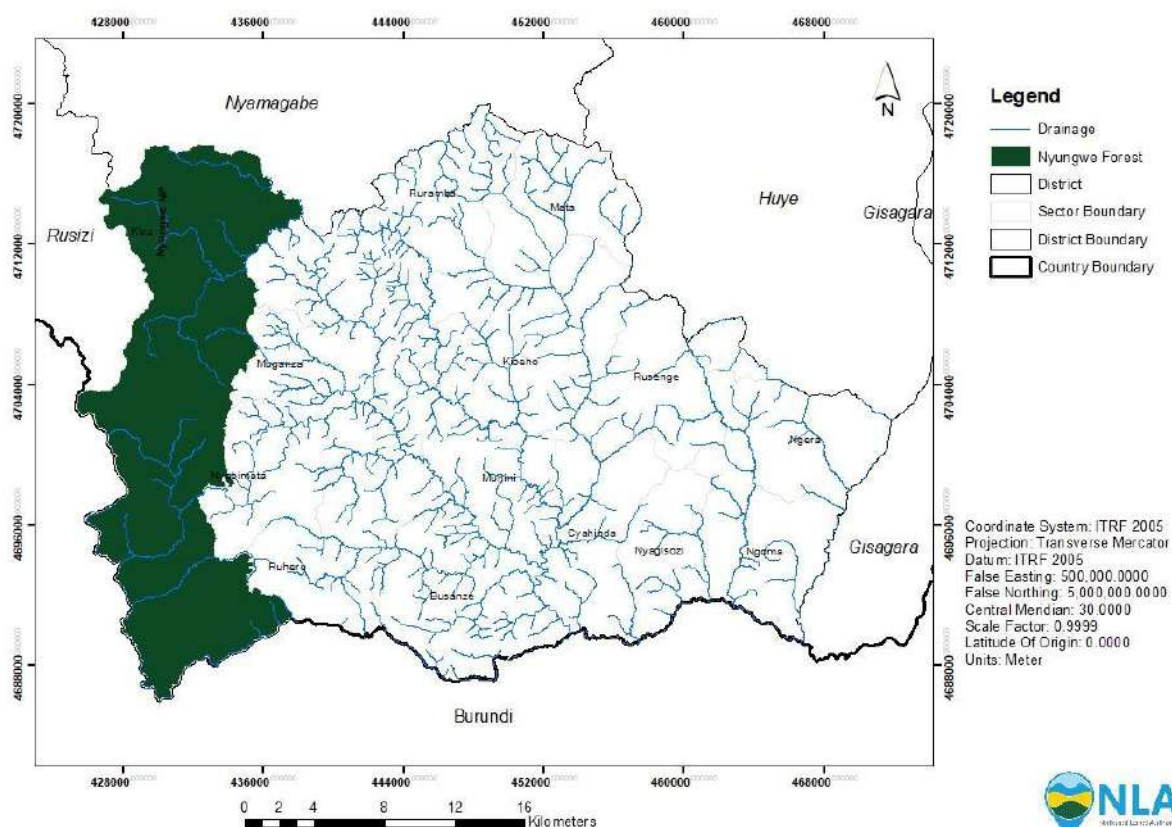
Nyaruguru District has different categories of slope from gentle slopes to steep slopes, however, it does not have a proper drainage system which would result in damages.

Settlements along steeper slopes are at greater risk of soil subsidence, uncontrolled erosion, and landslides especially as many areas have no storm water management and erosion control including the lack of canals and culverts; which leads to degradation of wetlands and natural watercourses resulting from unplanned settlement. Unprotected rivers and ravines pose danger particularly during the rainy season.

Other water related problems we find are but not limited to: Culverts are clogged fully or partially many road sections (segment) do not have the side drain and some available side drains are not connected to the culverts or any other good location for runoff discharge, and this is probably one of the causes of their failures, no maintenance is done on existing hydraulic structures.



Figure 25: In Nyabimata sector, the improper Road drainage caused the landslide and road deterioration

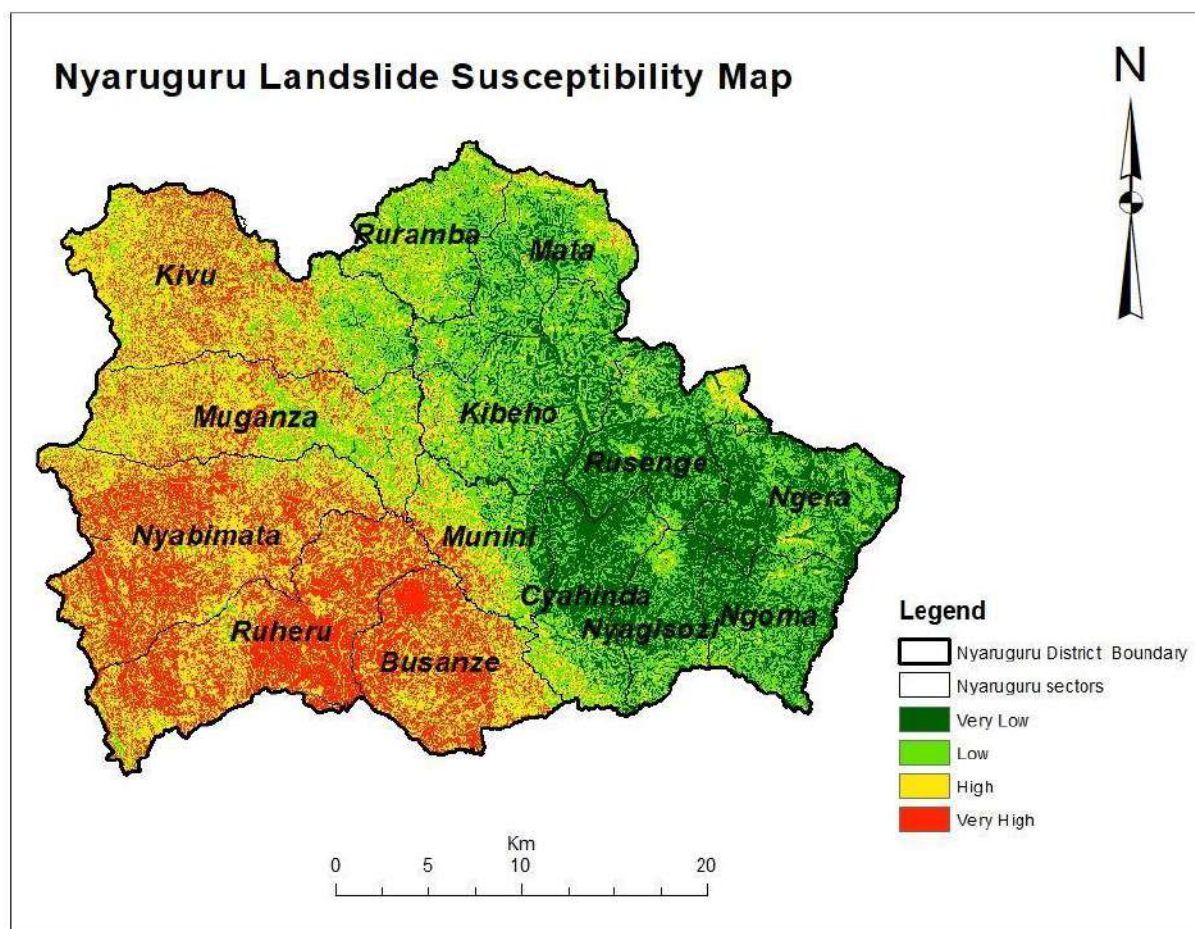


Map 25.Planning Perspective for Proposed Drainage system in Nyaruguru District

As it is shown on the map, the drainage system follows many parameters including the road networks, slope analysis, stream and the Physical plan respecting the rules of flowing order which follows the stream network. This drainage network represents the natural stream pathways. We recommend that it should be considered while constructing any roads, settlements and infrastructures because it has a high influence on the natural flow of water which causes damages to the entire landscape if not respected.

Further Planning proposals for storm water management include the following:

- During Construction/implementation of this drainage system, a study at a small scale area will be needed to add more drainage channels in urban areas.
- It is supposed that every building in urban areas will have a rain water harvesting system connected to drainage channels to ease storm water collection and conveyance.
- It is supposed that every drainage will be constructed following the topography of urban areas. No drainage channel will need excavation against the slope.
- Some adjustment will be needed before implementation to reduce the cost of expropriation that may be needed where drainage channels layout pass through key infrastructures.
- The detailed studies should consider and have a complete designation of inundation areas along major watercourses with regard to built-up areas, in areas suitable for building on according to the general land use planning documentation, or also in other areas for the purpose of determining the size of potential flood hazard areas;
- To delimit all areas exposed to flood hazard risk, including the regulatory provisions, using the prepared flood hazard and flood risk maps as a mandatory basis in development;



Map 26: Nyaruguru Landslide susceptibility Map

The Landslide susceptibility mapping is an essential tool for understanding and assessing areas that are prone to Landslides. The methodology employed in creating Landslide susceptibility maps typically involves a systematic analysis of various factors that contribute to the occurrence and severity of landslides. This includes gathering information on historical Landslide events, rainfall patterns, topography, land use/land cover and soil characteristics.

The western part of Nyaruguru District, mainly Nyungwe national park and the sectors around the park is found to be highly prone to landslides like Busanze, Ruheru, Nyabimata, Muganza and Kivu sectors. However, the current main contributing factors are the improper drainage channels and uncompleted road construction activities; it will continue to be affected by landslides if there isn't any mitigation measure taken. Various landslide mitigation measures like afforestation at high slope, maintaining the drainage channels, cut-offs development along the roadside and appropriate retaining walls should be taken into consideration during any infrastructure development.

4.8 Tourism and conservation

4.8.1 Existing situation

Nyaruguru District tourism Sector is known for Pilgrimage center of Kibeho, Vatican-recognized miracle site, with its historical background related to the apparition of the Virgin Mary and Nyungwe National Park and tea plantation.

There is an increase of tourists attracted by *the famous* Pilgrimage center of Kibeho, Vatican-recognized miracle site, with its historical background related to the apparition of the Virgin Mary. Kibeho attracts over 50,000 people every year from religious pilgrimages. This Increase of tourists also increases the number of employment. Nyungwe National Park is a popular tourist destination and the improvement of access to the forests would highly boost Nyaruguru District's economy.

4.8.2 Planning perspectives

_ 14 hectares of land has been demarcated by NLUDMP 2020-2050 for tourism.

_ Conservation and rehabilitation of attractions for tourism occasioned by Kibeho pilgrimage and other tourism site (Nyungwe National Park, Ikibuye cya Shali, Urutare rwa Munanira ibigabiro by'umwami Rudahigwa).

_ Diversification of economic base with Focus put on the tourism development, handcraft and agribusiness industry reinforcement, increase of animal and agriculture production processing and wood processing as well with an aim of reducing farm jobs.

Based on the logical framework for Nyaruguru District. It presents all the planned activities and projects to be performed within the period of six years for the District Development Plan including tourism industry. for employment opportunities.

_ Improving access and conservation of Nyungwe national park forests hence creating service-sector employment.

_ Encouraging the growth of agro-forest cooperatives which Allows off-arm employment.

_ In alignment with NST-1 priority Area: “Create 1.5m (Over 214,000 annually) decent and productive jobs for economic development”

Nyaruguru District aims at increasing off-farm jobs for youth and women through: Supporting Business development Advisors to develop Bankable projects; Supporting new viable projects in each village; Coaching all off farm jobs in the District; Promoting employment through craft centers creation.

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.

Quantitatively, 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 the District

Nyaruguru District is currently undergoing rapid development in various sectors, presenting numerous economic potentialities as outlined in the Local Economic Development (LED) strategies. These potentialities contribute to employment creation in the following ways:

- ❖ All sectors of the district offer suitable land for coffee and tea cultivation, supported by the favorable climate and soil acidity. This integration into the national supply chain creates employment opportunities in the coffee and tea industry.
- ❖ The district's abundance of touristic sites, including the Pilgrimage center of Kibeho (a Vatican-recognized miracle site) and the popular Nyungwe National Park, offers opportunities for employment in the tourism and hospitality sectors.
- ❖ The existing forests ready for harvesting, vast tracts of land for forestry, and experienced lumberjacks create employment in the forestry and timber production sector.
- ❖ The favorable climate for beekeeping, availability of land drills, and presence of skilled beekeepers enables the development of apiculture, leading to employment opportunities in the beekeeping industry.
- ❖ The rivers in the district provide a source of energy generation through hydro-power stations, contributing to job creation in the renewable energy sector. Furthermore, the presence of rivers and water springs offers the potential for electricity production and the establishment of small-scale processing units, which can create employment opportunities in the energy and manufacturing sectors.

4.9.3 Current employment status in Nyaruguru District

According, Thematic report for economic activity (EICV 5), Nyaruguru District has a working-age population of 163,000 individuals, with a working population ratio of 88.9%. In terms of job status, the breakdown is as follows: 11.1% are engaged in wage farming, 13.5% in wage non-farming activities, 70.5% are independent farmers, 4.7% are independent non-farmers, and 0.3% are unpaid non-farmers. Furthermore, when considering the distribution of these individuals across broad economic sectors, 71.3% are employed in agriculture, 9.7% in industry, and 19% in services.

Moreover, the recent Labour Force Survey of 2022 revealed additional insights. The employment-to-population ratio stands at 34.2%, highlighting the proportion of the working-age population currently employed. In contrast, the unemployment rate is reported as 21%. The survey also identified that

139,515 individuals are outside the labor force, while the number of employed individuals is 84,801, with 23,747 falling into the category of the unemployed.

Recognizing the significance of employment creation in addressing the country's rapid population growth, poverty reduction, and overall economic growth, the government has made it a priority. In the Nyaruguru District Development Strategy for 2018-2024, it is outlined that the aim is to create 104,761 productive jobs by 2024, with a particular emphasis on empowering youth and women.

To better illustrate the current status of employment creation in Nyaruguru, a visual representation is provided below:

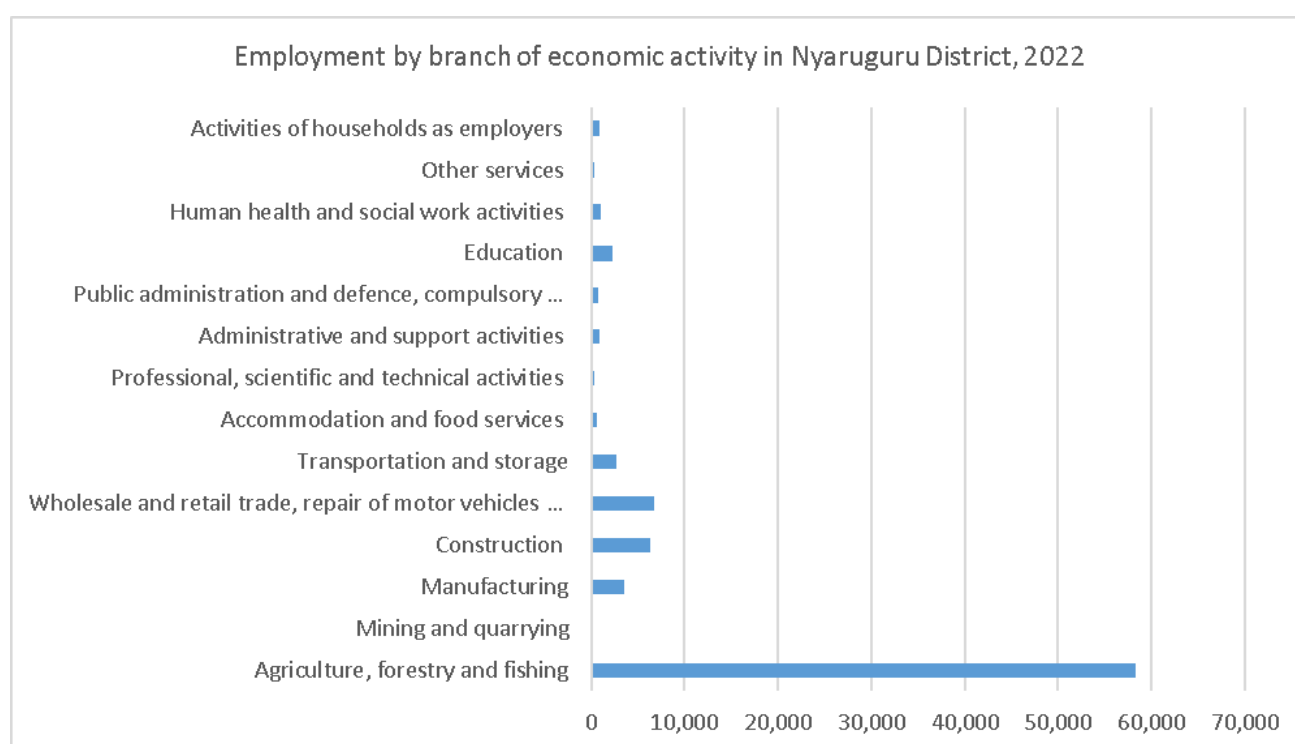


Figure 26: Nyaruguru District employment creation by branch of economic activity, RLFS 2022

Based on the provided graph, which illustrates the distribution of job creation in various economic sectors during the year 2022, a comprehensive analysis reveals that the agriculture sector prominently emerged as the dominant contributor, accounting for a substantial 68.8% of the total job creation. Following closely behind, the Wholesale and Retail Trade sector experienced a noteworthy upsurge, responsible for generating 8% of the total employment opportunities. Moreover, the Construction sector exhibited a considerable presence in the job market, contributing significantly with a share of 7.5%.

The predominance of the agriculture sector in job creation during the specified period underscores 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.

Simultaneously, the Wholesale and Retail Trade sector demonstrated a noteworthy expansion, capturing a considerable fraction of the job market. This growth is indicative of increased consumer demand, economic activity, and commercial transactions, which are often influenced by factors such as population growth, urbanization, and changing consumer preferences. The substantial employment opportunities created in this sector reflect its significance as a major source of income generation and trade facilitation within the economy.

Furthermore, the Construction sector emerged as another key contributor to job creation, with a notable share of 7.5%. This sector's growth and employment prospects are closely linked to infrastructure development, urbanization, and investment in construction projects. The rise in construction-related employment indicates an increasing emphasis on expanding physical infrastructure, which typically stimulates economic growth, attracts investments, and enhances living standards.

4.9.4 Planned perspective on Employment Opportunities in the District

Using the base of the Labour Force Survey (RLFS) done by NISR for 2022, plus the percentage estimates as presented in the NLUDMP 2020-2050, the same assumption as was cascaded to the District Level and grouped the employment sectors into five main categories which are:

- ❖ Agriculture, Forestry and Fishing,
- ❖ Mining and Quarrying,
- ❖ Construction,
- ❖ Manufacturing and
- ❖ Services.

The methodology for employment projection in Nyaruguru District involved cascading the assumptions outlined in NLUDMP 2020-2050 down to the district level taking into consideration the economic specialization of the district will be helpful in ensuring the alignment with the guidelines provided by NLUDMP 2020-2050, allowing for accurate and consistent estimation as presented in the graph below:

Sector of activity	Percentage	Number of Employment to be created
Formal Employment 2050	100%	255,077
Agriculture, forestry and fishing	15.2 %	38,848
Mining and quarrying	6.0 %	15,305
Agro-processing mills and udukiri	19.0 %	48,455
Construction	15.0 %	38,261
Services	44.8 %	114,207

Table 21: Employment opportunities in Nyaruguru District by 2050

Based on the table and figure presented above, it is evident that a total of **255,077** employment opportunities are projected to be created by the year 2050. Among these sectors, the service sector is expected to be the dominant sector in terms of job creation, accounting for 114,207 employment opportunities, representing **44.8 %** of the total formal employment. This sector encompasses various activities such as financial services, trading, garages, tourism, and others.

Following the service sector, Agro-processing mills and udukiri are anticipated to create **48,455** employment opportunities, which accounts for **19 %** of the total formal employment. It is important to note that Nyaruguru District focuses primarily on agro-processing mills and udukiri activities within the industrial sector.

At the third place, the agriculture, forestry and fishing sector is expected to generate **38,848** employment opportunities, representing **15.2 %** of the total formal employment. The construction sector includes infrastructure development projects and contributes significantly to job creation.

Due to the urbanization process, specifically establishment of infrastructure, the construction will occupy a significant portion of the total formal employment equivalent to **38,261** employment opportunities representing 15% of total formal employment.

Lastly, the mining and quarrying sector, although characterized by limited mineral deposits, is anticipated to provide 15,305 employment opportunities, representing **6.0 %** of the total formal employment. This sector will require the utilization of high-end technology and specialized skills.

4.9.5 Commercial Business and Trade in the District

According to EICV 4 District Profile, Nyaruguru District is among the districts with a high percentage of extreme-poor and poor population categories. The poverty incidence is 47.9% of the population under poverty line while the poverty incidence at national level is 39.1% and 20.1% who are in extreme poverty which is also above 16.3%, the national figure. Compared to other Districts in Rwanda, Nyaruguru District ranks fourth by percentage of population identified as poor or extremely poor.

Mostly the population of Nyaruguru District rely on subsistence agriculture with 98 % out of the total population. Among this, 72% are independent farmers, wage non-farm is estimated to be 11% while wage farm is 9% and the rest 6% are independent non-farmers.

4.9.5.1 Trade and Commerce in Nyaruguru District

a) Existing trading centers

Based on the employment information, 6% of Nyaruguru District population working class are independent non-farmers (i.e. businesses), these businesses include mainly commercial activities which are based on different commercial centers and Markets within the District.

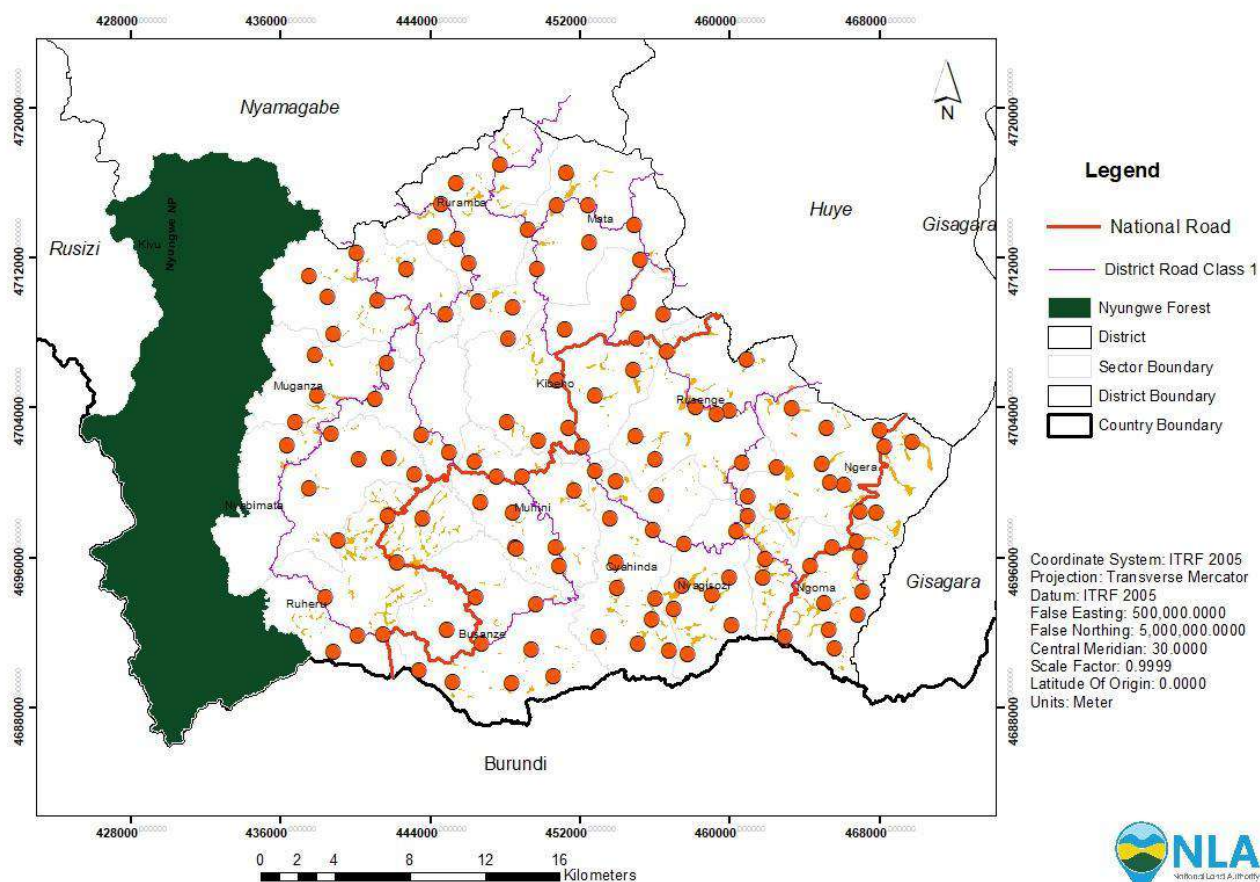
In the Urban area, commercial activities are found in Kibeho modern Market, and commercial mixed-use activities along the road, and Ndago market and Ndago commercial centers.

Apart from Nyaruguru urban area, about 21 trade centers were identified across Nyaruguru District and occupy an area equivalent to , Their location is as Follow:

No.	SECTOR	CELL	TRADE CENTER NAME	AREA(Ha)
1	Busanze	Runyombyi	Runyombyi	4.35
2		Nkanda	Gatunda	3.86
3		Kirarangombe	Gisenyi	3.66
4	Cyahinda	Rutobwe	Viro	2.08
5		Muhambara	Kubitiro	1.55
6	Kivu	Rugerero	Rugerero	4.9
7		Kivu	Rusuzumiro	1.9
8	Mata	Murambi	Murambi	2.12

9		Gorwe	Gorwe	1.73
10	Muganza	Muganza	Kamirabagenzi	
11	Munini	Nyarure	Kamana	0.6
12	Ngera	Nyanza	Nyanza	1.7
13		Kiyonza	Kiyonza	0.83
14	Nyagisozi	Nyagisozi	Ryabidandi	1.05
15		Maraba	Birambo	7.69
16	Ruheru	Remera	Remera	1.51
17		Ryenzi	Gisanze	2.08
18		Kabere	Mujeni	5.48
19	Ruramba	Ruramba	Ruramba	1.67
20	Rusenge	Raranzige	Rugalika	1.91
21		Bunge	Bunge	0.98

Table 22: Existing trading centers



*Map 27: Spatial distribution of trade centers in Nyaruguru District***b) Existing Markets**

There are also 17 markets located in these small centers, some are in good condition and others are in poor and critical conditions due to lack of access to electricity, water, roads, solid waste management and waste water treatment, lack of parking facilities etc. Some markets do exist in the small centers but not constructed, traders bring their products and put them on the floor, others on temporary constructed stands by sticks, such markets occur in the evening when the local communities are done with their farming activities. There are also several selling points

Generally local traders face the challenges based on lack of basic infrastructural facilities like electricity and water both in urban and rural areas.

No	Names of market	Sector	cell	Fencing (Yes/No)	Clean water accessibility (Yes, No)	Electricity(Yes or No)	Waste management
1	Viro	Cyahinda	Rutobwe	Yes	Yes	Yes	Yes
2	Cyahinda	Cyahinda	Cyahinda	Yes	No	No	Yes
3	Ndago Livestock	Kibeho	Mubuga	no	No	No	Yes
4	Ndago	Kibeho	Mubuga	yes	Yes	yes	Yes
5	Rugalika	Rusenge	Raranzige	Yes	Yes	Yes	Yes
7	Kamirabagenzi	Muganza	Muganza	Yes	No	No	Yes
8	Kabere	Ruheru	Kabere	No	No	No	Yes
9	Ruyenzi	Ruheru	Ruyenzi	No	Yes	No	Yes
10	Gatunda	Busanze	Nkanda	Yes	Yes	Yes	Yes
11	Gisenyi	Busanze	Kirarango mbe	No	Yes	No	Yes
12	Rusuzumiro	Kivu	Kivu	No	No	No	Yes
13	Rugerero Mini Market	Kivu	Rugerero	No	No	No	Yes
14	Birambo Mini market	Nyagisozi	Maraba	No	Yes	Yes	Yes
15	Ruramba	Ruramba	Ruramba	No	No	No	Yes
16	KIBEHO	KIBEHO		YES	YES	YES	Yes
17	AKANYARU CROSS BORDER MARKET	NGOMA	FUGI	YES	YES	YES	Yes

Table 23: Location and status of existing market in Nyaruguru District

4.9.5.2 Existing agro-processing industries in Nyaruguru District

The Nyaruguru District predominantly comprises light industries, specifically tea factories and tea washing stations. These establishments are typically situated within small premises due to the compact nature of their machinery. It is worth noting that some of these facilities are not situated within designated industrial zones. Additionally, the district accommodates other forms of light industries, such as small-scale fabrications like welding. These activities are considered part of the commercial sector, as their space requirements can be adequately met within such locations. Optimal proximity to the target consumers is crucial for their success.

Examples of light industries found in Nyaruguru District include metal fabrications, repair services, and similar enterprises. Unlike heavy industries, light industries are characterized by lower capital intensity and a stronger focus on consumer-oriented production. They typically manufacture smaller consumer goods intended for end-users rather than serving as intermediates for other industries. Furthermore, light industries generally have a lower environmental impact compared to heavy industries. Their primary emphasis is on the production of small-scale goods that are directly sold to the individuals who will utilize them, rather than being supplied to other manufacturers.

No	Name of Sector	Name of Cell	Names of Industry	Type of Industry: Light, General, and Others)	Product fabricated
1	Mata	Murambi	Mata Tea Company	light	Tea
2	Muganza	Kivu	Muganza Kivu Tea Factory	light	Tea
3	Nyabimata	Mishungero	Nshili Kivu Tea Factory	light	Tea
4	Ngoma	Rubona	Umuhoza Fraternity Ltd	light	Banana based alcoholic
5	Ngera	Murama	Imfura y'imfura	light	Banana based alcoholic

6	Kibeho	Mubuga	Agriculture Community Center	Light	Maize flour
7	Nyagisozi	Nyagisozi	Nyakizu Coffee Washing Station A	Light	Washed coffee
8	Nyagisozi	Maraba	Nyakizu Coffee Washing Station B	Light	Washed coffee
9	Ngoma	Nyamirama	Rushubi Coffee Washing Station	Light	Washed coffee
10	Ngoma	Fugi	Fugi Coffee Washing Station	Light	Washed coffee
11	Ngera	Murama	Ngera Coffee LTD	Light	Washed coffee
12	Busanze	Nteko	Busanze Coffee Washing Station	Light	Washed coffee
13	Cyahinda	Rutobwe	Cyahinda Coffee Washing Station	Light	Washed coffee
14	Rusenge	Bunge	KOPENYA Coffee Washing Station	Light	Washed coffee

Table 24: light industries found in Nyaruguru

4.10 Land Use Balance Sheet

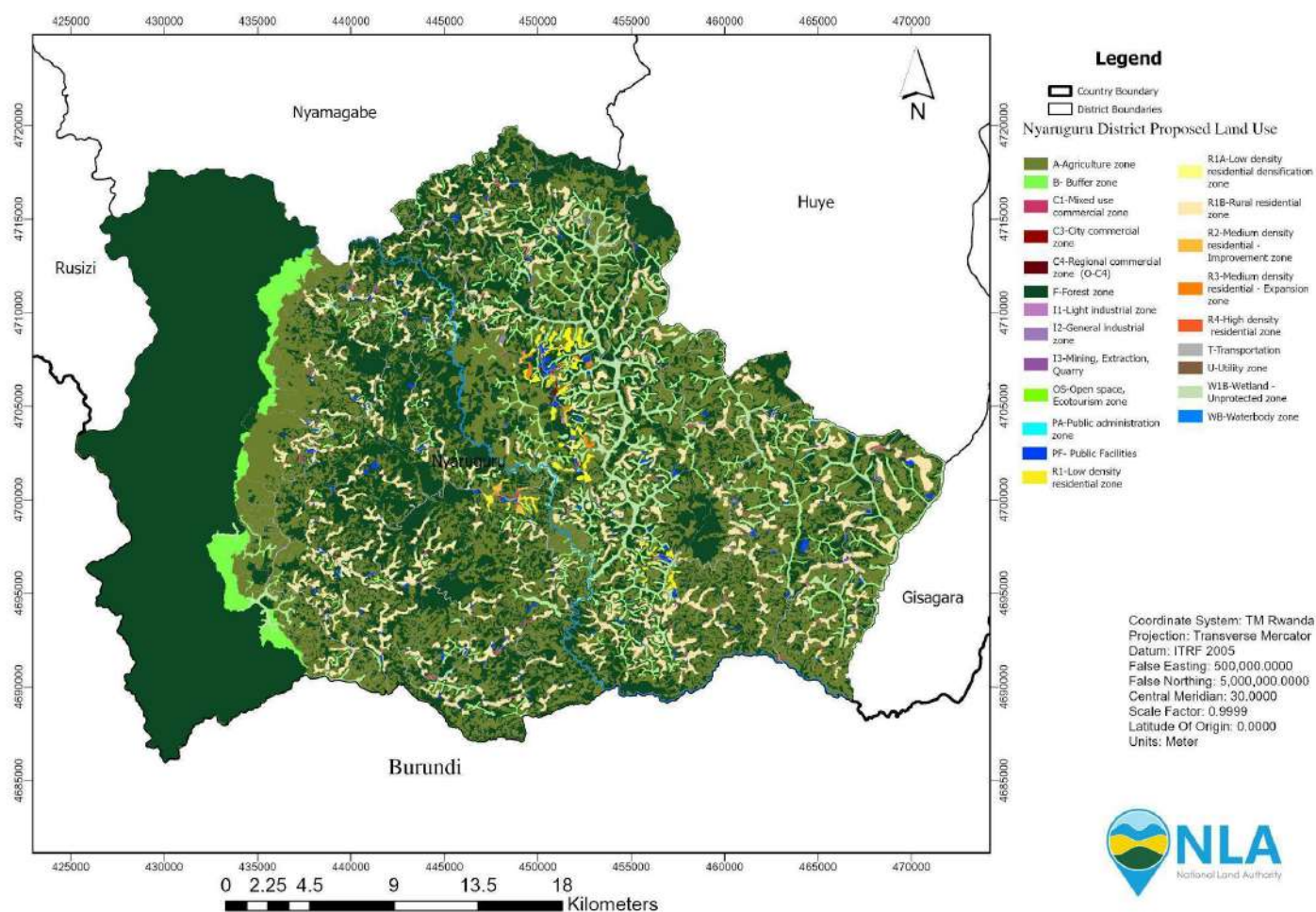
During the elaboration of Nyaruguru DLUP, the land use balance sheet considered various aspects such as the population projections and its future demand, sectorial demands, physical characteristics of the area, complying with existing policies, proposed strategic, catalytic and development local and development projects at community level, local government and national levels and their impact like climate change. The data collected from different sectoral institutions were clearly analyzed and merged into a single layer and associated tables showing the percentage of each land. In Nyaruguru District, different land uses such as settlement areas, residential areas and others are allocated based on the future needs of the population.

The land use balance sheet includes the urban areas of Nyaruguru, the District town and Rural Centers, and the zoning balance for the rural settlement sites.

Forestry and agriculture are the primary land uses in Nyaruguru District. Agriculture (including livestock) accounts for 338.6 km² (33%). Forestry, including already protected natural forests for conservation, plantations, accumulate to 498.26 km² (49.47%). In addition, river buffers are recommended to be planted with suitable species of trees to protect river banks as are many parts of the roads reserves outside of settlements areas.

S/N	Nyaruguru			1012km ²	100%
	Land use category	Existing 2023		Proposed 2050	
		Km ²	%	Km ²	%
1	Agriculture	340.13	33.72	338.55	33.65
2	Livestock	-	-	0.05	0.004
	Agriculture & livestock	340.13	33.72	338.6	33.7
3	Ecotourism and Open spaces	0.02	0.002	0.02	0.002
4	Forest	499.13	49.49	498.26	49.47
Forest & conservation		499.15	49.49	498.28	49.47
6	Commercial	-	-	3.76	0.37
7	Industrial (Light, General)	-	-	0.27	0.02
8	Public administration	-	-	0.23	0.02
9	Public facility	-	-	5.97	0.57
10	Residential	-	-	51.86	5.13
11	Transportation	-	-	27.20	2.69
Settlements & infrastructures		-	-	89.29	8.8
13	Swamplands	40.30	3.99	41.01	3.98
14	Water body	1.83	0.18	1.48	0.14
15	Buffers (Water bodies & Swamplands buffers)	-	-	14.03	1.19
Water & Wetlands & buffers		42.13	4.17	80.85	7.99

Table 25: Land allocation in Nyaruguru District 2023-2050



Map 28: Proposed land Use Plan of Nyaruguru District

5. IMPLEMENTATION STRATEGIES

5.1 Implementing institutions

One of the fundamental aspects of achieving the goals as set out in Nyaruguru District Land Use Plan for a specific spatial space is the implementation of such a plan by the established implementation Agency.

The implementation of Nyaruguru DLUP, which is the official document (that contains public policy, programs and projects for Nyaruguru District) is a major determinant of urban and rural development and Nyaruguru District has a major role to play. Stakeholders are the key actors in the implementation of DLUP. The table below shows the targeted stakeholders and the associated roles and responsibilities.

N°	Actors & Stakeholders	Intervention sector	Responsibilities
1.	Nyaruguru 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 NST1 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/REG	- 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.	MINISANTE	- Health	- Financial accessibility of health services - Strengthening national referral hospitals, treatment & research centres - 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/M OYA/MINUBU MWE	Sports and Culture	- 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 Nyaruguru DLUP Implementation Phases - Capacity Building of all implementation Actors at all levels of Governance - Involve public and private investors and developers for Nyaruguru 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, Catalyse 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 Kirehe Population

Table 26: Stakeholder Analysis

5.2 Nyaruguru 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 National Land Use and Development Master Plan, thereby promoting social, economic and environmental benefits.

Nyaruguru DLUP emerged with the 2035 target, which is to be revised for the 2050 target, to facilitate the implementation of the NLU DMP 2020-2050 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 National Land Use and Development Master Plan 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, implementability 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 Capital Improvement and Catalytic Projects

1. Agro-Industrial Development and Value Chain Enhancement

Boosting agricultural productivity and processing to improve rural livelihoods and market access.

- Construction of Kibeho Tea Factory to add value to tea production and create local employment.
- Construction of Munini Tea Factory to strengthen tea value chains and agro-export capacity.
- Construction of Honey Collection Center to support beekeepers, improve product quality, and expand market reach.
- Construction of Improved Slaughterhouse to enhance hygiene, meat quality, and livestock value addition.

2. Religious Tourism and Cultural Heritage

Positioning Nyaruguru as a spiritual tourism hub anchored in Kibeho's significance.

- Construction of Kibeho Cathedral Church to accommodate increasing numbers of international and local pilgrims and reinforce Kibeho's role as a key religious destination.

3. Energy Access and Green Infrastructure

Expanding clean and reliable energy to support communities, institutions, and industries.

- Construction of Ntaruka Hydropower Plant to increase renewable energy supply and promote sustainability.
- Installation of New Voltage Lines to expand electricity access to remote and growing areas.

4. Transport and Mobility Enhancement

Improving connectivity for economic integration, access to services, and tourism development.

- Construction and Asphaltting of New Roads to improve access to markets, social services, and tourism destinations.

5. Water Access and Basic Services

Providing essential services that enhance quality of life and support human development.

- Construction of New Water Pipeline Networks to increase access to clean and safe water for residents and institutions.

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.

5.2.2 Land Readjustment & Detailed Physical Plans

Land Readjustment of existing plots and Detailed Physical Plans are recommended during implementation of the Nyaruguru DLUP to assure rational development and effective land use. Where the plots are of different quality or value, area or value adjustments are to be made.

The readjustment of land transforms irregularly shaped plots into regular and standard shaped plots with access to infrastructure such as roads, electricity, and water, and services such as schools, and hospitals, which contributes to the value of the land in any specific area. Statutory phasing in each land-use plan will be compulsory.

The communities who are landowners are encouraged to participate in all phases of development including elaboration of site physical plans, data collection and all mapping and site demarcations exercises until the assignment is completed and approved, being provided by in-depth 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. Any conflicts and disputes that may occur in the process should be resolved between the landowners, the site committee established, local Village Chiefs and Cell Leaders. A practical guide for participatory land readjustment was established by the National Land Authority for local physical plan development procedures and implementation, roles and responsibilities for local communities, the site committee, local authorities and the consultants or experts developing the neighborhood or planning site. Therefore, the community approach is part of Nyaruguru DLUP for its successful implementation.

5.2.3 Other Recommendations for Implementation of DLUP

Nyaruguru District is encouraged to avail budget for Detailed physical plan elaboration and these should be approved by the district council for guiding all land development in Nyaruguru District, and be implemented through the Land Readjustment strategy.

Implementation strategy of the proposed land use zones should be done in different phases to avoid urban sprawl.

All land administration services, the transactions must be based on proposed zoning.

Construction permits will be aligned with phasing plans.

Land taxation databases should be based on detailed physical plans for areas where infrastructures have been developed.

Mobilization of urban population for changing land titles based on proposed zonings.

Working with FONERWA, REMA, RDB, PSF, for the development of proposed eco-tourism sites.

Working with MINAGRI, RAB, and PSF for developing agriculture, including wetlands.

Proposed zonings for agriculture and forest must be fully protected.

Public infrastructures including; electricity, water, health facility, education facility will be distributed only in urban, rural areas and selected rural settlement sites.

Nyaruguru District should work hand in hand with private Sectors to invest in District infrastructures

Nyaruguru District is urged to establish land committees at Cell level for Master plan implementation and mobilization

Working with RFA to increase forest cover in Nyaruguru District

RHA is recommended to provide housing typology and models to be implemented in rural settlement sites.

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Bibonywe kugira ngo bishyirwe ku mugereka w'Iteka rya Minisitiri n° 005/25/10/TC ryo ku wa 28/07/2025 rishyiraho igishushanyo mbonera cy'imikoreshereze n'imitunganyirize by'ubutaka cy'Akarere ka Nyaruguru	Seen to be annexed to Ministerial Order n° 005/25/10/TC of 28/07/2025 establishing land use and development master plan of Nyaruguru District	Vu pour être annexé à l'Arrêté Ministériel n° 005/25/10/TC du 28/07/2025 établissant le schéma directeur d'utilisation et d'aménagement des terres du District de Nyaruguru
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Kigali, 28/07/2025

(sé)

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