COUNTY GOVERNMENT OF NYERI

NYERI COUNTY SPATIAL PLAN
(COUNTY PHYSICAL AND LAND USE DEVELOPMENT PLAN)
(2020-2030)

FINAL PLAN REPORT

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Plan Approval

CERTIFICATE

I certify that the plan has been prepared as per section 110 of the County Governments Act, Planning standards and guidelines.

Signature: ..... Date: .....

County Director- Physical Planning

Recommended

Signature: ..... Date: .....

County Executive Committee Member- Lands, Housing, Physical Planning and Urban Development

Signature: ..... Date: .....

County Assembly

Endorsed

Signature: ..... Date: .....

H.E The Governor

Foreword by H.E the Governor

The Constitution of Kenya 2010 bestows the mandate of County Planning to County Governments. Further, section 110(1)(a) of the County Governments Act stipulates that the County Spatial Plans shall give effect to the principles and objects of County planning and development contained in section 102 and 103 of the same Act.

Nyeri County Spatial Plan (CSP) is a ten-year geographic information system (GIS)-based plan that guides the efficient, productive and sustainable use of land from 2020 to 2030. The vision of this CSP is ***"Transforming lives through advancement of infrastructure, economic prosperity, food security and environmental conservation."***

Nyeri County is endowed with pristine natural and human capital resources. However, the County faces several development challenges, which can be addressed within a planned framework .in order to achieve the goals of Vision 2030 and Big 4 agenda development programme of uplifting the livelihoods of people across the County. This endeavor is proposed through the CSP integration of planned land use, socio-economic and environmental framework to guide sustainable and optimal utilization of resources.

The preparation of this CSP was based on vigorous and detailed stakeholder participation. In line with the constitutional objective to transfer the "power of self-governance to the people and enhance the participation of the people in exercising the powers of the state," several activities were taken as part of the CSP preparation process. These included stakeholder sensitization forums at ward level, carrying out detailed diagnostic analyses, assessment of the legal and institutional framework, performing GIS-based profiling of the physiography and natural resources, auditing of existing infrastructure, identifying settlements, measuring land and land usage patterns, sizing the population in terms of demographic and socio-cultural factors, urbanization and rural development, and governance dynamics. Technical meetings with departmental personnel as well as the County Assembly members were also conducted.

Several environmental, economic, and social development strategies, projects, and programmes have been outlined as part of the CSP. These are critical transformation flagship projects with high multiplier effects and with potential to kick-start the economy of Nyeri County, such as the Annual Investment Summit, the Special Economic Zone, Private Sector facilitation and the Annual Nyeri Festival, which will harness the tourism and cultural potential for the county. The CSP further stipulates a capital investment framework as well as an implementation, monitoring, and evaluation framework, which will guide the achievement of these projects and programmes.

It is my expectation that the CSP will transform Nyeri by promoting the sustainable management of scarce resources and spurring investments that facilitate socio-economic growth, enhance inter-County linkages, and ultimately improve the County's competitiveness.

I therefore take this opportunity to rally the people of Nyeri to support the implementation of this CSP for transformation of our County.

Signature: _____

H. E. MUTAHI KAHIGA

GOVERNOR, NYERI COUNTY.

Preface

The County Government of Nyeri completed the County Spatial Plan (2020-2030) to guide future spatial developments in the County. The final plan has been prepared through a consultative, collaborative, and participatory process that involved the local community and various stakeholders across all levels.

The preparation of a County Spatial Plan is a legal requirement under the County Government Act of 2012. Section 110 (1) describes it as a ten-year GIS based 'Spatial Plan' for the County which is a component part of the County Integrated Development Plan (CIDP). The Plan is anchored by a comprehensive GIS database that has carefully been prepared, capturing cadastral property boundaries of all surveyed land parcels in the entire County.

The Nyeri County Spatial Plan is an overall spatial framework desired to strategically guide sustainable development of the county for a period of 10 years. This plan has localized strategic National and Regional policies and strategies, by identifying the County's natural assets, outlining strategies to facilitate efficient and cost-effective delivery of infrastructure services through short- and long-term investment programmes, and providing a robust framework for revitalizing industries as well as trade and commerce for sustainable economic development.

Further, this Plan proposes equity in resource allocation within the County, and ensures that short-term gains are not biased above long-term sustainability. The Plan has provided a platform for unifying Planning, budgeting, financing, programme implementation and performance review.

The implementation of this plan will be a major milestone towards facilitating the transformation of the quality of life and well-being of the residents of Nyeri County, through the advancement of infrastructure, economic prosperity, food security and environmental conservation.

Signature: _____

DR. KWAI WANJARIA
County Executive Committee Member
Department of Lands, Housing, Physical Planning and Urban Development.

Acknowledgements

The Nyeri County Spatial Plan (CSP) is the result of a comprehensive stakeholder participatory process, which had a multi-disciplinary and multi-sectoral approach, with the involvement of all the relevant stakeholders from various levels, both public and private. We received a wide range of comments and submissions and have sought to respond to these in the final publication.

The process included the integration of national policies that have relevance to the County Government Planning and budgeting needs. Stakeholders' meetings were held in all the wards in recognition of the fact that the ward has become an important Planning unit as far as the County Government Act of 2012 is concerned. In each ward, the participants were able to develop the vision for their ward, which were later merged to form the County Vision. This Spatial Plan is strategic and therefore aims at addressing the various spatial problems facing the County's geographical space by providing comprehensive strategies and policy guidelines to solve the problems of rural and urban development, industry, infrastructure and human settlement, ecotourism, and sustainable environmental management. Spatial concepts have been used to further describe and depict the unique landforms that make up Nyeri County's geographical space.

I take this opportunity to sincerely acknowledge the support and mobilization of all the actors in the preparation of this plan, specifically, the sincere support from the County Government leadership, spearheaded by H.E the Governor, Hon. Mutahi Kahiga, members of the County Executive Committee, the County Assembly,the Municipal Board, and the administrators at County, Sub-County, and ward levels, for their goodwill and support during the plan formulation period.

I would also like to recognize the extensive technical input of the Nyeri County planning department led by Plan. Beatrice Koech- the County Director of Physical Planning and Urban Development, and her team that included physical planners; Joseph Njomo, Hudson Chege, Marcos Mururu, Peter Ndichu, Anthony Ngatia and Effy Awuor; Daniel Mukiri- the Director of Lands & Survey and Interns; Grace Kirugumi, David Ndigirigi and Tabby Tirop.

This document would not have been prepared without the invaluable input and guidance of the county assembly committee for Physical planning, Housing and Urban development led by the chair Hon. Rose Kamau. I sincerely appreciate the inputs given by this team during the various technical stakeholder meetings that were held in the plan preparation process, to further improve the outcomes of the Spatial Plan.

I would also like to recognize the extensive technical input of the consultant team from Two EMS Associates, who steered the process in a highly professional manner, led by Plan. Michael Gachoki, (Principal Consultant) and his team that included Plan. Hellen Njoki (Climate Change Expert), Irene Mwaniki (Physical Planner), Joseph Maina (Physical Planner & GIS Expert), George Ogutu (Urban Designer), and the following planners: Lorna Mukiri, Samuel Ngari, Benjamin Ayoro, John Kimani and Shadrack Mbuta; for spearheading the process towards successful completion of the plan.

Finally, I wish to thank the residents of Nyeri County in all the 30 wards, for their active participation and valuable contributions during the plan preparation process to ensure that the plan met its' needs.

Signature: _____

PLAN. HANNAH MARANGA
Chief Officer
Department of Lands, Housing, Physical Planning and Urban Development.

Executive Summary

The Fourth Schedule of the Constitution of Kenya confers the role of County planning to the County Governments. Additionally, the County Government Act of 2012 requires each County Government to prepare a ten-year GIS-based County Spatial Plan (CSP) in respect of the entire County. The CSP is a framework for organizing and distributing local populations and activities desired to achieve both national and County development objectives. The CSP also aims to coordinate the implementation of sectoral projects and programs, to reduce the wastage of scarce resources and the duplication of efforts.

The preparation process was guided by the; Constitution of Kenya, Kenya Vision 2030, and relevant policies and legislations for spatial development (such as the National Spatial Plan, National Land Use Policy 2018, National Land Policy 2009, and the CIDP (2018 - 2022). The preparation process was also informed by other various relevant Acts, including the County Government Act (2012), the Physical and Land Use Planning Act (2019), the Urban Areas and Cities Act (2019), the Environment Management and Coordination Act, the Water Act, the Land Act, the National Land Commission Act, the Forest Act, among others.

Stakeholders' meetings were held in all the wards in recognition of the fact that the ward has become an important Planning unit as far as the County Government Act of 2012 is concerned. In each ward, the participants were able to develop the vision for their ward, which were later merged to form the overall County vision.

Through this CSP, the County envisions "Transforming lives through advancement of infrastructure, economic prosperity, food security and environmental conservation." This CSP is an output of a lengthy planning process involving a wide range of stakeholders and the benchmarking of global best practices and spatial development initiatives that have demonstrated the greatest transformation potential for a County/region.

The County, measures approximately 3,337 km² in area, located in the central region. It is home to an estimated 759,164 people (2019 population census), at a density of approximately 342 people per km². The County is located approximately 150 km from Nairobi County and strategically borders five counties: Laikipia County to the North, Meru County to the North East, Kirinyaga to the east, Muranga to the south and Nyandarua County to the West. The County's strategic location provides opportunities for improving regional competitiveness through the formation of inter-County economic blocks with shared economic interests and immense potential for inter and intra connectivity, agribusiness, commerce, and tourism.

The CSP structure has been informed through County physical features, urban-rural interface, settlement structure, land use structure, and land tenure composition. The plan preparation process was informed through a multi-disciplinary approach and use of different types of data from primary and secondary sources that were collected and collated. This data that was studied in detail to identify the development issues and gaps within different urban and rural sectors. Analysis of spatial data was mainly done through vector data analysis procedures and is "the heart" of GIS work in this report. Through analysis of data from different sources, new information was gained. GIS stores both attribute and spatial data, analysis was conducted on both types of data – however, it is the spatial analysis capability that sets GIS apart from database applications. The study performed attributes queries, arithmetic calculations, statistical summaries, data reclassification, spatial queries, spatial joins, overlays and conditional aggregations.

The various challenges and opportunities that Nyeri County presents have informed the goals, objectives, and implementation of the spatial development vision. Nyeri County land use plan was informed through the analysis of; transportation and infrastructure gaps, human settlements, an environmental sensitivity, and a land capability, availability, and suitability. The framework sets out strategic planning policies in terms of space. The structure plan comprises of three elements – namely a physical zoning map, land management policies, and land use standards. Overall, the spirit of any structure plan is environmental conservation.

The County Environmental Strategy synthesizes the opportunities and constraints presented by geological, water, forest, energy, land, and wildlife resources. Water resources strategies cover the protection of riparian reserves, wetlands, and underground water sources by restricting development and introducing innovative changes in surrounding areas (such as better and cleaner farming practices and appropriate tree planting schemes). Forest protection strategies include participatory forest conservation projects, restrictions on development within forests or in their immediate vicinity, agro-forestry plans, and promotion of alternative energy sources. Within the wildlife and scenic resources strategy, promotion of eco-tourism would develop wildlife resources.

The Economic Strategy is anchored on the livestock, trade and industry sectors. The crop agriculture and livestock strategy revolves around value-chain maximization. The industrialization strategy involves the promotion of agro-industrial development through the creation of industrial zones, revival of collapsed industries, formation and investment in regional markets.

The Integrated Transportation Strategy covers the development of road, rail, and air transportation. Road use behavioural changes and strict rules of enforcement would also greatly reduce accidents and traffic issues. This CSP proposes the development and maintenance of sustainable and efficient transport systems, prioritizing the development of strategic transport corridors to enable global competitiveness. Additionally, promoting the integration and development of NMT facilities across all rural and urban infrastructure. There is also need to upgrade and maintain the existing rail and air transport infrastructure.

The Spatial Development Strategy has sub-strategies for urbanization, rural development, and housing. The urbanization strategy proposes the improvement of existing urban areas through preparation of local physical and land use development plans for all major towns and rapidly emerging 'special' towns/development corridors. The rural development strategy proposes the servicing of rural areas (where possible, through the provision of mobile social services to cater to dispersed settlements and the conservation of prime farmlands.

The Capital Investment Programme outlines the County government funded projects, National government funded projects, public-private partnerships and donor funded initiatives. This Plan has also ensured that pursuit of equity in resource allocation within the County has been promoted, and that short-term gains are not favoured above long-term sustainability. The Plan has provided a platform for unifying Planning, budgeting, financing, programme implementation and performance review.

Plan Implementation, Monitoring, and Evaluation relies on a sound institutional set-up. Given the multidisciplinary nature of the CSP, a coordination committee or unit should be constituted to facilitate implementation, incorporating key executive officers from all the thematic areas. The implementation of the CSP will transform Nyeri sustainably through effective and equitable resource management and utilization, which is in line with both the County and National visions and plans.

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PART I:
INTRODUCTION

CHAPTER ONE:

BACKGROUND

1.1 Purpose of the Plan

The Fourth Schedule of the Constitution of Kenya confers the role of County planning to the County Governments. Additionally, the County Government Act of 2012 requires each County Government to prepare a ten-year GIS-based County Spatial Development Plan (CSP) in respect of the entire area of jurisdiction of the County. The CSP is defined within Section 110 of the Act as a geo-referenced plan that is a spatial depiction of the County Integrated Development Plan (CIDP), providing a broad framework for organizing and distributing population and activities in the County for the achievement of both national and County development objectives.

It also serves the purpose of enabling the County government strengthen the coordination of sectoral projects and programmes to mitigate duplication of efforts and waste of scarce resources. The CSP mainstream the national level plans in terms relevant to the County and at the same time guides in the down streaming the preparation of lower level plans. The CSPs are envisioned to allow for the realization of fundamental rights and freedoms as enshrined in Chapter 4 of the Constitution on the bill of rights which include; clean and healthy environment, housing, sanitation, food, water, education and social security, all of which depend on proper planning.

Additionally, CSP are intended to allow for the holding, use and management of land in a manner that is equitable, efficient, productive and sustainable, as outlined in Article 60 of the Constitution. The CSP also serves as a tool to enable the State to regulate the use of any land or any interest in, or right over any land, in the interest of land use planning, as outlined in Article 66 of the Constitution.

In view of the above, the County Government of Nyeri mandated Two Ems Associates Limited, a planning, surveying and mapping firm, to prepare the Plan for the area under its jurisdiction, with a duration period of ten years (2020-2030). The CSP is an output of a lengthy planning process, that incorporated detailed literature reviews, comprehensive field surveys, and robust engagements with stakeholders. The stakeholders included individuals at the household level, stratified groups (at sub-County-specific forums), members of the political leadership (such as County executives and Assembly), and technocrats at both the County and National level.

The CSP is anchored on the aspirations of past and present integrated visions and resultant plans. The preparation process relied on the Constitution of Kenya, Kenya Vision 2030, and relevant policies and legislations for spatial development (such as the National Spatial Plan, National Land Use Policy 2018, National Land Policy 2009, and the CIDP (2018-2022). The preparation process will also be informed by other various Acts, including the County Government Act (2012), the Physical and Land Use Planning Act (2019), the Urban Areas and Cities Act (2011), the Environment Management and Coordination Act (1999), the Water Act (2016), the Land Act (2012), the National Land Commission Act (2012), the Forest Conservation and Management Act (2016), among others.

1.2 Vision of the Plan

The Vision of the Nyeri County Spatial Plan was informed through a synthesis of various stakeholder inputs received during the various stakeholder forums; former and current Governor's manifestos; and a review of various development policies and plans as shown here below;

Source	Components
Governor Gakuru's Manifesto	The Late former Nyeri governor's aspirations for Nyeri County were as follows; • Preservation of the rich non-paralleled heritage • Land of best coffee and tea • Food secure County • County desirous of best health care services • County that cherishes education • Prosperity of the youth and children
Governor Kahiga's Manifesto	The current Nyeri governor's manifesto to build a more prosperous Nyeri is anchored on the following aspects; • Infrastructure maintenance • Attracting investment • Improved access to social services • Food security • Employment creation
CIDP 2018-2022	The Vision of the CIDP for Nyeri County is; • "A wealthy County with happy, healthy and secure people"
Vision 2030	• A newly industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment
MTEP III 2018-2022	• Transforming lives: Advancing socio economic development through the Big 4." By; o Development of regional stadia o Immigration offices o Development of cold storage and mini-fish processing facility o Universal Health Coverage o Improved infrastructure in slums
Mount Kenya Economic Bloc	• Focused on agri-business, healthcare, tourism, water, ICT and infrastructure. The document envisions industrial parks & logistics Hub; expansion of transport corridors; SEZs in all counties; revival of railway to connect to LAPSSET corridor.

Stakeholders' aspirations	During the stakeholder forums, the residents from the different wards envisioned the following; • To have adequate water for farming and domestic use. • To be well equipped with education and health facilities • To be an environmentally sustainable • Food security • Efficient disaster management measures (fire fighters) • To be a well-connected ward with easy access

The resultant vision coined to guide the spatial development of Nyeri County is as follows;

VISION: ***"Transforming lives through advancement of infrastructure, economic prosperity, food security and environmental conservation."***

The Visions of the stakeholders is summarized in the following illustrations;

FOOD SECURITY

Improved Livestock breeds

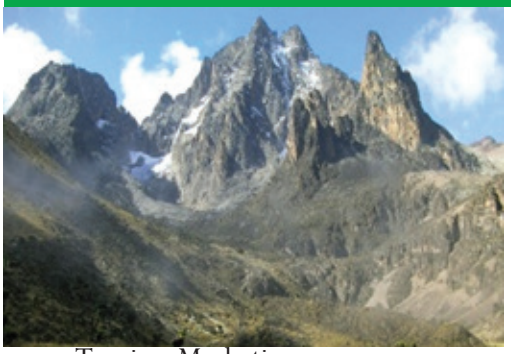
Irrigation

ENVIRONMENTAL CONSERVATION

Soil conservation

Riparian conservation

ECONOMIC PROSPERITY



Tourism Marketing

Food value addition and processing

ADVANCED INFRASTRUCTURE

Water Supply

Improved Connectivity

1.3 Objectives of the Plan

The main objective of the CSP is to provide a broad planning framework to guide spatial planning and growth within the County for a period of ten years from the year 2020 to 2030. The terms of reference for preparation of the CSP outlines the following specific objectives:

1. Assess the available resources, their level of utilization and potential;
2. Indicate infrastructure and services levels and distribution and enable the County government prioritize investments in infrastructure development;
3. Provide strategic guidance in respect of the location and nature of development within the County;
4. Set out basic guidelines for a land use management system in the County taking into account any guidelines, regulations or laws as provided for under article 67(2)(h) of the constitution;
5. Set out a capital investment framework for the County's development programs;
6. Undertake a strategic assessment of the environmental impact of the spatial development framework;
7. Identify programs and projects for the development of land within the County;
8. Provide a framework for coordinating County development programmers and strategies so as to avoid duplication of projects and wastage in use of both financial and human resources.
9. Form a basis for preparing sectoral programmes and projects
10. Identify areas where strategic intervention is required.
11. Indicate areas where priority spending is required.
12. Form the basis for seeking donor funding and public/ private partnership in development of the County.

1.4 Scope of the Plan

The County Spatial Plan covers the entire area of the County measuring approximately 3,337 km² and is home to 759,164 people according to the 2019 population census. It is divided eight administrative (8) sub-counties; Kieni East, Kieni West, Mathira East, Mathira West, Nyeri Central, Mukurweini, Tetu and Nyeri South sub-counties.

The County's strategic location provides opportunities for improving regional competitiveness through the formation of inter-County economic blocks that have shared economic interests and immense potential in agri-business, commerce, and tourism. Plan preparation will consider the inter relation with the neighbouring areas whose activities directly influence the County and other Cross-County resources. Any matters touching on regional planning and existing ones will have to be considered and incorporated where appropriate.

1.5 Organization of the Plan

This CSP is presented in seven parts and seventeen chapters, namely:

a) Part 1: Introduction

Chapter 1- This section details the background and scope of the CSP, as well as the objectives and purpose of the Plan.
Chapter 2- This section presents the contextual information about Nyeri County in terms of its location and administrative units. The chapter also details the methodology used in developing the CSP, as well as the supporting policy and legal framework.

b) Part 2: Situational Analysis

Chapter 3- This section presents the County's base map, highlighting the natural and man-made structuring elements.
Chapter 4- This section gives an inventory of County physiographic characteristics such as topography, geology, soils, hydrology, vegetation and climate.
Chapter 5- This chapter details the characteristics of the people of Nyeri in terms of population size, structure, culture, religion, among other demographic characteristics.
Chapter 6- This chapter discusses land as a resource, looking at elements such as the uses of land, sizes of land and the suitability of land.
Chapter 7- This chapter analyses the environment and natural resources found within the County.
Chapter 8- This chapter describes the human settlements, both urban and rural, within the County.
Chapter 9- This chapter analyses transportation, water and sanitation, solid waste management, energy, ICT and social infrastructural facilities found in the County.
Chapter 10- This chapter describes the economic activities within Nyeri County, such as agriculture, mining, tourism, industry, trade, commerce and farm forestry.
Chapter 11- This chapter looks at the existing institutions operating in Nyeri County, as well as their roles and challenges.
Chapter 12- This section provides an analysis of the emerging issues from the eight thematic areas of physiographic, population, land, environment, human settlements, transportation and infrastructure, economy and governance.

c) Part 3: Plan Formulation

Chapter 13- This section provides various possible spatial development scenarios and development models.

d) Part 4: Plan Proposals

Chapter 14- This section details the policies, strategies and actions proposed for the CSP, responding to the challenges identified in the previous sections.
Chapter 15- This section presents the structure plan that forms the proposed spatial development framework (proposed spatial form) for Nyeri County.
Chapter 16- This section details three action plans for areas that require special intervention.

e) **Part 5: Plan Implementation Strategy**

Chapter 17- This section details the various components necessary for plan implementation such as the capital investment plan, the institutional framework for implementation, monitoring and evaluation.

Annex- This section contains copies of the Terms of Reference for this project, as well as evidence of public participation in the process of formulation of this CSP.

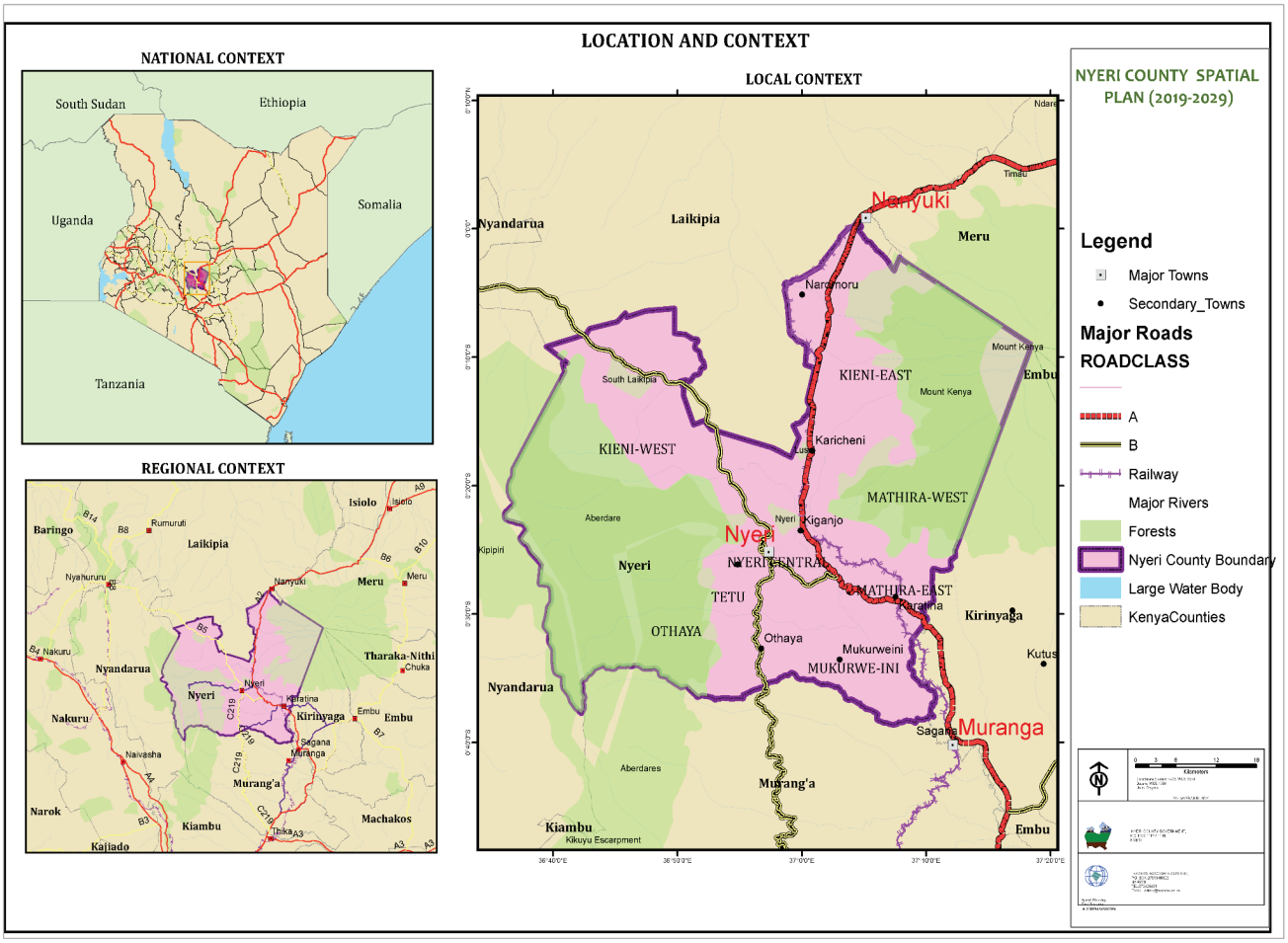
CHAPTER TWO:

PLANNING CONTEXT

2.1 Location and Size

Nyeri County is strategically located within the central region of Kenya approximately 150 km from Nairobi County and strategically borders five counties: Laikipia County to the North, Meru County to the North East, Kirinyaga to the east, Muranga to the south and Nyandarua County to the West. Nyeri County covers an area of 3,337 km² and lies between longitudes 360 380 east and 370 200 east and between the equator and latitude 0^0 degrees 38^0 south.

Map 1: Regional Context



Source: Two EMS Associates, 2019

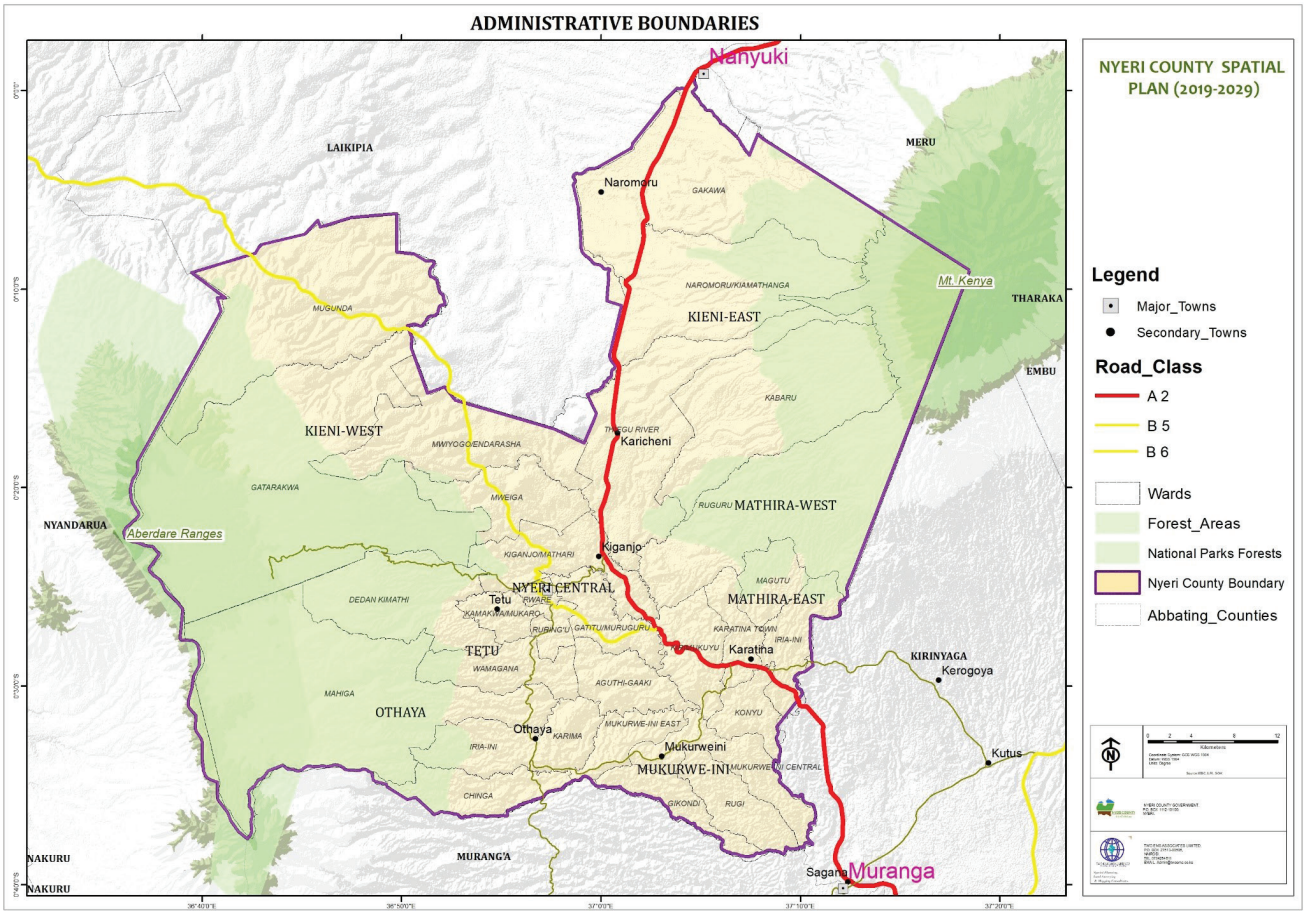
2.2 Administrative Units

The planning area comprises of eight administrative (8) sub-counties; Kieni East, Kieni West, Mathira East, Mathira West, Nyeri Central, Mukurweini, Tetu and Nyeri South sub-counties. Additionally, the County is subdivided into 30 administrative wards.

Table 1: Administrative units

SUB-COUNTY	WARDS
Mathira West	Ruguru, Kirimukuyu
Mathira East	Iriaini, Karatina Town, Magutu, Konyu
Kieni East	Gakawa, Naromoru/ Kiamathanga, Thegu River, Kabaru
Kieni West	Gatarakwa, Mugunda, Endarasha/Mwiyogo, Mweiga
Tetu	Aguthi/Gaaki, Dedan Kimathi, Wamagana,
Mukurwe-ini	Rugi, Gikondi, Mukurwe-ini Central, Mukurwe-ini West
Nyeri town	Kamakwa/Mukaro, Kiganjo/Mathari, Rware, Ruringu, Gatitu/Muruguru
Othaya	Chinga, Mahiga, Iriaini, Karima

Map 2: Administrative Boundaries



Source: Two EMS Associates, 2019

2.3 Methodology

County planning requires assimilation of massive amounts of information (both quantitative and qualitative). Changing public values have also drawn attention to the effects of any development on the rest of the community. The approach to plan preparation included the following elements;

- Preparatory Phases
- Detailed Field Survey
- GIS Mapping Component
- Stakeholder Participation
- Training and Capacity Building

2.3.1 Preparatory Phases

a) Literature Review:

Literature Review was the first data collection instrument for the purposes of familiarization of the study scope and characteristics of the area under study. This stage involved the perusal and review of relevant literature review for:

- Understanding of both the theory and policy background of County spatial planning.
- Collection and collation all secondary data already compiled on Nyeri County. The Secondary data collected formed the basis of informing the required data collection instruments and the foundation on which subsequent data compilation was done.

The sources of reviewed secondary data is diverse as well as the scope of this study . It includes among others the Kenya Population Census (2009), County Development Plans, Policy/Legislative Documents, Independent Reports and Reviews of the study area, Local Physical Development Plans, and Internet sources.

b). Reconnaissance Surveys:

Reconnaissance surveys are crucial in providing an understanding of an area that desk research cannot effectively offer. An intensive reconnaissance survey was conducted throughout Nyeri County, including an initial contact meeting of the consultants with the County Physical Planning Department.

This informed structuring of data collection, structure, visit itineraries and collection instruments. It also enabled identification and interaction with the County planning team to be be incorporated into the planning process.

2.3.2 Detailed Field Surveys

a) Administration of Household Questionnaires

Due to the high population of the County, sampling served as a crucial tool to ensure that data collection was possible. Using the standard sample size calculation formula (Fisher et al, 1991) designed for large populations, a resultant sample of 383 respondents was arrived at. These sample size was further stratified between the two phases and their respective sub-counties proportionately, based on their population sizes. 395 questionnaires were allocated throughout the County. In this formula, any population of more than ten thousand (10000) people is considered infinite. Thus, the formula below was adopted.

n = (Z□/2)2 pq
L2

Where n = sample size
Z□/2 = Z-the value at the chosen confidence interval (for 95% confidence interval=1.96)
p = estimated population with attributes of interest which
If unknown, we use
p = 0.5
q = 1-p and
L = precision (chosen to be 0.05)

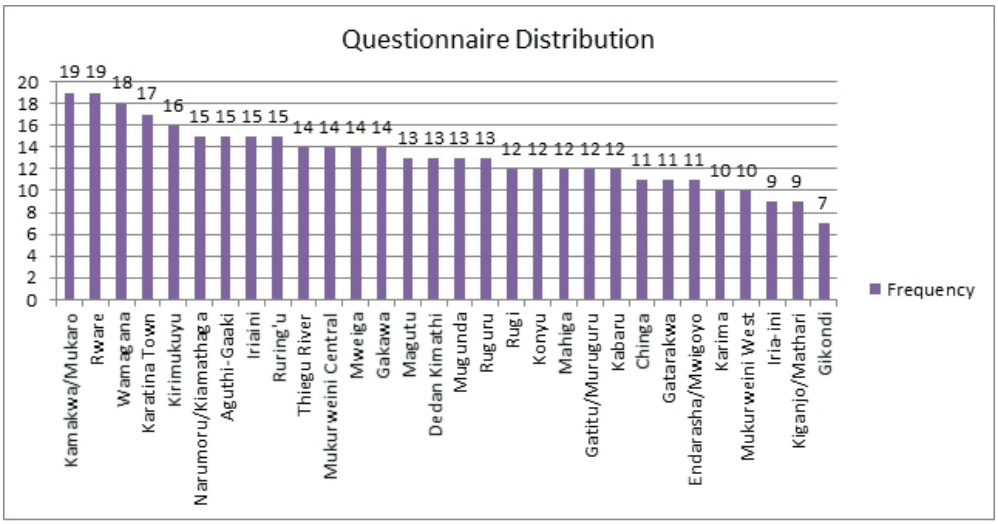
For this study, sample size calculation was done using the following values:

p = 0.5
q = 0.5
Z□/2 = 1.96 for 95% CI
= 0.05
Therefore, n = (1.96)2 (0.5×0.5)
= **383 questionnaires**

The advantage of using this formula was that it provided a scientifically acceptable sample size, which enabled the consultants to save on time, costs and speed due to the vast size of both the planning area, and its population

The questionnaire administered to these households and businesses have been attached as Appendix A and B of this report. In each of the wards, both the population and the number of households in each were considered (proportionate distribution), and the sample frame distributed as per the population as illustrated in the maps and chart below:

Figure 1: Household Questionnaire Distribution per Ward



Source: Field Survey, 2019

Random sampling was applied to distribute the questionnaires in the various settlements in each sub-County and ward ensuring a comprehensive survey of the area. Of the people interviewed, 60% were women and 40% were men. Data collection, analysis and presentation for household questionnaires administered relied on the Kobo Collect data software.

b) Administration of Business Questionnaires

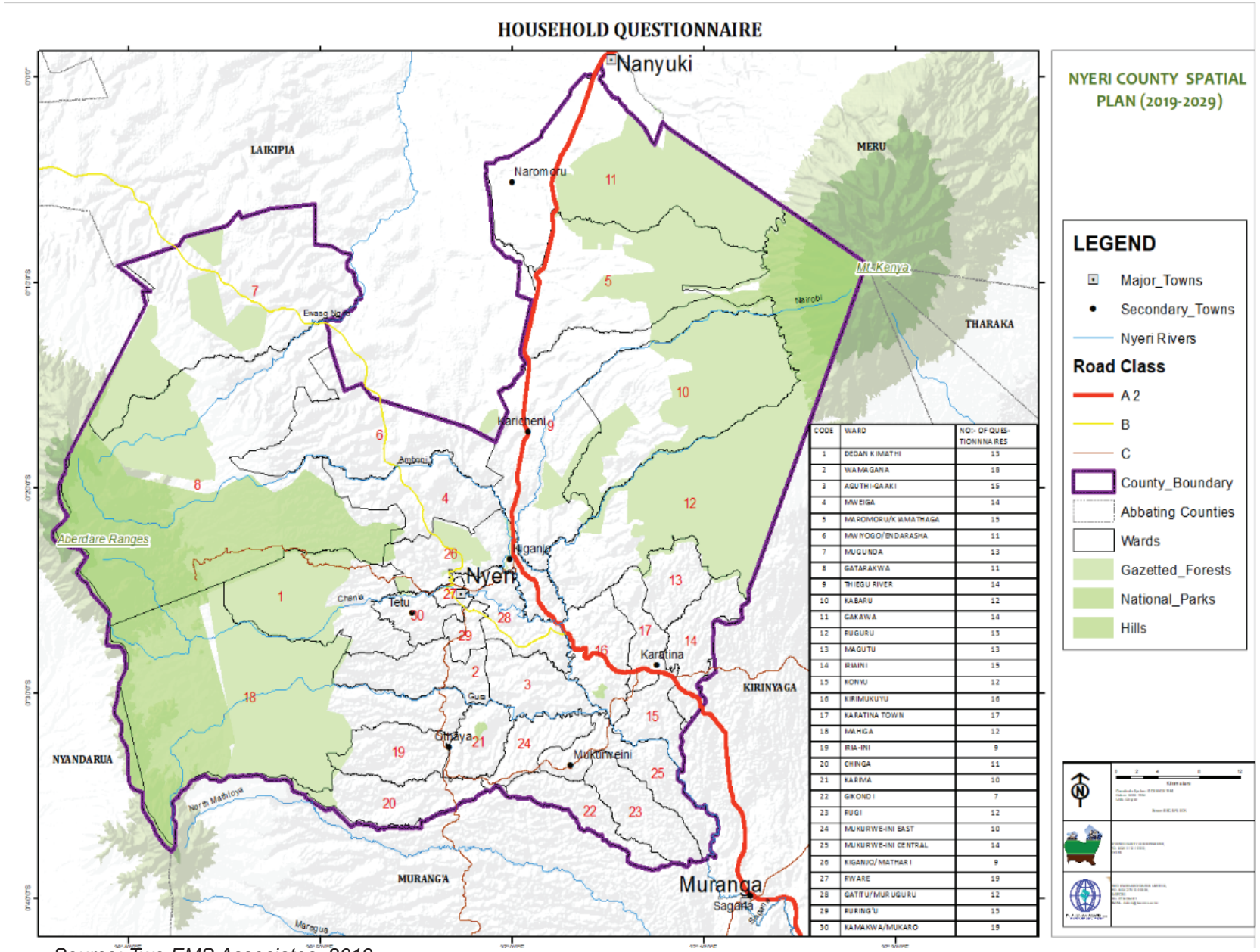
Random sampling was used to distribute business questionnaires in the various centers in each ward ensuring a comprehensive survey of the area. Additionally, selective businesses and industries were interviewed using a qualitative method, guided by an unstructured interview guide.

The business/industry sampling used a snow balling method from the key informants. The following is a list of the key businesses interviewed:

- Canola Oils
- Village Nut – Macadamia processors
- Tea Factories
- Dairy processing companies
- Centurion Ballast company

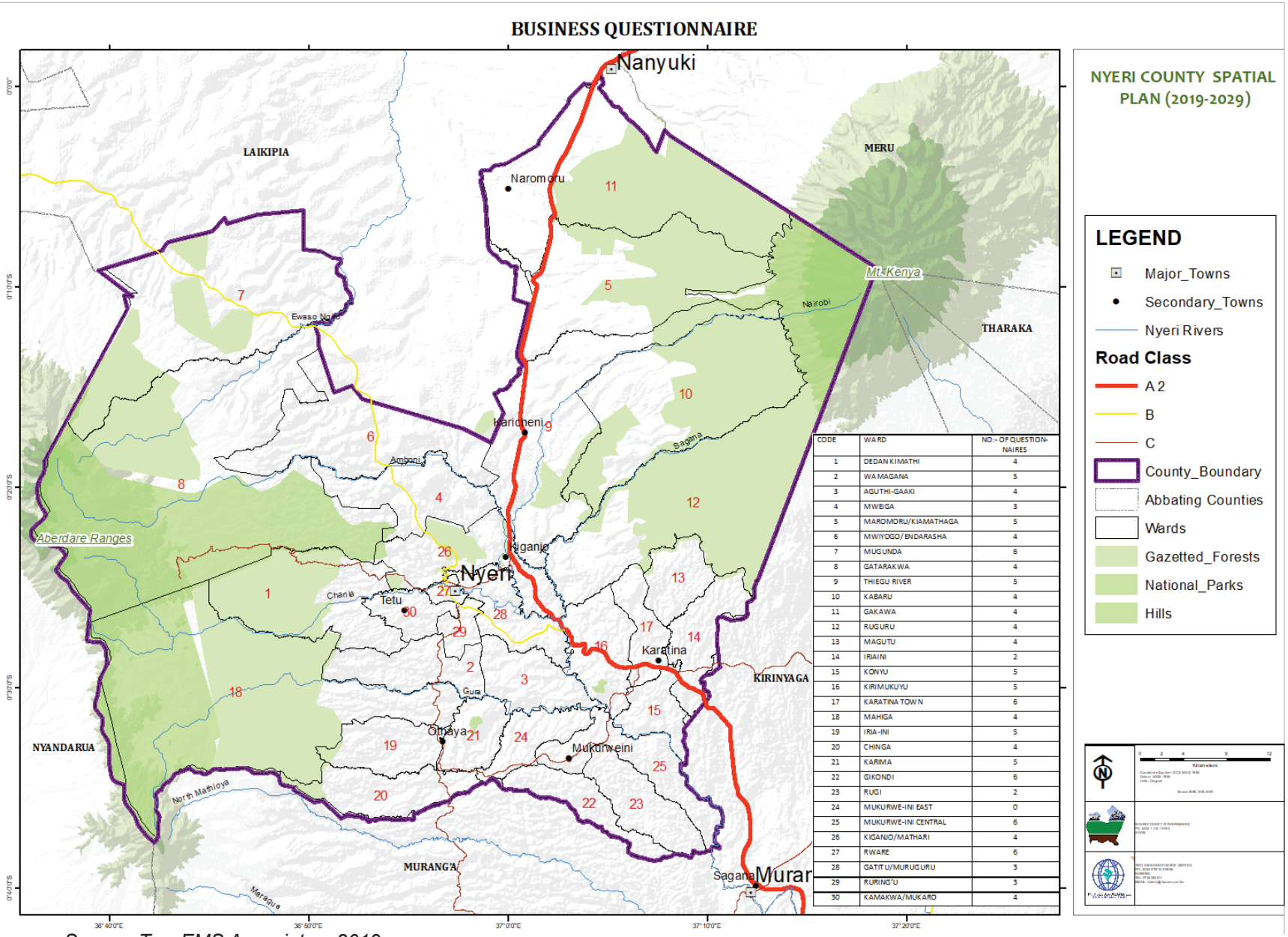
Data collection, analysis and presentation for business questionnaires administered relied on the Kobo Collect data software.

Map 3: Distribution of Household Questionnaires



Source: Two EMS Associates, 2019

Map 4: Distribution of Business Questionnaire



Source: Two EMS Associates, 2019

c) Key Informant Interviews

Key informant initial interviews were done to gather information of various ministries and sectors in the County. It was also applied as a method to create a rapport between the consultant and various ministries in Nyeri County. Nyeri County has ten devolved ministries in 2019 when the field surveys were carried out, and key informants interviewed from these ministries as listed here below:

- County Forest Officer
- Sub-County Administrators
- County Tourism Officer
- County Water and Sanitation Officer
- WARMA
- County Education Officer
- County Environment Officer
- Assistant County Commissioners
- County Trade Officer
- County Industries Officer
- County Economic Planning/Development Officer
- County Youth and Sports Officer
- County Health Officer
- County ICT Officer
- County Roads and Infrastructure Officer
- County Crop Officer
- County Livestock Officer
- County Fisheries Officer
- County Veterinary Officer

Among the National Government stakeholders visited were all the Sub-County Administrators, representatives from Kenya Power and Lighting Company (KPLC), Various Water Service Providers such as Nyeri Water and Sanitation Company (NYEWASCO}, Othaya Mukurweini Water Services Company (OMWASCO), Tetu Aberdares Water and Sanitation Company (TEAWASCO), and Naromoru Water and Sanitation Company (NAROWASCO), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Kenya Dairy Board, National Museums of Kenya and National Environmental Management Authority (NEMA). Other important Non-governmental key stakeholders included the Ruring'u Old Court Museum.

2.3.3 GIS Mapping

a) GIS Analysis:

Vector and Raster Analysis

Analysis of spatial data was mainly done through vector data analysis procedures and is "the heart" of GIS work in this report. Through data analysis from different sources, new information was gained. GIS stores both attribute and spatial data, analysis was conducted on both types of data – however, it is the spatial analysis capability that sets it apart from other database applications. The study performed attributes queries, arithmetic calculations, statistical summaries, data reclassification, spatial queries, spatial joins, overlays and conditional aggregations. Data was obtained from different sources such as KNBS, ILRI, USGS, FAO, KENSOTER, KFS and fieldwork.

Tabular data collected Kenya Bureau of Statistics (KNBS) was spatially analysed through 'Spatial Join'. This operation is a mix of spatial and attributes operations. 'The result is a join of two database from tables, but the basis for the join is 'coincident space'. As with a 'regular join' relationship must be one-to-one or many-to-one between records in the 'destination-to-source tables'. As an example, we had two themes: Schools data and Wards of the County.

A spatial join was done for wards as the destination theme, as it yields a count of schools per ward (many wards to one ward).A spatial join would thus bring data from the schools' theme to the wards theme. A spatial join was also done on wards to many other tabular data such that the results is tabular data is joined as part of the attribute of wards (polygon data).Supervised Image Classification is another technique used to analyse data in this study. Land sat data was classified into five main classes (Farmland, Grassland, Forest, Bushland and Settlement. In supervised classification we trained the pixel classification process by specifying the various pixels' values or spectral signatures that should be associated with each class.

This was done by selecting representative sample sites of known cover type called Training Sites or Areas. The training sites were collected with the help of Google Earth. The computer algorithm is subsequently used with the spectral signatures from these training areas to classify the whole image into the five classes identified.

The consultant classified images from two time-stamps (2003 and 2011) from Landsat 5 images. These dates were chosen because of the availability of cloud free data.

b). Land Use Modelling:

Land use modelling was used to simulate ten years period future land use for the year 2019 and 2029. A statistical approach was used for allocation of land cover prediction procedure. Logistic regression method in MOLUSCE (Modules for Land Use Change Simulations) tool in QGIS was used for this analysis. In this technique, we started with 2003 land use as initial input data and 2011 land use as the final time stamp. The algorithm takes an input of a collection of pixels of initial state raster and factor raster. Factor raster used in this modelling approach were Digital Elevation Model, NDVI and Population Density. Logistic regression takes initial pre-processing of the data (dummy coding and normalization of the land use data), randomly samples and trains a model (Yirsaw et al., 2017).

The coefficients of the model created takes the form M ((C − 1) (2N + 1)2 + B(2N + 1)2 + 1), but only (M − 1)((C − 1)(2N + 1)2 + B(2N + 1)2) are independent whereby, C is the count of land use categories, N is neighbourhood size which in this case we specified 1px, B is summary band count of factor rasters which in this case B=3. M is count of unique categories in the change map (C2). M depends on the sampling mode which was set as random with 1000 samples (Tayyebi et al., 2010). Coefficients of one transition land use class (transition from land use category 2 to land use category 3, for example) (Kityuttachai et al., 2013). We had 5 land use categories 1, 2, 3, 4, 5 and we select 3 one-band factors and we used 1-neighborhood, this gave us 81 coefficients per transition class:

We used 1-neighborhood and two one-band factors, we get 37 coefficients per transition class:

- b_0 is an intercept;
- Coefficients from b1 through b27 are the coefficients of dummy variables of current land use state: (b1, …, b3 are dummy variables for the upper-left corner of 3x3 neighbourhood
- Coefficients from b28 through b36 are the coefficients of the first raster pixels (1-neighborhood uses 9 pixels or 3x3 window);
- Coefficients from b37 through b45 are the

The analysis accuracy was assessed through Pseudo R-squared which for the first analysis between the years 2003-2011 was 0.724. This was considered to be a good model for simulating future land uses (2020, 2030).

c) Gini-Coefficient:

The Gini index is defined as a function that assigns to each non-negative income vector a real number between 0 and 1, which represents the society's inequality level. This measure is 0 in maximum equality and 1 in perfect inequality (Mirzaei, et al., 2017). On the figure below, the Lorenz curve maps the cumulative income share on the vertical axis against the distribution of the population on the horizontal axis. The Gini coefficient is calculated as the area (A) divided by the sum of areas (A and B) i.e. A/(A+B). If A=0 the Gini coefficient becomes 0 which means perfect equality, whereas if B=0 the Gini coefficient becomes 1 which means complete inequality. Let xi be a point on the X-axis, and yi a point on the Y-axis, the Gini coefficient formula is:

$$Gini = 1 - \sum_{i=1}^{N} (x_i - x_{i-1})(y_i + y_{i-1})$$

d). Map Layouts:

The map layouts for this report were designed in ArcGIS with all the data projected on the fly to geographic coordinate systems (WGS 1984). For calculations and area measurements, the data were projected to UTM Zone 36N.

2.3.4 Stakeholder Engagement

Stakeholder participation and involvement of various actors was also recognized as important input to the plan preparation process. In this regard, stakeholder identification and mapping was done by carrying out literature reviews and interacting with clients and key informants during the recoinnaisance and field survey.

This involvement provided an opportunity for residents and concerned parties to provide insights on matters that affect them. The key stakeholders identified include:

- National government representatives such as National Land Commission, KFS, KWS
- County government officials; CECMs and MCAs
- Experts from various departments such as Ministry of Transport, Infrastructure, Public works and Energy, Ministry of Health
- Representatives from non-governmental organizations (NGOs)
- Local religious leaders
- Representatives of marginalized groups such as Women, Youth & People with Disabilities (PWDs).

Several stakeholder engagements have been conducted in the form of; community sensitization forums on County Spatial Planning at ward level, Sensitization forum with County Executive Committee Members & Members of County Assembly were conducted to sensitize the stakeholders on the planning process. This culminated to formulation of a shared vision to guide development of the County.the stakeholders on the planning process.

Additionally, 5 technical meetings with the departmental teams have been conducted to provide professional input and to validate the data on the socio economic findings and the plan proposals. Members of County Assembly and County Executive Committee Members including the Governor were also invited to review the plan and contribute towards plan making/ approval process.

Community Situational analysis validation and Plan presentation forums have been held at ward level. The process was done through an inclusive mapping process based on thematic groups divided into; Environment, Land & Governance, Economy, Physical Infrastructure, and Social Infrastructure. Stakeholder participation is still an on-going process.

Plate 1: Stakeholder engagement forums

Project inception meeting

MCA sensitization meeting

Community sensitization meeting

Community plan presentation meeting

Technical meeting with Members of County Assembly

Technical meeting with County Executive Committee Members

Stakeholder participation is still an on-going process. The details of the forums have been summarized in the table below;

Table 2: List of Stakeholder Forums

Forum:	Date of Forum:	Location:	Male Participants:	Female Participants:
1. KICK-OFF FORUM				
Introductory meeting between the client and the Consultant	1st August, 2018	Nyeri County Department of Physical Planning, at County Land's office boardroom	17	7
2. NYERI COUNTY ASSEMBLY				
Members of County Assembly Lands sensitization forum	7th August 2018	Green Hills Hotel	8	8
3. CECs MEETING				
County Assembly Lands Committee sensitization forum	8th August 2018	Green Hills Hotel	26	10
4. COMMUNITY SENSITIZATION FORUMS				
Ruguru Ward	10th December 2018	Kiamariga Nursery.	30	9
Magutu Ward	10th December 2018	Giakaibei Catholic Hall	22	5
Iriaini Ward	10th December 2018	Kiamwangi PCEA Hall	30	9
Gikondi Ward	10th December 2018	Muthuthi-ini AIPCA Hall	30	9
Rugi Ward	10th December 2018	Muthuthi-ini AIPCA Hall	30	9

Konyu Ward	10th December 2018	Divisional Headquarters Hall	36	14
Kirimukuyu Ward	10th December 2018	Kaiyaba Hall	30	13
Mahiga Ward	11th December 2018	Kamoko CDF Hall	44	13
Chinga Ward	11th December 2018	Gichiche Community Hall	27	17
Iria-ini Ward	11th December 2018	Iria-ini Community Centre	31	20
Karima Ward	11th December 2018	Witima CDF Hall.	28	13
Aguthi-Gaaki	11th December 2018	Gichira Community Hall.	37	12
Wamagana Ward	11th December 2018	Wamagana Educational Hall	36	14
Mukurwe-ini West Ward	11th December 2018	Njiru-ini Secondary School.	26	23
Mukurwe-ini Central Ward	11th December 2018	DCC Boardroom	29	12
Endarasha/Mwiyogo Ward	13th December 2018	Kanyagia Community Hall.	25	11
Mugunda Ward	13th December 2018	Fine Breeze Hotel	31	13
Gakawa Ward	13th December 2018	Murero D.O. Offices	29	14
Narumoru/Kiamathaga Ward	13th December 2018	Narumoru Township Primary School Hall.	35	20

Gatarakwa Ward	13th December 2018	Watuka Cooperative Social Hall.	42	9
Mweiga Ward	13th December 2018	Kieni CDF Hall	20	8
Theigu River Ward	13th December 2018	Victor's Chapel Hall	29	8
Kabaru Ward	13th December 2018	Kimahuri Dairy Society Hall.	31	11
Gatitu/Muruguru Ward	14th December 2018	Gatiyu Nursery School	17	29
Dedan Kimathi	14th December 2018	Ihururu PCEA Hall	24	14
Ruring'u Ward	14th December 2018	Ruring'u Museum Hall	25	17
Kamakwa/Mukaro Ward	14th December 2018	Tetu Catholic Hall.	23	23
Rware Ward	14th December 2018	YMCA Hall	27	16
Kiganjo/Mathari Ward	14th December 2018	YMCA Hall	29	20
5. TECHNICAL FORUMS				
Situational Analysis presentation to County departmental technical team	4th April 2019	County Secretary's Boardroom (Nyeri Town)	6	9
Draft Plan Presentation to County departmental technical team	5th September 2019	County Secretary's Boardroom (Nyeri Town)	10	7

Draft Plan Presentation to County departmental technical team	5th September 2019	County Secretary's Boardroom (Nyeri Town)	10	7
Draft Plan Presentation to Members of County Assembly	13th September 2019	Queen's Inn (Nanyuki Town)	9	6
Project Progress Meeting with County Technical Team	29th November 2019	Green Hills Hotel	25	11
Project Progress Meeting with County Executive Committee Members	18th December 2019	Travellers Beach Hotel	30	15
6. COMMUNITY PLAN PRESENTATION FORUMS				
Gikondi Ward	17th Feb 2020	Muthuthi-ini AIPCA Hall	39	11
Rugi Ward	17th Feb 2020	Giathugu polytechnic	24	10
Mukurwe-ini Central Ward	17th Feb 2020	Muhito PCEA hall	23	10
Mukurwe-ini West Ward	18th Feb 2020	Njiru-ini Secondary School.	26	33
Mahiga Ward	18th Feb 2020	Ndunyu community Hall	44	13

Karima Ward	18th Feb 2020	Witima CDF Hall.	28	13
Aguthi-Gaaki	19th Feb 2020	Gichira Community Hall.	44	37
Chinga Ward	19th Feb 2020	Gichiche Community Hall	42	10
Iria-ini Ward	19th Feb 2020	Iria-ini Community Centre	40	9
Magutu Ward	20th Feb 2020	PCEA Hall	31	11
Ruguru Ward	20th Feb 2020	Kiamariga Nursery.	33	12
Kirimukuyu Ward	20th Feb 2020	Kiriko PCEA Hall	26	20
Konyu Ward	21st Feb 2020	Ndimaini hospital Hall	36	14
Karatina Ward	21st Feb 2020	Karatina town hall	35	14

Iriaini Ward	21st Feb 2020	Kahuru chief office	34	12
Rware Ward	24th Feb 2020	Old Municipal Hall	39	10
Gatitu/Muruguru Ward	24th Feb 2020	Lilian's Hotel	48	17
Ruring'u Ward	24th Feb 2020	Old Municipal Hall	25	17
Kamakwa/Mukaro Ward	25th Feb 2020	Mununga-ini chief compound	27	19
Dedan Kimathi	25th Feb 2020	Ihururu chief hall	39	15
Wamagana Ward	25th Feb 2020	Wamagana Educational Hall	33	25
Kiganjo/Mathari Ward	26th Feb 2020	PC headquartes Office	23	13
Mweiga Ward	26th Feb 2020	Kieni CDF Hall	28	11
Gatarakwa Ward	26th Feb 2020	Watuka Cooperative Social Hall.	24	10

Endarasha/Mwiyogo Ward	27th Feb 2020	Endarasha catholic Hall.	26	6
Gakawa Ward	27th Feb 2020	Nature Kenya hall	19	10
Mugunda Ward	27th Feb 2020	Fine Breeze Hotel	26	8
Narumoru/Kiamathaga Ward	28th Feb 2020	PCEA hall	39	22
Theigu River Ward	28th Feb 2020	Victor's Chapel Hall	33	16
Kabaru Ward	28th Feb 2020	Baptist Hall.	33	6

Efforts were made during the stakeholder consultation to ensure that representatives from all genders were present during stakeholder forums held. The complete attendance lists of stakeholder forums held have been attached to the Stakeholder Engagement report.

2.3.5 Training and Capacity Building

To build capacity of the County staff, the Consultant endeavoured to integrate the Nyeri County staff throughout the CSP process from inception to approval. This involved participation in all stakeholder forums held for both the public and political officers, as well as training on GIS data collection and application instruments.

2.4 Constitutional, Policy and Legal Framework

Policies are relevant as they indicate the desired development goals of the formulating institution as well as the means of achieving the goals. Each legislative body provides relevant institutional guidelines that relate to the process of urban development and planning. On the other hand, institutions are the agents of policy implementation. An understanding of the relevant policies and institutions helps to ensure proper coordination and implementation of any given plan.

2.4.1 Policy Framework

Table 3: Summary of Policy Context of the CSP

GLOBAL POLICIES	
a) Sustainable Development Goals (SDGs)	The Sustainable Development Goals (SDGs) define global sustainable development priorities and aspirations for 2030 and seek to mobilize global efforts around a common set of seventeen goals and targets. SDG 11 aims to make cities and human settlements inclusive, safe, resilient and sustainable.
b). New Urban Agenda	The New Urban Agenda provides a roadmap for building cities that can serve as engines of prosperity, inclusion and centres of cultural and social well-being while protecting the environment. The Agenda also provides guidance for achieving the SDGs and provides the underpinning for actions to address climate change.
c). The Paris Agreement	The Paris Agreement is a commitment of global nations (including Kenya) to attain the long-term global goal of stabilizing the global temperature increase to below 1.5 degrees Celsius above the preindustrial levels. While the Agreement is not legally binding, each country is expected to determine, plan and regularly report its contribution to achievement of the common targets of adaptation, mitigation and climate financing.
d). Treaties against Discrimination	Kenya has ratified the: • Convention on the Elimination of Discrimination against Women (CEDAW) • United Nations Convention on the Rights of the Child (UNCRC) • International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)

THE CONSTITUTION OF KENYA
• **Fourth Schedule** identifies the functions of the County government including the role of County planning and development. • **Article 60 (1)** provides that land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable and in accordance to principles such as equity in access to land, security of land rights, sustainable and productive management of land resources, transparent and cost-effective management of land, sound conservation and protection of ecologically sensitive areas. This Article also advocates for the participation of people in decision making. • **Article 61 (1), (2)** describes land ownership and classification within Kenya. • **Article 63** of the Constitution of Kenya guarantees the rights of communities to their lands and territories. It states that community land consists of land lawfully held, managed or used by specific communities as community forests, grazing areas or shrines and that it includes ancestral lands and lands traditionally occupied by hunter-gatherer communities. • **Article 66 (1)** states that the state may regulate the use of any land or right over land in the interest of public safety, order, health or land use planning. • **Article 69** envisions the achievement and maintenance of a tree cover of at least ten per cent of the land area of Kenya. • **Article 174** outlines principles of promoting socio-economic development and provision of proximate and easily accessible services which equally depend on proper planning, development and management of utilization of resources. • **Chapter Four** of the Kenyan Constitution contains a progressive Bill of Rights that guarantees all citizens the right to a clean and healthy environment; it makes international law a key component of the laws of Kenya and guarantees protection of minorities and marginalized groups.

NATIONAL POLICIES AND PLANS	
Kenya Vision 2030	• This is the blue print for Kenya's long term national development. It is anchored on three main pillars: Economic, Social and Political. • The document is geared towards transforming Kenya into "a newly industrializing, middle income Country providing a high quality of life to all its citizens in a clean and secure environment" through improvement of key thematic sectors such as Infrastructure; Energy; Security; Tourism; Agriculture; Wholesale/Retail Trade; Manufacturing; Financial Services; and Business Process Outsourcing. • Regarding Nyeri, integration of these sectors through spatial planning will be at par with the objectives of Vision 2030.
National Spatial Plan (2015-2045)	• The NSP defines the general trend and direction of spatial development for the country by providing a framework for better national organization and linkages between different activities within the national space hence informing the future use and distribution of activities

NATIONAL POLICIES AND PLANS	
National Land Policy (Sessional Paper No. 3 of 2009)	• The National Land Policy guides the country towards a sustainable and equitable use of land. It aims at providing a framework for undertaking land use planning and development control in all administrative levels i.e. national, County and town level. It also calls for immediate actions to addressing environmental problems that affect land such as degradation, soil erosion and pollution.
National Land Use Policy (Sessional Paper No. 1 of 2017)	• Provide legal, administrative, institutional and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, County and community levels. • Categorization of land uses in the country. • Advocates for the development of County Spatial Plans, Community land use plans for the country with full participation of all stakeholders and strict adherence to them enforced. • Promoting environmental conservation and preservation
Draft National Urban Development Policy	• Seeks to provide a framework for sustainable urban development in various thematic areas such as land, infrastructure, urban safety and disaster risk management among others.
National Climate Change Action Plan (2013-2017); the National Adaptation Plan (2015-2030) and Kenya's Intended Nationally Determined Contribution	• The NCCAP outlines the proposals for boosting adaptation and mitigation to climate change per sector. • The NAP contains sector strategic adaptation actions for each planning sector to build resilience and enhance adaptive capacities to the impacts of climate change. • Kenya's INDC outlines key mitigation activities up to 2030 which will include expansion in renewable energy, tree cover of at least 10%, clean energy, low carbon transportation, climate-smart agriculture and sustainable waste management systems. • The INDC also identifies priority adaptation actions per sector that should be mainstreamed into plans for enhanced resilience to climate change.
Forestry Master Plan (1995-2020)	• It recognizes the environmental role of forests including the provision of water, habitat for biodiversity and carbon sequestration that mitigates against climate change.w
Energy Policy 2004	• This policy promotes the utilization of renewable energy sources to enhance Kenya's electricity supply capacity while mitigating climate change from fossil fuels.
Relevant Policies against Discrimination protecting minorities	• Examples of such policies include; the National Children's Policy 2010 and Employment Act 2007

2.4.2 Legal Framework

Table 4: Summary of Legal Context of the CSP

Name of Act:	Applicability to CSP:
County Government Act, 2012	• ***A CSP is provided for in Section 110 (1) of the County Government Act, as a ten-year GIS based database system providing:*** - A spatial depiction of the social and economic development programme of the County as articulated in the integrated County development plan - Clear statements of how the spatial plan is linked to the regional, national and other County plans - Clear clarifications on the anticipated sustainable development outcomes of the spatial plan • ***Sec 110-2(g-j) of the CGA requires that CSPs:*** - Shall identify areas where strategic intervention is required; - Shall indicate areas where priority spending is required; -Shall provide clear clarifications on the anticipated sustainable development outcomes of the spatial plan; and -Shall indicate the areas designated to conservation and recreation. • ***The CGA also has provisions aimed at protecting the marginalized that include:*** - Sec. 102c which outlines one principle of County planning as aiming to protect and integrate rights and interest of minorities and marginalized groups and communities. -Sec. 103f which outlines one objective of County planning as providing the preconditions for integrating under-developed and marginalized areas to bring them to the level generally enjoyed by the rest of the County • ***The CGA also has provisions addressing climate change and sustainability that include:*** - Sec. 103i which outlines one objective of County planning as working towards the achievement and maintenance of a tree cover of at least ten per cent of the land area of Kenya as provided in Article 69 of the Constitution. - Sec. 102b which outlines another principle of County planning as aiming to protect the right to self-fulfilment within the County communities and with responsibility to future generations. -The Act requires the County Governor to promote and facilitate citizen participation in the development of policies and plans, and delivery of services in the County.
Physical and Land Use Planning Act, 2019	• This Act provides for preparation of a County physical and land use development plan (sections 36-45) once every ten years. The main purpose of a County physical and land use development plan is to provide an overall physical and land use development framework for the County. • The plan should guide rural development and settlement, provide a basis for infrastructure and services delivery, natural resources management, environmental protection and conservation, zonation for industrial, commercial, residential and social developments, improve transport and communication networks and linkages as well as safeguarding national security.

Name of Act:	Applicability to CSP:
Urban Areas and Cities Act, 2011	• The Act establishes a legislative framework for classification of areas as urban areas or cities, governance and management of urban areas and cities and participation by the residents in the governance of urban areas and cities. • The Act which was amended in 2019 provides that: o A city should have a resident population of at least 250,000 residents and have the capacity to effectively and efficiently deliver its services to its residents and has in existence, the services provided in the First Schedule. o A municipality should have a resident population of a least 50,000 residents, have an integrated urban area development plan and the capacity to effectively and efficiently deliver its services to its residents and has in existence, the services provided in the First Schedule. o Every headquarters of a County government shall be conferred the status of a municipality, whether it meets the criteria for a classification as a municipality. o A town should have a resident population of at least 10,000 residents and have the capacity to effectively and efficiently deliver its services to its residents and has in existence, the services provided in the First Schedule. o A market centre should have a resident population of at least 2,000 residents and have an integrated urban area development plan.
The National Land Commission Act, 2012	• States the functions, powers of the NLC such as; to monitor and oversee responsibilities over land use planning throughout the country. In addition, this Act provides for the management and administration of public, private and community land in accordance with land policy principles. It provides a linkage between the commission, County government and other institutions dealing with land.
Land Act No. 6 of 2012	• It is the substantive law governing land in Kenya which provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the public.
Environmental Management and Coordination Act, 1999	• EMCA provides for establishment of an appropriate legal and institutional framework and procedures for management of the environment. It provides regulations for the conservation and sustainable use of resources on wetlands, river banks and land for the benefit of the people and communities living in the area. This Act also offers preliminary provisions for the regulation of solid waste, industrial waste, hazardous wastes, pesticides and toxic substances, biomedical wastes and radioactive substances.
Water Act, 2016	• This Act provides for sustainable management, conservation, use and control of water resources. • Regarding Nyeri County, the provision in this Act makes it imperative that the water sources require strategies to ensure sustainable management and conservation

Name of Act:	Applicability to CSP:
Forest Conservation and Management Act, 2016	• This Act is concerned with forest resource management, administration and conservation for socio-economic development. It also advocates for benefit sharing model of forest resources for sustainable exploitation.
Agriculture and Food Authority Act, 2015	• This Act provides for the establishment of an Agriculture Fisheries and Food Authority. It also provides for the development of policy guidelines by the authority on preservation, utilization and development of agricultural land and related matters. It makes provisions for the respective roles of the national and County governments in agriculture (excluding livestock.
The Intergovernmental Relations Act, 2012	• It provides for a framework for consultation and cooperation amongst County governments and to establish institutional structures and mechanisms for intergovernmental relations. • In regard to Nyeri County, it does not operate in isolation and instead, shares various resources and infrastructure as well with other counties. Resources such as rivers, roads, the railway, among others. The management of such resources needs the involvement of other nearby counties, and this Act provides for that. • It is envisioned that this Act gives the operational grounds upon which institutions whose area of operation and sphere of influence is beyond the County borders such as the Mount Kenya region.
Climate Change Act, 2016	• The Act strengthens climate change governance, institutional arrangements, and mainstreaming of climate change into sectoral planning, budgeting and implementation at all levels of government.
Energy Act, 2019	• This Act promotes the generation and use of renewal energy and energy efficient technology.
Relevant laws against discrimination/ protecting minorities	• Children Act 2001 • Disability Act 2003

Disclaimer:

From the analysis of the legal framework, the document is regarded as a County Spatial Plan. This is derived from the Terms of reference, as well the County Government Act (section 107, 110) provides for the preparation of a County Spatial Plan to guide, harmonize and facilitate development within the county. Additionally, section 107 (b) indicates that the County Spatial Plan shall be the basis for all budgeting and spending in a county.

2.4.3 Institutional Framework

Table 5: Summary of Institutional Context of the CSP

Name of Institution:	Applicability to CSP:
County Government	☐ The function of County planning has been conferred to County Governments according to the 4th Schedule in the Constitution. ☐ The County Governments are tasked with the preparation of a CSP and its approval (as per the County Governments Act of 2012).
National Land Commission	☐ The National Land Commission oversees and monitors land use planning nation-wide. ☐ NLC is also mandated with the management and administration of public land.
Ministry of Lands and Physical Planning	☐ The Ministry of Lands oversees policy formulation to guide physical planning. Additionally, the Ministry also prepared the National Spatial Plan, upon which the CSP is supposed to be anchored. The national spatial plan seeks to provide a framework for functional human settlements, enhanced agricultural productivity, planning and managing natural resources and the environment, providing a framework for infrastructure provision, promoting industrial and commercial development and the enhancement of good governance. The County Spatial plan will aim to achieve the vision of the National spatial plan at the County level and provide a framework for the achievement of the national vision at a decentralized scale.
Other National Government Ministries and Parastatals (such as National Environment Management Agency, Kenya Forestry Service, Kenya Wildlife Service, Kenya Power, among others)	☐ Land, which is the canvass on which the CSP will be prepared, is an enabler of development across all sectors. In this regard, all spatially-based policies and initiatives by national government ministries and parastatals.

2.5 Linkages to Other Plans:

National Plans	Applicability to CSP:
County Government	• The NSP defines the general trend and direction of spatial development for the country by providing a framework for better national organization and linkages between different activities within the national space hence informing the future use and distribution of activities • The NSP has identified Nyeri as a Resource potential growth area. The NSP advocates for provision services and facilities such as establishment of an efficient mass transit public transportation system, expansion of sewerage systems and waste management facilities to meet its functions and also defines local urban–rural development systems.
Kenya Vision 2030	• This is the blueprint for Kenya's long-term national development. It is anchored on three main pillars: Economic, Social and Political. • The document is geared towards transforming Kenya into "a newly industrializing, middle income Country providing a high quality of life to all its citizens in a clean and secure environment" through improvement of key thematic sectors such as Infrastructure; Energy; Security; Tourism; Agriculture; Wholesale/Retail Trade; Manufacturing; Financial Services; and Business Process Outsourcing. • Regarding Nyeri, integration of these sectors through spatial planning will be at par with the objectives of Vision 2030.
National Climate Change Action Plan (2013-2017); the National Adaptation Plan (2015-2030) and Kenya's Intended Nationally Determined Contribution	• The NCCAP outlines the proposals for boosting adaptation and mitigation to climate change per sector. • The NAP contains sector strategic adaptation actions for each planning sector to build resilience and enhance adaptive capacities to the impacts of climate change. • Kenya's INDC outlines key mitigation activities up to 2030 which will include expansion in renewable energy, tree cover of at least 10%, clean energy, low carbon transportation, climate-smart agriculture and sustainable waste management systems. • The INDC also identifies priority adaptation actions per sector that should be mainstreamed into plans for enhanced resilience to climate change.
Forestry Master Plan (1995-2020)	• It recognizes the environmental role of forests including the provision of water, habitat for biodiversity and carbon sequestration that mitigates against climate change.

County Plans	Applicability to CSP:
The Nyeri County Integrated Development Plan (CIDP 2018-2022)	• The CIDP provides the County's vision for the next five years while detailing various projects and programme per sectors with their location for implementation.

2.6 Emerging Issues

Opportunities:	Constraints:
• Strong policy framework for plan preparation. • Strong community participation and political will during the plan preparation process • Devolved funds from the national government to help in steering development. • Support by civil society organizations to initiate development projects	• The general level of public awareness about the provisions of the constitution is low. • The many legal Acts that exist promote conflict and competition in the public domain instead of cooperation and coordination, which further weakens the planning capabilities of County government. • Political interference in finance allocations and infrastructure development. • Weak policy and legal framework in some institutions. • Poor interdepartmental linkages and operations. • Weak linkage between development planning and budgetary allocation • Poor coordination of past and current interventions by both state and non-state actors. • Mismanagement of funds on non-development projects

CHAPTER THREE:

BASEMAP

3.1 Elements of Base map

A base map is a topographical map that depicts natural and man-made spatial elements on geographic space of an area. The Nyeri topographical map was prepared using high-resolution (3 meters) ortho-rectified imagery, Survey of Kenya topo maps and Digital Elevation Models (DEMS). This data was updated using primary data captured using hand held Global Positioning Systems (GPS) and mobile geo-location software.

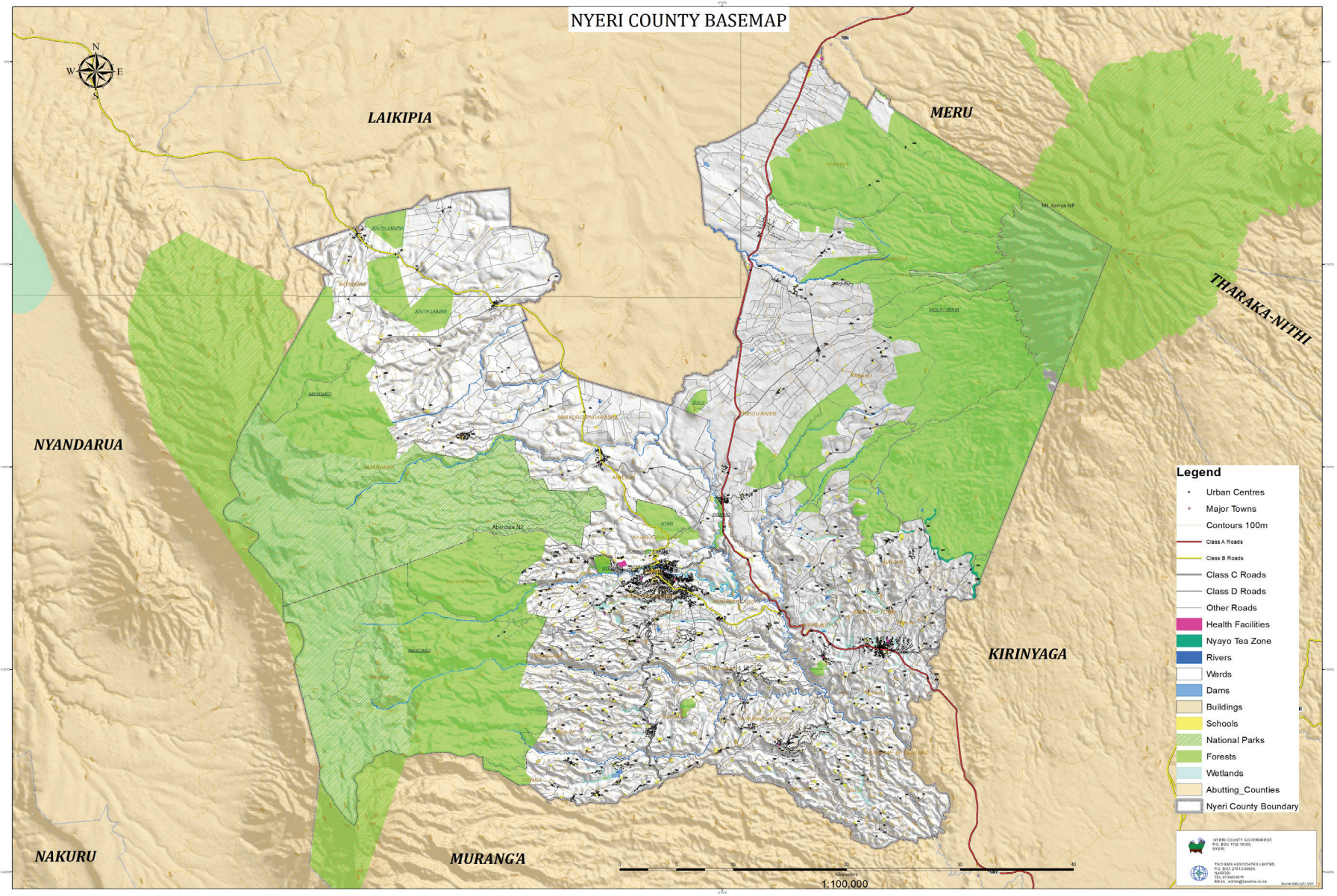
The base-map is developed on the of the following layers: topographical features (mountains, hills, ranges, ridges, steep slopes, valleys and plains), hydrological networks (such as rivers, wetlands and dams), forests, national parks and game reserves, human settlements (building footprints and names of urban centers), transportation corridors (such roads, airstrips and railway lines), social infrastructural facilities (such as schools and health facilities), large scale agricultural estates (such as the Nyayo Tea Zones), administrative boundaries (Nyeri County, abutting counties, sub-counties and wards).

3.2 Importance of Base map

A base map is important in the plan preparation and implementation because of the following:

- To provide background detail necessary that virtually orients the location of the map. Base maps also add to the aesthetic appeal of a map.
- It serves as a digital base map that is a primary element for developing a Geographic Information System for organized urban development.
- Base map forms the framework for overlaying other relevant details related to infrastructure, land base, utility networks, property details etc. to create any intelligent GIS map.
- An accurate base map lay the foundation for efficient infrastructure planning, monitoring and management. Our systematic approach for base map preparation ensures accuracy and effectiveness.
- Importing raw survey data into base maps is simple. Raw GPS survey data can be gathered and seamlessly integrated into a base map, creating an easy way to analyze tracks and waypoints stored on virtually any device.
- The flexible design of a base map is one of its most alluring features. Stakeholders may ask to visualize multiple scenarios during the design approval process. The ability to quickly scale and add objects can help yield a faster approval.
- Base maps serve as a catalyst for major government initiatives.

Map 5: Base Map



Source: Two EMS Associates, 2019

3.3 Summary of Base Map Features

Statistics of various base map features have been summarized in the table below:

Table 6: Factsheet on base map features

Feature:	Remarks:
Administrative boundaries (Nyeri County, abutting counties, sub-counties and wards)	• County area: 3337 km^2 • Number of sub-counties: 8 • Number of wards: 30
Topographical features (mountains, hills, ranges, ridges, steep slopes, valleys and plains)	• Highest point: Mount Kenya (5199m above sea level) • Lowest point: Mukurweini Central ward (Sagana river)- (1192m above sea level) • Slope range: 2%-90%
Hydrological networks (such as rivers, wetlands and dams)	• Cover 0.05% of County total land area. • River Sagana: Highest average discharge: 13m^3/s
Vegetation	• Forest cover: 38% of County total land area • Mount Kenya Forest: 64,470.62 Ha • Aberdare Forest: 50,964.22 Ha
National parks and game reserves	• Mount Kenya National Park: 107 km^2 • Aberdare National Park: 466 km^2
Human settlements (building footprints and names of urban centers)	• Principle towns: 2 (Nyeri, Karatina) • Urban centers: 4 (Othaya, Mweiga, Mukurweini, Kiganjo/ Chaka) • Market and rural centers: 224
Transportation corridors (such roads, airstrips and railway lines)	• Road network: 3092 km • Rail network: 77.7 km • Number of airstrips: 4
Social infrastructural facilities (such as schools and health facilities)	• Number of schools: 440 public ECDs, 352 public primary schools, 195 public secondary schools, 14 colleges, 51 TVETS, vocational training institutes and polytechnics, and 2 universities. • Number of health facilities: 1 Level-6 (Mwai Kibaki Teaching and Referral Hospital), 2 Level-5 Hospitals, 10 Level-4, 26 Level-3, 88 Level-2 and 251 Level-1 facilities.

Source: Two EMS Associates, 2019

PART II:
SITUATIONAL ANALYSIS

CHAPTER FOUR:

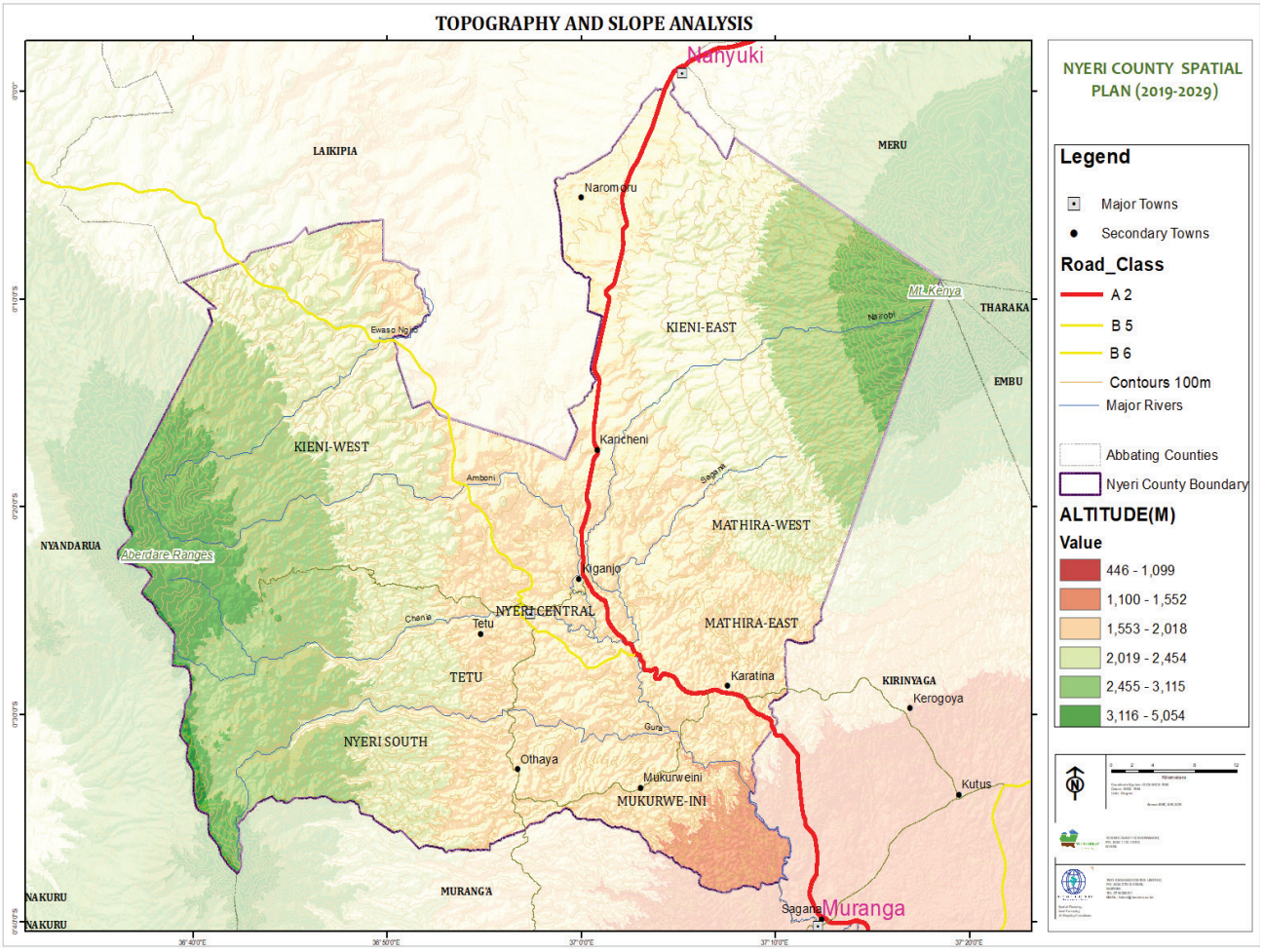
PHYSIOGRAPHICAL CHARACTERISTICS

4.1 Topography and Slope Analysis

Nyeri County lies within the central highlands of Kenya and is divided into three topographic regions namely the plains, the mountain and the hills. The County, characterized by high altitudes; 5,199 meters above sea level being the highest point and 1192 m being the lowest point. The main physical features are Mount Kenya that lies 5,199m above sea level located to the East and the Aberdare Ranges (3,999m above sea level) on the west side of the County.

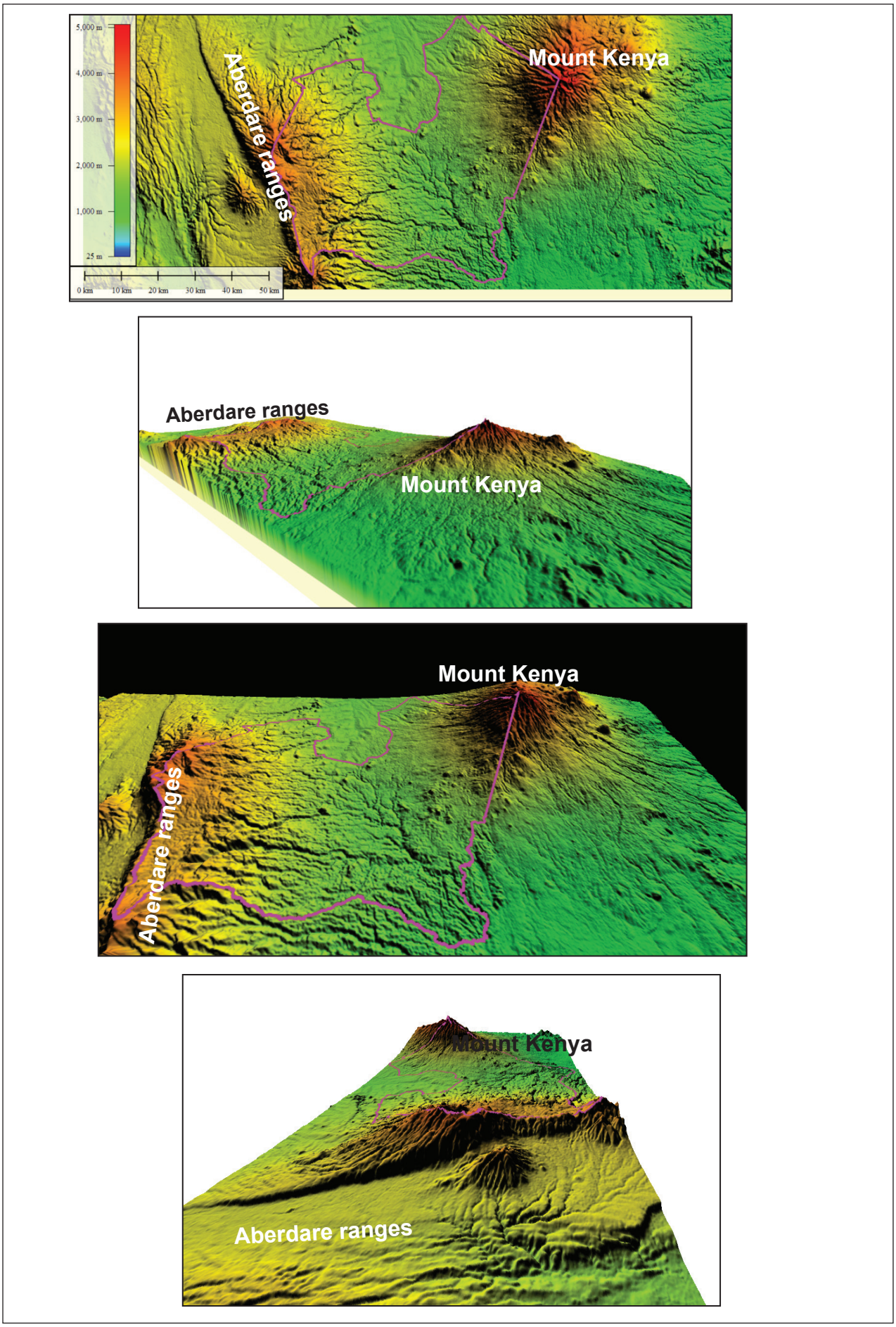
The County has an average slope of 8.8%. The topography in the County is characterized by steep ridges and valleys, as well as hills such as Karima, Nyeri and Tumutumu. These hills affect the climate especially the rainfall patterns thus influencing the mode of agricultural production and type of agricultural produce. Sections of Kieni East and Kieni West sub-counties are relatively flat.

Map 6: Topography



Source: Two EMS Associates, 2019

Figure 2: DEM models



Source: Two EMS Associates, 2019

4.2 Geology and Soils

4.2.1 Geology

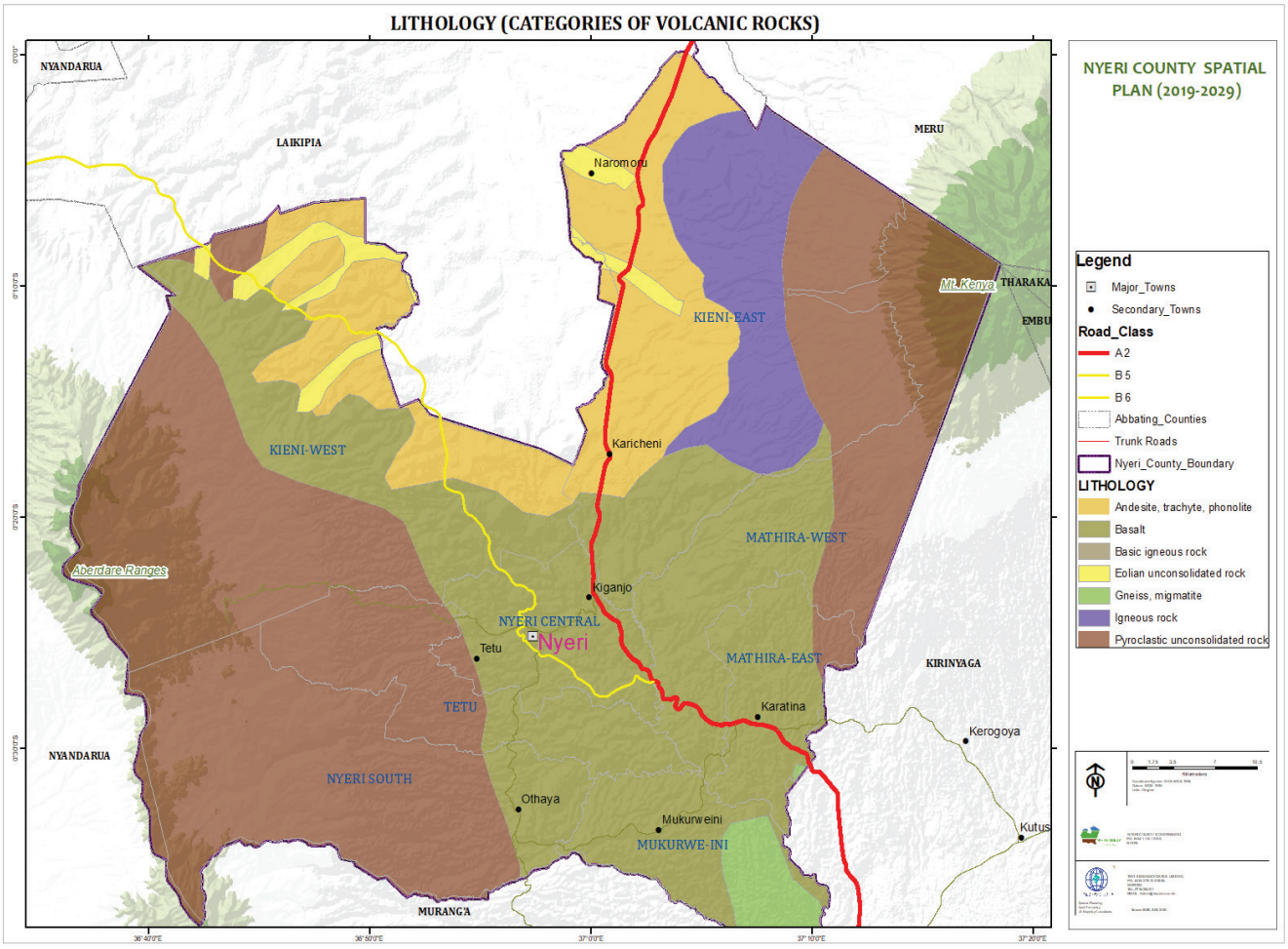
Geological knowledge of an area is important in determining soil types, probability of aquifers, mineral composition of an area, prediction of geological hazards and avoidance of environmental threats. Additionally, geological knowledge is crucial when planning for building construction and infrastructural development such as dams, roads, boreholes and mineral exploration.

The County is characterized by volcanic rocks formed from the extrusions of Mount Kenya and the Aberdare Ranges. The highlands of the Aberdares and Mount Kenya consist of pyroclastic rocks characterized by fertile volcanic soils rich in humus content.

The midlands are made up of basalt rocks, high in silica content good for ceramics and building stone. The lowlands of Kieni lie on phonolite, andesite and trachytes which extrude to the surface hence easily accessed as building stones. The lower to upper midlands of Kieni East are characterized by igneous rocks good for interior and exterior decoration.

The river valleys are characterized by the eolian rocks which erodes to form high quality construction sand. The gneiss rocks in lower Gikondi and Rugi are associated with thin soils and can be used for ornamental purposes.

Map 7: Geology

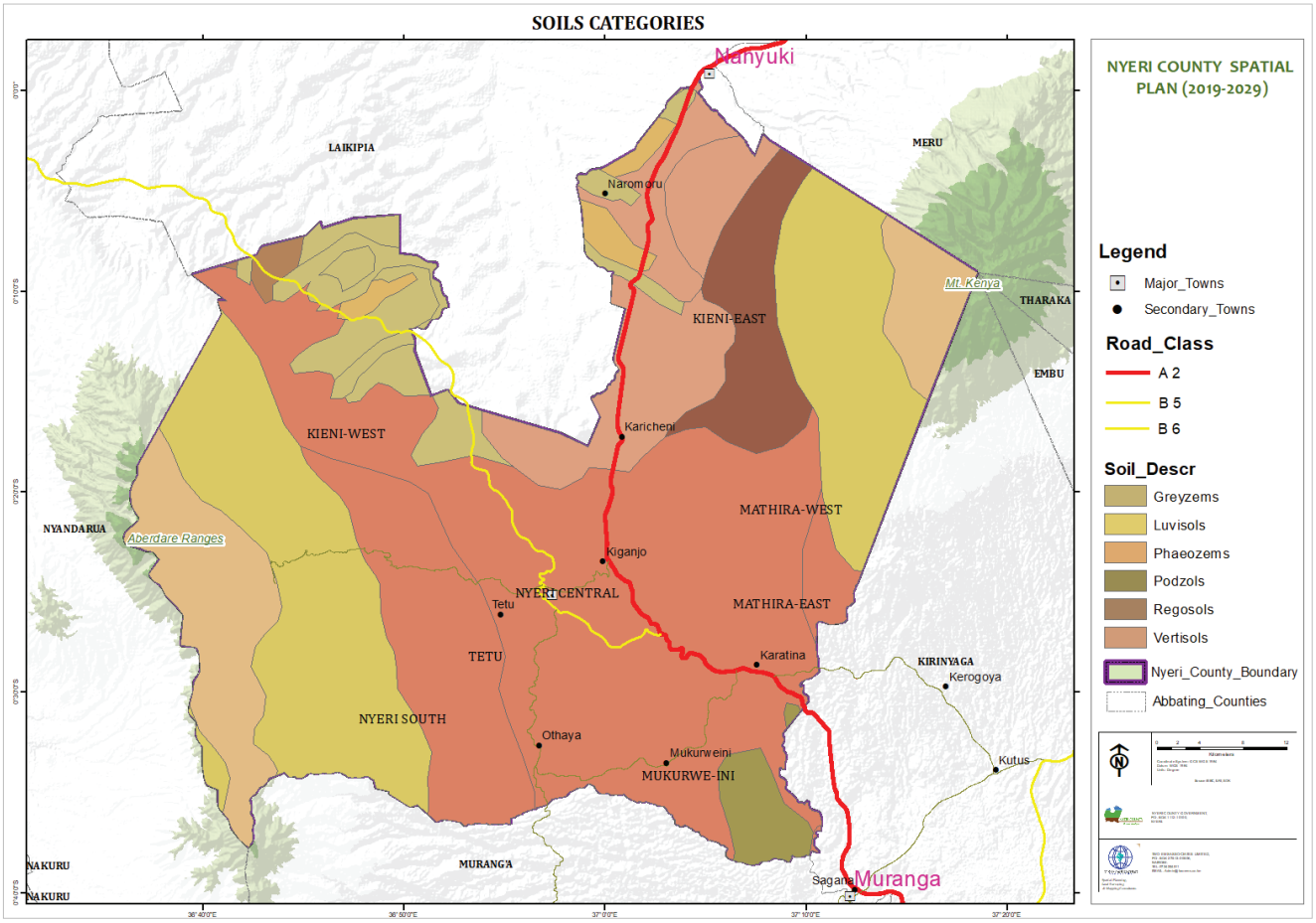


Source: Two EMS Associates, 2019

4.2.2 Soils

The soil types and distribution has been influenced by the geological sub-structure. The knowledge on soils is important as it has an impact on water retention/ drainage, agricultural productivity, biodiversity, water quality and construction activities.

Map 8: Soil Types



Source: Two EMS Associates, 2019

The soils are mainly black cotton soils in Kieni East and West, red volcanic soils in Othaya, Karatina, Mukurwe-ini and other areas within the County. Some parts of Kieni are characterized by a bit of sandy soils. The soils in Nyeri County are generally well drained and can support agriculture.

There are six main types of soils in Nyeri County namely greyzems, luvisols, phaeozems, podzols, regosols and vertisols.

Table 7: Soil Types and Characteristics

Soil Type:	Soil Characteristics:	Soil Texture:
Greyzems	Associated with highlands and steep areas and they mainly cover parts on the foot slopes of Mt. Kenya and Aberdare. They are well drained and have high humus content (very fertile).	Loamy to clayey
Luvisols	Luvisols are strongly leached soils that normally develop on igneous rocks. They mainly cover the Kieni plains. Luvisols are fertile and are good for agriculture.	Clayey to very clayey
Phaeozems	Phaeozems are well drained, with high contents of organic/ humic substances in the topsoil as well as a high plant-available soil water; thus, possessing a high fertility. They have developed on tertiary basic igneous rocks like olivine basalts, phonolites and tuffs. They mainly cover Rugi, Gikondi and Mukurweini Central wards, and are thin because of steep slope.	Sandy-loamy
Regosols	Regosols are weakly developed soils from unconsolidated materials like igneous and basement rocks. The soils are characterized by shallow, medium- to fine-textured, unconsolidated parent material that may be of alluvial origin. The Regosols in Mukurweini are high in silica content good for clayworks.	Loamy
Vertisols	Vertisols are dark montmorillonite-rich, poorly drained cracking clays. The clay content is higher than 30 %. They develop on alluvial and colluvial materials as well as on basic rocks. Areas that have these soil types are often associated with flooding example of areas in Kieni East and West.	Very clayey (black cotton soils)
Podzols	Podzols have a sandy texture and weak aggregation and thus are very well drained. They are a good source of sand for construction and are mainly found in river valleys.	Sandy

Source: KENSOTER, 1995

4.3 Climatic Conditions

Climatic observations and analysis are key to enhance climate forecasting and help in determining agricultural timings for various crops. It's also important aspect in determination of future climatic expectations, climate change and risk management.

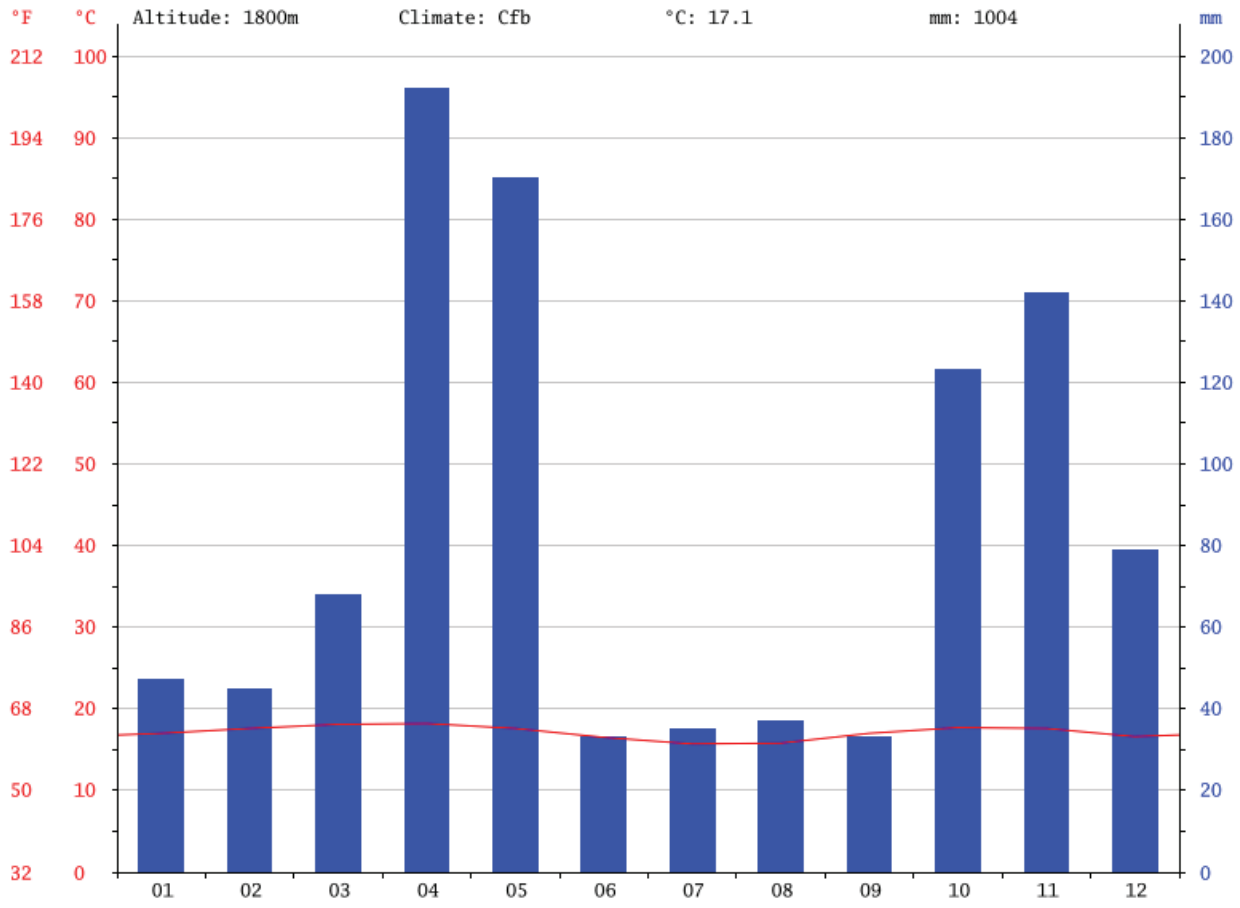
4.3.1 Rainfall

The County experiences equatorial rainfall due to its location within the highland zone of Kenya. The long rains occur from March to May while the short rains come in October to December, but occasionally this pattern is disrupted by abrupt and adverse changes in climatic conditions. .

The rainfall patterns have also changed over the years as the effects of climate change take place within the County. Some areas have experienced delayed rains affecting the planting seasons

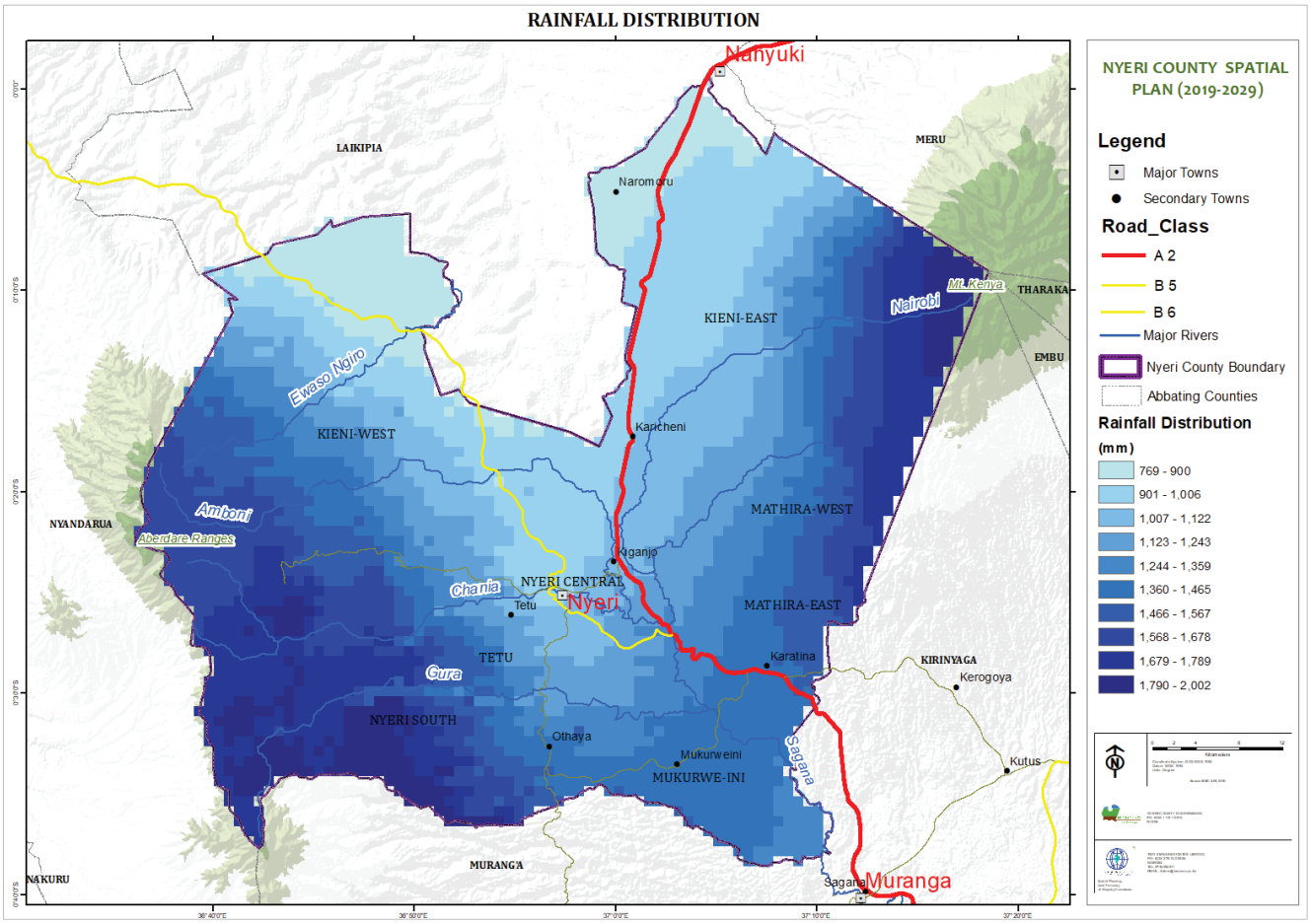
The annual rainfall ranges between 1,200mm-1,600mm during the long rains and 500mm-1,500mm during the short rains. The precipitation is highest in the month of April and lowest in the months from June and September.

Chart 1: Rainfall distribution



Source: Climate-data.org, 2018.

Map 9: Rainfall Distribution



Source: Two EMS Associates, 2019

4.3.2 Temperature

Temperature varies from 15 °C to 18.2 °C following the rainfall patterns. February and March are the hottest months while July is the coolest month of the year. However, areas around Mount Kenya experience low temperatures throughout the year.

Chart 2: Temperature levels

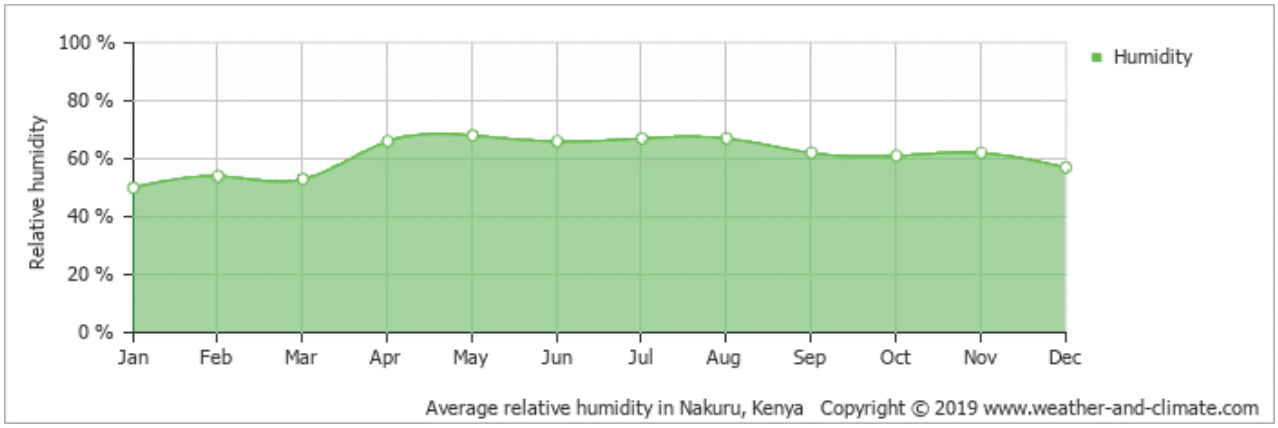
	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	17	17.6	18.1	18.2	17.6	16.5	15.7	15.8	17	17.7	17.6	16.6
Min. Temperature (°C)	7.9	8.3	9	10	9.9	8.9	8.6	8.5	8.6	9.2	9.6	8.2
Max. Temperature (°C)	26.1	27	27.3	26.5	25.4	24.1	22.9	23.1	25.4	26.3	25.6	25.1
Avg. Temperature (°F)	62.6	63.7	64.6	64.8	63.7	61.7	60.3	60.4	62.6	63.9	63.7	61.9
Min. Temperature (°F)	46.2	46.9	48.2	50.0	49.8	48.0	47.5	47.3	47.5	48.6	49.3	46.8
Max. Temperature (°F)	79.0	80.6	81.1	79.7	77.7	75.4	73.2	73.6	77.7	79.3	78.1	77.2
Precipitation / Rainfall (mm)	47	45	68	192	170	33	35	37	33	123	142	79

Source: Climate-data.org, 2018.

4.3.3 Humidity

Humidity is water vapor in the atmosphere. When there is more water vapor in the air, it turns to rain especially when the temperatures drop. The most humid month in the County is May, while the least humid is January. However, the average annual percentage across the County is 61.0%.

Chart 3: Humidity levels



Source: Climate-data.org, 2018

4.4 Hydrology and Water Resources

The analysis of hydrological resources (such as springs, streams, rivers and fresh-water habitats like wetlands) is important, particularly as the adequacy or deficiency of water resources can serve either as an impediment or opportunity to development.

4.4.1 Water Towers and Catchment Areas

The Aberdare Ranges and Mt. Kenya are part of Kenya's five water towers. The Aberdare Ranges are the source of Rivers Ewaso Ng'iro, Chania, Gura and Amboni. Mount Kenya water tower is the source of Nairobi River within the County. River Sagana is jointly fed by rivers from both Mt. Kenya and Aberdares Ranges. The Aberdare Ranges water tower faces challenges such as illegal logging, forest fires and encroachment from agricultural expansion.

The Mount Kenya water tower, on the other hand, faces challenges such as overgrazing, forest fires and agricultural expansion. As a result, there has been drying of rivers and streams (compounded by climate change) in the highlands.

4.4.2 Rivers and Springs

The major rivers found in the County are Sagana, Ewaso Ng'iro, Gura, Chania, Nairobi and Amboni, which have their main catchment areas being Mt. Kenya and Aberdare Ranges. The permanent and seasonal rivers in the County are the main source of water for domestic and industrial use across the County.

However, these water sources face several challenges especially within the water catchment areas where deforestation is experienced. If well tapped, these rivers, tributaries and streams can make the County to be self-sufficient in surface and sub-surface water resources.

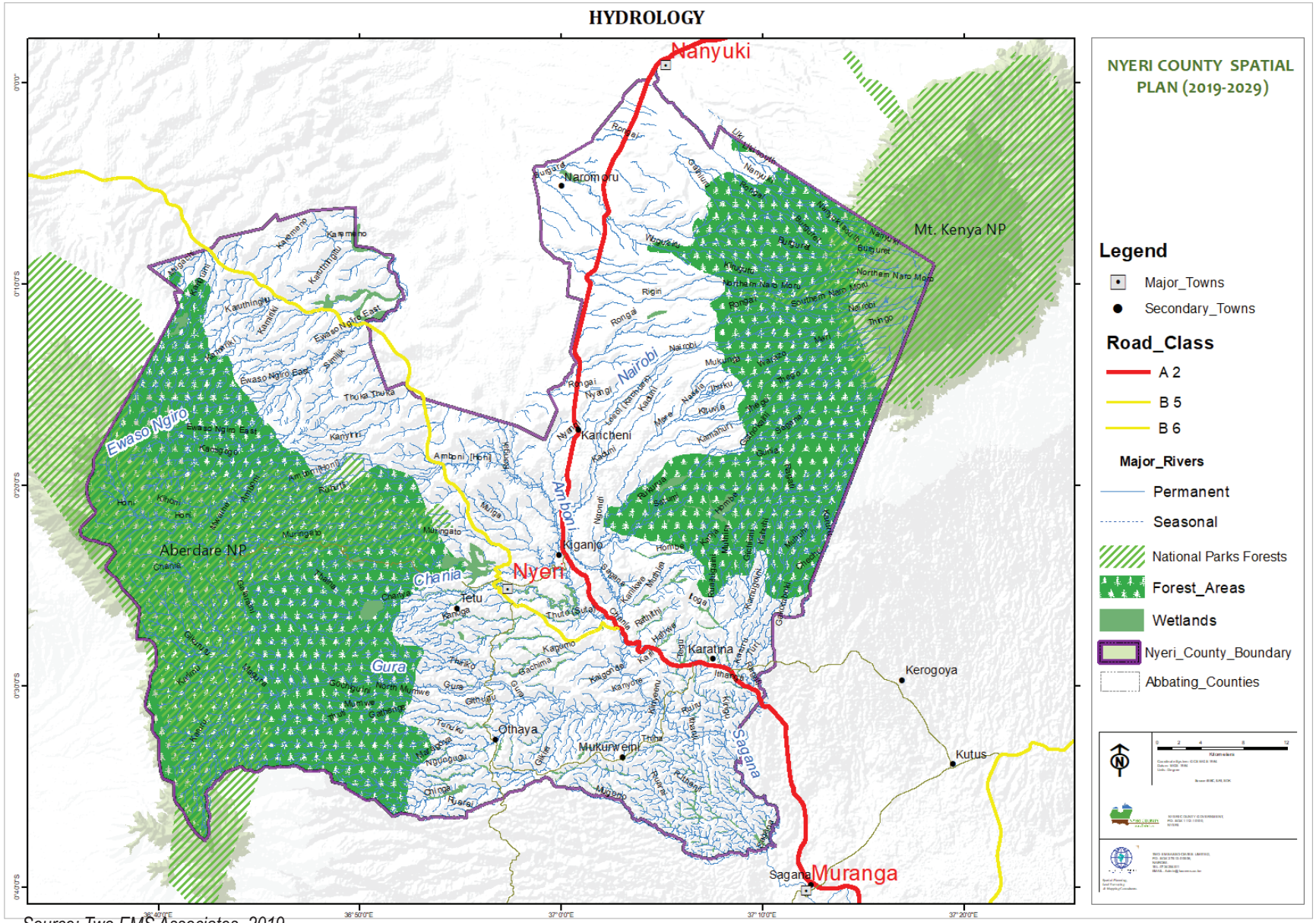
The table below is an inventory of the major rivers within the county;

Name	Type	Major Challenge
Sagana	Permanent	Diversion of river flow by various individuals for private agricultural activities Pollution by industrial waste diverted into the river
Chania	Permanent	The river experiences increased pollution especially from agricultural chemicals used for agriculture
Ewaso Ngiro	Permanent	Siltation along the river due to increased erosion especially along the riparian reserves
Gura	Permanent	Uncontrolled agricultural practices that has led to encroachment into the riparian reserves
Amboni	Permanent	Reducing water volumes due to inadequate water intake as most streams are drying up due to increased plantation of Eucalyptus tree along the rivers
Nairobi	Permanent	Destruction of river diversity caused by human activities like intensification in use of pesticides causing pollution of river

Nyeri County Spatial Plan

Source: Two EMS Associates, 2019

Map 10: Hydrology


HYDROLOGY
Nanyuki
Naromoru
Mt. Kenya NP
Kanicheni
Kiganjo
Nyeri
Chania
Tetu
Aberdare NP
Ewaso Ngiro
Gura
Othaya
Mukurweini
Karatina
Kerogoya
Kutus
Sagana
Muranga
Nairobi
Amboni
Thuta
Rongai
Rigiri
Ruguru
Kamemeno
Karuthinguru
Ewaso Ngiro East
Simlik
Thuta Thuta
Kanyiri
Amboni Honi
Honi
Khoni
Muringato
Kuiga
Ngondi
Kiburia
Kamahuri
Kiruwia
Thiha
Ruaraka
Ruaka
Kagaa
Kamukwe
Mugua
Kaganda
Kanyoro
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Downstream, unregulated and excessive use of water for irrigation has reduced reliability of water supply and impacted on riparian environments. Small-scale irrigation projects in the ecosystem are many and most of them have abstracted water from the rivers without having the requisite water permits. Planting of high-transpiration tree species such as eucalyptus has also contributed to reduced volumes of water.

4.4.3 Ground Water

Ground water in Nyeri is abstracted through wells and boreholes. Rock type remarkably affects aquifer characteristics. In Nyeri County, mapping of ground water resources (such as aquifers), their quantity and quality has not been documented. Ground water in the County is used for domestic, agricultural and industrial purposes. Available data shows that borehole depth ranges from 80-250 meters within the County with a median yield of about 9 liters per second, fluctuating seasonally. Groundwater varies in chemical composition and this variation occurs both spatially and seasonally. The County has potential to tap into underground water especially in areas of Kieni West, Kieni East and Mathira East sub-Counties. This will improve access to water for both domestic and industrial use.

Springs

The county is home to two major water catchment areas; the Aberdare and Mt Kenya. Within the county especially within the Aberdare ranges, there are several water springs which are a source of water for domestic and agricultural use. Some of the major springs in the county include; Mahigaini in Kirimukuyu ward and Chania and Karuru located in Mahiga ward. There is need for more extensive studies and analysis in determining the occurrence of possible extraction of underground water within the county and take feasibility studies.

The map below shows location of the springs within the county.

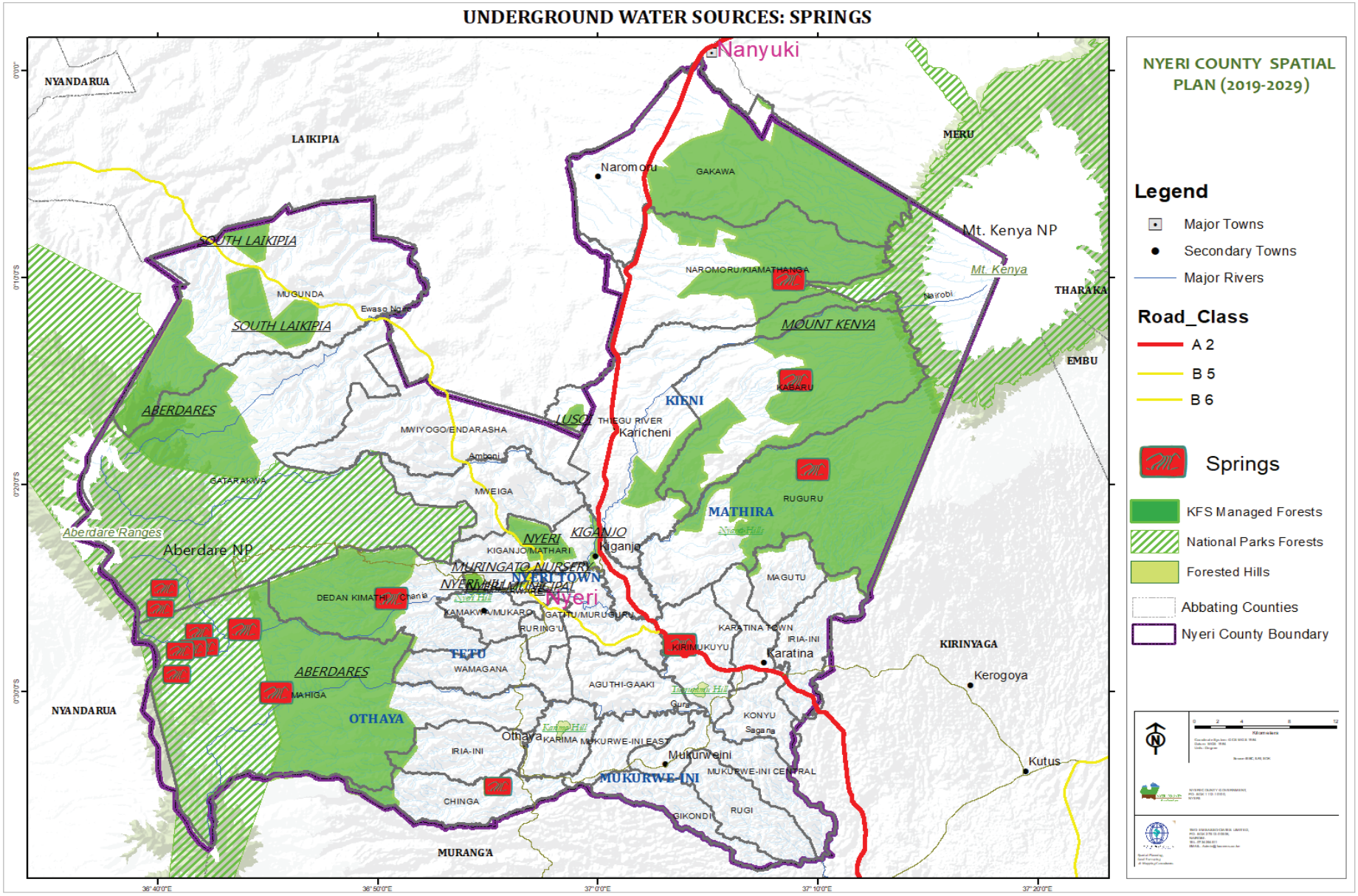
4.4.4 Wetlands

Wetlands are water reservoirs for irrigation schemes, livestock and habitat for birds. They improve water quality, assist in flood control and often form urban edges for towns and centres. Major wetlands in the County include Muringato wetland in Rware ward, Hombe wetland in Kiganjo/ Mathari ward and Karemeno wetland in Gakawa ward.

The major threats facing wetlands in the County include:

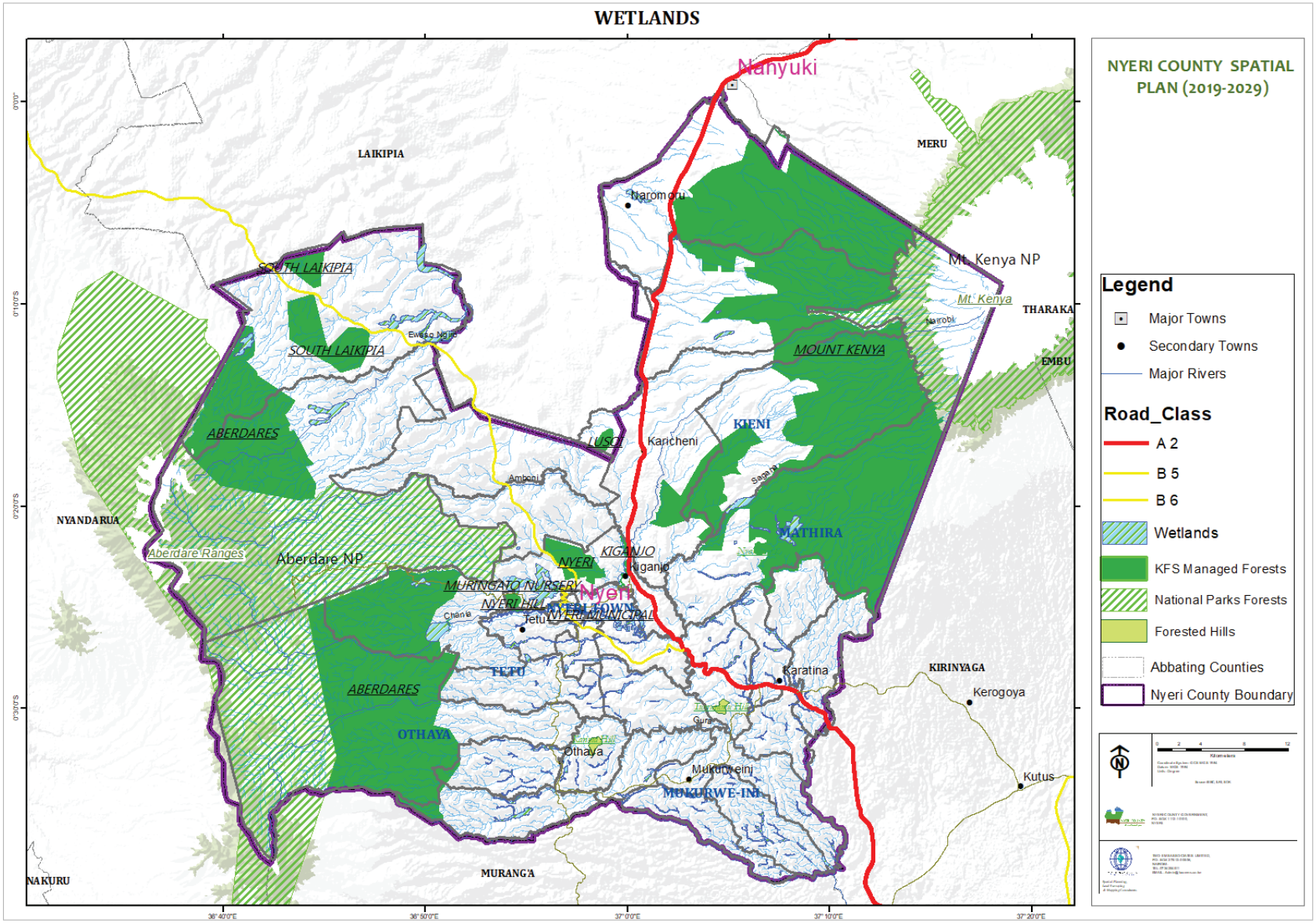
- Sedimentation, invasive weeds and prolonged droughts
- Pollution by excessive use of chemicals during farming.
- Encroachment by human activities
- Siltation
- Prolonged droughts and drying up of source rivers
- Pollution by industrial waste.

Map 11: Springs



Source: Two EMS Associates, 2019

Map 12: Wetlands



Source: Two EMS Associates, 2019

4.4.5 Water Quality and Pollution

The main issues in water quality and causes of pollution to hydrological resources in the County have been summarized in the table below:

Table 8: Water quality issues

No.	Source	Quality issue	Causes of pollution
1	Rivers and streams	The water is clean in some sections and polluted especially lower areas of the streams	Poor sanitation in urban and rural areas along the streams, use of excess chemicals in farming and siltation.
2	Ground water	The water has fluorides. (levels of fluorides are varied)	Weathering of rocks, excavations and mining.
3	Wetlands	The water in wetlands is generally contaminated.	Pollution, poor sanitation in surrounding areas and siltation.
4	Water pans	The water is sedimented and contaminated.	Siltation and human activities
5	Dams	Sedimented and domestically polluted	Pollution due to domestic waste and siltation.

Source: Two EMS Associates, 2019

4.5 Vegetation

Vegetation supports critical functions in the biosphere, at all possible spatial scales. Vegetation regulates the flow of numerous biogeochemical cycles, critically those of water, carbon, and nitrogen. Such cycles are important not only for global patterns of vegetation but also for those of climate.

Vegetation is also of great importance in local and global energy balances. Vegetation strongly affects soil characteristics, including soil volume, chemistry and texture, which feedback to affect various vegetation characteristics, including productivity and structure. Vegetation serves as a habitat for wildlife and an energy source for the vast array of animal species on the planet especially herbivores. Vegetation is also critically important to the world economy, particularly in the production and use of biofuels as an energy source.

4.5.1 Rangelands

Rangelands are areas covered by grass lands, bushlands and scrublands. Rangelands are found within sections of Kieni East and West sub-counties. The existing rangelands lie in semi-arid areas, characterized by minimal rainfall and dry weather conditions. However, the zones are suitable for ranching and wildlife conservation. Rangelands in Nyeri County are facing challenges such as climate change, overgrazing and growing demand for land.

4.5.2 Forests

The County has a forest coverage of 38%, which is above the recommended minimum of 10%. However, the forest cover is decreasing due to increased deforestation and human encroachment.The two major forest eco-systems, namely Aberdare and Mt. Kenya.The County also has other isolated forested hills under the management of County Government such as Karima and Tumutumu.

Apart from being a source of traditional forest products such as timber, fuel, fodder, herbal medicine among others, these forests play vital roles which include; maintenance of water cycle, wildlife habitat and are also repository of a wide range of biodiversity. Since soil conditions in the County are almost similar, agricultural productivity is influenced by rainfall intensity and temperature conditions.

The main actors involved within this sector are:

- Kenya Forest Service
- Kenya Wildlife Service
- NEMA
- County Government of Nyeri
- Community Forest Associations

Table 9: National Gazetted Forests

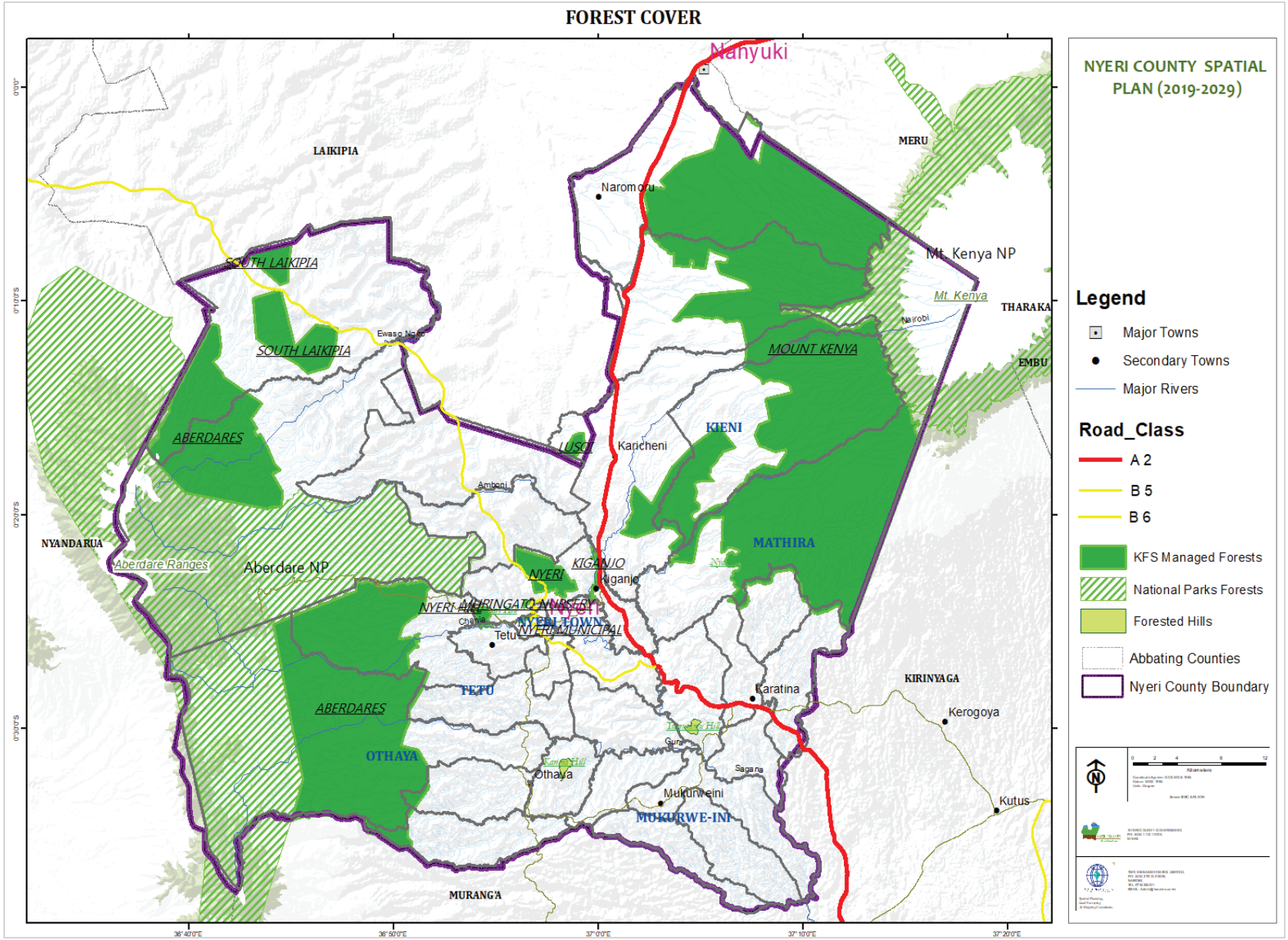
Name of forest	Forest Sub Stations	Coverage (Ha)
Mt. Kenya Forest	Nanyuki, Gathiuru, Naromoru, Kabaru, Hombe, Ragati, and Chehe	64,470.62 Ha
Aberdare Ranges	Muringato, Kabage, Zaina, Zuti, and Kiandongoro.	50, 964.22 Ha

Table 10: County Forests

NO:	NAME OF FOREST	CATEGORY	AREA (HA)
1	Karima Hill	Indigenous	108.50
2	Tumutumu Hill	Indigenous	110.0
3	Gachirichiri	Indigenous	7.3
4	Wagere	Indigenous	4.0
5	Karundu	Indigenous	2.428
6	Karindi	Indigenous	0.404
7	Thangathi	Indigenous	0.404
8	Ngamwa Hilltop	Indigenous	2.023
9	Gachuthe	Indigenous	0.404

Source: Field Survey, Nyeri County, 2019.

Map 13: Forest Cover



Source: Two Ems Associates, 2019

On-going Forest programs initiatives.

The following forestry programs and projects are being undertaken in the County:

a) The Natural forest conservation management and protection program.
Objective: To intensify conservation and sustainable management of the forest resources for environmental protection and economic growth.

b) Industrial Forest Plantation Establishment and Management.
Objective: To maintain and enhance productivity of industrial forest plantation as well as increased efficiency in wood utilization for wealth and employment creation.

Silvicultural operations like pruning, thinning and coppice reduction are carried out under the program to maintain the hygiene of the stand.

c) Farm & Dryland Forestry Programs.
Objective: To promote farm forest extension on farms and dry areas so as to increase tree cover for sustained timber, wood, fuel, non-wood forest products and environmental conservation. This is carried out in all the sub-counties in the Nyeri.

Some of the efforts and steps that have been made towards forest conservation include;

i. 1145 Ha currently under the PELIS Scheme (Plantation Establishment and Livelihood Improvement Scheme)
ii. Collaboration between KFS & the County in terms of tree planting activities, under which 341Ha of forests have been planted and 208 Ha of natural forests planted.
iii. KFS sells tree seedlings and also provides them for free during key environmental events

Table 11: Threats faced by Forest Stations

STATION	BLOCK	ISSUE
Muringato	Biricha/South Laikipia	The block is in Kieni West, which is considered as an ASAL area and poverty level is high. The block is surrounded by communities who engage in poaching of cedar posts and illegal removal of Olea Africana for charcoal burning.
	Embaringo	Illegal growing of cannabis sativa (Bhang), fire outbreaks during the dry seasons.
Zuti	Mathioya (along the boundary between Zuti and Wanjerere stations	Illegal growing of tobacco in bamboo areas.
Kabaru	Ngonde and Meere	Illegal charcoal burning
	Kihenja (along the boundary of Naromoru and Kabaru stations	Illegal removal of cedar posts Surrounding communities have their own cedar trees on their farms, which make it difficult to distinguish from those poached from the forests.

Gathiuru	Bantu	Occassional removal of cedar and Olea Africana trees.
Nanyuki	Compartment 2 – Plantation 2 (H) and 2 (F)	Poaching of exotic trees. The plantation neighbours Kanyoni village which is a slum.

Source: Field Survey, 2019

4.6 Wildlife Resources

4.6.1 Overview

Nyeri County is endowed with natural physical features which form ecosystems that are inhabited by diverse flora and fauna. Aberdare National Park and Mt. Kenya have the following animal species: African elephant, rare black leopard, spotted hyena, olive baboon, black and white Columbus monkey, Sykes monkey, the cape buffaloes, warthogs, common zebra, bush buck, reed back and lions among others.

In addition to Mt. Kenya National Park, the park also holds Mt. Kenya orphanage and Mt. Kenya game reserve. Dedan Kimathi University manages the only wildlife conservancy which has 9 species of grazing mammals that include: wildebeest, warthogs, Grant's Gazelles, Impalas, Burchell's Zebras, Andean llamas among other flora and fauna.

Other conservancies include: Sangare Ranch, Solio Ranch (known for Rhino protection), Aberdare Park, Hombe Conservancy (Naromoru forest) and Mt. Kenya National Park conservancy.

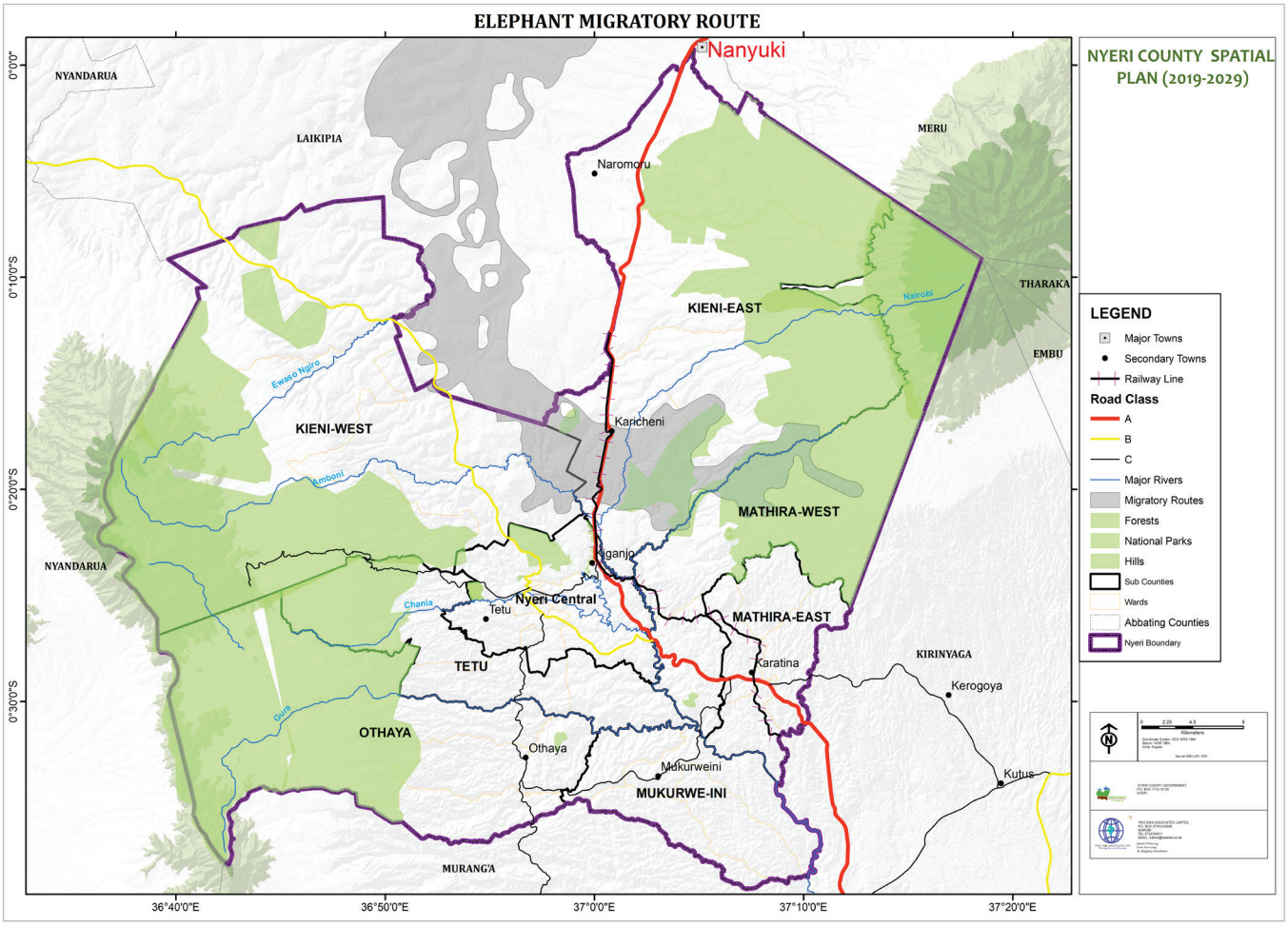
4.6.2 Human-Wildlife Conflict

The wards bordering the Aberdare and Mt. Kenya National Park like Gakawa, Narumoru, Kabaru. Gatarakwa, Mugunda, Dedan Kimathi and Mahiga experience human-wildlife conflict. Mt Kenya being a resource within many counties; Meru, Kirinyaga, Nyeri, Tharaka Nithi and Embu, elephants have migratory routes along the forest especially during dry months in search of food and water. This is Aberdare forest too is home to elephants which have migratory routes along Nyeri, Nyandarua and Muranga Counties.

However human encroachment into the forest ecosystem and migratory routes for animals has a led to conflicts with wildlife as they have moved into the natural ecosystems that are habitants for these animals. "In west Laikipia, the Lariak-Rumuruti corridor is completely blocked by agriculture and settlements.

The Kieni-Rumuruti Swamp passage is blocked, mostly by the trans-Laikipia fence but also by agriculture and settlement. The Solio-Mt. Kenya passage is partially blocked, but a complete blockage by settlements on both sides of the Nairobi-Nanyuki highway is imminent. The Aberdare-Mt. Kenya Forest passage through south Laikipia has been completely blocked by the Nairobi-Nanyuki-highway, and by land sub-division on both sides of the road." (Wildlife migratory corridors and dispersal areas: Kenya Rangelands and Coastal Terrestrial Ecosystems report, 2017)

Map 14: Elephant MIgratory Route



Source: Two Ems Associates, 2019

4.7 Energy Resources

4.7.1 Overview

The energy sector plays a critical role in the socio-economic development. Currently the energy sector in Kenya relies partially on the importation of all petroleum requirements. Electricity, by virtue of its versatility in application, is crucial to the socio-economic development of the country and is the most sought-after energy service by society. The available national supply capacity currently is 1,279 MW comprising Hydro (738 MW), Thermal (345 MW), Geothermal (185 MW) and Mumias bagasse (115 MW).

4.7.2 Hydropower

Hydropower is the single largest generation source for grid electricity in Kenya providing some 677 MW of the total installed grid capacity and over 57 % of Kenya's total electricity output is generated by hydropower plants. Hydropower generated electricity is the cheapest and one of the most environment-friendly sources of energy.

There are rivers that have potentials for construction of H.E.P. Some studies, by Sogreah Engineering Firm, have been done for some of these rivers. Most of the studies were done in 1980's, but Kengen has not been able to update the studies for all the mentioned rivers. Within the planning area Sagana River has the potential for H.E.P.

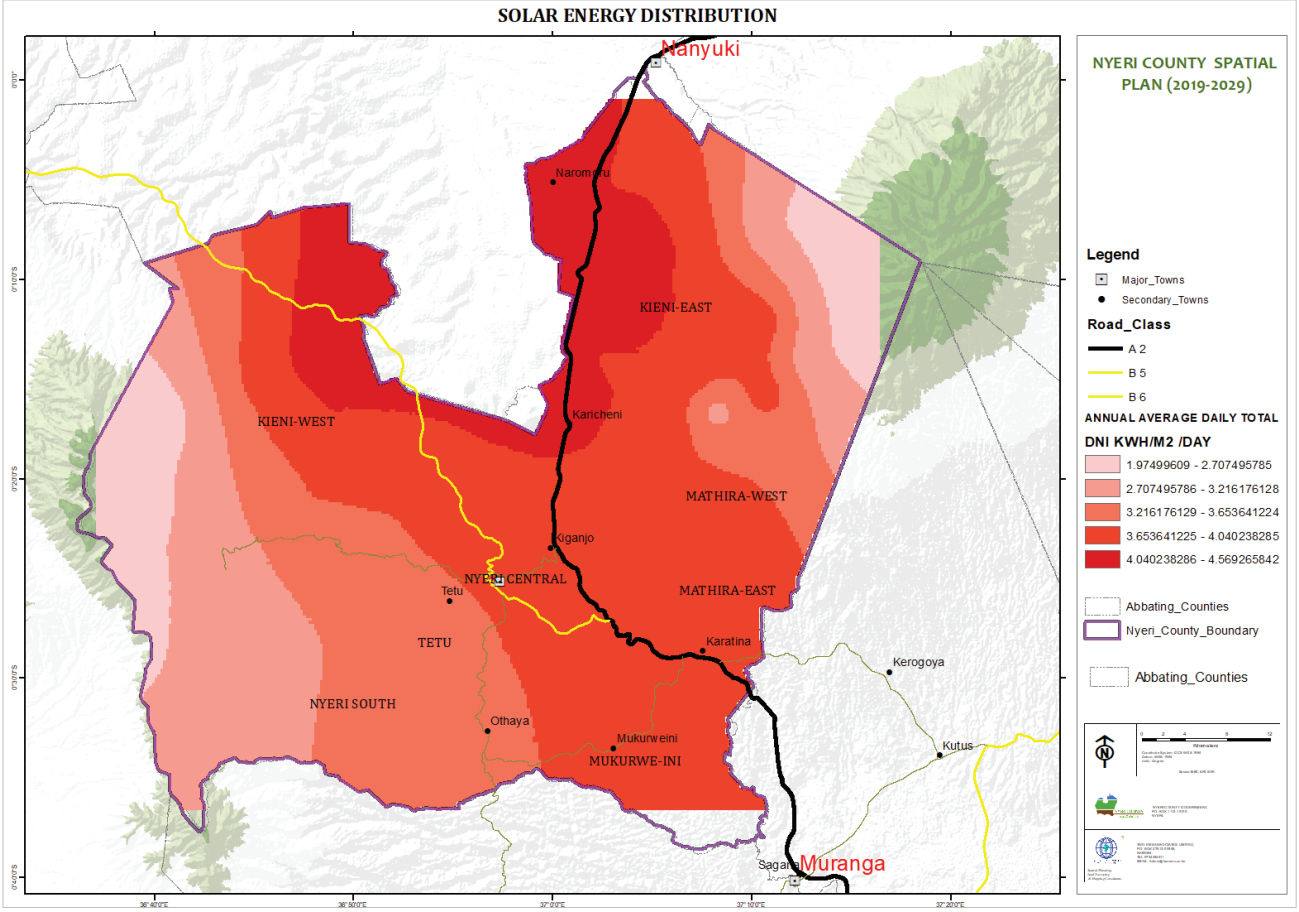
4.7.3 Wind Power

The wind speed in the County is low as it is on the windward side of Mt. Kenya. There is moderate potential in wards within Kieni East with the capacity to generate power at small scale despite the low wind speed in the County.

4.7.4 Solar Power

The country is generally cold due to the influence of its positioning within the Aberdare Ranges and Mt. Kenya. The potential for solar energy in the County is in the drier and hotter areas of Kieni East and West sub-counties due to the high insulation, especially during dry seasons.

Map 14: Solar Energy Distribution



Source: Two Ems Associates, 2019

4.7.5 Biomass

Biomass is an organic matter that can be used to provide heat, make fuel and generate electricity. Biomass fuels are the most important sources of primary energy in Kenya with wood-fuel (firewood and charcoal) accounting for over 68% of the total primary energy consumption (MOE, 2012). Wood fuel is used by more than 98% (MORD, 2011) of the population in the region and its utilization is restricted to domestic use only.

However, the ever-increasing farming activities in parts of the region have diminished firewood supply and hence domestic energy comes from individual farms and the immediate neighborhoods. Nyeri County has intensive dairy farming. The County residents could use manure from livestock to generate bio-gas at the household level. This provides cheap and green energy. There are efforts by different groups to recycle plastics and other wastes into charcoal briquettes which are a source of green energy.

4.8 Emerging Issues

Sector	Potential Opportunity	Constraints
Topography	• The Aberdare Ranges and Mt. Kenya give the town an identity • Potential for tapping into scenic features such as hills, forests, ridges • Tapping into the topography creating a tourist circuit track	• The harsh terrain may make infrastructure development very costly • Poor road conditions in steep terrain areas
Climate	• Varied climatic conditions enable varied land uses (such as range lands offering opportunities for wildlife conservation (e co-tourism potential), humid zones offering opportunities for dairy farming and intensive agriculture.	• Climate change, deforestation and conventional farming systems has promoted massive erosion and decreased water levels. • Increased deforestation and pollution of environmentally sensitive areas
Geology and soils	• The soils support agriculture. • The availability of stones for construction can attract real estate developers to the region. • The geological base rock composition holds ground water that can be tapped as a water source. • Geological analysis is important in order to predict geological hazards.	• Quarrying and leaving open old mines creates hazardous zones in the County • Deforestation hence weakening the soil • Use of excess chemicals during farming, increasing acidity.
Hydrology and drainage	• The rivers are a source of water for domestic use and can be tapped into for green energy generation • The rivers also aid in setting up storm water drainage following their direction of flow	• Encroachment on riparian reserves • Flooding • Poor access to water resources • Encroachment on wetlands • Encroachment on water springs • Soil erosion • Erosion along the riverbed • Diversion of water from rivers for irrigation • Poor sanitation methods

Sector	Potential Opportunity	Constraints
Forest and Wildlife	• Rich eco-systems comprising of flora and fauna • The forests are form the main water catchment areas • Untapped tourism potential in Aberdare and Mt Kenya • Tourist circuit linking all the tourism sites within the County.	• Deforestation occurring at a fast rate due to population pressure. • Charcoal burning • Farming within forested areas • Increased human-wildlife conflicts
Energy	• Green energy, solar potential in Kieni east and west • Hydropower potential - R. Sagana, Chania, Gura, Tana, Amboni, Ewaso Ngiro.	• Low wind and solar potential for large scale harvesting • Decreased water volumes on major rivers hence limiting hydro=power potential • High cost of investment in green energy

CHAPTER FIVE:

POPULATION AND DEMOGRAPHIC CHARACTERISTICS

5.1 Population

Population is defined as the number of people living within a particular area. Demography is the study of human population — their size, composition and distribution across place – and the processes through which populations change.

With respect to the spatial planning of Nyeri, a population analysis determine the County's future course and shape the future outcomes of local communities at the end of the planning period. This chapter analyses population size as well as growth, distribution, and demographic characteristics in order to come up with a socio-economic forecast for the County.

5.1.1 Population Size

Nyeri has a population of approximately 759,164 people in 2019 which has increased from a population of 679,236 people in 2009. This consists of 426,590 male and 447,863 female residents. The population density of the County is approximately 342 people per km^2 which is lower than the national average of 401 people per km^2. The ratio of men to women is approximately 1:1.

5.1.2 Population Distribution

Nyeri Central Sub-County has the highest population density in the county. This is a resultant effect of high urbanization of Nyeri Municipality. The average population density for Nyeri County is approximately 204 people per km^2.

Table 12: Population Distribution per sub-county and forests

SUB-COUNTY	2019 POPULATION	2020 POPULATION PROJECTION	2025 POPULATION PROJECTION	2029 POPULATION PROJECTION	2030 POPULATION PROJECTION
Kieni East	110,376	111,940	119,759	128,597	130,419
Kieni West	88,631	89,668	94,854	100,376	101,551
Mathira East	99,065	99,384	100,977	102,358	102,687
Mathira-West	60,083	60,952	65,299	70,248	71,264
Mukurwe-ini	89,137	89,687	92,435	94,995	95,581
Nyeri Central	140,338	143,206	157,547	176,388	179,993
Nyeri South	91,081	91,624	94,338	96,853	97,430
Tetu	80,453	80,696	81,911	82,959	83,209
Mt. Kenya Forest	188	191	204	219	222
Aberdare Forest	120	122	129	136	138

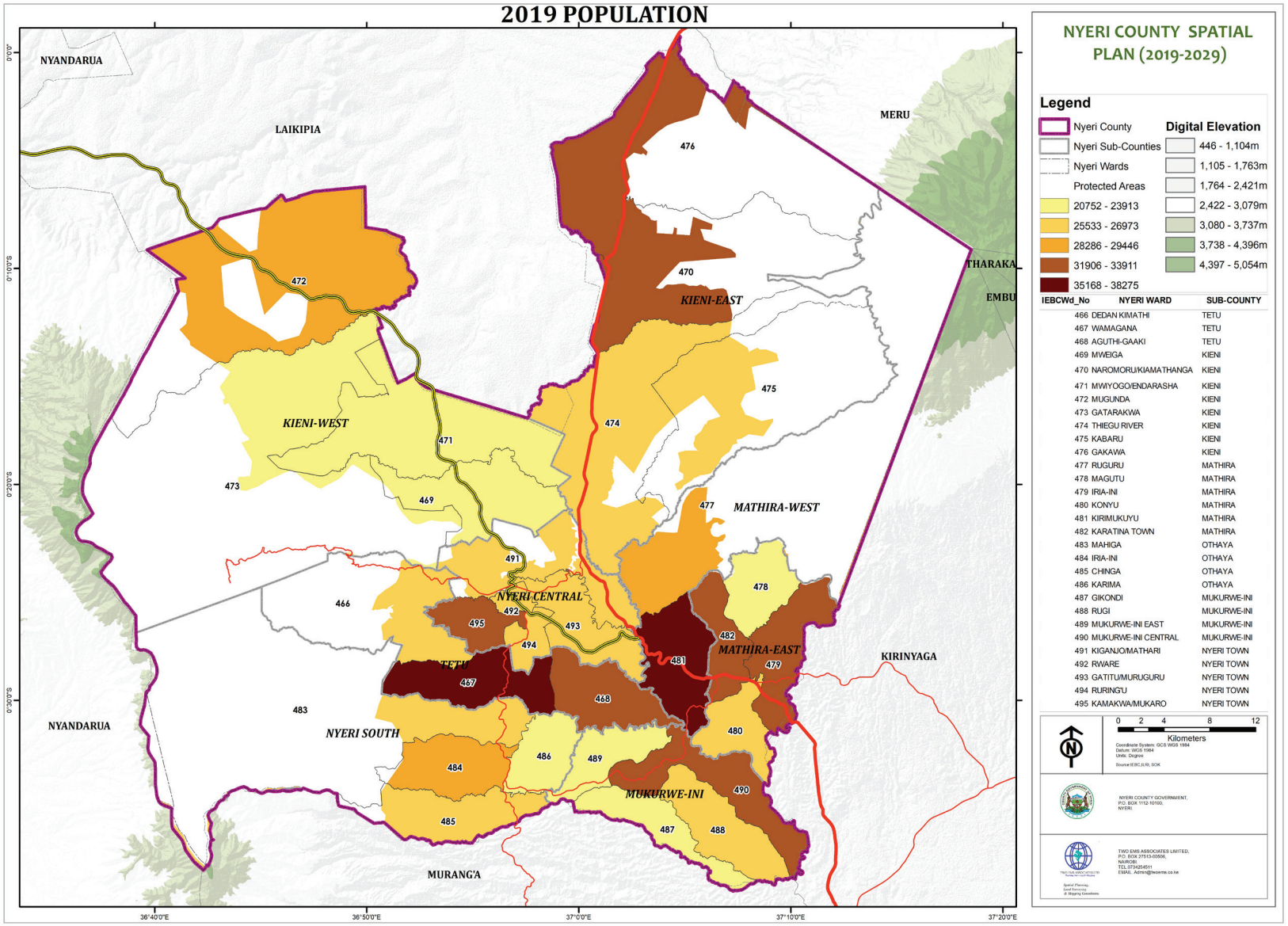
Source: KNBS and Two Ems Associates, 2019

Table 13: Nyeri wards current and projected population

SUB-COUNTY	WARD	2019 POPULATION	2020 POPULATION PROJECTION	2025 POPULATION PROJECTION	2029 POPULATION PROJECTION	2030 POPULATION PROJECTION
Tetu	Dedan Kimathi	21,322	21,386	21,654	21,986	22,052
Tetu	Wamagana	31,962	32,059	32,460	32,958	33,057
Tetu	Aguthi-Gaaki	27,169	27,251	27,592	28,015	28,099
Kieni West	Mweiga	19,033	19,256	20,294	21,555	21,805
Kieni East	Naromoru/ Kiamathanga	30,104	30,531	32,589	35,074	35,564
Kieni West	Mwiyogo/ Endarasha	21,786	22,041	23,230	24,673	24,959
Kieni West	Mugunda	26,450	26,760	28,203	29,955	30,302
Kieni West	Gatarakwa	21,362	21,612	22,777	24,192	24,472
Kieni East	Thiegu River	24,646	24,995	26,680	28,715	29,116
Kieni East	Kabaru	25,212	25,570	27,293	29,374	29,785
Kieni East	Gakawa	30,413	30,844	32,923	35,434	35,929
Mathira West	Ruguru	26,784	27,171	29,049	31,315	31,761
Mathira East	Magutu	20,010	20,074	20,342	20,675	20,741
Mathira East	Iriaini	28,376	28,467	28,847	29,319	29,413
Mathira East	Konyu	22,549	22,622	22,924	23,299	23,374
Mathira West	Kirimukuyu	33,299	33,781	36,116	38,933	39,488
Mathira East	Karatina Town	28,130	28,220	28,597	29,065	29,158
Nyeri South	Mahiga	23,001	23,138	23,730	24,458	24,603
Nyeri South	Iria-Ini	25,358	25,509	26,162	26,965	27,125
Nyeri South	Chinga	22,889	23,025	23,614	24,340	24,484
Nyeri South	Karima	19,833	19,951	20,461	21,090	21,215
Mukurwe-Ini	Gikondi	19,747	19,869	20,396	21,045	21,174
Mukurwe-Ini	Rugi	22,047	22,183	22,771	23,496	23,640
Mukurwe-Ini	Mukurwe-Ini East	19,554	19,674	20,196	20,839	20,967
Mukurwe-Ini	Mukurwe-Ini Central	27,790	27,961	28,703	29,616	29,798
Nyeri Central	Kiganjo/Mathari	26,995	27,547	30,462	33,930	34,609
Nyeri Central	Rware	26,740	27,287	30,175	33,609	34,282
Nyeri Central	Gatitu/Muruguru	26,554	27,097	29,965	33,375	34,044
Nyeri Central	Ruringu	27,455	28,016	30,982	34,508	35,199
Nyeri Central	Kamakwa/ Mukaro	32,593	33,260	36,780	40,966	41,786

Source: KNBS and Two Ems Associates, 2019

Map 15: Population Distribution

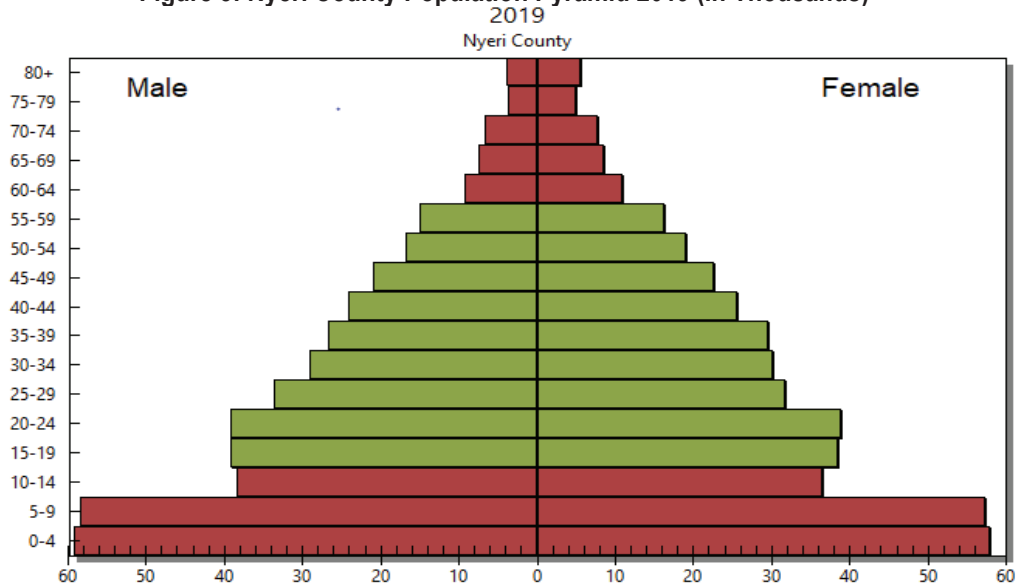


Source: Two Ems Associates, 2019

5.1.3 Population Distribution by Age

The highest and the lowest population for 2019 are the age cohort of 10-14 and 75-79 respectively. Ages 10-14 represent 11.4%, while 75-79 comprise of just 1% of the total population. Over 60% of the population is below 30 years, portraying a youthful population which is more productive and thus the need to involve them in development activities.

Figure 3: Nyeri County Population Pyramid 2019 (In Thousands)



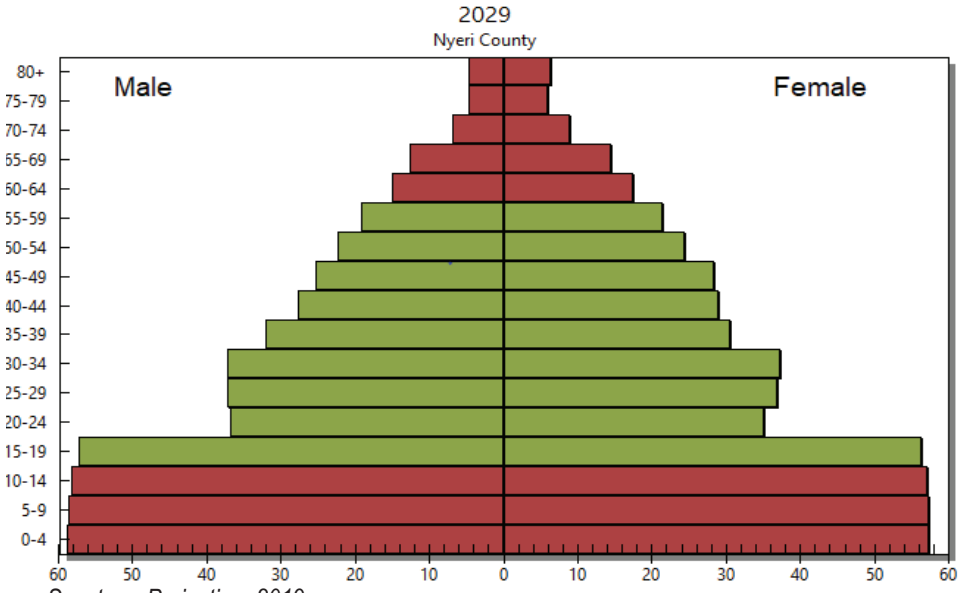
Source: Spectrum 5 Projections, 2019

5.1.4 Population Projections

The population projections for Nyeri County were arrived at using Spectrum software. Spectrum is a suite of easy to use policy models which provide policymakers with an analytical tool to support the decision-making process. In this case, demographic projections were generated.

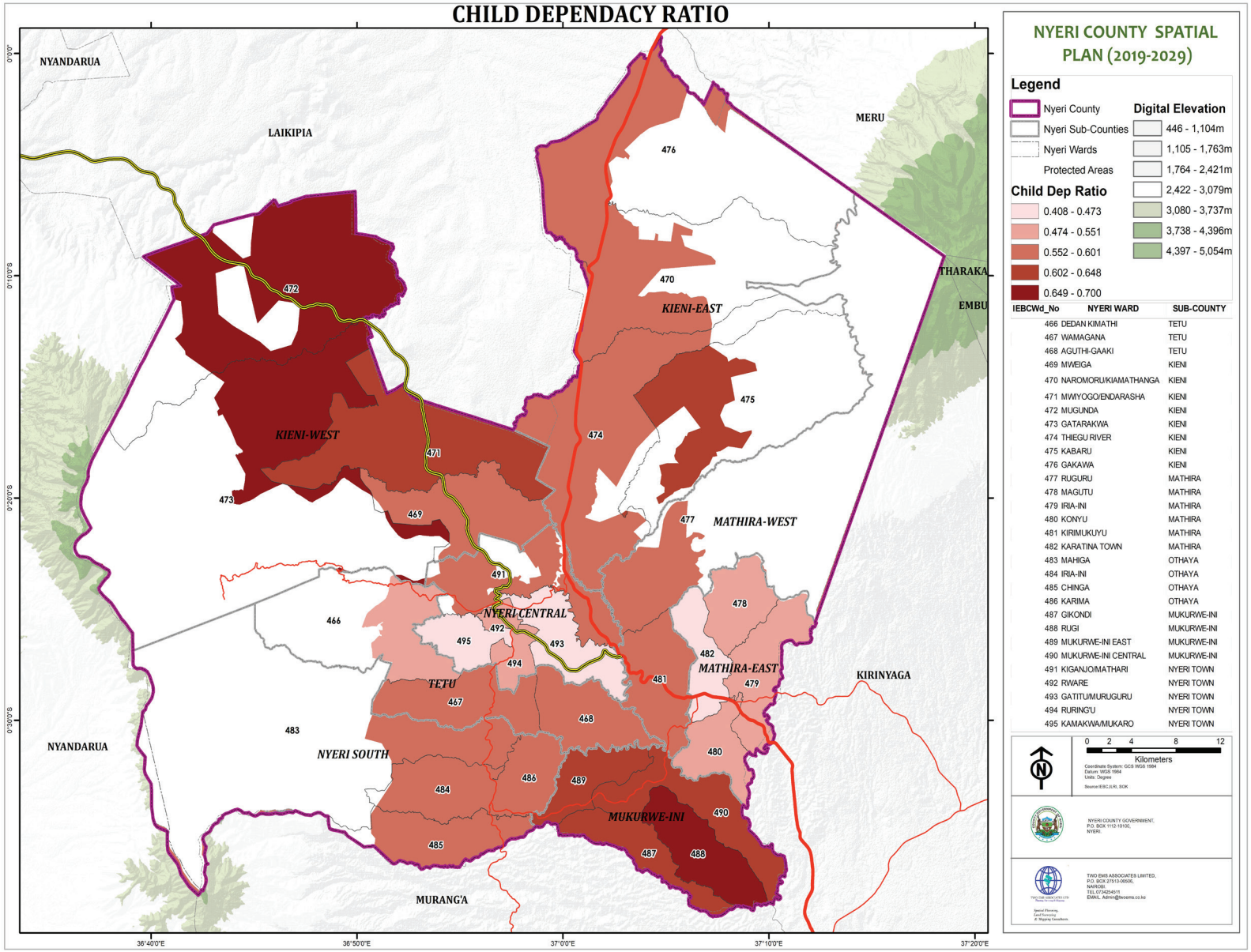
The demographic and population indicators were projected depending on their past and present trends. These indicators include; the overall fertility rate, age distribution per age cohorts, age-specific fertility, morbidity, mortality and life expectancy rates.

Figure 4: Projected Population Pyramid



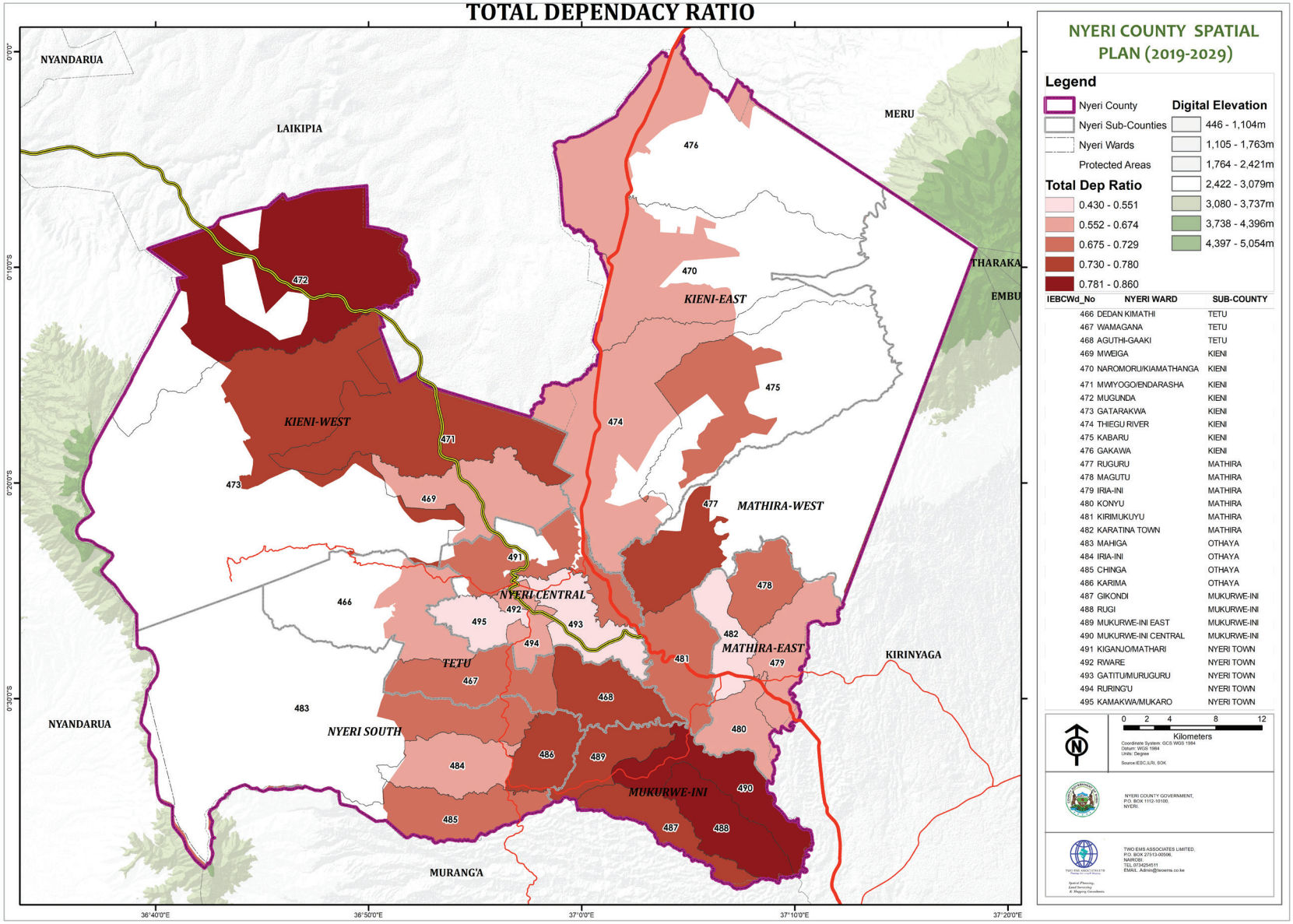
Source: Spectrum Projection, 2019

Map 16: Child Dependency Ratios



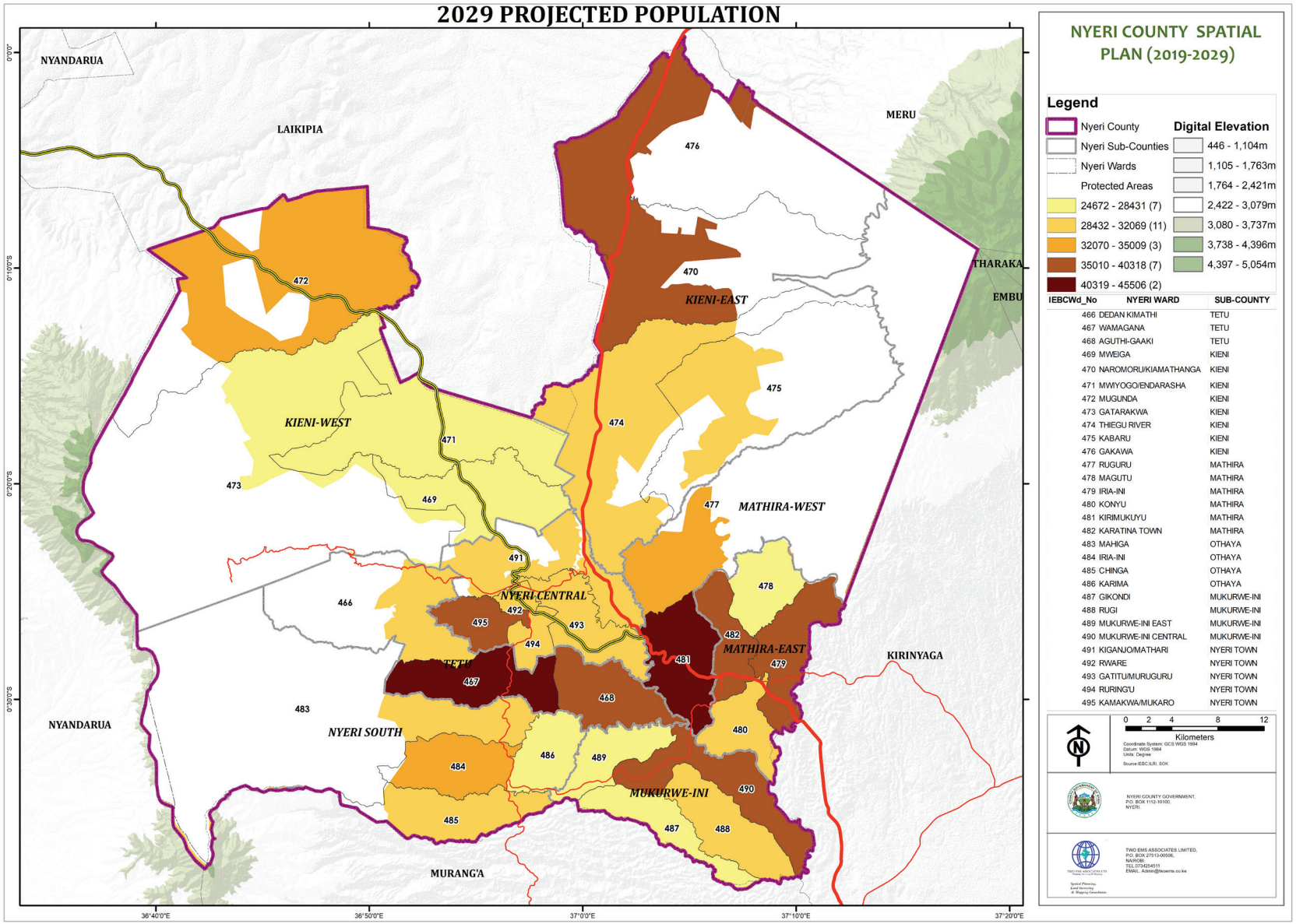
Source: Two Ems Associates, 2019

Map 17: Total Dependency Ratio



Source: Two Ems Associates, 2019

Map 18: Projected Population Distribution



Source: Two Ems Associates, 2019

5.1.5 Urban and Rural Population

There is only one municipality in the County and five major urban centres. Nyeri Municipality has the highest population while Endarasha has the lowest. Karatina urban has a higher number of people during the day because it has the largest open-air market in the region and is expected to have a projected population of 10,035 persons by the year 2019

There is need for involvement of the department of physical planning in planning of urban centres and enhancement of service delivery especially solid waste management, provision of water and sewer services. Establishment of farm produce processing plants and cottage industries in other urban centres will curb migration to the Nyeri Town and other major urban areas.

Table 14: Projected Urban Population in Nyeri

URBAN CENTRE	2019 POPULATION			2020 POPULATION			2025 POPULATION PROJECTION			2029 POPULATION PROJECTION			2030 POPULATION PROJECTION		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Nyeri Town	41,047	40,861	81,908	41,843	41,653	83,496	42,639	42,446	85,085	49,006	48,785	97,791	57,761	57,501	115,262
Karatina	4,627	5,966	10,592	4,717	6,082	10,798	4,806	6,197	11,004	5,524	7,122	12,646	6,511	8,394	14,904
Naromoru	3,817	3,656	7,473	3,891	3,727	7,618	3,965	3,798	7,763	4,557	4,365	8,922	5,371	5,145	10,516
Endarasha	1,840	2,085	3,925	1,876	2,126	4,001	1,911	2,166	4,077	2,196	2,490	4,686	2,588	2,936	5,523
Mweiga	2,186	2,427	4,613	2,228	2,474	4,702	2,271	2,521	4,792	2,610	2,897	5,507	3,076	3,414	6,490
Othaya	3,070	3,543	6,613	3,130	3,612	6,741	3,189	3,680	6,870	3,666	4,230	7,895	4,322	4,986	9,307
TOTAL	**56,586**	**58,538**	**115,124**	**57,684**	**59,673**	**117,357**	**58,781**	**60,808**	**119,590**	**67,559**	**69,889**	**1137,447**	**79,628**	**82,375**	**162,003**

Source: CIDP, 2018-2022

5.1.6 Migration Patterns

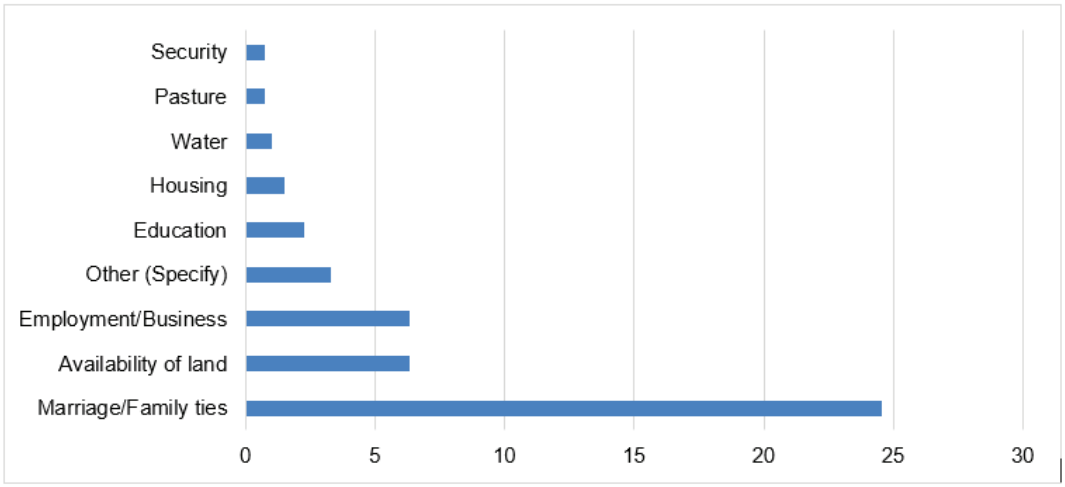
The rate of out-migration in the planning area is lower than the rate of in-migration due to several factors (e.g., marriage, search for white-collar jobs, excessive subdivision of land, search for education facilities, etc.). The in-migration to Nyeri stands at 15.7% per annum. Hence making migration into the County a big contributor to the population growth of Nyeri County.

Intra-migration was equally observed that consisted of urban-rural migration and rural-urban migration. Urban-rural migration was as a result of cheaper land for ownership in the rural regions. There are many pull factors associated with migration (e.g. work opportunities and education, transport, housing, and entertainment facilities).

Seasonal migration is experienced when education institutions open or close. Students from tertiary institutions like Dedan Kimathi and Karatina University are part of the seasonal population in the County. During school semesters, these students live and operate around the school premises and thereby increase the population.

The daytime population in the town consists of employees and businesspeople who come from within the town and the periphery. The Karatina market causes an anomaly as the area has a higher daytime population than the night population. This is because move to the market to trade and leave.

Figure 5: Reason for settling in Nyeri County



Source: Field Survey, 2019

5.2 Demographic Characteristics

5.2.1 Morbidity, Mortality and Life Expectancy Rates

The five most common diseases in order of prevalence are as follows;

Table 15: Prevalent Diseases

S/ No	Under 5yrs	S/ No	Over 5yrs
1	Diseases of Respiratory System	1	Diseases of Respiratory System
2	Diseases of the skin	2	Diseases of the skin
3	Diarrhea	3	Arthritis , Joint pains
4	Tonsillitis	4	Road traffic injuries and other injuries
5	Pneumonia	5	UTI (Urinary Tract Infection)

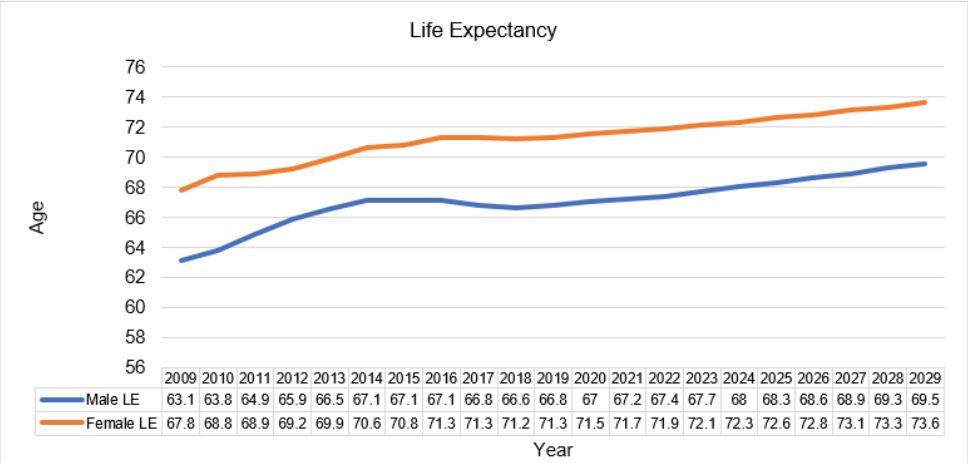
Source: Nyeri CIDP (2018-2022), 2018

5.2.2 Impact of HIV/AIDS

A trend analysis of the HIV prevalence in Kenya since 1990, shows that it was at its peak of 10.5% in 1995-96, after which it declined by about 40% to approximately 6.7% in 2003. Since then, the prevalence has remained relatively stable. The County HIV and AIDS prevalence rates stands at 4.3% (KAIS 2012) with 21,391 persons living with HIV and > 1300 new HIV infections being reported annually.

5.2.3 Life Expectancy in the County

The average lifespan in Nyeri County is 68years. Men live an average of 66years and women live an average of 71years.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Male LE	63.1	63.8	64.9	65.9	66.5	67.1	67.1	67.1	66.8	66.6	66.8	67	67.2	67.4	67.7	68	68.3	68.6	68.9	69.3	69.5
Female LE	67.8	68.8	68.9	69.2	69.9	70.6	70.8	71.3	71.3	71.2	71.3	71.5	71.7	71.9	72.1	72.3	72.6	72.8	73.1	73.3	73.6

Source: Two Ems Associates, 2019; Adapted from Spectrum Projection, 2019

5.2.4 Employment levels

In the County, 92,205 persons are wage earners thus contributing 24% of the household income. They are mainly employed by the national and County governments, learning institutions and the business community. Rural self-employed persons in the County are 15,368 contributing 4% of household income. Urban self-employed persons are 4,444 and contribute 13% of the household income.

The wages are higher in urban areas than in the rural areas. The County will need to provide affordable credit for the establishment of micro enterprises to create more self-employment opportunities. The unemployment level in the County is 17.5% since out of the potential labor force of 421,298 persons, only 347,502 are employed.

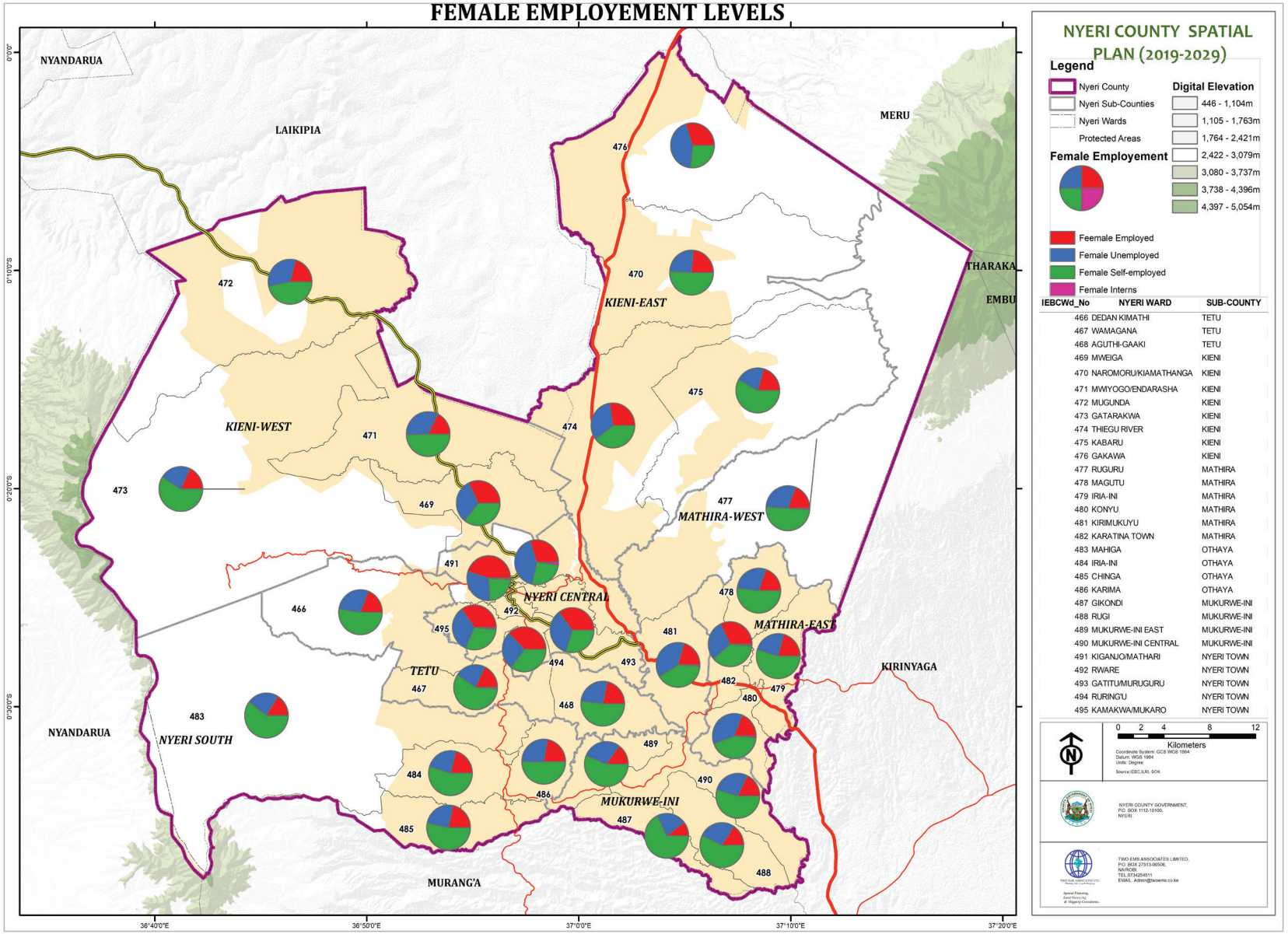
The dependency rate in the County therefore stands at 51% of the total population. Apart from affordable credit, there is need of establishing cottage industries to add value on farm produce and hence create more employment.

Formal employment is male dominated based on the statistical data. The employment levels among the female population between 15-64 years per ward indicate that majority of the women are self-employed as show in the map and table below.

However, there are notable cases where there are more women in employment as well as those unemployed. Specifically, 43% of the women in Gakawa ward are unemployed while the same case occurs in Kiganjo ward whereby 41% of them are unemployed. Rware ward on the other hand has 45% of the female working population in employment.

This would suggest that there are more employment opportunities for women in Rware ward as opposed to the other wards. Rware is located within Nyeri Municipality. Urban centres offer more employment opportunities compared to rural regions.

Map 19: Female employment levels per ward



Source: Two Ems Associates, 2019

Table 16: Female Employment Levels Per Ward

IEBC Code per Ward	Ward	Employed	Self-employed	Unemployed	Interns
476	Gakawa	29.65	26.32	43.25	0.79
477	Ruguru	19.18	50.01	29.8	1.01
478	Magutu	19.56	51.41	28.1	0.92
479	Iriaini	27.28	45.05	27.21	0.46
480	Konyu	19.13	43.2	36.42	1.25
481	Kirimukuyu	20.59	40.25	38.08	1.08
482	Karatina Town	32.38	37.88	28.67	1.06
483	Mahiga	16.32	60.14	22.71	0.83
484	Iria-Ini	20.78	54.4	24.07	0.76
485	Chinga	21.65	52.99	24.73	0.63
486	Karima	21.95	49.77	27.56	0.72
487	Gikondi	10.23	67.43	21.73	0.62
488	Rugi	15.63	56.81	27	0.57
489	Mukurwe-Ini East	14.79	55.83	28.51	0.86
490	Mukurwe-Ini Central	17.72	53.93	27.39	0.96
491	Kiganjo/Mathari	29.92	26.31	41.76	2
492	Rware	45.18	22.99	30.74	1.09
493	Gatitu/Muruguru	34.9	29.44	34.84	0.8
494	Ruringu	36.96	34.8	27.36	0.89
495	Kamakwa/Mukaro	34.94	30.26	33.29	1.52
466	Dedan Kimathi	18.93	51.86	28.3	0.91
467	Wamagana	18.1	58.58	22.28	1.04
468	Aguthi-Gaaki	21.41	51.67	26.25	0.67
469	Mweiga	31.93	35.56	31.56	0.96
470	Naromoru/ Kiamathanga	23.52	50.74	24.99	0.75
471	Mwiyogo/Endarasha	17.56	49.55	32.54	0.34
472	Mugunda	20.6	46.65	32.15	0.59
473	Gatarakwa	18.02	58.71	22.83	0.45
474	Thiegu River	27.05	39.19	33.07	0.69
475	Kabaru	20.44	57.81	21.31	0.44

Source: KNBS, 2020

5.2.5 Literacy Levels and Skills Development

The highest literacy levels in Nyeri County were recorded from Rware, Ruringu and Kamakwa Wards as observed in the map below. Gikondi and Rugi had the lowest literacy levels. Both Gikondi and Rugi are plagued with insecurity as well as poverty which are the contributing factors to the low literacy levels. The highest illiteracy levels recorded among the female population were in Karima and Mukurwe-ini East wards as shown in the table below. The contributing factor is poverty and the fact that a number of women of the older generation did not receive formal education as a result of cultural beliefs. Rugi ward recorded the highest level of female enrolment in primary schools while Rware recorded the highest number of females who had completed secondary and tertiary education. The male population on the other hand has had lower illiteracy levels compared to the female population due to the same cultural reasons.

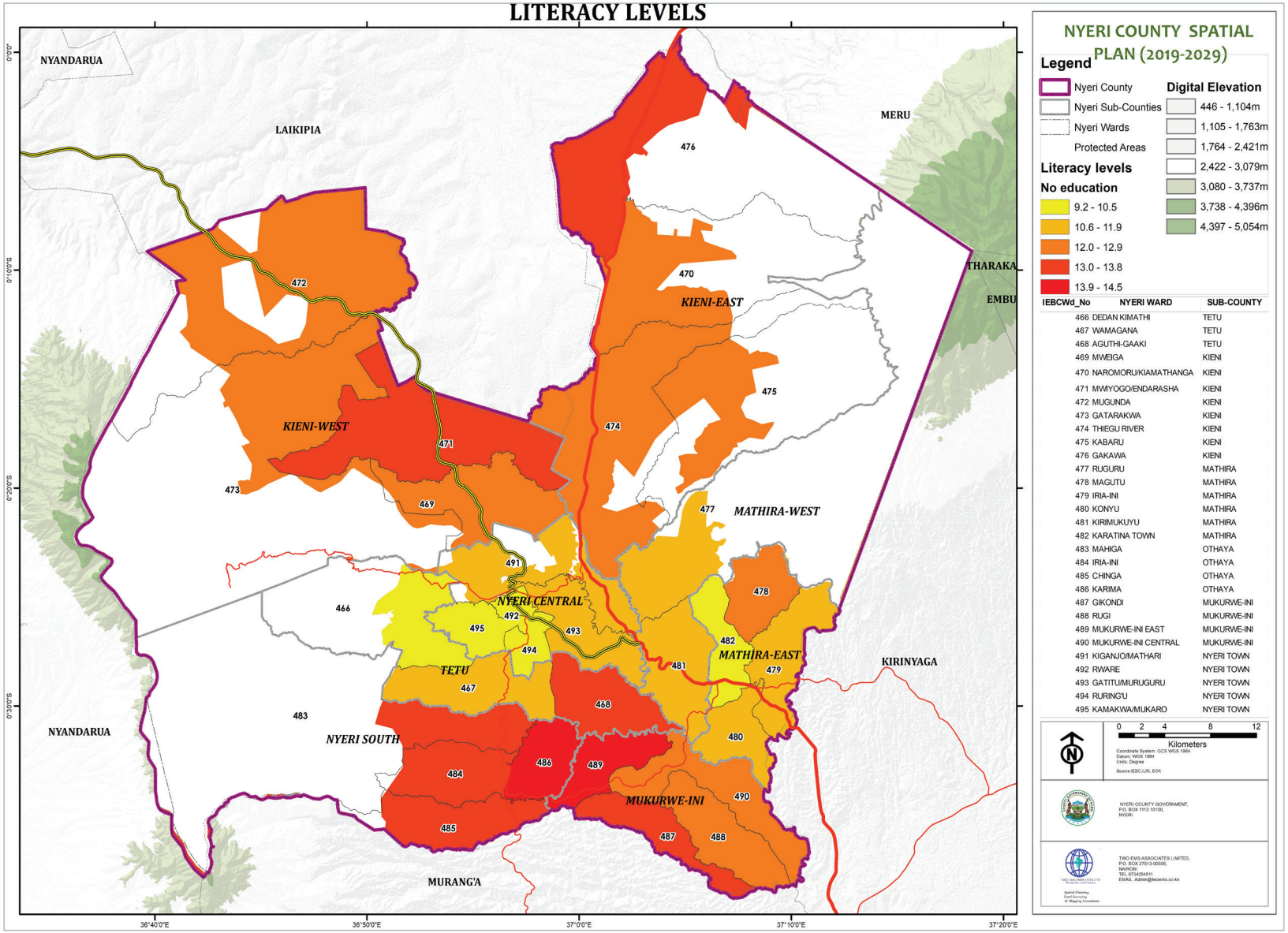
Table 17: Education Levels per Ward per Gender

Ward	Male			Female		
	None	Primary	Secondary+	None	Primary	Secondary+
Dedan Kimathi	9.1	49.6	41.3	11.9	51	37.1
Wamagana	9.8	56.5	33.7	13.5	56.3	30.2
Aguthi-Gaaki	10.8	55.4	33.8	15.9	53.2	30.9
Mweiga	11.9	54.6	33.5	13.5	56.8	29.8
Naromoru/Kiamathanga	11.8	55.9	32.4	13.2	54.4	32.4
Mwiyogo/Endarasha	11.7	59.2	29.1	14.7	58.7	26.6
Mugunda	11.3	63.1	25.6	14.4	61.5	24.1
Gatarakwa	11.3	63.2	25.6	13.7	62.6	23.8
Thiegu River	11.6	58.6	29.9	13.2	56.8	30
Kabaru	12.4	59.8	27.8	13	59.5	27.5
Gakawa	12.8	51.8	35.4	14	51.4	34.6
Ruguru	9.8	57.7	32.6	13.3	56.9	29.8
Magutu	11.8	55.2	33.1	13.6	54.2	32.3
Iriaini	9.5	54.9	35.6	13.2	53.1	33.8
Konyu	9.6	57.8	32.6	13.3	54.8	31.9
Kirimukuyu	10	55.6	34.5	12.8	54.6	32.7
Karatina Town	8.9	48.5	42.6	10	46	44
Mahiga	10.5	57.6	32	16.1	55	29
Iria-Ini	11.5	50.5	38	15.6	47.8	36.6
Chinga	11.1	50.5	38.4	16.3	50.2	33.5
Karima	11.3	54.3	34.5	17.3	51.1	31.6
Gikondi	10.8	64.7	24.5	15.8	61.9	22.4
Rugi	10.2	64.4	25.4	14.9	62.9	22.2
Mukurwe-Ini East	11.3	58.1	30.6	16.4	56.9	26.6
Mukurwe-Ini Central	10.5	58.6	30.9	15	56.4	28.6
Kiganjo/Mathari	10.2	52.4	37.4	13.6	52	34.4
Rware	8.7	37.3	54	9.6	38.4	52.1
Gatitu/Muruguru	10.3	48.3	41.4	13	46.1	40.9
Ruringu	9.6	41.8	48.7	10.4	40.3	49.4
Kamakwa/Mukaro	9.4	46.3	44.3	10.9	45.6	43.6

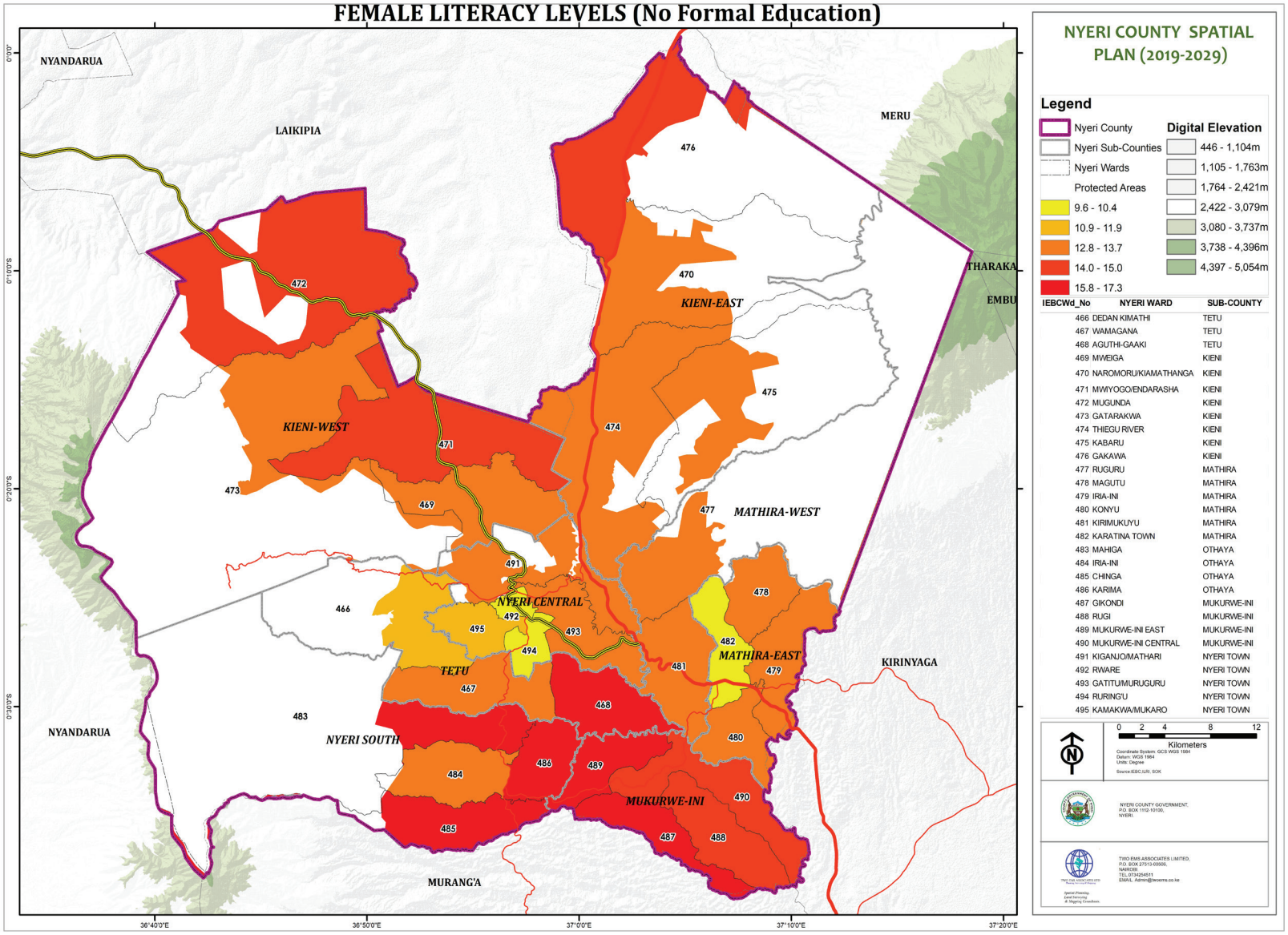
Source: KNBS, 2020

Nyeri County Spatial Plan

Map 20: Literacy Levels



Map 21: Female Literacy Levels



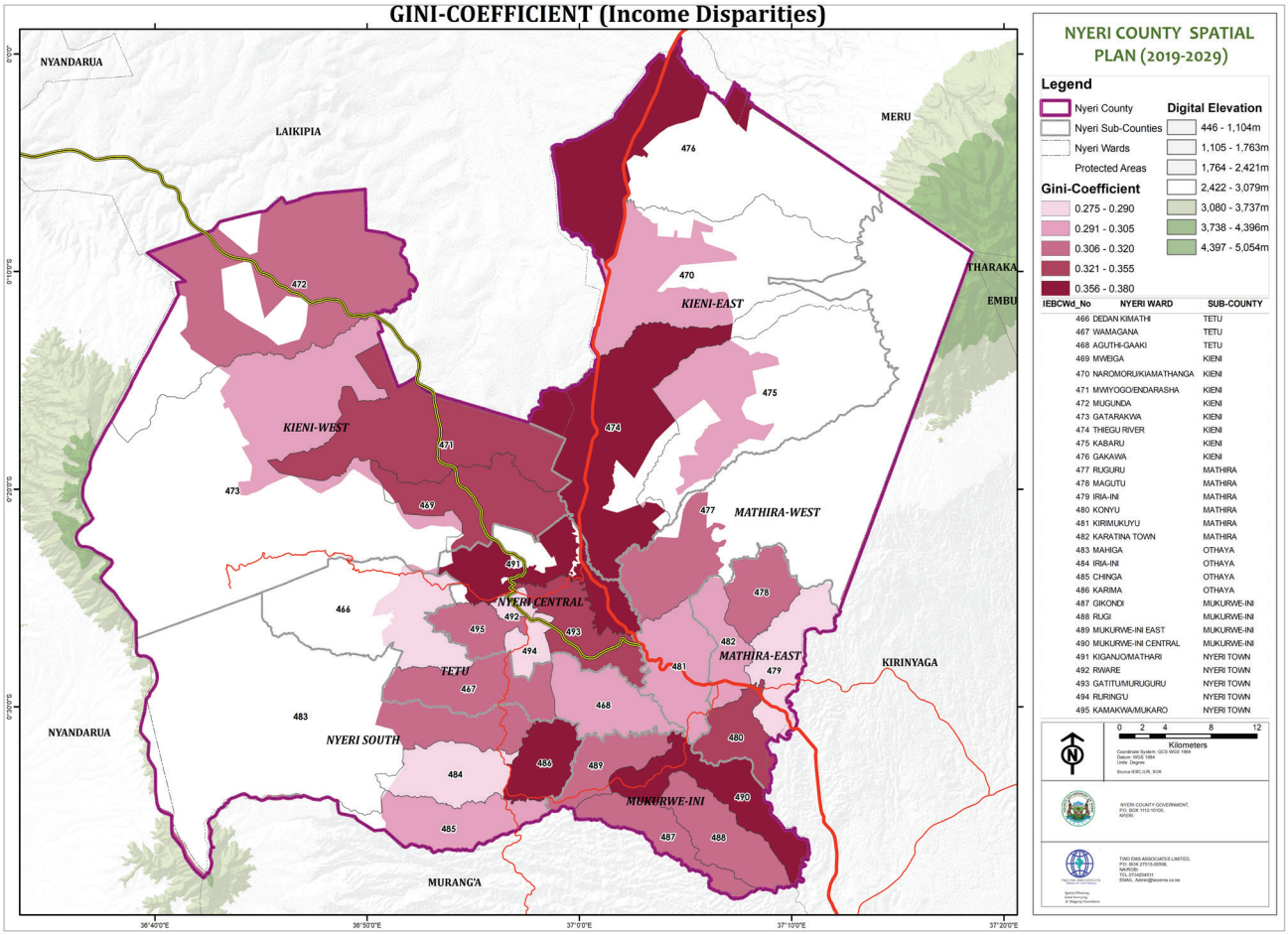
Source: Two Ems Associates, 2019

5.2.6 Poverty

Poverty is the state of general scarcity, it is also defined as a pronounced deprivation in well-being; it includes low level incomes and the inability to acquire basic goods and services, for basic survival with dignity. Nyeri currently has a poverty level of 32.7%. It comprises of, low levels of health, education, poor access to clean water and sanitation, insecurity, insufficient capacity and opportunities among other factors (World Bank, 2011).

This can further be shown through the disparities of income levels through the Gini-coefficient ranking. As shown in the map below, the darker shades would indicate higher inequality in income. This suggests that on both extremes of high and low income, there are more people as compared to middle income earners.

Map 22: Gini-Coefficient



Source: Two Ems Associates, 2019

5.3 Social Analysis

5.3.1 Community and Culture

A community is a group of people living and sharing common characteristics or interests and perceiving itself with distinct respects from the larger society. These characteristics can either be social, religious, and occupational amongst others. Culture is defined as an integrated system of learned behaviour patterns created and possessed by people. Culture defines the way human beings live and interact and include behaviour and beliefs, language, and material culture (artefacts characteristics of a particular social, ethnic or age-group).

It is argued that when people become confined to their culture such that they cannot reason beyond, culture becomes what is known as a tradition. Interestingly, tradition is defined as a way of doing things based on a belief system. Nyeri County is majorly inhabited by the Kikuyu Community who are Bantus. There are various aspects of culture that have affected the development of Nyeri County.

POSITIVE IMPACTS OF CULTURE ON DEVELOPMENT	NEGATIVE IMPACTS OF CULTURE ON DEVELOPMENT
• The culture of a people has intrinsic effects in that, it makes people seek out and want to consume cultural products of the community • Culture may also have instrumental effects, which may be useful by-products from a cultural activity e.g. traditional music and fashion from various communities within the County, may be used as entertainment. • Culture within the County may also be used to foster civic participation, build cohesion as well as form and retain identity of the people. Thus, positive functional effects may come forth from culture. • The youth of the County are known for their business acumen, which puts them in an advantageous position to engage in national and international business ventures • Cultural events may be organized in the County to be able to showcase the Kikuyu cultures, with the aim of promoting tourism and also maintain the cultural practices in the County	• The culture prevents people from practicing alternative forms of economy. For example, fish farming is not fully exploited as majority of Nyeri County residents do not eat fish.

a) The Kikuyu Community

Areas Occupied.	The Kikuyu belong to the highland bantus which is a sub-group of Eastern Bantus. Their language is most closely related to that of the Embu and Mbeere. Geographically, they are concentrated in the vicinity of Mount Kenya. Their origin is not clear, however, the Kikuyu dispersed from Shungwaya along with other Eastern Bantu tribes. Archaeological evidence suggest that they established themselves in the Central Region of Kenya by 1200 AD. This region was initially occupied by the Dorobo and Gumba who were hunters and gatherers respectively.
Main Tribe	Kikuyu Language
Settlements	-The Kikuyu tribe live in large round hut-like houses referred to as 'nyuba' having only one entrance. -Men and women live in different houses and two married women cannot inhabit the same house. A man's house, whether married or not, is referred to as 'thingira'
Economic activities	-The main economic activity for the community is agriculture. The grow crops like bananas, sugarcane, millet, maize, beans, peas, potatoes and vegetables. -They also grow cash crops such as tea and coffee in large scale. -They also keep livestock.
Cuisine	In most rural Kikuyu homes, typical traditional Kikuyu food includes githeri (maize and beans), mukimo (mashed green peas and potatoes), irio (mashed dry beans, corn and potatoes), roast goat, beef, chicken and cooked green vegetables such as collards, spinach and carrots

Socio-political Organisation	• Kikuyus are said to have a founder, Gikuyu and his wife, Mumbi who were created by God. The two had nine daughters who got married and started families from which 9 clans of the Kikuyu tribe were formed. • The community is organised in age sets, groups of boys get initiated every year and grouped into sets of generations that ruled 20-30 years traditionally. • The people also had a council of elders who were the leaders of the community.
Artefacts Used.	1. The Kikuyu community used horns from animals as cups for beer (Muratina) drinking by the men. There were also cultural ornaments by the community like long loop earrings worn by women. The community had clothes made from animal skin with beaded belts. 2. The Kikuyu had a number of noteworthy musical instruments that were mostly played by soloists. This is due to the fact that their traditional dances were mainly choral in nature with hardly any accompaniment except for the jingles on the legs to maintain a rhythm. These musical instruments include: • **Jingles-** The Kikuyu used leg Jingles as percussion instruments. The jingles were made by blacksmiths who shaped a sheet metal to contain metal pieces or pebbles. The leg was moved rhythmically with some force to accompany the music. • **Stretched animal skin-** The Kikuyu did not play drums, which is surprising for such a widespread instrument among the neighbours (Akamba, Chuka etc.) They however had a unique musical instrument that was made from a single-membrane that was stretched on the ground, from where it was played. Since it could not be carried away, it must have been stretched every time it was needed and then rolled away when it's use was over. • **The Flute-** It was only played when the player had too much time in his hands. It was also played when a man was grieving over the loss of somebody or personal belongings. During the dry season, when the millet that was planted during the short rain (mbura ya mwere) was maturing, the flute came in handy • **The Gechande-** It was a gourd with coloured lines and images which decorated with cowrie shells. the gourd was filled with small hard objects to form a rattle. The images represented a story which was re-told by the player who was neither accompanied by another singer, nor instrument. the singer would travel for a period of up to six months performing the Gechande along the way • **Wandindi-** It was a one stringed musical instrument of the Kikuyu and other communities. The resonator was made of a calabash and piece of tight skin. A stick projected from the calabash and had a string attached to its extreme end, tightly from the resonator. The player made different sounds by sliding a finger or thumb on the string while using a bow on the string in the manner of a violin • **Ciigamba-** Routledge described the rattles as "oval sheet of Iron with ends brought to a blunt point 6-Inch-long folded over until the edges only 1/4 inch apart - the form produced being something like that of the banana fruit. Several bullets of Iron are enclosed… worn strapped in horizontal position above the knee joint." These were used to make a rhythmic accompaniment to the singing by stamping the foot in a choreographed manner • **Coro-** These were side-blown horns which were of two kinds; the straight horn of the oryx and the spiral horn of the greater kudu.

Source: Kikuyu Tribe of Kenya, Language, Music Women,People, Houses, facts, 2009. (https://answersafrica.com/kikuyu-tribe-people-and-culture.html)

b) Other Communities

Nyeri County also has a diversity of ethnic communities apart from the Kikuyu. The biggest contributing factor to this is the in-migration brought about by people from other regions seeking employment, education or residents within the County. These communities include but not limited to Meru, Kamba, Luhya, Luo, Mijikenda, Kalenjin, Kisii, Embu, Maasai and Samburu.

5.3.2 Religion

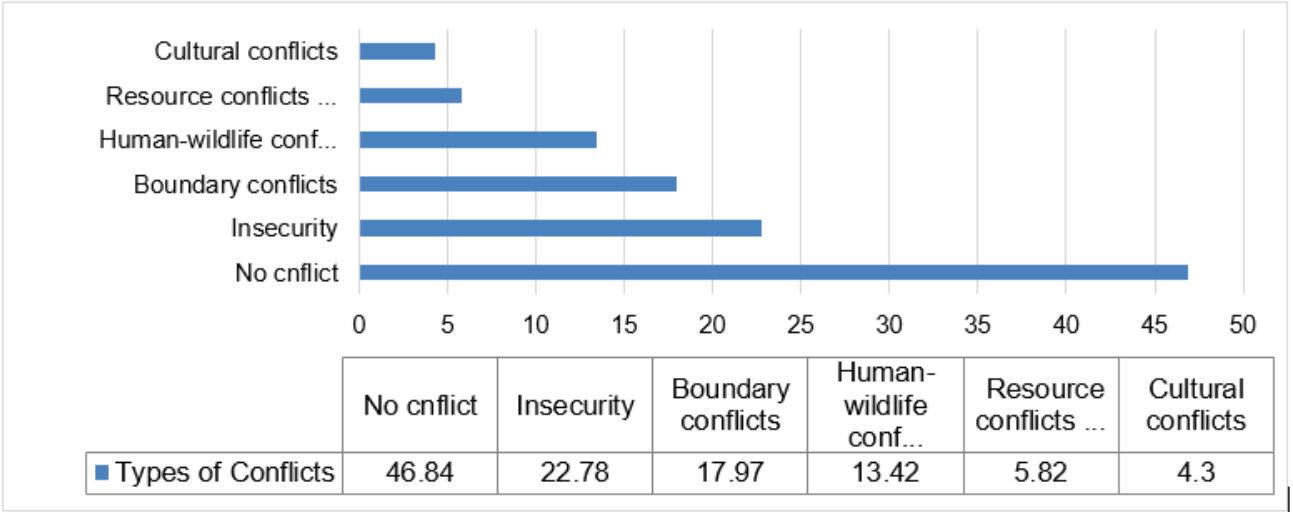
The main religion within Nyeri County is Christianity, mainly under major churches such as the Presbyterian Church of east Africa (PCEA), the Catholic Church and the Anglican Church of Kenya. There are communities however that practice indigenous worship. Muslim communities are few and are mainly found within the major urban centres such as Nyeri and Karatina

5.3.3 Conflict and Conflict Resolution

Conflicts between communities and counties have been a matter of cultural, resource-use and economic related issues. Inter-communal activities have been the time immemorial causes of conflict. Which has changed overtime as the present-day conflicts are caused by complex factors such as: the diminishing resource capacity, commercialization for monetary gains and the entry of ammunition in the communities, political conflicts and boundary disputes.

The main sources of conflict in Nyeri County is Human-wildlife conflict, boundary conflict, insecurity and conflict over limited resources.

Figure 6: Cause of Conflict

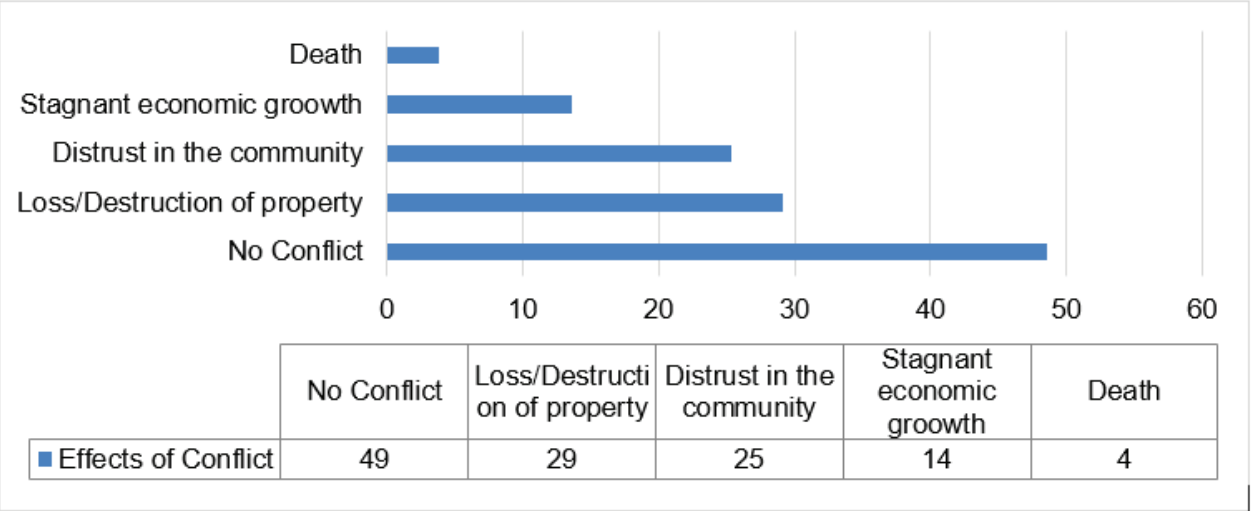


	No cnflict	Insecurity	Boundary conflicts	Human-wildlife conf...	Resource conflicts ...	Cultural conflicts
Types of Conflicts	46.84	22.78	17.97	13.42	5.82	4.3

Source: Field Survey, 2019

Some of the effects of conflict as witnessed in the County are shown in the figure below:

Figure 7: Effects of Conflicts



	No Conflict	Loss/Destruction of property	Distrust in the community	Stagnant economic groowth	Death
Effects of Conflict	49	29	25	14	4

5.3.4 Conflict Resolution Mechanisms

According to the Field survey (2019) that was carried out, most conflicts are solved by village elders, and chiefs. Several residents prefer settling disputes and conflicts through religious leaders, negotiations or going to court. County officials can apply other mechanisms such as rehabilitation and initiating the Nyumba Kumi initiative to solve conflict in the County.

5.3.5 Marginalized Groups

There are various categorized of marginalized persons in Nyeri County and they include:

- **Persons with disability** - Persons with disability are marginalized in the County as they are viewed as burdens, unable to participate in intensive economic activities like farming and requiring special health treatment.
- **Women and girls** - The culture of most communities within the County discriminates against women and girls, preventing them from seeking education, property ownership and employment.
- **Intersex people-** The most recent 2019 Population Census revealed that there are 3 intersex people in Nyeri County. Intersex refers to a condition in which a person is born with a reproductive or sexual anatomy that doesn't seem to fit the typical definitions of female or male. For example, a person might be born appearing to be female on the outside, but having mostly male-typical anatomy on the inside. Health facilities as well as community facilities require to be well-equipped to cater for the needs for the Intersex people.

5.4 Emerging issues

SECTOR	POTENTIAL OPPORTUNITIES	CONSTRAINTS
Population size	• A youthful population provides an opportunity for innovation and technology and ensures that there is an available workforce	• Rapid population growth and high dependency ratios in the town have over the time put pressure on existing infrastructure
Migration	• In-migration into the town takes place at both the national and international levels. This is an opportunity that can boost the growth of the local economy and spur regional development.	• The increase in population requires more development funds to build additional social and physical infrastructure
Human Resource Development	• The population has high literacy levels	• High unemployment rate
Community and culture	• A rich cultural environment provides an opportunity for different cultures to mingle and exchange ideas.	• Increased unemployment levels in the town. • High population growth increases the proportion of total income, thus diminishing the level of domestic savings available for investment. • Available land is increasingly being fragmented into uneconomic units.

CHAPTER SIX:

LAND

Land is a crucial resource that forms the canvas on which all natural resources are found, economic activities conducted and both physical and social infrastructure provided. Most human activity occurs on land which supports agriculture, vast habitats, and natural resources. Land use involves the management and modification of the natural environment.

Understanding land tenure and land use, are aspects that are closely related, which is crucial to income production and generation. Land cover in Nyeri is characterized by both natural features (such as forests, crops, lakes and hills) and man-made built-up features (such as urban and rural settlements).

Land use and land potential are closely related in income production and generation. Land is also a cultural resource, with the communities in the County attaching rich value to both its existence and access to it. It is the sustainable use of land that can bring about equitable distribution of County resources and infrastructure, while accommodating changes in lifestyles and economic activities in the long-term.

6.1 Land Tenure

6.1.1 Overview

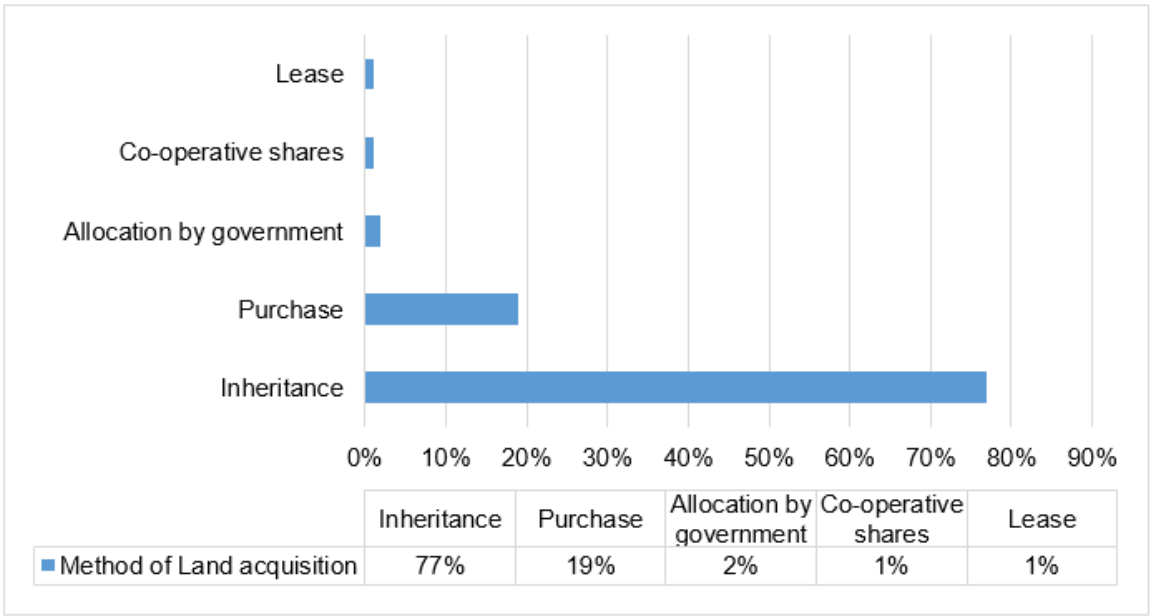
Land tenure is an important part of social, political, and economic structures. It is multi-dimensional and brings into play social, technical, economic, institutional, legal, and political aspects that are often ignored (but must be considered). Land tenure is simply defined as the legal right to hold property or land. It also refers to the legal and contractual arrangements governing the use and control of land resources. Land tenure is very important and highly sought after because it is a source of food and shelter. It provides security for the future.

6.1.2 Existing Land Tenure Systems

6.1.2.1 Private Land

Private land tenure system is characterized as either freehold or leasehold. The land in Nyeri County is under leasehold in the urban areas and freehold in the rural areas. The residents of Nyeri County have acquired their private lands mainly through inheritance (77%) and purchase (19%). Only 2% have acquired land through allocation by the government as shown in the figure below:

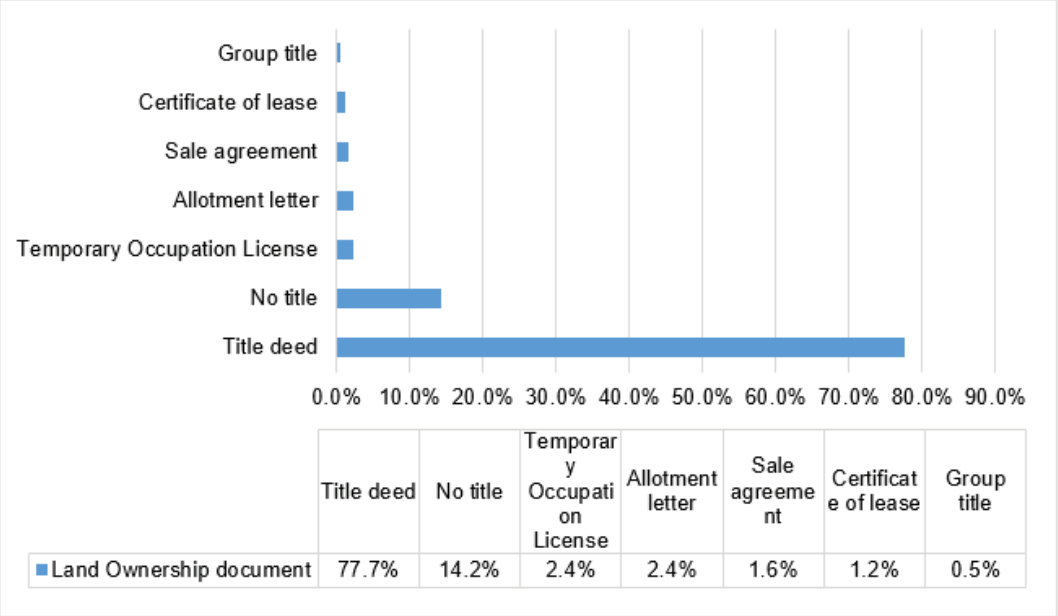
Figure 8: Method of Land Acquisition



Source: Field Survey, 2019

From the field survey, 77% of the respondents have title deeds, while 14% do not have any land ownership documents. Lack of title deeds is mainly experienced in the colonial villages. However, there are initiatives by the County government for planning and surveying of the colonial villages to issue title deeds to the beneficiaries.

Figure 9: Land ownership documents



Source: Field Survey, 2019

6.1.2.2 Public Land

Public land refers to land governed either by the national government or County government (other than community land). In Nyeri County, it includes the Aberdare and Mt. Kenya forest and other forested lands (managed by the County Government); Aberdare and Mt. Kenya National Reserve and public land within centres comprising of schools, hospitals, stadiums and other public purpose infrastructure.

The main challenge facing public land is encroachment and grabbing in various parts of the County. This has resulted to difficulty in provision of services such as utilities and social amenities as it requires the government to purchase land for aforementioned purposes.

6.1.3 Gender and Land Ownership Rights

Men in Nyeri County have more involvement in issues pertaining to land ownership and administration they are more involved compared to women.

Only 2% of women in the County are involved in land administration, while 59% of men have taken responsibility of land administration, sale and disposal. Moreover, no women are reported to be involved in issues pertaining to land subdivision and land related disputes (Society for International Developement, 2004).

Most women do not have a say in land matters and cultural barriers limits them from land inheritance. Contrary to Article 27 and 60 (1) (f), of the Kenyan Constitution and Article 16 of the Universal Declaration of Human Rights which refutes gender discrimination in laws, customs and practices related to land and property in land. (GoK, 2010), It is evident that the customary laws are still very powerful and women are excluded from land inheritance and administration.

6.2 Land Use

6.2.1 Land Resource Characteristics

The total size of land in the County is 3,337.2 km^2. The land is mainly comprised of highlands and midlands. Of the total area, 987.5 Km^2 is arable land and 758.5 Km^2 is non-arable land respectively. The larger part of the land is used for food crop while the rest is used for cash crop farming, livestock rearing and farm forestry. The mean holding size is one hectare for majority of the small holders.

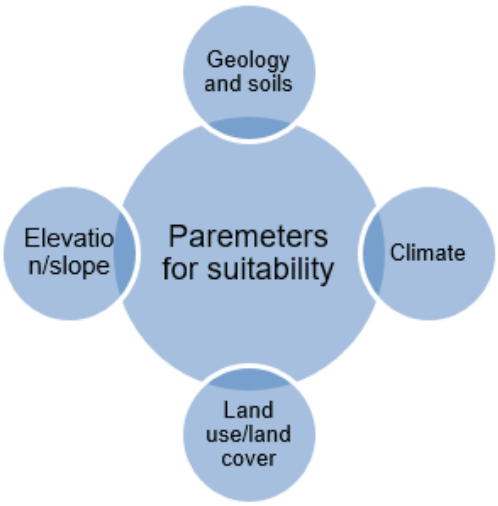
Sub-County	Area in Km^2
Mathira East	131
Mathira West	165.6
Kieni West	623.3
Kieni East	817.1
Tetu	217.5
Mukurwe-ini	178.6
Nyeri Town/Nyeri Central	167.8
Othaya/Nyeri South	174.5
TOTAL	**3475.4**

6.2.2 Land Suitability Analysis

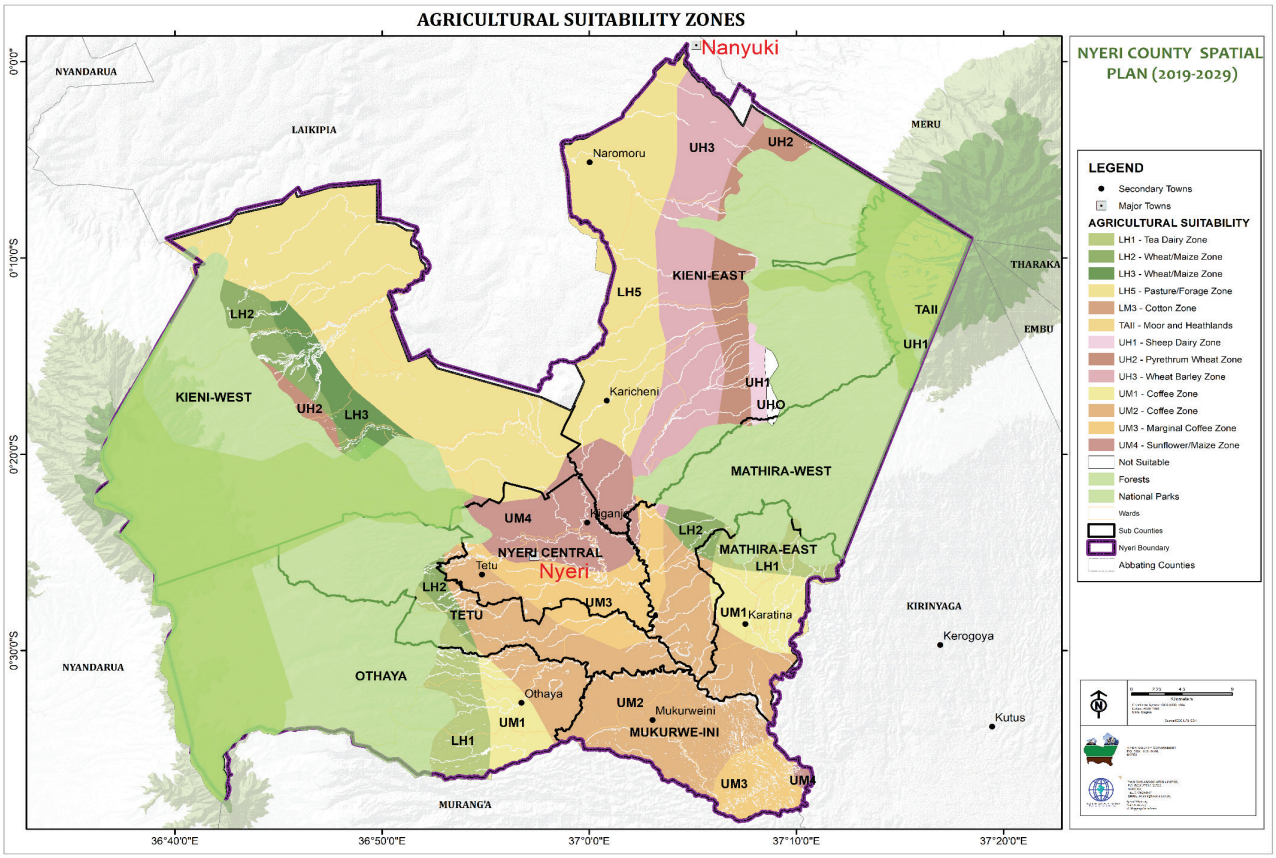
Land Suitability Analysis (LSA) is a GIS-based process applied to determine the suitability of a specific area for considered use, i. e. it reveals the suitability of an area regarding its intrinsic characteristics (suitable or unsuitable).

Agriculture land suitability analysis is a prerequisite to achieve optimum utilization of the available land resources for sustainable agricultural production. To delineate the suitable areas for agricultural crops, there are several variables that need to be put into consideration as follows;

The areas identified as unsuitable for agricultural production include; forested areas, Steep slopes above 200, dams, 60m riparian reserve along main rivers and 30m riparian reserve along minor rivers.



Map 23: Agricultural Suitability zones



Source: Two Ems Associates, 2019

6.2.3 Land Capacity Analysis

Land capacity analysis enables public authorities to track land potential, which in turn allows returns to be made on land above its cost of utilization. For example, some tracts may be highly productive relative to their utilization costs because of favorable locations (with respect to markets and transportation and communication facilities). Tracts may also be productive because of resource characteristics such as soil fertility, climatic conditions, or the presence of wood and water.

The County's land capacity can be increased by the introduction of effective and efficient methods of soil conservation and land management. In the lowlands where water is a constraint to crop agriculture, development of adaptable rainwater harvesting and storage technologies, irrigated cultivation and introduction of drip irrigation and drought resistant crops can improve the livelihoods of the people.

Land use planning and zoning is necessary to enhance the land capacity of Nyeri. This will create settlement zones away from areas mapped as disaster prone, while allowing for mechanization and other adaptable technologies, which enhance economies of scale and sustainable natural resource use.

6.2.4 Land Use Trends

Over the years, the increase in population has resulted in urban sprawl, encroachment into the environmentally sensitive areas and loss of natural vegetation. Human activities such as crop farming including illegal farming of bhang and tobacco as well as illegal logging have largely contributed to reduction in the forest cover, moorland and heathland.

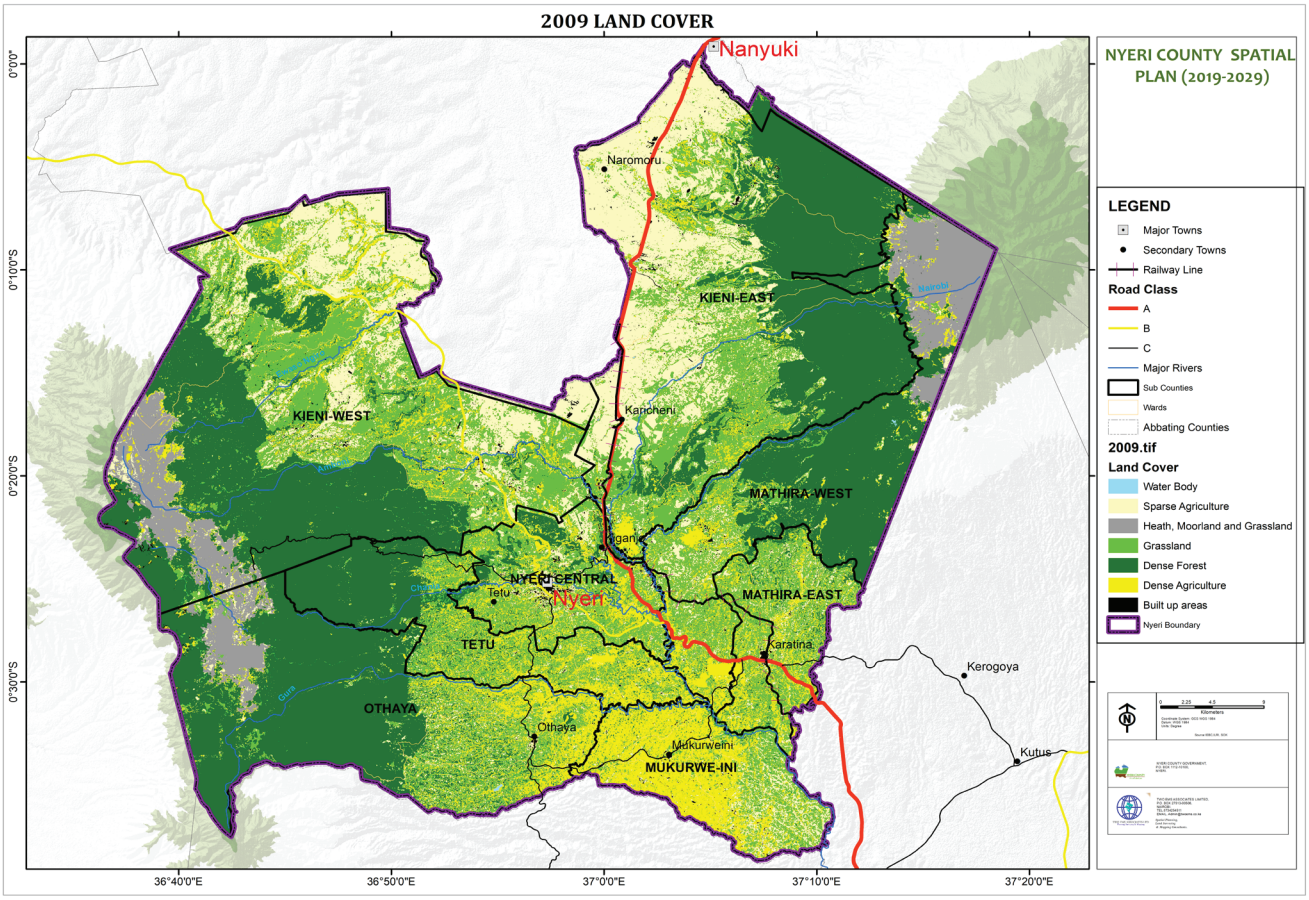
From the spatial temporal map below, there has been increase in built up areas in the County in the form of emergence of new centres such as Wamagana, Narumoru and Mweiga which have extended into the rich agricultural hinterlands.

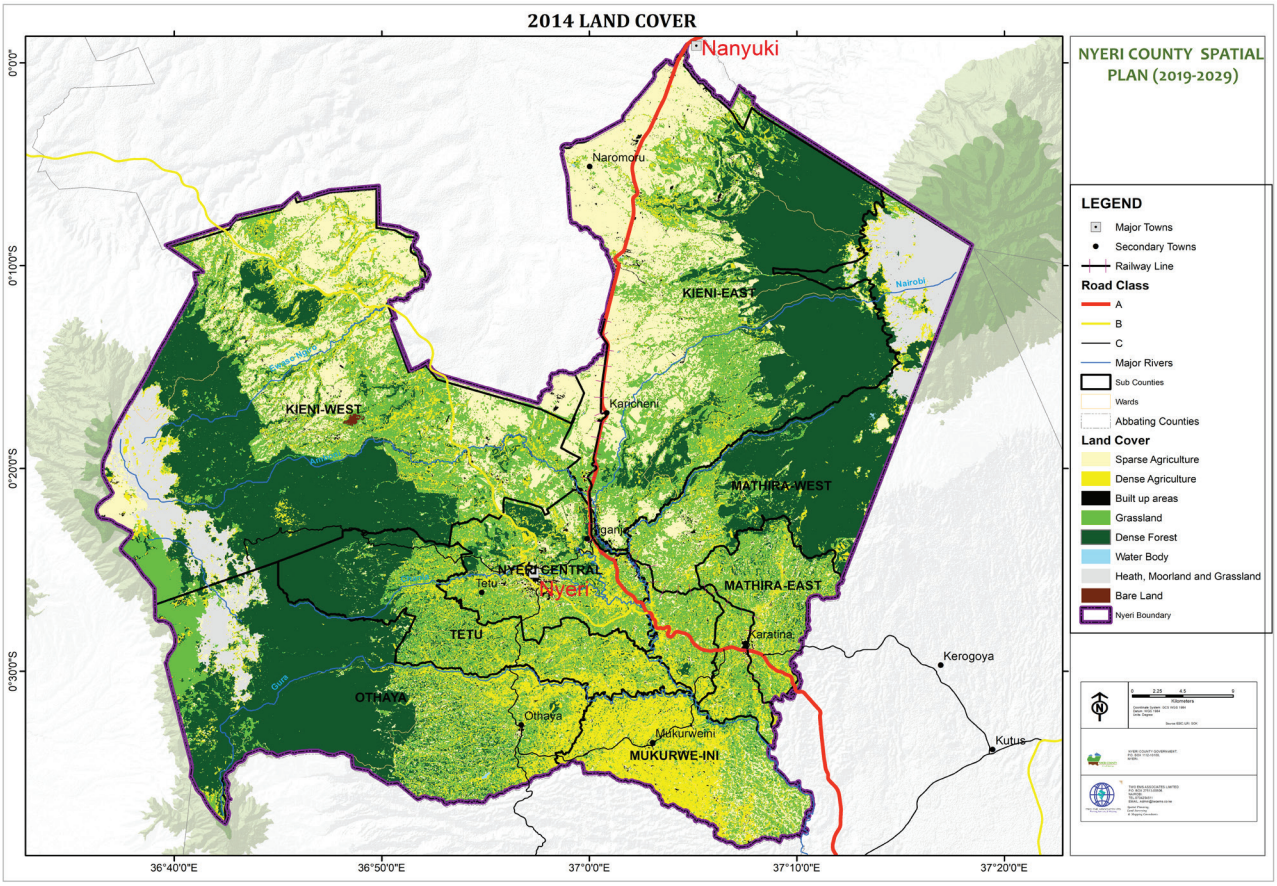
Due to climate change and agricultural activities along the riparian reserves as well as over abstraction of water resources, the County is experiencing 50.27% decrease in level of water bodies over the period of 10 years. The resultant consequences are the lack of water for agriculture and tapping for domestic use.

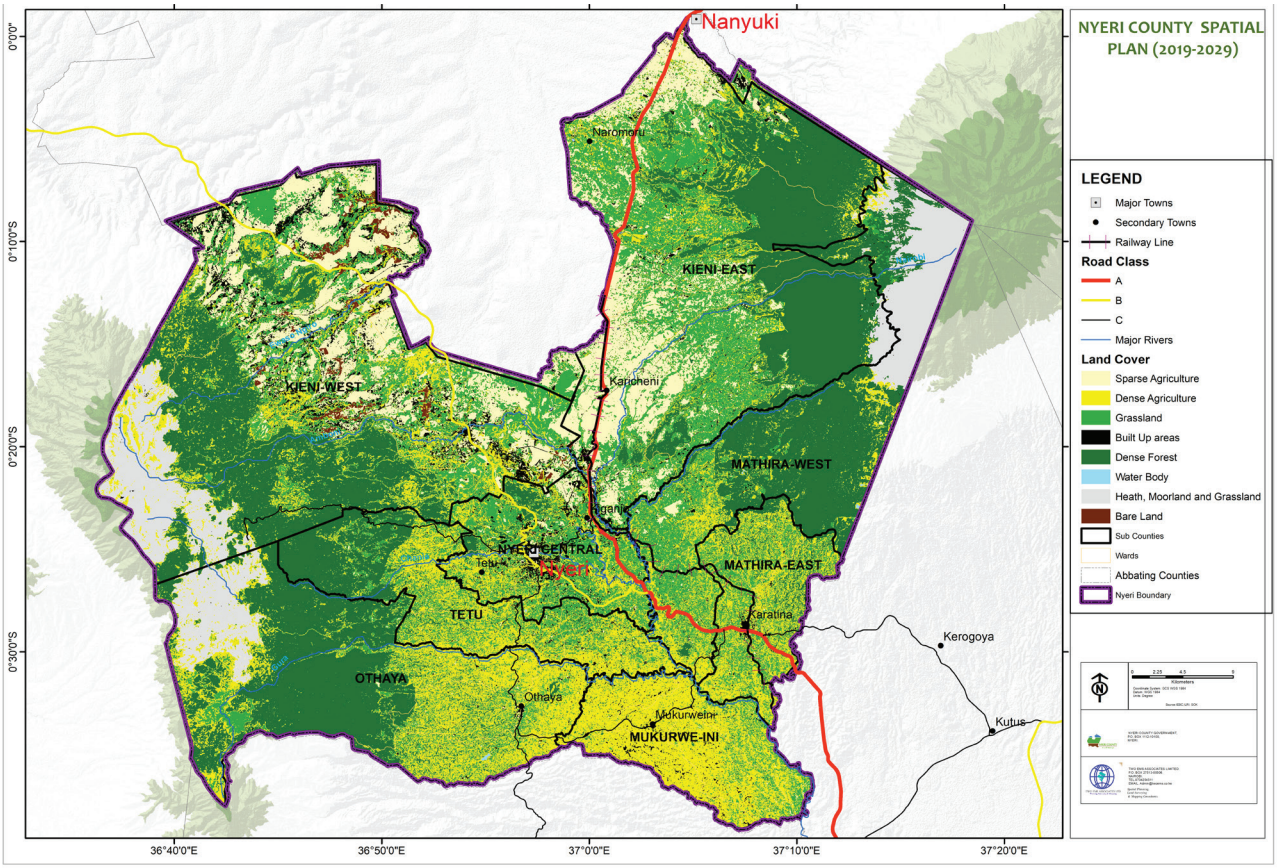
The changes in land cover is as shown in the table below:

Land Cover	2009	2014	2019	Change	Area occupied in relation to area of the County
Dense Forest	1296.16	1201.52	1078.18	16.82% decrease	31.36%
Heath, Moorland and Grassland	176.30	171.38	163.37	7.33% decrease	4.75%
Grassland	704.05	721.91	712.01	1.13% increase	20.71%
Dense Agriculture	513.68	520.58	752.24	36.39% increase	21.88%
Sparse Agriculture	619.67	632.42	692.36	11.73% increase	20.14%w
Built Up Areas	26.56	30.54	35.22	34.22% increase	1.02%
Bare Land	6.58	5.06	3.96	66.16% decrease	0.12%
Water Body	1.37	0.84	0.72	50.27% decrease	0.02%
Bare land	6.58	5.06	3.96	66.16% decrease	0.12%

Map 24: Land cover spatial temporal changes





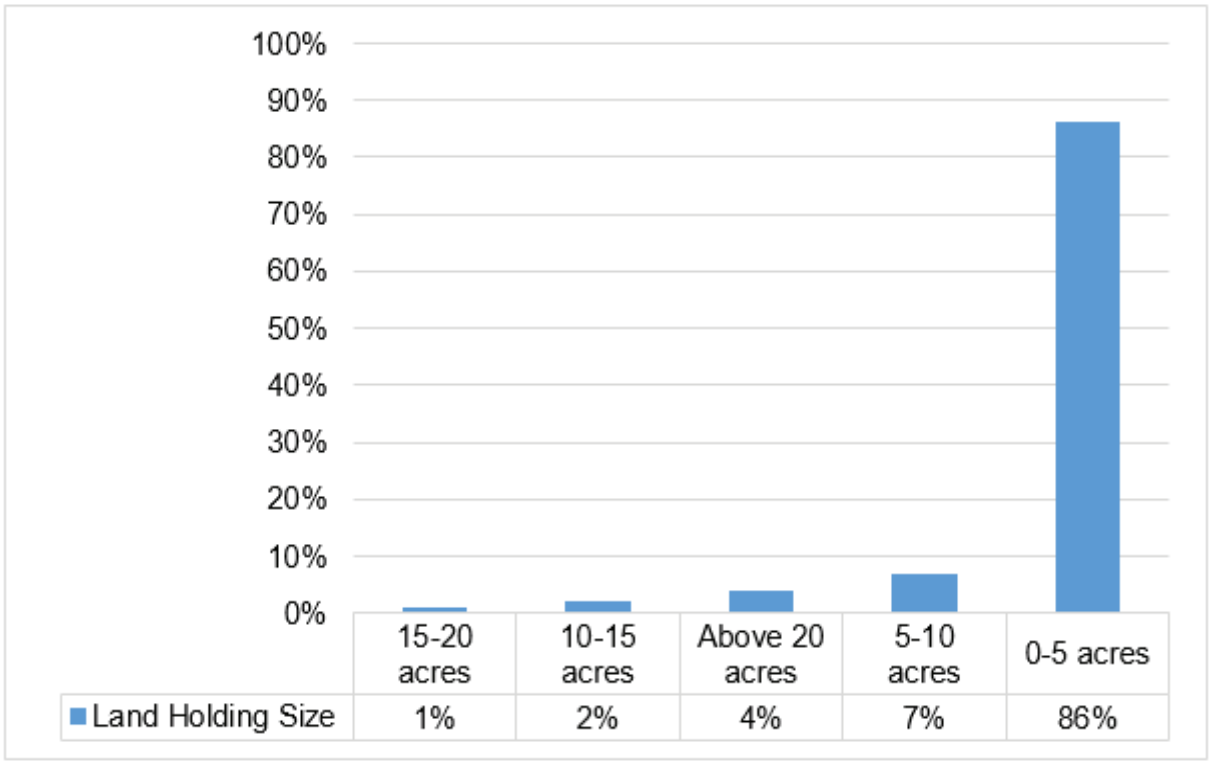


Source: Two Ems Associates, 2019

6.2.5 Land Size

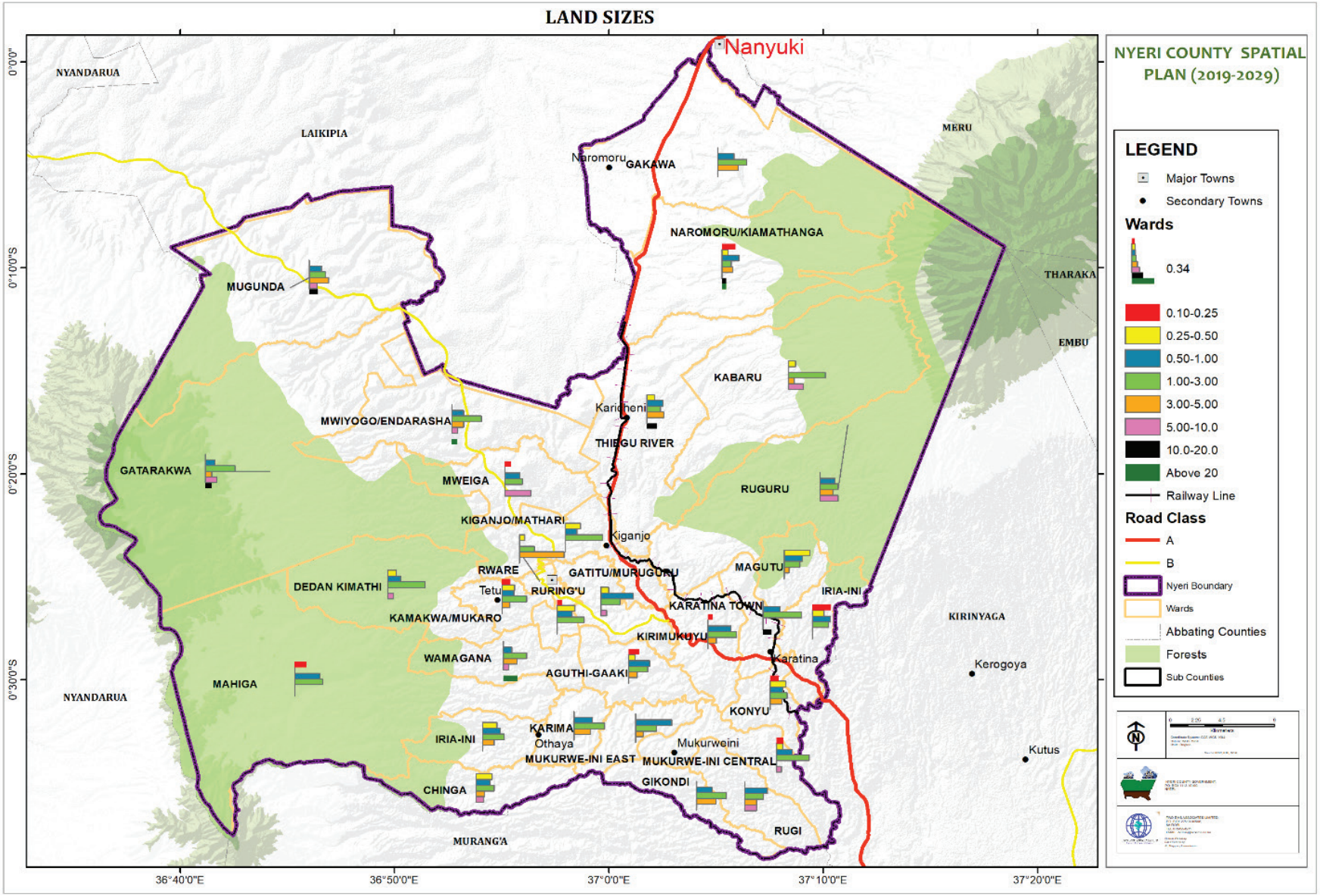
Majority of the land parcels (86%) in the County range between 0.1 to 5 acres. Landholding in the County varies from one ward to another. Large land holding sizes are mainly in Mweiga, Mugunda and Kiganjo/Mathari wards, while small land holding sizes are in Magutu, Iriani and Mahiga wards.Due to the increased population pressure on land, rapid land fragmentation has been experienced in the County which has resulted to uneconomical land units leading to reduced agricultural productivity.

Figure 10: Land Holding Sizes



Source: Field Survey, 2019

Map 25: Land sizes per ward



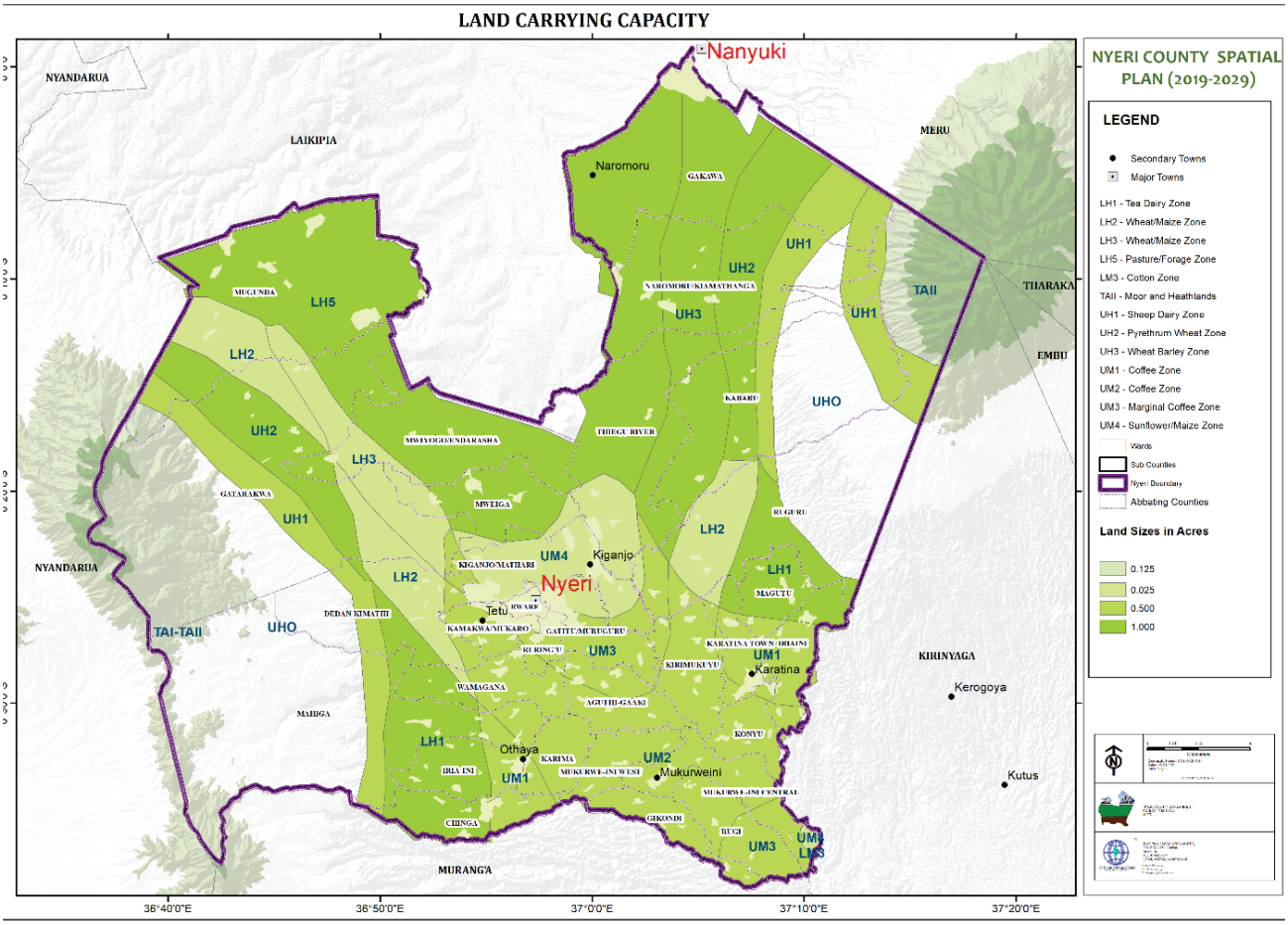
Source: Two Ems Associates, 2019

6.3 Land Carrying Capacity

Land Carrying Capacity is the level of human activity that can be infinitely sustained in a region without causing land degradation. It emphasizes on the sustainable availability of regional resources for the regional population and economic activities. This means that the land production potential should be less than the per capita consumption. With an increase of 36% on dense agriculture, 11% increase on sparse agriculture and a population growth rate of 10%, then the land carrying capacity is sustainable to support the increasing rural population.

Food crops are mainly produced on small scale due to the small holding sizes because of population pressure. According to the Strategic Plan 2018/19-2020/23 from the Department of Agriculture, Livestock and Fisheries, the average farm size is 0.7 hectares for small scale farmers and 4 hectares for large scale farmers. To determine the land carrying capacity, there is need to analyse the land productivity potential. This has been done with the help of the Farm Management Handbook of Kenya which has analysed the Agro Ecological Zones of Nyeri County using the soil potential structure and climate of the area which includes rainfall, temperatures and minimum land sizes in which different crops can best thrive in. For Tea and Dairy areas is 1 acre of land, 0.5 acres for coffee and Irish potato zones and 0.25 acres for maize zones.

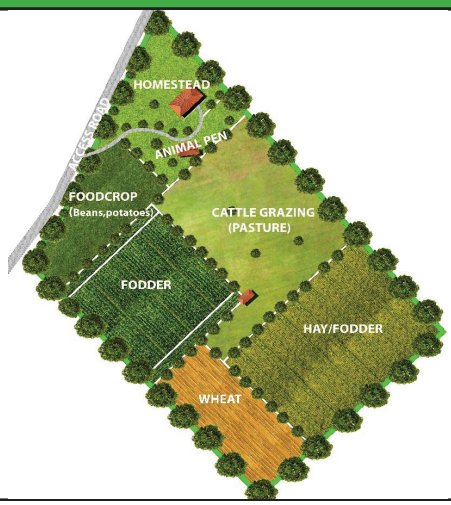
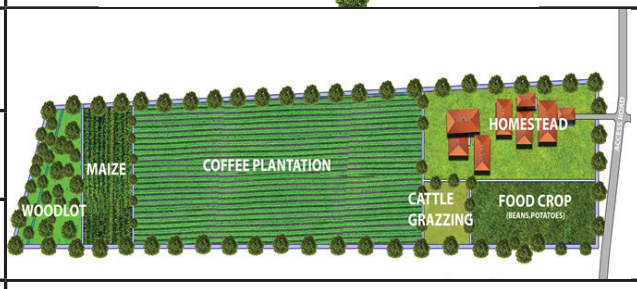
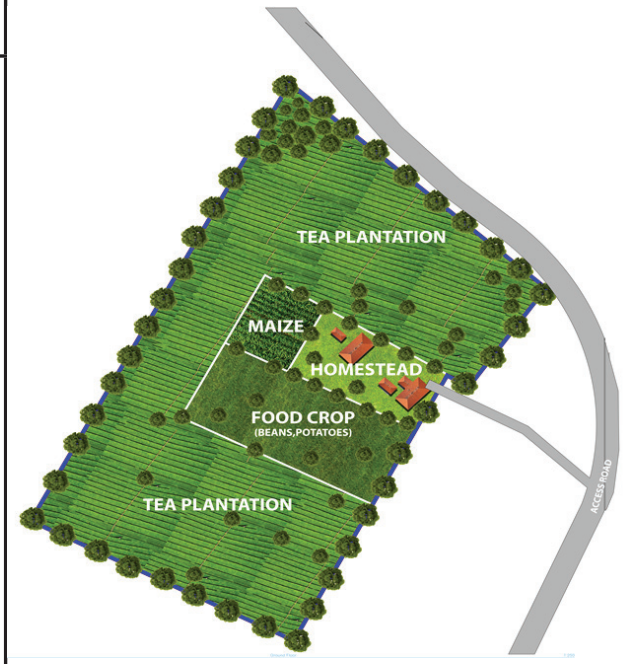
Map 26: Land Carrying Capacity



Source: Two Ems Associates, 2019

6.3.1 Rural farm holding

Farm holding is all land which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location. Below is a representation of a typical rural farm holding in Nyeri county in three major zones i.e. Ranching zone, Coffee zone and Tea zone.

Major zone	Main Agro-ecological zone	Zones	Typical Farm Holding
Ranching zone	Lower Highland Zone	LH5	
Coffee Zone	Upper Midland Zone	UM1 UM2 UM 3	
Tea zone	Lower Highland Zone Upper Midland Zone	LH1 UM1	

6.4 Land Challenges and Conflict

There are various challenges facing land ownership, use and access within the County. Majority of the land challenges outlined by respondents related either to the physical nature of land, to land ownership or to land conflicts, as summarized in the figure below:

Figure 11: Land Challenges

Physical Nature of Land	• Harsh terrain/ steepness in Mukurwei-ini sub-County • Dry infertile nature of land in the Kieni sub-counties • Landslides • Soil erosion (hence land degradation caused by poor farming methods, and deforestation)Poorly serviced land (poor access/ planning)
Land Ownership Challenges	• Small land sizes • Lack of title deeds • Lengthy title acquision process • Reluctance of elderly to undertake land succesion • Unadjudicated land (causing unsustainable use of land)
Land Conflicts	• Land ownership conflicts • Boundary conflicts areas bordering Laikipia and Murang'a counties • Land grabbing

Possible solutions were identified and are summarized below:

Physical Nature of Land:
- Provision of water for irrigation
- Government support for land development
- Planting trees
- Appropriate agricultural practices (applying manure/ fertilizer, changing cropping system)

Land Ownership:
- Surveying of land for boundary delineation
- Easing title acquisition process
- Educating people on importance of having title deeds
- Eradicating corruption in land issues
- Government hastening land succession process

Land Conflicts:
- Resolving problems with traditional elders
- Compensation of evictees
- Hasty settlement of court cases
- Provision of security

6.5 Emerging Issues

POTENTIAL/OPPORTUNITIES	CONSTRAINTS
• Private land ownership encourages maximum investment • Repossess grabbed public land. • Development of zoning regulations • Land consolidation	• Increased subdivision due to population growth • Available land is increasingly being fragmented into uneconomic units • Encroachment on existing land uses e.g. way leaves, riparian reserves, • Majority of the land is under freehold hence difficult to regulate zoning of the planning area • Poor soil conservation • Increased land grabbing • Unsurveyed plots leading to land conflicts especially in rural areas • Poor enforcement of existing zoning regulations

CHAPTER SEVEN:

Environment And Natural Resources

7.1 Environment

The natural environment encompasses the interaction of living and non-living species. The increase in population exerts tremendous pressure on the County's natural resources, particularly forests, water and land. The Constitution of Kenya entitles every person to a clean and healthy environment. This obligates the two levels of government to protect, utilize and conserve the environment prudently through various strategies including accountability, participation of communities, integration of IT and innovation.

The Environmental Management and Coordination Act and other acts touching on specific environmental aspects (such as the Water Act, the Forest Act, among others) have provided the basis for environmental assessment.

7.1.1 Environmental Fragile Areas

These are the environmentally sensitive areas in the County that are susceptible to degradation. These areas include forests, water towers, riparian reserves, areas prone to floods and landslides. The Aberdare ranges and Mt. Kenya are two of the major water towers in Kenya. The forests belt along the Aberdare ranges comprise major water catchment areas for Tana River, as well as Athi, Ewaso Ngiro (North) and Malewa rivers. They are also the main catchments for the Sasumua and Ndakaini dams. These forests need to be protected from encroachment and deforestation. The riparian reserves should also be preserved from farming and settlements along the reserves.

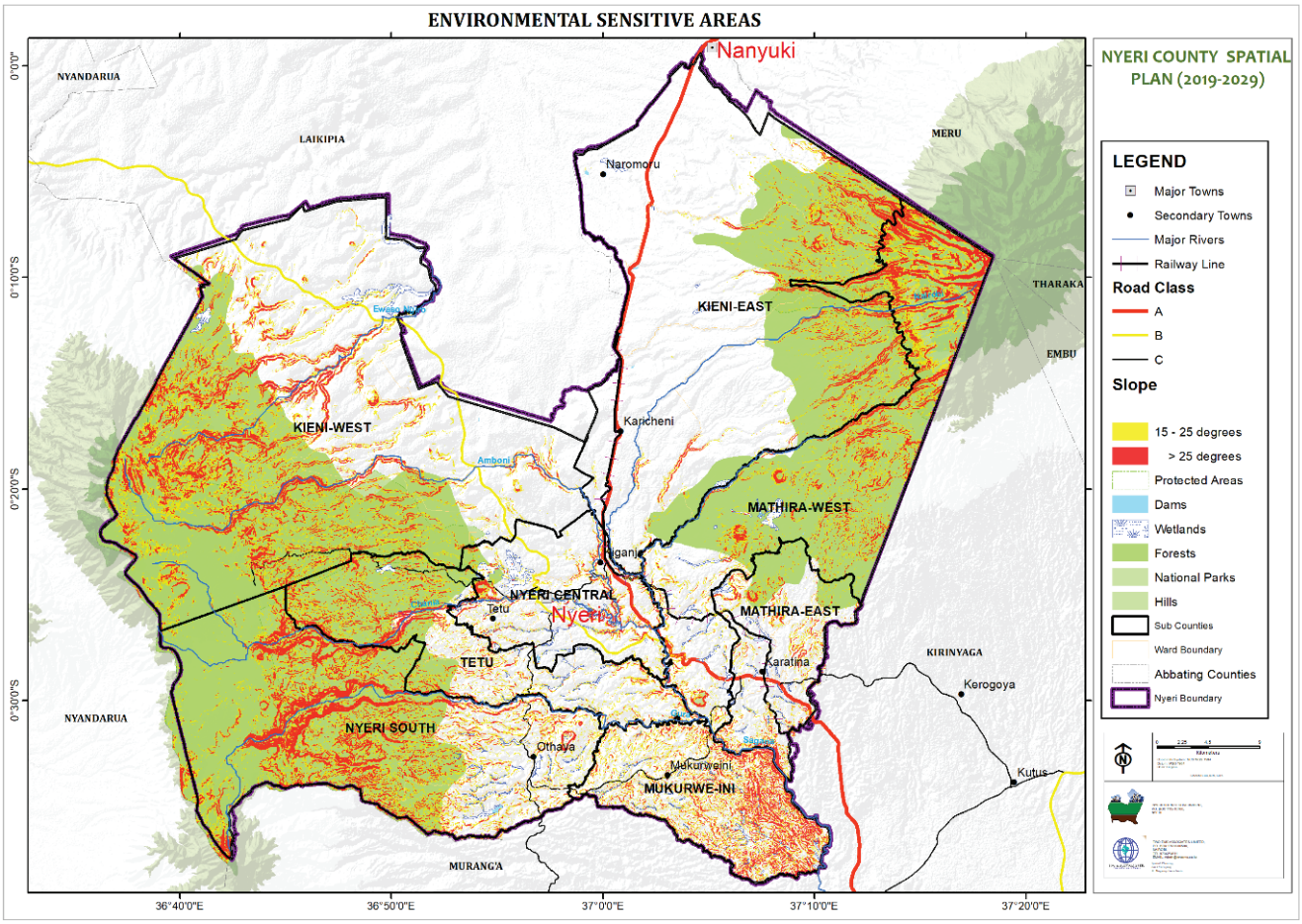
The table below highlights some of the major challenges within the very most environmental fragile areas

Environmental Fragile area	Location	Function	Threats
Mt. Kenya	Kieni East, Mathira West, Mathira East Sub counties	• Major water tower within the country. • Tourist attraction sites • Historical and religious site • Wildlife habitant and home to a range of bio diversity	• Intensified agricultural activities within the forest. • Forest fires that over the years have intensified • Deforestation especially cutting down of tress for charcoal • Increased human wildlife conflict
Aberdare Ranges	Kieni West, Nyeri South, Tetu Sub Counties	• Major water tower within the country. • Tourist attraction site • Wildlife habitant	• Deforestation; cutting down of trees for timber • Increased encroachment into forest to undertake agricultural practises
South Laikipia Forest	Kieni West	• Maintenance of water cycle • Source of wood fuel • Home to biodiversity	• Poaching of cedar posts and illegal removal of Olea Africana for charcoal burning.

Environmental Fragile area	Location	Function	Threats
Ewaso Ngiro	Kieni West	• Water source for domestic and industrial use • Source of food; fish	• Siltation along the river due to increased erosion especially along the riparian reserves • Increased encroachment along the wetland for agriculture
Sagana River	Mukurwe-ini, Mathira East Sub Counties	• Source of hydropower • Water source for industrial and domestic use • Tourist attraction site; water sporting activities	• Diversion of river flow into private farms for agricultural use • Pollution by industrial waste
Nyeri Hill	Nyeri Central	• Catchment area • Historical tourist site • Religious site	• Deforestation and encroachment onto steep slopes undertaking agricultural activities
Karima hill	Nyeri South	• Water catchment area • Source of fuel	• Poaching of indigenous tress for charcoal burning. • Increased agricultural activities around the hill
Tumutumu Hills	Mathira East	• Tourist attraction site • Home to a range of wildlife and biodiversity	• Destruction of forest diversity. • Encroachment into forest reserve to extract firewood for fue

Source: Field Survey, 2019

Map 27: Environmentally Fragile Areas



Source: Two Ems Associates, 2019

7.1.2 Geo-Hazards

The County is prone to landslides especially in hilly areas of Mukurwe-ini, Othaya and Tetu Sub Counties. This can be associated to poor farming methods characterized by encroachment of riparian areas and steep slopes and deforestation; activities that have left the soil bare and loose hence prone to soil erosion.

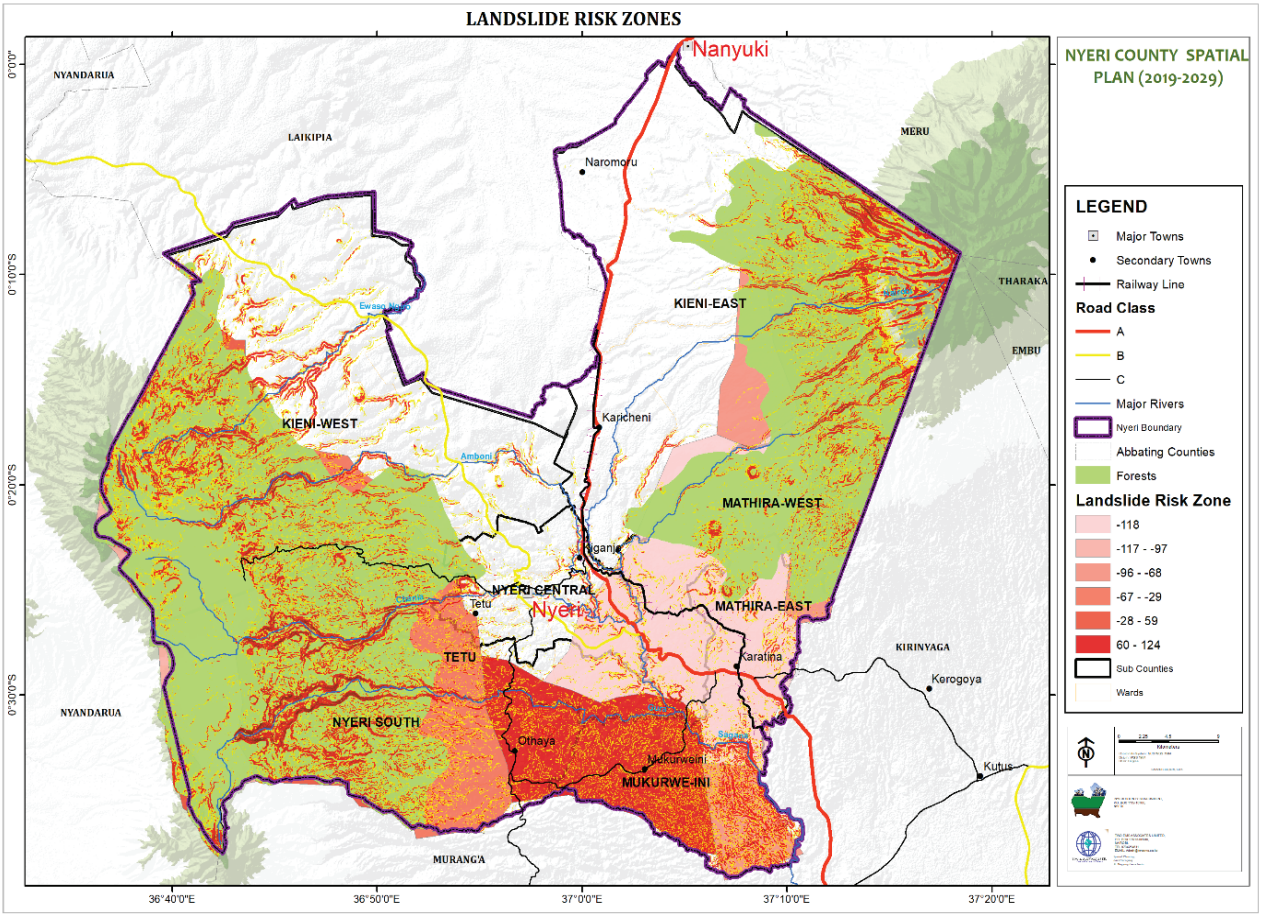
There is urgent need to reclaim all the environmentally fragile areas and plant indigenous trees to protect further soil erosion. The table below shows the areas of geo-hazards:

Area	Ward	Geo Hazards	Remarks
Kigathi	Rugi	Landslide	Encroachment on steep slopes and increased agricultural activities hence leaving the soil prone to soil erosion
Kiirungi	Gikondi	Landslide	Poor agricultural practises like cultivation on steep slopes, this has made the soil prone to surface run off.
Giathugu	Rugi	Landslide	Cultivation on steep slopes and along riparian reserves exposing the soil to erosion.

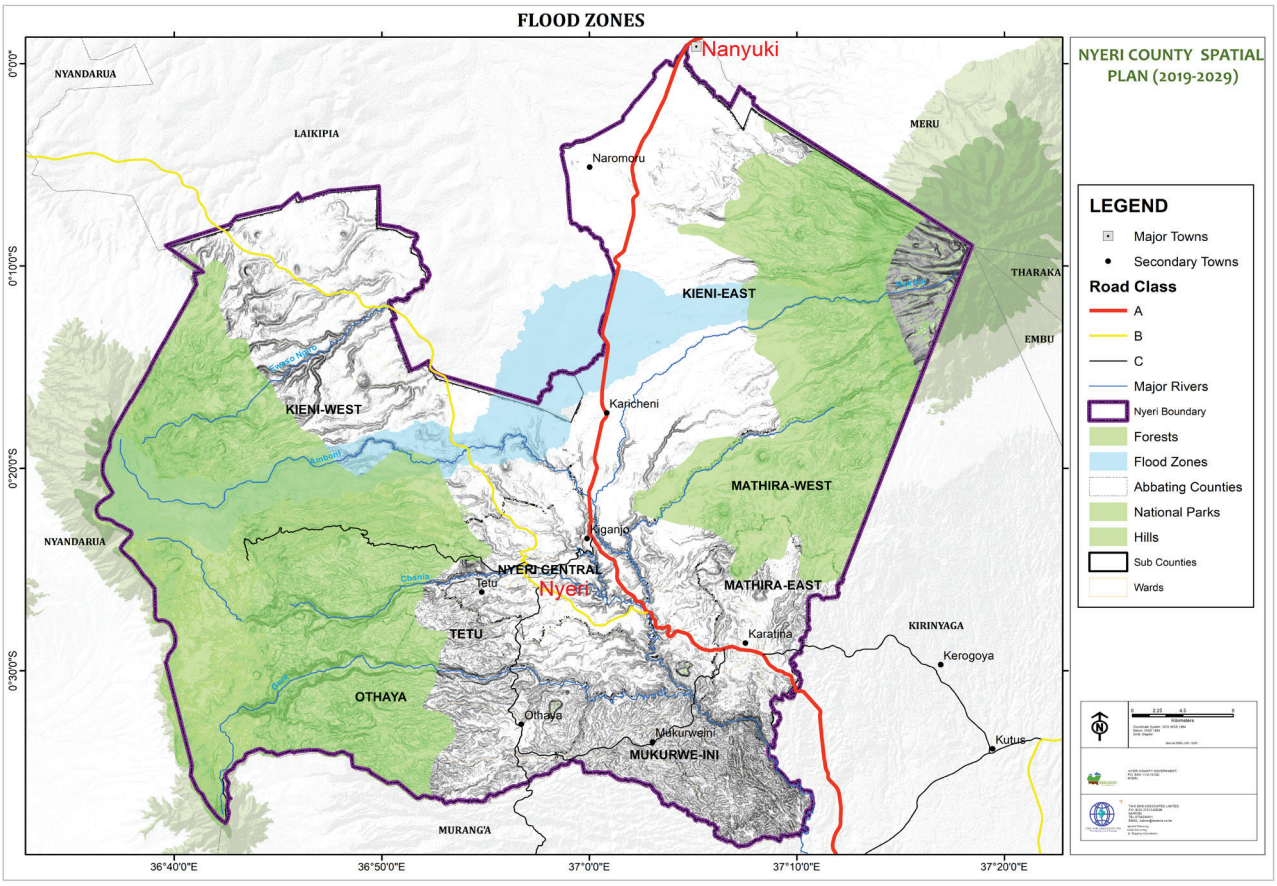
Area	Ward	Geo Hazards	Remarks
Igutha	Gikondi	Landslide	Loose top soil, hence exposing making it prone to soil erosion and flooding due to inadequate soil cover
Nyana Hill	Ruguru	Landslide	Encroachment into the forest and increased agricultural activities, Deforestation
Kiamucheru Hill	Karatina	Landslide	Increased agricultural activities on the hill, clearing the top rich soil. Cutting down of trees and not replanting hence exposing the soil
Karungai	Theigu river	Landslide	Encroachment on steep slopes and deforestation
Endarasha	Endarasha/Mwiyogo	Landslide	The soil in the area is not protected with the top vegetation cover hence exposing it to erosion
Mweiga	Mweiga	Flooding	Encroachment of riparian reserves and poor drainage systems.
Mutonga	Gikondi	Flooding	Encroachment of riparian reserves and poor drainage systems.
Kabuta	Rugi	Flooding	Encroachment of riparian reserves and poor drainage systems.
Kiuu	Mukurweini Central	Flooding	Due to encroachment along riparian reserves, no soil cover exposing it to flooding
Ichagachumi	Mukurweini West	Flooding	Increased agricultural activities along rivers and riparian reserves
Naromoru Town	Naromoru/ Kiamathaga	Flooding	Poor drainage systems and inadequate vegetation cover
Rutune	Rugi	Flooding	Poor drainage system hence increased open surface runoff
Nduiye river	Mahiga	Flooding	Encroachment of riparian reserves and poor drainage systems.
Chinga Dam	Chinga	Flooding	Increased surface run off along deforested riparian reserves
Gatumbiro	Dedan Kimathi	Flooding	Increased population hence pressure on the land, this has made more land under riparian reserves to be brought under agriculture
Kagati	Ruguru	Flooding	Encroachment along the riparian reserves
Kihuro	Karatina	Flooding	Poor drainage systems

Source: Field Survey, 2019

Map 28: Landslide Risk Zones



Map 29:Flood risk Zones



Source: Two Ems Associates, 2019

7.1.3 Threats to Ecologically Fragile Areas

There is degradation of the environment as well as loss of biodiversity can be attributed to several activities that result in natural disasters such as landslides and flooding.

The environmental threats in the County include:

1. Forest Degradation

The forest reserves in the Aberdare and Mt. Kenya ecosystems have undergone excisions and encroachment. Gatumbiro Hill Forest, Karima Hill Forest and Tumutumu Hill forest are just but among the forests within the County that undergo illegal logging for timber products and firewood is causing loss of biodiversity and threatening flora and fauna. Loss of tree cover is also affecting the rainfall patterns giving rise to unpredictable seasons. Due to lack of tree and grass cover, floods are prevalent because of unchecked flow of surface runoff which also reduces the retention of the water table.

2. Degradation of riparian systems;

The rivers in the County are experiencing encroachment on the riparian reserves through cultivation along the riverbanks. These activities have led to destruction of vegetation resulting to increased soil erosion, siltation and pollution of rivers not forgetting drying of some major rivers and streams. This also contributes to increased flush floods and landslides.

3. Quarrying and mining activities

Increased demand for building materials such as stones and ballast has led to more areas being excavated. Unsuitable quarrying activities is practiced in some parts of Nyeri County. These mining activities have adversely affected Rware, Naromoru, Kiganjo, Gatitu, Thegu river and Mweiga wards.

5. Climate Change

The County has experienced climate change with recent change in weather patterns which has led to cases of drought and drying up of vegetation. This is evident through decrease in water volumes and drying up of rivers, low crop yield and death of livestock in some areas. This has a major influence on food security, leading to hunger and famine.

In recent time some of the areas affected by drought include the following wards; Gataragwa, Rugi, Mukurweini Central, Konyu, Gikondi, Mugunda, Ruguru, Thigu river, Naromoru, Mweiga, Thigu river and Karima.

6. Poor waste management

The effects of poor waste disposal methods has contributed to pollution of major ecological areas, with increased pollution levels of air and water bodies as well. In the long run, more disease prevalence is in the increase. Poor management of industrial waste from tea and coffee factories with most industries directly disposing liquid waste into the rivers. Increased use of pesticides and fertilizers from farmers especially those cultivating along the riverbanks and riparian reserves have also contributed towards pollution of the water bodies. There is need to ensure that proper waste disposal mechanisms are put in place in the markets and urban centers.

7.2 Climate Change and Disaster Management

7.2.1 Overview

Climate change is a challenge facing communities globally. It has exhibited impacts on numerous systems and sectors essential for human livelihood. Climate change has effects that disrupt ecological systems and inhibit sustainable development. The impacts are significant on water supply, food security, environment, health, physical infrastructure and agricultural produce

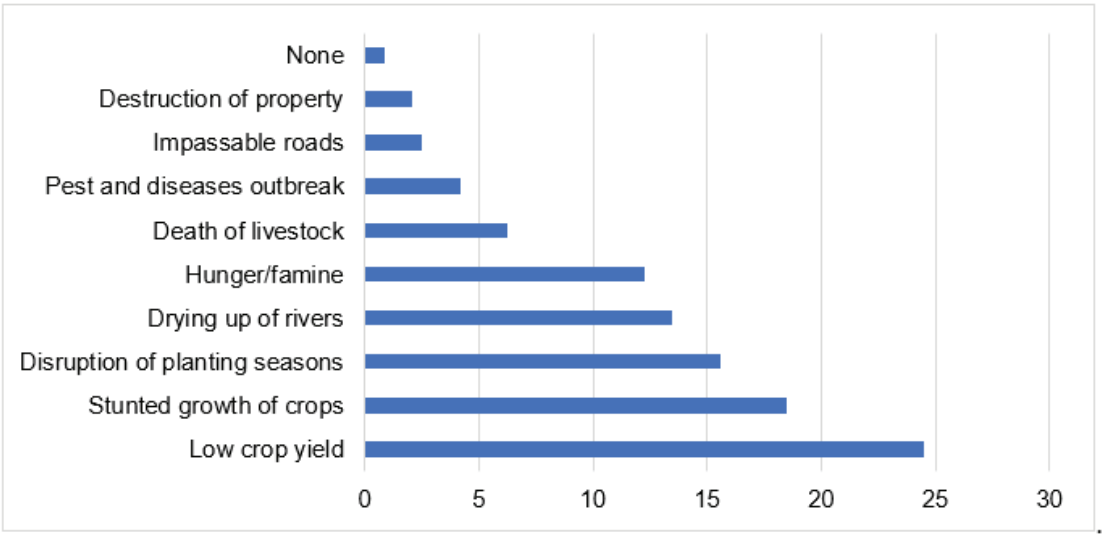
Africa is recognized as one of the most vulnerable regions to climate change despite being one of the least contributors of global emissions. Africa's susceptibility to the effects of climate change is as a result of widespread poverty, recurrent droughts, over-dependent on rain-fed agriculture and low adaptive capacity. Nyeri County has also experiencing challenges with climate change being among the counties with rich ecological systems.

7.2.2 Climate Change and its Impacts

Climate change and its impacts are evident in the County. The agricultural sector has greatly been affected due to drought and unreliable erratic rain patterns. In the past, Nyeri County was among the counties that received food aid, despite its agricultural potential, however climate change has been on the rise. (MoALF, 2016)

The field survey revealed that 75% of the respondents recognized that there is climate change in the County, while 25% reported that no climate change had occurred. The impacts of climate change were evident on agriculture through low crop yield, stunted growth of crops, disruption of planting seasons and death of livestock. Other impacts include; drying up of rivers leading to drought and famine among others described in the chart below:

Figure 12: Impacts of Weather Changes



Source: Field Survey, 2019

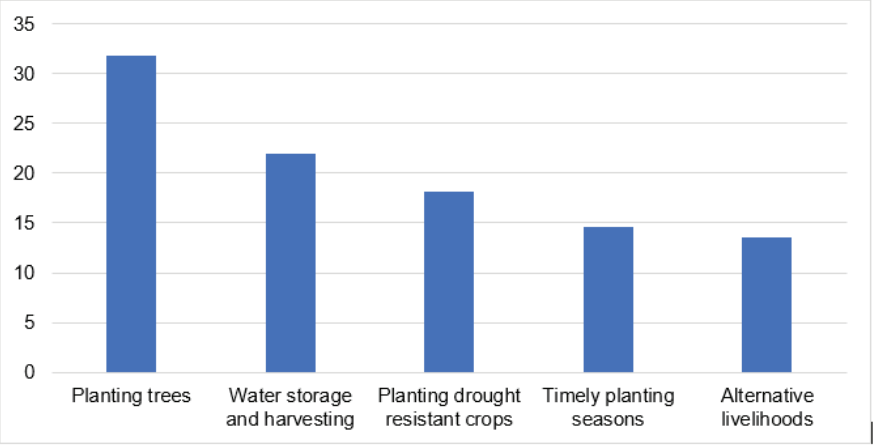
7.2.3 Climate Change Adaptation

The Nyeri County government plans to formulate a climate change policy to mitigate against the effects of global warming (Muthini, 2014). Among the measures that the County proposes is the adoption of green energy for domestic and industrial use. The County aims to construct dams to generate hydro power. Other recommendations under consideration include the construction of a landfill to help recycle waste and generate energy.

Efforts are also in place to increase forest cover not only to replace trees but also to help reduce levels of carbon dioxide, a greenhouse gas, in the atmosphere. Crop and livestock farmers have also taken up some adaptation strategies. Adaptation strategies by crop farmers include improved seed varieties, changing the cropping calendar, use of indigenous information in controlling diseases, irrigation, water harvesting, soil and water conservation, drought tolerant crops and use of greenhouse.

The strategies for livestock farmers include fodder conservation, rearing improved breeds, feed supplementation, livestock intensification (zero grazing), and planting drought- tolerant fodder crops. (MoALF, 2016). Adaptations by the respondents include these indicated in the chart below:

Figure 13: Adaptation to Weather Changes



Source: Field Survey, 2019

7.2.4 Impact of Climate on Physiography and Natural Resources

ASPECT	EFFECT OF CLIMATE CHANGE
Geology and Soils.	Climate change may lead to alteration of soil properties like changes in the soil biota which may have modified effects on soil structural stability, soil biodiversity, plant-soil interactions and nutrient cycling.
Hydrology and water sources.	Climate change is likely to increase demand while shrinking water supplies. This shifting balance would challenge water managers to simultaneously meet the needs of growing communities and sensitive ecosystems. As temperatures increase, evaporation increases, sometimes resulting in droughts. Climate change will likely increase the risk of drought in some areas and the risk of extreme precipitation and flooding in others. Climate change intensifies the hydrological cycle because as air temperatures increase, more water evaporates into the air. Warmer air can hold more water vapour, which can lead to more intense rainstorms, causing major problems like extreme flooding.
Vegetation	Nutrient cycles, microbial activities, as well as physiological activities of plants will vary. Elevated levels of carbon dioxide have an effect on plant growth thus influencing complex forest ecosystems in many ways. Warming temperatures generally increase the length of the growing season and it also shifts the geographic ranges of some tree species, e.g. species that currently exist only on mountaintops may die out as the climate warms since they cannot shift to a higher altitude. Hence, loss of plant biodiversity.

Energy resources	Since water is necessary for electricity production, this could stress water resources and consequently, impacting the amount of electricity produced by hydroelectric power plants. Rising temperatures, increased evaporation, and drought may increase the need for energy-intensive methods of providing drinking and irrigation water. E.g., desalinization plants can convert saltwater into freshwater, but consume a lot of energy.
Wildlife	Loss of wildlife biodiversity from extreme weather patterns such as prolonged droughts and extreme floods. Increased human-wildlife conflict due to changes in wildlife migratory patterns.

7.3 Natural Resources

Minerals are one of the major sources of revenue and income to a particular country. The presence of minerals is also a major source of income mostly to those who excavate the earth surface. Geological composition and basement system of an area determines the presence of minerals. The County is rich in various minerals. These are among the major minerals;

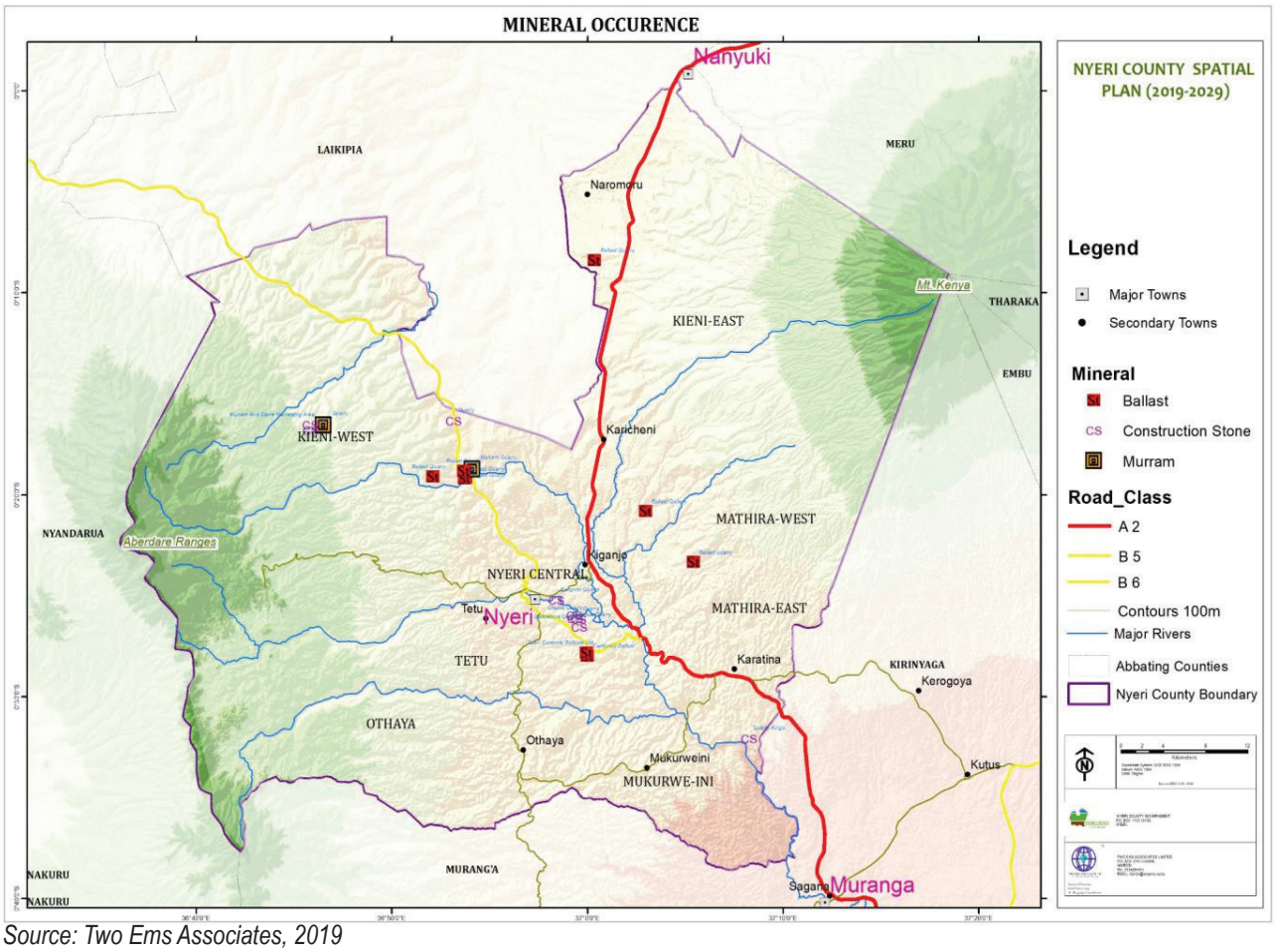
Building Stone

Building stones mining in the County has increased with areas around Mukurwe-ini, Nyeri Town, Kieni East, Kieni West, and Mathira West Sub Counties having several quarries. Increased urbanization and demand for building material has led to increased quarrying within the County and is also a source of revenue for development.

Gravel, Ballast and Clay

Gravel mining in the County is the highest with 2.3 million tons mined per year and employing about 1,431 persons. Clay mining is the lowest at 2,555 tons employing 756 people.

Map 30: Mineral Occurrence



Source: Two Ems Associates, 2019

7.4 Emerging Issues

Opportunities	Constraints
• Expansive hills and mountains act as water towers. (Mt. Kenya and Aberdare ranges) • Varied climatic conditions enable varied land uses (such as rangelands offering opportunities for wildlife conservation (eco-tourism potential), humid zones offering opportunities for dairy farming and intensive agriculture. • Rich variety of flora and fauna in the County's ecosystems • Opportunities in exploitation for eco-tourism in all forested areas.	• These water towers are shrinking as a result of deforestation. Continued upland deforestation causing increased water runoff thus increasing erosion. • Encroachment of environmentally fragile areas such as forest, hills and mountain. • The climate change, deforestation and conventional farming systems has promoted massive erosion up stream leading to drying of rivers. • Desertification in the County – evident by frequent droughts and drying up of water bodies and streams. • Increased excavation, leading to open quarries which are environmentally unsafe. • Poor waste disposals methods leading to environmental pollution • Poor community awareness • Encroachment of riparian reserves.

7.3.1. Natural Capital Assessment

This refers to the process of valuing impacts and dependencies of a counties natural resources in order to help in management and determination of key intervention strategies. It is important to undertake the assessment as it also helps in decision making especially for natural resource conservation and protection.The table below is an assessment matrix;

THEMATIC SECTOR	KEY ELEMENTS	RISK FACTOR	IMPACT DRIVERS	DEPENDENCIES/PROPOSAL
Climate	Climate Change	Heat stress Changing rainfall patterns Droughts	Deforestation especially of major forests (Mt. Kenya and Aberdare's)	Afforestation and reafforestation to increase the tree cover within the county
	Flooding and landslides	Floods, Landslide	Poor farming practises leaving the soil bare and prone to erosion.	Encourage planting of cover crops and also encouraging agro forestry
Water resources	Water availability	Growing season rainfall	Agricultural activities such as planting along riparian reserves have an impact on the availability of water in the hydrological cycle, particularly for surface and sub-surface water	Encourage alternative water sources such as water harvesting use of sub surface water especially for industrial use
	Water Use	Water use inefficiency	Overdependence on surface water especially the major rivers	
	Water Quality	Poor water quality	Erosion, use of pesticides and siltation are the major causes of poor water quality	Conservation of riparian reserves Minimal use of pesticides for agriculture
Vegetation	Biodiversity	Encroachment into natural habitant	Farming activities may have impacts on biodiversity through land use changes, habitat loss or degradation, synthetic chemical and fertiliser use, and nutrient run-off	Planting of various tree species to assist in regeneration and also pollination, pasture cover and composition
	Forests	Degradation and deforestation	Increased encroachment into forest ecosystems and cutting down of tress for wood fuel	Forest buffer and afforestation to increase the tree cover within the county.

Wildlife Resources	Wildlife	Human-wildlife conflict	Encroachment into wildlife ecosystems and migratory routes.	Fencing of major forests Protection of endangered species through conservancies
	Tourism	Tourism Potential	No established tourism routes Poor efforts towards marketing the county as a tourist destination	Establishing of a tourism circuit to promote local and international tourism within the county hence earning revenue.
Energy Resources	Energy Use	Energy inefficiency	The use of energy derived from fossil fuels is a driver of resource depletion and climate change through production of greenhouse gases	Encourage use of alternative sources of energy such as wind and solar. Biogas use especially at household level
Land and Soil Resources	Soil quality	Soil infertility	Overdependence on use of chemical fertilizers affecting soil fertility	Soil testing and encourage use of organic manure to stabilize the soil composition
	Land Ownership	Fragmentation	Increased land sub division eating into agricultural land	Land policies and regulation for rural an urban area to protect agricultural land
		Public Land	Inadequate public land	Land banking
Mineral resources	Mineral Occurrence	Under exploration of mineral resources	There are not enough feasibility studies undertaken o establish the various type of mineral resources within the county	Marketing of various mineral potential sites within the county to attract investors. This will spur economic growth within the county and revenue increase

Source: Two EMS Associates, 2019.

CHAPTER EIGHT:

HUMAN SETTLEMENTS

8.1 Patterns and Trends of Human Settlement

Human settlements refer to the concentration of activities and people in space. Settlements play an important role; they are agents of economic growth and provide favourable locations for productive investment.

This chapter reviews the existing human settlement structure of Nyeri in order to lay the basis for the establishment of functional human settlements. Physical developments in functional human settlements — whether located in urban or rural areas — are organized in a coherent manner.

Sustainable human settlement development is achieved through the integration of services and functions offered at growth centres, service centres and market centre facilitated by human settlement. Human settlements, therefore, play an important role as agents of economic growth by providing favourable locations for productive investments, human resource and market for the produce.

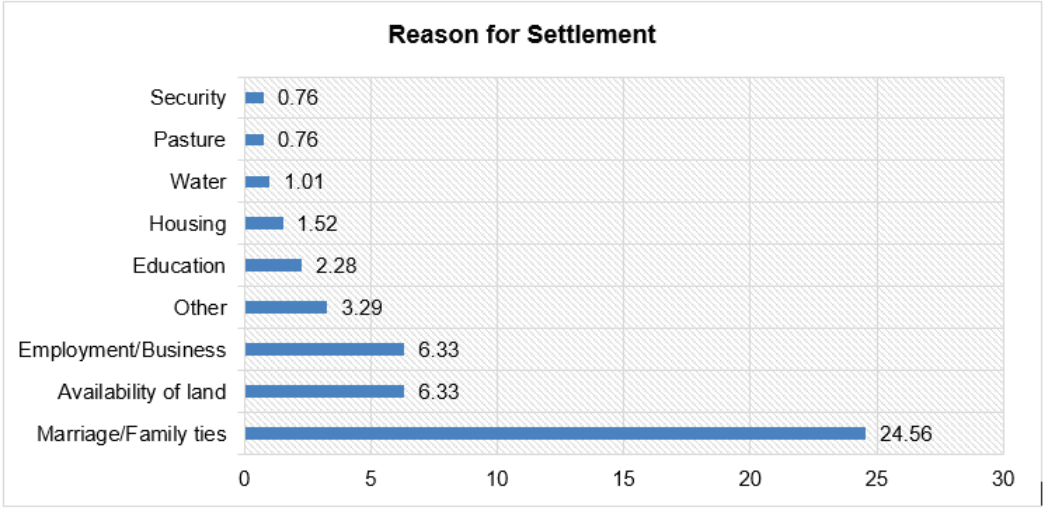
Nyeri County was initially Nyeri District under the former Central Province. The district has a long history since it was first commissioned in the earlier 1900's as a base of military operation during the colonial era. A fort was built in current district and provincial offices in Nyeri town by the colonial British Government. The fort was surrounded by a deep defensive ditch ("Mukaro" in Kikuyu) leading to the present name of the central area of Nyeri town.

Nyeri was declared a township in 1911. In 1954, the Nyeri Urban District Council was created whereby Nyeri, Kiganjo and Mweiga were part of Nyeri District. Nyeri town was elevated into a Municipality in 1971 and was the provincial capital/ headquarters of then Central Province. Following a national referendum in August 2010, that dissolved the provincial administration structure/system of Government, Kenya's new constitution gave birth to Nyeri County.

8.1.1 Migration Trends

The chart below shows the factors that influence settlements in the County include by birth, marriage, employment & business and land availability. Other reasons are education, security, water, housing, pasture and security.

Figure 14: Reasons for the Settlement in the County



Source: Field Survey 2019.

The figures indicate that 24.56% have settled in the County due to marriage and family ties, followed by the availability of land and employment/business opportunities, as cited by 6.33% each of the respondents from the field survey.

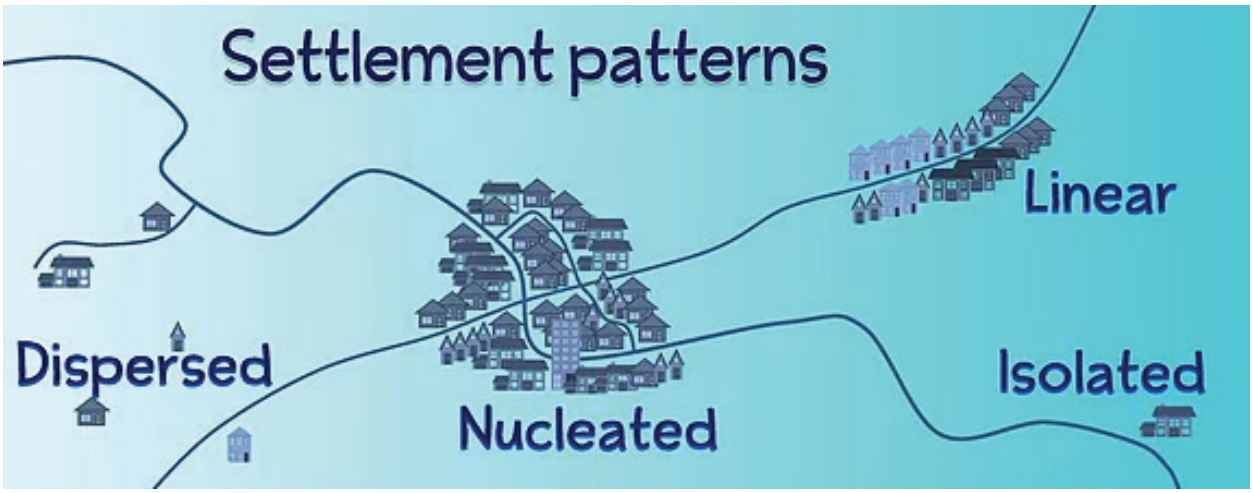
Nyeri County was ranked No. 7 on the ease of starting a business and had an overall DTF score of 82.30, hence also highlighting it as a County with an enabling environment for business, and this explains why 6.33% of the respondents migrated into the County to do business.

8.1.2 Existing Settlement Patterns

Nyeri County has both urban and rural settlements. These settlements form various form of settlement patterns as a result of natural as well as man-made factors. The natural features that guided the settlement patterns in Nyeri County include rivers, ridges, forest cover, rough terrain, mountains and hills.

The man-made features that guided the formation of settlement patterns included roads, railway, colonial towns and gazetted forests. The most common settlement patterns of centres in Nyeri are nucleated, linear and grid structured.

Figure 16: Types of settlement patterns



Source: 3D Geography, 2019

Figure 17:Clustered settlements in Karatina

Source: Two Ems Associates, 2019

Nucleated settlements

These are settlements where buildings are clustered around a central point. Nyeri Municipality and Karatina town have a nucleated grid pattern. This is attributed to the proximity to social and physical infrastructure. This was influenced by the fact that they were established colonial towns with administrative and commercial functions. Junction centres such as Marua, Gatitu, Ichamara, Ihururu are also clustered majorly influenced by convergence of transport corridors and interchanges. Centres in Wamagana ward have been clustered due to presence of favourable climate and fertile agricultural soils.Ichamara, Ihururu are also clustered majorly influenced by convergence of transport corridors and interchanges. With proper planning, it is easier to provide utilities and services in these areas,limiting sprawl into rich agricultural hinterland.

Figure 18: Junction nucleated town; Ichamara

Source: Two Ems Associates, 2019

Linear settlements

Linear settlements consists of buildings lined up along a transport route, river, valleys etc.Some of the major factors that have led to growth of linear settlements can be attributed to existing transport corridors, major river valleys and in some instances the terrain. In Nyeri County, centres like Othaya, Mukurweini have a ribbon developments structures by terrain and road corridor. Naromoru, Chaka, Kiganjo, Giakanja have all been structured by major transport corridors (trunk road and railway line) connecting the county to major urban centres. Areas of Gikondi, Rugi, Mukurweini central wards have linear development influenced by terrain.Though it is easier to provide services and utilities along linear settlements, they experience congestion along the main arteries.

Figure 19:Linear settlements in Rugi ward

Source: Two Ems Associates, 2019

Figure 20:Linear settlements in Endarasha

Source: Two Ems Associates, 2019

Dispersed settlements

This type of settlements is characterized by scattered buildings within an area. Some factors that have influenced this settlement pattern include; poor soils, poor terrain, harsh climate, large chunks of land, lack of transport and physical infrastructure among other factors.

Within the County, Gakawa, Mugunda, Thiegu River, Endarasha and Kabaru wards have dispersed settlement patterns. This type of settlement makes it difficult for provision of basic services and facilities.

Figure 21: Dispersed settlements in Thegu river

Source: Two Ems Associates, 2019

8.2 Rural Settlements

A rural area is usually defined as an area where the settlements are sparse, where agriculture is the main employer and where majority of the sources of income are agriculturally based. Rural settlements exhibit specific characteristics that differentiates them from urban settlements.

8.2.1 Characteristics of rural settlements

1. ***Size of the Community:*** The village communities are smaller in area than the urban communities. As the village communities are small, the population is also low.
2. ***Density of Population***: As the density of population is low, the people have intimate relationships and face-to-face contacts with each other. In a village, everyone knows everyone.
3. ***Agriculture is the Main Occupation:*** Agriculture is the fundamental occupation of the rural people and forms the basis of rural economy. A farmer is required to perform various agricultural activities for which he needs the cooperation of other members. Usually, these members are from his family. Thus, the members of the entire family share agricultural activities.

4. ***Close Contact with Nature:*** The rural people are in close contact with nature as most of their daily activities revolve around the natural environment. This is the reason why a rurality is more influenced by nature than an urbanite. The villagers consider land as their real mother as they depend on it for their food, clothing and shelter.
5. ***Homogeneity of Population:*** The village communities are homogenous in nature. Most of their inhabitants are linked to agriculture and its allied occupations, though there are people belonging to different tribe, religions and classes.
6. ***Social Stratification:*** In rural society, social stratification is a traditional characteristic, based on caste. The rural society is divided into various strata based on caste.
7. ***Social Interaction:*** The frequency of social interaction in rural areas is comparatively lower than in urban areas. However, the interaction level possesses more stability and continuity. The relationships and interactions in the primary groups are intimate. WThe family fulfils the needs of the members and exercises control over them. It is the family, which introduces the members to the customs, traditions and culture of the society. Due to limited contacts, they do not develop individuality and their viewpoint towards the outside world is very narrow, which makes them oppose any kind of violent change.
9. ***Social Mobility:*** In rural areas, mobility is rigid as all the occupations are based on caste. Shifting from one occupation to another is difficult as caste is determined by birth. Thus, caste hierarchy determines the social status of the rural people.
10. ***Social Solidarity:*** The degree of social solidarity is greater in villages as compared to urban areas. Common experience, purposes, customs and traditions form the basis of unity in the villages.

8.2.2 Growth of Rural Centres

Growth and development of rural centres in Nyeri County is relatively progressive. This is contributed by factors such as availability of land for agriculture, expansion of small business in the rural centres and their connectivity to the main urban centres. There's also availability of water for drinking in these centres, hence making them favourable for human settlement.

Nyeri County is 80% rural; this has implication therefore in provision of infrastructure and services.

8.2.3 Hierarchy of Rural Settlements in Nyeri

The 1978 book on Human Settlements in Kenya: A Strategy for Urban and Rural Development categorises rural settlements into rural centres and local centres. These centres are established to serve the rural hinterland.

Rural Centres which were Intended to serve a population of about 40,000 people and has a residential population of between 2,000-10,000 people. These centres are required to have a Secondary school (with at least four streams), health centre (with maternity), development of better shopping facilities, markets and banking facilities, piped water supply and sewerage disposals systems, electricity and telephone services postal.

Local Centre: - Is at the lowest level of service centre designated to serve the local needs of people within walking distance. It should serve a population of 5,000 people from the hinterland. These centres are required to have Primary school, shops, dispensary, public water supply systems and open-air market.

Rural centre	Characteristics, Functions, Challenges and Growth Indicators.
Kiawara	• Has a vibrant commercial centre. • Presence of a Police Post (Kiawara Police Post) • Surrounded by a rich agricultural hinterland. • Has a major garlic training centre (Saumu Training Centre Ltd.)
Nairutia	• Is a relatively busy linear commercial centre • Presence of an AP Post (Nairutia AP Post) • It has a Dairy Cooling Plant • Is characterized by black cotton soil • Is characterized by an agricultural hinterland (there's growth of Aloe Vera, Maize, Hay, Millet) **Challenges:** • Poor Solid Waste Management • Lack of planning of the centre. • Poor road conditions in the hinterland.
Giakanja	• Large and active commercial centre. • Has a Closed market for vegetables and fresh produce. • Has a major high school: Giakanja Boys High School • Has several modern residential units. • Is surrounded by an agricultural hinterland (there's growth of maize, bananas, **Challenges** • Poor solid and liquid waste management • Lack of urban planning in the town.
Laburra	• Has a small commercial centre • Characterized by black cotton soil. • Is generally dry with grasslands and maize farming. • Has small scale irrigation schemes **Challenges:** • Sanitation problem (Solid and Liquid Waste) • Lack of planning of the town. • Poor road conditions in the hinterland.
Watuka	• Surrounded by an agricultural hinterland, with large farm sizes. (with growth of maize, cabbage, carrots, Napier grass and wheat) • Characterized by red volcanic soil. • Has a major secondary school (Watuka Boys High School) **Challenges:** • Poor road conditions in the hinterland. • Poor solid and liquid waste management • Lack of urban planning in the centre
Mwiyogo	• Has a small commercial centre. • Surrounded by an agricultural hinterland. (maize, onions, etc). • The farm sizes around the town are very large. • Characterized by black cotton soil. **Challenges** • Poor road conditions in the hinterland. • Lack of planning of the town. • Poor solid waste management in the centre.

8.2.4 Colonial Villages

Nyeri County was part of the white highlands during the colonial period. As a result, various colonial villages were established. The following tabled consists of colonial villages, their administrative location as well as the extent of planning and surveying each town has undergone:

Table 18: Status of colonial villages

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
KIENI EAST	KABARU	NDATHI	NOT SURVEYED	PLANNED
KIENI EAST	KABARU	LUSOI	NOT SURVEYED	PLANNED
KIENI EAST	KABARU	GICHAGI KIA NAIROBI (NAROMORU GIRLS AREA)	SURVEYED	UNPLANNED
KIENI EAST	THEGU RIVER	THUNGARI	NOT SURVEYED	UNPLANNED
KIENI EAST	THEGU RIVER	KARUNDAS	SURVEYED	UNPLANNED
KIENI EAST	THEGU RIVER	NGONDE	SURVEYED	PLANNED
KIENI EAST	GAKAWA	KANYONI	NOT SURVEYED	PLANNED
KIENI EAST	GAKAWA	BURGURET	SURVEYED	UNPLANNED
KIENI EAST	GAKAWA	NGERIMA	SURVEYED	UNPLANNED
KIENI EAST	GAKAWA	MURERU	SURVEYED	UNPLANNED
KIENI EAST	KABARU	MBIRIRI	SURVEYED	PLANNED
KIENI EAST	KABARU	KIMAHURI	SURVEYED	PLANNED
KIENI EAST	KABARU	KALULERI	SURVEYED	PLANNED
KIENI EAST	KABARU	NYAROGE/KARICHEN	SURVEYED	PLANNED
KIENI EAST	KABARU	WARAZO JET	SURVEYED	PLANNED
KIENI EAST	NARUMORO / KIAMA-THAGA	NARUMORU	NOT SURVEYED	UNPLANNED
KIENI EAST	NARUMORO / KIAMA-THAGA	KABURAINI	NOT SURVEYED	UNPLANNED
KIENI EAST	NARUMORO / KIAMA-THAGA	MWICHUIRI	SURVEYED	PLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	WATUKA	SURVEYED	PLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	ENDARASHA	SURVEYED	PLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	UASONYIRO	SURVEYED	UNPLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	GAKANGA	SURVEYED	PLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	MWIYOGO	SURVEYED	PLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	CHARITY	SURVEYED	UNPLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	KABATI	NOT SURVEYED	UNPLANNED
KIENI WEST	ENDARASHA /MWIYO-GO	KANYAGIA	NOT SURVEYED	UNPLANNED

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	KIAWARA	SURVEYED	PLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	MUGUNDA	SURVEYED	PLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	BELLEVUE	SURVEYED	PLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	EMBARINGO	SURVEYED	UNPLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	TANYAI	SURVEYED	UNPLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	GITEGI	NOT SURVEYED	UNPLANNED
KIENI WEST	MUGUNDA /GATARAK-WA	KIMUNYURU	NOT SURVEYED	PLANNED
KIENI WEST	MWEIGA	MWEIGA	SURVEYED	PLANNED
KIENI WEST	MWEIGA	EXPAGES	SURVEYED	PLANNED
KIENI WEST	MWEIGA	AMBONI	SURVEYED	PLANNED
KIENI WEST	MWEIGA	BONDENI	SURVEYED	UNPLANNED
KIENI WEST	MWEIGA	NJENGU	SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	GATURA	NOT SURVEYED	NOT PLANNED
MATHIRA EAST	IRIAINI	KARIKI	SURVEYED	PLANNED
MATHIRA EAST	IRIAINI	KIARUHIU	SURVEYED	PLANNED
MATHIRA EAST	IRIAINI	MIIRI	SURVEYED	PLANNED
MATHIRA EAST	IRIAINI	IHWAGI	SURVEYED	PLANNED
MATHIRA EAST	IRIAINI	KIAMWANGI	SURVEYED	PLANNED
MATHIRA EAST	IRIAINI	ITUNDU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	THENGEINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	KANGOCHO	NOT SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	KIARITHAINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	NDAROINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	IRIAINI	GATONDO	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	UNJIRU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	MUNGETHO	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	GACHUKU (KIENI)	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	GACHUIRO	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	GATHUINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	GATURIRI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	KAGUMOINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	MUKORE	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	NDIMAINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	KIAMAMBARA	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	KARINDUNDU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	KIAWARIGI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	MATHAITHI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	KONYU	GITHIMA	NOT SURVEYED	UNPLANNED

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
MATHIRA EAST	KONYU	ITIATI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GIAKAIBEI	SURVEYED	PLANNED
MATHIRA EAST	MAGUTU	NDUMANU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GITIMAINI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GIKUMBO	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GATHEHU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GAIKUYU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	KANJURI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	RAGATI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	KIAMUCHERU	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	KAGOCHI	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	KARURA	NOT SURVEYED	UNPLANNED
MATHIRA EAST	MAGUTU	GITUNGUTI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	GATIKO	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	KIANJOGU	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	MUTATHINI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	GIATUU	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	KANYAMA	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	THAITHI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	NGUNJIRI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	NGANDU	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	RUTHAGATI	SURVEYED	PLANNED
MATHIRA WEST	KIRIMUKUYU	TUMUTUMU/MBOGO-INI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	KAROGOTO	NOTSURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	KIAMACHIMBI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	KIANGOMA	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	NGURUMO	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	GACHUIRO	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	NGAINI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	GITHIMA	NOT SURVEYED	UNPLANNED
MATHIRA WEST	KIRIMUKUYU	RITITI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	KIAMARIGA	NOT SURVEYED	NOT PLANNED
MATHIRA WEST	RUGURU	SAGANA SCHEME	NOT SURVEYED	PLANNED
MATHIRA WEST	RUGURU	GATHUINI	SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	IRURI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	KABIRUINI	NOT SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	HIRIGA	NOT SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	NGORANO	SURVEYED	PLANNED
MATHIRA WEST	RUGURU	GATUNGANGA	NOT SURVEYED	UNPLANNED
MATHIRA WEST	RUGURU	CHIENI	SURVEYED	PLANNED
MUKURWEINI	RUGI/GITHI	KARUNDU	SURVEYED	PLANNED
MUKURWEINI	RUGI/GITHI	MIHUTI	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	KANGURWE	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	KIANGOMA	NOT SURVEYED	UNPLANNED

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
MUKURWEINI	RUGI/GITHI	THANGATHI	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	KIANGONDU	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	ICHAMARA	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	KIMONDO	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	MWERU MARKET	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	MWERU	NOT SURVEYED	UNPLANNED
MUKURWEINI	RUGI/GITHI	GIATHUGU	SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	GIKONDI	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KARABA	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	THANU	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	MUTHUTHI	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KIAMURATHE	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	WAMUTITHI	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KAMUCHUNJI	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	NDUMA	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KARINDI/WAMACHA-THA	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	NYAKAHUHO	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KAHARO	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	MUTONGA	NOT SURVEYED	UNPLANNED
MUKURWEINI	GIKONDI	KIAMURATHE	NOT SURVEYED	UNPLANNED
MUKURWEINI	LOWER MUHITO	GUMBA	NOT SURVEYED	UNPLANNED
MUKURWEINI	LOWER MUHITO	KARIARA	NOT SURVEYED	UNPLANNED
MUKURWEINI	LOWER MUHITO	KIUU	NOT SURVEYED	UNPLANNED
MUKURWEINI	LOWER MUHITO	KARUIRO	NOT SURVEYED	UNPLANNED
MUKURWEINI	LOWER MUHITO	KABUTA	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	GAIKUNDO	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	GACHIRIRO	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	NDAINI/GAKINDU	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	KAHETI	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	THUNGURI	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	MUTWE WATHI	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	MATIRAINI	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	GAIKUNDO	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	KIAWAMURURU	NOT SURVEYED	UNPLANNED
MUKURWEINI	MUKURWEINI CENTRAL	TAMBAYA	NOT SURVEYED	UNPLANNED
NYERI TOWN	KAMAKWA /MUKARO	GITERO	SURVEYED	PLANNED
NYERI TOWN	KAMAKWA /MUKARO	KAMUYU	SURVEYED	PLANNED
NYERI TOWN	KAMAKWA /MUKARO	GITATHINI	SURVEYED	PLANNED
NYERI TOWN	KAMAKWA /MUKARO	MUTHUAINI	SURVEYED	UNPLANNED
NYERI TOWN	KAMAKWA /MUKARO	MUNUNGAINI	SURVEYED	PENDING
NYERI TOWN	KAMAKWA /MUKARO	MWITWO NA HIGI	SURVEYED	UNPLANNED
NYERI TOWN	KAMAKWA /MUKARO	IHWA	SURVEYED	UNPLANNED
NYERI TOWN	KAMAKWA /MUKARO	KINUNGA	SURVEYED	UNPLANNED
NYERI TOWN	KAMAKWA /MUKARO	KIHATHA	SURVEYED	UNPLANNED

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
NYERI TOWN	KAMAKWA /MUKARO	KAMAKWA	SURVEYED	UNPLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	KIHUYO	SURVEYED	PLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	KIGANJO	SURVEYED	PLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	NYARUGUMU	SURVEYED	PLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	MATHARI	SURVEYED	PLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	KAHIGA	SURVEYED	UNPLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	NDURUTU	SURVEYED	UNPLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	KIRICHU	SURVEYED	UNPLANNED
NYERI TOWN	KIGANJO/MATHARI/ RWARE	NYARIBO	SURVEYED	UNPLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	MARUA	PENDING	PENDING
NYERI TOWN	RURING'U/GATITU/ MURUGURU	GATITU	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	MURUGURU	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	GITHIRU	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	RIAMUKURWE	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	RURINGU	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	KIAMWATHI	SURVEYED	PLANNED
NYERI TOWN	RURING'U/GATITU/ MURUGURU	CHORONGI	SURVEYED	PLANNED
OTHAYA	KARIMA	WITIMA	SURVEYED	PLANNED
OTHAYA	KARIMA	KIANGANDA	SURVEYED	UNPLANNED
OTHAYA	KARIMA	GATUGI	NOT SURVEYED	UNPLANNED
OTHAYA	KARIMA	GIATHENGE	PENDING	PENDING
OTHAYA	KARIMA	KAMOINI	NOT SURVEYED	UNPLANNED
OTHAYA	KARIMA	KAGUMO	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	MUNYANGE II	NOT SURVEYED	PLANNED
OTHAYA	MAHIGA	KIHOME	SURVEYED	PLANNED
OTHAYA	MAHIGA	GIKOE	SURVEYED	UNPLANNED
OTHAYA	MAHIGA	NJIGARI	SURVEYED	PLANNED
OTHAYA	MAHIGA	KAGERE	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	BIRITHIA	NOT SURVEYED	UNPLANNED

SUB-COUNTY	WARD	VILLAGES/MARKET	SURVEYED	PLANNED
OTHAYA	MAHIGA	NDUNYU	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	GITUGI	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	MUGAA	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	KAGONYE	NOT SURVEYED	UNPLANNED
OTHAYA	MAHIGA	MUNYANGE I	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	ICHAGACHIRU	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KIGOGOINI	NOT SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KIANDERE	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	NJOGUINI	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KIAMATHAMBO	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KANJORA	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KIHINGO (NGORU)	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	NYARUGUMU	SURVEYED	PLANNED
TETU	DEDAN KIMATHI	KIRURUMI	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	GATUMBIRO	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	GITHAKWA	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	KAGOGI	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	KAHIGAINI	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	IHURURU	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	MIAGAYUINI	NOT SURVEYED	UNPLANNED
TETU	DEDAN KIMATHI	KANYINYA	NOT SURVEYED	UNPLANNED
TETU	WAMAGANA	WAMAGANA	NOT SURVEYED	PLANNED
TETU	WAMAGANA	GACHATHA	NOT SURVEYED	PLANNED
TETU	WAMAGANA	KIANDU	NOT SURVEYED	PLANNED
TETU	WAMAGANA	ITHENGURI	NOT SURVEYED	PLANNED
TETU	WAMAGANA	KARURUMO	NOT SURVEYED	PLANNED
TETU	WAMAGANA	KARIGUINI	NOT SURVEYED	PLANNED
TETU	WAMAGANA	NOT KAIGURI	SURVEYED	PLANNED
TETU	WAMAGANA	KAGWATHI	SURVEYED	PLANNED
TETU	WAMAGANA	MUKARARA(GATH-UTHI I)	SURVEYED	PLANNED
TETU	WAMAGANA	NDUGAMANO (GATH-UTHI II)	NOT SURVEYED	PLANNED
TETU	WAMAGANA	GITHERERE	NOT SURVEYED	PLANNED
TETU	WAMAGANA	KAGIOINI	NOT SURVEYED	PLANNED
TETU	WAMAGANA	HUBUINI	NOT SURVEYED	PLANNED
TETU	WAMAGANA	GIAKANJA	NOT SURVEYED	PLANNED
TETU	WAMAGANA	GIACHAMWENGE	SURVEYED	PLANNED

8.3 Urban Settlements

An urban settlement can be defined as an area with a threshold population size of 2,000 with an economic function centred around formal employment with a fabric characterized by but not limited to paved and tarmacked streets, storeyed buildings, electric lighting and small plot sizes.

8.3.1 Characteristics of urban settlements

Size: As a rule, in the same country and at the same period, the size of an urban community is much larger than that of a rural community. In other words, urbanity and size of a community are positively correlated. This equally contributes to high population density.

Occupation: Urban settlements are characterized by formal employment. The major occupations are industrial, administrative and professional in nature. Divisions of labour and occupational specialization are very much common in towns/cities/metropolises.

Social heterogeneity: Urban centres symbolize cultural heterogeneity. The cities are characterized by diverse peoples, races and cultures. There is great variety with regards to the food habits, dress habits, living conditions, religious beliefs, cultural outlook, customs and traditions of the urbanites.

Mobility: The most important feature of urban community is its social mobility. In urban areas the social status of an individual is determined not by heredity or birth but by his merit, intelligence and perseverance. Urbanity and mobility are positively correlated.

Rapid social and cultural change: Rapid social and cultural change characterize urban life. The importance attached to traditional or sacred elements has been relegated to the background. The benefits of urban life have effected changes in respect of norms, ideologies and behavior patterns.

Individualism: The urbanites attach supreme importance to their own welfare and happiness. They hesitate to think or act for the good of others. This differs from the rural set-up that thrives of the aspect of community cohesion.

Urban areas are experiencing rapid growth rate; however, they lack planning and development control will lead to development challenges in the long run such as urban sprawl, sewerage provision challenges, inaccessibility of urban infrastructure and amenities.

Nyeri, Othaya and Karatina have high urban populations. The principle towns are fast growing because of their administrative, commercial and service functions attracting population from rural areas.

Urban population in Nyeri County is expected to grow steadily with concomitant demand for infrastructure and amenities. Lack of planning and development control measures will lead to urban sprawl, mixed

8.3.2. Hierarchy of Urban Centres

Human settlements are concentration of activities and people. These range from smallest village in the rural area to the largest metropolis (Republic of Kenya, 1978). Rural refers to a large and isolated area of an open country often with low population density while Urban refers to an area with an increased density of human-created structures in comparison to the areas surrounding it and has a population of 2,000 and above (Republic of Kenya, 2009). Human settlements are considered focal points of commercial, industrial, administrative, health, educational and recreational activities required by the population.

Table 19: Classification of Human Settlements according to functions.

Settlement Category		Residential Population of Centre	Service Provided per Settlement
Urban Centre	City	Above 250,000	Planning and Development Control, City Economic Development Plan, Traffic Control and Parking, Water and Sanitation, Street Lighting, Outdoor Advertising, Cemeteries and Crematoria, Public Transport, Libraries, Storm Drainage, Ambulance Services, Heath Facilities, Fire Fighting and Disaster Management, Control of Drugs, Sports and Cultural Activities, Electricity and Energy provision (gas, kerosene etc.), Abattoirs, Refuse Collection, Solid waste management, Pollution (Air, water, soil) control, Child Care Facilities, Pre-Primary Education, Local Distributor Roads, Community Centres, County Hospital, Constituent University Campuses, Polytechnic, County School, Stadium, Airport, Airstrip, Theatre, Library/ICT services, Administrative Seat, Financial Hub, Museum/cultural centres, Fire Station, Emergency Preparedness, Telecommunication services /postal services/ICT, Funeral Parlour, Cemetery, Recreational Parks, Animal control and welfare, Religious Institution
	Municipality	50,000-250,000	Planning and Development Control, Traffic Control and Parking, Water and Sanitation, Street Lighting Outdoor Advertising, Cemeteries and Crematoria, Public Transport, Libraries, Storm Drainage, Ambulance Services, Heath Facilities, Fire Fighting and Disaster Management, Control of Drugs, Sports and Cultural Activities, Electricity and Energy provision (gas, kerosene etc.), Abattoirs, Refuse Collection, Solid waste management, Pollution (Air, water, soil) control, Child Care Facilities, Pre-Primary Education, Local Distributor Roads, Community Centres, County Hospital, Constituent University Campuses, Polytechnic, County School, Stadium, Airstrip, Theatre, Library/ICT services, Administrative Seat, Local Economic Development Plan, Museum/ cultural centres, Fire Station, Emergency Preparedness, Telecommunication services /postal services/ICT, Funeral Parlour, Cemetery, Recreational Parks, Animal control and welfare, Religious Institution

Urban Centre	Town	10,000-49,000	Street Lighting, Cemeteries and Crematoria, Library Services, Health Facilities, Sports and Cultural centers or facilities, Abattoirs, Refuse Collection, Solid waste management, Pollution (Air, water and soil) control, Child Care Facilities, Pre-Primary Education, Community Centres, Vocational Institution, Primary or High school, Bus park, Road network, streets, walkways, sideways and cycle ways, Postal services or telecommunication, Funeral Parlour or mortuary Cemetery, Recreational parks, Animal control and welfare, Religious Institution
	Market Centre	Above 2000	Primary school, secondary school, health centre, post office, telephone facilities, police post, local bus service and other social commercial services.

Source: Urban Areas and Cities act, 2019, Human Settlement strategy of 1978.

In accordance to the standards of classification in the table above, Nyeri County consists of urban areas, rural areas and market centres. These levels of human settlements are as shown:

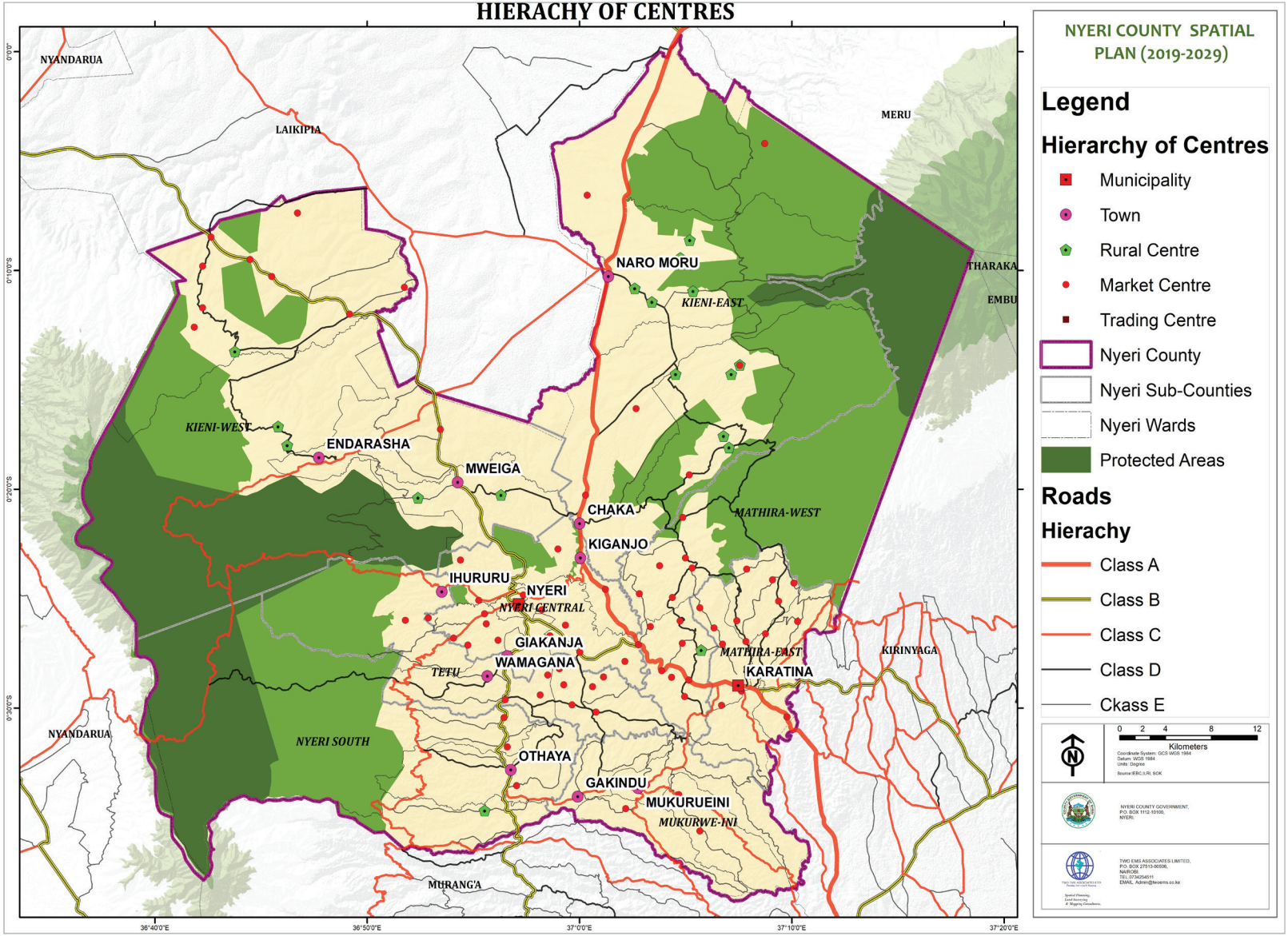
Table 20: Hierarchy of Centres in Nyeri County

URBAN				
Municipality	**Town**	**Market Centre**	**Rural Centre**	**Local Centre**
Nyeri	Othaya Mweiga Kiganjo Karatina	Mukurweini Wamagana Ihururu Endarasha Naro Moru Chaka Giakanja Gakindu	Gacami Gitunduti Ngurano Kabiruini Kiamariga Iruri Hiriga Ndathi Mbiriri Kimuri Kiambogo Charity Amboni Mwireri Watuka Kimahuri Gatarakwa Ihwa Chania Ndumanu Kanjuri Giakaibei Mugunda	Mutwewath Karindi Mukore Mungetho Ndaruini Kamunyaka Gikororo Kariki Ichamara Karogoto Kanunga Gaikuyu Mikundi Karundas Gakurue Karundu Mairoini Githagara Muthuthini Karaba Thaara Kamwa Giathugu Miiri Gathioro Chieni Gakuyu

Municipality	Town	Market Centre	Rural Centre	Local Centre	
				Kiuu Thangathi Kihuti Kimondo Gathanji Gichiche Nduma Nyamari Gatuyaini Mathakwa-Ini Kagwathi Kanjora Kahiga-Ini Njogu-Ini Nyarugumu Kimunyuru Embaringo Mwiyogo Kihuhiro Kaharo Mweru Gakanga Mabati Judea Munyu Kairi Maston Village Maston Karkulet Route Irigithathi Guruai Soweto Kariokor Manyata Bagdad Gumba Karuthi	Mutonga Muchatha Kahuru Miiri Gathioro Chieni Gakuyu Kiamambara Ndunyu Kagoci Kanyinya Ngooru Gakanga Rititi Ngandu Nyaribo

Source: Two Ems, 2019

Map 31: Hierarchy of Centres



Source: Two Ems Associates, 2019

8.3.2.2 Hierarchy of Major Centres based on Services

Function	NYERI	OTHAYA	KARATINA	NARU MORU	MWEIGA	WAMAGANA
Street Lighting	√	√	√	√	√	√
Cemeteries and Crematoria	√	X	√	X	X	√
Libraries	√	√	√	X	X	X
Heath Facilities	√	√	√	√	√	√
Sports and Cultural Activities	√	√	√	√	√	√
Abattoirs	√	√	√	√	√	X
Refuse Collection	√	√	√	√	√	√
Solid waste management	X	X	X	X	X	X
Air noise	X	X	X	X	X	X
Child Care Facilities	X	X	X	X	X	√ PPP
Pre-Primary Education	√	√	√	√	√	√
Community Centres	√ PR	√	√	X	√	√
Guest Houses	√	√	√	X	X	√
Homestays	X	X	X	X	X	X
Polytechnic	X	√	√	X	X	
Training Institution i.e. Vocational training centres,	X	√	√	√	X	√
County School	X	X	X	X	X	X

Airstrip	X	X	X	X	X	X
Classified roads	√	√	√	√	√	√
Museum	√	√	X	X	X	X
Historical Monument	√	X	X	X	X	X
Postal services	√	√	X	X	√	X
Regional Radio Station	√	X	X	X	X	X
Community Radio	√	X	X	X	X	X
Funeral Parlour	√	√	X	X	X	X
Cemetery	√	X	X	X	X	√
Recreational Parks	√	√	X	X	X	X
Management of Markets	√	√	√	√	√	√
Waterfront	X	X	X	X	X	X
Animal control and welfare	X	√	√	√	√	√
Religious Institution	√	√	√	√	√	√
Stimulus market	√	√	√	X	X	X
Total x/32	23	20	17	9	12	14

Key:

√	Available Public
PR	Available Private
PPP	Available Public-Private Partnership
X	Not Available

8.3.3 Growth Trends of Urban Settlements

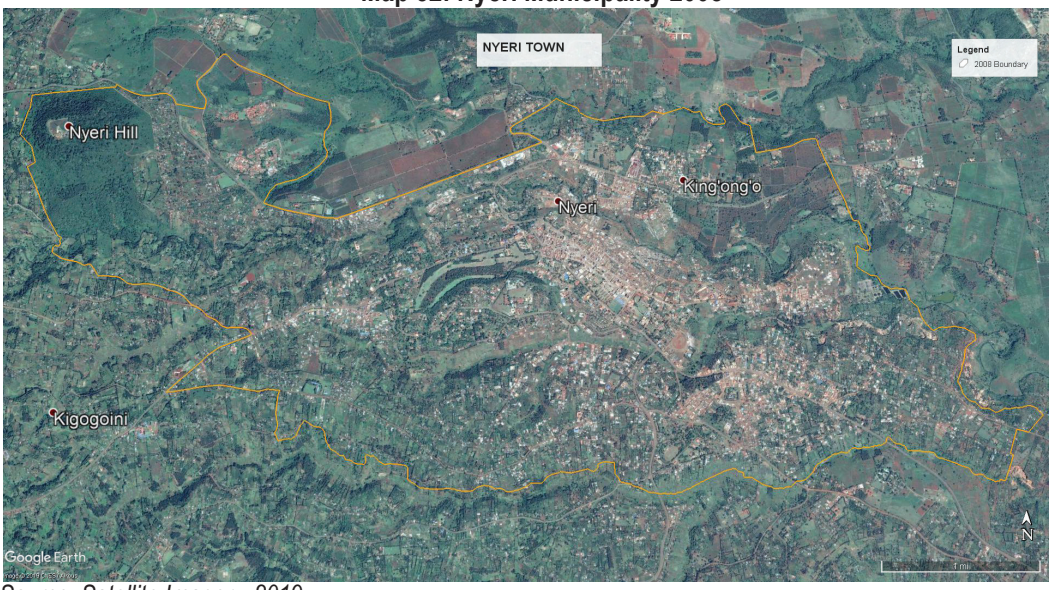
Urban fabric reviews the urban edges, growth directions and factors defining the edges for the principle towns in the County.

a) Nyeri Municipality

Nyeri Municipality is located on the foothills of the Aberdare Mountain Ranges, approximately 150km from Nairobi and is the headquarters of Nyeri County. The centre is boarded by rivers to the north as well as south. The Terrain in the centre is quite dynamic due to the existence of ridges as well as steep slopes.

Tourism and agriculture are the backbone of the town's economy as it neighbours rich agricultural fields and popular tourist attractions such as the Aberdare National Park and Mount Kenya (Kenya Information Guide, 2018). Nyeri is a former colonial town. The Municipality forms a nucleated grid structure which emanated from the CBD. Nyeri municipality retained its urban structure between 2008 and 2019. The major change is increased building density, especially, in the suburban areas such as King'ongo.

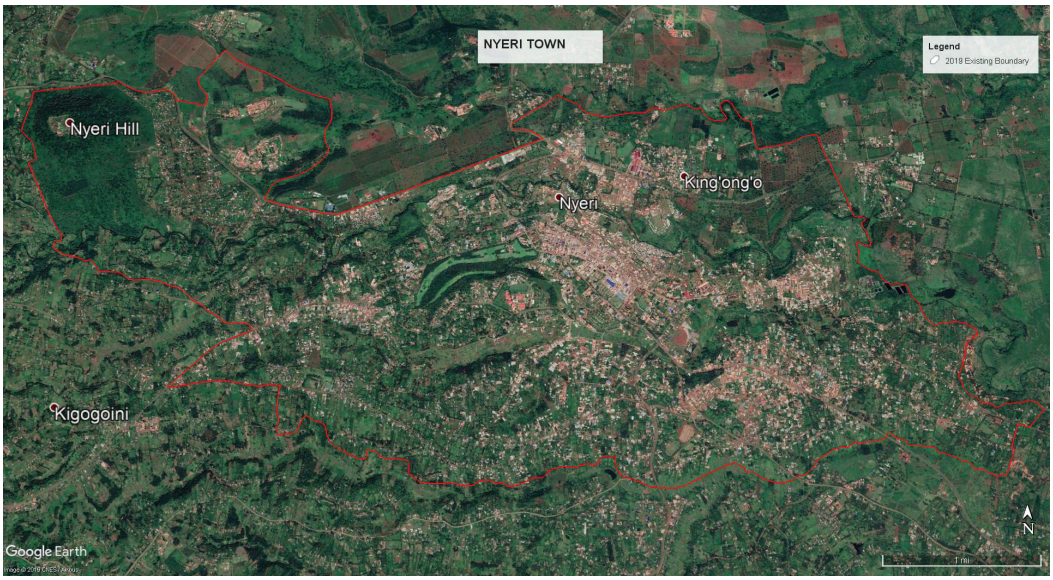
Map 32: Nyeri Municipality 2008



Source: Satellite Imagery, 2019

The 2008 boundary was adopted from a 1:10000 Topo-Cadastral Map that was compiled and drawn by the Survey of Kenya in 1988.

Map 33: Nyeri Municipality in 2020

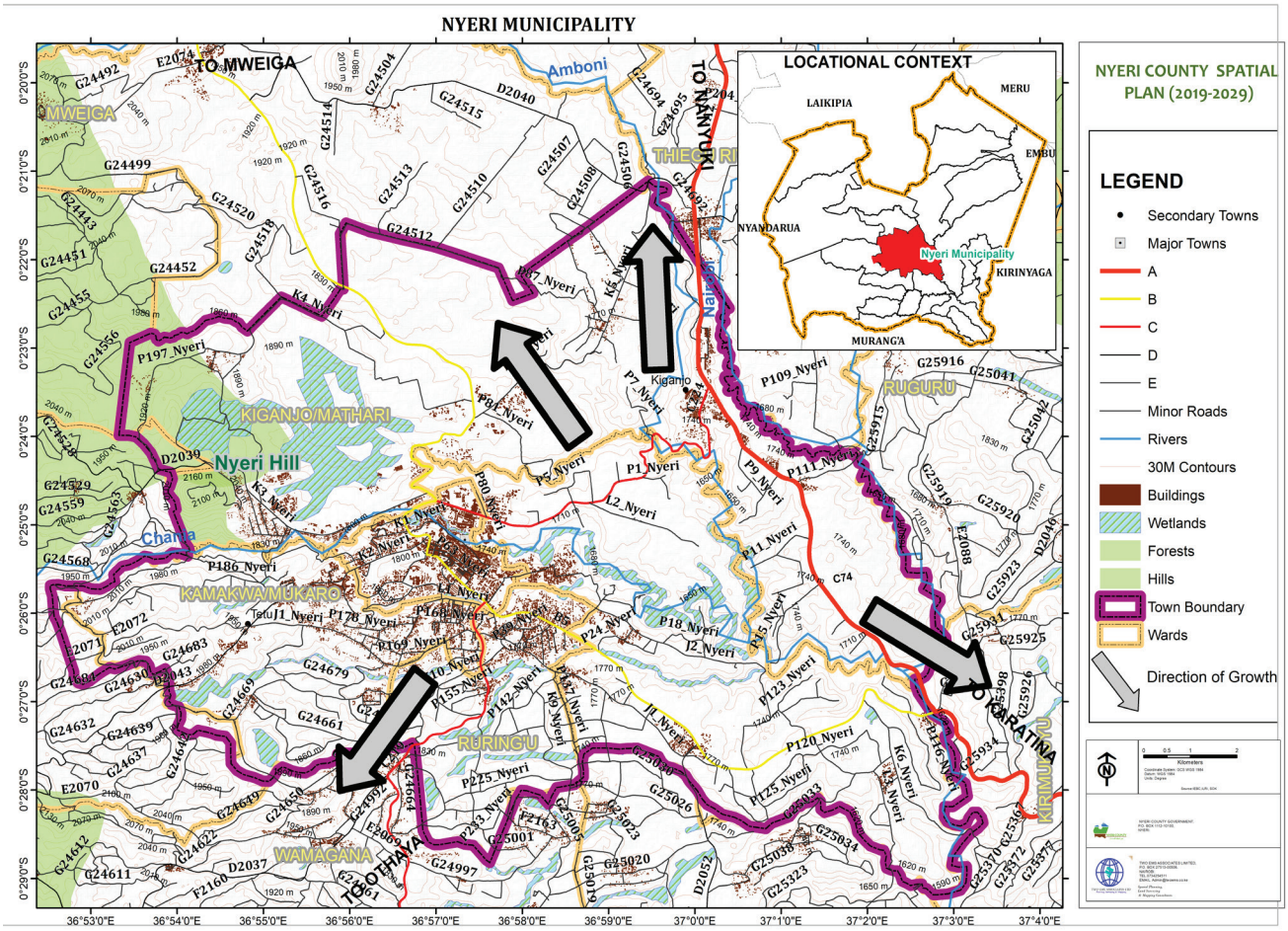


Source: Satellite Imagery, 2019

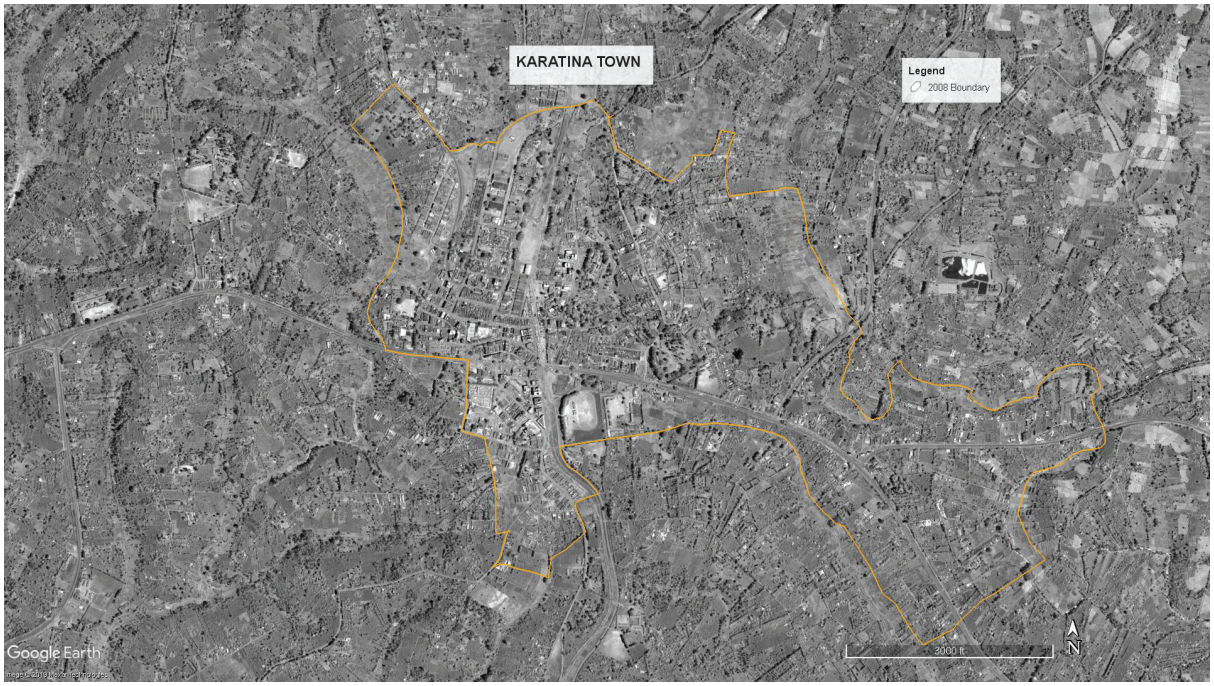
The new municipality boundary was adopted from the Nyeri Municipality Integrated Development Plan (IDeP) 2018-2020.

The urban extent of Nyeri Municipality was determined by existing natural and physical features. The North Eastern section of the boundary were established from Nairobi River, the South Eastern boundary from River Sagana, the Northern boundary from the Mweiga Ward boundary, the southern side from an existing wetland and the western boundary from the Dedan Kimathi ward boundary.

Map 34: Nyeri Municipality Urban Fabric


NYERI MUNICIPALITY
LOCATIONAL CONTEXT
LAIKIPIA
MERU
EMBU
NYANDARUA
Nyeri Municipality
KIRINYAGA
MURANG'A
NYERI COUNTY SPATIAL PLAN (2019-2029)
LEGEND
Secondary Towns
Major Towns
A
B
C
D
E
Minor Roads
Rivers
30M Contours
Buildings
Wetlands
Forests
Hills
Town Boundary
Wards
Direction of Growth
TO MWEIGA
TO NANYUKI
TO KARATINA
Amboni
KIGANJO/MATHARI
Nyeri Hill
Chania
KAMAKWA/MUKARO
RURINGU
WAMAGANA
THEGU RI
RUGURU
KIRIMUKUYU
Nairobi R.
Kiganjo
Kiganjo
Kiganjo

Map 35: Karatina town in 2008



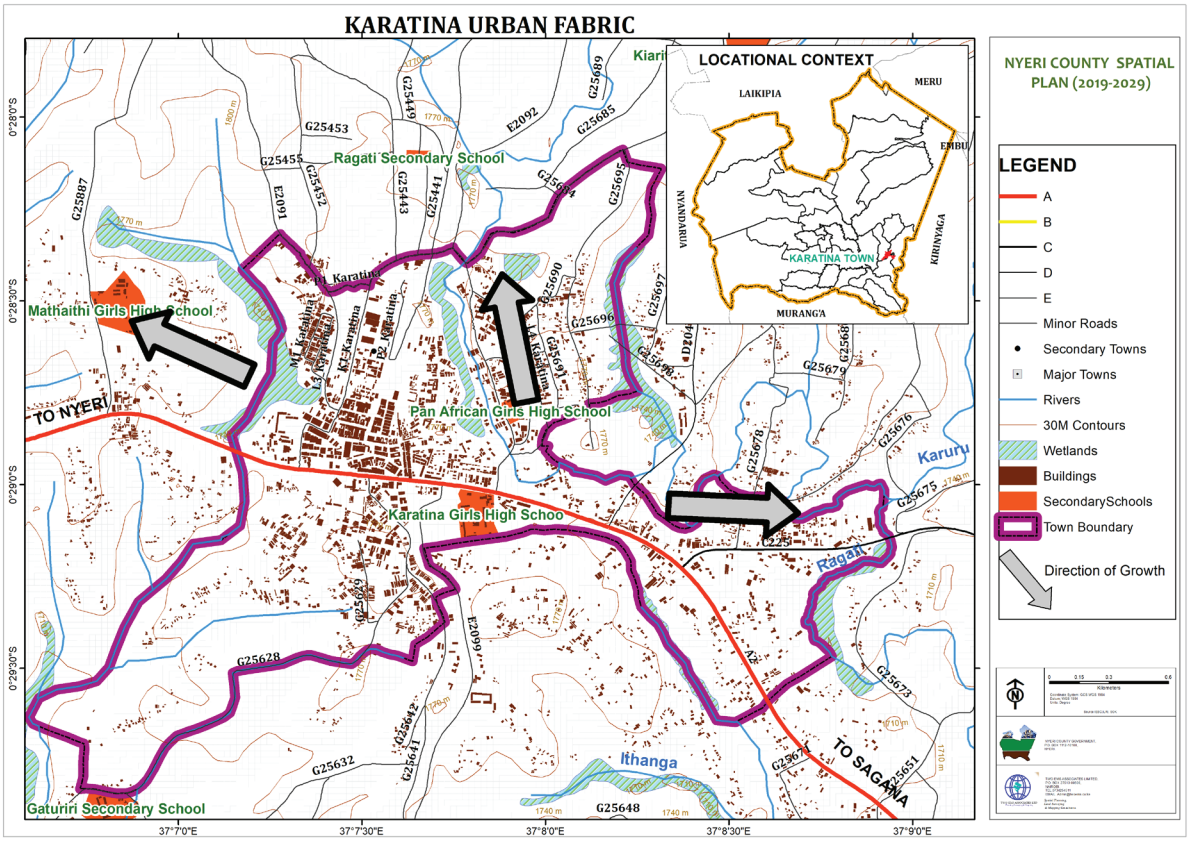
Source: Satellite Imagery, 2019

Map 36: Karatina Town in 2019

Source: Satellite Imagery, 2019

The urban extent of Karatina were delineated based on the existing road network and rivers. The Eastern and Western sections of the boundary of the town were delineated along the river, while the northern and southern sections of the boundary were determined by the existing road networks.

Map 37: Karatina Town Urban Fabric



Source: Two Ems Associates, 2019

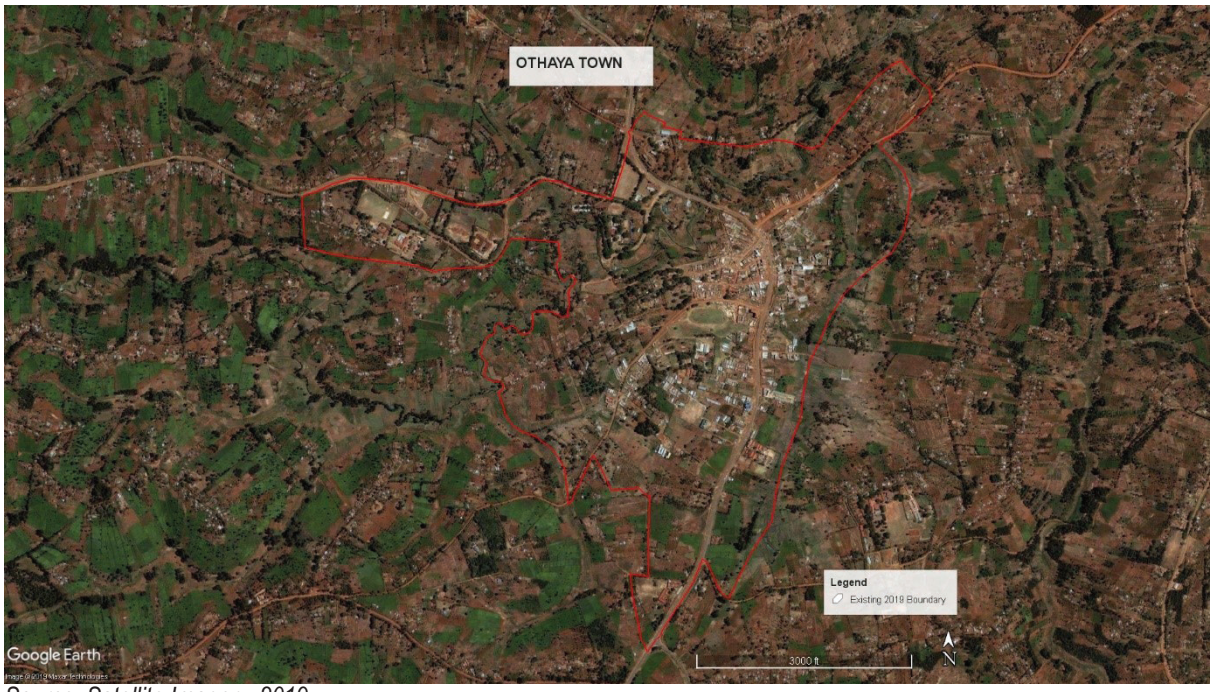
c) Othaya Town

Othaya is located 120km north of Nairobi. It is the sub County headquarter of Nyeri South sub-County. The town also has a commercial and agricultural function with coffee and tea as the main cash crops grown in the agricultural zones. Othaya is also home to former President Mwai Kibaki (Kenya Information Guide, 2018). The centre also plays a health function due to the existence of Othaya Level 4 hospital as well as the newly opened Mwai Kibaki Teaching and Referral Hospital. Othaya town retained its linear structure between 2008 and 2019.

Map 38: Othaya town in 2008

Source: Satellite Imagery, 2011

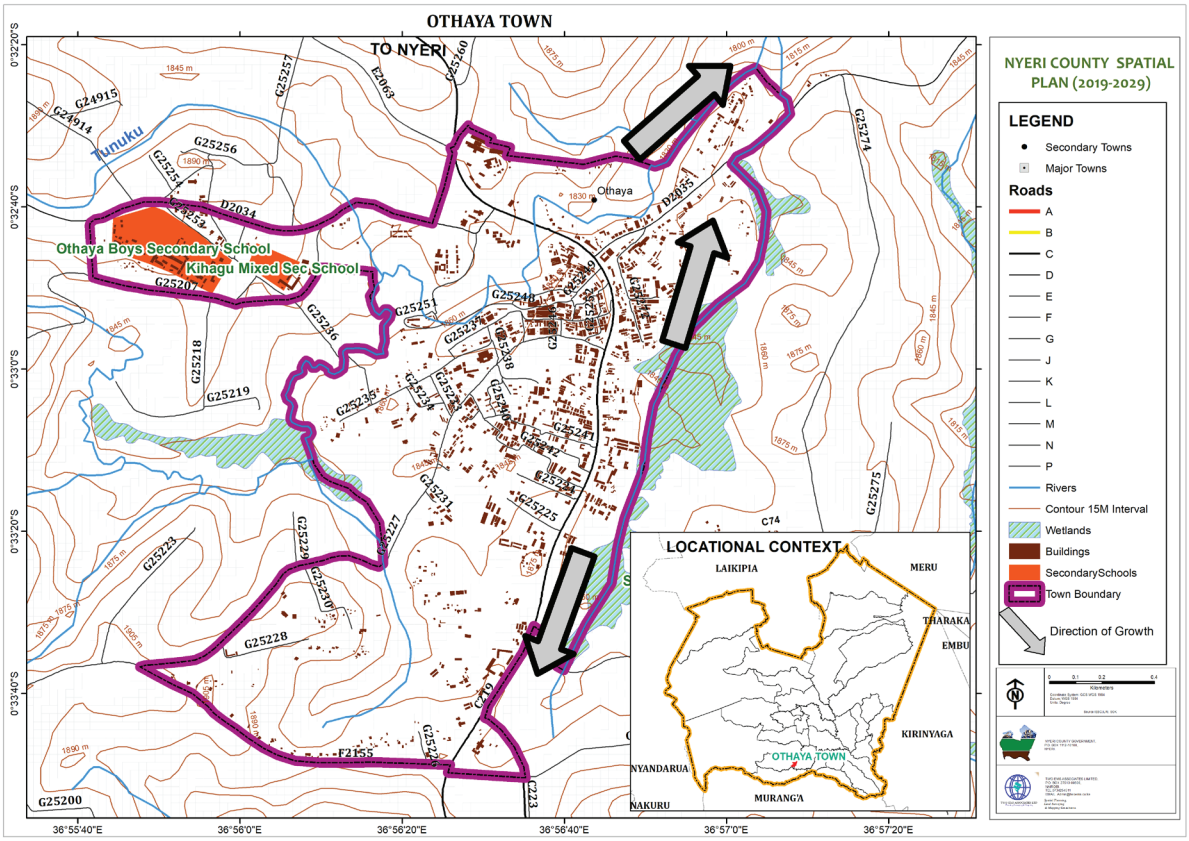
Map 39: Othaya Town in 2019



Source: Satellite Imagery, 2019

The urban extent of Othaya was guided by the existence of structuring elements such as the existing extensive road networks, built up foot prints areas, rivers and a wetland. The eastern section of the boundary was determined by the existence of a wetland while the northern and southern sections of the town boundary were delineated along the existing roads. The western section of the boundary was delineated along the river.

Map 40: Othaya Town Urban Fabric



Source: Two Ems Associates, 2019

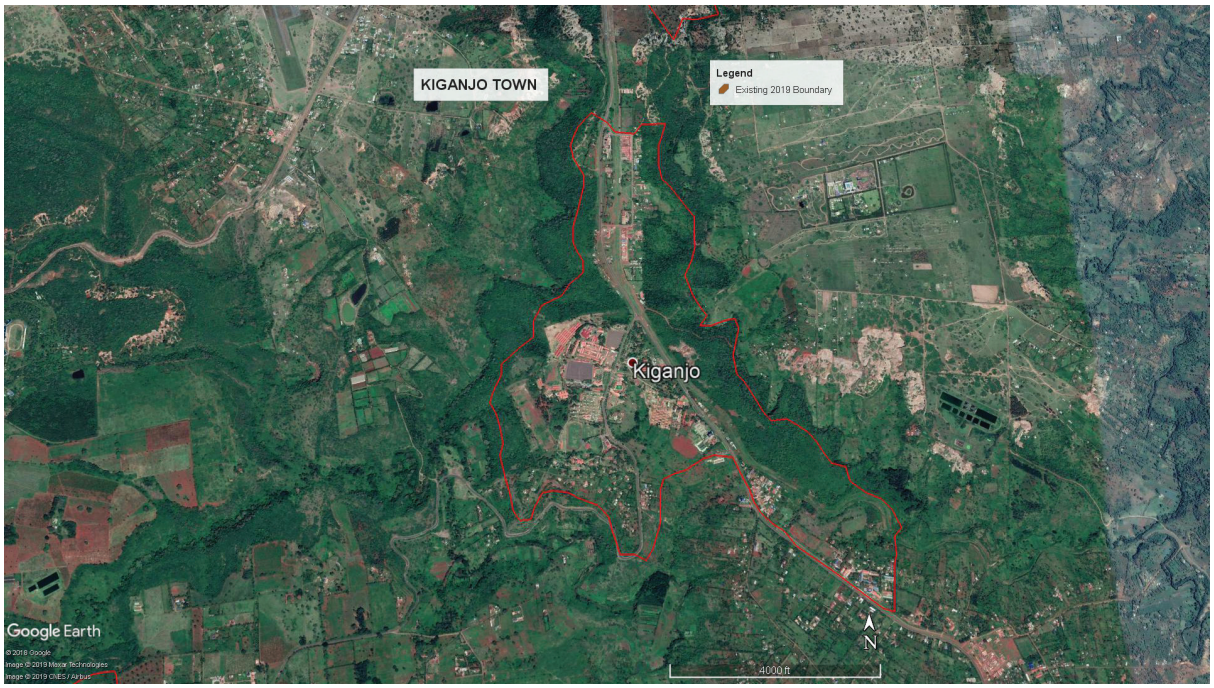
d) Kiganjo Town

Kiganjo town hosts the Kenya Police College which is Kenya's main college for police training. Kiganjo also hosts one of the Kenya Cooperative Creameries KCC (New KCC) and a milk depot for the Brookside Milk Company (at Chaka). Kiganjo sits at the junction of roads from Nairobi (A2) and Nyeri (B5) and hosts a railway station on the northern arm of the Kenyan Railway System (Kenya Information Guide, 2018).

Map 41: Kiganjo town in 2003

Source: Satellite Imagery, 2003

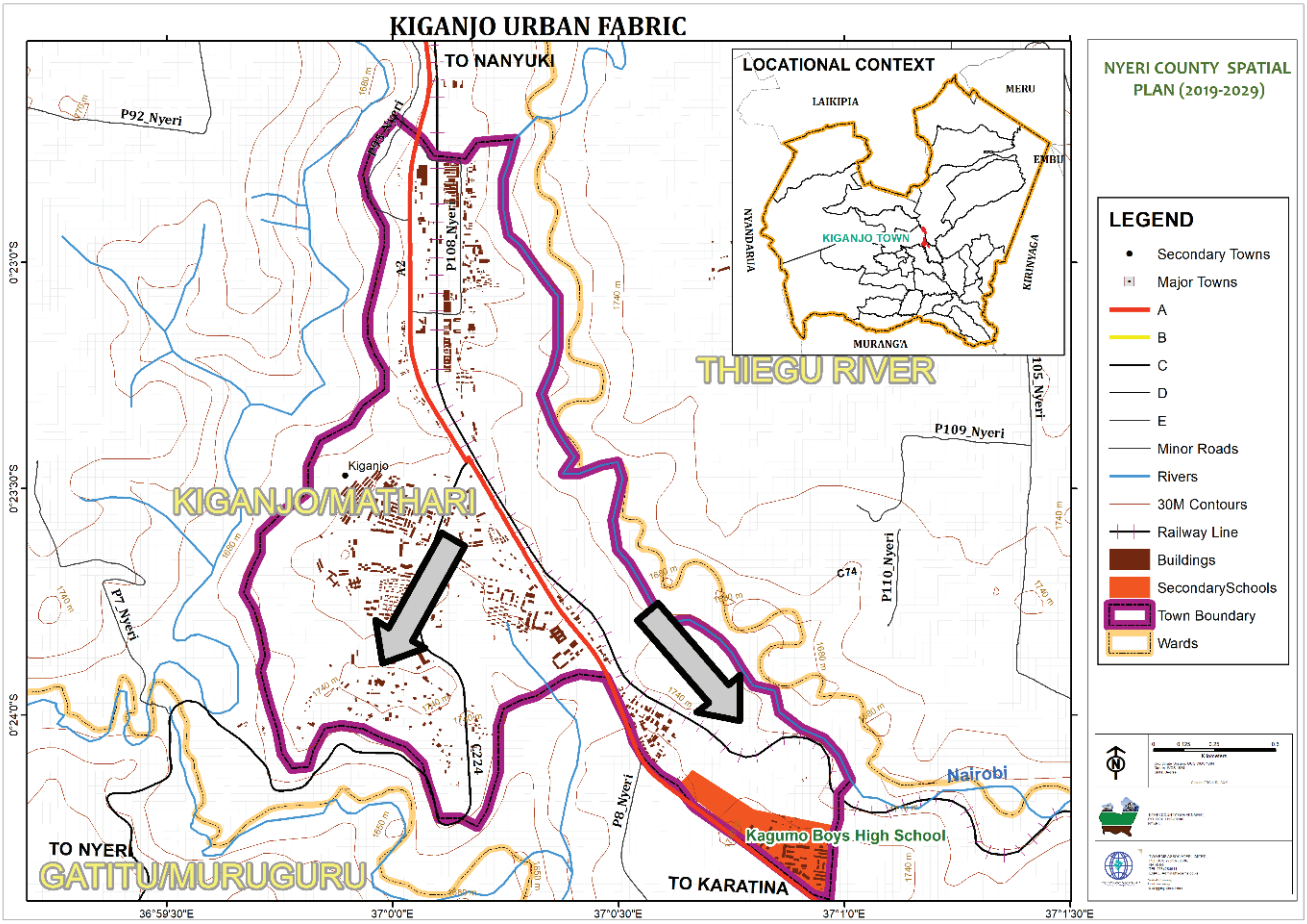
Map 42: Kiganjo Town in 2019



Source: Satellite Imagery, 2019

The urban extent of Kiganjo was greatly influenced by the existing industries and Kenya Police College. The eastern and western sections of the boundary were delineated along a 14% slope terrain while the northern and southern sections of the boundary were delineated along the roads.

Map 43: Kiganjo Town Urban Fabric

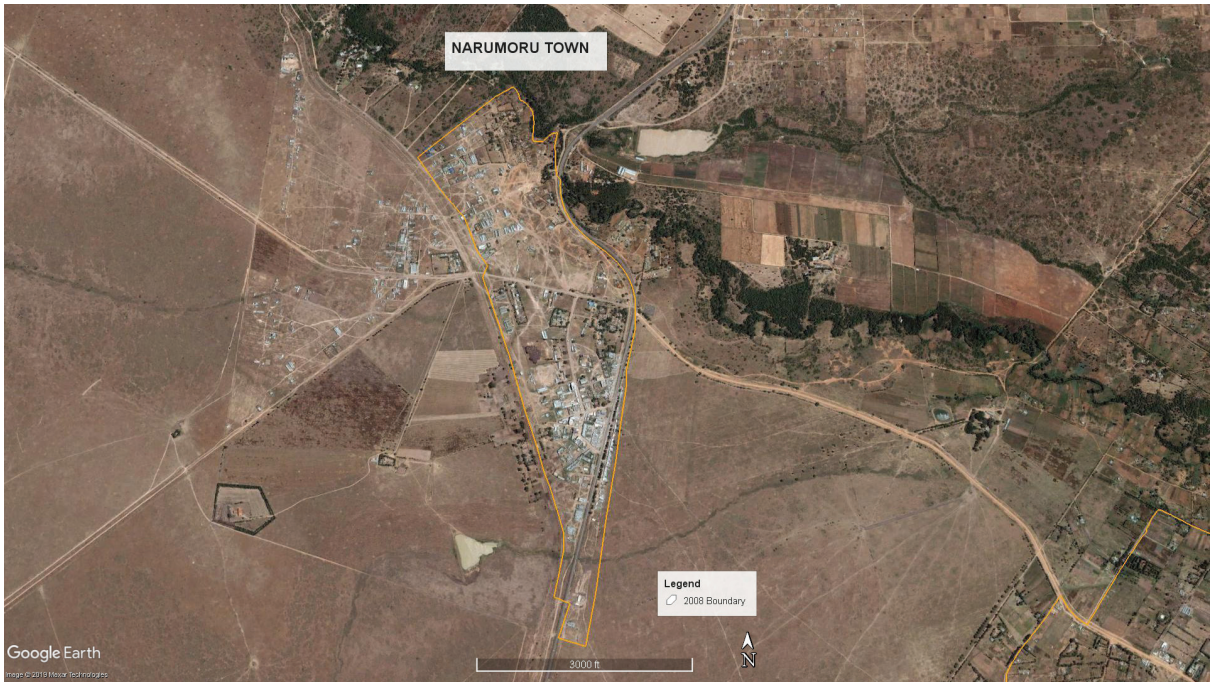


Source: Two Ems Associates, 2019

e) Naru Moru Town

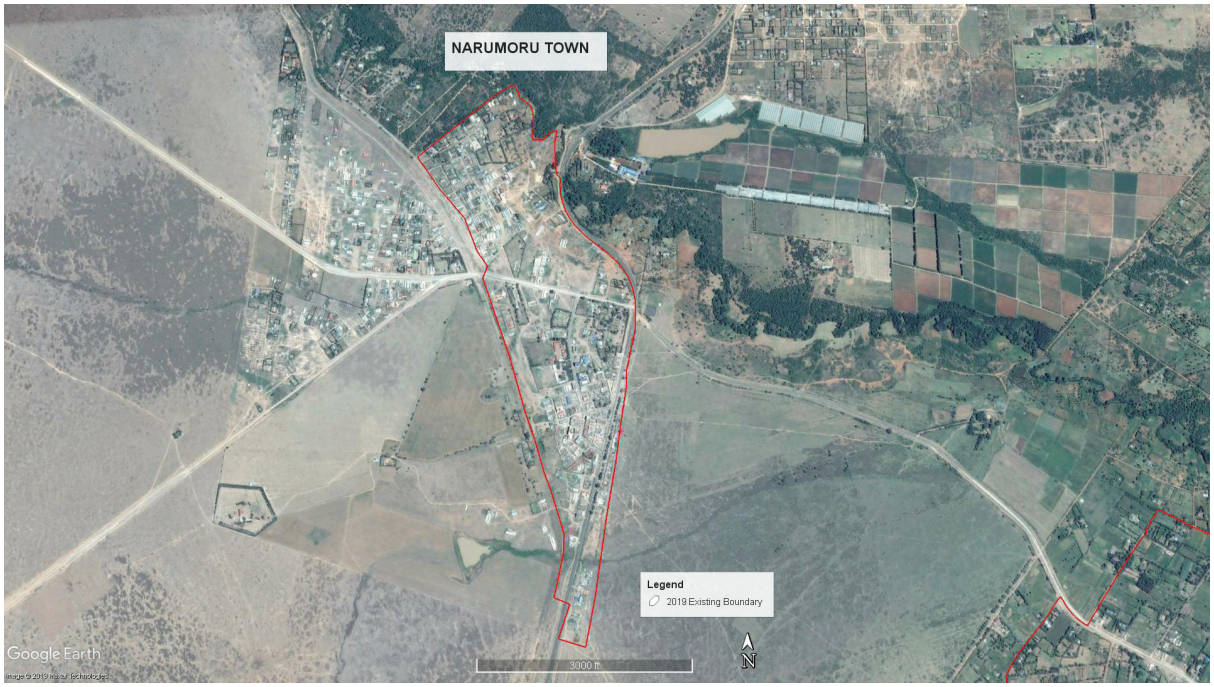
Naro Moru is the headquarters of Kieni-East subCounty. The centre is located along the A2 road and has grown linearly along the internal trunk road. It serves as a commercial centre and as a tourist base for hikers ascending Mount Kenya. Furthermore, Solio Game Reserve is located opposite the centre towards the South Eastern Side of the town. Naru Moru experienced a significant increase in building density towards the eastern side of the A2 road as well as the western side.

Map 44: Naru Moru Town in 2008



Source: Satellite Imagery, 2008

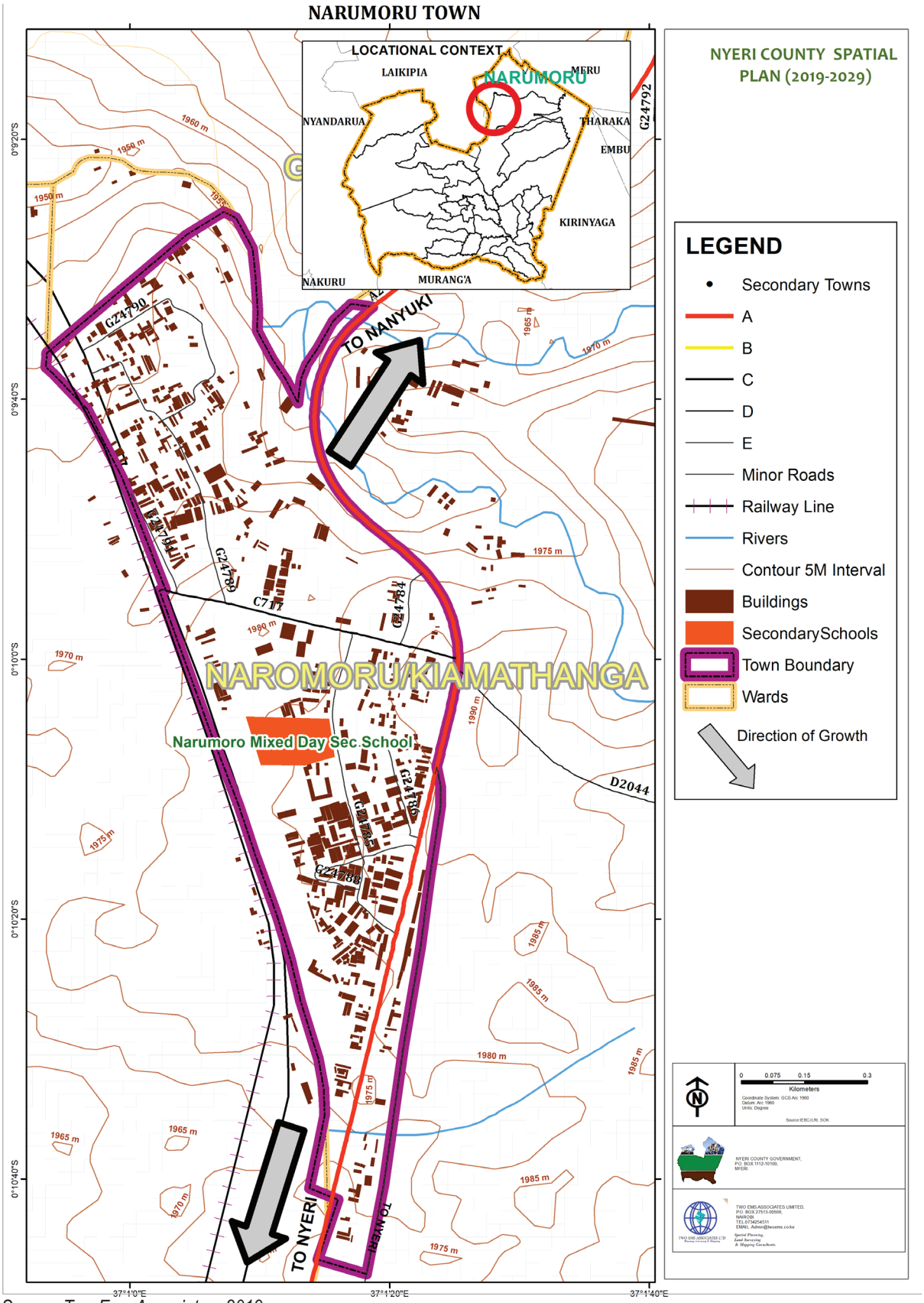
Map 45: Naru Moru Town in 2019



Source: Satellite Imagery, 2019

The urban extent boundary was delineated based on the existing road network, direction of growth and the edge of the existing forest cover bordering the centre.

Map 46: Naru Moru town Urban Fabric



Source: Two Ems Associates, 2019

f) Dedan Kimathi University District

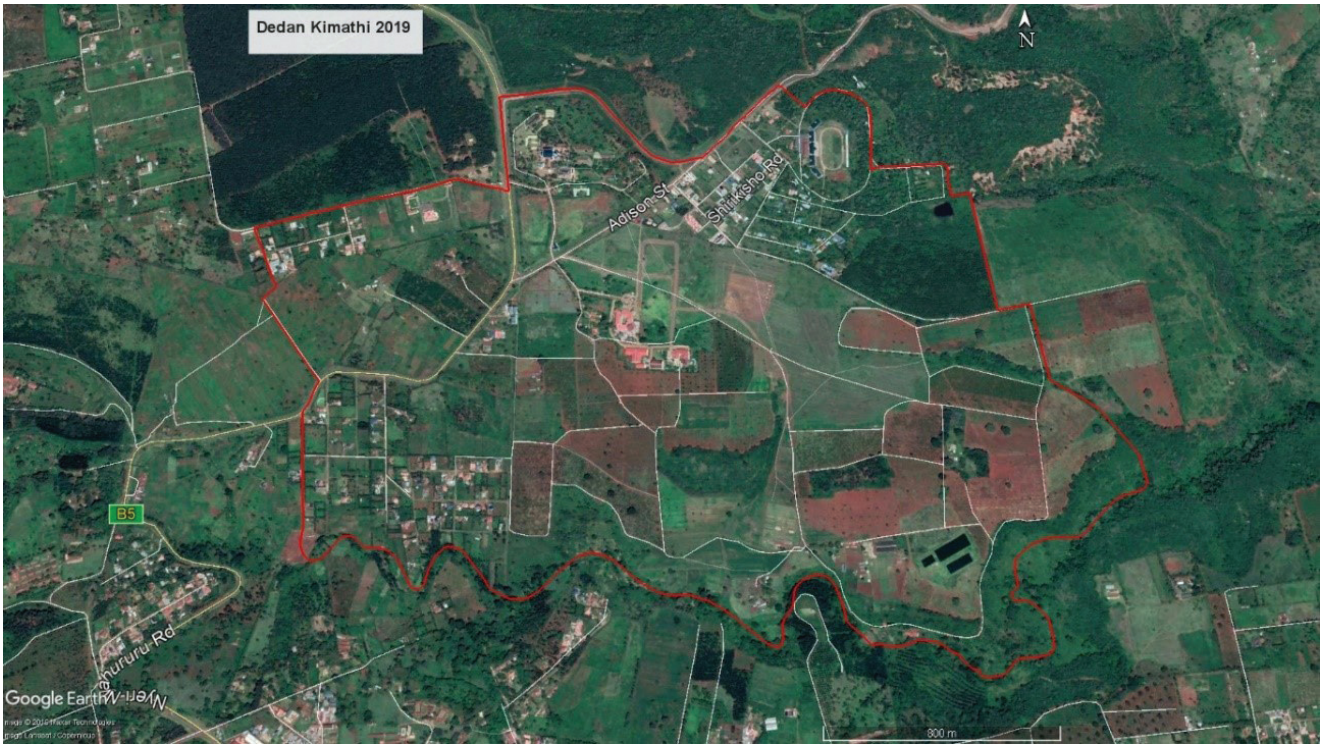
Dedan Kimathi University District is currently a growing educational node due to the presence of the existing Dedan Kimathi University. It is located 6 km from Nyeri along the Nyeri – Mweiga highway. The university land spans about 1,000 acres (4.0 km2) consisting of 350 acres (1.4 km2) of natural forest, 350 acres (1.4 km2) of mature coffee and 300 acres (1.2 km2) of open space for expansion. The district has brought about growth of a residential zone due to increased student and staff population.

The university started as a middle-level national technical and business-oriented learning institution in 1972 and was elevated in 2007 to a constituent university college of Jomo Kenyatta University of Agriculture and Technology through a Kenya Gazette notice to become a full-fledged university in three years. However, this came later on 14 December 2012 when President Mwai Kibaki officiated and awarded the institution a charter. DeKUT was founded as a community initiative to create opportunities for young people from all walks of life.

Map 47: Dedan Kimathi University District in 2011

Source: Satellite Image, 2011

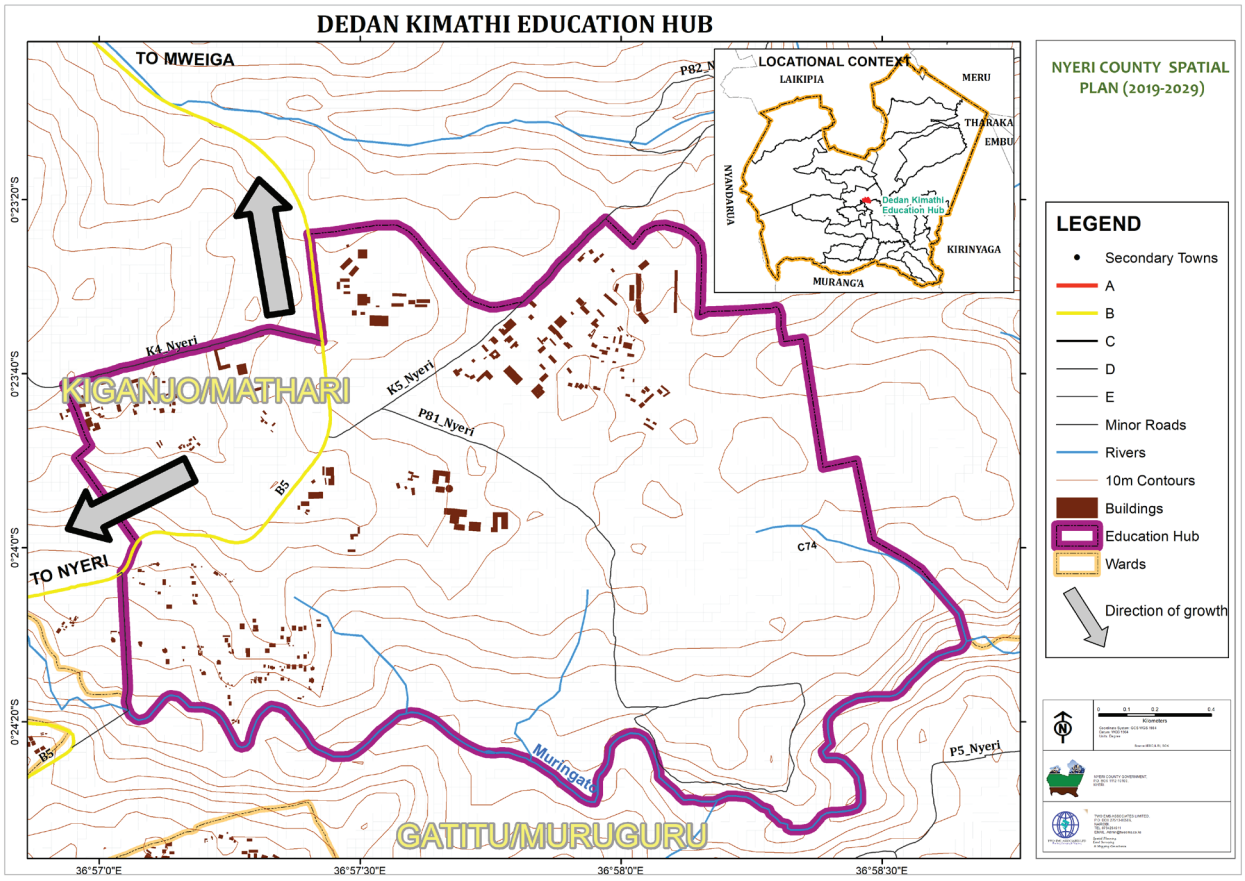
Map 48: Dedan Kimathi University District in 2019



Source: Satellite Image, 2019

The southern side of the boundary has been adopted from River Muringato and the remaining boundary has been adopted from roads that border the university district.

Map 49: Dedan Kimathi Urban Fabric



Source: Two Ems Associates, 2019

g) Chaka Town

Chaka is one of the fastest growing centres in Nyeri. This is due to its location advantage next to the A2 National Trunk, its commercial aspect, the proximity to Mount Kenya National Park and the existence of Chaka Ranch with associated existing recreational/luxurious facilities. The centre is located along a relatively flat terrain, however, the urban edges towards the east, west and southern side boundaries structured by ridges. This would mean the most likely growth of the centre would be towards the northern side.

Map 50: Chaka Town in 2008

Source: Satellite Image, 2008

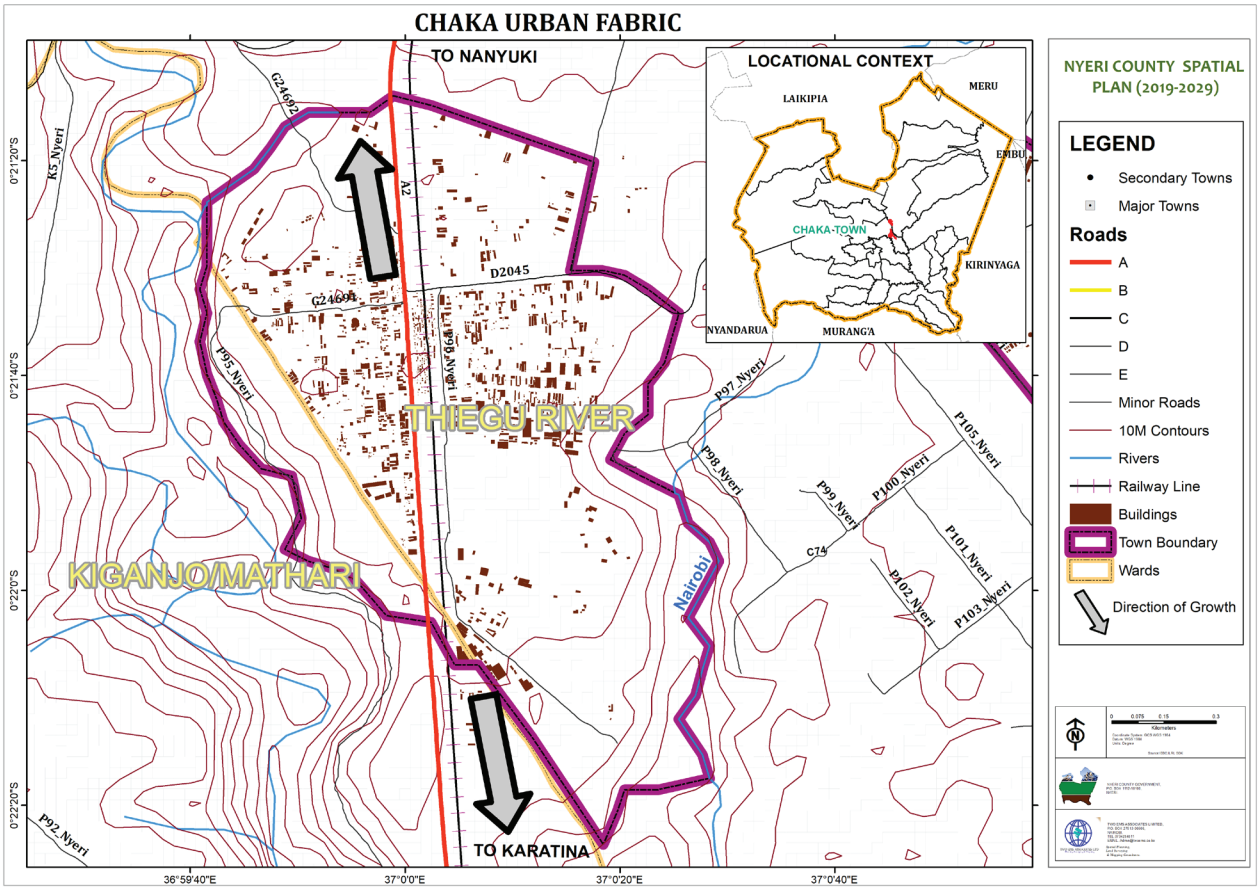
Chaka experienced an increase in developments between 2009 and 2019 as observed in the images. This increase is in development has been observed on the eastern side of the A2 which has experienced an increase in building.

Map 51: Chaka Town in 2019

Source: Satellite Image, 2019

The boundary of Chaka town was informed by the existing road network, river and steep slope. The left and right boundary was adopted from a 14% slope and the top and bottom boundary from a road. The centre has assumed a ribbon type of development whereby its developing linearly along the sides of the A2 road.

Map 52: Chaka Town Urban Fabric



Source: Two Ems Associates, 2019

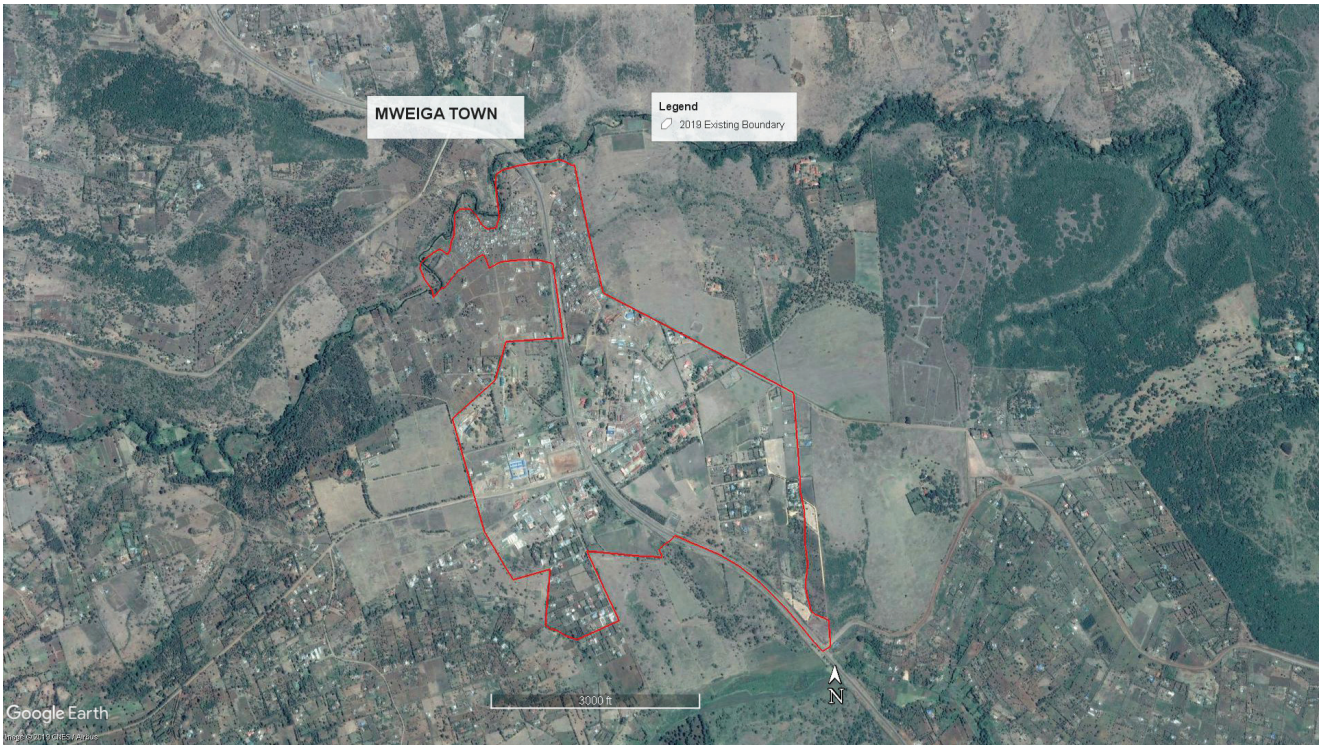
h) Mweiga Town

Mweiga market centre is the sub-County head quarter of Kieni West Sub-County that has grown due to its commercial and agricultural functions. The centre equally plays residential and public purpose functions that sustain the growing population. The centre has grown linearly along the B5 (Nyahururu-Nyeri) road. Between the years of 2014 and 2019, the centre retained its linear structure with slow rate of growth.

Map 53: Mweiga Centre in 2014

Source: Satellite Imagery, 2014

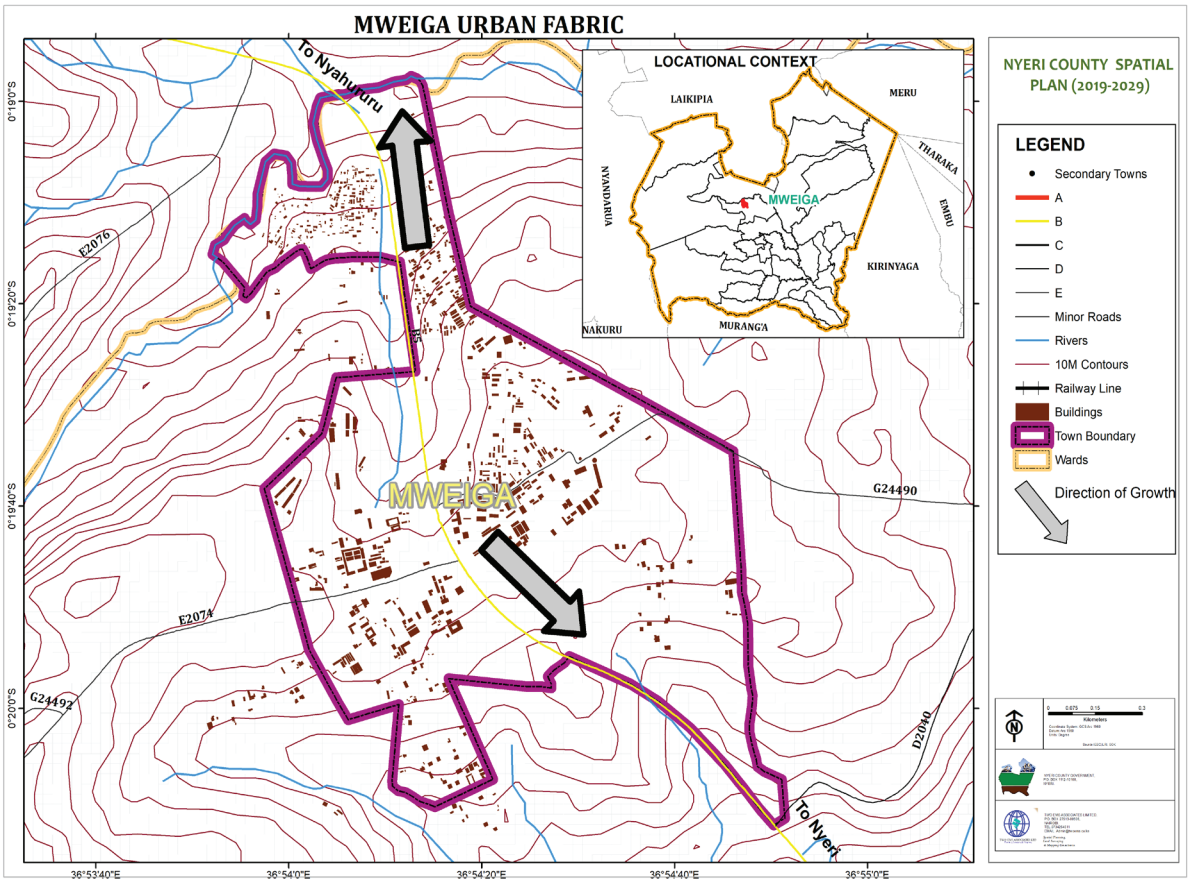
Map 54: Mweiga Town in 2019



Source: Satellite Imagery, 2019

The top boundary of the town has been delineated by a river and the remaining boundary by roads corridors. The centres is growing along the B5 road towards Nyahururu to the North and towards Nyeri in the South.

Map 55: Mweiga Urban Fabric



Source: Two Ems Associates, 2019

8.3.4 Analysis of Growth Centres

Growth centres	Functions, Growth inducing factors and challenges
Nyeri	• County headquaters. • Potential for CBD urban renewal/ Regeneration Planning • Good infrastructure furniture (good internal circulation and regional linkages), • Presence of banking institutions and higher learning institutions. • Has a Museum. • Nyeri County Referral Hospital. • Economic hub of the County. • Tourism potential. **Challenges** • Poor solid and liquid waste management. • Unplanned informal settlements and un-planned urban sprawl. • Urban sprawl. • Poor provision of pedestrian infrastructure in the town. • Congestion in the CBD. • Lack of Integrated comprehensive Development Plan to guide sustainable urban development

Othaya	• Serve as administrative headquaters for Othaya town and Nyeri South Sub-County. • Commercial hub for Nyeri South Sub-County. • Has a closed market with stalls. (Is a market for fresh produce) • Good transport linkages and streetlighting. • Surrounding farming activites. (tea growing zones). • Has a stadium. • Has a major sub-County hospital (Othaya Sub-County Hospital) • Surrounded by an agricultural hinterland (Tea zones) **Challenges** • Poor solid and liquid waste management. • Lack of Integrated comprehensive Development Plan to guide sustainable urban development • Poor provision of pedestrian infrastructure. • Poor town planning within the town. • There's no navigation facilities within the town. (No street naming in the town) • The stadium is located at a low-lying, poorly drained area hence gets marshy when it rains.
Karatina	• SubCounty headquaters for Mathira East Sub-County. • Urbanization in Karatina has roots in the pre-colonial period • Economic hub due to the agricultural activities an in the region and the famous Karatina Open Air Market. • Fairly good transport network and street lighting. • Major tertiary centre present: Karatina University. **Challenges** • Lack of Integrated comprehensive Development Plan to guide sustainable urban development • Urban sprawl. • Poor solid and liquid waste management. • Poor provision of NMT facilities.
Mweiga	• Sub County headquaters for Kieni West sub County. • Presence of Kabartonjo health centre and police posts. • Farming activities and tree logging activities in the neighborhoods. • Poor water supply in the urban area. • Commercial hub. • Has a stadium, which is fenced. (Mweiga Stadium) **Challenges** • Poor road network in the hinterlands. • Lack of Integrated comprehensive Development Plan to guide sustainable urban development
Naru Moru	• Sub County headquaters for Kieni East. • Police station and district hospital. • Good stransport network. **Challenges.** • Lack of Integrated comprehensive Development Plan to guide sustainable urban development • Poor urban infrastructure and street lighting systems. • Poor provision of pedestrian infrastructure.

Source: Nyeri Field Survey, 2018

8.3.5 Future growth drivers

The principal towns and growth centres in the County are Nyeri, Othaya, Karatina, Mweiga, Naru Moru and Wamagana. The current drivers of urbanization in the County include natural resource potential, administrative function, agriculture, tourism and culture, transport connectivity, growth centre potential, agricultural, education hubs.

With the rapid urbanization and population increase, various urban centres have strong economic functions that are driving development in the County. These offer massive employment opportunities, increase access to services and overall better living standards. The centres have a great development potential as their activities act as pull factors for development.

a) **Administrative Driven growth**

Administrative centres were established in the colonial period as colonial towns and grew as a result of this administrative function. In the post-colonial period, these centres were made administrative capitals to the former districts and divisions as well as current counties and as sub-counties. Nyeri and Karatina are two major centres that were established as colonial towns and grew as a result of their administrative functions.

b) **Agriculture driven growth**

Agricultural driven growth centres in Nyeri are attributed to the presence of agricultural produce from the rural hinterlands. The sale of agricultural produce in these centres boosts their economies hence increasing their rate of urbanizations. Centres such as Mweiga, Chaka, Othaya and Karatina have established markets for agricultural produce.

c) Industrial driven growth

These mostly consist of centres in Nyeri whose economies are industrial based. This would mean that there are established industries process or manufacture raw materials available in the county. The by-products of these raw materials are sold within the county or outside the county. These centres mainly include Nyeri Municipality, Iriani and Kiganjo. Transport Driven Growth

The existing railway and the road network provide an opportunity to compliment the growth of the centres along it. Towns like Naru Moru and Kiganjo grew due to the existence of the railway stations, and the industries that were connected to the railway such as KCC and NCPB. The railway line is still there and only requiring revival to further contribute to the growth and local economies of the centres along it.

d) Natural Resource Potential

Nyeri County is home to two major water towers, i.e. the Aberdare Ranges and Mt. Kenya. There are very many rivers and streams which flow from both towers and offer great potential for hydropower energy from rivers such as River Gura.

The County is also home to Aberdare National Park and Mt. Kenya National Park, which have a variety of wild animals as well as the presence of several private ranches and animal sanctuaries. The County is also home to several forests, such as Mt. Kenya Forest, Karima Hill Forest, Aberdare Ranges Forest, Gachirichiri Forest, Thangathi Forest, among others.

c) Education and Research Institution Hub Potential

The presence of Karatina University, Outspan Medical College, Tumu Tumu Nursing and Training College, Iraini Kenya Medical Training College, Mukurweini Technical Training Institute, Kagumo Teachers Training College, among other tertiary and research institutes have great potential to spur development within and around the towns and centres in which they are located.

d) Tourism and Culture

The County is home to Aberdare National Park and Mt. Kenya National Park, which have a variety of wild animals as well as the presence of several private ranches and animal sanctuaries. This has further fuelled and impacted the tourism industry in the County, which is a catalyst for growth. Tourism and culture potentials if exploited fully can drive growth in the County.

Table 21: Summary of growth drivers

Potential Growth Centre	Pull Factor
Nyeri town	Administrative Function, level of service provision, scenic view.
Othaya town	Administrative Function, Agro-industrial induced growth- Strong agricultural base. (tea zones),
Karatina town	Administrative Function, Commercial, Transit (Rail Station)
Mweiga town	Administrative Function, Agricultural success.
Naru Moru town	Administrative function, Transit factor (Road and Rail).
Dedan Kimathi	Education
Wamagana town	Administrative function, Linkages, Agriculture
Chaka Town	Commercial Function
Kiganjo Town	Industrial Function, Administrative Function, Transit factor (Rail station)

Source: Two Ems Associates, 2019.

8.3.4.2. Urban-Rural Development and Linkages

The urban development pattern in Nyeri has greatly influenced the nature of the rural pattern. This is the direct result of a shift in the balance between the growth of both the urban and rural economies. This shift is closely linked to economic growth and to the changing patterns of demand for, and supply of, employment. This rapid population shift has led to the emergence of primacy of urban centres.

Model of concentration

The model of concentration involves the natural and organic growth of a centre as a result of existence of social and physical infrastructure, economic factors such as employment and as a result of physiographical factors. In the case of Nyeri County, the growth pole centres grew as a result of concentration of the mentioned factors.

The disadvantage of this model of urban growth is urban sprawl since the process is uncontrolled. This involves the encroachment of the neighbouring settlements and complete erosion of their individual functions. Case and point, various land parcels initially meant for agriculture in Karatina as well as Nyeri have been converted into residential land uses. Furthermore, Ihururu and Embaringo have begun encroaching into the forested areas.

Model of complete dispersal

This model suggests that all centres with human habitation to be fully serviced to allow for complete decentralize all functions from the principal centres. The model will encourage urbanization of existing as well as potential urban centres. The drawback of this model is that the process of fully servicing centres is expensive. Moreover, the model will encourage total urbanization, yet Nyeri County relies on the agricultural sector which is a predominantly rural function. This will in turn lead to conversion of productive agricultural land into urban land uses.

Model of selective concentration

This model is like the model of concentration; however, this model is for minor potential economic nodes. These minor centres encourage concentration of urbanism away from the principal centres. The drawback of this model is that the potential economic nodes will turn into major economic nodes hence begin causing urban sprawl into their rural hinterlands.

Model of Selective dispersal

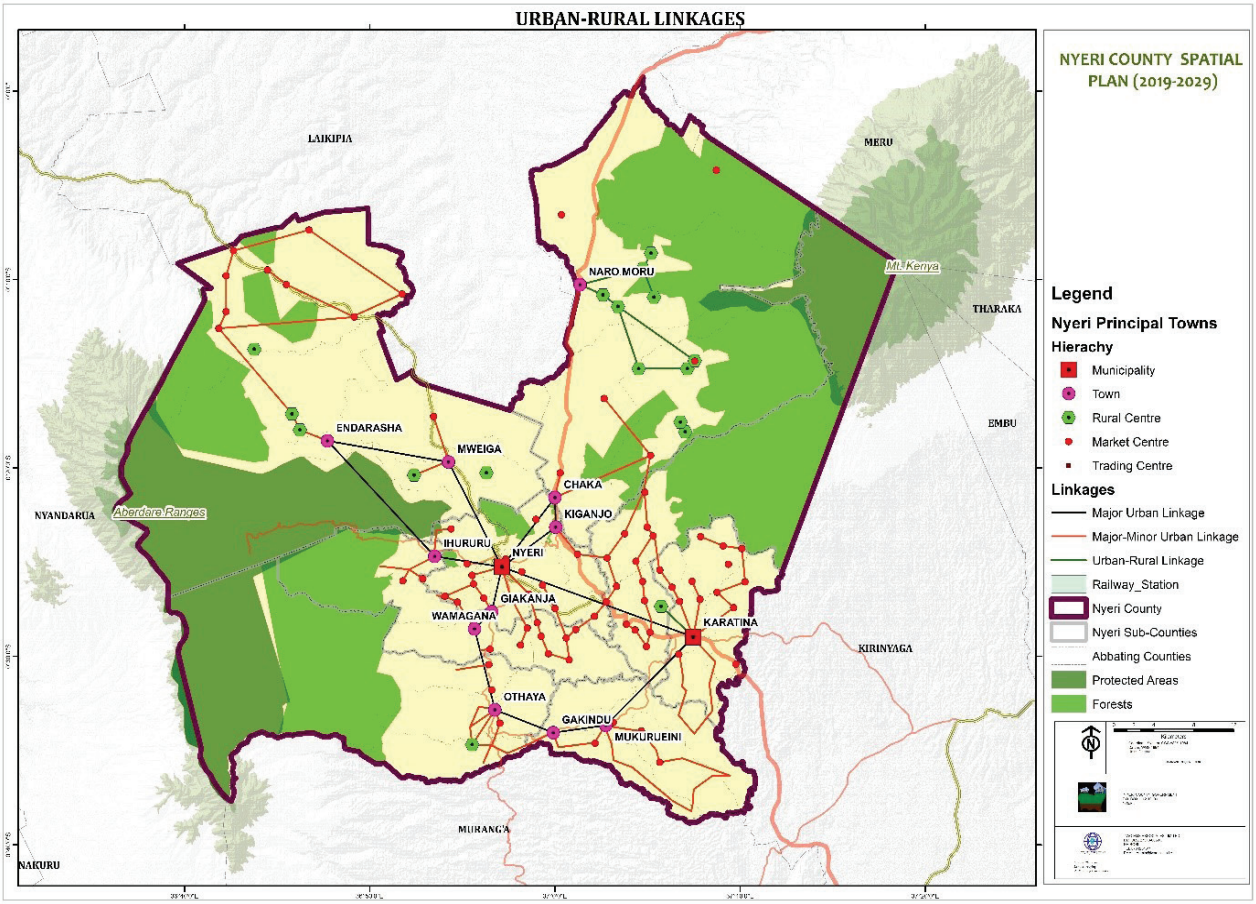
This model involves identification of potential economic as well as existing economic centres.

The identified centres will there for be well serviced based on the needs of each centre. The model encourages proper planning of the nodes by assigning them prime function, demarcating their edges and granting them urban. This model encourages controlled urban growth, preservation of the agricultural and environmentally sensitive zones as well as creating urban-rural linkages.

Preferred model for Urban-Rural Linkage

The preferred urban model is the model of selective dispersal. This is because various centres in the County possess potential to grow based on their unique endowment. The model encourages provision of urban services and amenities in existing and emerging centres throughout the County. Commercial, health centres, education, administration, tourist, industrial and agricultural processing are selectively dispersed in areas where there is existing as well as potential for each. Government functions and private investments are distributed in the County based on concentration of settlements and administrative boundaries.

Map 56: Urban-Rural Linkages



Source: Two Ems Associates, 2019.

8.4 Housing

It is commonly accepted that development of the County is substantially affected when the need for adequate and affordable housing is not met. Access to adequate housing has long been viewed as a basic human right and is considered to be an integral factor for the enjoyment of other economic, social and cultural rights.

According to the United Nations (UN) Committee on Economic, Social and Cultural Rights, satisfactory housing consists of: legal security of tenure; availability of accessible services, facilities and infrastructure; habitability; accessibility (e.g. access to employment, health services, schools, etc.); cultural adequacy; and affordability.

8.4.1. Housing typologies

Housing typologies are also largely influenced by the level of services within the County as well as by the availabilityand price points of various building materials.

Majority of people within the study area use wood for construction of their houses. A smaller percentage of the population use stones and bricks. This can be attributed to the availability and affordability of these construction materials.

However, it is important to note that the plot densities around the major town centres are beginning to increase and this will require development control in future.

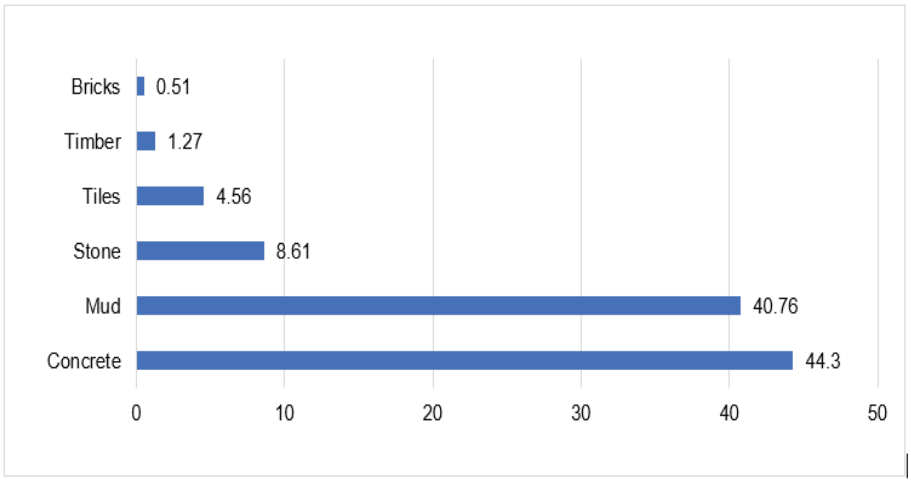
Plate 2: Various Housing Typologies in the County.

8.4.2. Housing materials

Floor material

In Nyeri County, 44.3% of homes are constructed by use of concrete material, 40.76% have earth floors and only 4.56% have tile floors. 8.61% have floors made of stone, while less than 2% have floors made of timber and bricks.

Figure 23: Floor material.

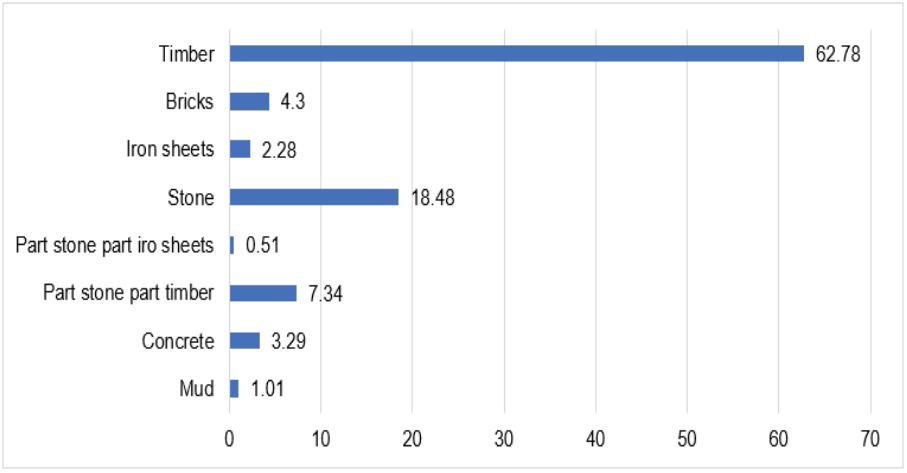


Source: Field Survey, 2019.

Wall material

From the field survey, the most common material used in the County is timber at 62%, stone only at 18.48%, part stone/part timber walls at 7.34% while 4.3% is made of timber and 3.29% made of concrete.

Figure 24: Wall material.

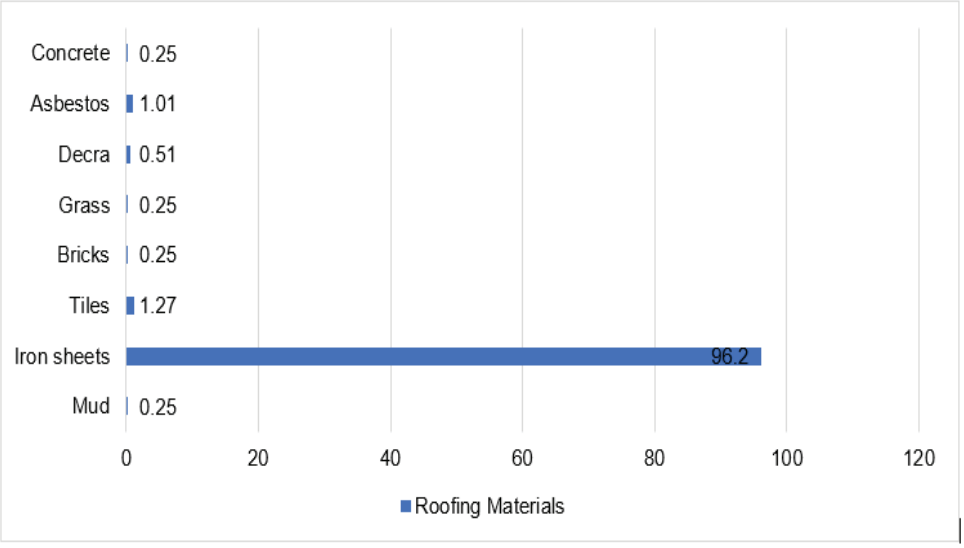


Source: Field Survey, 2019.

Roof material

Corrugated iron sheets are the most commonly used in the County at 96.2%. Tiles come in at 1.27% and asbestos at 1.01%. Other roofing materials are concrete, decra, grass, bricks and mud each at less than 1%.

Figure 25: Roofing materials



Source: Field Survey, 2019.

Housing Stock

It is important to note that the housing sector within the county is heavily dependent on individual owned private housing units. Despite the fact that Nyeri County has several governments owned housing estates which include Blue Valley, Karatina, Mweiga, Naru Moru, Mukurweini, Ruringu, Kimathi and Ring road Estates, the houses are dilapidated and are not adequate hence creating a high demand for public housing. It therefore requires tracking of housing stock within the County to know the housing deficit.

8.4.3 Urban Informal Settlements

Informal settlements in urban areas are settlements that have no legal ownership of land they occupy, and the buildings do not comply with planning and building standards. Some of the Informal settlements in the County include; Majengo Kiamwangi, Kahuru, Kiarathiaini, Itundu, Mbari ya Njagi, Thengeini, Gatondo among others.

There is need for the County government to coordinate all slum upgrading projects in the County. The County government should facilitate tenure regularisation in informal settlements, towards providing sustainable living conditions

8.5 Emerging Issues

Sector	Opportunities	Constraints
Urban settlement	• Growth Centre opportunities. • Reclassification of Nyeri urban centres most have outgrown their current designation. • Sustainable solid waste disposal opportunities within the urban centres. • Urban centres linked to transit corridors.	• Urban sprawl encroaching on fragile ecosystem. • Lack of physical development plans and zonation plans. • Encroachment of forests reserves and fragile ecosystems. • The population growth in urban centres does not match the service provided.
Rural settlement	• Irrigation opportunities to boost the food security. • Service provision.	• Westernization and erosion of culture. • Encroachment of forests reserves and fragile ecosystems. • Subdivision of land in areas with high agricultural potential. • Insecurity in some areas of the County • Poor access to social infrastructure and amenities. • Animal – wildlife conflicts. • Rugged terrain making areas difficult to access.
Housing	• Construction skills are taught in local institutions within the County. • Availability of construction materials in the County i.e. sand, building stones, water, grass for thatched houses. • National housing policy. • Shelter is a basic need and an integrated land-use • Need for increased investment and funding in the housing sector	• Land tenure dynamics in the County. (Lack of titles and other identifying documents in some areas). • Housing shortages in urban areas. • Access to amenities problems

CHAPTER NINE:

TRANSPORT, INFRASTRUCTURE AND SERVICES

9.1 Transport, Network and Distribution

Transport infrastructure consists of fixed installations (such as roads, railways, airways, waterways, and canals) and terminals (such as airports/airstrips, railway stations, warehouses, trucking terminals, and refuelling depots). The development of transport infrastructure is largely a public-sector initiative.

The transportation network is the circulation system of any given area, and its design should always consider safety, comfort, affordability, and environmental effects. Transportation is important because it facilitates economic, industrial, social and cultural development. It also contributes to shaping land use patterns and structures as well as human settlements.

The Integrated National Transport policy, 2010 provides for the provision of transport infrastructure consistent with the needs of the country to be developed to respond to various regional land uses and transport demand management. It also advocates for provision of appropriate NMT infrastructure and furniture including pedestrian crossing, walkways, footbridges and other facilities.

9.1.1 Road Transport

9.1.1.1 Road Network Connectivity Analysis

Nyeri County is traversed by a road network of various classes and lengths. The top most classification is a class A road (an international highway) which runs through the county and passing at Karatina, Kiganjo, and towards Nanyuki. Class B National roads are also traversing the county providing national linkage.

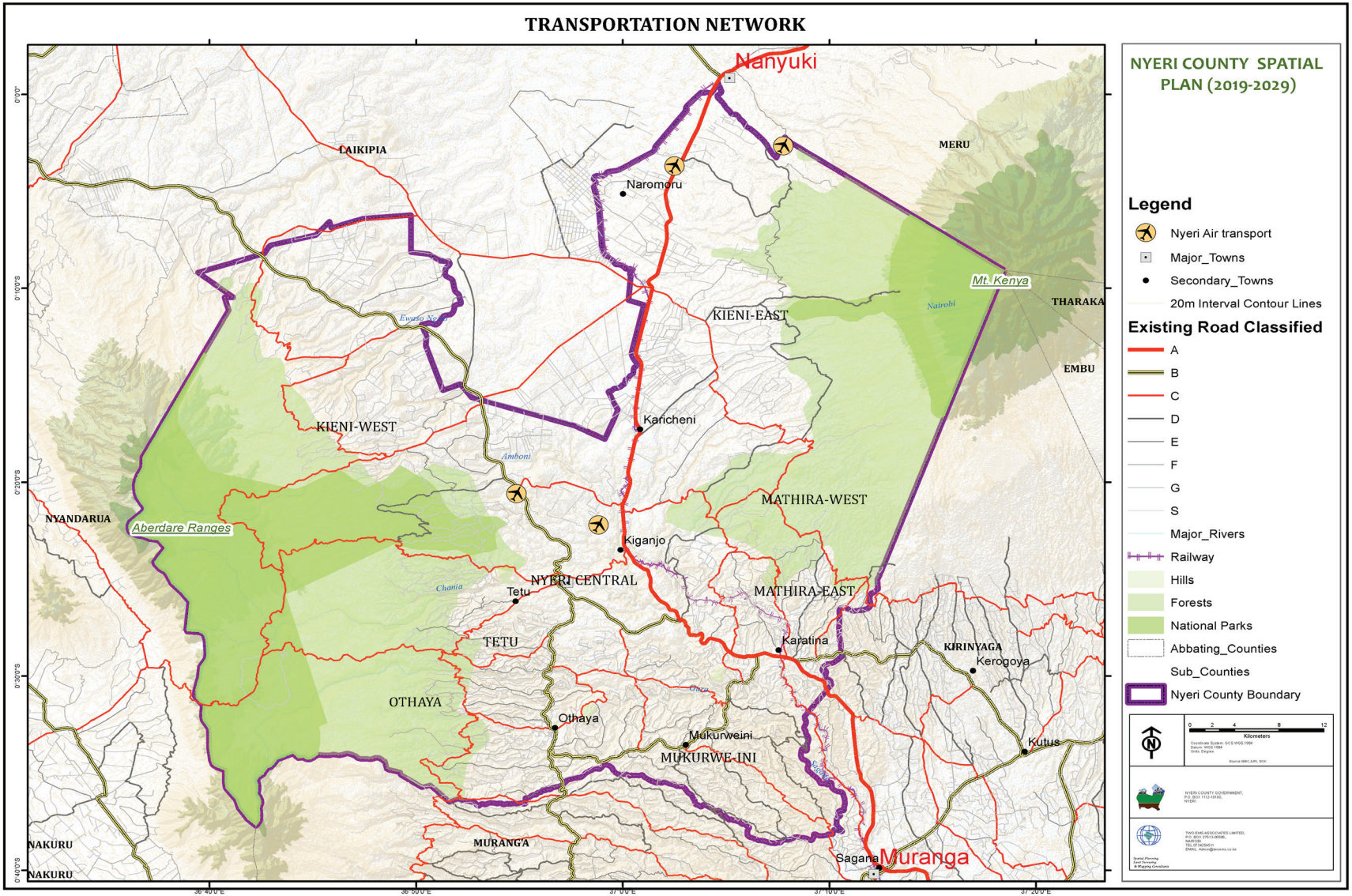
They include Nyeri- Nyahururu highway, Karatina-Kutus, Nyeri-Othaya and Karatina- Mukurweini roads. There are also several internal collectors and access roads of lower classes including class C, D E, F and G roads providing connection to the urban centers and rural villages within the County. The road network caters for pedestrians, motorbikes, transit matatus and buses, Lorries and private vehicles.

These existing road network enables many households to secure water and firewood from outside their living compounds. Farmers are able to transport agricultural inputs and outputs to and from their fields, and laborers also are able to travel from their homes to places of employment.

Externally produced provisions are transported into the villages, and surpluses are transported out. Children attending schools are able to move between their homes and the school building, and those seeking health services travel to the health centres through these networks.

However, due to the undulating topography of the county, the road network pattern is running on top of the ridges with few direct links between two nodal points. This has made travel time and distance to be longer in the affected regions.

Map 57: Transportation Network in Nyeri County.



Source: Two Ems Associates, 2019

Factors influencing Transport Networks

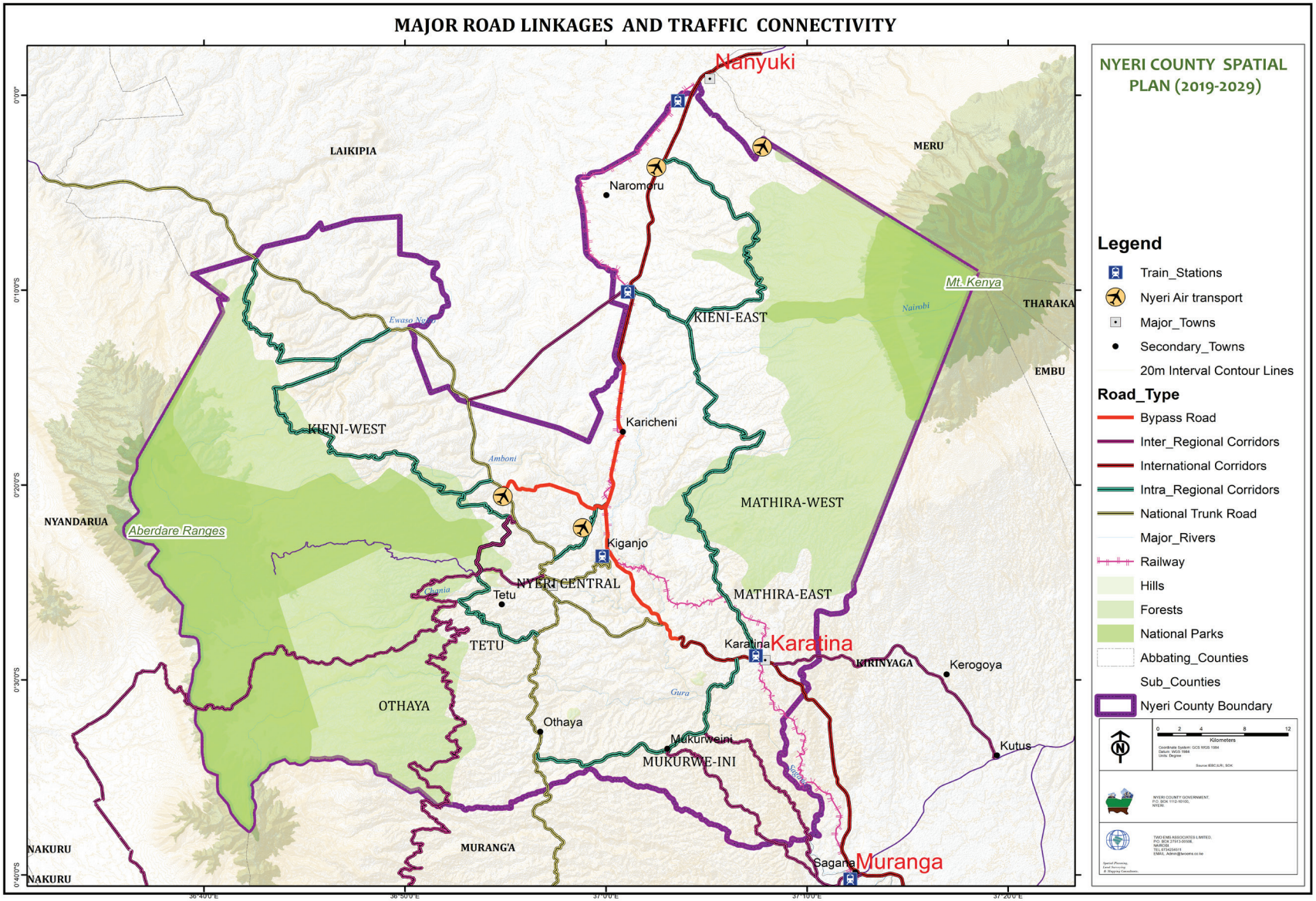
- Resource endowment: In places such as Nyeri Town, Karatina town, Othaya town, and Mukurweini town are well connected because of trade, Industry, and education development. Othaya SubCounty, Mathira East, Mathira West, and Tetu, have better transport networks due to its high agricultural potential including tea farms and their tourism attractions Including Mt Kenya, Aberdares National Park and this has enabled the County to capture resource and market opportunities.
- Need for inter and intra-County linkages: The County has seen economic opportunities from both the tourism, agricultural and horticultural sectors that needs an effective network to enable regional competitiveness.
- Demand: Due to increasing urbanization, it presents the need for flow of goods and services. The transport corridors Class A, B, C, D and E roads influence urbanization in the region.

9.1.1.2 Road linkages and traffic quality

The county of Nyeri is connected to the abating counties through several inter-regional roads. This has enables easy access to the services, market and social interaction with the neighboring counties to be smooth and productive. There also ongoing construction of more regional roads to further improve the accessibility in the region. Example of one major regional road network under construction is the Mau Mau road originating in Kiambu County through Muranga county and joins Nyeri County before terminating on Nyeri Nyuhururu highway.

Internally there are road collectors of considerably longer lengths forming a network of bypasses and ring roads linking major urban hubs and other transport hubs including railway stations and airstrips. Their pattern has made the current traffic quality to be fluid by making it easy for one to avoid points of congestion and traffic emergencies scenarios. These patterns when well-maintained can continue to serve for the projected period of this plan.

Map 58: Intra and Inter road linkages

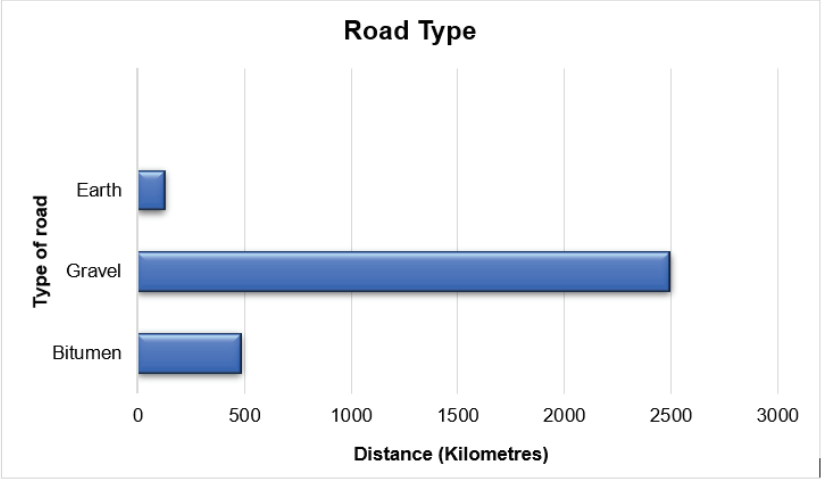


Source: Two Ems Associates, 2019

9.1.1.3 Road Types

Nyeri County has approximately 3,092.73 Km of classified roads with 478.25 Km of bitumen/tarmac, 2,492.85 Km gravel and 121.63 Km earth surface. Most of these roads within the County do not have designated lanes for NMT users.

Figure 26: Road Type



Source: Nyeri CIDP, 2018-2022

Table 22: Length of road by surface type per ward

Ward	Area	Tarmac	Gravel	Earth
GATARAKWA	461.68	4.13	137.62	158.57
MAHIGA	354.18	33.13	47.58	144.96
RUGURU	342.5	23.35	57.73	82.62
MUGUNDA	260.97	45.1	18.59	170.44
GAKAWA	251.54	14.47	23.8	159.18
KABARU	203.62	24.81	30.96	87.73
THIEGU RIVER	185.91	49.26	31.92	179.49
NAROMORU/ KIAMATHANGA	176.04	20.48	48.72	146.76
MWIYOGO/ ENDARASHA	132.8	10.2	53.38	130.68
DEDAN KIMATHI	116.26	12.86	79.11	113.17
KIGANJO/MATHARI	76.24	44.66	26.73	39.49

Ward	Area	Tarmac	Gravel	Earth
MWEIGA	69.31	26.06	41.2	26.45
MUKURWE-INI CENTRAL	58.61	15.06	31.3	97.32
KIRIMUKUYU	54.23	32.51	14.42	107.84
WAMAGANA	53.54	27.52	38.68	129.98
CHINGA	53.17	38.91	36.94	45.35
IRIA-INI	49.78	37.7	43.85	71.48
RUGI	49.35	15.29	15.99	81.73
AGUTHI-GAAKI	47.8	20.24	15.31	94.31
IRIA-INI	45.79	46.17	13.94	72.69
GATITU/MURUGURU	45.26	23.66	15.24	56.68
GIKONDI	37.51	1.64	33.08	67.73
MAGUTU	35.29	7.35	27.55	63.6
KARIMA	33.14	35.55	13.87	27.16
MUKURWE-INI EAST	33.14	11.34	23.76	42.6
KONYU	31.86	6.13	5.91	67.71
KARATINA TOWN	31.33	18.15	19.8	57.06
KAMAKWA/MUKARO	24.81	8.55	19.42	68.79
RURING'U	14.93	12.19	1.36	50.37
RWARE	6.5	10.47	10.17	12.98

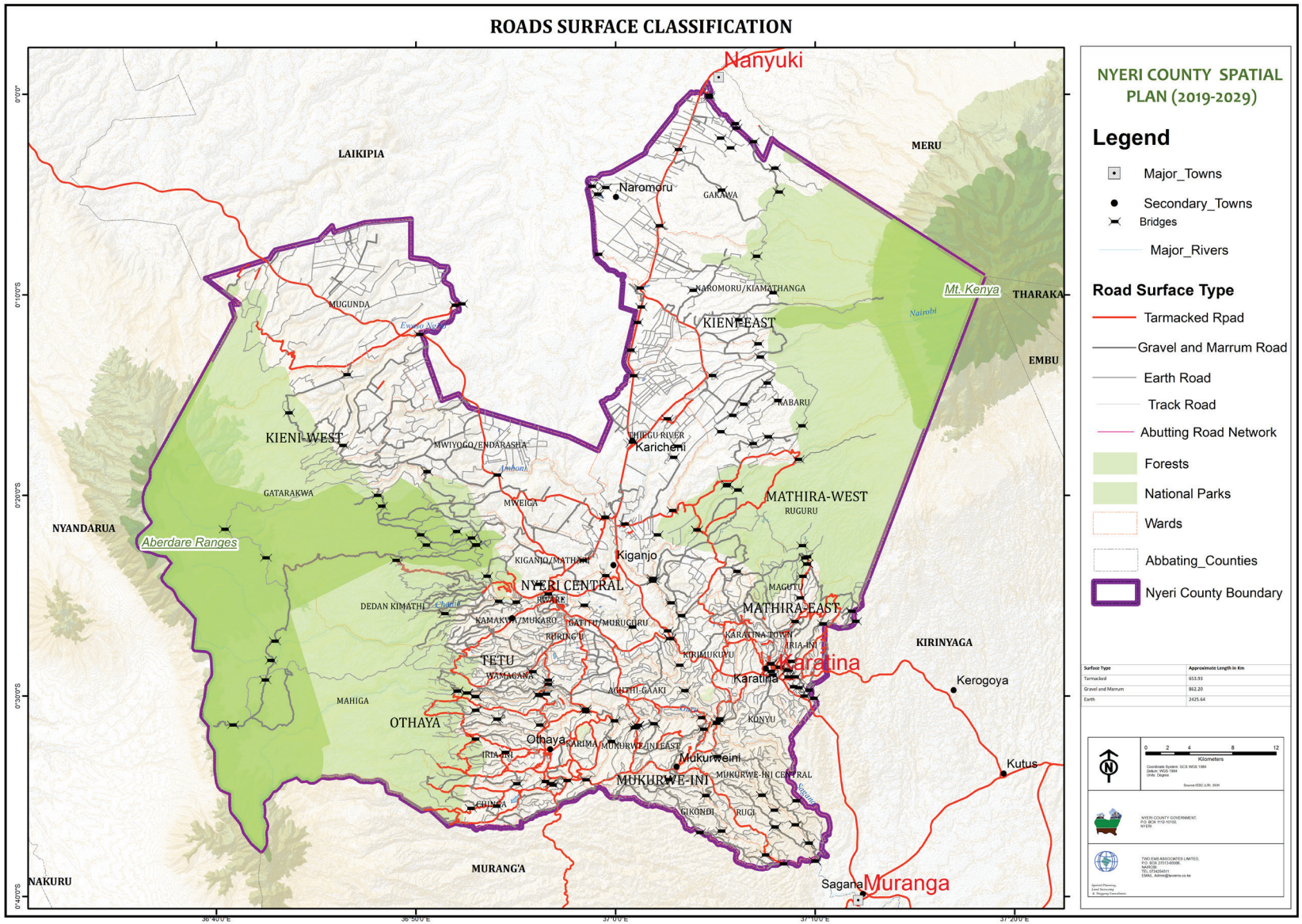
From the table above, Gatarakwa, Mugunda, Thiegu river wards have a high number of earth roads compared to tarmac roads hence facing high level of inaccessibility. Relatively, Iria-ini, Chinga, Kiganjo/Mathari have a high number of tarmac roads compared to earth roads.

9.1.1.3 Road Conditions

The roads in Nyeri, Othaya, and Karatina towns have been re-carpeted to the required standards. However, in the rural areas, majority of the roads are either earth or gravel roads. There are approximately 17.4% of paved roads in the County. This is attributed to the steep/ harsh terrain and the vastness of the region which makes infrastructure development costly. Consequently, this has resulted in the inability to transport goods and services to the markets and the inaccessibility to public facilities like schools and health centres.

In the highlands, such as; Mathira East, Mathira west, Othaya, Tetu Nyeri Central sub-counties, there are better road networks and conditions that have continued to improve the production in the agricultural sectors. Poor road network and inaccessibility during the rainy seasons has limited their agricultural development. In the lowland and dry areas, such as; Mukuruini, the road networks are in poor state and this has affected the region that is known for high horticultural potential. As a result, the transportation challenges have limited exploitation of the above resources and industrial development.

Map 59: Road Conditions



Source: Two Ems Associates, 2019

9.1.1.4 Road access/density standards

a. Road Access Index

Road access index is the proportion of people who have access to an all-weather road within an approximate walking distance of 2 kilometers (km). From the spatial analysis based on the percentage of the household survey population, the road access index is 62%, which is higher compared to the national average of 56% (World Bank, 2016). This indicates that Nyeri county has modest accessibility.

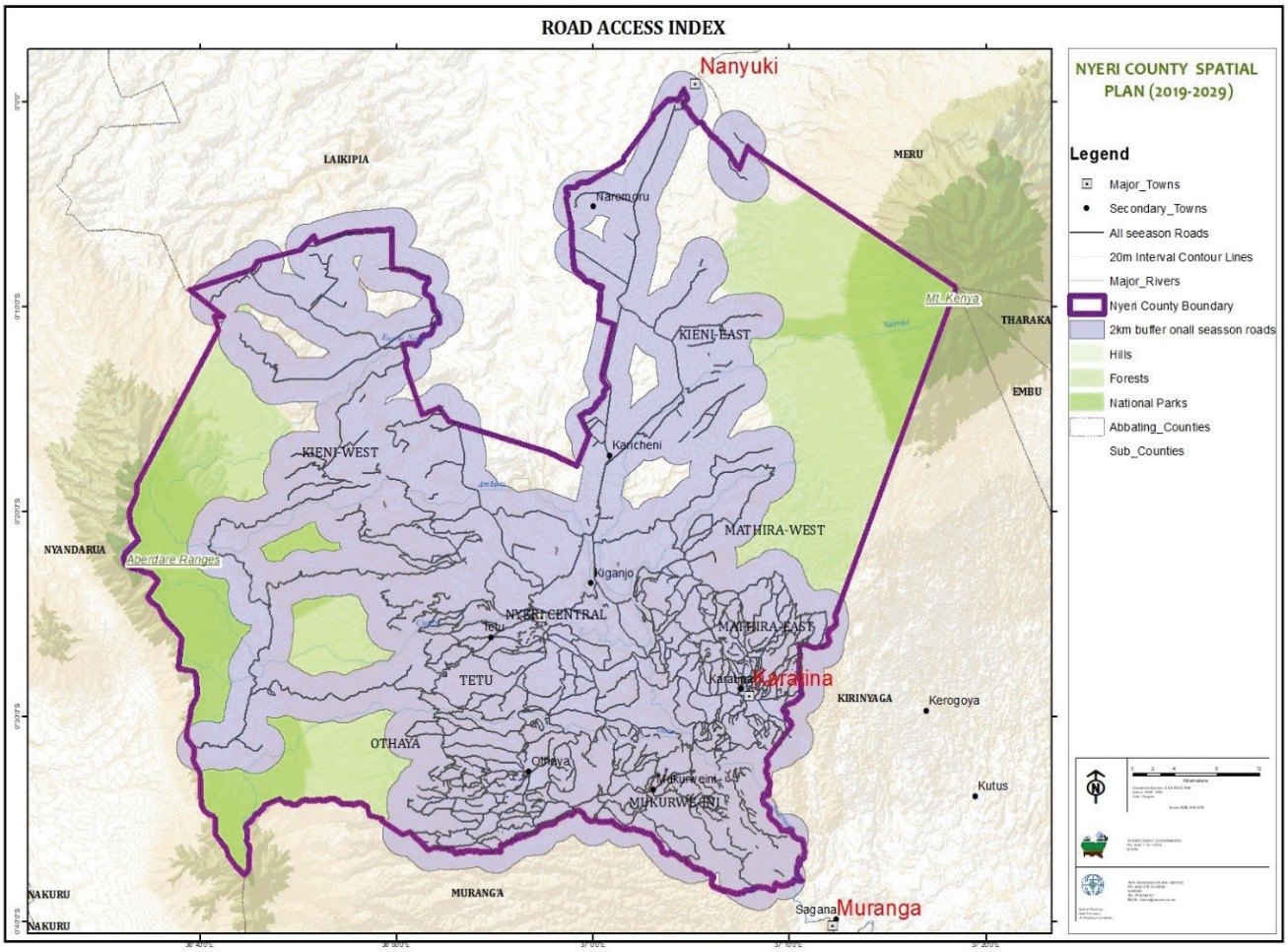
Road density is the ratio of the length of the county's total road network to the county's land area. Road density is most useful as a visual aid for finding areas with relatively high concentrations of roads. Road density is most useful where a high concentration of roads is problematic to a watershed or to wildlife. This may be the case with species that are sensitive to the disturbance and danger associated with roads. The road density in Nyeri County is 0.93km per sq km.

This indicates relatively good presence of roads. Comparison among the wards shows that Rware and Ruring'u have high road densities. This is attributed to them being urban centres and have high population density.

Ruguru ward has the lowest road density, however this is experienced because most of the ward is covered by the Mt. Kenya forest. This is followed by Mahiga and Gatarakwa wards which have lower road density compared to the rest of the wards.

As much as the overall road access/density is relatively good, the county experiences poor road conditions which requires upgrading/expanding of the existing road network or reclassification of unclassified or informal roads into the official network. Additionally, focus should be given to wards that have low road densities.

Map 60: Road access index



Source: Two Ems Associates, 2019

Table 23: Road density per ward

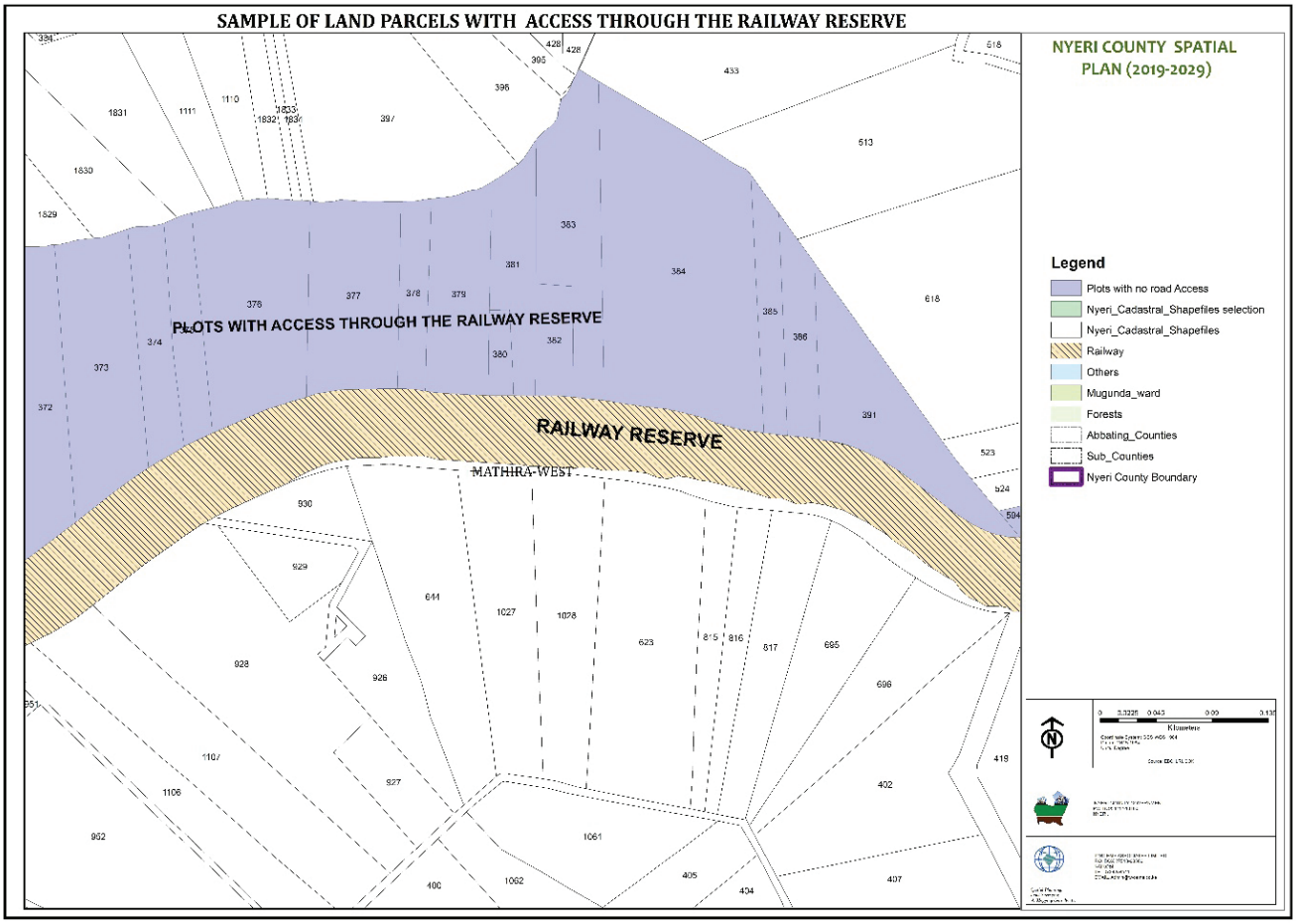
Ward	Area	Total road network	Road density
GATARAKWA	461.68	300.32	0.65
MAHIGA	354.18	225.67	0.63
RUGURU	342.5	163.7	0.47
MUGUNDA	260.97	234.13	0.89
GAKAWA	251.54	197.45	0.78
KABARU	203.62	143.5	0.70
THIEGU RIVER	185.91	260.67	1.40
NAROMORU/KIAMATHANGA	176.04	215.96	1.22
MWIYOGO/ENDARASHA	132.8	194.26	1.46
DEDAN KIMATHI	116.26	205.14	1.76
KIGANJO/MATHARI	76.24	110.88	1.45
MWEIGA	69.31	93.71	1.35
MUKURWE-INI CENTRAL	58.61	143.68	2.46
KIRIMUKUYU	54.23	154.77	2.85
WAMAGANA	53.54	196.18	3.66
CHINGA	53.17	121.2	2.27
IRIA-INI	49.78	153.03	3.07
RUGI	49.35	113.01	2.29
AGUTHI-GAAKI	47.8	129.86	2.71
IRIA-INI	45.79	132.8	2.9
GATITU/MURUGURU	45.26	95.58	2.11
GIKONDI	37.51	102.45	2.73
MAGUTU	35.29	98.5	2.79
KARIMA	33.14	76.58	2.31
MUKURWE-INI EAST	33.14	77.7	2.34
KONYU	31.86	79.75	2.5
KARATINA TOWN	31.33	95.01	3.03
KAMAKWA/MUKARO	24.81	96.76	3.9
RURING'U	14.93	63.92	4.3
RWARE	6.5	33.62	5.2

b. Access to the plots Neighbouring railway and forest reserve

Following the digitization of land cadaster records for the Nyeri County, it was realized that there are particular individual land parcels which have no road access and network. They rely on the abutting railway reserve or the footpaths within the forests as their primary access. These plots can be landlocked in case the Kenya Railways corporation and Kenya Forest Service construct fences around their respective reserves. This possible lack of access challenge should therefore be resolved.

Bounding Feature	Registry Section
Railway line	Waraza settlement scheme, Narumoru block 1, Ruguru Gachika, Ruguru Karuthi, Kirimukuyu Gachuiro,Konyu Ichuga,Magutu Ragati,Karatina Town, Konyu Barichu,Konyu Gaikunyu
Forests	Mt. Kenya Forest: Narumoru ragati, Naromoru Kamathage block3, Naromoru settlement scheme, Waraza settlement scheme, Island farms,Magutu Gaikuyu, Magutu Gatheru Aberdares Forest: Chinga Gathera, Othaya Ihuririo,Mahiga Kihome, Mahiga Munyange, Tetu Ichagachiru, Tetu Kabage, Tetu Karahiu ,Gatarakwa settlement scheme,Watuka Settlement scheme, Gakanga Charity Nyeri: Mweiga Block3, Mweiga Njengu Kiganjo: Ruguru Gachika South Laikipia: Gatarakwa Block 3

Part of railway reserve within Kirimukuyu Gachiuru where the parcels have no road access



9.1.1.5 Means of Road Transport

a) Motorized Transport

Motorized transport is composed of public and private transport. Public transport is generally the main means of motorized transport in the County.

1. Private Transport

Private transport is composed of personal cars and motorcycles. Private transport is however common in major urban areas, especially in Nyeri, Karatina, Othaya and Mweiga towns and its environs.

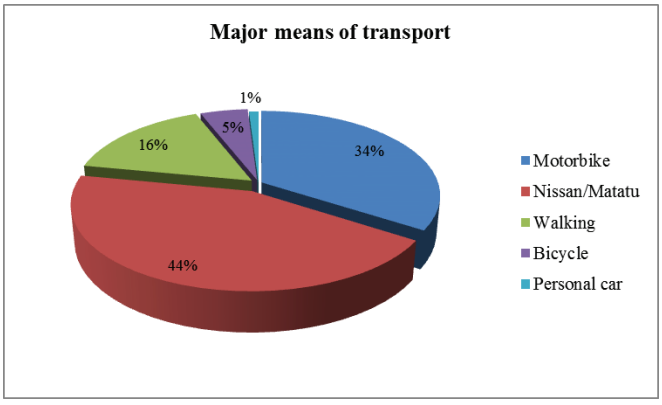
2. Public Transport

The key means of transport in the County is the use of Nissan/Matatu and Boda boda services. A good number of the population use matatu`s for travelling long distances as well as, connecting from urban centres to small towns and vice versa. Motorbikes are also commonly used for shorter distances to the nearest centre/facilities such as; schools and health centres.

The main challenge facing public transport in the region is the poor road network due to undulating terrain, and conditions. This has resulted to limited transport options that are cheap, comfortable and safe for People with Disability and women which hamper access to employment, as well as contribute to weakened social networks. It is therefore, important to provide multi-modal transportation systems that can provide much needed options for people who typically lack options, like women, children, the disabled and the poor. It is also necessary to ensure linkage to public transport as it is an important consideration for safety in urban areas.

The preferred means of transport by the people is motorcycles.

Figure 27: Major means of transport



Source: Field survey, 2019

This is because it is convenient and appropriate in the rural areas because of its ability to navigate in the bad roads in the region.

b) Non-Motorized and Intermediate Means of Transport (NMIMTs)

Non-Motorized and Intermediate Means of Transport (NMIMT) include head loading, on bicycles, motorcycles, or through animal transport. NIMTS is an important means of transport both in urban and rural areas. It is mainly used to support rural mobility needs between homes and farms, markets, rivers, meeting grounds, schools, dispensaries, churches, local administrative offices and rural homes. These journeys facilitate the production of goods and their movement to markets and their supply to urban areas.

In the County, NMT comprises of Boda boda (cyclists), walking, and animal transport. However, there lacks infrastructure for NMT such as dedicated paths for cyclists and pedestrians in urban areas.

c) **Public Transport Terminals**

The County has three operational bus terminals, which include: Kimathi University Bus Park, The Lower stage, the middle stage and upper stage. Besides the bus parking facilities in Nyeri town other major bus terminals are located in Mukurweni, Karatina, Othaya and Mweiga towns. There is also an ongoing construction of a multi-million matatu and bus terminus on the outskirts of Nyeri town that is expected to accommodate more than 200 matatus and 1,000 business stalls.

d) Parking Lots

There are limited existing parking facilities for cars, taxis, boda boda, and Lorries within the urban centres. The existing parking facilities have not designations for People with Disability. This leaves the People with Disability to compete for the limited parking spaces available.

The County government has made an effort to this effect to improved parking bays and parking lots for cars within Nyeri CBD. This however, doing this in Nyeri town a lone is not enough but the same should be introduced in other major towns in the county. More sustainable ways including designation of NMT lanes and Bicycles parking, in these towns should be considered to improve the mobility and safety of the urban users.

9.1.1.6 Effect of Climate Change on Road Infrastructure

Climate change poses a critical threat to road infrastructure. Extreme weather conditions pose a costly hazard to roads in terms of degradation, necessary maintenance, and potential decrease in lifespan due to climatic impacts. The climatic events have resulted to lost connectivity, traffic accidents and reduced mobility.

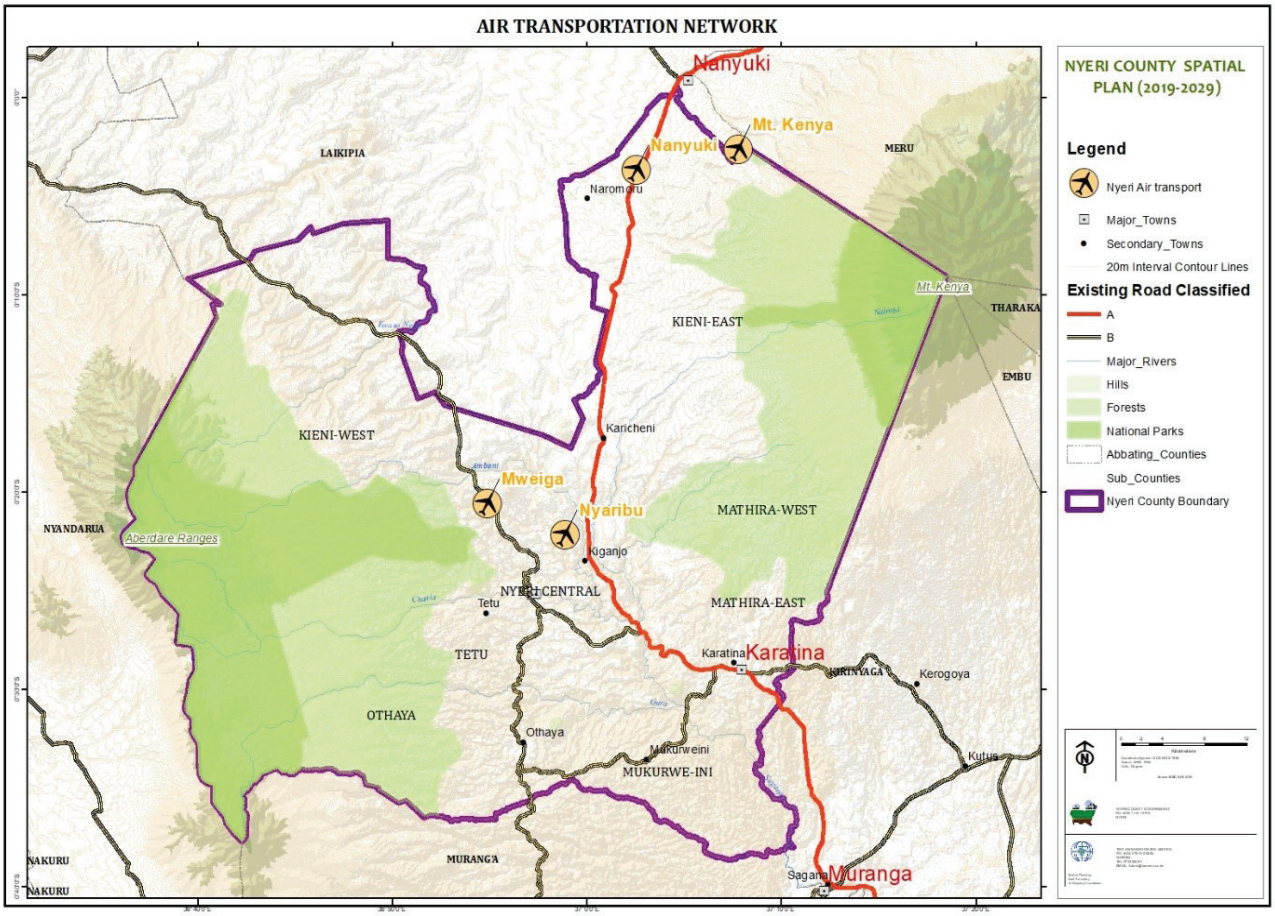
In Nyeri County, certain areas face severe environmental degradation which can result into increased soil erosion which can as well affect the road infrastructure in the county. In some areas, bridges are likely to be carried away or over flown with excessive flood, this can paralyze transportation in the affected areas.

9.1.2 Air Transport

There are four airstrips in the County namely; Mweiga airstrip, Mt Kenya airstrip, Nanyuki airstrip and Nyaribo airstrip. However, there are not fully operationalized to capacity since they are under developed. This means of transport if fully tapped into will open up the County to regional and international markets especially for tourism and agriculture (horticulture) development.

Airstrip	Condition	Remarks
Nyaribo	• Land Occupied: 4.5 km^2 • Has a tarmacked runway of 1.4km gazette. • Has external access road to Nyeri town which is tarmacked • It serves few commercial flights to Nairobi • Has a new aviation training institute	Requires construction of standard terminal building with improved security screening, lounges etc for effective service delivery
Mt. Kenya	• Land Occupied: 7.7 km^2 • Has Tarmacked runway of 1.7Km • Mainly used by Kenya wildlife services and Kenya Forest Service aircrafts	Should have regular maintenance and be fitted with emergency response equipment
Mweiga	• Land Occupied: 4.1 km^2 • Has a untarmacked runway of 1.4km • Has external access road to Nyeri town which is tarmacked	Requires construction of standard terminal building with improved security screening, lounges etc for effective service delivery
Nanyuki	• Land Occupied: 4.2 km^2 • Has Tarmacked runway of 1.4Km • Its strategically located along Nyeri-Nanyuki Highway • Gateway to Mt. Kenya National park and is used mostly by tourists	More room for concession including vibrant hospitality services

Map 61: Air transport



Source: Two Ems Associates, 2019

From the analysis above, Nyaribo, Mweiga and Mt.Kenya airstrips are strategically located and compatible with abutting land uses. Nyaribo and Mweiga are bordering agricultural farmlands, while Mt. Kenya is in the forest and is used by KFS. However, Nanyuki airstrip is susceptible to encroachment as Nanyuki town is developing towards it and therefore there is need for a zoning plan to protect it.

The land demand standards for airstrips is a minimum of 4km^2. This therefore shows that the land required for upgrading of the airstrips is adequate. Plans have been underway with recent laying of a tarmac runway that will improve the condition of Mweiga airstrip.

9.1.3 Rail Transport

The Nairobi-Nanyuki Railway (77.7Km) line transverses through the County. It has three railway stations at Kiganjo, Karatina and Naromoru within County. The choice of the site location was chosen due to its topographical advantages in the County and the historical close proximity to the settler farmlands.

The Nairobi-Nanyuki Railway was built by the colonial government around 1908 to primarily open up commercial farming for white settlers in the region. Large scale commercial farming in the region comprised mainly beef ranching with live animals transported by rail to the Athi River meat factory. Wheat and barley farming, wool (sheep) and dairy farming, coffee and other cash crops were also transported. These raw agricultural produces were transported by the railway to Mombasa for export.

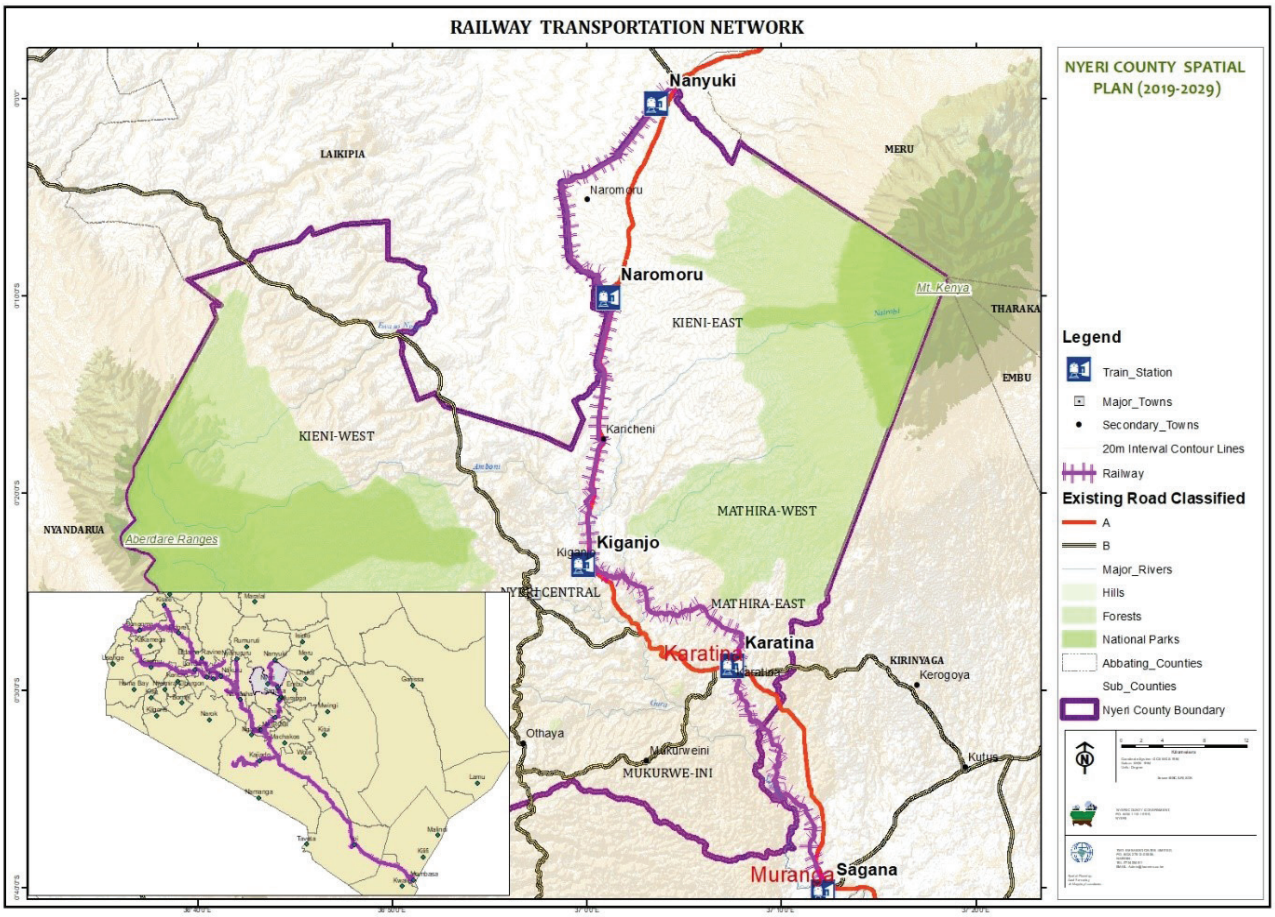
Historically the railway transport had stalled for several years after the independence due lack of economic viability i.e. reduced agricultural production and market and competition from other means of transport including road transport. However, it has been revived and there is great opportunity for the county to maximize on its growth potentials.

Northwards, trains ferried machinery, farm inputs, bulk petroleum, and consumer goods. The railway was also the main inter-town mode of passenger transportation, making three trips a week from Nairobi to Nanyuki and back. By the 1970/80s, the Nairobi-Nanyuki railway traffic diminished as commercial agriculture reduced, and the introduction of road transportation capacity to ferry goods and passengers.

The railway line has a 60m railway reserve which is the recommended standard. Cases of encroachment along the railway reserve by informal traders were initially experienced in Karatina and Chaka town, however currently the railway reserve has been repossessed. The existing railway stations cover on average an area of 4,680m2.

Railway transport is currently underutilized and there is need to revive it to be an alternative means of transport as it will transport bulk agricultural produce from the Count and link the County to regional markets. Plans are under way to revive the railway line from Nairobi –Nanyuki, in a plan that aims at formation of Mt Kenya and Aberdares counties economic block bringing together various counties; Embu, Meru, Nyeri, Laikipia, Tharaka Nithi, Nyandarua, Kiambu and Muranga.

Map 62: Rail transport network



Source: Two Ems Associates, 2019

9.1.4 Emerging Issues of Transportation

Opportunities	Constraints
• Promotion of inter-County modal linkages • Opening up/upgrading of strategic rural roads that will spur development and promote security • Well-articulated transport network. • Upgrading of all airstrips across the County to boost economic trade • Development of effective NMT facilities • Establishment of safe, comfortable public transport system • Construction of all-inclusive parking bays • Use of rail transport • Public Private Partnerships in road development	• Poor road conditions make some areas inaccessible (especially rural areas during the rainy seasons). • The lack of designated non-motorized transport spaces has led to frequent accidents involving pedestrians and boda bodas/bicycles in major towns. • The under-utilized and undeveloped airfields limit transport interchange options. • Poor rural-urban linkages hindering the transportation of produce and people to and from the market and urban centres • Under-utilized rail services • The lack of effective public transport system has alienated vulnerable groups such as People with Disability

Infrastructure and services

Infrastructure refers to the basic physical and organizational structures needed for the day to day operation of a society or enterprise. The provision of well-maintained infrastructure is imperative to economic growth, employment generation, and poverty reduction. Infrastructure is divided into two main components, namely physical and social infrastructure. Physical infrastructure comprises of water supply networks, energy systems, sanitation facilities, and information and communications technology (ICT) systems, while social infrastructure refers to community facilities relating to education, healthcare, security, and recreation. According to Kenya Vision 2030 initiative, physical infrastructure is identified as a key socio-economic pillar.

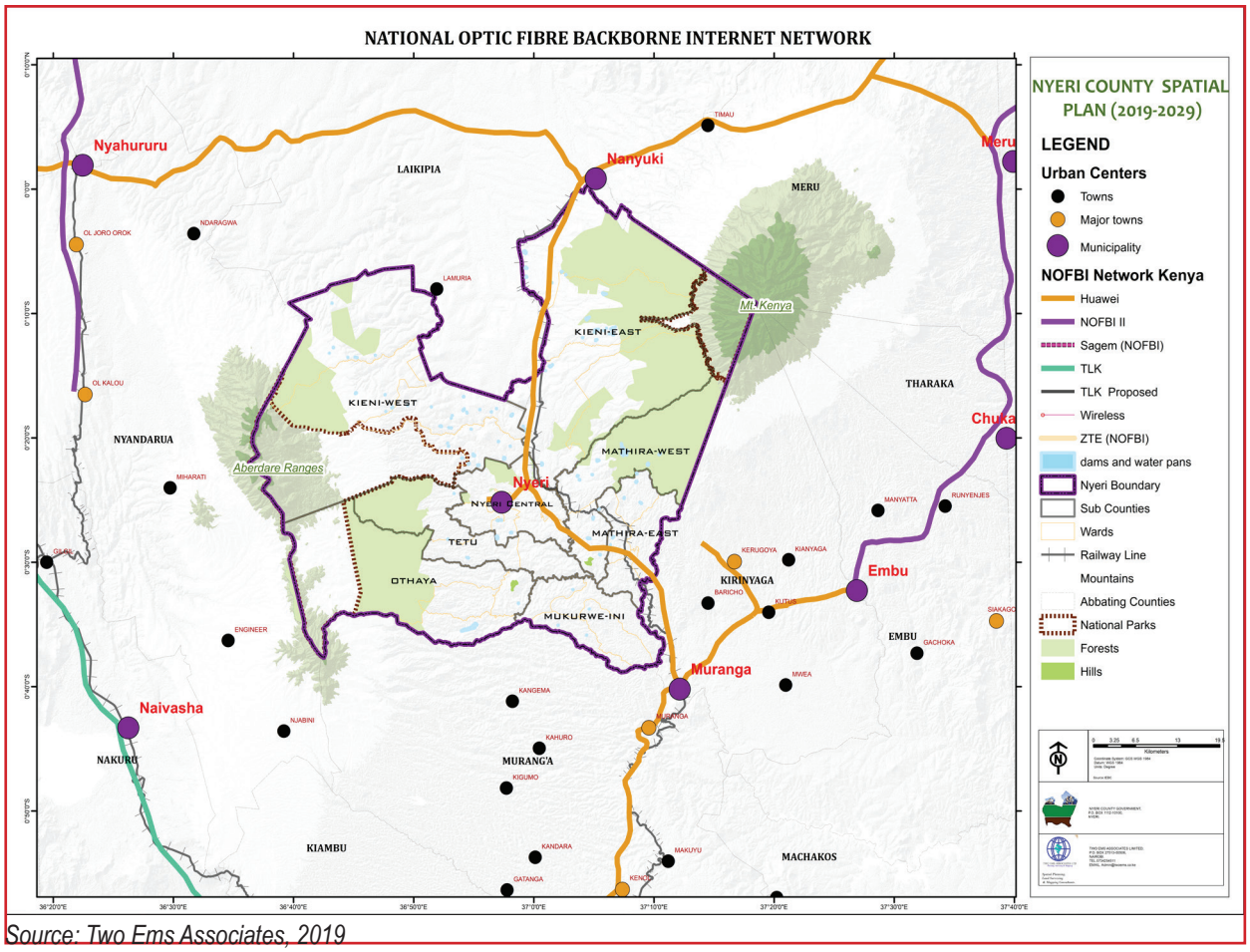
9.2 Information and Communications Technology

9.2.1. Fibre network coverage.

The National Optic Fiber Backbone (NOFBI) is a project aimed at decentralization of government services from the capital city to the 47 county governments. The projects desire to facilitate efficient public service in areas including registration of persons amongst others. Ministry of Information and Technology has laid approximately 6000km of NOFBI as at 2016 through its officially appointed agents. The agents include, Huawei, Sangem, ZTE, Telkom Kenya, and local wireless providers.

Nyeri county is served by Huawei high-speed internet cable while the wayleave aligned to A2 highway, and parts of B5 highway terminating in Nyeri town. A2 and B5 highways being international and national roads respectively have road reserves ranging 80-120M (A2) and 45-60M(B5). Shared wayleave is cost effective as a 1000-2000mm utility duct is provided at the shoulders thereby reducing land acquisition costs. Wireless providers include Safaricom, Airtel and TLK, as shown in the map and figures below.

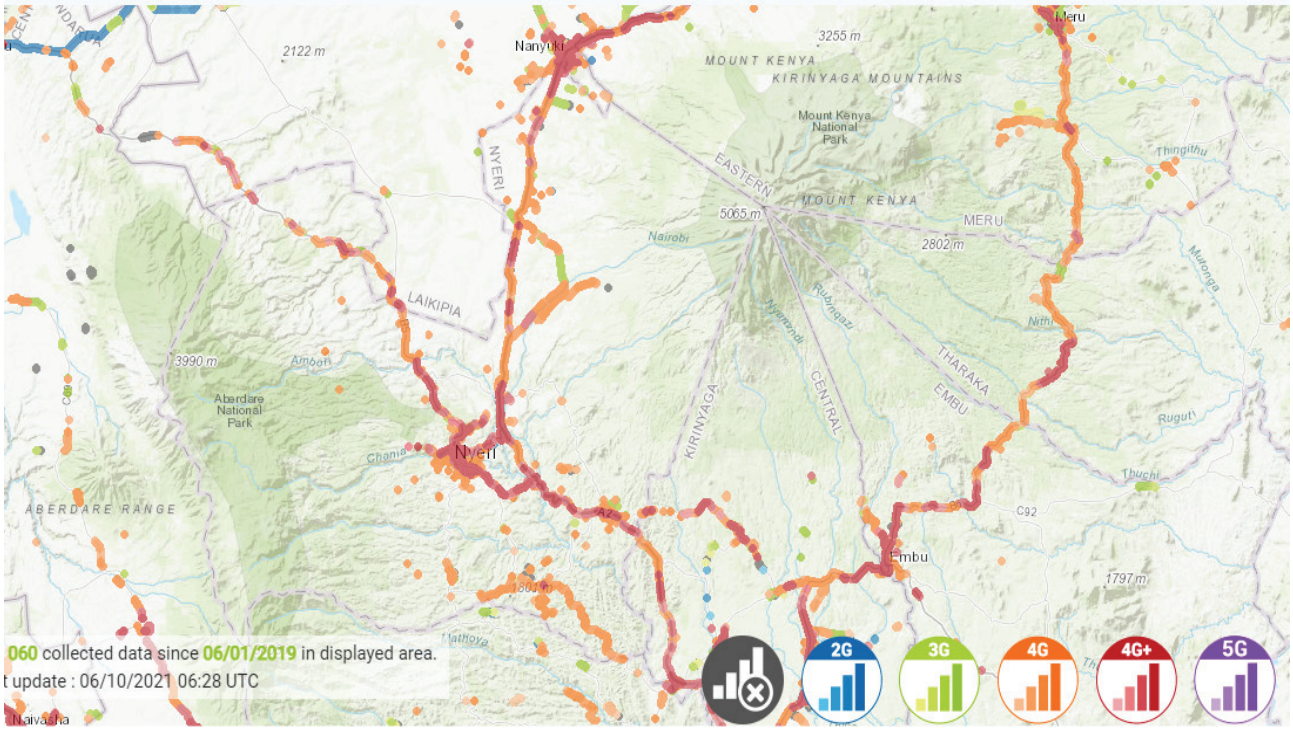
Map 63: National Optic Fibre Backbone Internet Cable



Source: Two Ems Associates, 2019

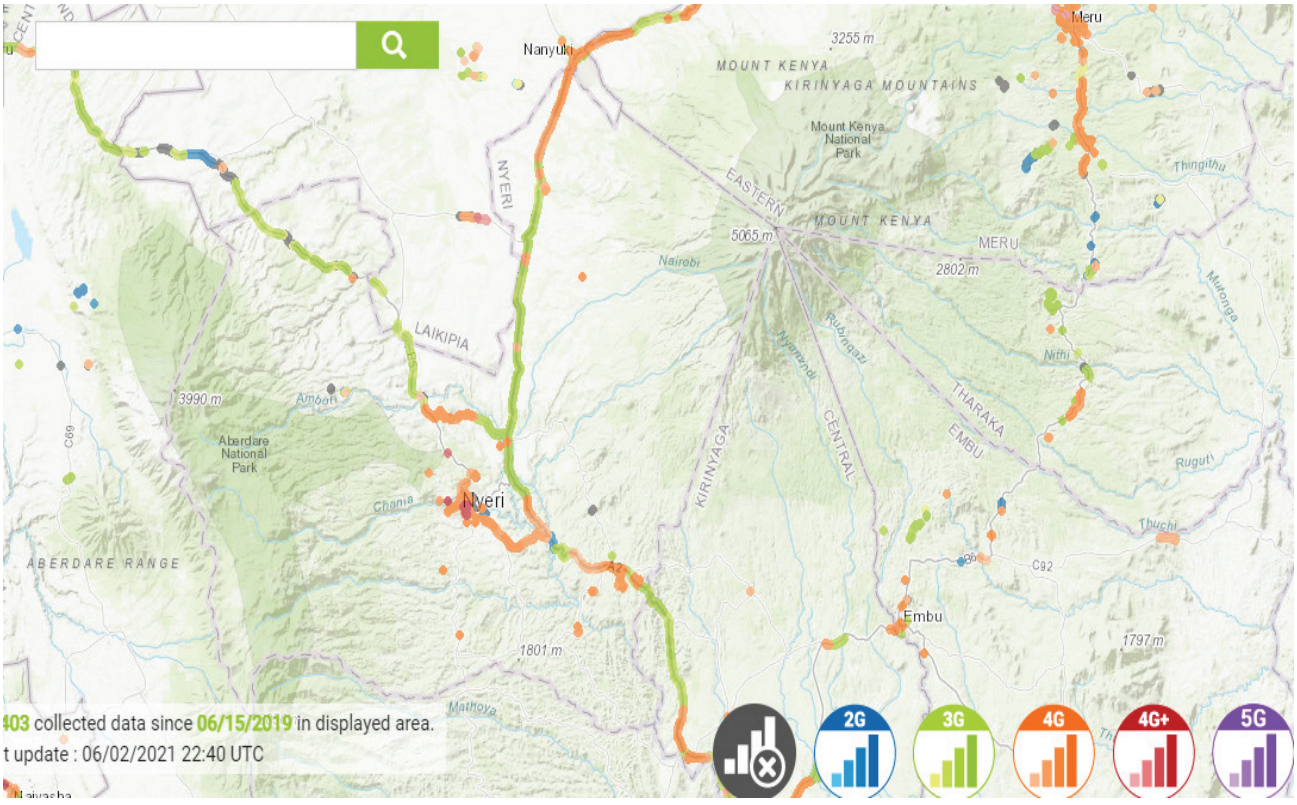
Wireless Mobile and data networks within the County is provided by Safaricom, airtel and telecom (TLK) and faiba companies. The three companies signal band strength ranges from Edge (G) ,2G,3G, 4G and 4G+. Urban centres have strongest signal as compared to rural areas of Mukurweini and Mugunda in which residents complained of poor signal strengths.

Figure 28:Safaricom fibre cable coverage within the County



Source: Safaricom ,2019.

Figure 29:Airtel fibre cable coverage within the County



Source: Airtel ,2019.

Figure 30: TLK (Telkom Kenya) wireless fiber coverage within the County

Source: Telkom ,2019.

b) Google loons project

The project was commissioned in Kenya in 2018 as an initiative of US-based company Loons.com and Telkom-Kenya partnership targeting rural areas underserved with internet infrastructure. Internet is sourced from well served urban areas and beamed 20km into the stratosphere where helium gas filled floating balloons re-beam 4G/ LTE signals back to earth over surface area of approximately 5,000Km^2 to the cell phones or laptops or any other equipment. Floating balloons are solar powered, and float at a distance where minimum air traffic is expected, dust or even wildlife, however KCAA approval is required for safety. The company has developed three ground stations in Nyeri, Nairobi and Nakuru. Station in Nyeri is located in Rware due to availability of High speed NOFBI, that acts as the original source of internet.

Location of ground station in Nyeri was informed by mountainous landscape that presents a challenge to regular internet providers, where many GSM base stations are required to cover the area, however with this technology one balloon would adequately supply 4G internet across the county. Loon's technology provides an alternative that can be used in cases of emergencies, it is very resilient, in cases of disasters such as flood and landslides that would normally destroy GSM base stations.

Plate 3: Loon internet balloon

Source: Telkom ,2019.

9.2.2 Telecommunication

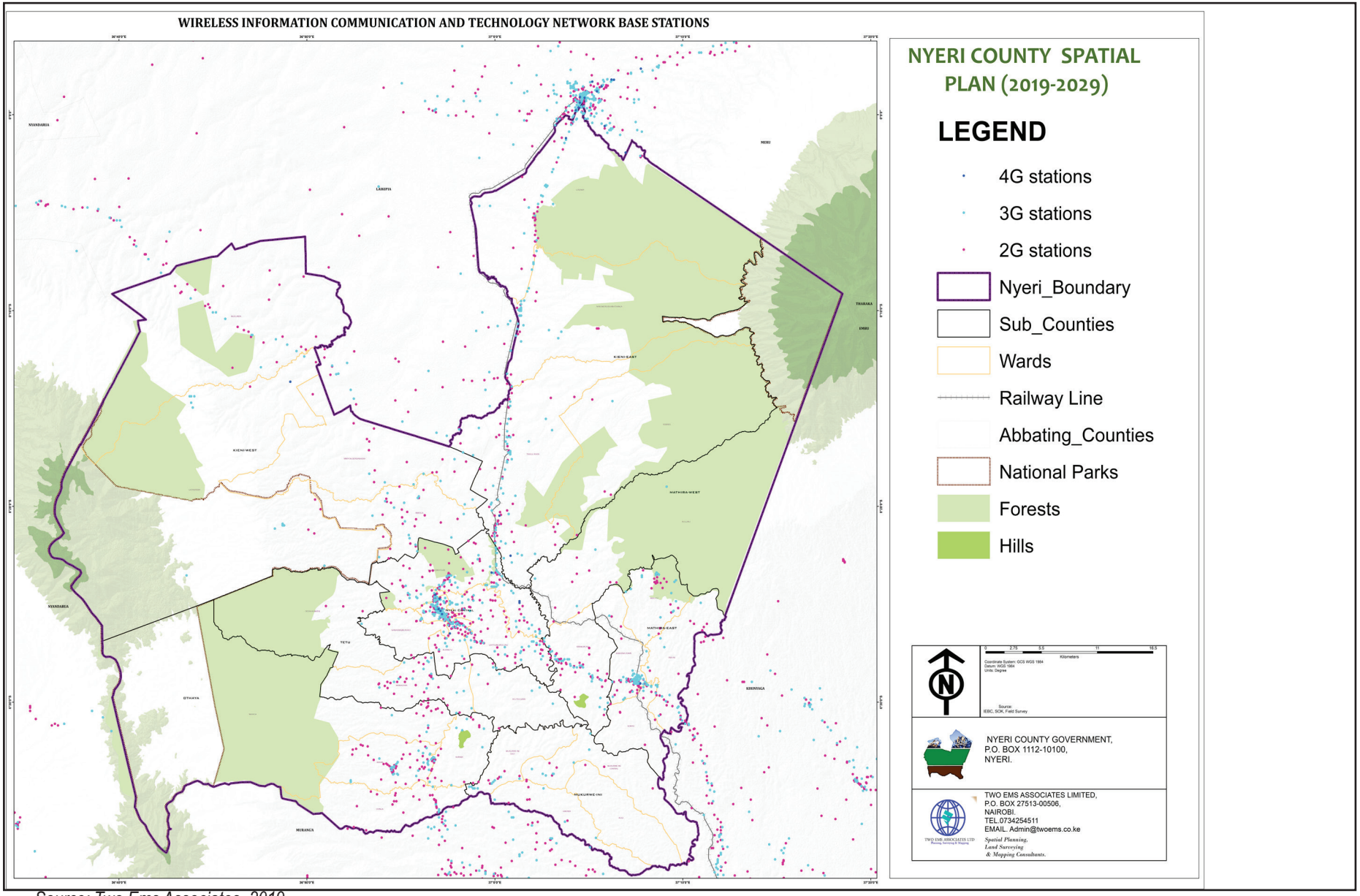
Telecommunication refers to modes with which information is transferred from one entity or person to the other. The telecommunication modes include television sets, mobile phones, radios, internet and newspapers. According to the household survey 2019, 80.9% of the residents own a radio, 58.9% own a television set and 62.3% own mobile phones.

This shows that majority of County residents rely on radio for information. Radio devices are less costly to manage as compared to mobile phones and TVs and higher signal frequencies across the County. Also, there are lots of vernacular radio stations which also contribute to many locals tuning in as compared to televisions stations.

The main source of information is radio stations which constitute 70.0% of the residents within the county. Others include, television stations (15%), newspapers (4.9%) and internet (10.1%). The use of newspapers and internet is however expensive, as a single newspaper costs KES 60 while internet one needs data bundles to access. This makes radio favourable amongst locals as a source of information.

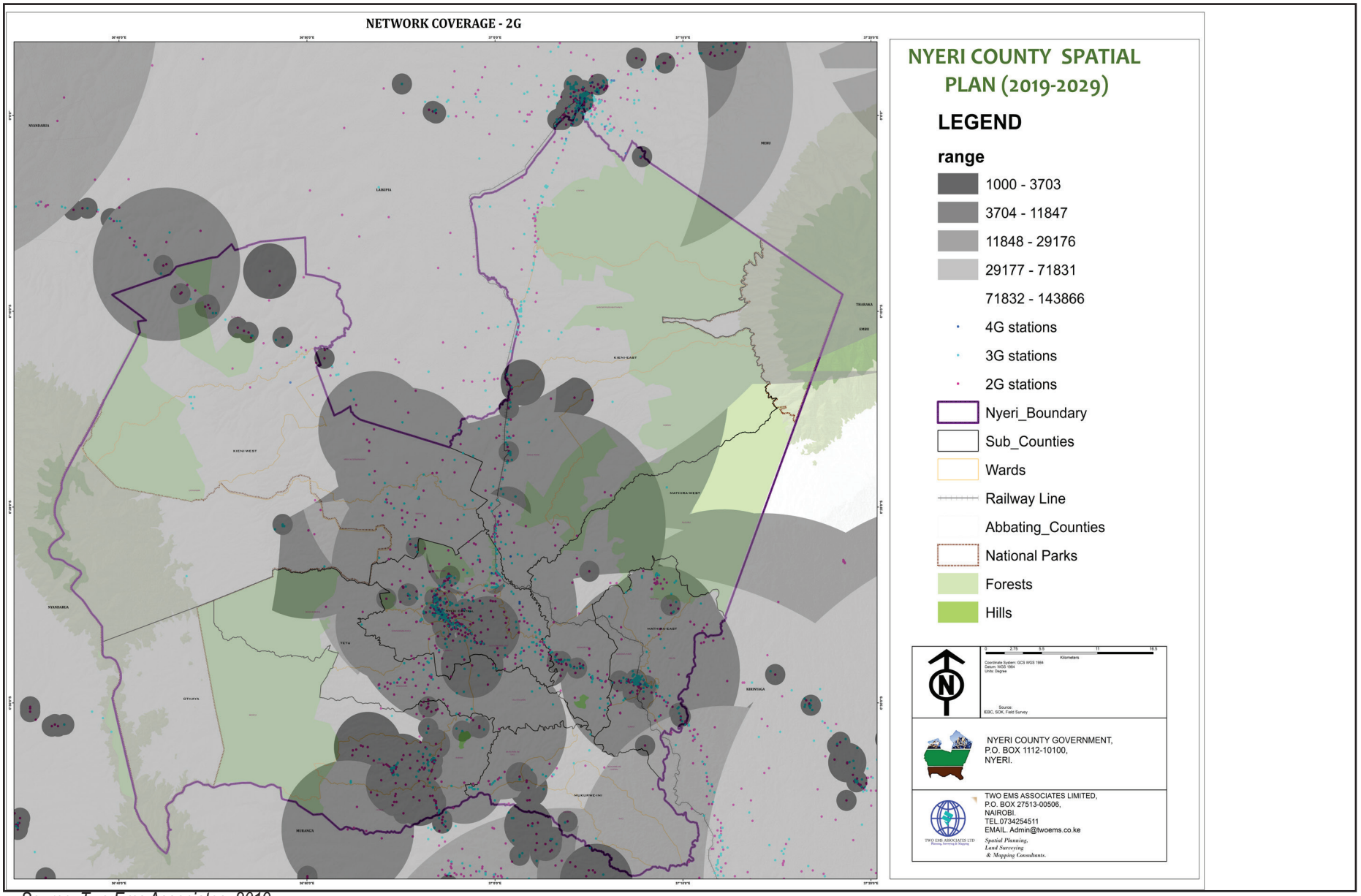
Nyeri county has a good relatively good network coverage, that facilitates communication. Main network service providers are Safaricom, Airtel, and Telkom. The network is in form of 2G, 3G, and 4G signals. Safaricom and TLK (Telkom Kenya) have the highest network coverage as compared to Airtel see coverages below.

Map 64: Network Base Stations



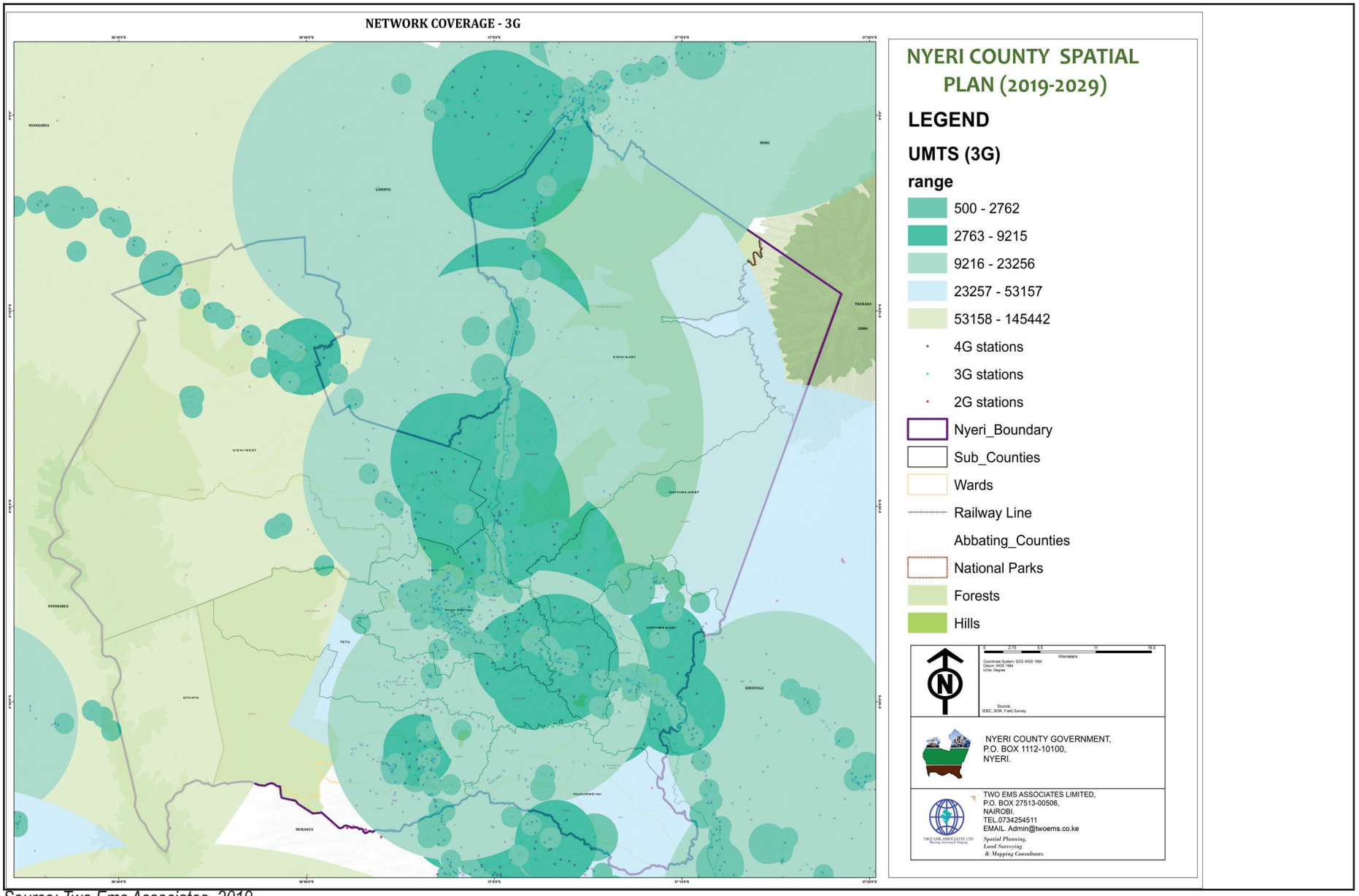
Source: Two Ems Associates, 2019

Map 65: Network Coverage-2G



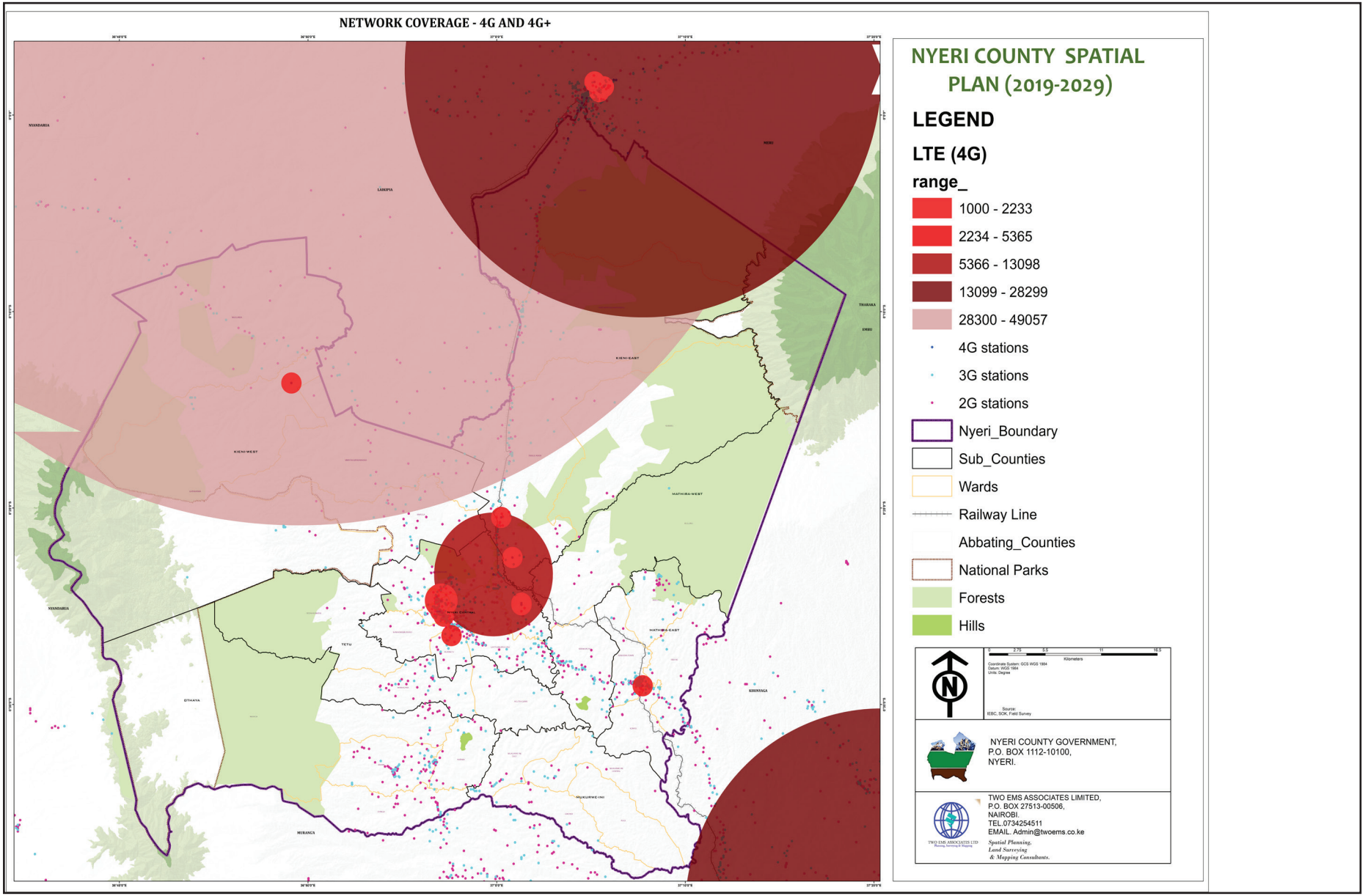
Source: Two Ems Associates, 2019

Map 66: Network Coverage-3G



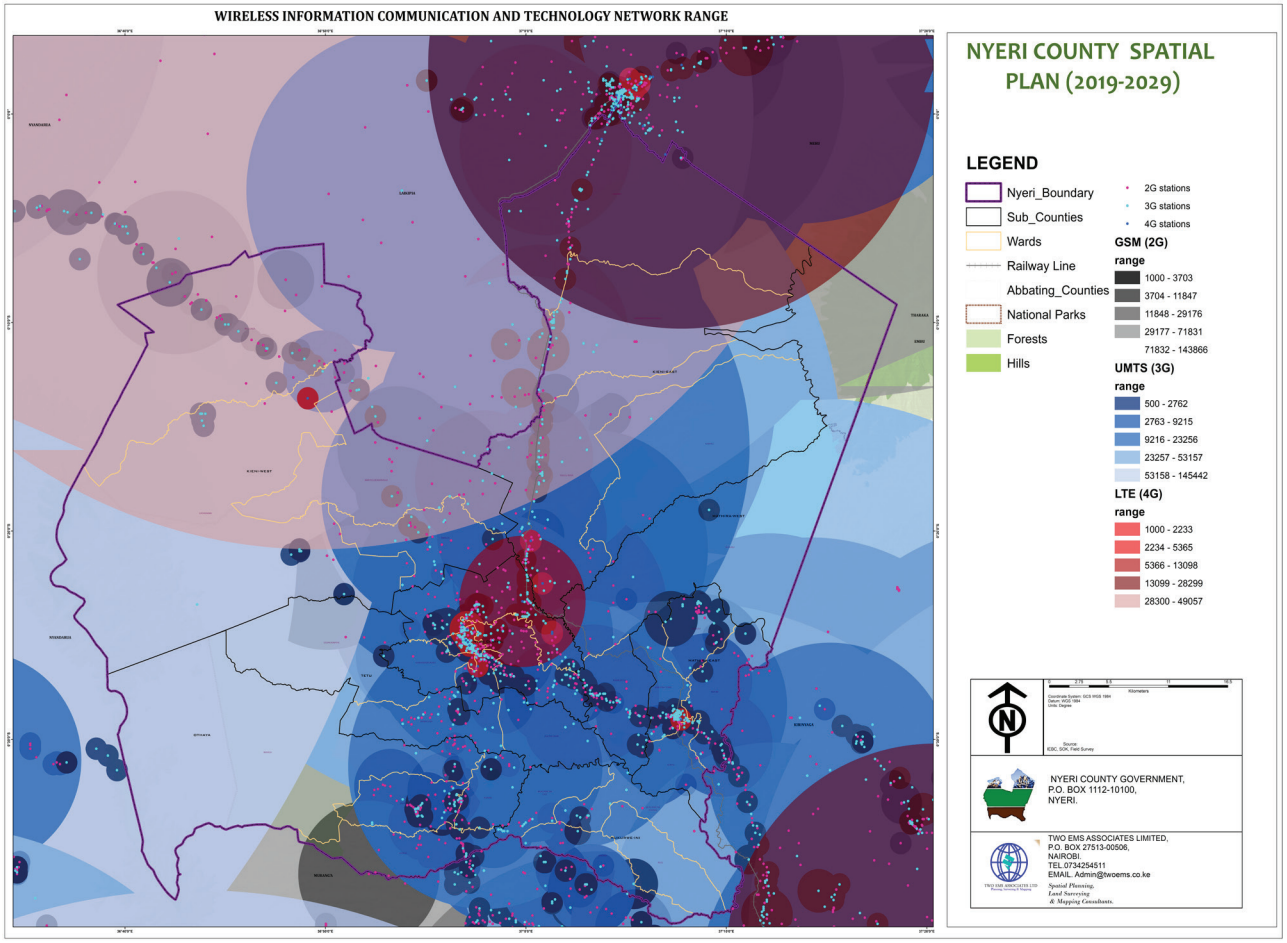
Source: Two Ems Associates, 2019

Map 67: Network Coverage-4G and 4G+



Source: Two Ems Associates, 2019

Figure 31: Mobile network coverage in Nyeri county



Source: Safaricom, Airtel & TLK (Telkom Kenya) ,2019.

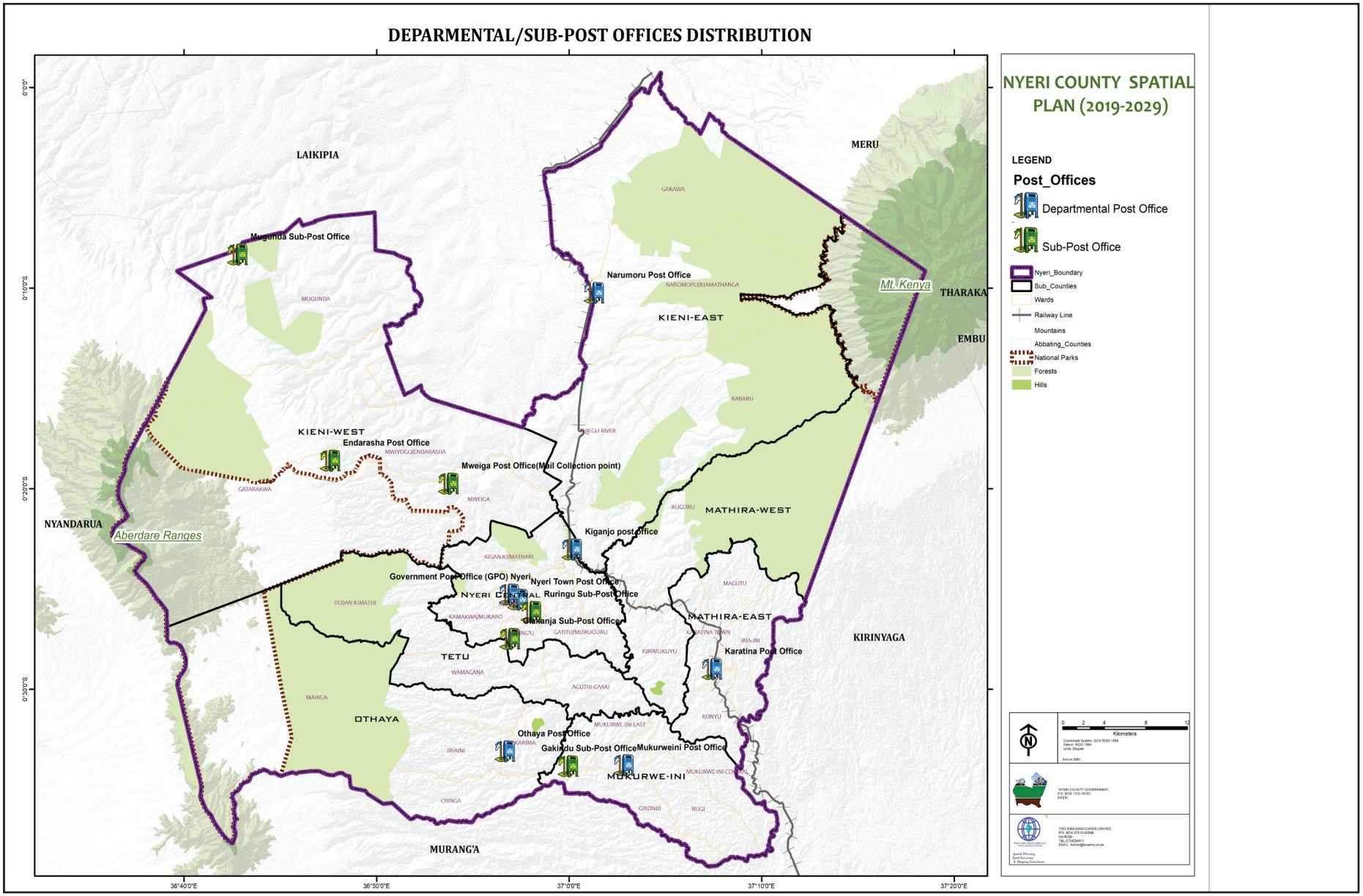
9.2.3 Courier services

Courier services within the County are provided by Posta Kenya and private companies Some of the private companies operating in the County include G4S, DHL, Fargo services amongst others. In addition, transportation companies have also ventured into this service moving goods and parcels to various areas within and outside the county.

9.2.4 Postal Services.

Postal services were established by Kenya Information and Communications Act Cap. 411A of 1998. Post office service within the county are offered in two levels including: Main Branches and at Sub-Post Office level. Nyeri County Post Office, Now Nyeri County GPO was formally the headquarters of Central province postal services, with main branches in Karatina, Nanyuki, Narumoro, Othaya and Kiganjo town. Sub-post offices are design to devolve the service to sub-county and ward level, they include Mweiga, Endarasha, Mugunda, Gakindu, Giakanja and Ruringu. See map below for distribution of the service infrastructure.

Map 68: Post office distribution



Source: Two Ems Associates, 2019

9.2.5. Access to ICT Facilities

The County residents have reliable and adequate access to ICT infrastructure as majority have access to radio, mobile phones and television sets. Paradigm shift in access of information is towards use of internet while minimising use of newspapers which encourages deforestation. In the course of household surveys 37.8% of the respondents complained about poor network signals as a major hinderance of digital transformation from radio to internet use. These problems were highly pointed out in areas where terrain is rugged especially in Mukurweini central at 64.3%, Magutu at 61.5%, or far rural interior areas such as Mugunda 69.2%, compared to urban centres such as Nyeri, Karatina and Narumoro where above listed challenges scored less than 2%.

Other challenges hindering access to ICT infrastructure include high tariff costs, expensive nature of ICT devices amongst others. Household survey also established poor service delivery especially in the public service sector, and inadequate ICT connections were blamed for the slow services. It is important for investment in E-government to hasten government processes and services.

9.2.6 Opportunities and challenges to ICT Facilities

Potential/Opportunities	Constraints
• Radio services is the preferred mode of information. • Existing ICT infrastructure such as Fibre optic cables along the A2 corridor can be used to establish ICT hubs. ICT hubs will provide employment for the youth.	• Cost of internet access is high. • ICT infrastructure is not full accessible within the county. • Steep terrain that deflect/block GSM waves, making it expensive to provide 4G and 3G in parts of Mukurwe-ini and Dedan -kimathi.

Table 24: Electricity Access Rate in households per Constituency

Constituency	No. of Connected Households August 2018	Access Rate as at August 2018
KIENI	33,043	65.86%
MATHIRA	45,586	83.05%
MUKURWE-INI	21,251	88.72%
NYERI TOWN	50,875	99.57%
OTHAYA	28,274	85.63%
TETU	22,753	80.71%
TOTAL	**201,782**	**80.78%**

Source: Kenya Power, 2019.

9.3 Energy

Energy plays an important role in sustainable development and poverty eradication. The major sources of energy in the County are: Firewood and Charcoal. Electricity, LPG and Kerosene are used mainly in urban areas

9.3.1 Energy Sources

a) Electricity Supply.

Over 80.78% of households in the county are connected to the national grid as at August 2018 (Kenya Power, 2019). Power supply is spearheaded by Kenya Power and the Rural Electrification and Renewable Energy Corporation. As at 2017 the co-corporation had connected 70% of the rural hinterland with electricity and projections indicate that as at 2022 the County will have achieved 100% grid connectivity.

b) Rural Electrification

Rural power supply is currently spearheaded by the Rural Electrification and Renewable Energy Corporation which ensures power provisions in all rural trading centres, health facilities, public school, and KPLC which ensures connectivity of households located within a radius of 600m from a transformer both funded by National government through the last mile project. As at 2017 the co-corporation had connected 70% of the rural hinterland with electricity under the project, and projections indicate that as at 2022 the County will have achieved 100% grid connectivity.

c) Solar

Solar is regarded as clean energy. However, use of solar energy hasn't gained traction within the County. This can be attributed to 70% of the County having less potential of solar energy. While this is the case remaining 30% of County has the potential including Kieni East and West areas which is yet to be exploited. However, household results indicate a section of population in Kieni have noted an opportunity in solar energy and some are moving towards use of solar. This spatial plan intends to unlock this potential to provide County residents with clean energy as an alternative to kerosene, firewood and charcoal.

d) Bioenergy

Bioenergy is a form of clean energy that the County is yet to fully exploit. Bioenergy includes amongst others energy from municipal solid waste, use of bio-digesters from animal droppings, gasohol and biodiesel. National government through the ministry of energy has a demonstration center for bio-energy production at Wambugu farm. Household findings indicated the County has a challenge of solid waste management.

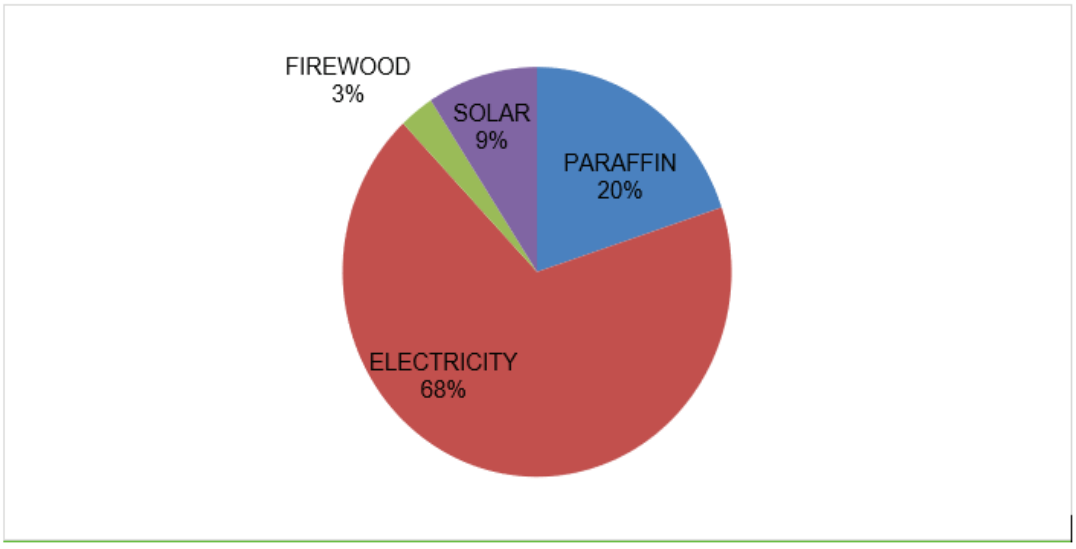
This spatial plan finds this as an opportunity for exploring production of electricity with the waste as raw material while dairy farming zones have an opportunity of using the animal waste to produce bio-gas.

9.3.2 Energy Use

Energy for lighting

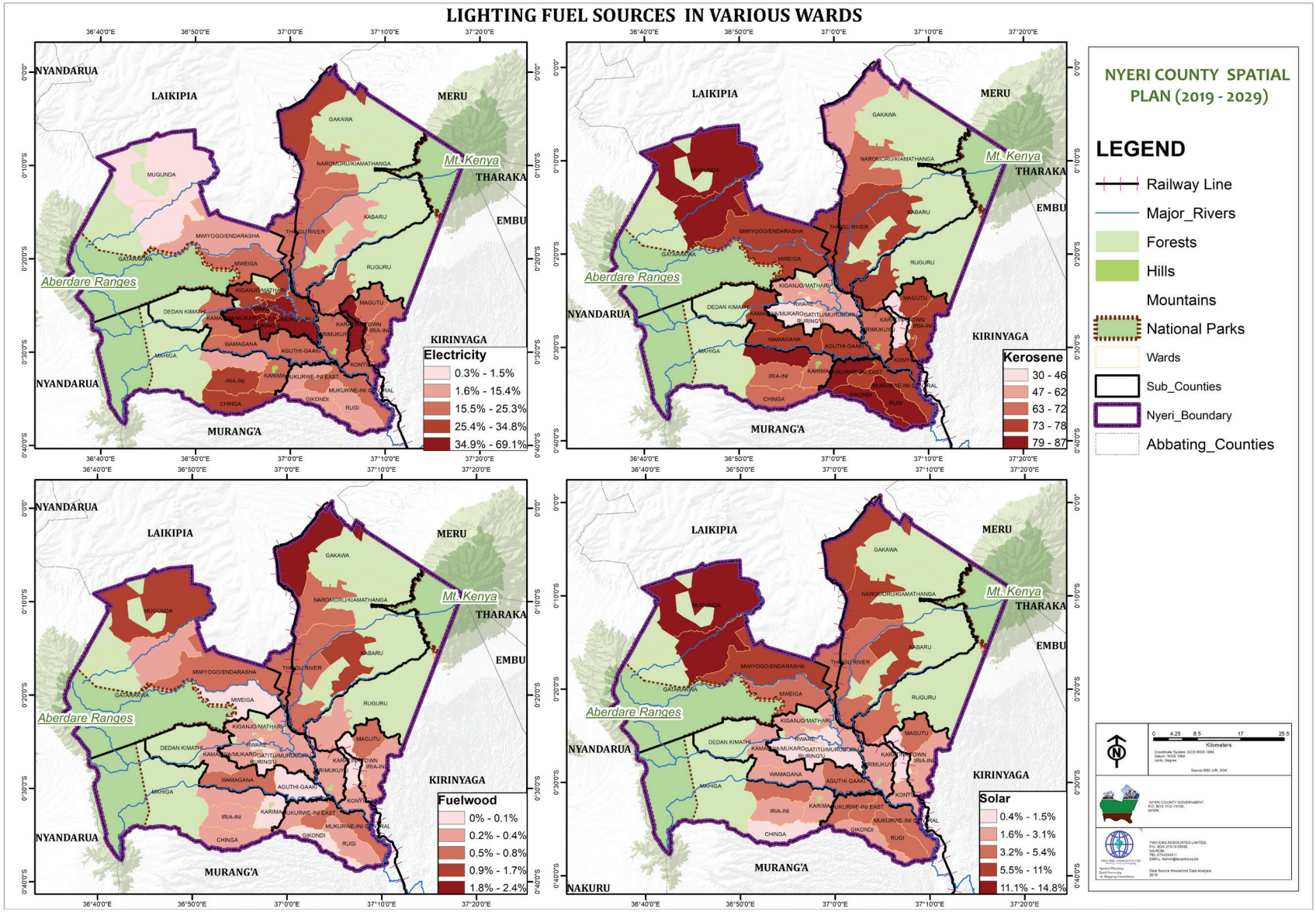
The household survey findings established that 68% of the residents' use electricity as source of lighting. Solar use is gaining momentum at 9.2%. Use of kerosene stands at 19.9%, which can be attributed to high cost of electricity connection.

Chart 4: Energy source in Lighting



Source: Field survey, 2019

Map 69: Lighting Energy source per ward



Source: Two Ems Associates, 2019

Wards such as Rware, Ruringu, and Karatina town and Kamakwa/Mukaro have 60-70% use of electricity for lighting. Electricity for lighting is least used in Mugunda & Gatarakwa and Rugi wards which recorded 0.5-2% and 8.9%, this can be attributed to low connectivity to the power grid. Areas where electricity is least used kerosene is utilized as an alternative, in Mugunda, Gatarakwa, and Rugi wards which recorded over 82%.

The 9.2% who use solar energy are mainly found in Kieni east and west sub-counties attributed to high solar insolation compared to other sub-counties. Use of solar in Kieni east and west sub-counties shows potential of solar energy as an alternative to fuelwood and kerosene. Firewood is predominantly used in areas close to forests such as Mugunda, Kabaru and Gakawa which recorded over 2%. Firewood is predominantly used in areas close to forests such as Mugunda, Kabaru and Gakawa which recorded over 2%. .

Street Lighting

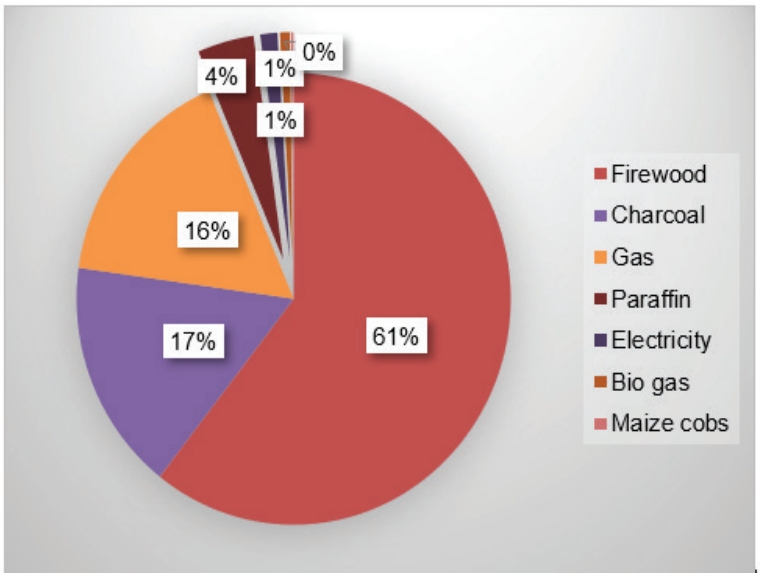
Street lighting is necessary for security and promoting a 24-hour economy especially in urban areas. A total number of 2,020 LED lanterns have been mounted on concrete poles especially within markets in the last 5 years.

Majority of centres in Ruguru, Karima, Gatitu, Ruringu, Rugi, Wamagana, Thegu River, Kabaru, Mukurweini Central, Gatarakwa and Rware are not well covered with streetlights. This poses an insecurity risk hindering a 24-hour economy.

Energy for cooking

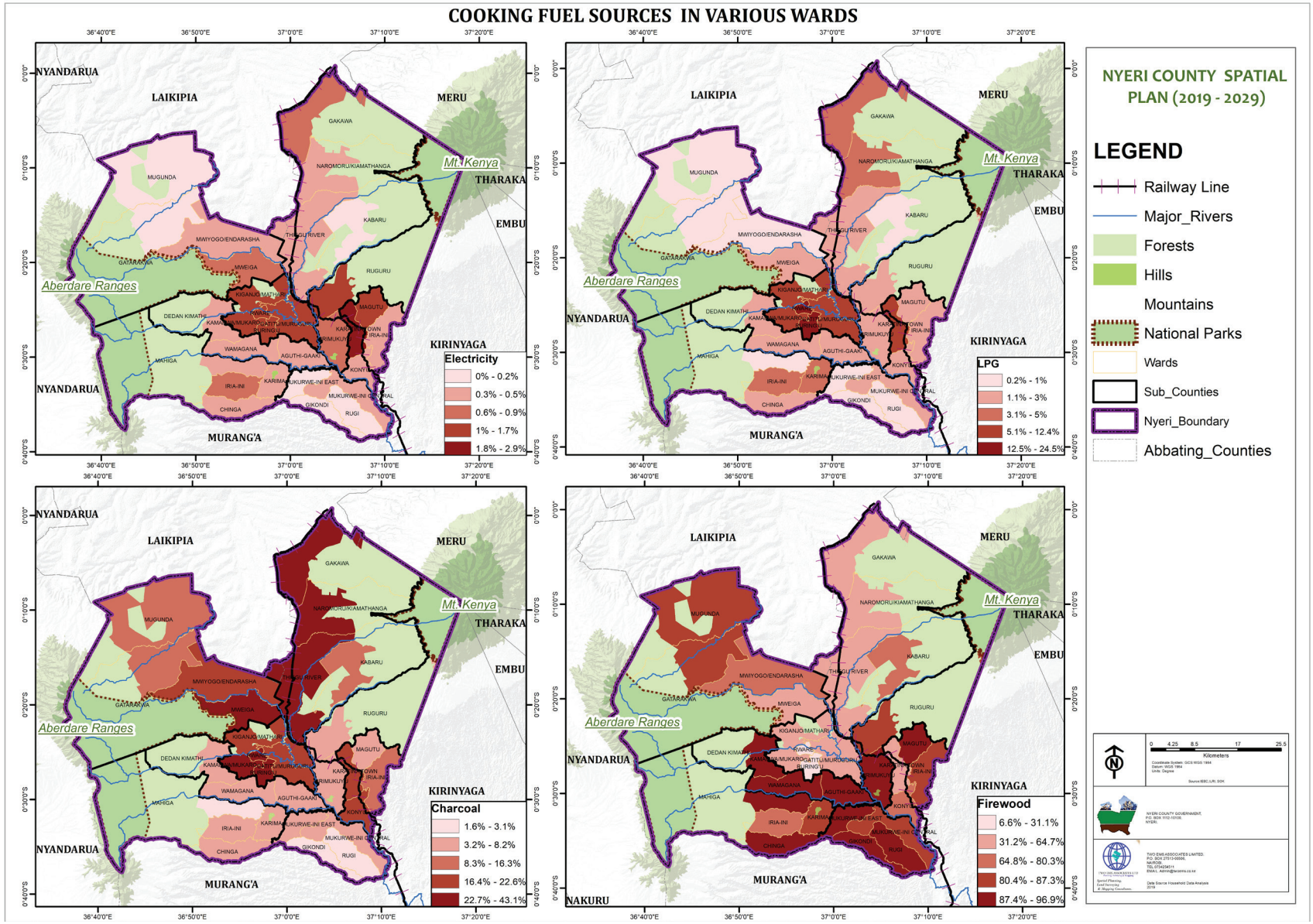
Approximately 61% of the respondents from household survey use firewood for cooking, 17% use charcoal, 16% use LPG while 1% use of electricity. Maize cobs and Biogas are used as supplements for cooking energy. Electricity use in cooking is expensive followed by use of LPG, charcoal and firewood in that order. This would explain the use of firewood as the preferred source of cooking within the County.

Chart 5: Energy source for cooking



Source: Field survey, 2019.

Map 70: Cooking energy source per ward



Source: Two Ems Associates, 2019

Electricity and LPG use is predominant in Rware, Ruringu, Karatina and Aguthi Gaaki wards. This can be attributed to high income levels of people living in the surburbs and proximity to urban fabrics of Nyeri and Karatina towns. Electricity as a source of cooking fuel, is limited compared to it as a lighting fuel source a factor attributed to high cost of power needed, which is unaffordable to most county residents.

Charcoal is highly used as cooking fuel within wards hosting urban centers such as Mweiga, Rware, Ruringú, Gakawa and Kamakwa/Mukaro which recorded over 30% usage, this is against rural areas which use less charcoal and more of firewood. Firewood is highly used in Mukurweini sub-county with Rugi and Gikondi wards recording over 95%, and Mukurweini east at 93.8% wards. Ruguru, Magutu, Wamagana and Dedan-Kimathi recorded 90%-92%. This Informs about the high level of deforestation within county especially Local and Cross counties forest reserves such as Aberdares and Mt-Kenya forests.

Choices for energy fuel sources in a household is directly proportional to income levels across the county evidenced by use of electricity and LPG by population within urban areas and proxy regions. Charcoal which is an incomplete form of burnt fuelwood is highly used in areas where electricity and LPG is greatly used, while fuelwood is used in rural areas where residents are mainly Tea, Coffee and dairly farmers.

The maps above provide clear answer to one of the most critical environmental strategy. For efforts such as forest re-afforestation and conservation to bear fruits, there is need to provide alternative energy sources. Solar energy can be used as an alternative energy source within Kieni East and west sub-counties.

There are technologies in the County that can reduce the consumption of biomass energy by almost 80%. They include the improved charcoal stove (KCJ) which can save up to 50%, the improved wood stove that can also save 50% energy, fireless cookers that can save up to 50% and the improved charcoal kilns which can save up to 60% energy when compared to the traditional technologies.

Investment in the development and promotion of other biomass technologies like biogas and woody crop residues should be considered.

9.3.3 Energy Demand and Supply

Energy tariffs pattern in Kenya favour large firms as compared to small scale firms and households. It is for this reason that Nyeri County electricity consumption is geared towards lighting and less of cooking. According to Kenya's energy demand, supply and policy strategy for households, small scale industries and service establishments, national average household consumption is 694 kWh/year with rural areas using 544 kWh/year and urban 844 kWh/year.

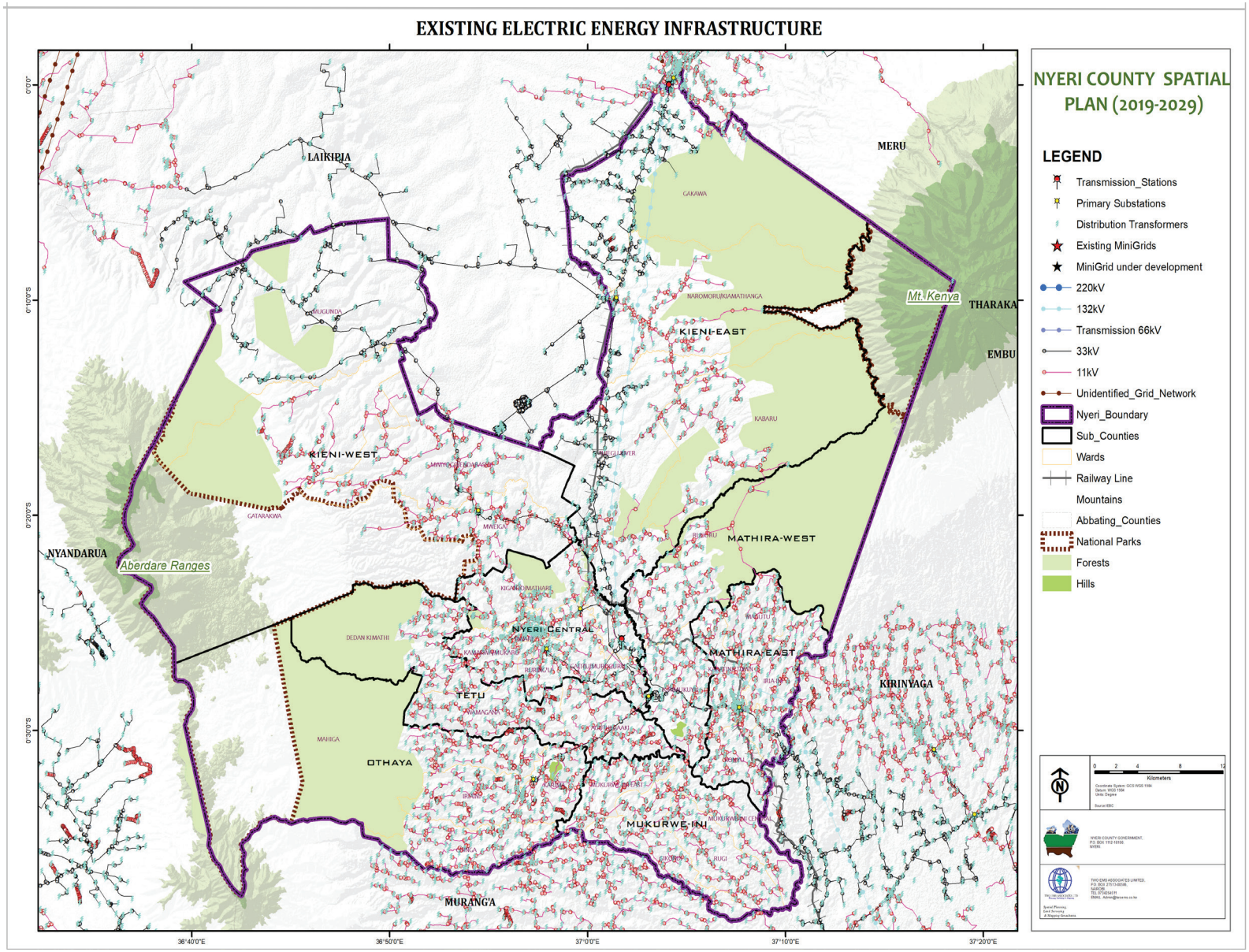
The Kenya Distribution Master Plan prepared by Kenya Power & Lighting Company in 2011 projected total demand for energy inclusive of commercial and industrial uses to be slightly below 250 Megawatts as at 2030 see figure below.

Electricity is Transmitted to Nyeri via Muranga (Githambo sub-station) through KETRACO 132kv transmission line and KPLC heavy capacity line from Kindaruma Hydropower plant. In terms of distribution Zoning by KPLC Nyeri County lies in Mount-Kenya North and south regions. Othaya, Tetu, Mathira east and west, and Mukurweini sub counties lie in the Mount Kenya south, while Kieni east and west lie in Mount Kenya north region.

Power is distributed from Kiganjo 132/133Kv/ Substation and Nanyuki 132/33kV Substation, other minor substations are in Othaya, Ruringu, Mukurweini, Mweiga and Naromoru which are all 33/11kV. See sample schematics in the Annex.

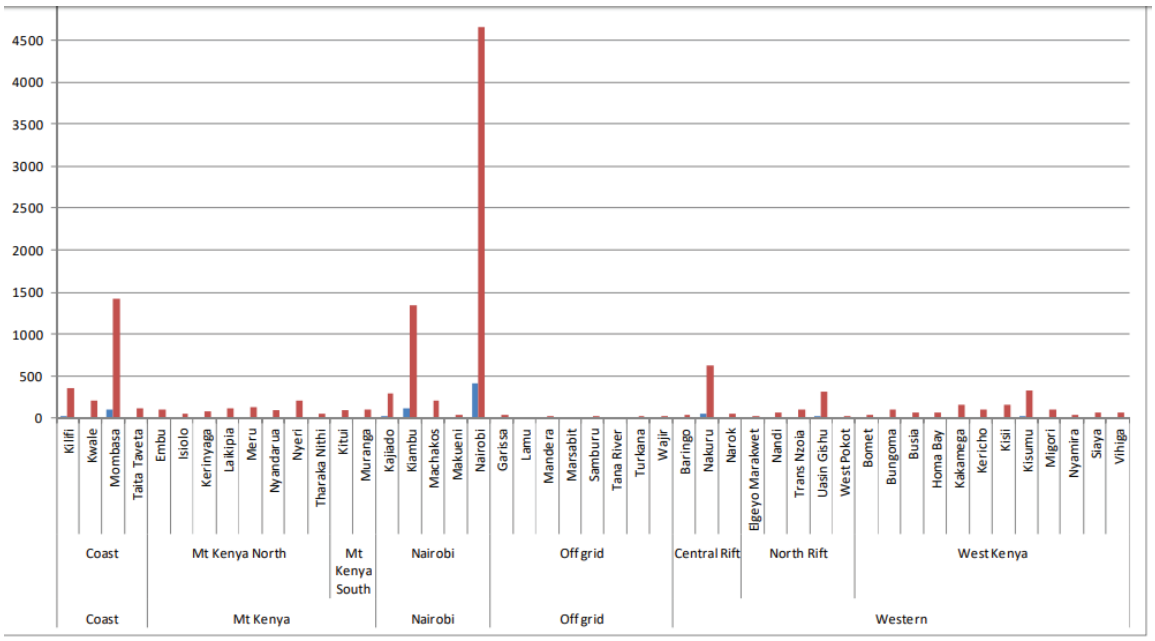
Field and household survey analysis indicate areas of Gakawa, Narumoro Kiamathanga and Kabaru have less use of electricity as a source of energy due to lack of transformers. Therefore, in effort of minimizing use of fuelwood, kerosene and charcoal supply of this critical infrastructure will be necessary.

Map 71: Power utilities distribution



Source: Two Ems Associates, 2019

Figure 32: Electricity Demand



Source: KPLC master Plan 2011

9.3.4 Emerging Issues in the Energy Sector

Potential/Opportunities	Constraints
• Solar energy potential in Kieni west and east which can be utilised to provide affordable power source to the residents. • Increased investment in electricity production, from government through national parastatals such as Rural Electrification and Renewable Energy Corporation and Kenya power and lighting company. Projects such as last mile provide basis of improving trading activities within the County.	• Environmental pollution from energy sources such as firewood, kerosene and charcoal. • Solar energy potential is not widespread across the county, areas abutting Mt-Kenya and Aberdares forests solar strength unit/m2/hr. is very poor for solar energy generation even at household level. • High cost of electrical connections which is KES 15,000 in comparison to, average income of KES 20,000. • Deforestation leading to reduction of forest density in areas of Ruguru, Dedan Kimathi, Mugunda, Mukurweini wards, Evidenced by high use of firewood and charcoal as source of cooking energy fuel. • Inadequate funds to finance infrastructure development

9.4 Water Supply

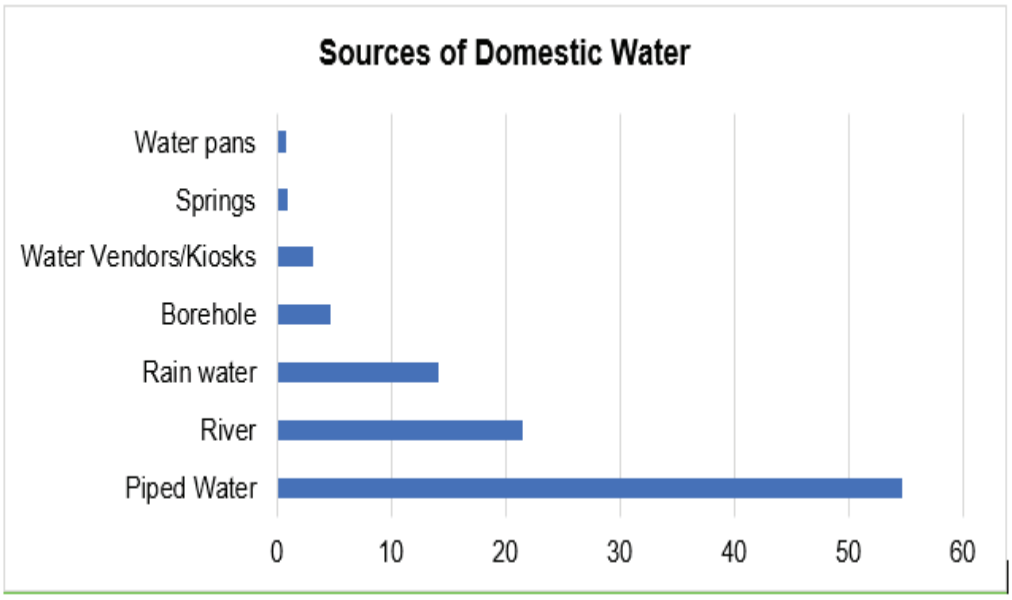
Water supply is a systemic provision of water to the public by County government appointed agents, community-initiated schemes, Non-government Organizations or private individuals through pipes, water trucks, boreholes amongst others.

9.4.1 Water Sources

The major sources of water in Nyeri County are:

- Rivers
- Rainwater
- Ground water sources, i.e. springs, shallow wells, water pans and boreholes

Figure 33: Sources of water



Source: Field survey, 2019

From the field survey conducted, 55% of the population in Nyeri County uses piped water for domestic use, while 21% use river water and 14% rely on rainwater for domestic use. 5% of the residents use water from boreholes, 3% rely on water vendors to access water for domestic use, 1% use water pans and another 1% rely on spring water. Piped water is mainly accessed by people living in and near urban areas while other sources of water are predominantly used by the rural population.

9.4.1.1 Piped water supply

Piped water accounts for 55% of the water used by the local population within Nyeri County. Access to piped water is highest in Karima ward (87.5%), Kamakwa/ Mukaro ward (80%) and Gikondi ward (75%). These wards are widely covered by water reticulation infrastracture. Dedan Kimathi ward has the lowest access to piped water in the County.

Piped water access in Endarasha, Gatarakwa and Thiegu River wards is moderate (20-30% access rate), not withstanding the unvailability of water reticulation lines laid by water companies. Existing water reticulation systems in these wards have been laid by NGOs or are part of community initiated water schemes.

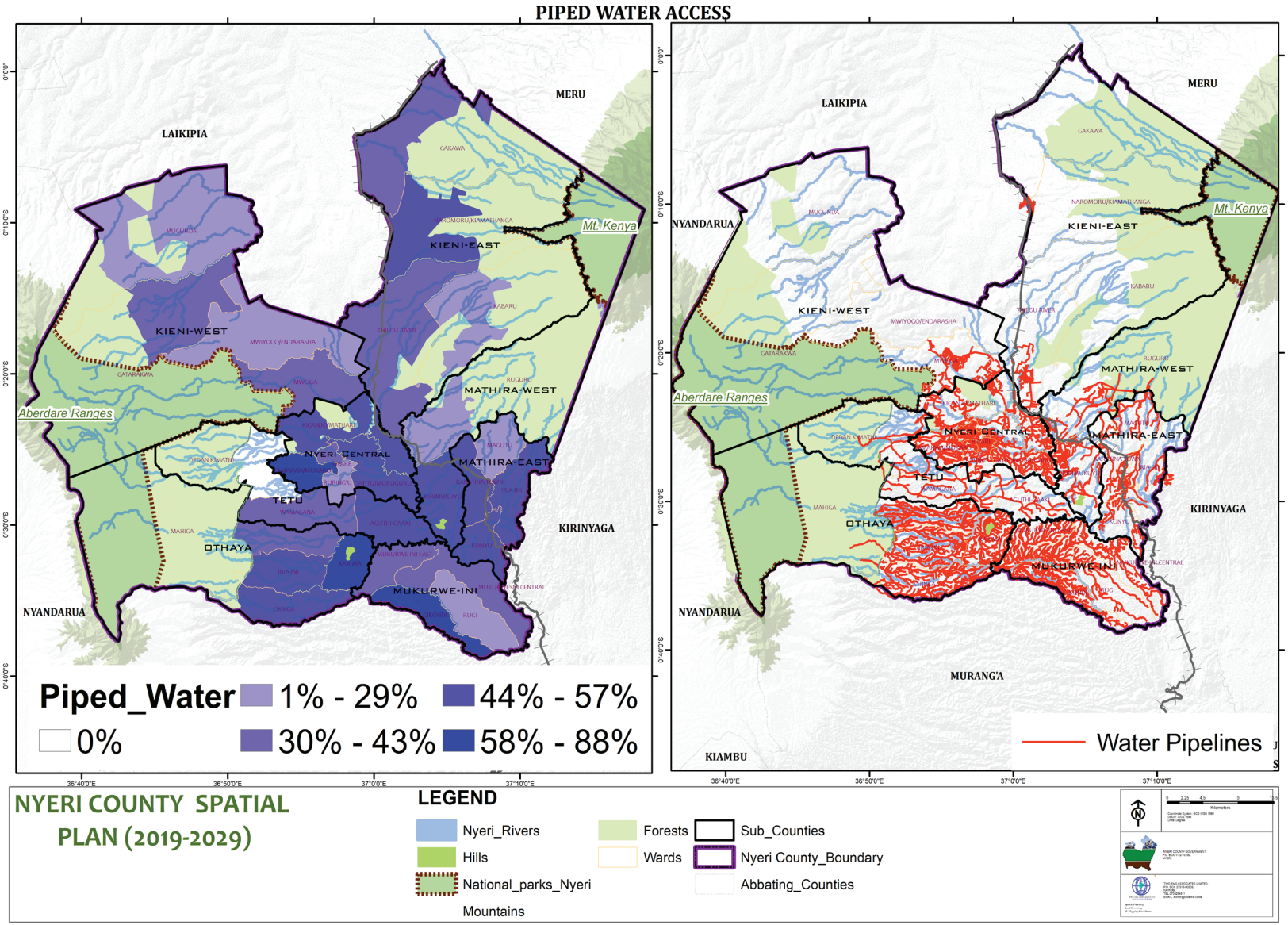
However during the dry season water rationing and acute shortages are experienced particularly within community water schemes in Kieni East and West sub counties

Piped water supply system is managed by Nyeri County Government through its water service providers who are spread across six sub-counties. They include; Nyeri Water & Sewerage Company (NYEWASCO), Othaya Mukurweini Water Services Company (OMWASCO), Tetu Aberdares Water & Sanitation Company (TEAWASCO), Mathira Water & Sanitation Company (MAWASCO) and Naromoru Water & Sanitation Company (NAROWASCO).

a) Nyeri Water and Sewerage Company (NYEWASCO)

Nyeri Water and Sewerage Company (NYEWASCO), which is responsible for supply of water in Nyeri central and parts of Mweiga, Ruguru, Thiegu River, Kirimukuyu and Dedan Kimathi wards. Main Intake of raw water is located along river Chania at Ihwa and is channelled through steel pipes to Kamakwa treatment plant. Treated water is supplied through uPVC pipes ranging 280mm trunk lines to 0.75mm service lines.

Map 72: Water Access

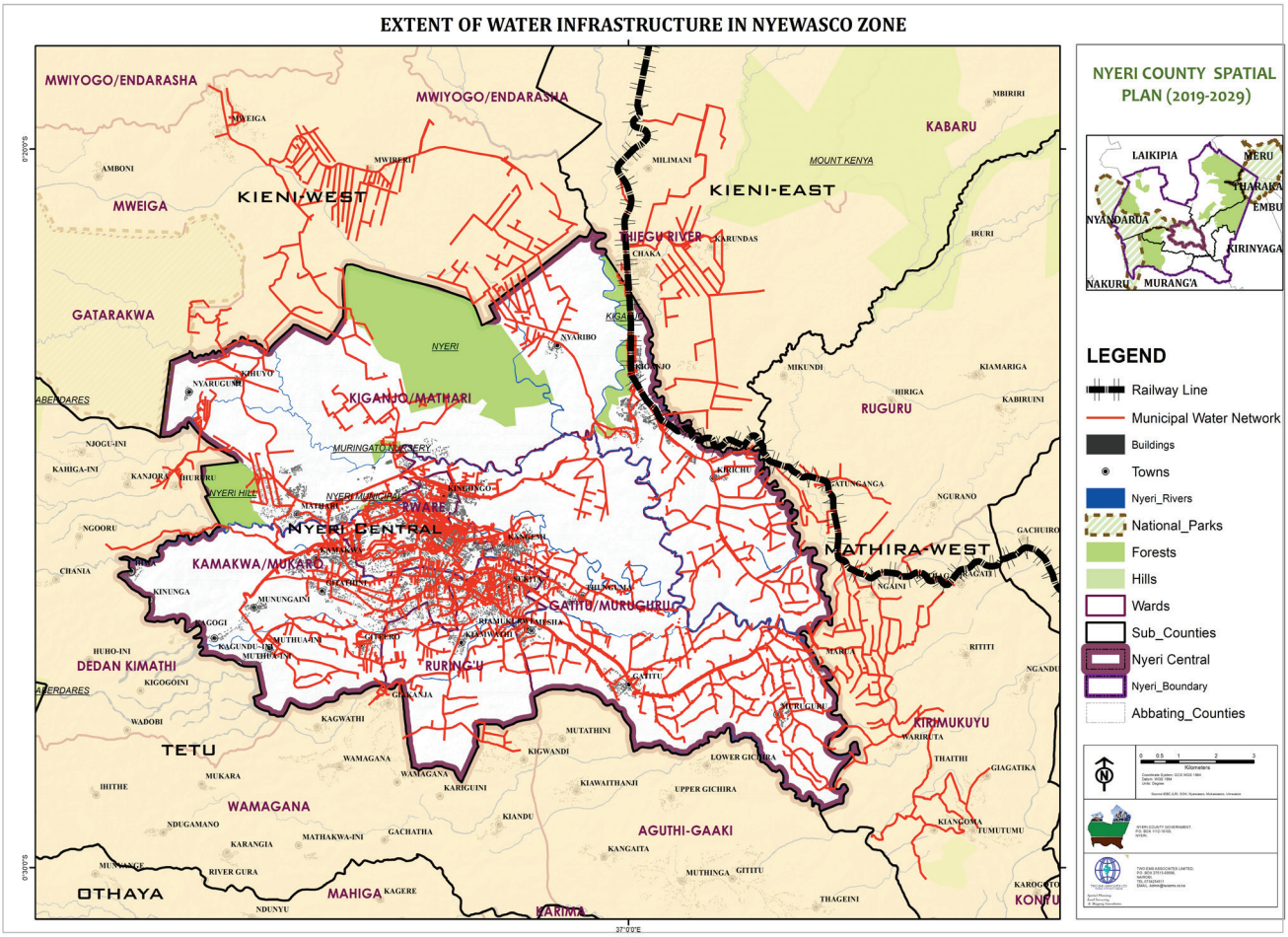


Source: Two Ems Associates, 2019

NYEWASCO Kamakwa water treatment plant has a design capacity of 27, 000 m^3 per day against an abstraction capacity of 17,000m^3/day and demand of 16, 500m^3/day.

The company covers an area of 364 km^2 with 922km network of mains and service pipes. The company serves a population of 166, 467 out of 169,467 people representing 98.4%. The distribution of the treated water throughout the service area is essentially by gravity apart from a few areas in Tetu, Nyeri Hill and Mweiga Town which constitute an estimated 5 percent supplied through pumping.

Map 73: NYEWASCO Water Supply



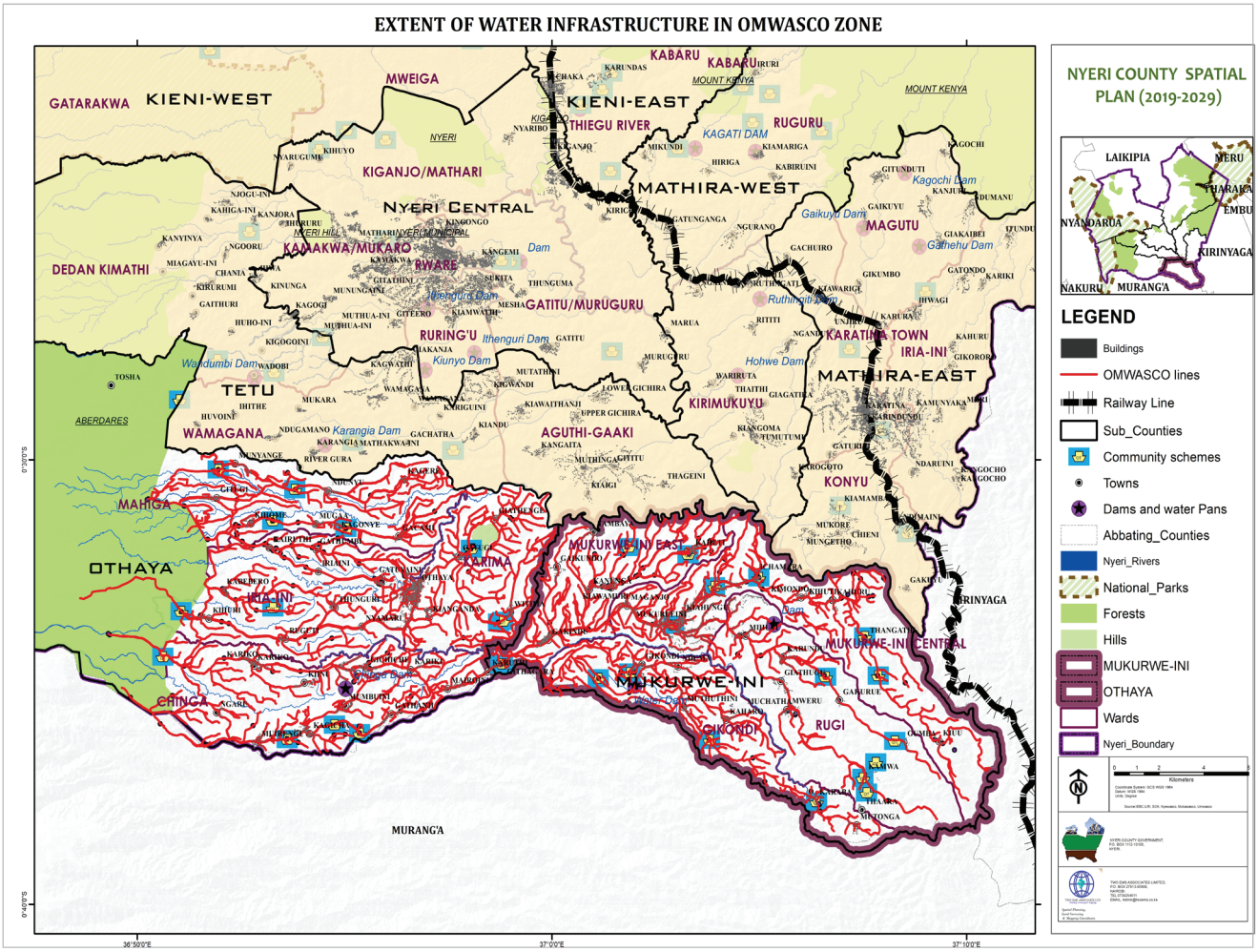
Source: NYEWASCO, 2019

b) Othaya Mukurweini water services Company (OMWASCO).

The company supplies water to Othaya and Mukurweini sub counties. Main water intake is at Chinga dam(Chinga river), which is channeled through steel pipes to Chinga treatment plant in the same locality with a design capacity of 14,000m^3/day, other facilities include New gikira and Kihuri treatment plant with a design capacity of 7,000m^3/day and 8,000m^3/day respectively while intakes are located at gikira river, Changachicha treatment plant with a design capacity of 2500m^3/day and intake at changachicha river, Kaharo treatment plant with a design capacity of 1000m^3/day and intake at thuti river, Mumwe/Njigari treatment plant with a design capacity of 500 m^3/day and intake at Mumwe river.

The total design capacity of OMWASCO treatment plants is 33, 000m^3/day, however they operate below optimum to daily supply of 21,600m^3/day, 11,400m^3/day below capacity. OMWASCO and Nyeri county government is in possession of land title deeds of Main Water T-works and reservoirs, but not other facilities such as water tanks which are located at various locations within its area of operation. Details of landownership where these water facilities are located in unknown.

Map 74: OMWASCO Water Supply



Source: OMWASCO, 2019

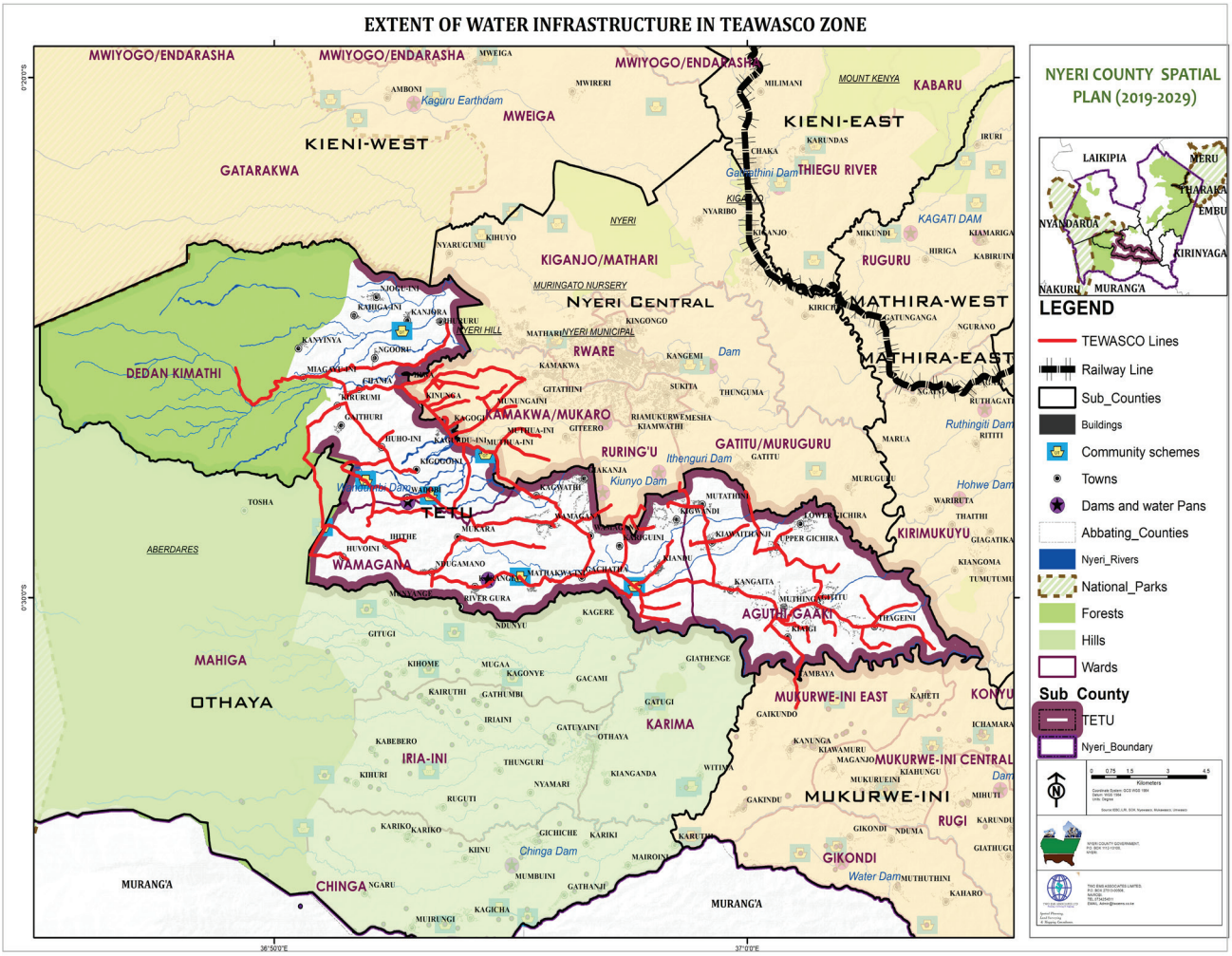
c) Tetu Aberdare's Water & Sanitation Company (TEAWASCO)

The company supplies water to Tetu sub County, and parts of Kamakwa/Mukaro ward. The company operates three schemes of gravity systems namely;

- Aguthi scheme constructed in 1980 with design capacity of 5,620m3/day and covers approximately 130km2 with intake at Gura river.
- Tetu thegenge scheme constructed in 1975 with a design capacity of 3,460m3/day and covers approximately 60km2 with intake at Zaina river.
- Titie scheme constructed in 1985 with a design capacity of 1,300m3/day and severs 90km2 with intake at Titie river.

TEAWASCO collectively supplies approximately 10,380m^3/day, with non-revenue water accounting for 38% of the sum total supply. Titie thegenge scheme has the highest non-revenue water, a factor attributed to continued use of asbestos pipes, which are considered cancerous. Water is channeled from the three intakes to Zaina and Tetu thegenge treatment plants, while development of Titie water is ongoing.

Map 75: TEAWASCO Water Supply

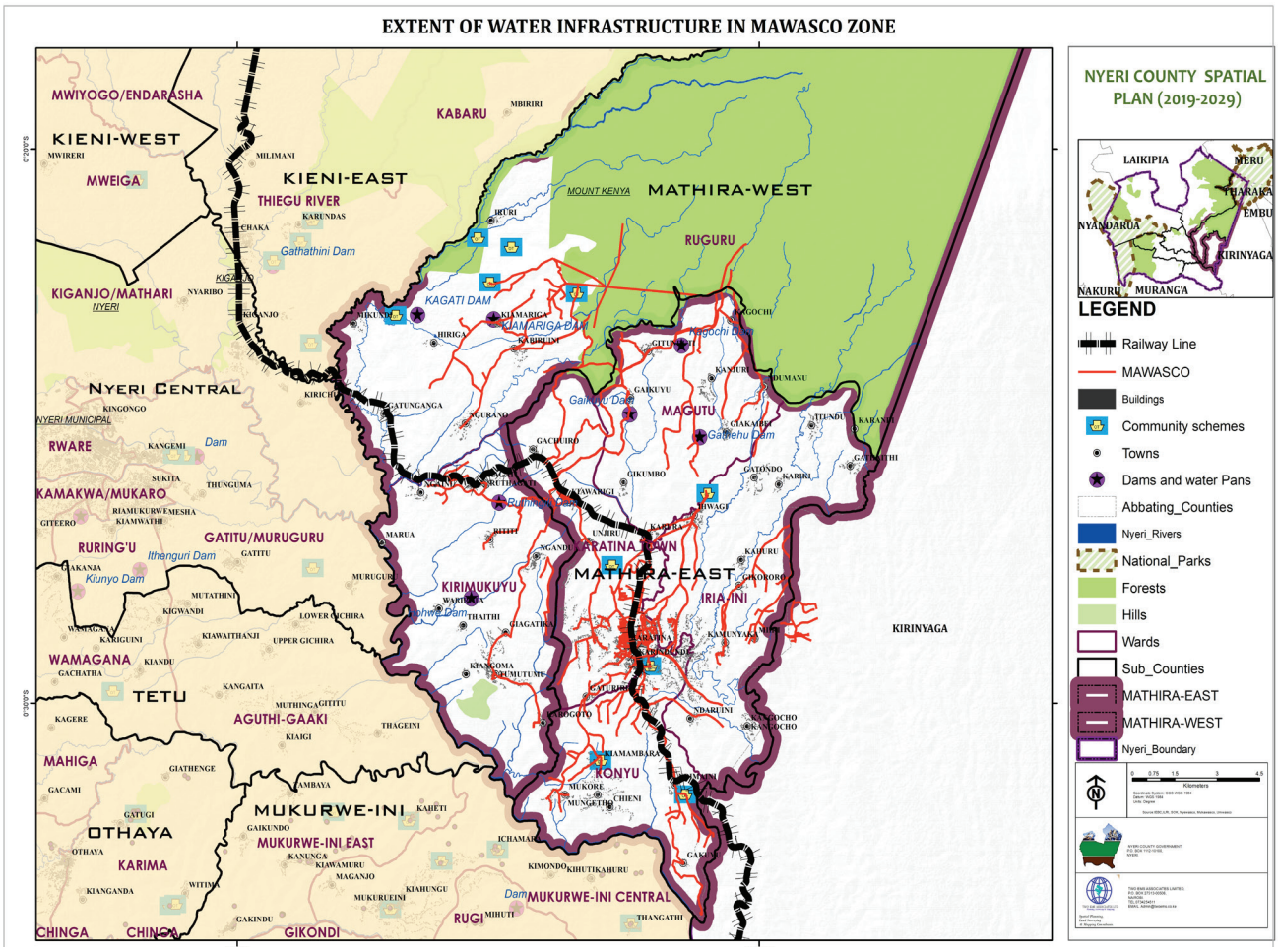


Source: TEAWASCO, 2019

d) Mathira Water and Sanitation Company (MAWASCO)

MAWASCO zone covers a total area of 320Km^2. The company supplies water to Mathira East and Mathira West sub counties. Main raw water intake is Ragati and Hombe dams, which is channelled through 6" and 8" pipes to the treatment plant in Ihwagi treatment works. MAWASCO supplies 11,000m^3/day against a demand of 20,000M^3/day.

Map 76: MAWASCO Water Supply

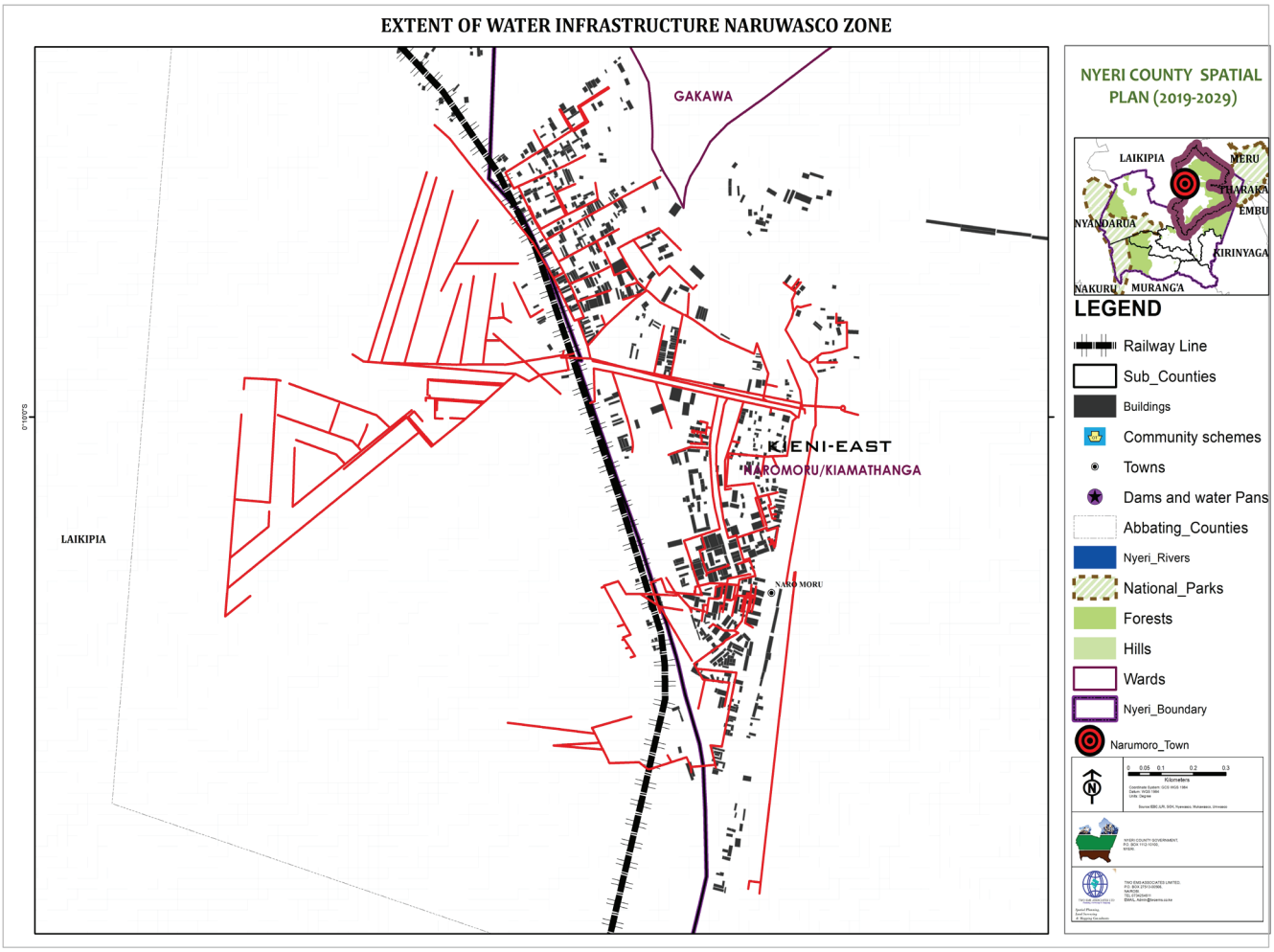


Source: MAWASCO, 2019

e) Naromoru Water and Sanitation Company (NAROWASCO)

Naromoru Water and Sanitation Company (NAROWASCO) company supplies water in Naromoru town and lower Lamuria in Laikipia, with a daily water supply of 1798m^3 per day, with a target population of 10,000 against the current reach of 6,000 people. NAROWASCO manages the Kandara/Ngutiki water project which supplies Tigithi and Kiamathanga areas with 345m^3/day. Other projects within the company's administrative area include; Muriru water project, Burguret water project, Arimi/Kiamathanga borehole water project.

Map 77: NARUWASCO Water Supply



Source: NARUWASCO, 2019

Water schemes

Local water schemes are water supply projects developed and funded locally through pulling resources together. The project is developed in two stages a) intake development b) supply stage. Intakes are either developed as weir/dams along or across the rivers. While supply is developed as distribution network to the members who contributed to the scheme. This method is highly used in Kabaru, Thiegu river Narumoro kiamathanga, Endarasha mwiyogo and Gatarakwa. However, comparing water schemes with county government funded water projects such as Nyewasco, water schemes lack treatment works component. This poses health hazard to the users of this untreated water.

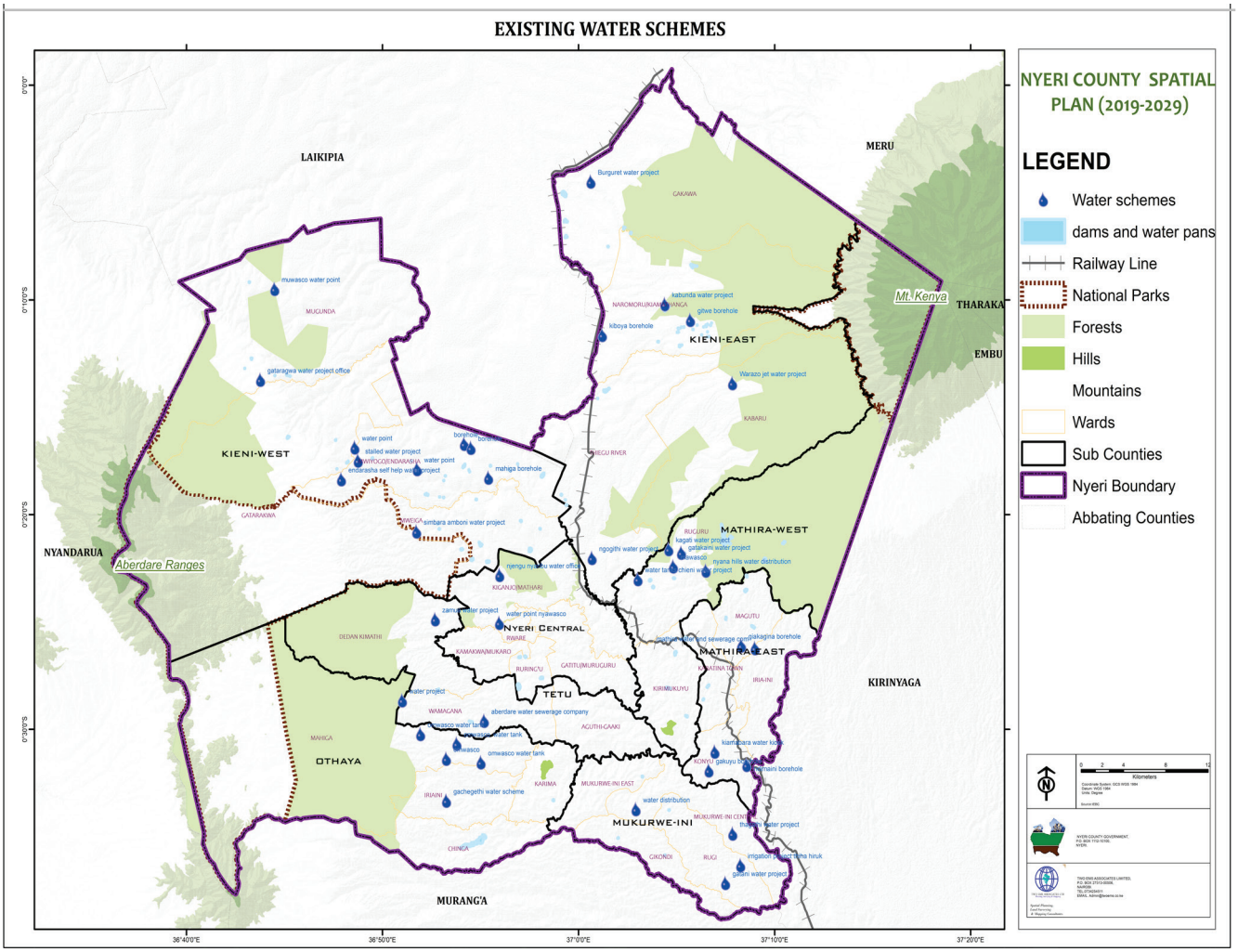
Water treatment works components are very expensive to build and maintain, therefore this explains why all water schemes lack treatment plants. Moreover, having this water schemes is an opportunity to nyeri county government, in that developing a single water distribution network for kieni east and west will be facilitated by the existing lines, through partnership with members of the schemes. To facilitate consumption of clean water the government will be required to develop a treatment plant and water reserviour. Water schemes in Tetu, Othaya and Mathira are mainly used for irrigation pruposes unlike in Kieni west and east where they are used for domestic pruposes.

Community-initiated supply schemes in the County include the following:

- Watuka Water Project
- Endarasha Water Project
- Treffos Kiburuti Water Project
- Embaringo Water Project
- Simbara Amboni Water Project
- Simbara Mbondeni Water Project
- Simbara Kamatongu Water Project
- Warazo Jet Water Project
- Burguret Water Project
- Kiahia Karurumo Water Project
- Hika Water Project
- Thiringoini Water Project
- Kiongo Water Project
- Mutitu Water Project
- NGK Water Project
- Ndiritia - Aguthi Water Project borehole has a design capacity of 3m3/h main intake is 250M depth borehole.

- NGK Water Project
- Warazo Jet Water Project
- Burguret Water Project
- Kiahia Karurumo Water Project
- Hika Water Project
- Thiringoini Water Project
- Kiongo Water Project
- Mutitu Water Project
- Ndiritia - Aguthi Water Project borehole has a design capacity of 3m3/h main intake is 250M depth borehole.

Map 78: Water schemes

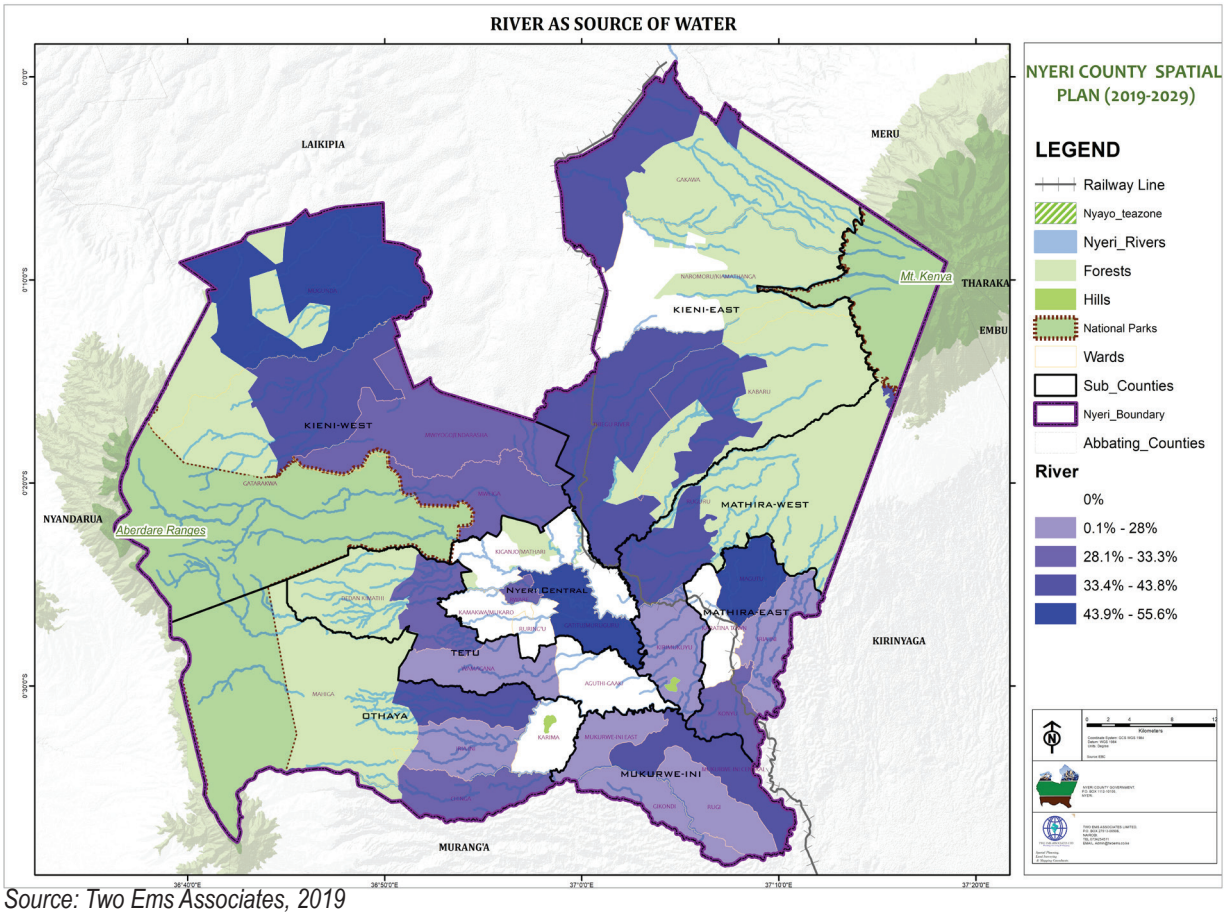


Source: Two Ems Associates, 2019

9.4.1.2 River and Stream Water

An estimated 22% of all the water used by residents of Nyeri County comes from rivers and streams. River water is mainly used for irrigation purposes and domestic use where piped water supply is unavailable. The map below shows the level of utilization of rivers as the main source of water at ward level. Field survey results indicate that wards with the highest percentages in utilization of river and stream water are Mugunda, Iriani and Gatitu/ Muruguru wards. The lowest level of utilization of river water is found in Nyeri Central, Mukurweini, Othaya and Tetu sub-counties attributed to the extensive water piping infrastructure covering the four sub counties.

Map 79: Rivers as a Source of Water



Source: Two Ems Associates, 2019

Plate 3: Gura River in Dedan Kimathi ward

Source: Field survey, 2019

9.4.1.3 Boreholes and wells

A borehole is a small diameter hole dug by drilling machines deep into the water table /acquifer, while a well is a hole with a larger diameter usually dug by hand. Wells are relatively shallow as compared to boreholes. Water from boreholes is extracted using a water pumps to an overhead tank, while wells use hand propelled pumps or rope pumps.

Boreholes and wells are the main source of water for 6% of residents within the County. Ground water is highly utilised in Kieni East and West and Mathira east sub-counties, due to limited public piped water reticulation networks. Around 30% of community-initiated water schemes use ground water to facilitate water supply. There are 49 boreholes across the county such as Kiboya borehole is used to supply Narumoro town with water. Narumoro township borehole supplies both Narumoro town residents with water, Mwireri in Mweiga amongst others.

Boreholes capacity to supply water depends on extraction rate for instance Ndiriti-Aguthi borehole at depth of 250meters has an extraction rate of $3M^3/Hr$ can adequately sustain 1200 households/ 6000 people. Therefore to adequately supply keini east and west people county needs alternative water sources.

Of the 49 boreholes only seven are fully mechanized for optimum water extraction. The include: Kiboya, Mahiga, Gitero, Gitero/kabati, Mathian karundas, Gituamba and Karachieni boreholes. Limited or lack of power and mechanization has resulted to operational death of majority of boreholes, especially in Kieni east and west.

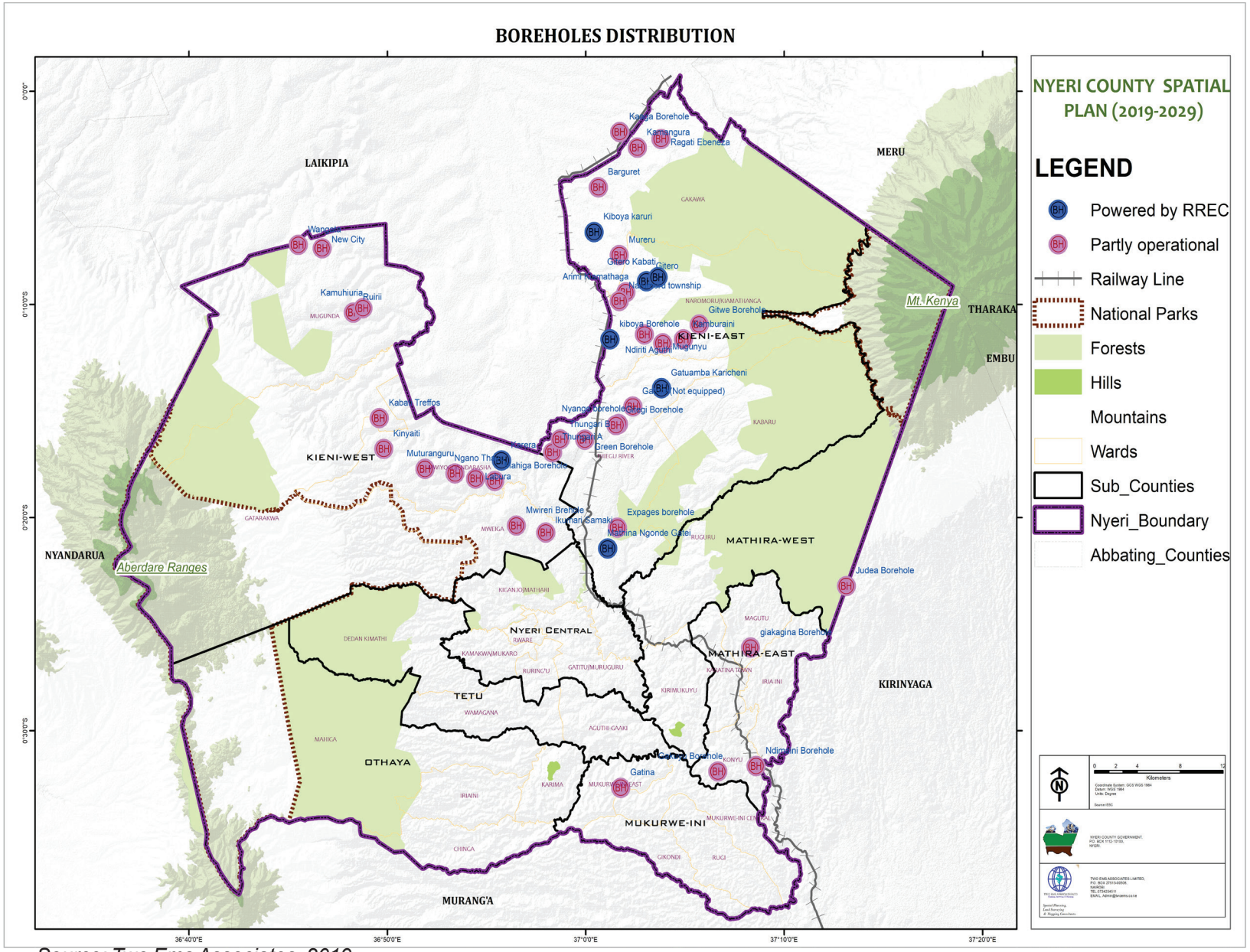
Therefore locals continue to have limited access to lean domestic water despite having a borehole in the locality. Ground water utilisation depends on depth and the quality of water in an aquifer and the cost of drilling a borehole.

According to Athi Water and Services Board, borehole depth ranges from 80-250 meters within the County with a median yield of about 9 litres per second, fluctuating seasonally hence the need to develop sustainable water sources that would fill tye shortage during the dry season. Though the cost of drilling a borehole has been reducing, it's still prohibitive to drill and operate and therefore limits use of borehole as a source of water for community projects and water companies. see map below for distribution of boreholes in the county.

Water sourced from the well is used by 34.8% of residents of Kirimukuyu, 15.4% in Rugi, 21.4% in Karatina town, and 23.2% in Konyu wards. Wells are categorized as protected or unprotected depending on level of improvements made to maintain cleanliness of the water.

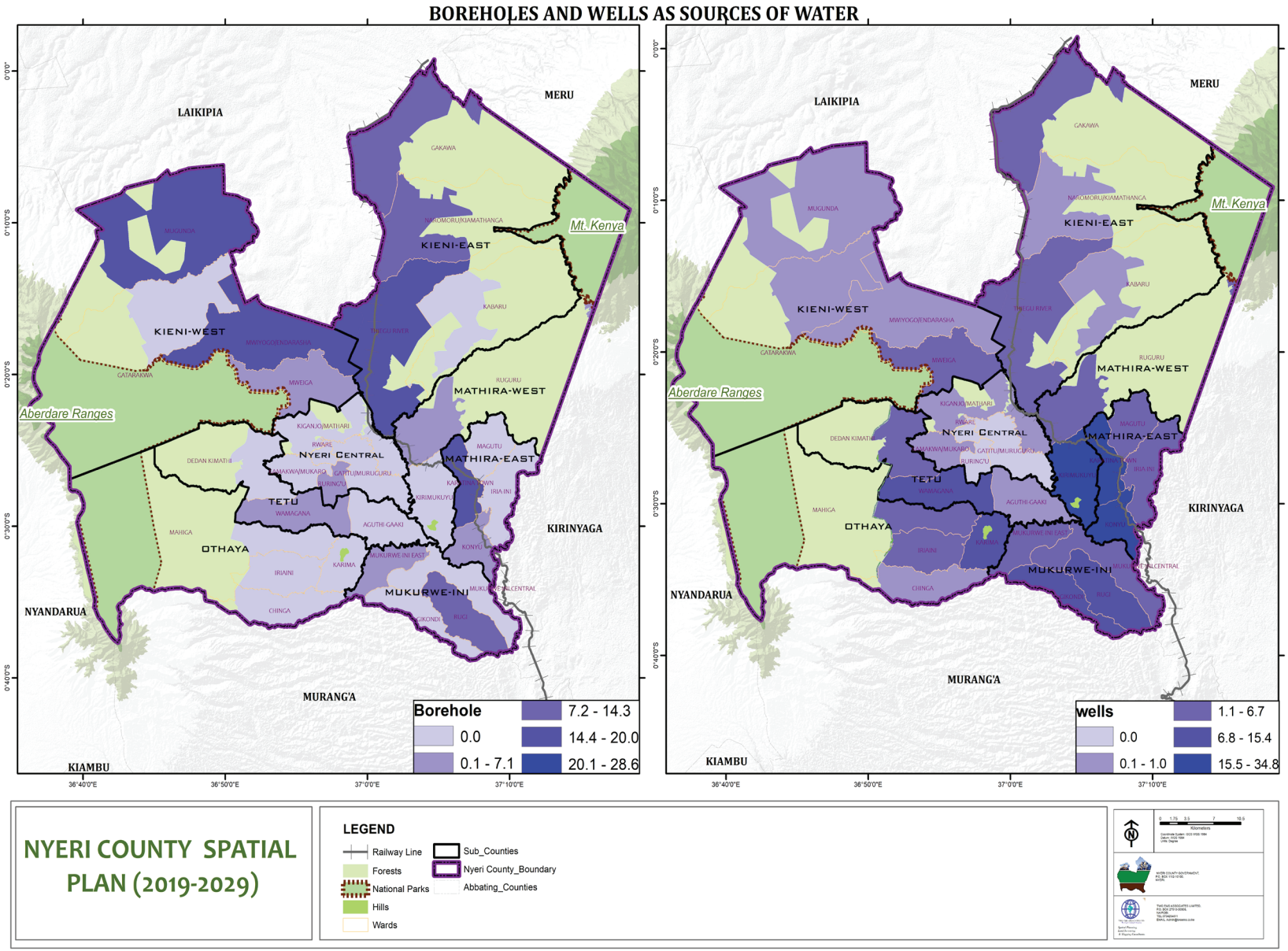
Protected wells are less exposed to risk of walls collapse unlike the unprotected wells. Well water in Mathira east and west sub-counties is used for subsistence irrigations of farmlands, whilst in Mukurweini sub-county is equally amounts of water are used for household and farming purposes. The map below shows level of utilization of ground water within the County.

Map 80: Spatial distribution of boreholes accross the county



Source: Two Ems Associates, 2019

Map 81: Borehole and Wells as a Source of Water

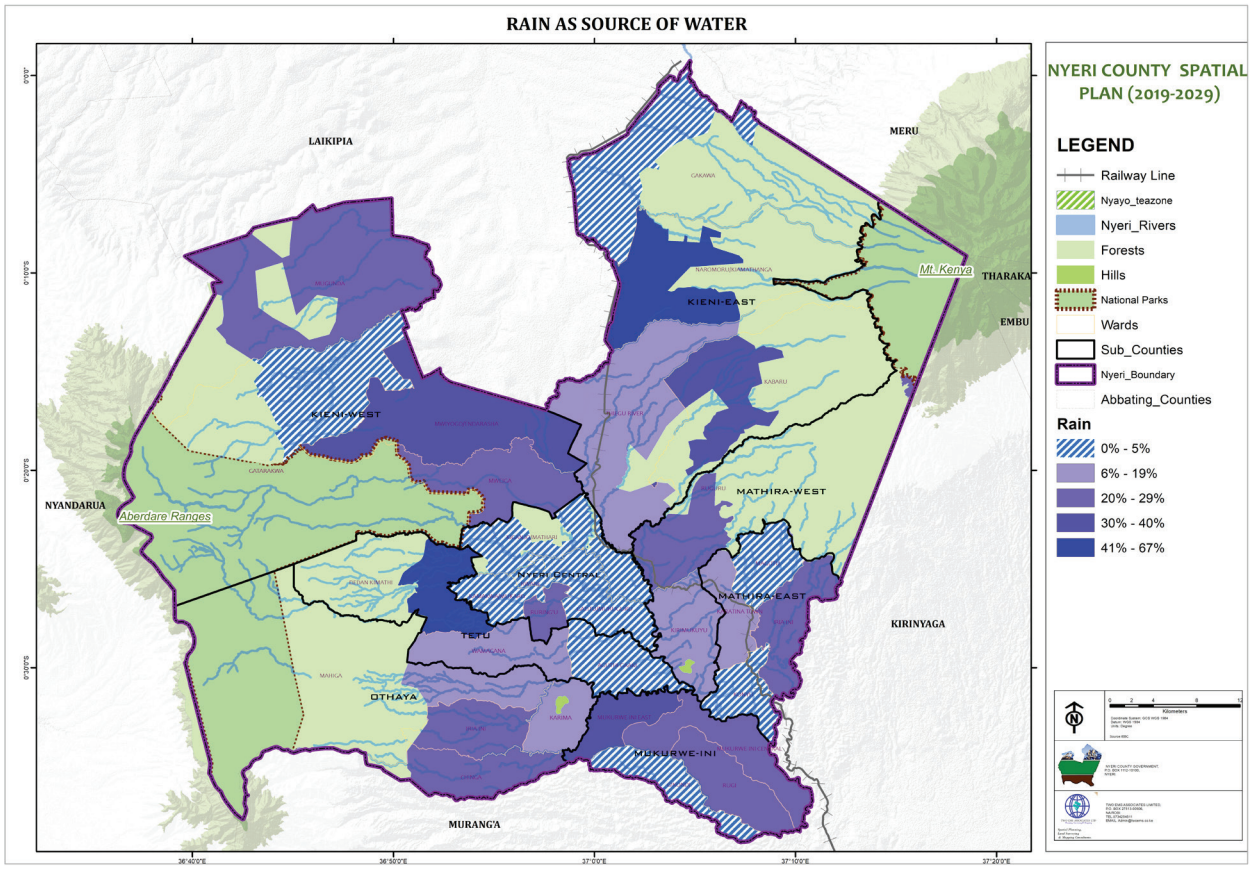


Source: Two Ems Associates, 2019

9.4.1.4 Rainwater

Rainfall distribution within the County ranges between 750mm- 2000mm per annum. Rainwater harvesting is practised across all wards, but limited in major urban areas since they are well served with piped water infrastructure. The map below shows use of rainwater across various wards by percentages.

Map 82: Rain as a Source of Water

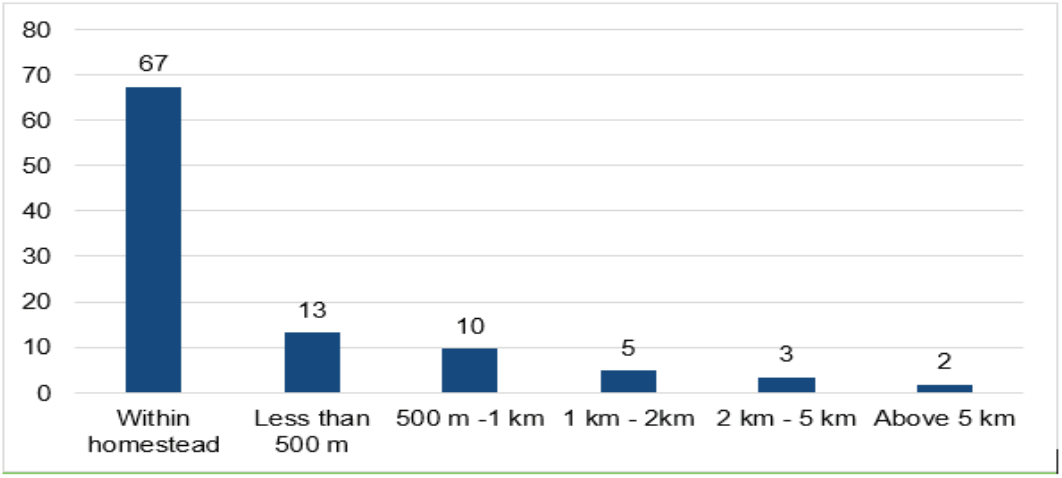


Source: Two Ems Associates, 2019

Distance to the source of water

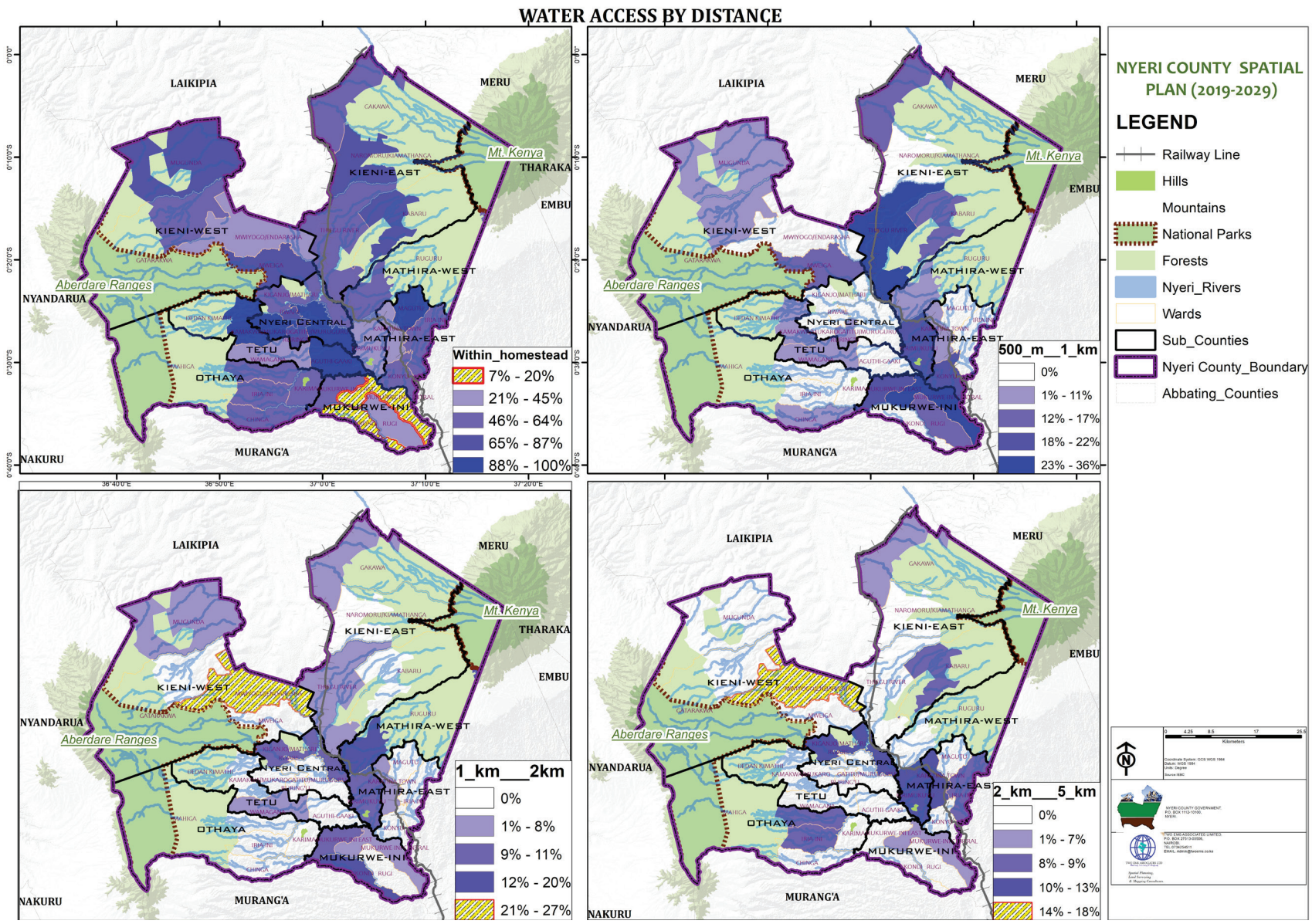
67% of the population access water within their homestead, while 13% travel for less than 500m to access the nearest water source. 10% of the population travels between 500m to 1km to access while 3% and 2% of the population travels a distance 2-5km and above 5km respectively to the point of the water source.

Figure 34: Distance travelled to water source



Source: Field survey, 2019

Map 83: Water Access by Distance



Source: Two Ems Associates, 2019

Despite low distances travelled by the majority of the population access by distance is unequal in across wards. For instance, nearly all residents of Aguthi Gaaki and Kamakwa/Mukaro wards have water within their homesteads as opposed to Endarasha/Mwiyogo ward where 27% walk 2km to access water, while another 18% walk up to 5km to access water.

Therefore, there is a close relationship between the presence of piped water and distance travelled to water sources.

9.4.2 Water Demand

Nyeri county government through appointed water companies as at 2019 supplied approximately 45531.614 m^3 / day of piped water against an approximate demand of 75,916.4 m^3/day (WHO consumption rate standards of 100 liters per head), indicating a demand deficit of 30,384.79 m^3 /day. This deficit is filled by use of sources from rivers and dams' water which is not treated therefore possess a health hazard. Table below is showing a summary of water supply vs demand of the main piped water supply companies operating on behalf of Athi water services board and Nyeri County government.

Table 25: Major Water Supply Schemes in Nyeri.

Water supply scheme	Total Water Demand (per annum M^3)	Total Water Supply (per annum in M^3)	Population served
NYEWASCO	5,612,829	6,655,549	149,605
OMWASCO	7,868,670	10,329,500	179,172
TEAWASCO	1,078,210	2,378,705	77, 124
MAWASCO	1,528,985	4,304,445	148,847
NAROWASCO	530,345	656,270	5,805
Total	**16,619,039**	**24,324,469**	**483,429**

Source: Field survey, 2019

Other community-initiated supply schemes in the County include the following:

- Watuka Water Project
- Endarasha Water Project
- Treffos Kiburuti Water Project
- Embaringo Water Project
- Simbara Amboni Water Project
- Simbara Mbondeni Water Project
- Simbara Kamatongu Water Project
- Warazo Jet Water Project
- Burguret Water Project
- Kiahia Karurumo Water Project
- Hika Water Project
- Thiringoini Water Project
- Kiongo Water Project
- Mutitu Water Project
- Ndiritia - Aguthi Water Project has a design capacity of 3m^3/h main intake is 250M depth borehole.
- NGK Water Project

Throughout the plan period situation will be dire if immediate interventions are not enforced to ensure adequate access to piped water to all. See the table below for project water needs across the county over 10years assuming nil-intervention (ceteris paribus) and WHO consumption rate standards of 100 liters per head.

Table 26: Projected water demand calculations

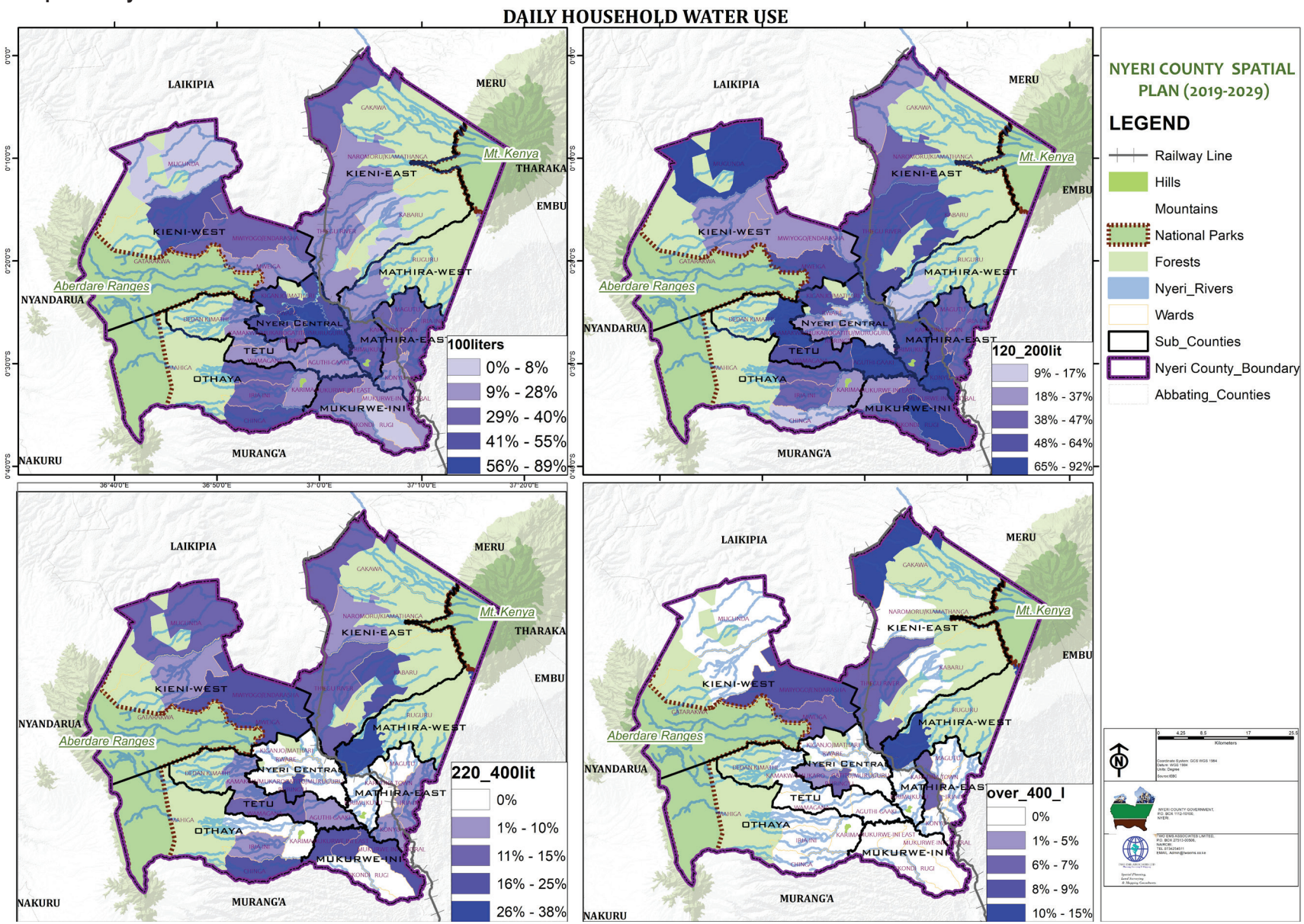
Year	Population	Daily demand m^3 /day (WHO standards)	Annum demand (WHO standards)	Daily supply (ceteris paribus)	Daily deficit (ceteris paribus	Annual deficit (ceteris paribus
2019	759,164	75,916.40 M^3/ day	27.709 million m^3	45531.614 M^3/ day	30,384.79 M^3/ day	11.09 million m^3
2020	767,157	76,715.70 M^3/ day	28.001 million m^3	45531.614 M^3/ day	31,184.09 M^3/ day	11.38 million m^3
2025	805,969	80,596.90 M^3/ day	29.417 million m^3	45531.614 M^3/ day	35,065.29 M^3/ day	12.79 million m^3
2029	852,774	85,277.40 M^3/ day	31.126 million m^3	45531.614 M^3/ day	39,745.79 M^3/ day	14.50 million m^3
2030	862,000	86,200 M^3/day	31.463 million m^3	45531.614 M^3/ day	40,668.39 M^3/ day	14.843 million m^3

Water consumption rates

According to the field survey, 34.1% of the residents use up to 100 litres per day, while a majority of 45% consume between 120-200 litres while only 12.2% use over 220 litres per day. This indicate high water usage across the County compared to the WHO consumption rate standards of 100 litres per head.

The maps below show high water consumption rates despite inadequate supply and unreliable sources. This spatial plan endeavours to meet water demand across all the wards.

Map 84: Daily Household Water Use



Source: Two Ems Associates, 2019

9.4.3 Water Quality

The levels of pollution in the water sources are mostly due to soil erosion, which is later deposited in rivers as silt resulting to pollution. Field survey results indicated that the main pollutants were soil (55%), chemical contamination (28%) and salty water (17%).

Soil contamination is predominant in wards that rely on river for their water needs. They include Ruguru, Mukurweini Central, Magutu and Dedan Kimathi. The four highlighted wards have steep terrain hence soil erosion is a major factor in water pollution. Chemical pollution was highlighted mainly by residents of Gikondi and Thiegu River wards, largely attributed to agro-chemicals.

9.4.4 Emerging Issues for Water

Potential/Opportunities	Constraints
• Abundance of rivers that flow from the County which can be tapped to fill water supply gap. • Some sub-counties especially Mathira East and West, Othaya and Tetu receive relatively consistent rainfall, hence rainwater harvesting can be encouraged as a short-term strategy in meeting the water supply gap. • Existence of community water projects that can be developed further to serve a bigger population, with additional and upgrading the existing infrastructure, while reviving some. Such is the case in Thiegu River, Narumoro/Kiamathanga, Endarasha amongst others. This can be utilised as a medium-term project as the County government explores long-term mega water supply projects for the County. • Emerging technologies in water treatment that can filter agricultural chemicals and soils. • Existing local water schemes that could be interlinked to a single water distribution network that supplies treated water to large number of residents in Kieni east and west.	• Unreliability of water sources- This includes seasonal fluctuations in river volumes as well as water rationing and outages within piped water supply schemes (such as Mukurweini sub county. • Long distance travelled to access water sources especially in Endarasha/Mwiyogo at Kirimukuyu and Mukurwe-ini Central wards. • High cost of water infrastructure across the wards. Water infrastructure is very capital-intensive ranging from wayleaves acquisition, engineering design and construction phase. • Steep terrain of the County • Pollution of water sources especially from agricultural pesticides and fungicides, and soil erosion. • Members of existing water schemes may be unwilling to cooperate in developing a sub-countywide water distribution system, therefore extensive consultation is required to achieve this goal. • Details of landownership where majority of water facilities are located in unknown. Therefore, in case of land dispute county government/water companies may not be in good position to settle the dispute.

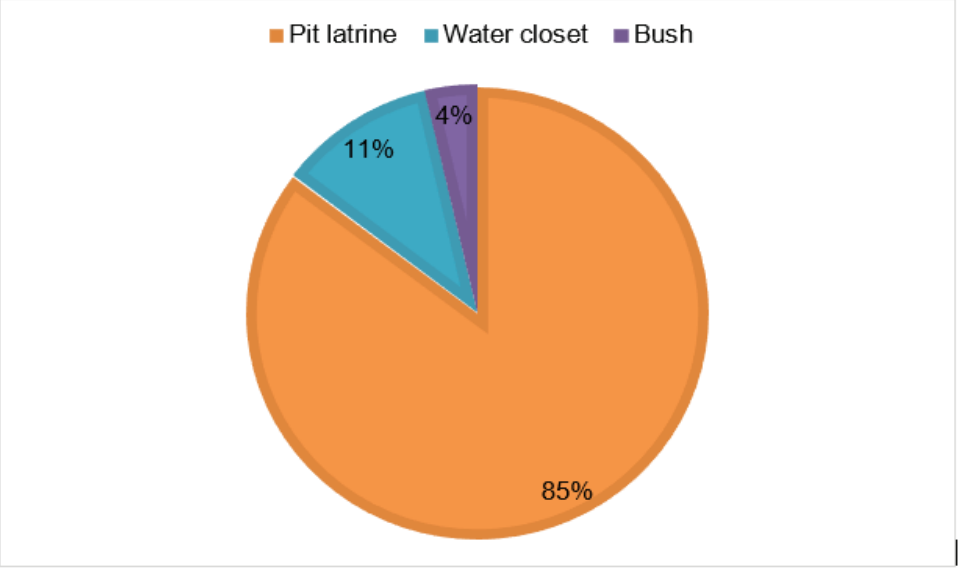
9.5 Wastewater Management and Sanitation

Sewerage infrastructure is an essential component of human settlement. Sanitation facilities play an important role as they have a significant beneficial impact on health both in households and across communities.

9.5.1 Wastewater management

Human waste disposal is mainly through the use of pit latrines (85%), water closet (11%) and bush (4%). Nyeri county has 9% of residents connected to sewer, while 11% of households rely on septic tanks. The existing sewer lines only cover major urban centres such as Othaya, Nyeri and Karatina town.

Figure 35: Human Waste Disposal Methods.



Source: Field survey, 2019

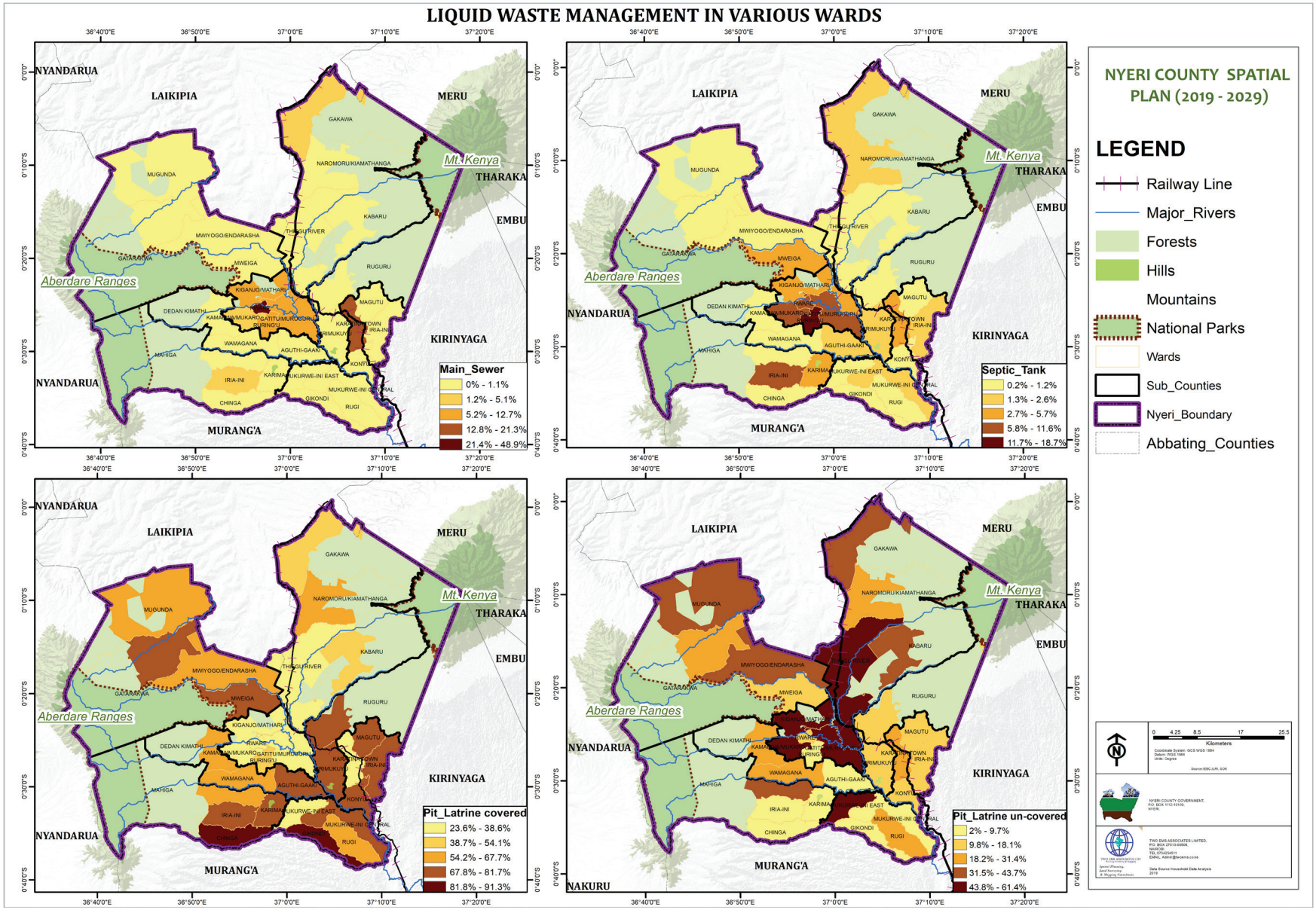
Approximately 2% of residents in Mugunda ward have access to sewer infrastructure as shown in the map below. This is facilitated by private initiatives of the Catholic Church in the area. However, the area lacks a public sewerage system. Private initiatives are also seen in Kiganjo/ Mathari ward where Dedan Kimathi University provides sewer treatment services to adjacent households.

The maps below indicate imbalance in supply of sewer infrastructure in Mukurweini, Kieni East and West sub-counties and rural parts of Othaya and Tetu. Over 80% of the population use pit latrine either (covered or uncovered) as form human waste disposal attributed to inadequate and costly sewerage infrastructure and expensive nature of septic tanks construction.

Pit latrines can be a health hazard by contaminating ground water sources where water table is shallow, furthermore uncovered pitlatrines provide compounds for flies that spread diseases such as cholera and diarrhoea.

Pit latrines are highly exposed to flooding during the rainy season this also places a risk of contamination of surface water sources such as rivers, wells and springs which forms over 15% of water sources in the County. Lack of an elaborate sewer infrastructure across the county places the health of the residening population at risk especially during the rainy season. Therefore, this spatial recognizes the need for the infrastructure and the need to protect water resources.

Map 85: Liquid Waste Disposal

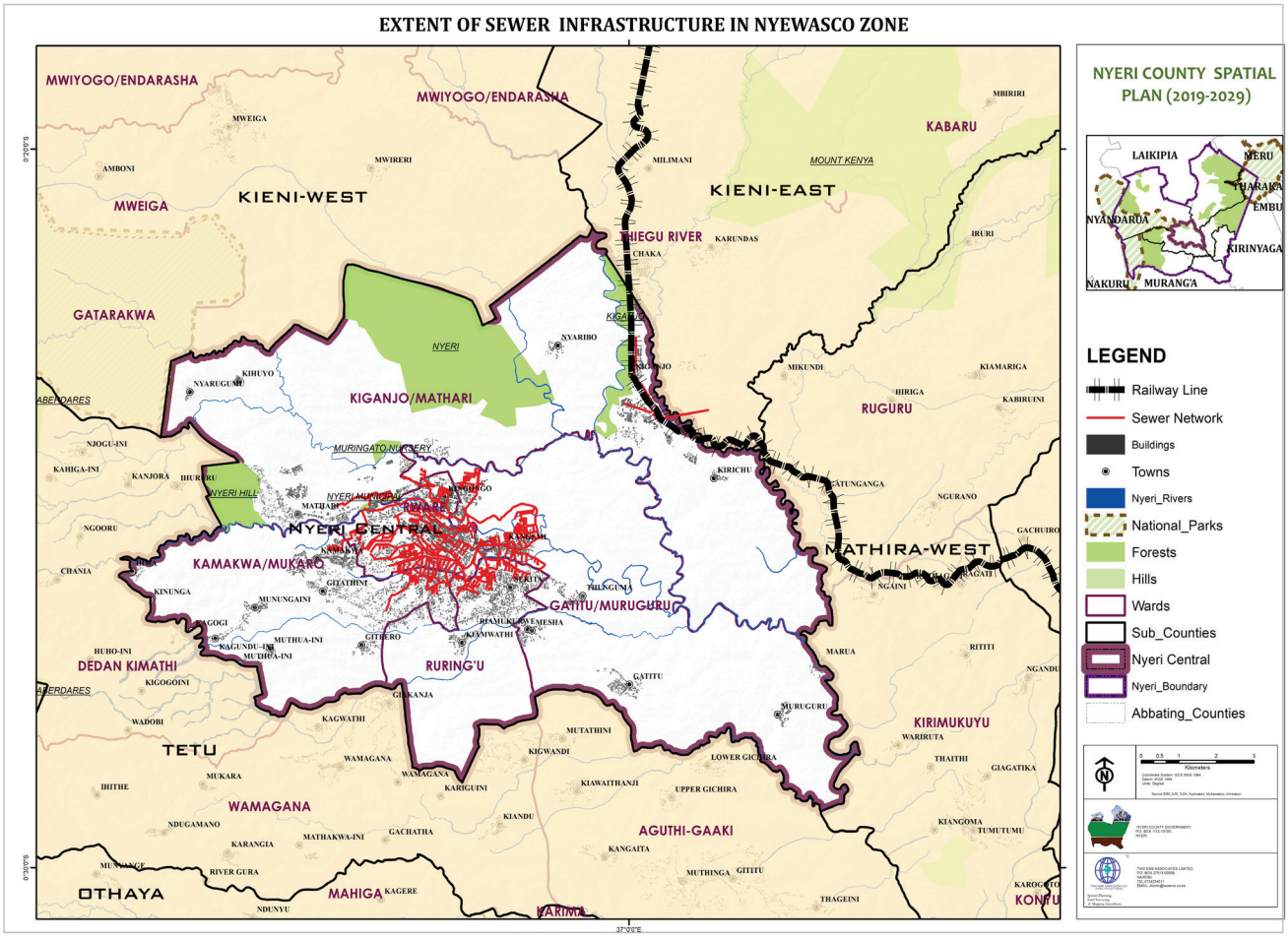


Source: Two Ems Associates, 2019

Demand for sanitation infrastructure

Nyeri County generates approximately 60,733 m^3 of liquid waste per day , expected to rise to 68,221.9 m^3/day by 2029. Main sewerage treatment plants are located in Nyeri central sub-County and they include, Kangemi Sewage Treatment works design capacity of 6,000 m^3/day, but operating at 3,000 m^3/day, Gatei Sewage Treatment ponds design capacity of 2,000 m^3/day but operating at 800 m^3/day, Kiamwangi treatment plant design capacity of 5,000 m^3/day but operating at 2000 m^3/day, while OMWASCO (Karega sewer works in Othaya) treats 1094 m^3/day Consequently, only 9% of the County liquid waste is treated in treatment plants pointing to an acute shortage in sanitation infrastructure.

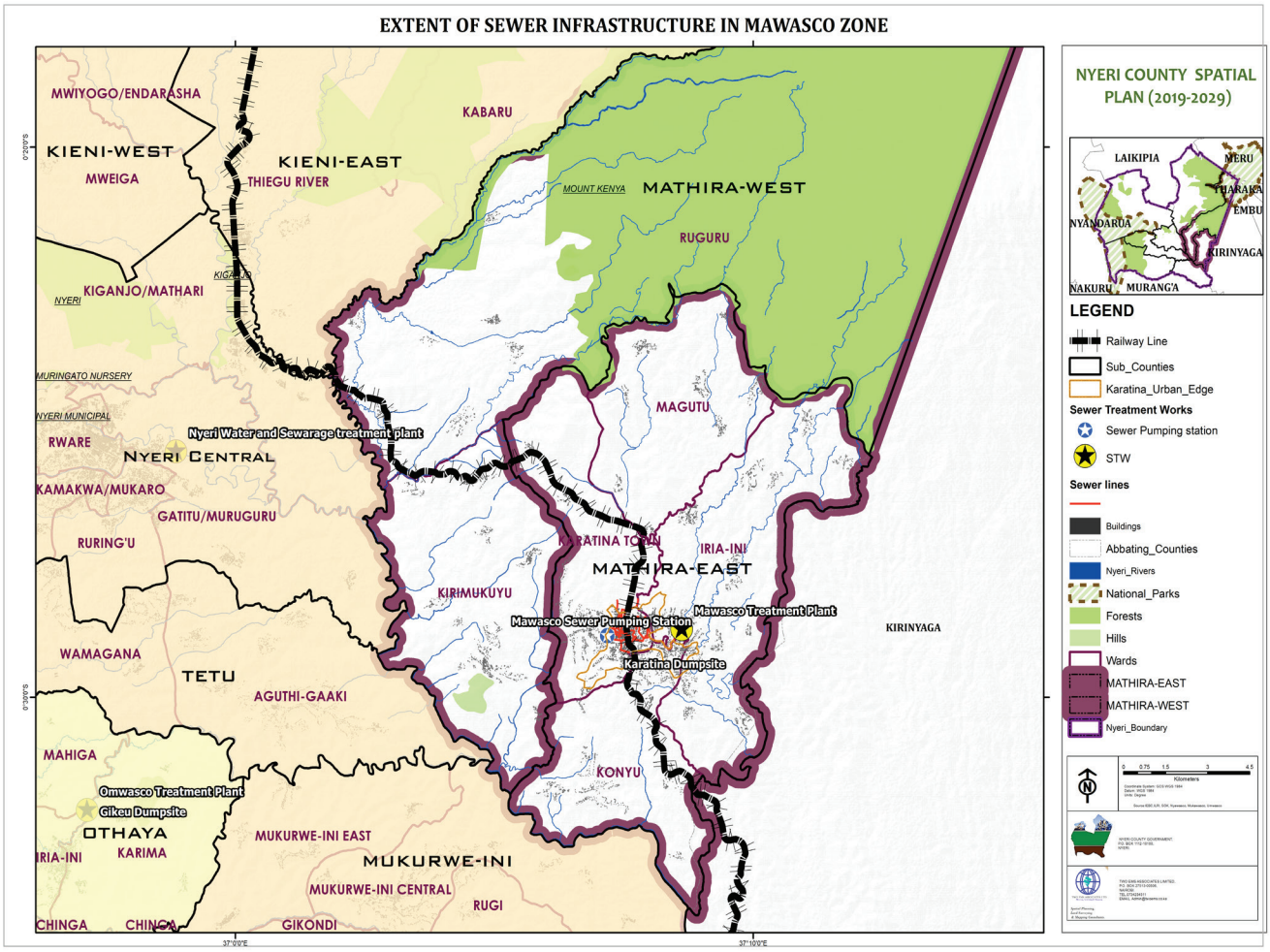
Map 86: Extent of sewer network by NYEWASCO



Source: NYEWASCO, 2019

MAWASCO zones covers an area approximate 320km^2, of this area the existing sewer network covers Karatina town only which is less than 5% of the total zone with a total of 3500 connections as at 2019. Design capacity of kiamwangi treatment plant 5000m^3/day but operates at 2000M^3/day shown in the map below.

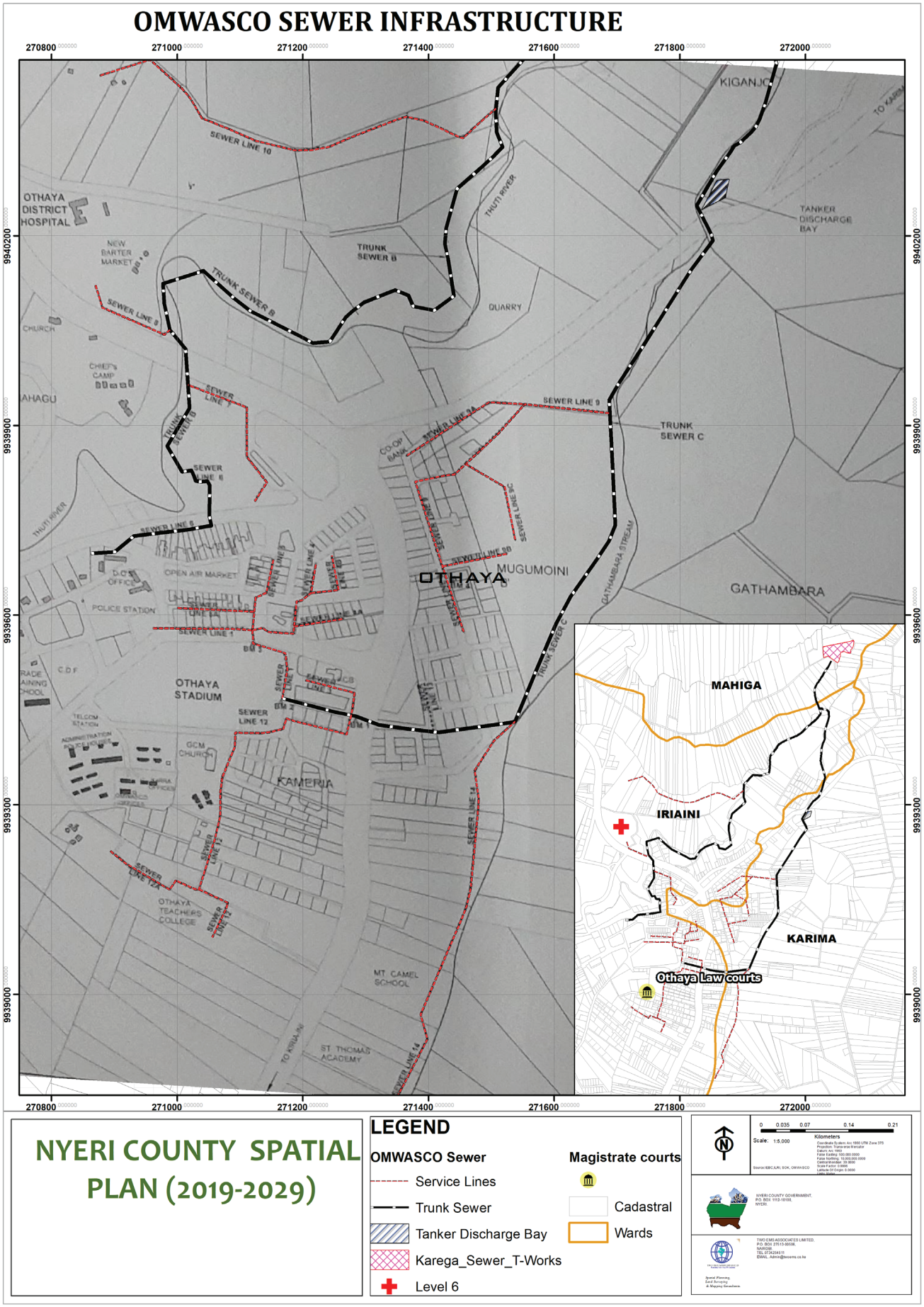
Map 87: Extent of sewer network by MAWASCO



Source: MAWASCO, 2019

OMWASCO sewer network is limited within Othaya town and immediate environs, Main treatment works are located at Karega with a design capacity of 1,094m^3/day. This capacity serves approximately 791 connections out of the total population of Iriaini ward. The company is in the process of developing a sewer works facility that will serve Mukurweini town residents.

Map 88: Extent of sewer network by OMWASCO



Source: OMWASCO, 2019

Table 27: Projected sanitation infrastructure demand

Year	Population	Daily demand m^3 /day (80% of water demand)	Annum demand (80% of water demand)	Daily treatment (ceteris paribus)	Daily deficit (ceteris paribus	Annual deficit (ceteris paribus
2019	759,164	60,733 m^3	22.167 million m^3	6,894 m^3	53,839 m^3	19.6 million m^3
2020	767,157	61,373 m^3	22.400 million m^3	6,894 m^3	54,479 m^3	19.8 million m^3
2025	805,969	64,476 m^3	23.534 million m^3	6,894 m^3	57,582 m^3	21.0 million m^3
2029	852,774	68,221 m^3	24.901 million m^3	6,894 m^3	61,327 m^3	22.3 million m^3
2030	862,000	68,960 m^3	25.170 million m^3	6,894 m^3	62,066 m^3	22.6 million m^3

Inference:
Limited access to infrastructure has fueled the use of pit latrines and septic tanks, which is highly un-sustainable and dangerous Healthwise in case of disasters such as floods. Flooding of pit-latrines may result to outbreaks of cholera and other related water borne diseases.

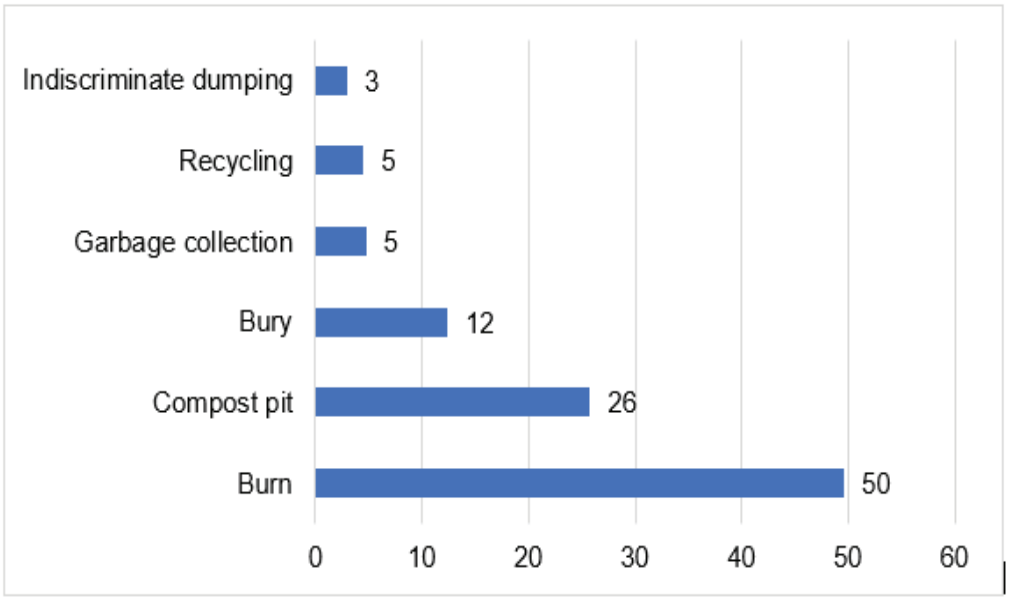
Ground water is highly used in Kieni east and west sub-counties at the same time use of pit-latrines is of high within the same regions, this raises concern of main water source pollution, thereby the need for a sewer line for ground water quality conservation.

9.5.2 Solid Waste

Nyeri County produces an estimated 1138.74 tons of solid waste per day as at 2019 , projected to be approximately 1,150.7 tones/day in 2020, 1208.8 tones/day in 2025,1279.16 tons of solid waste per day by 2029 and 1293 tones/day in 2030. From the field survey, 50% of the population uses burning as their main method of solid waste disposal, mostly in the rural areas, while 26% use compost pits, mostly in the urban areas. Approximately 12% of households bury their waste, garbage is collected and recycled from 5% of the population, while 3% practice indiscriminate dumping.

[2]Assumed average production of solid waste per person is 1.5kg per day.

Figure 36: Solid Waste Disposal Methods.



Source: Field survey, 2019

Currently the County has no formally designated dumpsites. There are however several informal dumpsites such as; one at Asian Quarters in Nyeri town and another in the North Western side of Karatina town. Waste from major towns such as Othaya, Mukurweini and Narumoro is dumped in informal mini dumpsites within the town precincts. Many market centres do not have any dumping sites. The County Government is in the process of identifying suitable locations for designated waste handling plants

Plate 4: Karatina dumpsite

Source: Field survey, 2019

Existing waste management practices in the County result in air and soil pollution, unpleasant views and foul smells from decomposing materials in dumpsites. Solid waste poses a great danger to Nyeri County fragile ecosystem which consist of wetlands, national parks and forests and domestic animals. Pollution of this ecosystems jeopardises the tourism sector, local farming and quality of water consumed by the County residents.

The county government may adapt use of GIS in ensuring timely and prioritized waste collection, sensor technologies in sorting of waste and garbage compact trucks. Garbage compacting trucks technology ensures more waste is collected using the existing resources, as opposed to flat pile garbage.

9.5.2.1 Types of solid waste

Waste and by-products cover a diverse range of materials, as the following list illustrates:

1. Household waste: Waste generated by households across the county. Construction and demolition waste: Waste generated from civil works, in roads, buildings, utilities amongst others. Electronic waste: used electronic waste, such as computers, radios, television sets, mobile phones amongst others.
2. Hazardous waste generated from health facilities, pharmaceuticals, and chemical industries amongst others. Such waste includes:

a) Infectious waste: waste contaminated with blood and other bodily fluids (e.g. from discarded diagnostic samples), cultures and stocks of infectious agents from laboratory work (e.g. waste from autopsies and infected animals from laboratories), or waste from patients with infections (e.g. swabs, bandages and disposable medical devices);

b) Pathological waste: human tissues, organs or fluids, body parts and contaminated animal carcasses; Sharps waste: syringes, needles, disposable scalpels and blades, etc.; Chemical waste: for example, solvents and reagents used for laboratory preparations, industrial manufacturing processes, disinfectants, sterilant and heavy metals (e.g. mercury lead amongst others) and batteries;

c) Pharmaceutical waste: expired, unused and contaminated drugs and vaccines;

Non-hazardous or general waste: waste that does not pose any biological, chemical, or physical hazard such as boxes, the packaging of medical items and food, remains of food, and waste from offices.

9.5.2.2 Possible Health and Environmental Impacts of solid waste

Health Risks

Waste contains potentially harmful microorganisms that can infect the public. Other potential hazards may include drug-resistant microorganisms which may spread from hazardous wastes such as hospital waste and into the environment.

Adverse health outcomes associated with waste and by-products also include:

- Sharps-inflicted injuries.
- Toxic exposure to pharmaceutical products antibiotics and cytotoxic drugs released into the surrounding environment, and to substances such as mercury or dioxins, during the handling or incineration of health care wastes.
- Chemical burns arising in the context of disinfection, sterilization, or waste treatment activities.
- Air pollution arising because of the release of particulate matter during incineration, and foul smell associated with decomposing organic waste.
- Thermal injuries occurring in conjunction with open burning and the operation of waste incinerators; and radiation burns.

Environmental Impact

The following are some of the environmental impacts that are associated with poor disposal of solid waste:

- Unmanaged disposal of wastes in landfills can lead to the contamination of drinking, surface, and ground waters if those landfills are not properly constructed.
- The treatment of wastes with chemical disinfectants can result in the release of chemical substances into the environment if those substances are not handled, stored, and disposed in an environmentally sound manner.

- Incineration of waste has been widely practiced, but inadequate incineration or the incineration of unsuitable materials results in the release of pollutants into the air and in the generation of ash residue thus resulting to air pollution. Incinerated materials containing or treated with chlorine can generate dioxins and furans, which are human carcinogens that have been associated with a range of adverse health effects. Incineration of heavy metals or materials with high metal content (in particular, lead, mercury, and cadmium) can lead to the spread of toxic metals in the environment. Only modern incinerators operating at 850-1100 °C and fitted with special gas-cleaning equipment can comply with the international emission standards for dioxins and furans.

9.5.2.3 Management of Solid waste

The processes involved in the management of solid waste include:

- Segregation (separation):

This stage should be practiced at household level, where sorting of organic, from non-organic, recyclables from non-recyclables and that which is to be reused.

- Storage:

Nyeri county government department of environment has fairly distributed garbage bins, across various sites in urban areas, waste transfer receptacles strategically within urban areas.

- Disinfection:

This applies to toxic and hazardous wastes. The disinfection of solid waste using chemical disinfectants is only effective if such waste has been shredded beforehand.

- Transportation:

Waste collection and transportation within the county is the mandate of department of environment. Segregated storage containers are designed in such a way they can be emptied into bigger transportation trailers. The containers must be easy to carry, preferably with handles and a tight-fitting but easy to remove lid. Where waste is to be disposed in an incinerator or pit, it should be designed so that it's relatively easy to empty the contents without spillage.

- Disposal:

This the final stage of solid waste management. Technologies involved include general solid waste pits, incineration, sharps pits and placenta burial pits.

9.5.2.4 Use of Geographic Information System in the management of solid waste management

GIS as a decision-making tool, is adequately resourced in determination of a suitable site/s for solid waste management. Considering factors such as land availability, residential areas, bio-diversity, terrain, water table, accessibility, infrastructure such as airports and heavy-duty electricity transmission lines amongst others the tool segregates a site that satisfies at least majority of the factors while subject to community participation and Environmental impact assessment.

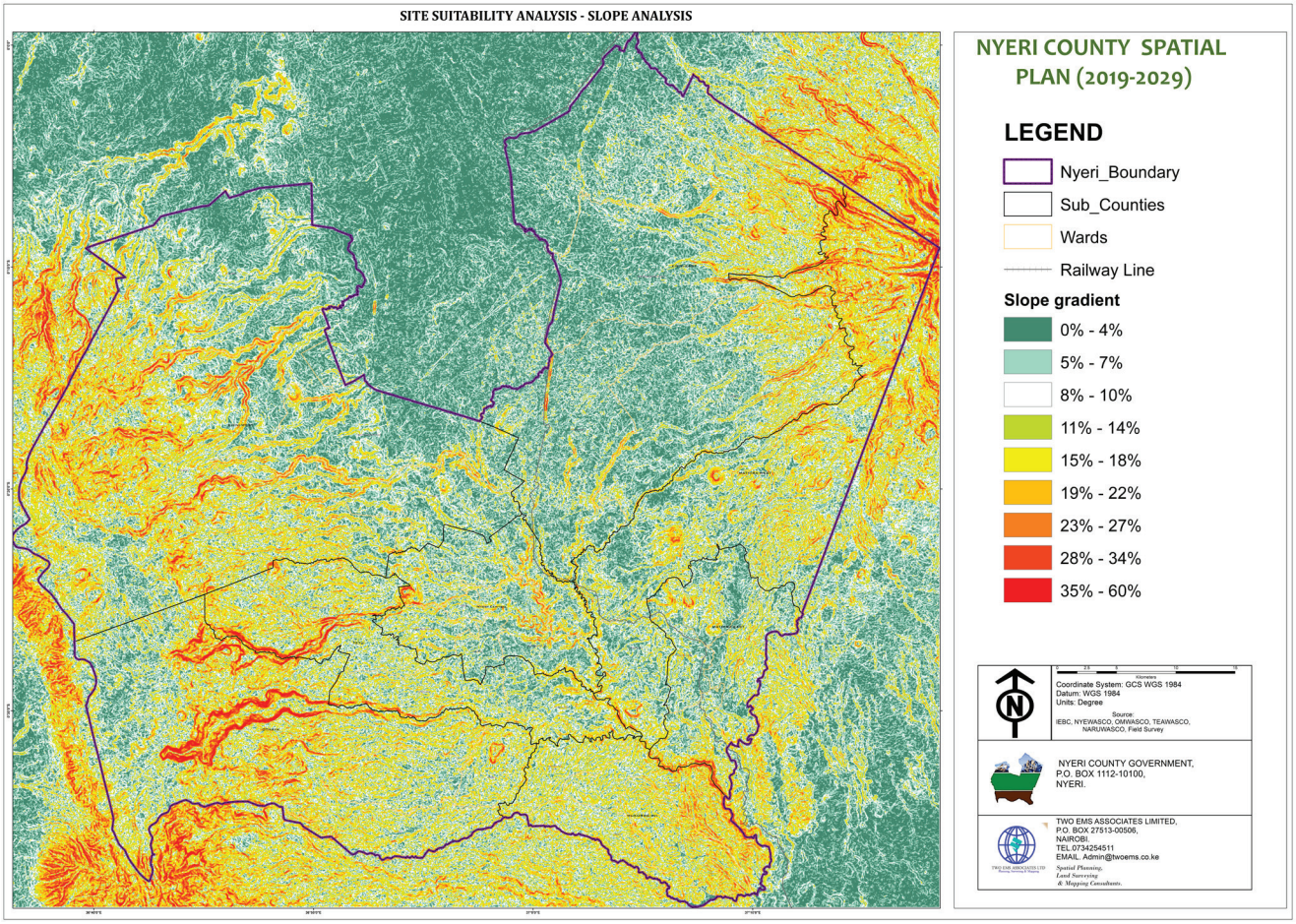
9.5.2.5 Site suitability analysis for a solid waste management site/landfill

The following factors were applied before site selection:

1. Terrain

Sites with gradients above 15% were avoided in the determination of solid waste management site. This is because steep slopes are subject to landslides and highspeed fast moving flood waters. Preferred areas should be flat or gently sloping with gradients within 3-6%.

Map 89: Slope Elevation Map. Areas that are less slopy were considered



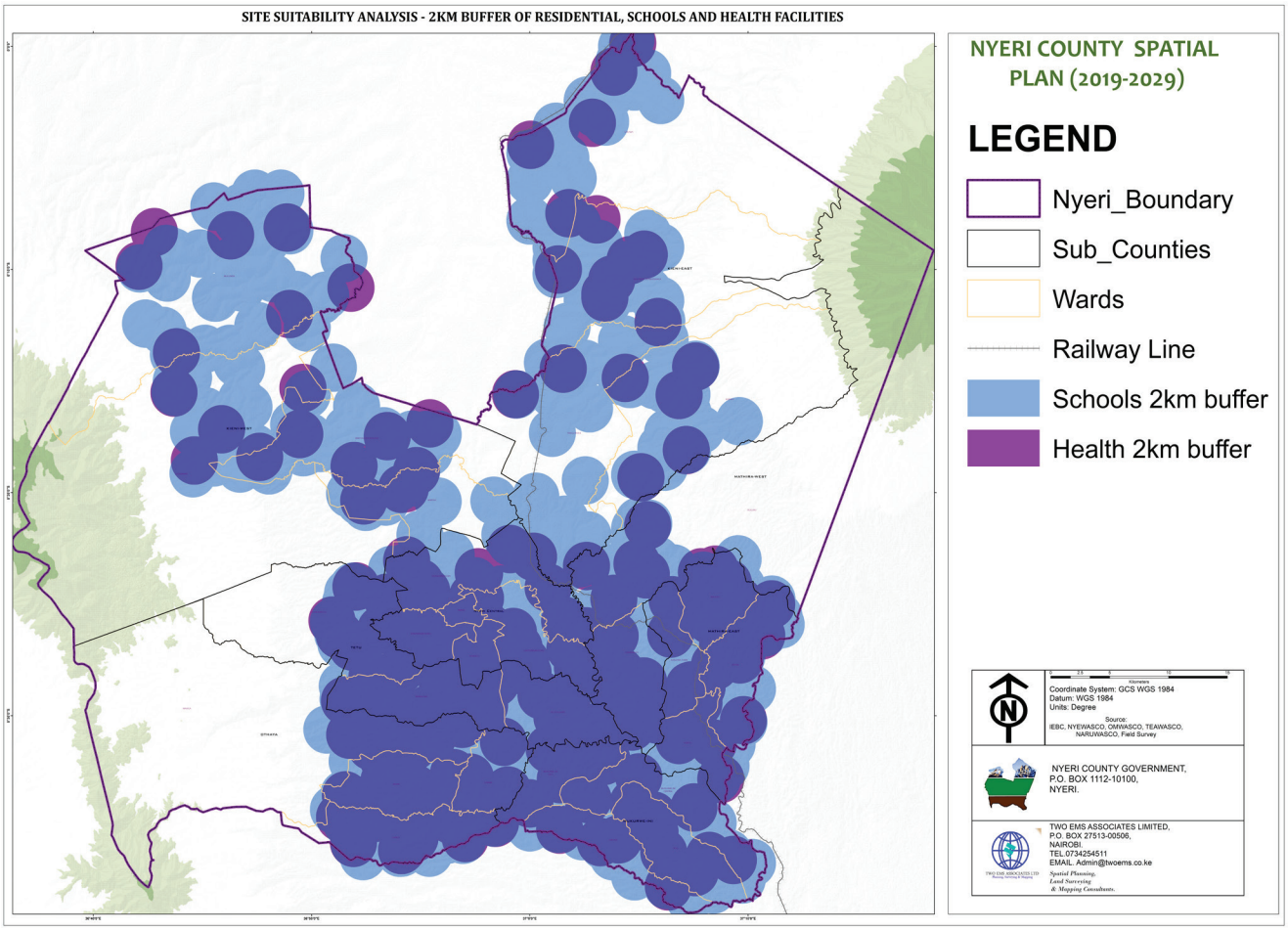
Source: Two Ems Associates, 2019

The yellow to red zones represent un-suitable areas, above 7% slope gradient, while light to dark green zones represent slope suitable zones, including areas abutting Mt Kenya and aberdares, Mukurweini, Tetu and Othaya sub-counties are largely unsuitable.

2. Allow for residential, schools, health zones buffer

Waste management site should be located not less than 5kms from the nearest residential zone point. This is necessary to mitigate possible medical fumes from disposed laboratory chemicals, morgue chemicals amongst others.

Map 90: Map showing a 5km buffer from residential zones, schools and hospital facilities



Source: Two Ems Associates, 2019

Mweiga, Thegu river, Endarasha mwiyogo, Gatarakwa and parts of Kabaru are the only wards with available sites satisfying this criterion as shown in the above map.

3. Water table

The water level in ground water table should be sufficiently below the base of any excavation to enable solid waste management site development. This is to avoid contamination of water sources, which may come as a result of exposure to toxic waste. Solid waste management site development should be also be waterproof so as to prevent leaching. Areas with shallow water tables should be avoided.

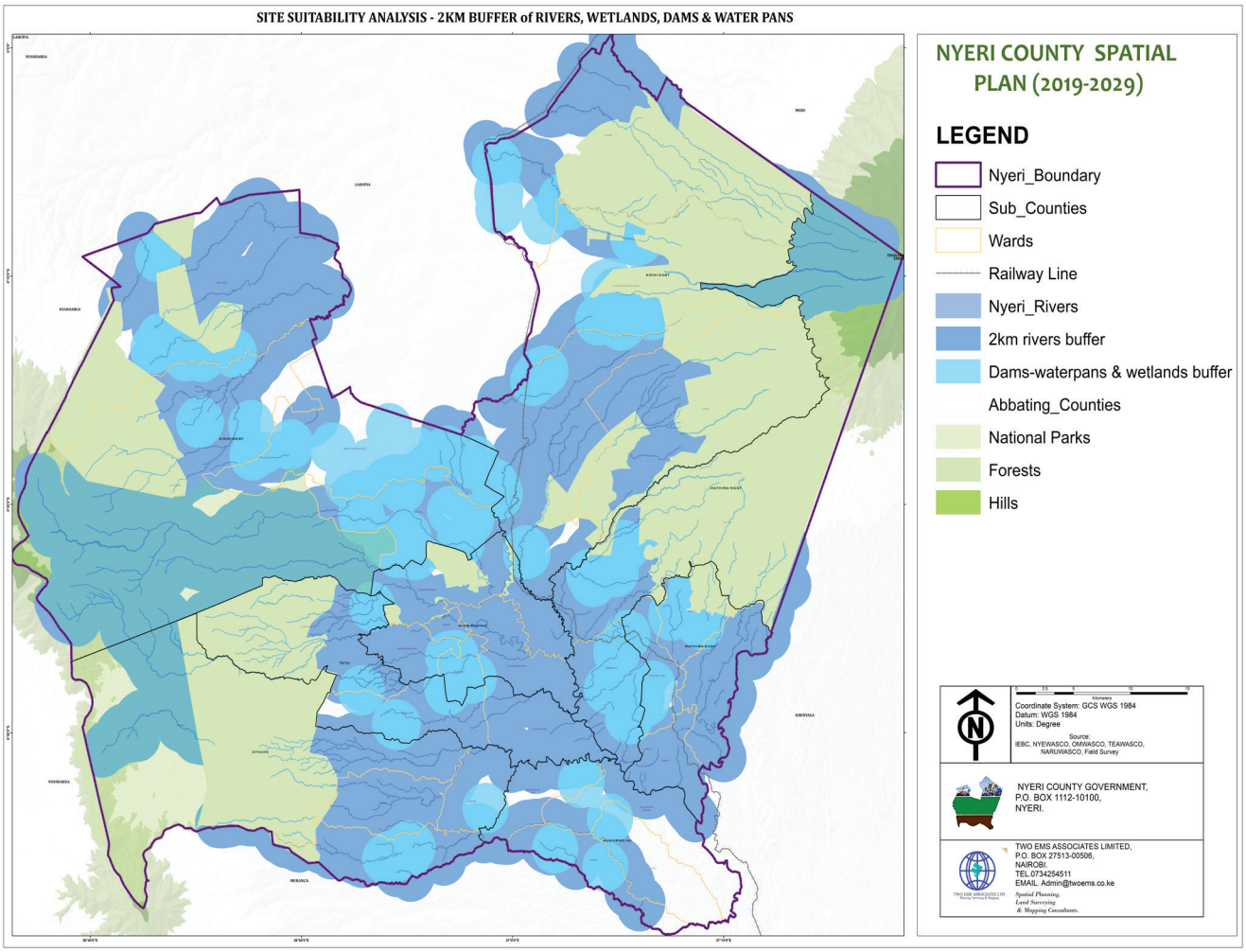
4. Biodiversity

The proximity to sensitive ecological and biodiverse areas should be considered in selecting a suitable location for solid waste management site development. Sensitive ecological areas in this case include wetlands, parks and game reserves, rivers, catchment areas and forests. A two-kilometer buffer should be considered before locating such a facility so as to preserve biodiversity.

5. Water bodies

Solid waste management area should not be remarkably close to significant water bodies (water courses or dams). This is because of the risk of contamination, which can be hazardous for aquatic life. A 2-kilometer buffer zone along rivers, water reservoirs, swamps is recommended.

Map 91: Hydrological Map showing a 2km buffer from rivers, wetlands and dams



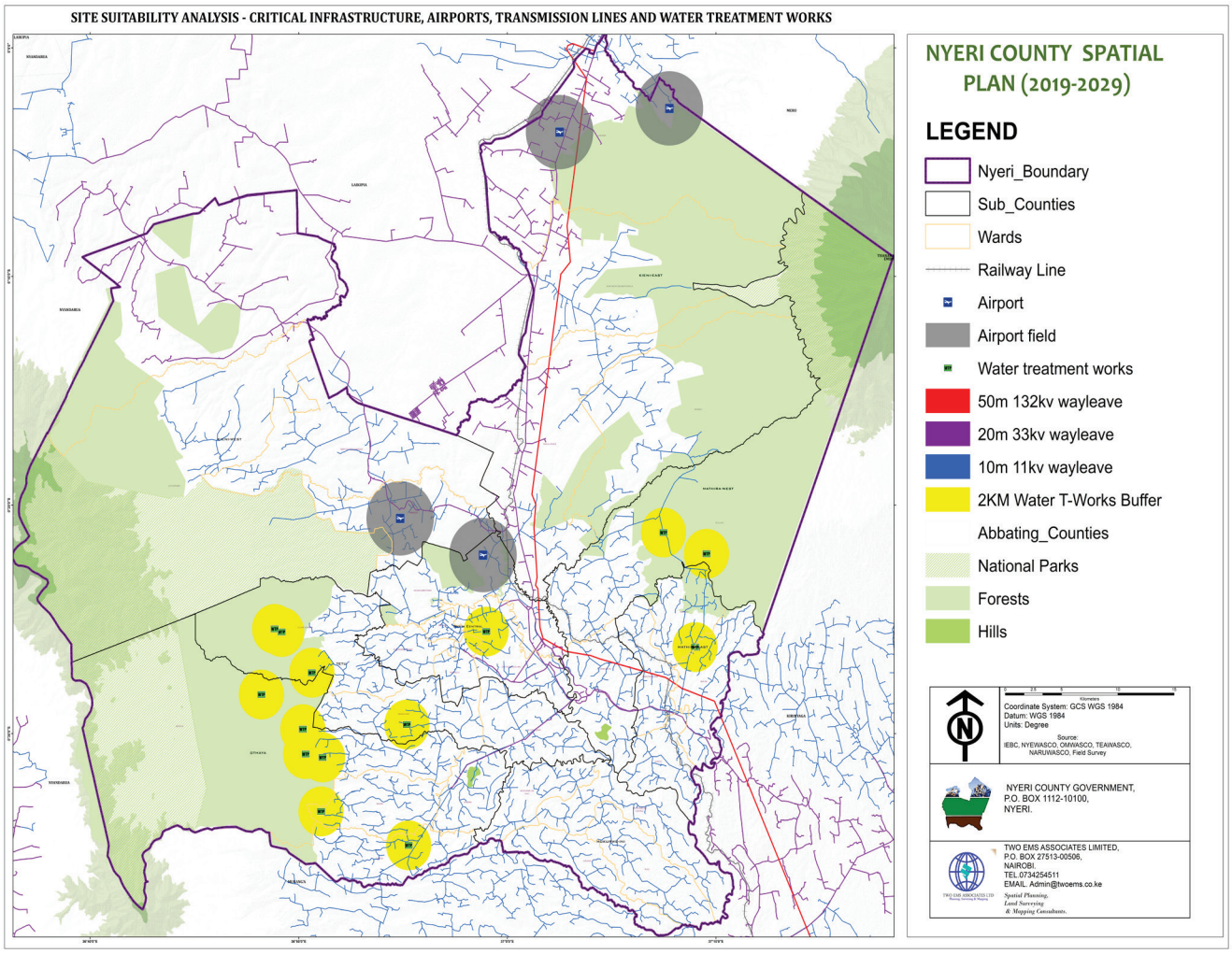
Source: Two Ems Associates, 2019

6. Critical Physical Infrastructure Airports, Transmission line and water supply infrastructure

No major power transmission, distribution or other infrastructure like water supply lines, reservoir, should be crossing through Solid waste management site. The proposed site should if near the heavy-duty line should have a leeway of 10m wayleave for 11kv lines, 20m wayleave for 33kv line, 30m wayleave for 66kv line, and 50m wayleave for 132kv lines. The site should be located outside a 2km away from the nearest water treatment works. Public & private irrigation water supply wells should be far away from the boundaries of Solid waste management sites. This is because such infrastructure would be at risk of contamination, and consequently affect people's health.

The site should atleast be 5km away from the nearest, airport or airstrip in the horizontal surfaces, and 15km in the approaches. Solid waste sites attract scavengers mostly birds which would otherwise pose danger to flights during take off or landing. For suitability analysis purposes a 5-kilometer buffer zone along the airport.

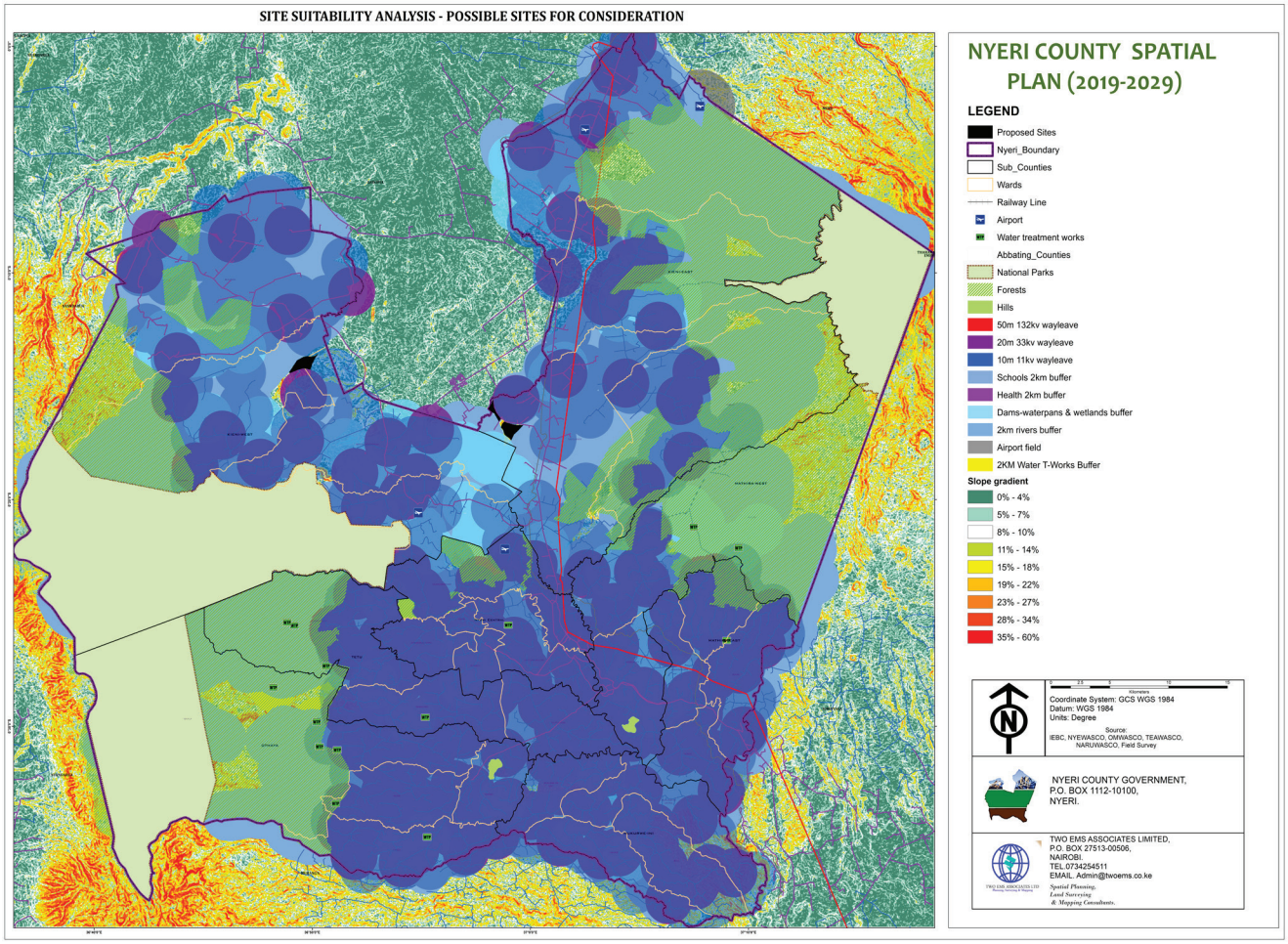
Map 92: Buffers of Electric transmission infrastructure, Airports and water supply infrastructure



Source: Two Ems Associates, 2019

Site segregation using above factors, results into two possible locations in Thegu river and Gatarakwa ward. The site satisfies is within 0-3% slope gradient, away from any river/stream/school/health facility, electric transmission line, residential area, airport, water treatment facility, hills, forests or national park see the map below.

Map 93: Segregation of most suitable site for possible consideration

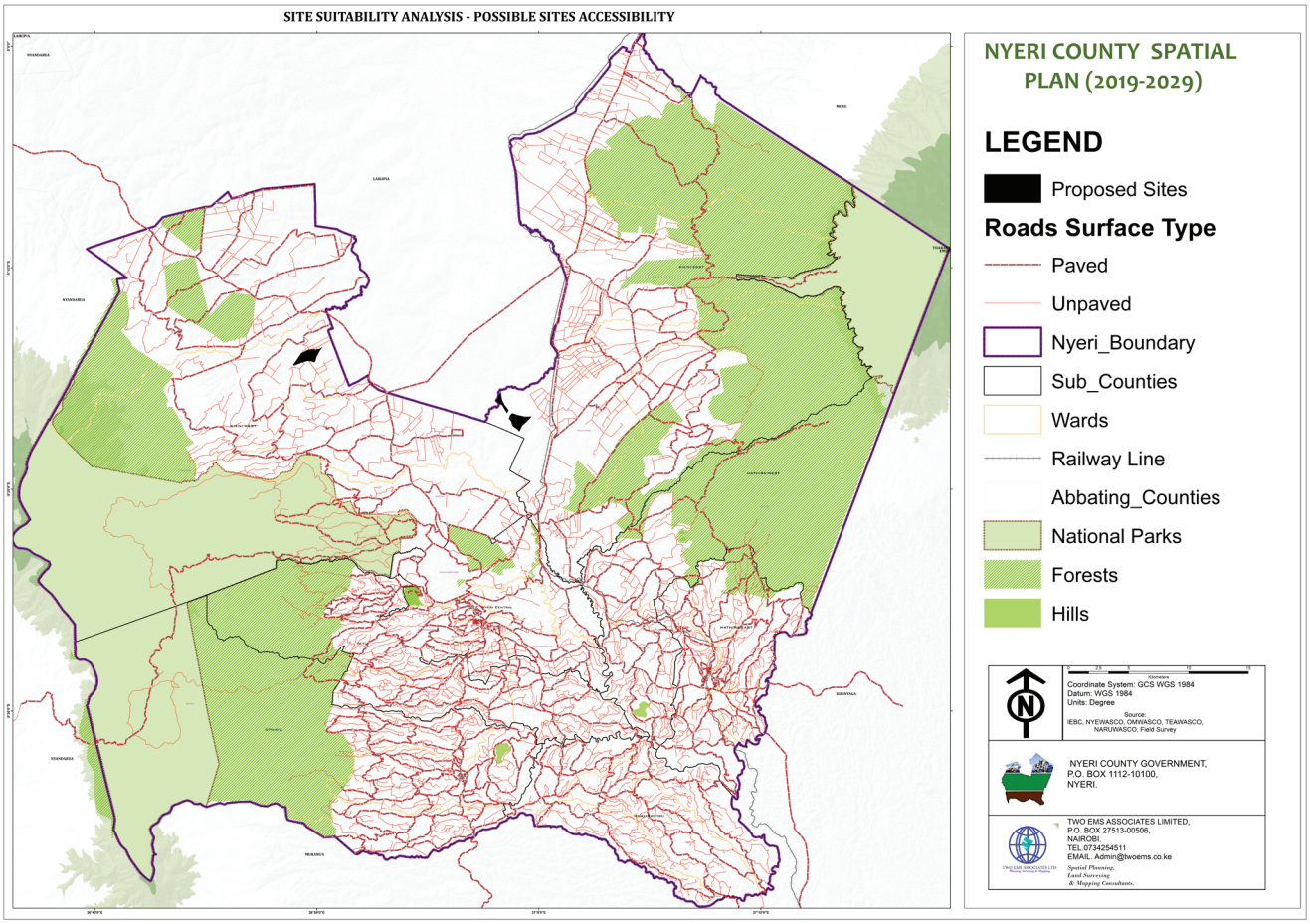


Source: Two Ems Associates, 2019

7. Accessibility

The site should be easily accessible from a minimum of a 12m all-weather road. This is to allow the movement of heavy trucks and waste delivery across all the seasons. Access to the facility must be restricted and controlled.

Map 94: Accessibility Map showing access from paved and unpaved roads



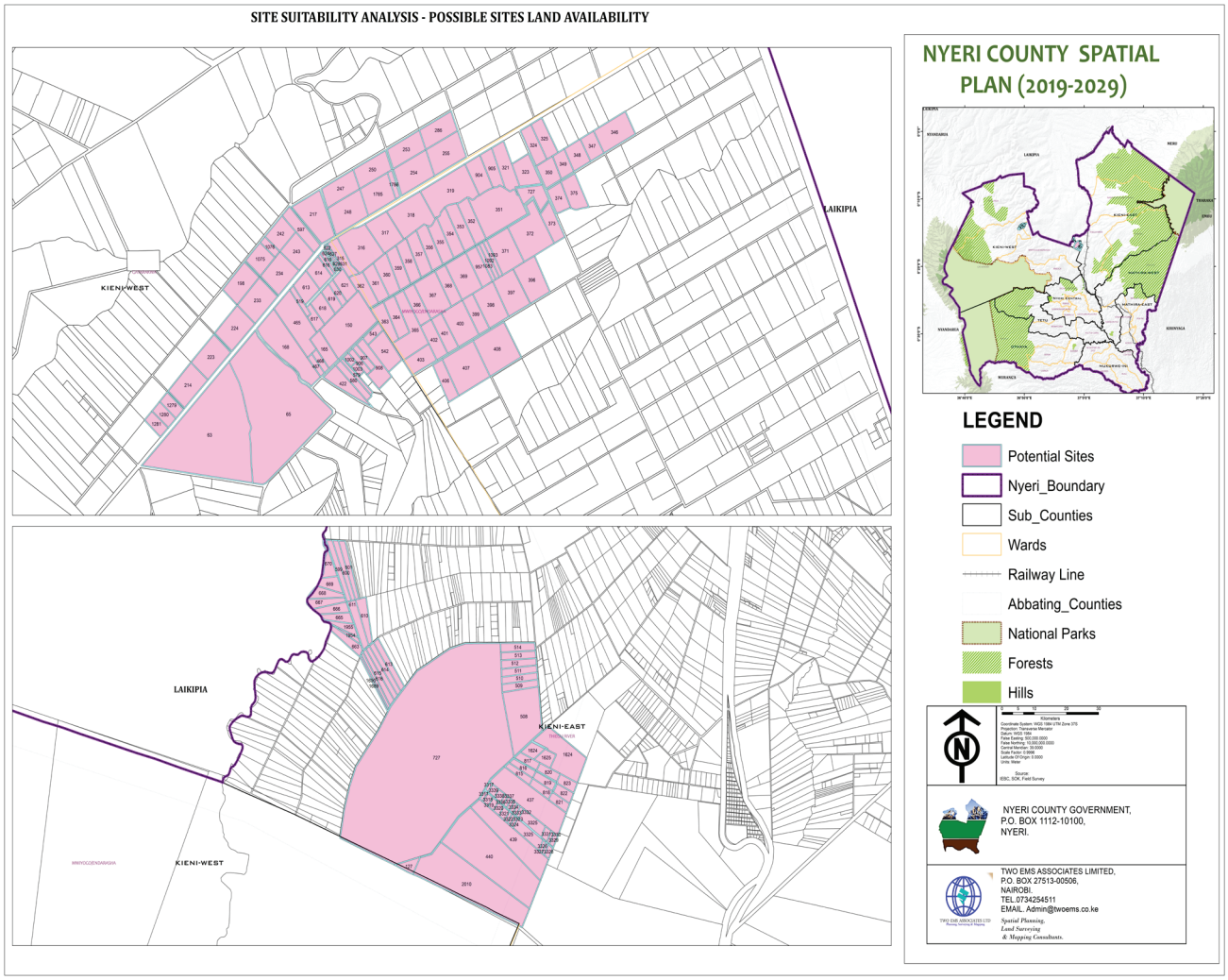
Source: Two Ems Associates, 2019

The site within Gatarakwa ward has adequate access to unpaved roads while two other sites in Thegu river lack a properly define access, therefore accessibility must be addressed before development of any of the sites as solid waste management area.

8. Availability of land

Last factor for consideration was the availability of land. This factor relies on the acceptability of the project by the local community and the parcel owners to be affected. However, in case the project is of greater public good, then the rights of the public supersede the individual. This does not mean; the owner is not compensated appropriately. The map below shows parcels affected by the identified sites for consideration for solid waste management.

Map 95: Parcels suitable for development as solid waste management centers



Source: Two Ems Associates, 2019

9.5.3 Emerging Issues for Sanitation

Potential/Opportunities	Constraints
• Existing and future solid waste production is adequate to facilitate operations of a modern waste sorting, recycling, reducing plant. An opportunity to create employment as well as handling waste sustainably. • Use of technology such as WEB GIS in waste management, sensors, and compact machines in transportation. • Terrain favors gravitational sewer flow if the lowest contours are established, this is advantageous in laying sewer infrastructure. • There is demand for sewer infrastructure as only 9% of the population is connected. This would ensure returns to the investor as and when the infrastructure is provided.	• About 80% of Othaya, Kieni East and West, Mukurweini sub-counties lack a public sewer line/ or treatment Infrastructure. There is need to provide this service to minimize water borne diseases and improve sanitation levels within the County. • Provision of sanitation and sewer infrastructure is very capital intensive from wayleave acquisition, construction and management phase. • Terrain is a limiting factor too. Some areas especially in Mukurweini Central, Mukurweini East, Ruguru and Dedan Kimathi, Rugi and Gikondi wards are very steep it would be very expensive to develop infrastructure in this area. • Frequent sewer bursts particularly during the rainy season. This results in foul smells and increased exposure to water-borne diseases. • Market centres do not have designated dumping sites, which has resulted into the unpleasant views of the respective centres, pollution of wetlands, air pollution and death or diseases of livestock by ingesting the plastic bags.

9.6 Social Infrastructure

9.6.1 Education

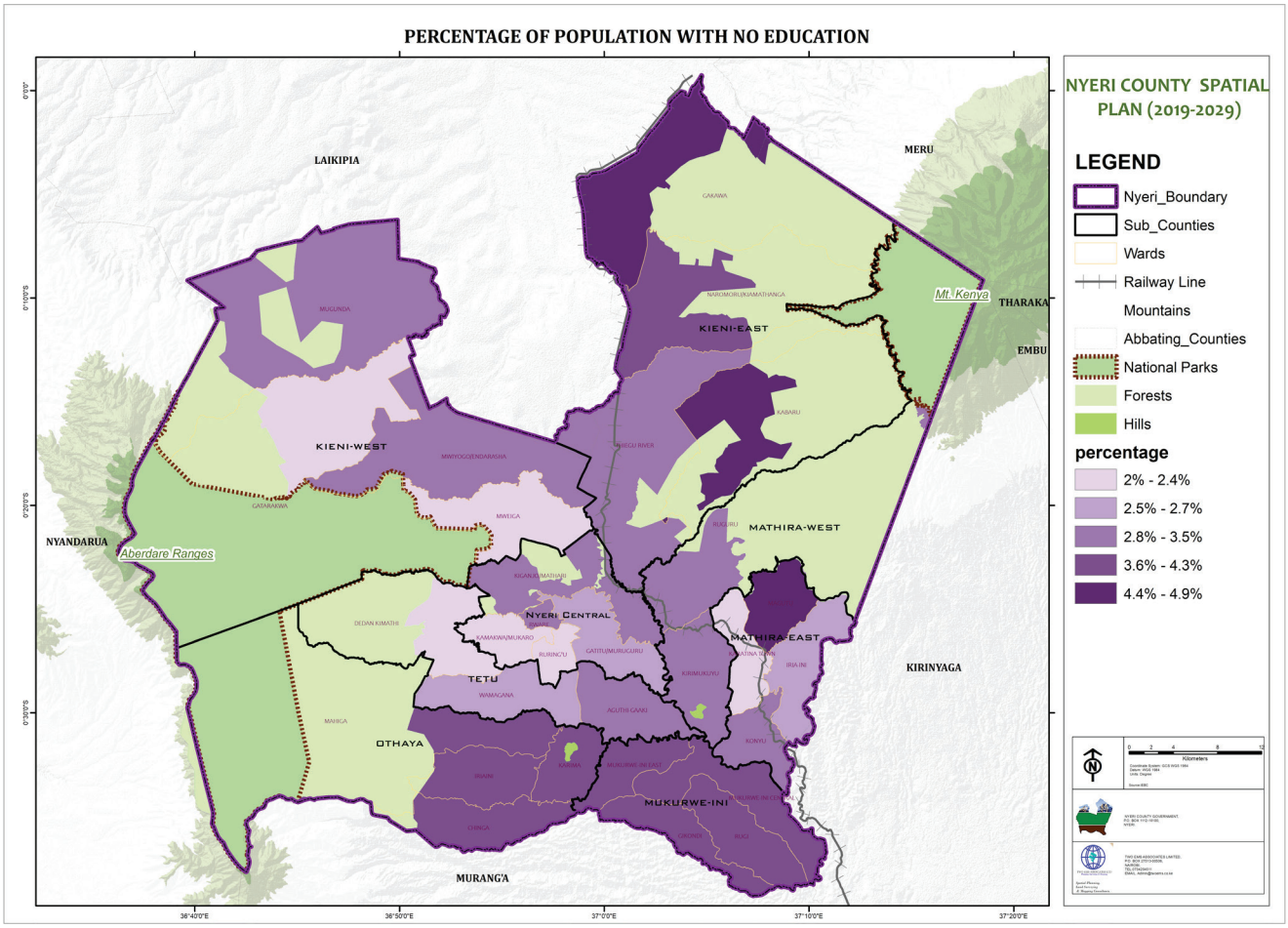
9.6.1.1 Education Facilities Distribution

a) Pre-primary Facilities

Social economic survey findings indicated that 9% of Nyeri county residents have no formal education, while KNBS 2019 household population census indicated that 7% of county population have attained ECD education level only. Lack of any form of formal education means that this section of the population did not receive pre-primary training. The rate of enrolment is approximately 95%, which shows that there is still a significant number of children though not a large percentage who are not in school. Failure to enroll can be attributed to, poverty and agricultural activities.

Low income levels inhibit family's inability to sustain education costs despite primary and secondary education being declared free, moreover the vibrant tea, coffee, macadamia, avocado and dairy across the county provides daily wages to casual employees who are employed either as tea pickers, and coffee farms amongst other casual jobs. Map below indicates percentage distribution of population with no formal education at ward level. Magutu, Kabaru and Gakawa have the highest percentage at 4.9%, while Mweiga, Ruringu, kamakwa and Dedan kimathi wards have the least at 2.4%.

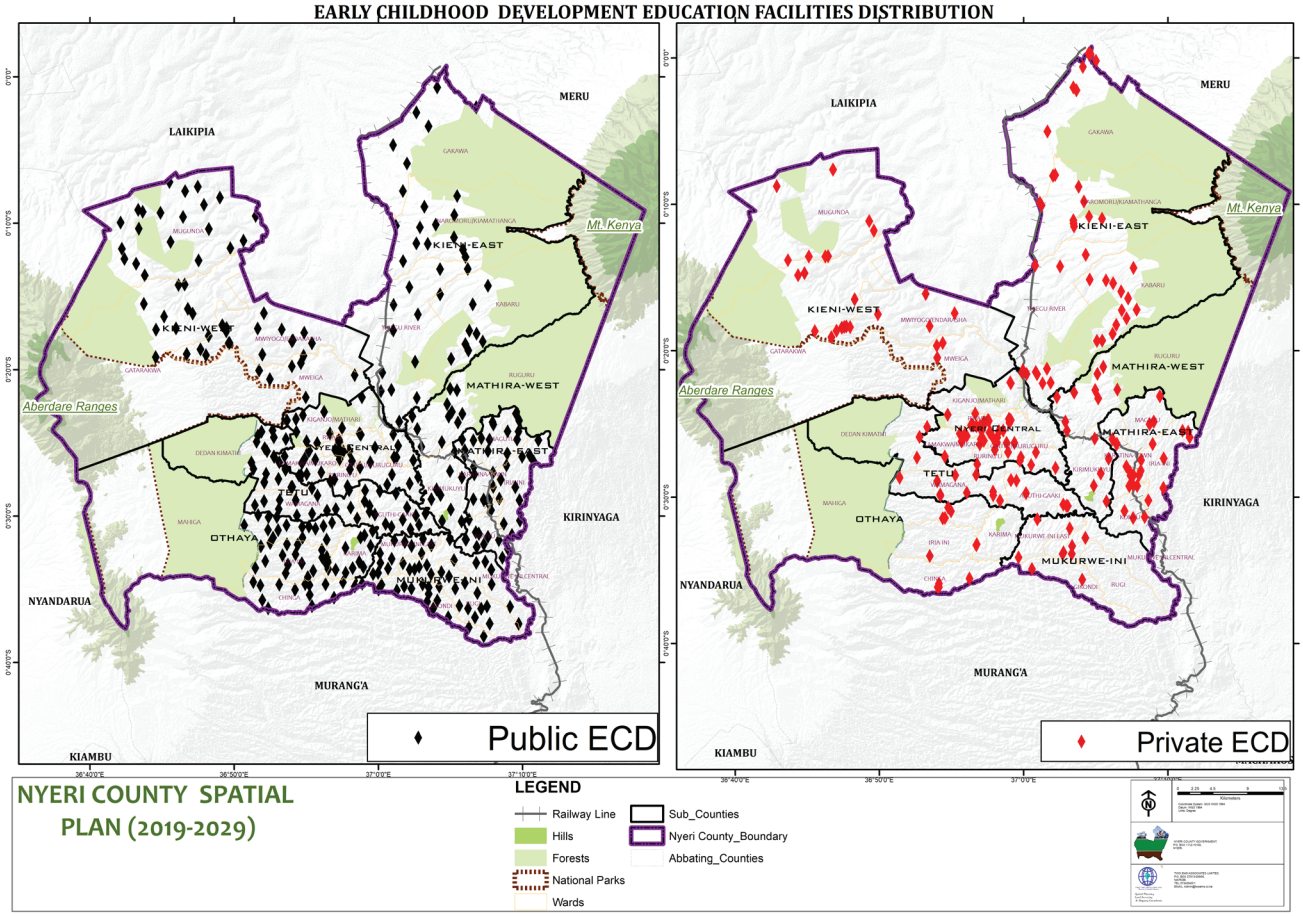
Map 96: Percentage of population with no formal education



Source: Two Ems Associates, 2019

There are 440 public Early Childhood Development Education (ECDE) centres in Nyeri County, serving approximately 20,000 pupils in 2019. There is a total of 800 ECDE teachers in the County, making the teacher/ pupil ratio to be 1:12. The main challenges facing ECDE institutions include; insufficient school feeding program funds, inadequacy of learning materials and inadequate teaching personnel. In terms of land allocation, all public ECDs land use provision is adequate as they are attached to primary schools. Land analysis indicated all primary schools have land parcels averaging 3.25ha, which fits within the recommended land allocations for a primary school with attached ECD

Map 97: Distribution of ECD Facilities



Source: Two Ems Associates, 2019

The analysis of the gap/ inadequacy of ECDE facilities by population has been summarized in the table below.

Table 28: Gap analysis of ECDE facilities

Population	Total population	Total public ECD	Recommended Physical Planning standards of (1@ 2500) population	Gap	Comments
Existing (2019)	759,164	435	303	0	Adequate
Projected (2020)	767, 157	435	307	0	Adequate

Projected (2025)	805,969	435	323	0	Adequate
Projected (2029)	852,774	435	341	0	Adequate
Projected (2030)	862,000	435	345	0	Adequate

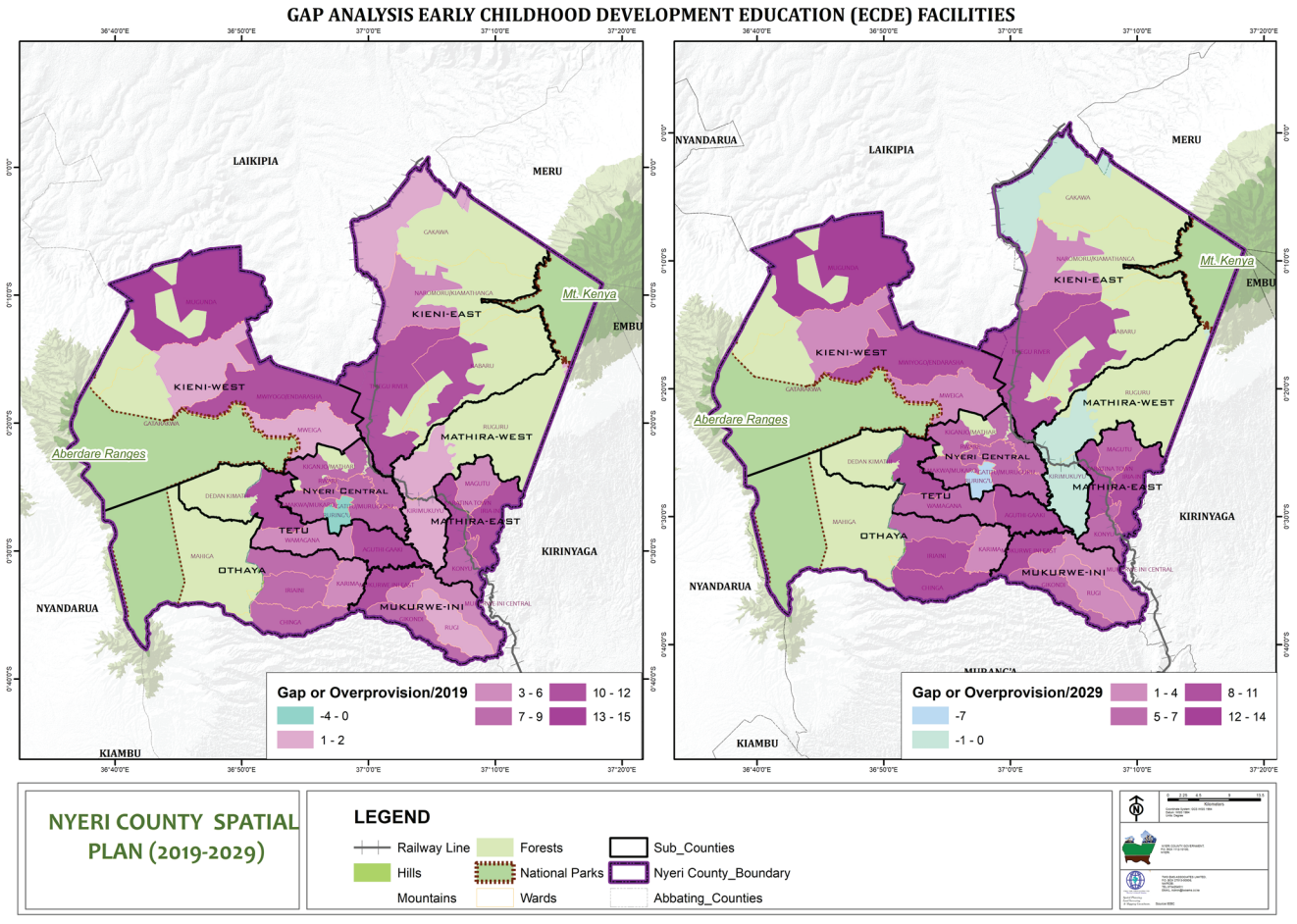
Source: Field survey, 2019

Ward level population vs demand-supply analysis

As at 2019, ruringu ward has a shortage of 3 ECD facilities. This is attributed to the high population within the ward. The demand for ECD facilities in Ruringu is high due to dense residential settlement resulting from proximity to rware ward which is the core commercial center of the county. Ten years' projections indicate wards that have unstable adequacy of facilities (1-2) as at 2019, will face a shortage of up to 6 facilities this include Gatarakwa, Mugunda, Gakawa, Ruringu, Ruguru and Kirimukuyu wards.

This is attributed to the expected population growth. However low population growths in Rugi and Gikondi indicate that existing facilities will be adequate to serve the projected population. The map below indicates provision vs population rates for years 2019 and 2029 (Assumption no development of new facilities over 10 years' period).

Map 98: Gap analysis ECD



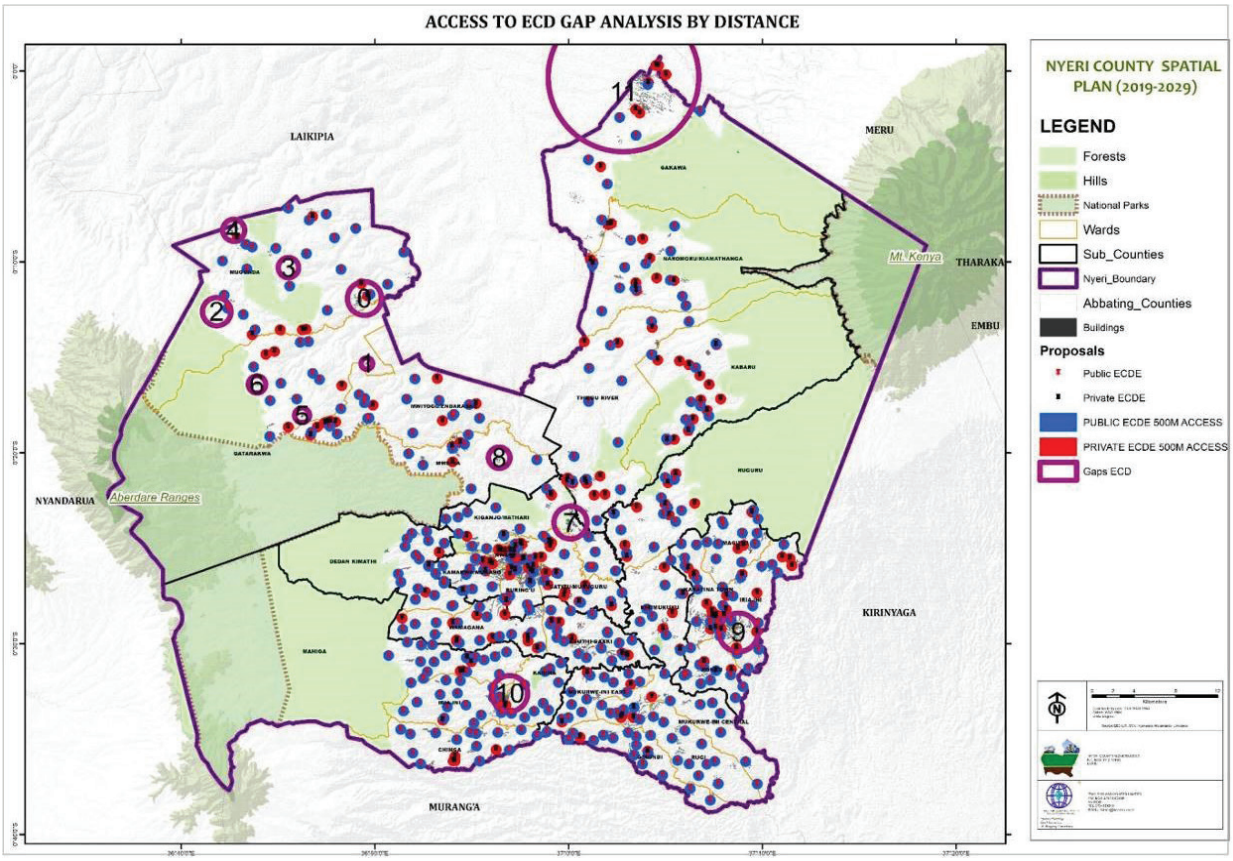
Source: Two Ems Associates, 2019

Local level access by distance

Physical planning standards recommend that a child of age between 2-6 years should have access to an ECDE within 300-500m in residential areas. Despite the fact that there is an over-supply of ECDEs based on the County population, there are areas where the population has no access to an ECDE facility within a 500m radius.

The gaps were identified in Gatarakwa, Mugunda, Mweiga, Kiganjo/Mathari, Kabaru, Karima, Rugi, Iria-ini, and Gakawa wards. Some areas like Gatitu center have access to private ECDs while the nearest public ECD (Kamuiru Primary ECD) is 3km away. Majority of the wards above are in Kieni East and West sub-counties. While there is over-provision of such facilities in other sub-counties, challenges faced include poor conditions and inadequacy of support infrastructure such as Kiamariga ECD in Ruguru ward.

Map 99: Gap analysis by distance



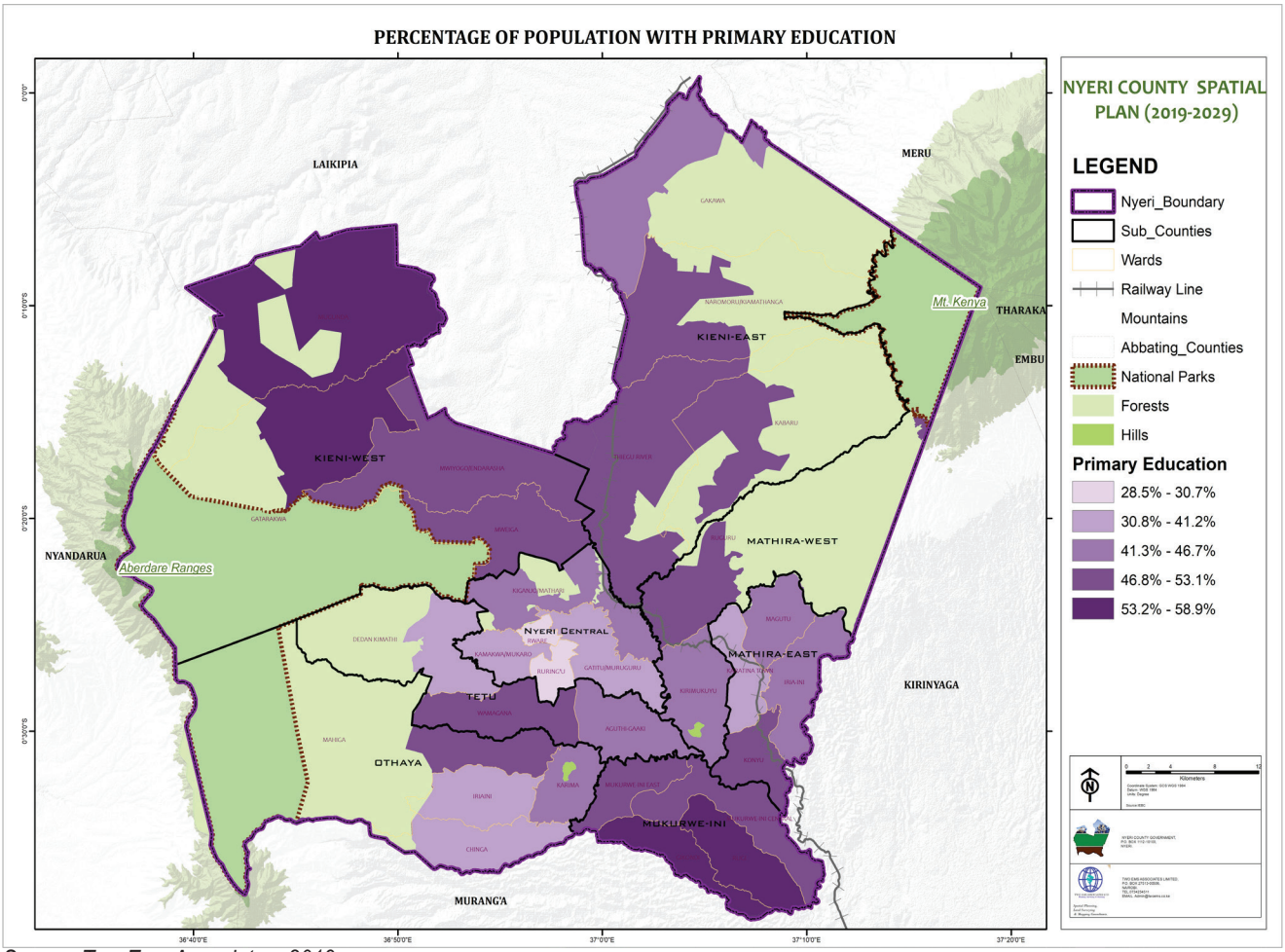
Source: Two Ems Associates, 2019

b) Primary schools

KNBS 2019 population census established that 46% of the county population have attained primary level education only, with both genders represented by 50%. This represents 54% transition rate from primary to secondary or other levels of education. The completion rate stands at 89.4% while retention and transition stand at 91% among boys and 85% among girls.

This low transition can be attributed to poverty expensive nature of secondary education a factor observed in Mugunda and Gatarakwa wards where 55% and 56% respectively of the population have primary education only, a combination of drug abuse and poverty especially in Rugi and Gikondi areas which have highest number of populations with primary education only at 58%. Wards in Mathira east and west, Othaya, Nyeri central have the least number of populations with primary education level, indicating the population in these wards have attained higher education levels.

Map 100: Percentage of Population with Primary Education Only

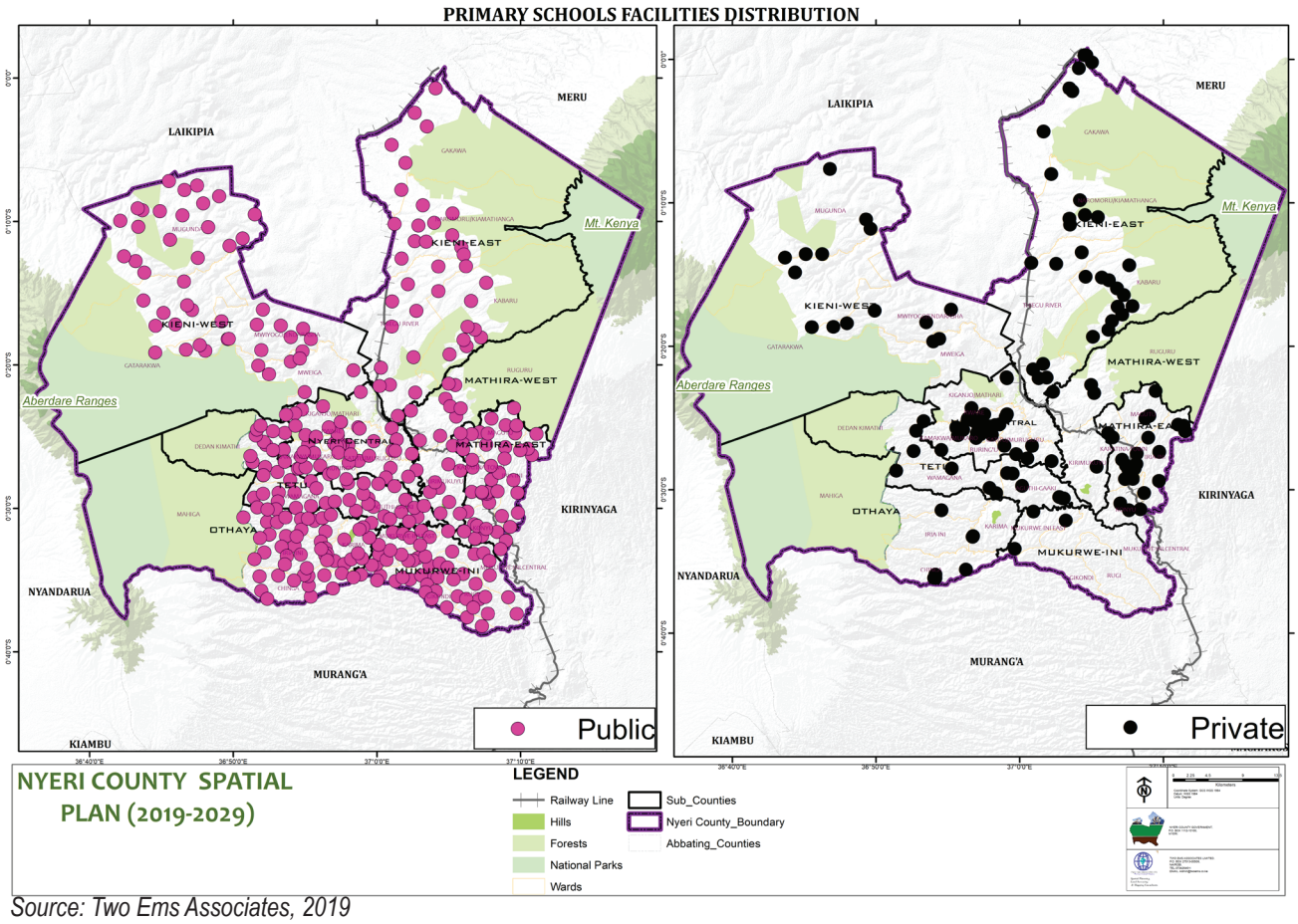


Source: Two Ems Associates, 2019

There are 418 public primary schools distributed across the County with a total enrolment of 141,243 comprising of 72,227 boys and 69,016 girls while private primary schools total to 118 mainly located in Kieni East and Nyeri Central sub-counties. Physical Planning standards recommend that a primary school hosting an ECD should be allocated 3.25ha, though land surveying of boundary demarcation of public primary schools is yet to be completed, preliminary observational findings indicated land use allocation to existing public primary schools is adequate. According to the Basic Education Statistical Booklet, the national pupil to teacher ratio per class in 2014 stood at 42:1, which is within the international standard of 40:1.

Primary schools in Nyeri County have recorded a decline in the number of pupils over the last five years. As a result, in some schools in Nyeri, the ratio is one teacher to 10 pupils. This has mostly been attributed to modern family planning and in a few cases, migration. Statistics from the Kenya Demographic and Health Survey show that 67 per cent of married women in Nyeri are using modern contraceptives, further impacting their fertility rates and hence, impacting the population.

Map 101: Distribution of primary education facilities



Source: Two Ems Associates, 2019

Primary school facilities are concentrated in central and south of the County. Othaya, Tetu, Mathira East and West, Nyeri central and Mukurweini sub-counties residents have access of 0.5-1km to the nearest public primary schools. This is different in Kieni East and West where up to 33% of pupils' trips to school are more than 2kms and some 10% make journeys of 5kms.

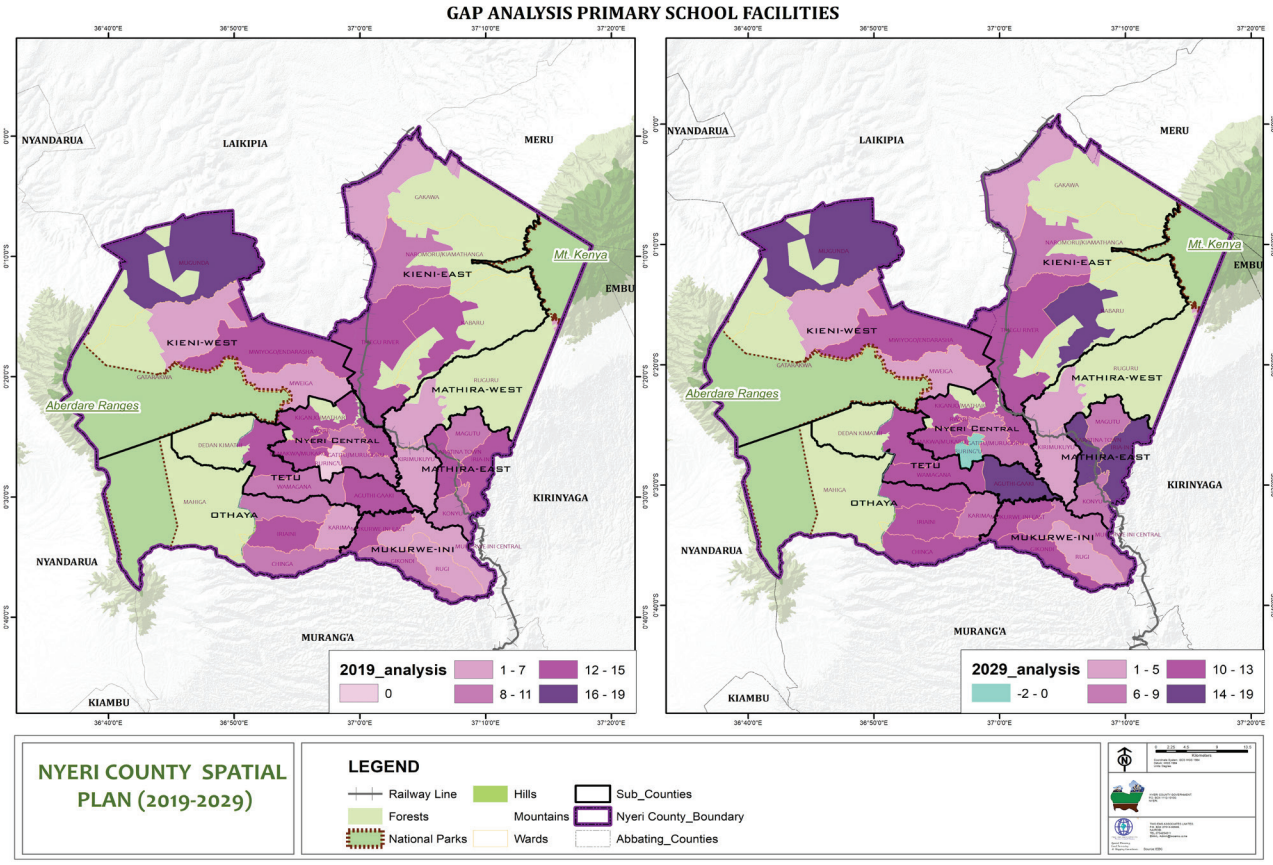
Table 29: County level population vs demand-supply analysis

Year	Population	Public facilities	Recommended Physical Planning standards (1 @ 4000 people)		Comments
			Required	Gap	
Existing (2019)	759,164	418	190	0	Adequate
Projected (2020)	767, 157	418	192	0	Adequate
Projected (2025)	805,969	418	202	0	Adequate
Projected (2029)	852,774	418	213	0	Adequate
Projected (2030)	862,000	418	216	0	Adequate

Ward level population analysis

As reflected in county level analysis, at ward level in 2019 existing primary schools are adequate to serve the existing population, similar is the case for 29 wards as at 2029, except for ruringu ward which will require an expansion of two schools to accommodate the population boom. The map below shows provision vs population rates in 2019 and 2029 (Assumption no development of new facilities over 10 years period).

Map 102: Primary schools gap analysis ward level

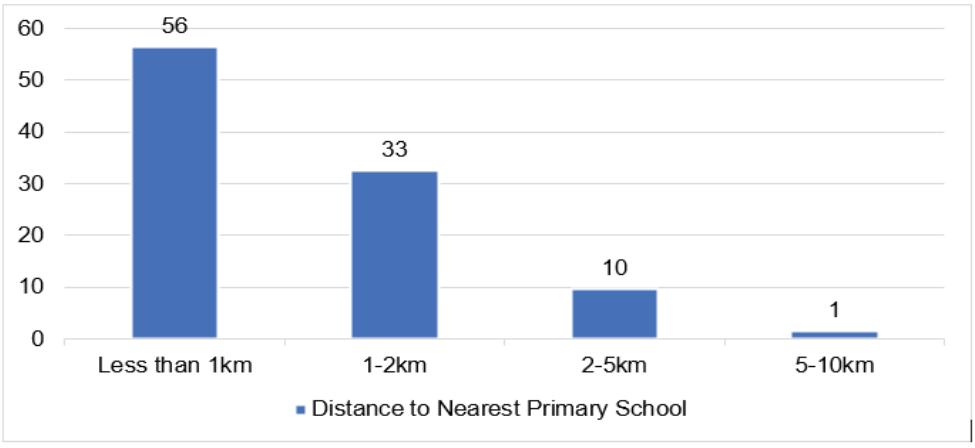


Source: Two Ems Associates, 2019

Primary schools Facilities Access

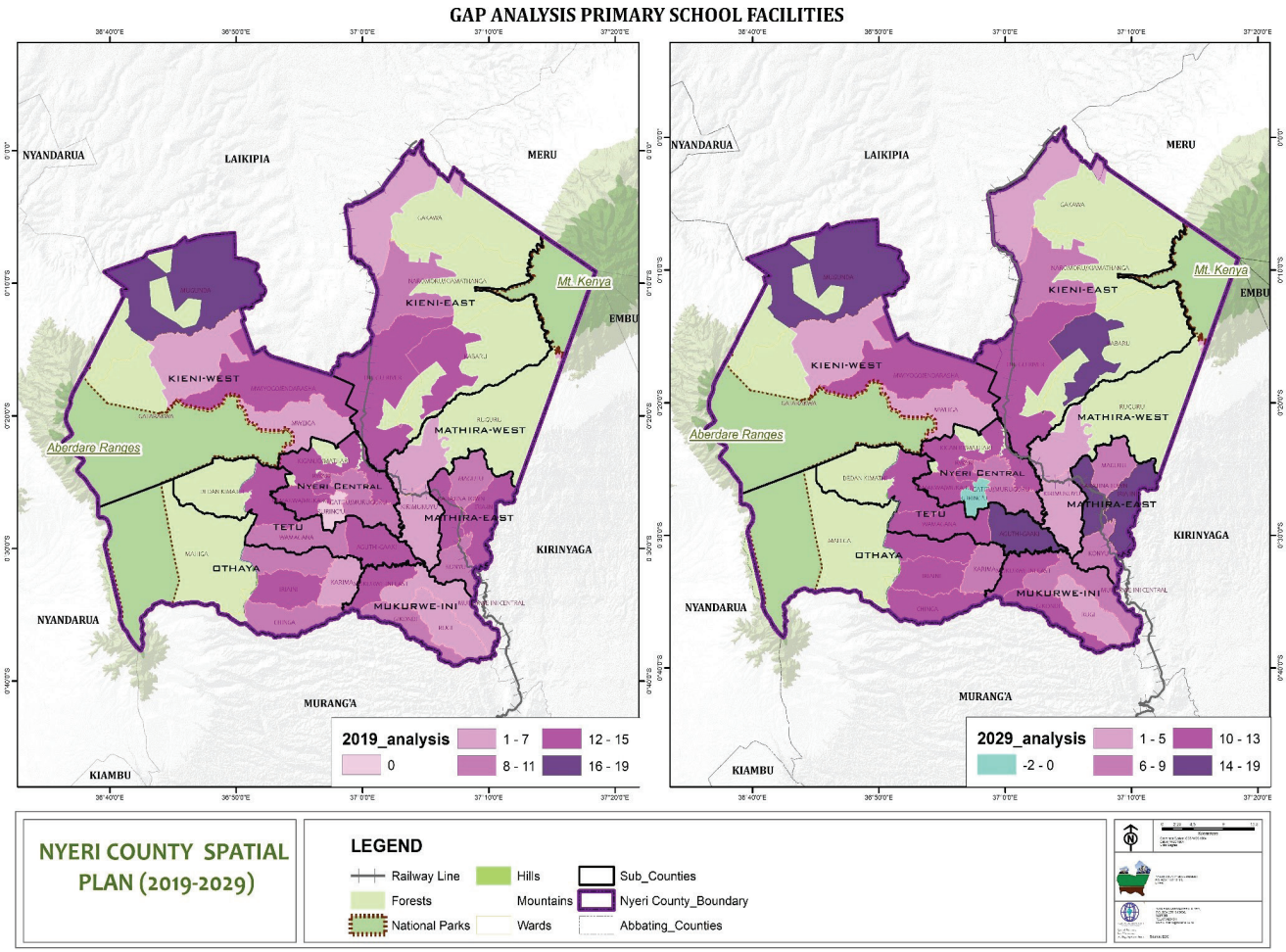
The average distance to the nearest primary school is less than 1 kilometre, as reported by 56% of the respondents in the field survey while 33% cited having to travel for 1-2km, 10% travel for 2-5km, and1% travel for 5-10 km.

Chart 6: Distance to nearest primary school



Source: Field Survey, 2019.

Map 103: Gap analysis for public primary schools



Source: Two Ems Associates, 2019

Gatitu Muruguru ward, Gatitu center requires development of a primary, the area lacks a public primary education facility, the nearest one kiamuiru primary school is located 3km away, which is very far for primary school aged pupils. Across the county, the main challenge facing the primary education sub-sector is the inadequacy of staff and learning equipment, which cuts across the County public schools.

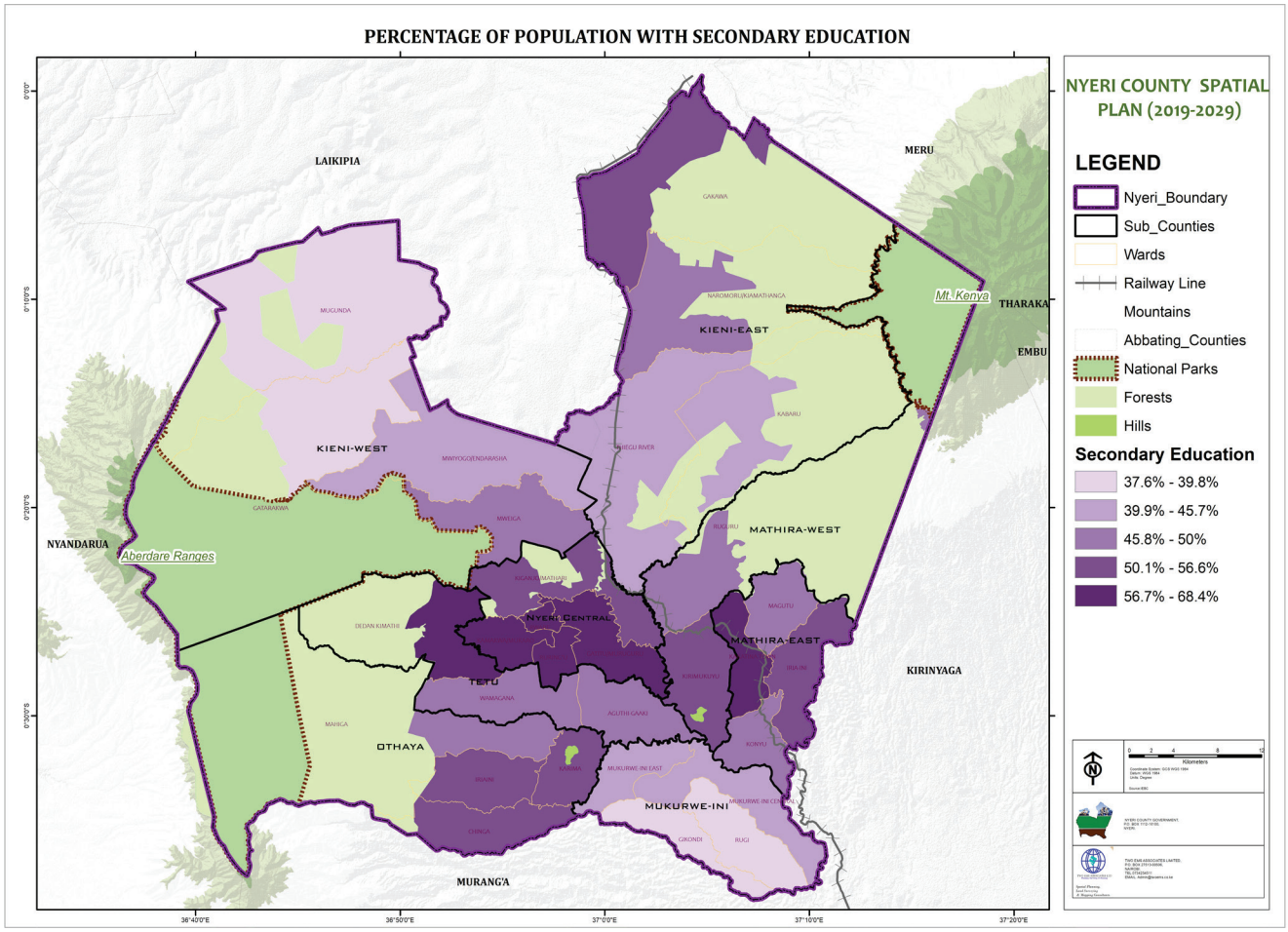
The education sector is also supported by the private sector, with majority of private education facilities being found in Kabaru, Narumoro/ Kiamathanga wards in Kieni, Nyeri central wards and in Mathira East sub-counties. The concentration of private education facilities in these regions signifies that Nyeri is a preferred investment destination for private sector in education, a factor that can be utilized to brand the County as a hub for education tourism.

a) Secondary schools

KNBS 2019 population Census established that 34% of Nyeri County population have secondary education level only. Of these 49% are male and 51% are female. The transition rate from secondary to other higher levels of education is 66% indicating majority of students in secondary schools enroll to tertiary level education programmes. However, the transition rates from primary school to secondary school is 83.5% among boys and 77.7% among girls, indicating more boys are likely to attend a secondary school as opposed to girls.

This factor establishes the preference of Boys attending schools as opposed to girls or early marriage and pregnancies thereby limiting chances of girls attending school. At ward level, it was established that population living within major urban centers such as Othaya, Karatina, Nyeri and Gakawa (proximity to Nanyuki town) have the highest number of populations with secondary education. Unlike wards in Kieni-West and Mukurwe-ini have less share of population with secondary education. See the map below for percentage distribution across the wards.

Map 104: Percentage of Population with Secondary Education Only



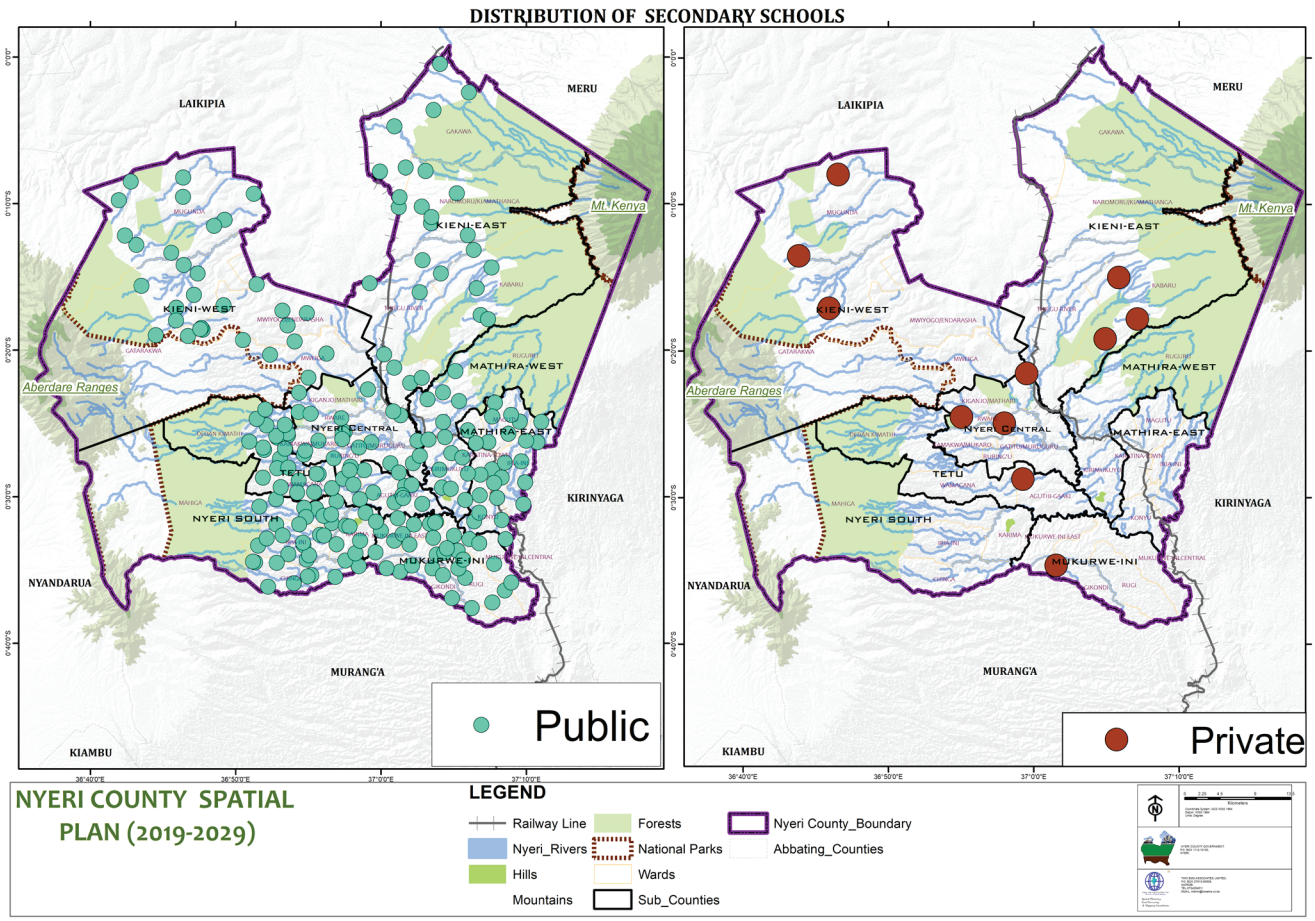
Source: Two EMS Associates, 2019.

There are 225 public and 11 private secondary schools with a total enrolment of 38,731 students of whom 19469 are boys and 18962 girls. The teacher/ student ratio is 1: 27 for public secondary schools. Physical Planning standards recommend that a Secondary school should be allocated 5ha to facilitate junior secondary and senior secondary school as per the new curriculum, though land surveying of boundary demarcation of public secondary schools is yet to be completed, preliminary observational findings indicated land use allocation to existing public secondary schools is adequate.

Table 30: Secondary education statistics

Facility	Number	Gender			Day/Boarding		
		Male	Female	Mixed	Day	Boarding	Day and Boarding
Public	225	30	32	163	149	74	2
Private	11	0	0	11	6	5	0
Total	236	30	32	174	155	79	2

Map 105: Distribution of secondary facilities

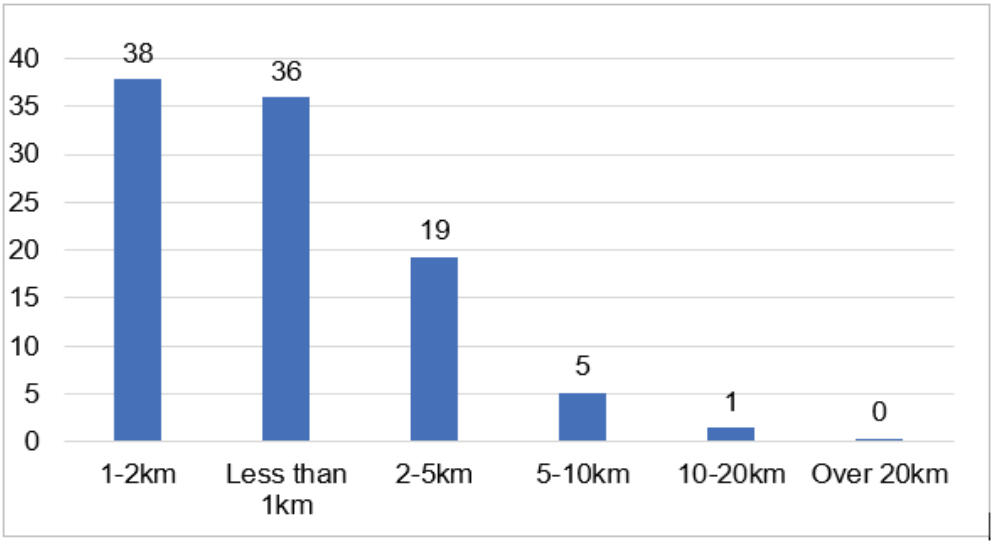


Source: Two EMS Associates, 2019.

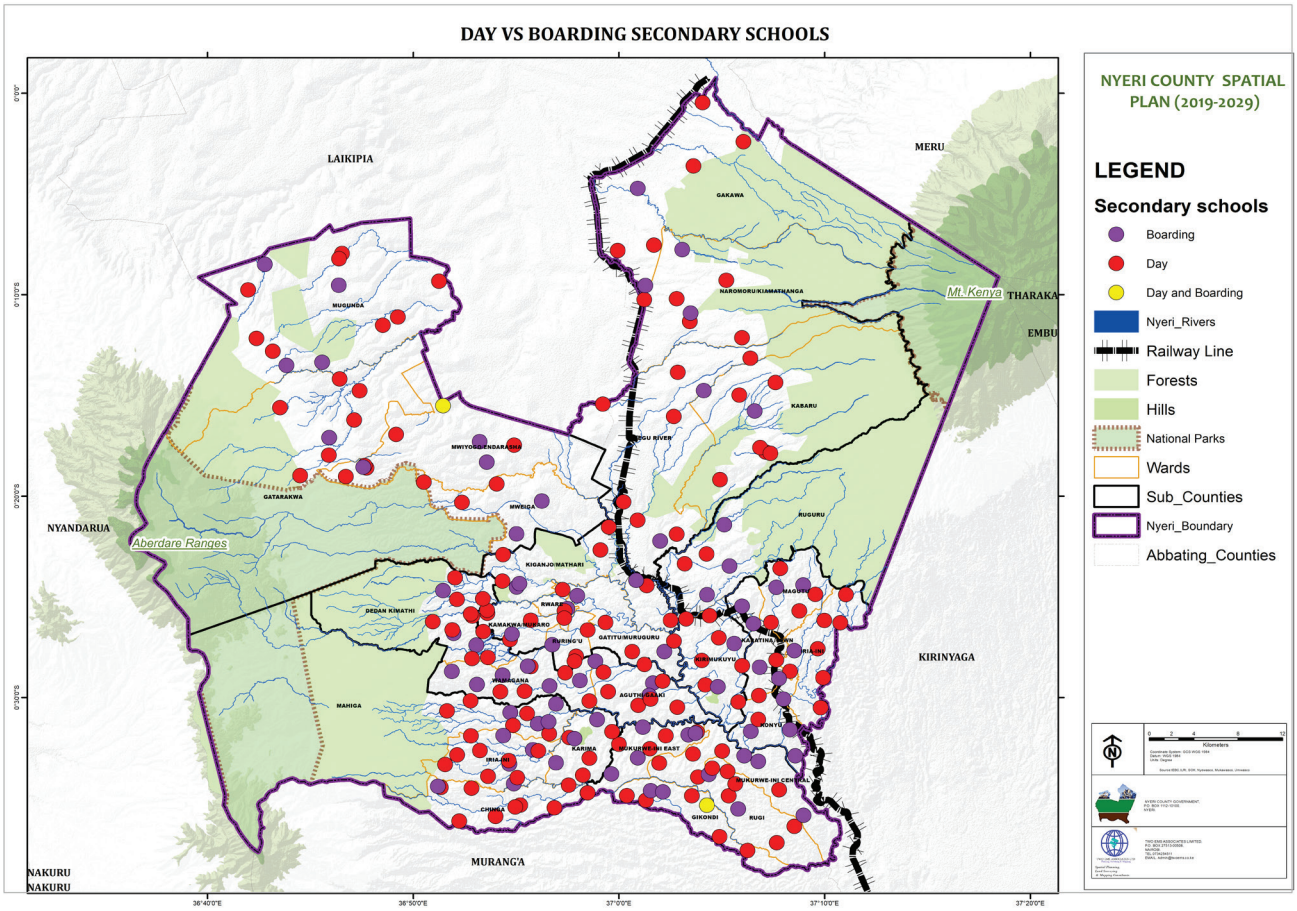
The Physical Planning Handbook recommends one secondary school for a catchment population of 8000 people and located within 1-2km of reach by all residents. Secondary school facilities are evenly distributed in relation to the distribution of population.

Areas such as Endarasha/ Mwiyogo, Mugunda, Gakawa and Gatarakwa have a scattered distribution, attributed to the lower population densities and scattered settlement patterns within the above-mentioned wards. On average, 74% of County residents are within 2km reach of a secondary school. However, 26% of the residents especially in Kieni East and West must make daily trips of about 3kms to school especially those in day schools.

Chart 7: Average distances to secondary schools



Map 106: Day versus boarding secondary schools



Source: Two EMS Associates, 2019.

It was observed that majority of secondary schools in Kieni West and East sub-counties are day schools, forcing students to make longer morning and evening trips to and from trips to school respectively. In Mugunda ward for instance, there are only three boarding schools, while Gakawa has only two boarding schools.

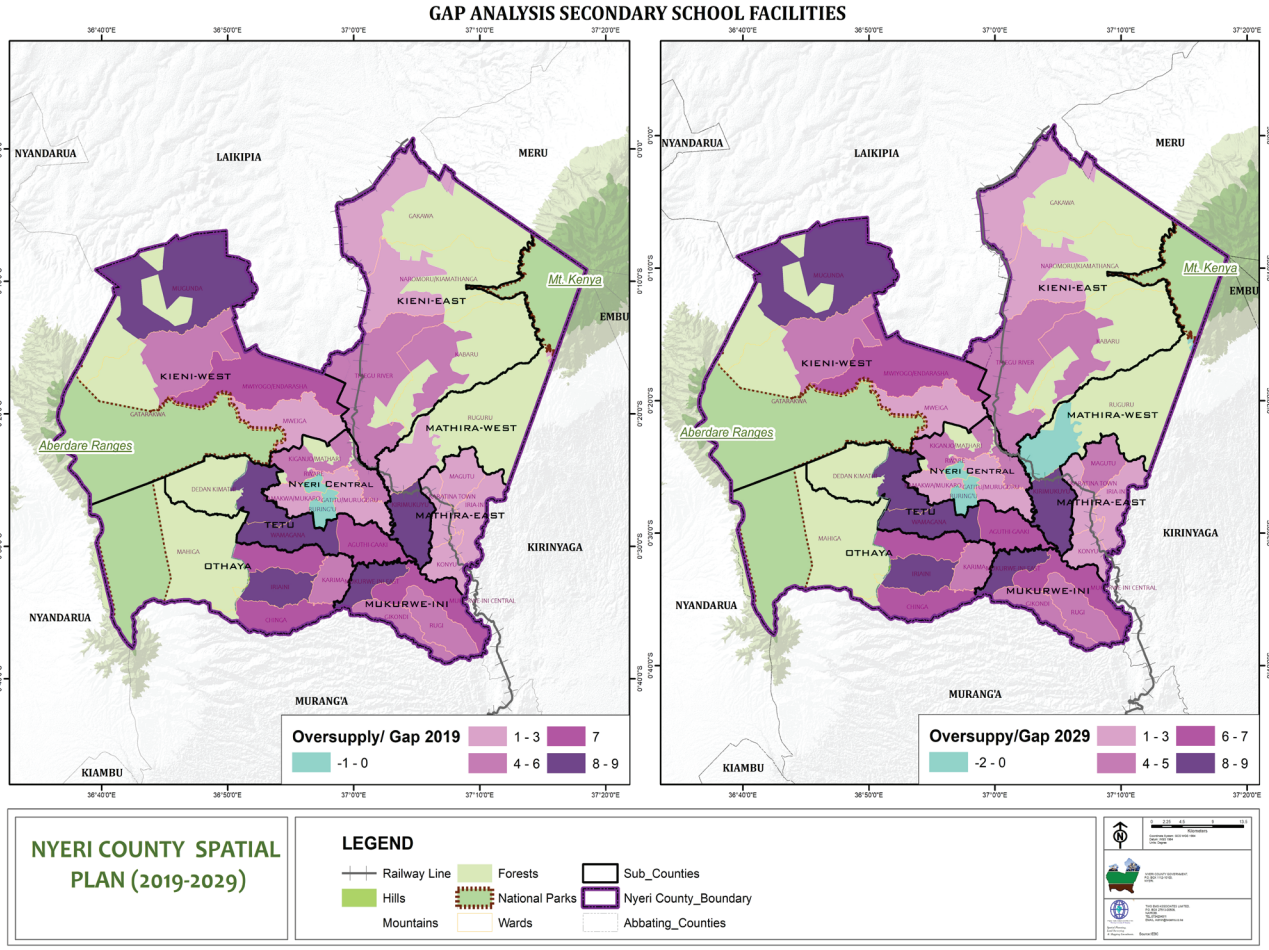
Table 31: Gap analysis for secondary schools

Year	Population	Public facilities	Recommended Physical Planning standards (1 @ 4000 people)		Comments
			Required	Gap	
Existing (2019)	759,164	225	95	0	Adequate
Projected (2020)	767, 157	225	96	0	Adequate
Projected (2025)	805,969	225	101	0	Adequate
Projected (2029)	852,774	225	107	0	Adequate
Projected (2030)	862,000	225	108	0	Adequate

Ward level population vs demand-supply analysis

As at 2019, ruringu is the only ward that has a shortfall of one secondary school to adequately serve the population, while wards such as Mugunda, Kirimukuyu, and wamagana having an over provision by 9 schools. Provision of secondary schools will remain high as at 2029, across 28 wards except Ruring'u which has a shortfall as at now and Ruguru ward attributed to population growth in the next 10 years that is assuming provision is constant, and no new schools are developed.

Map 107: Gap analysis for secondary schools



Source: Two EMS Associates, 2019.

d) Tertiary schools

KNBS 2019 population census findings established that 10% and 4% of Nyeri county population had attained TVET and University Education levels. Of these 48% were male and 52% female with TVET education while 58% were male and 42% female for university education level. This indicates more boys are likely to attend a tertiary education facility compared to girls. This can be attributed to discrimination of the female gender, marriage/early pregnancies.

There are 68 tertiary institutions in Nyeri County as summarized in the table below.

Table 32: Numbers of tertiary institutions

Facility	Number
University	2
University Satellite Campus	1
Colleges	14
Technical and Vocational Training Centers (TVTC)	1
Technical Training Institute (TTI)	11
Vocational Training Center (VTC)	11
National Polytechnic	1
Youth Polytechnics	29
Total	70

Source: Field Survey, 2019

These facilities are distributed across various wards as shown in the maps and table below.

Table 33: Spatial distribution of tertiary facilities

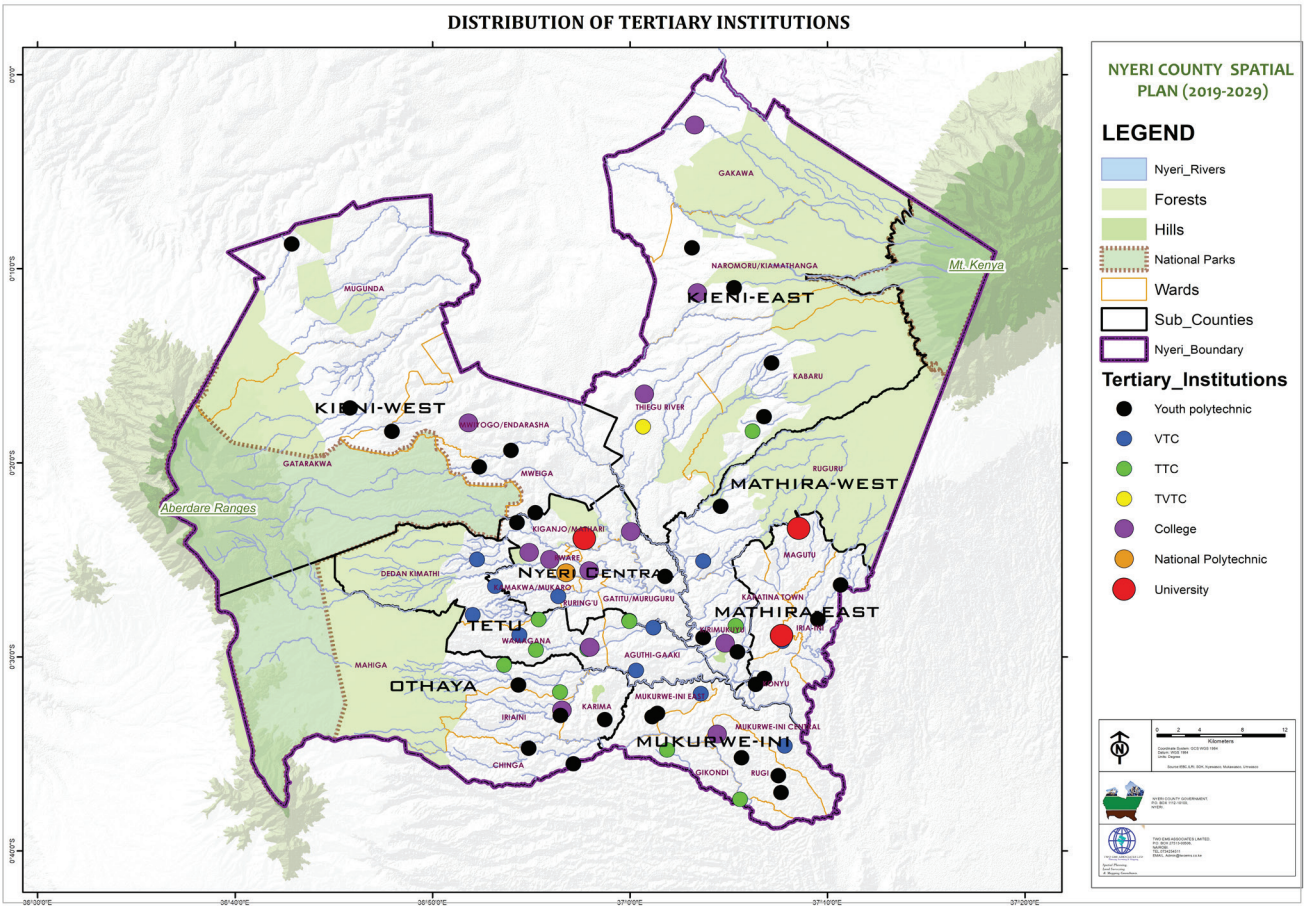
Name	Facility Type	Ward	Area
Kagumo Teachers Training College	College	Aguthi Gaaki	7.895 ha
Gathinga Vocational Training Centre	Vocational Training Centre (VTC)		0.945 ha
Gichira Vocational Training Centre			1.344 ha
Kiaguthu Polytechnic	Youth polytechnic	Chinga	0.730 ha
Kangongo Polytechnic			3.102 ha
Githima Vocational Training Center	Vocational Training Centre (VTC)	Dedan Kimathi	0.782 ha
Gatumbiro Vocational Training Institute			1.905 ha
Wits College	College	Endarasha	0.271 ha
Endarasha Youth Polytechnic	Youth polytechnic		0.376 ha
Kenya College of Teachers & Business School	College	Gakawa	3.465 ha
Procure Diocese of Marsabit	College		4.447 ha

Name	Facility Type	Ward	Area
Mukurweini Technical Training Institute	Technical Training Institute (TTI/C)	Gikondi	0.393 ha
Thanu Teaching and Training Institute			1.421 ha
Kiahurio Polytechnic	Youth polytechnic	Iriaini	0.878 ha
Mururuini Polytechnic			3.936 ha
KMTC and DECECE	College		2.082 ha
Othaya Polytechnic	Youth polytechnic		3.042 ha
Island Farm Institute	Technical Training Institute (TTI/C)	Kabaru	0.723 ha
Kimahuri Polytechnic	Youth polytechnic		2.191 ha
St. Joseph Wazaro Catholic Youth Polytechnic			1.257 ha
Kinunga Vocational Training Centre	Vocational Training Centre (VTC)	Kamakwa	0.486 ha
Gitero Vocational Training Centre			0.820 ha
Karatina University	University	Karatina Ward	0.337 ha
Karatina Riverbank Campus	College		1.425 ha
Unjiru Youth Polytechnic	Youth polytechnic	Karima Ward	1.639 ha
Gachika Youth Polytechnic	Youth polytechnic	Kiganjo/ Mathari	1.283 ha
Kimathi University	University		100 ha +
St. Joseph Brothers	Youth polytechnic		1.099 ha
Kihuyo Polytechnic			0.904 ha
St. Triza Secretariat College	College		2.884 ha
Kamwenja teacher's college			100+ ha
Franciscan Sisters			6.725 ha
Tumutumu Nursing Training College		Kirimukuyu	0.710 ha
Mungaria Youth Polytechnic	Youth polytechnic		2.777 ha
Mathira Technical and Vocational Training Center	Technical and Vocational Center (TVTC)		1.514 ha
Ngorano Vocational Training Centre	Vocational Training Centre (VTC)		1.906 ha
Kiamabara Youth Project	Youth polytechnic	Konyu	0.465 ha
Karatina Vocation Training Centre	Vocational Training Centre (VTC)		1.132 ha
Gachuku Youth Polytechnic	Youth polytechnic		2.164 ha

Karatina university Main Campus	University	Magutu	100 + ha
Rukira Technical Training Center	Technical Training Center (TTC/I)	Mahiga	3.172 ha
Nairutia Technical Polytechnic	Youth polytechnic	Mugunda	2.245 ha
Gathugururu Youth Polytechnic	Youth polytechnic	Mukurweini-Central	0.839 ha
Kiawamururu Youth Polytechnic			0.315 ha
Kaheti Vocational Training Centre	Vocational Training Centre (VTC)		0.048 ha
Thagathi Vocational Training Center			1.753 ha
Kieni Youth Empowerment Centre	Youth polytechnic	Mweiga	0.137 ha
Amboni Youth Polytechnic			0.301 ha
Mt Kenya Computer Services	College	NaruMoru/ Kiamathanga	0.225 ha
Narumoro Polytechnic	Youth polytechnic		0.065 ha
Kiamathaga Polytechnic			0.113 ha
Watuka Youth Polytechnic	Youth polytechnic	Mugunda	1.022 ha
ECD college	College	Rugi	0.528 ha
Rutune Polytechnic	Youth polytechnic		0.231 ha
Youth Center(Nganwa)			1.214 ha
Giathugu Youth Polytechnic			1.802 ha
Stalled polytechnic	Youth polytechnic	Ruguru	0.374 ha
Kenya Medical Training College	College	Rware Ward	5.902 ha
Nyeri National Polytechnic	National Polytechnic		17.592 ha
Kings Medical College	College	Thegu River	2.957 ha
Kieni Technical and Vocational Training Center	Technical and Vocational Training Center (TVTC)		0.3 ha
Gathuthi Vocational Training Center	Vocational Training Centre (VTC)	Wamagana	0.778 ha
Mathakwa_ini Technical Training Center	Technical Training Center (TTC/I)		3.034 ha
Karundu Technical Training Centre			0.527 ha
AIPCEA computer College Kiandu	College		0.364 ha
Tetu Technical Training Institute	Technical Training Institute (TTI/C)		0.611 ha
Wamagana Youth Polytechnic	Youth polytechnic		2.098 ha

Source: Field Survey, 2019

Map 108: Spatial distribution of tertiary institutions



Source: Two EMS Associates, 2019.

Vast wards such as Mugunda, Endarasha Mwiyogo, Mweiga and Gatarakwa lack TTCs or TTIs (which offer diplomas), which will eventually present locals with more advanced and specialised technical skills than polytechnics. Moreover, the four wards share four polytechnics which are under-equipped to facilitate the quality of the skills offered.

A long-term intervention would be upgrading of two polytechnics to VTC and TTC, while short-term would be adequate facilitation of existing facilities.In Kieni East residents there is an upcoming Technical and Vocational Training Center (TVTC) located in Karicheni in Thegu River ward. The facility is being developed by the National Government and is expected to be the most equipped in the County once complete. Moreover, the existing colleges are privately owned.

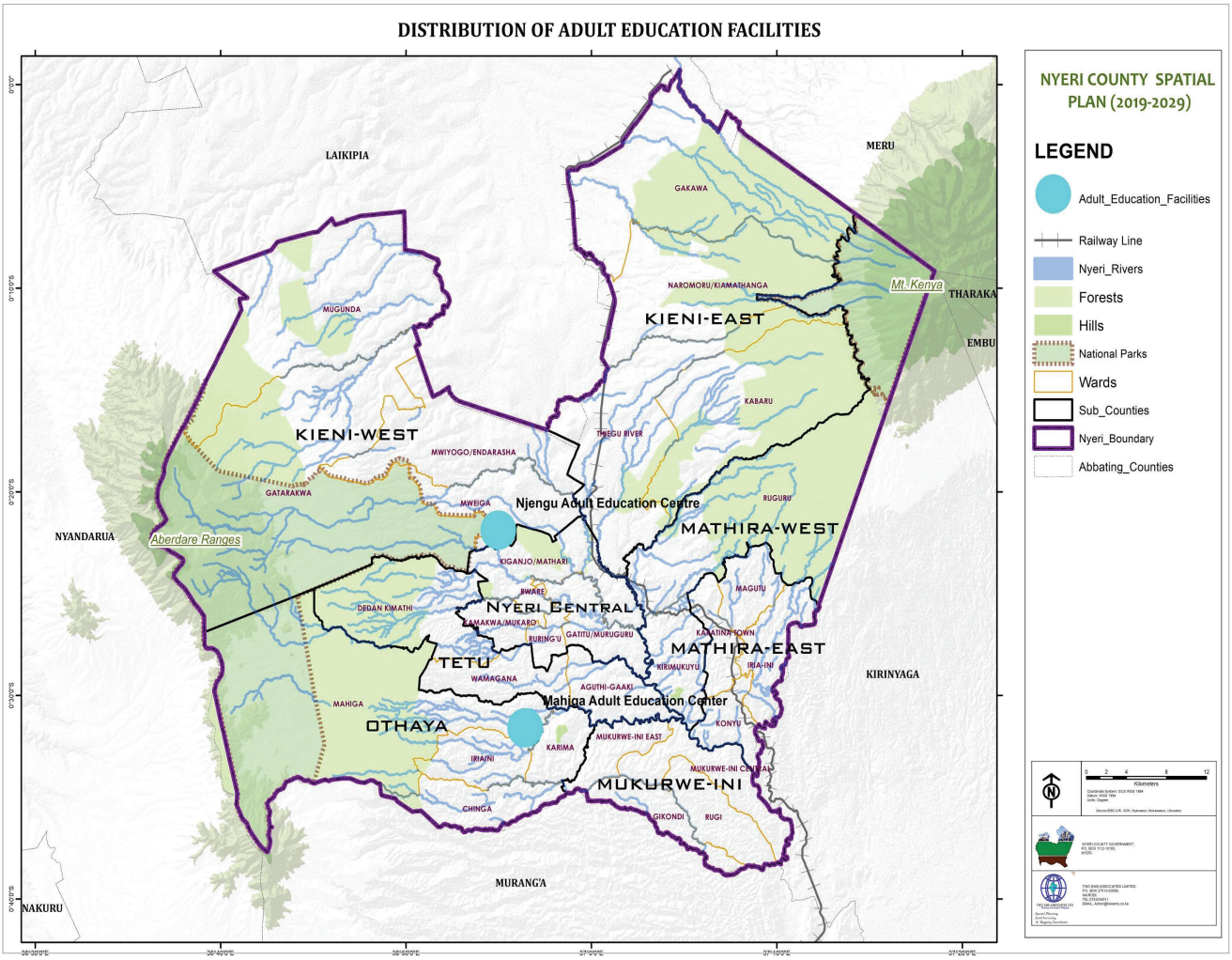
There is need for more TVETs as a long-term intervention in Kieni west sub-County while facilitation of polytechnics as a short-term intervention to ensure that the labour force gets the necessary skills for technical work.

(e)Adult education facilities

KNBS population census 2019, established that 0.13% of the county population have adult education as the highest level of education attained. Of these 22% are male while 78% are female. Indicating that women are three times likely to seek education in their adult years as compared to men.

Adult education students are either dropouts or never had any form of education. hence when juxtaposed with 9% who were found to have no education the 0.13% who seek to gain education in their adult years is very merge. The main adult education facilities include Njengu Adult Education Centre in Mweiga and Mahiga adult education center.

Map 109: Adult Education Facilities



Source: Two EMS Associates, 2019.

(f) Special Schools

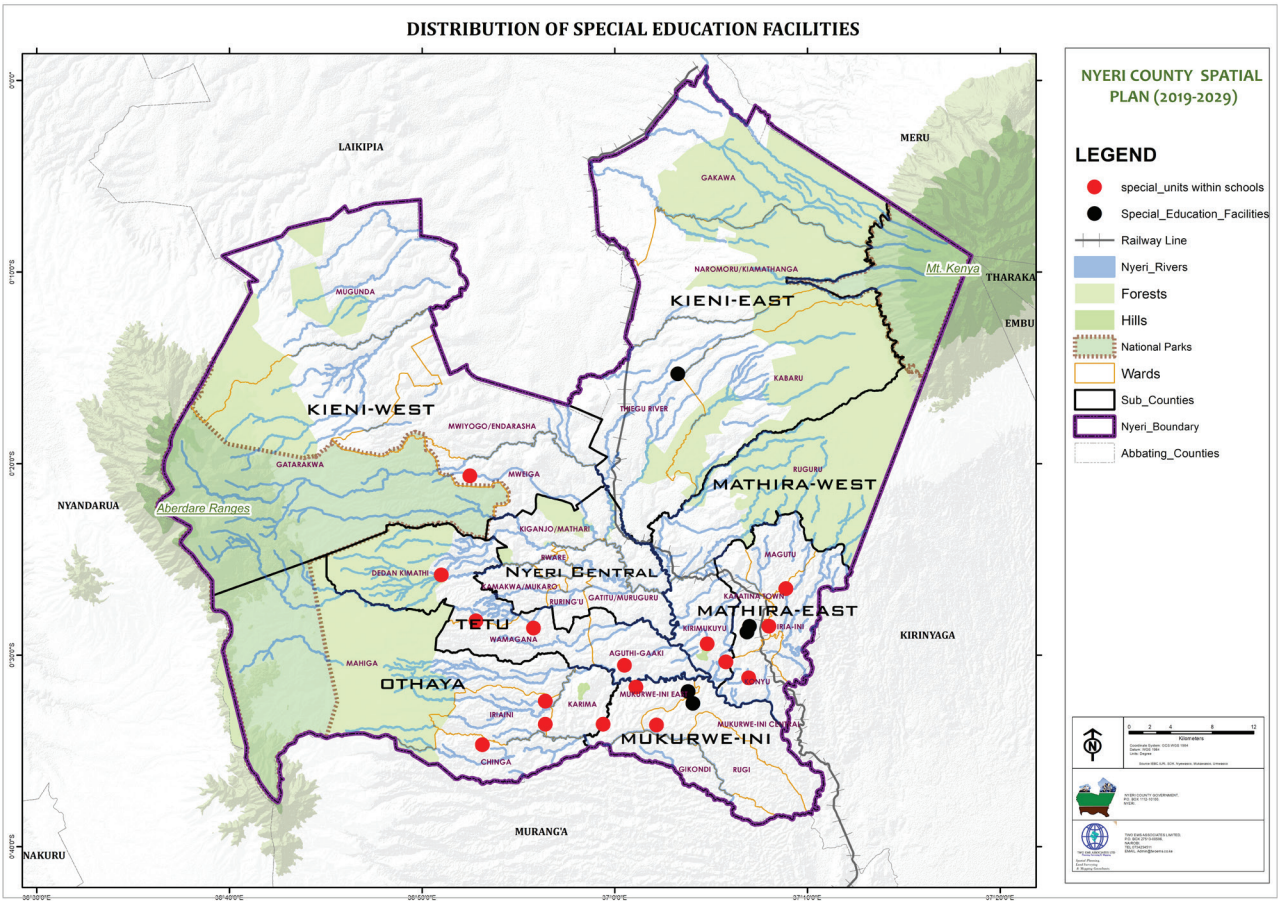
Special School include facilities that handle a category of people needing specialized training or extra care including persons living with disabilities and those for the less fortunate in the society. There are 21 special education facilities, publicly and private owned. Majority of the units are located within public owned primary schools. Special education facilities include: schools for the deaf, the blind, all inclusive, those for the physically impaired, visually and hearing impaired and the mentally handicapped/ challenged.

Table 34: Special schools

Name of School	Remarks	Ownership	School Sponsor	Mixed/ One Gender	Day/ Boarding	Type of School	Ward
Kiriko Special Unit	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Special School	Chinga
Munaini Special Unit	Within A Primary School	Public	Central Government/ Deb	Mixed	Day Only	Ordinary	Iriaini
Gathukimundu Pri Special Sch	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Integrated	Mukurwe-Ini Central
Othaya Rehabilitation	Within A Primary School	Public	Central Government/ Deb	Boys Only	Boarding Only	Special School	Iriaini
Tambaya Primary School - Special Unit	Within A Primary School	Public	Central Government/ Deb	Mixed	Day Only	Special School	Mukurwe-Ini East
Ndiani Special	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Integrated	Mukurwe-Ini East
Tumutumu School for The Deaf	Within A Primary School	Private	Religious Organization	Mixed	Boarding Only	Special School	Kirimukuyu
Ngunguru Pri Special Unit	Within A Primary School	Public	Central Government/ Deb	Mixed	Day Only	Integrated	Kirimukuyu
Ihwagi Pri Special Unit	Within A Primary School	Public	Central Government/ Deb	Mixed	Day Only	Ordinary	Iria-Ini
Kiamabara Special Unit	Within A Primary School	Public	Central Government/ Deb	Mixed	Day Only	Ordinary	Konyu
Karatina Special School For The Mentally Handicap	Within A Primary School	Public	Central Government/ Deb	Mixed	Day & Boarding	Special School	Iria-Ini
Wandumbi Special Unit	Within A Primary School	Public	Religious Organization	Mixed	Boarding Only	Special School	Wamagana

Name of School	Remarks	Ownership	School Sponsor	Mixed/ One Gender	Day/ Boarding	Type of School	Ward
Miagayuini Special	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Ordinary	Dedan Kimathi
Gathinga Pry	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Special School	Aguthi-Gaaki
Alamano Special School For The Mentally Handicap	Within A Primary School	Public	Religious Organization	Mixed	Day & Boarding	Special School	Karundu
Kiguru Special Unit	Within A Primary School	Public	Religious Organization	Mixed	Day Only	Special School	Mweiga
Kihate Primary And Secondary School (Boarding For The Physically Challenged)	Within A Primary School	Public	Central Government/ Deb	Mixed	Boarding Only	School for Physically Challenged	Mukurweini-Central
Karatina Special School for The Physically Challenged	Independently Developed	Private	Religious Organization	Mixed	Day & Boarding	School for Physically Challenged	Karatina Ward
Cheerful Special School	Independently Developed	Private	Religious Organization	Mixed	Day & Boarding	School for Physically Challenged	Karatina Ward
Rev. Muhoro School for The Deaf	Independently Developed	Public	Religious Organization	Mixed	Day & Boarding	School for The Deaf	Mukuruweini Ward
Kids Alive Boys Center Lusoi	Independently Developed	Private	Religious Organization	Boys Only	Day & Boarding	School for Physically Challenged	Thegu River

Map 110: Spatial distribution of special schools



Source: Two EMS Associates, 2019.

9.6.1.3 Education Services

From the field survey, it emerged that most of the education facilities had inadequate human resource especially teaching personnel, inadequate facilitation such as desks, books, lab equipment and libraries. According to the physical planning handbook, the number of primary and secondary schools in the County are adequate for the catchment population. However, the condition of the education facilities needs improvement as well as increment in the number of teaching personnel.

POC Analysis for the education sector

Potential/Opportunities	Constraints
• Nyeri County Residents have a relatively good access to ECDs, primary and secondary schools despite few gaps. This was determined by the catchment population of the existing and the projected population. This is a good starting point in ensuring delivery of education services. The existing gaps apart from Gatitu market center can be filled through vertical development of existing public facilities since land provision is adequate to support increase in population. • Special education facilities owned and managed by the private sector provide an opportunity to explore public-private partnerships.	• Inadequate teaching personnel especially polytechnic lecturers. • Inadequate learning materials in tertiary, secondary and primary schools. • Political will to develop the education sector. The sector requires adequate funding, especially in human resource, and learning facilitations. • wMajority of public schools lack title deeds, hence are prone to encroachment

9.6.2 Healthcare

According to the WHO standards, health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The prescribed doctor patient ratio is 1: 600. The provision of primary health care is essential, and it can be achieved through ensuring convenient, accessible and affordable health care services are planned for the well-being of the residents. The healthier a society is, the more productive it is and vice-versa. According to Fourth schedule of the Constitution, health is a devolved function of the County government, in an effort of improving the delivery of services to the lowest level possible.

9.6.2.1 Health Facilities Distribution

Health services in the County are organized across 6 levels of service delivery that include: 1 National Referral, 1 County Referral Hospital, 10 Sub-County Hospitals, 26 Health Centres, 88 dispensaries and 251 Community Health Units. The County has a fair distribution of health facilities where the population can access a health facility within a radius of 7 Km except in Kieni Sub Counties. Table below is a summary of the health infrastructure in the County.

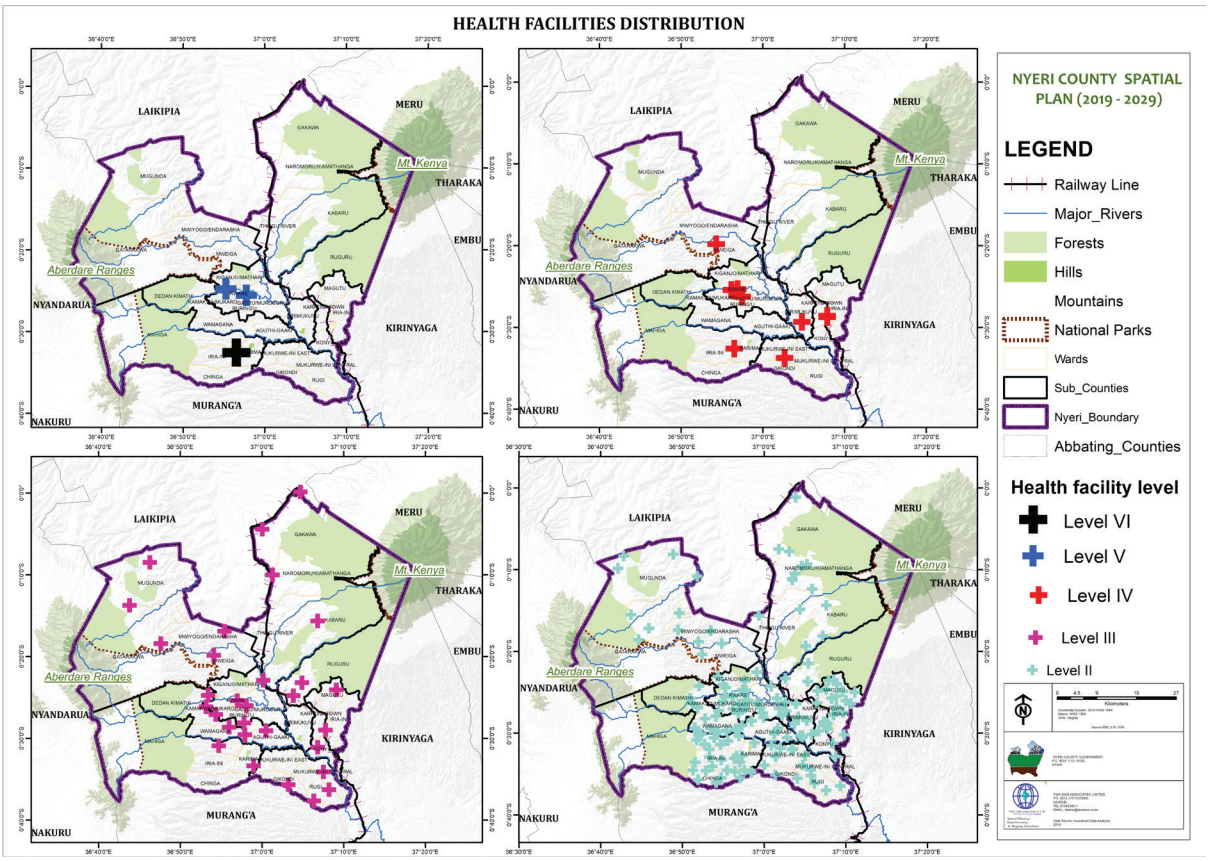
Table 35: Health infrastructure distribution

No.	Level of care	Infrastructure	Number functional, by type of provider				Total
			Public	Faith-Based	NGO	Private	
1	Level VI- National Referral Facilities (Kenyatta Annex Referral Hospital)	Total Number of Facilities	1	-	-	-	1
		Total Bed Capacity	350	-	-	-	350
		Total Specialized Units – ICU, Renal, Cancer Treatment Centre etc.	1	-	-	-	1
		Total Number of Operating Theatres	2	-	-	-	2
		Number of Specialized Radiology Services/ Centers: Providing MRI, CT-Scan	1	-	-	-	1
		Number of Specialized/ Tertiary Laboratories – Histopathology, Micro-Biology, Biochemistry	1 Class B	-	-	-	1
		Ambulances	5	-	-	-	5
2	Regional Referral Facilities	Total Number of Facilities	1(Nyeri County Referral)	1(Mathari Mission Hospital)	0	0	2
		Total Bed Capacity	323	170	0	0	493
		Total Specialized Units – ICU, Renal, Cancer Treatment Centre etc.	0	1	0	1	2
		Total Number of Operating Theatre	5	3	0	3	11

		Total of Basic Radiology Services/Centers providing X-Rays, Ultra-Sound	7	3	0	3	13
		Number with Secondary Laboratory Services – Hematology and Transfusion, Micro-Biology, Biochemistry	5	3	0	3	11
		Number of Functional Ambulances Linked to Facility	4	2	0	2	8
3	Level III - Primary Care Facilities	Total Number of Facilities	25	1	0	0	26
		Total Bed Capacity	250	4		38	292
		Total Functional Maternity Units	30	3	0	3	36
		Functioning Basic Laboratory Services- Rapid Tests, Microscopy	25	1	0	0	26
		Number of Ambulances Linked to Facility	8	0	0	0	8
4	Level II – Primary Care Facilities	Total Number of Facilities	88	0	0	0	88
		Number of Operational Delivery Rooms	0	0	0	0	0
		Number of Ambulances Linked to Facilities	0	0	0	0	0
		Total functional Community Units	251	0	0	0	251
5	Level I – Community Units	Number of functional Units	251	0	0	0	251
		Number of Moto-Bikes Linked to Community Units	70	0	0	0	70

Source: Department of Health Services, Nyeri County, 2019.

Map 111: Spatial distribution of health facilities



Source: Two EMS Associates, 2019.

The distribution map above presents a scenario of un-equalities in the sub-counties. Nyeri Central, Mathira East and West, Tetu and Othaya sub-counties. However Narumoru health center is undergoing upgrading works to a Level IV hospital while Kenyatta National Teaching and Referral Hospital Annex in Othaya was recently developed and is being equipped both from human resource and medical facilitation point of views. The hospital will host a medical school that will provide intern-nurses who will provided the much-needed human resource.

Community health units

The Kenya Essential Package for Health (KEPH) introduced six lifecycle cohorts and six service delivery levels. One of its key innovations is the recognition and introduction of Level 1 service, which aimed at empowering Kenyan households and communities to take charge of improving primary health are their own health. The primary approach was to establish Community Health Units (CUs) to serve a local population of 5,000 people, translating to 1000 households (on the assumption of 5 members per household).

Nyeri County health facilities are supplemented by level 1 Community health units are attached to various health facilities across all other levels, depending on catchment area. Each of the existing 251 units is manned by a community health worker who are volunteers. Moreover, community units serve a given number of households for example Karatina Level IV hospital has the following community units and the number of households each unit serves.

Figure 37: Community units under Karatina Level 4 Hospital

Community Health Units

Code	Name	Operation Status	House Holds Monitored
702565	Gathugu Community Unit	Fully-functional	580
701755	Giakairu coomunity unit	Fully-functional	723
701754	Mathaithi community unit	Fully-functional	830
701753	Commercial community unit	Fully-functional	254
701752	Jambo community unit	Fully-functional	482

9.6.2.2 Health Workforce by Cadre

Health workforce remain a challenge. Devolved Governments have increased the total number of health facilities and expanded specialized services in partnership with the National Government. The County is grappling with an aged health workforce and high rate of attrition through retirement. The County has been unable to hire more staff due to ever increasing health sector wage bill which contributes to about 81% (KES. 2.2B) of the health budget. This leaves very little funds for capital developments, operations and maintenance. The County has 1577 staff against an expected staff establishment of 2267 leaving most of the facilities understaffed. The table below shows the number of staff in the County (per cadre) and the gaps of each cadre per staff establishment.

Table 36: Nyeri County Health Personnel

CADRE	No. Authorized	No. of Staff	Gaps/Surplus
County Executive Committee Member	1	1	0
Chief Officer	1	1	0
Senior Deputy Director - Medical Services	5	5	0
Deputy Director - Medical Services	4	4	0
Senior Medical Specialist	3	3	0
Dental Specialist [1]	4	3	-1
Deputy Director of Administration	2	2	0
Medical Specialist [1]	16	6	-10
Senior Assistant Director - Medical Service	10	10	0
Assistant Chief Pharmacist	7	6	-1
Assistant Director - Medical Services	6	6	0
Dental Specialist [2]	3	3	0
Medical Specialist [2]	15	1	-14
Principal Registered Clinical Officer [1]	1	1	0
Deputy Chief Health Administration Officer	1	1	0
Principal Assistant Occupational Therapist	5	1	-4
Principal Medical Engineering Technologist	2	1	-1
Principal Medical Lab Technologist [2]	4	1	-3
Principal Registered Nurse	35	1	-34
Senior Medical Officer	64	33	-32
Senior Pharmacist	10	4	-6
Assistant Chief Physiotherapist	15	15	0
Chief Assistant Occupational Therapist	8	7	-1
Chief Assistant Public Health Officer	20	28	8
Chief Clinical Officer	20	1	-19
Chief Human Resource Officer	1	1	0
Chief Medical Engineering Technologist	4	1	-3
Chief Medical Lab Technologist	15	9	-6
Chief Office Administrator	2	1	-1

Chief Radiographer	4	2	-2
Chief Registered Clinical Officer	28	28	0
Chief Registered Nurse	100	68	-32
Dental Officer	9	5	-4
Deputy Chief Dental Technologist	1	1	0
Deputy Chief Orthopedic Technologist	1	1	0
Deputy Chief Pharmaceutical Technologist	3	1	-2
Medical Officer	64	44	-20
Senior Pharmacist	5	1	-1
Senior Accountant	1	1	0
Senior Assistant Community Oral Health Officer	2	1	-1
Senior Assistant Health Records & Information Mgt. Officer	1	7	6
Senior Assistant Occupational Therapist	5	1	-4
Senior Assistant Office Administrator	2	1	-1
Senior Assistant Public Health Officer	15	22	7
Senior Community Oral Health Officer	2	2	0
Senior Dental Technologist	1	1	0
Senior Enrolled Nurse [1]	153	126	-17
Senior Health Administration Officer	2	2	0
Senior HRM Assistant	2	1	-1
Senior Medical Engineering Technologist	2	7	5
Senior Medical Lab Technician[1]	13	11	-2
Senior Medical Lab Technologist	15	15	0
Senior Medical Social Worker	2	1	-1
Senior Nutrition & Dietetics Officer	3	1	-2
Senior Nutrition & Dietetics Technologist	3	4	1
Senior Pharmaceutical Technologist	1	1	0
Senior Physiotherapist	2	2	0
Senior Registered Clinical Officer	15	15	0
Senior Registered Nurse	160	135	-25
Assistant Health Records & Information Mgt. Officer [1]	2	2	0
Assistant Occupational Therapist [1]	11	3	8
Assistant Public Health Officer [1]	15	1	-14
Health Administration Officer [1]	2	1	-1
Medical Eng. Technologist [1]	2	1	-1
Medical Lab Technologist [1]	10	6	-4
Orthopedic Technologist [1]	3	2	-1
Pharmaceutical Technologist [1]	10	1	-9
Physiotherapist [1]	1	1	0

Radiographer [1]	3	2	-1
Registered Clinical Officer [1]	20	9	-11
Registered Nurse [1]	157	54	-103
Senior Charge hand Tailor	1	1	0
Senior Enrolled Nurse [2]	100	44	-66
Senior Health Records & Information Mgt. Assistant	2	2	0
Senior Medical Lab Technician [2]	10	7	-3
Senior Nutrition & Dietetics Technician	3	3	0
Senior Office Administrative Assistant	2	1	-1
Senior Public Health Assistant	49	49	0
Senior Public Health Officer	1	1	0
Senior Public Health Technician	3	3	0
Superintendent (Building)	1	1	0
Supply Chain Management Assistant [1]	4	2	-2
Telephone Supervisor [1]	1	1	0
Accountant [2]	3	1	-2
Assistant Public Health Officer [2]	18	2	-16
Chef	1	1	0
Chief Clerical Officer	10	8	-2
Dental Technologist [1]	2	1	-1
Enrolled Nurse [1]	70	32	-38
Health Administration Officer [2]	3	2	-1
Health Records & Information Mgt. Assistant [1]	5	1	-4
Medical Lab Technician [1]	10	2	-8
Medical Lab Technologist [2]	45	18	-27
Medical Social Worker [2]	6	6	0
Nutrition & Dietetics Technologist [2]	5	1	-4
Office Administrative Assistant [1]	2	1	-8
Orthopedic Technologist [2]	4	3	-1
Pharmaceutical Technologist [2]	8	8	0
Physiotherapist [2]	2	2	0
Principal Driver	4	1	-3
Radiographer [2]	6	4	-2
Registered Clinical Officer [2]	24	23	-1
Registered Nurse [2]	101	155	54
Revenue Officer [3]	1	1	0
Senior Charge Hand	3	1	-2
Supply Chain Management Assistant [2]	5	1	-4
Telephone Supervisor	2	1	-1
Telephone Supervisor [2]	2	2	0

Assistant Community Health Officer [3]	2	2	0
Assistant Health Records & Information Mgt. Officer [3]	2	2	0
Assistant Occupational Therapist [3]	9	2	-7
Assistant Public Health Officer [3]	22	23	1
Charge hand Tailor	1	1	0
Chief Driver	1	4	3
Community Health Assistant [2]	1	1	0
Community Health Officer [2]	4	1	-3
Dental Technologist [3]	4	3	-1
Enrolled Nurse [2	33	87	54
Health Records & Information Mgt. Assistant [2]	10	6	-4
Medical Eng. Technician [2]	8	1	-7
Medical Eng. Technologist [2]	1	5	-4
Medical Eng. Technologist [3]	20	1	-19
Medical Lab Technician [3]	20	1	-19
Medical Lab Technician [2]	1	6	5
Medical Lab Technologist [3]	1	1	0
Nutrition & Dietetics Technologist [3]	5	1	-4
Nutrition Officer	1	1	0
Office Administrative Assistant [2]	5	6	1
Office Assistant	1	1	0
Orthopedic Trauma Technician [2]	5	4	-1
Pharmaceutical Technologist [3]	27	10	-17
Physiotherapist [3]	2	2	0
Public Health Officer [3]	1	1	0
Public Health Assistant [3]	1	1	0
Public Health Assistant [2]	1	1	0
Radiographer [3]	12	2	-10
Registered Clinical Officer [3]	40	21	-19
Registered Nurse [3]	56	56	0
Secretary	2	1	-1
Senior Telephone Operator	1	1	0
Supply Chain Management Assistant [3]	5	4	-1
Artisan Grade [1] – Building	1	1	0
Cleaning Supervisor [1]	36	16	-20
Clerical Officer [1]	28	20	-8
Enrolled Nurse [3]	3	3	0
Health Records & Information Mgt. Assistant [3]	2	1	-1
Medical Engineer Technician	2	1	-1
Medical Eng. Technician [3]	3	1	-2

Medical Lab Technician [3]	2	2	0
Public Health Assistant [3]	29	28	-1
Senior Driver	3	3	0
Supply Chain Management Assistant [4]	4	4	0
Telephone Operator [1]	1	1	0
Artisan Grade [2] – Building	2	2	0
Cleaning Supervisor[2a]	27	27	0
Clerical Officer [2]	3	3	0
Cook [2]	4	4	0
Copy Typist [1]	1	1	0
Housekeeping Assistant [2]	2	2	0
Support Staff Supervisor	27	27	0
Tailor Grade [2]	2	2	0
Cook [3]	1	1	0
Driver	6	1	-5
Driver [2]	37	17	-20
Driver [3]	7	2	-5
Senior Support Staff	37	5	-32
Clerical Officer [3]	34	2	-32
Driver [3]	16	1	-15
Senior Support Staff	4	4	0
Support Staff [1]	1	1	0
Labourer[2]	3	3	0
TOTAL	2257	1577	-690

Source: Department of Health Services, Nyeri County, 2019.

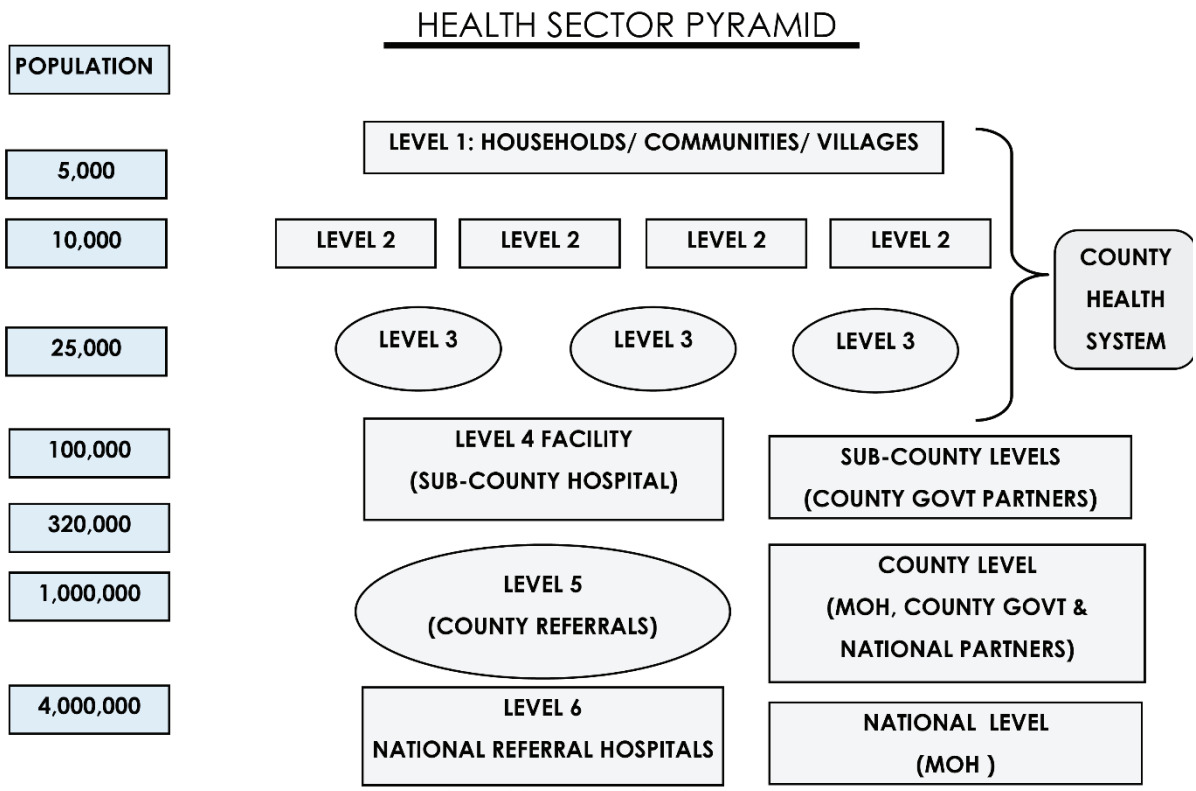
Inferences:

From the table above, there is a shortage of nurses and clinical officers at all levels. Nurses and clinical officers are the main human resource found in Level 1-3 heath facilities. This demonstrates the shortage of human resource in community units, dispensaries, and health centres.

9.6.2.3 Health Care Gap Analysis (Population)

According to the standards manual for health services provision the following is the proposed hierarchy of health facilities visa-s-vis the population each facility should serve.

Figure 38: Health sector pyramid



Source: Norms and Standards for Health Service Delivery, Ministry of Health (2006)

Modified by: Two Ems Associates (2018)

Table 37: Gap analysis for health facilities (Level 5-2)

Sub-county	Othaya				Kieni east				Kieni west				Nyeri central				Mathira west				Mathira east				Mukurweini				Tetu				Totals
Existing population (2019)	91081				110376				88631				140338				60083				99065				89137				80453				759,164
Projected Population 2025	93,967				119,486				94,504				158,363				65,165				100,711				92,066				81,706				805,969
Projected Population 2029	96853				128597				100376				176388				70248				102358				94995				82959				852,774
Projected Population 2030	97,427				130,393				101,537				179,921				71,250				102,686				95,578				83,208				862,000
	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	Std	Es	FN	Pro:	
Level 5	0	0	0		0	0	0		0	0	0		0	2	0		0	0	0		0	0	0		0	0			0	0	0		

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Level 4	1	1	1		1	0 (One under construction)	1	Enhance Medical facilitation provision	1	1	1	upgrade one health center (existing one is privately owned)	1	3	2	Enhance Medical facilitation provision	1	1	1	Enhance Medical facilitation provision	1	2	1		1	1	1	Enhance Medical facilitation provision	1	0	1	Upgrade one health center by 2025	One urgently needed in Tetu by 2025
Level 3	4	2	4	Upgrade two Level II to Level III (One should be ready before 2025)	4	3	5	Upgrade three dispensaries by 2030 (two should be ready before 2025)	4	6	4	Enhance Medical facilitation provision	6	7	7	Enhance Medical facilitation provision	2	2	3	Enhance Medical facilitation provision	4	2	4	upgrade two health centers by 2025. This will be sufficient till 2029 and 2030	4	4	4	Enhance Medical facilitation provision	3	4	3	Enhance Medical facilitation provision	Urgently needed in Kieni east and Mathira east before 2025
Level 2	9	22	10	Enhance Medical facilitation provision	11	7	13	Construct nine dispensaries by 2030 (eight should be ready before 2025)	9	11	10	Enhance Medical facilitation provision	14	16	18	construct two more dispensaries	7	7	7	Enhance Medical facilitation provision	10	11	10	construct two dispensaries by 2029 &2030	9	13	9	Enhance Medical facilitation provision	8	9	8	Enhance Medical facilitation provision	Urgently needed in Kieni east before 2025

Acronyms

Std-Ministry of health standards in terms of facilities provision that would adequately provide health services to the sub-county population as at 2019 KNBS census results.

Es-existing facilities within the sub-county as at 2019

FN-Future needs depending on the projected population 2029 against existing facilities.

Pro: Proposals based on population criteria to adequately serve the projected population as at 2029

Inferences:

Nyeri County needs one referral especially in Kieni West to adequately serve the projected population. Tetu, Kieni East (under Construction) sub-counties need one Level 4 hospital for adequate access to health services. Health centres are needed in Mathira East, Mathira West and Othaya sub-counties. There is a shortage of dispensaries in Mathira East and West, as well as Kieni East sub-counties.

Table 38: Community health unit's gap analysis

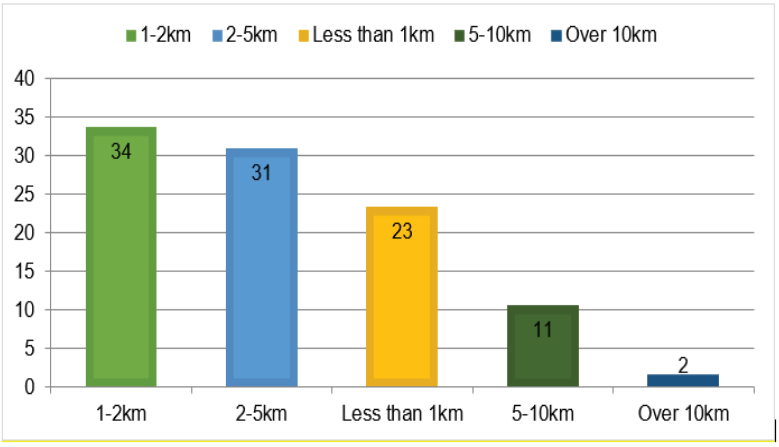
Year	population	Existing units attached to various Public health facilities across all levels.	Recommended Standards by Kenya Essential Package for Health (KEPH) (1 @ 5000 people)	Comments
2019	759,164	251	152	Over provision
2029	852,774	251	171	Over provision

The table above indicates that majority, if not all of the residents of Nyeri County are able to access a community health unit, for first basic primary health services.

9.5.2.4 Accessibility to Health Facilities

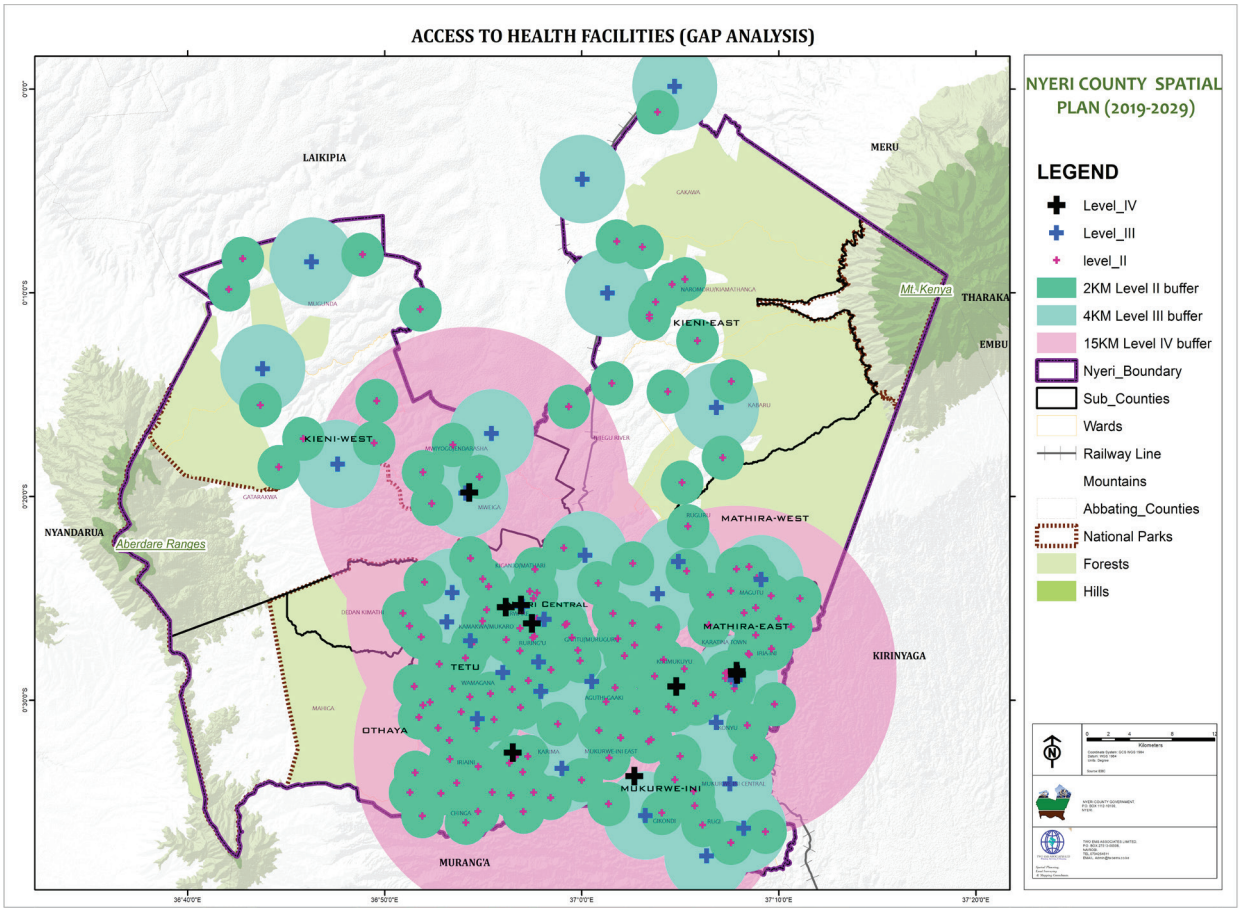
The average distance travelled to access the nearest health facility is 2-3 km, which is well below the recommended distance given by the WHO standards of 5km. It indicates a good distribution of public health facilities in the County. From the field survey, only 1% cited having to travel for more than 10 kilometres to access a health facility. The distance varies depending on the urban or rural setting, where people in urban areas a travel shorter distance than in the rural areas, especially in Kieni East and West Sub-counties.

Chart 8: Average distance to health facilities



Source: Field Survey, 2019.

Map 112: Spatial access to health facilities



Source: Two EMS Associates, 2019.

In terms of access by distance, above 60% of the population have access to a basic health care facility (health centers), except some areas in Kieni East and West as indicated in the map. However, the upgrading of Narumoro Health Center to a Level IV and the construction of Gituamba dispensary in Thiegu River wards is underway, hence accessibility will gradually improve once the facility has been constructed and equipped. While access within Nyeri Central, Mukurweini, and Tetu sub-counties is within a radius of 2km, some wards such as Thiegu river lack health infrastructure, hence the need for intervention.

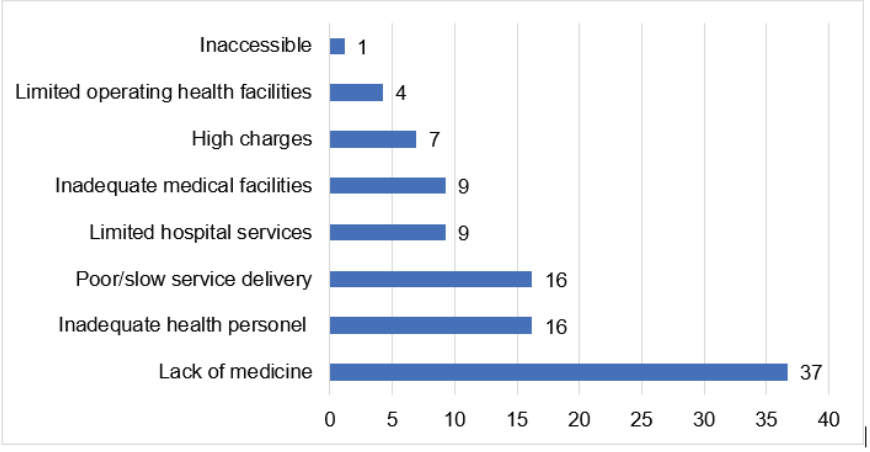
9.6.2.5 Health Services

The services offered by health facilities in the County are outpatient and in-patient curative services, preventive and promotive services: family planning, maternal child health, laboratory care services, comprehensive care services, rehabilitative and physiotherapy services, HIV counselling and testing and immunization services.

According to the field survey conducted, 69% of the households are satisfied with health services offered in the County, while 31% cited not being satisfied with the health services in the County. The challenges that hinder provision of adequate health services include: inadequate medicine supply, inadequate medical/ health personnel, poor/slow service delivery, limited operating health facilities, and high charges in hospitals.

Field survey results indicated that 15% of the County government-owned facilities operate only during the day 9this affects basic care facilities (dispensaries and health centres)), while only 10% are open as at 12am midnight. Only Level IVs and Vs are in operation at night. Medical equipment's such as ambulances are only available in Level 4 and 5 hospitals and are allocated to health centres and dispensaries on a need basis.

Figure 39: Reasons for dissatisfaction with health facilities



Source: Field survey, 2019.

9.6.2.6 Disease Prevalence

Common diseases that cut across the County include common cold, diarrhoea, pneumonia and skin infections. Diarrhoea prevalence can be attributed to poor sanitation, evidenced by poor solid and liquid waste disposal methods. This relates to intestinal worms, which can be attributed to water and soil pollution by human waste and organic matter. Steady re-occurrence of diseases amongst over children below 5 years of age such as urinary tract infections (UTIs) call for enhanced human resource across the County. Table below show prevailing diseases within the County.

Table 38: Prevalent diseases

Top Ten Commonest Health Conditions/Challenges/Problems				
	Under 5 Years		**Over 5 Years**	
	Condition	**Numbers/ Prevalence**	**Condition**	**Numbers/ Prevalence**
Linked to communicable conditions	Upper Respiratory Tract Infections	112456	Upper Respiratory Tract Infections	245169
	Diseases of the skin	13479	Diseases of the skin	61636
	Diarrhoea	13279	UTI	23598
	Tonsillitis	10120	diarrhoea	22989
	Pneumonia	7427	Intestinal worms	17114
	Intestinal worms	3831	Pneumonia	15816
	Eye Infections	3638	Eye Infections	9360
Linked to the increasing burden of non- communicable conditions	Heart diseases	-	Arthritis	59096
	Cancers	-	Dental Disorders	16558
	Asthma	1167	Hypertension	12856
	Ear Infections/ Conditions	2559	Mental disorders	7377

Top Ten Commonest Health Conditions/Challenges/Problems				
	Under 5 Years		**Over 5 Years**	
	Condition	**Numbers/ Prevalence**	**Condition**	**Numbers/ Prevalence**
Linked to the increasing burden of non-communicable conditions	Diabetes		Asthma	7227
	Dental disorders	1108	ENT infections	7123
	Others (specify)		Diabetes	7116
Linked to Violence & Injuries	Road accidents	432	Road accidents	4951
	Sexual violence	38	Violence related Injuries	35
	Violence related Injuries	2	Sexual violence	414
Linked to essential Medical services	Pregnancy / childbirth events	-	-	-
	Newborn events	-	-	-
	Adult women health events	-	-	-
	Adolescent events	-	-	-
	Obesity	-	Obesity	1074
Linked to common health risk factors	Underweight children	5950	Lack of contraception	58337
	Underweight mothers	-	-	-
	Poor breastfeeding practices	-	-	-
	Alcohol and drug use	-	-	-
	Unsafe sex	-	-	-
	Others (Specify)	-	-	-
	Unsafe water	-	-	-
Linked to collaboration with health-Related Sectors	Unemployment	-	-	-
	Insecurity	-	-	-
	Low female Education	-	-	-
	Large population growth	-	-	-
	Poor housing designs	-	-	-

Source: Department of Health Services, Nyeri County, 2019

Mobile Health Facilities

The aim of mobile health facilities is to be able to reach even the marginalised communities in Nyeri County. The County has mobile clinics donated through the Beyond Zero Campaign which seeks to give maternity services to all citizens. There is need to provide more mobile health facilities in the County to reach as many residents as possible especially in vast wards such as Gatarakwa, Mugunda, Endarasha/ Mwiyogo and Thiegu River.

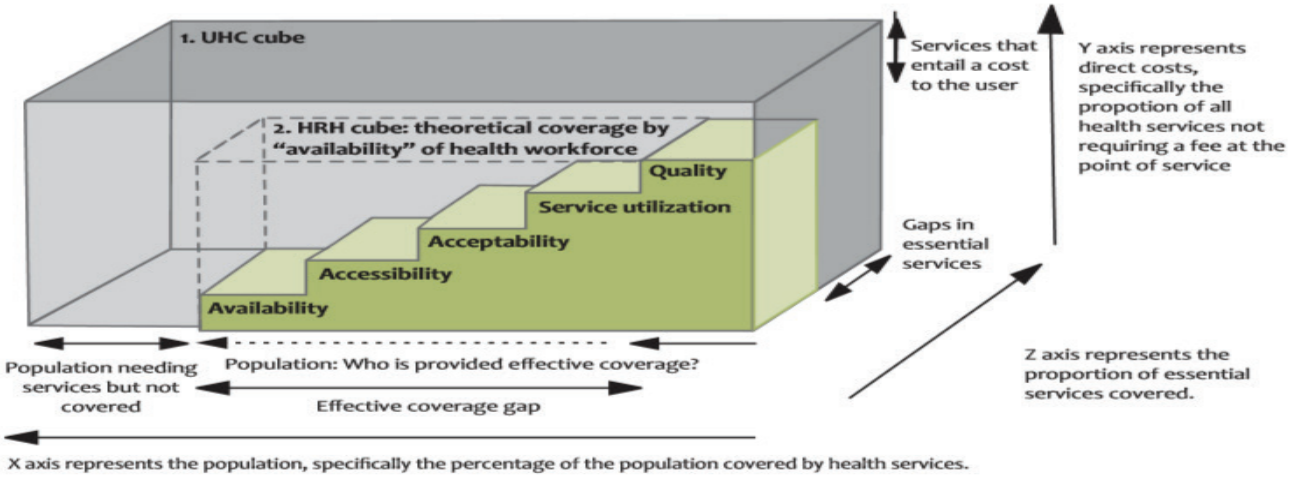
Figure 40: Photograph of a Beyond-Zero mobile clinic

Universal Health Coverage (UHC)

Kenya government has adapted Universal Health Coverage as a policy programme of the Big four agenda. Main goal of the programme is to ensure all persons in Kenya will be able to use the essential services they need for their health and wellbeing through a single uni☐ed bene☐t package, without the risk of ☐nancial catastrophe. The programme, which was launched in 2017, has a five-year timeline of up to 2022 when the national government in collaboration with County governments intends to have achieved 100% from current 50% universal health coverage index.

As part of the programme launch, National government piloted the project in four counties in Kenya, including Nyeri, Kisumu, Machakos and Isiolo. UHC has the following objectives, to improve health facilities, while equipping them with adequate human resource and medications. To ensure the population has a medical insurance that would ensure health services are affordable, accessible, acceptable and meet international ISO certifications in terms of quality, and finally expansion of maternity wings. See the figure below

Figure 40: UHC Project



Through the programme members of households across the four pilot counties were registered to ensure recognition as part of the programme. Through the programme Nyeri County is set to benefit especially provision of medical equipment and key staff across various levels of health facilities. As household survey established Nyeri County residents complained of slow delivery of health services, few numbers of facilities that are fully operational during the day and night, inadequate medicines and health related personnel in dispensaries and health centres.

The project was piloted for three years in the county up until COVID19 pandemic hit the country. To facilitate mitigation measures of the brought about by the pandemic the sponsor of the project who is the National Government of Kenya, diverted developmental funds across sectors into COVID19 kitty. UHC was one of the health programmes that suffered cash avalanche therefore suffered a natural collapse.

The project was instrumental to Nyeri County Residents as a huge portion of outpatient services in level IV and V were offered at very affordable prices when compared to income levels across the county. For this reason, county government of Nyeri should venture into Public - Private - Partnership with private medical practioner and institutions that offer health care services. A proposal that the County Spatial will explore in ensuring improved access to medical services.

9.6.2.7 Emerging Issues for Health Facilities

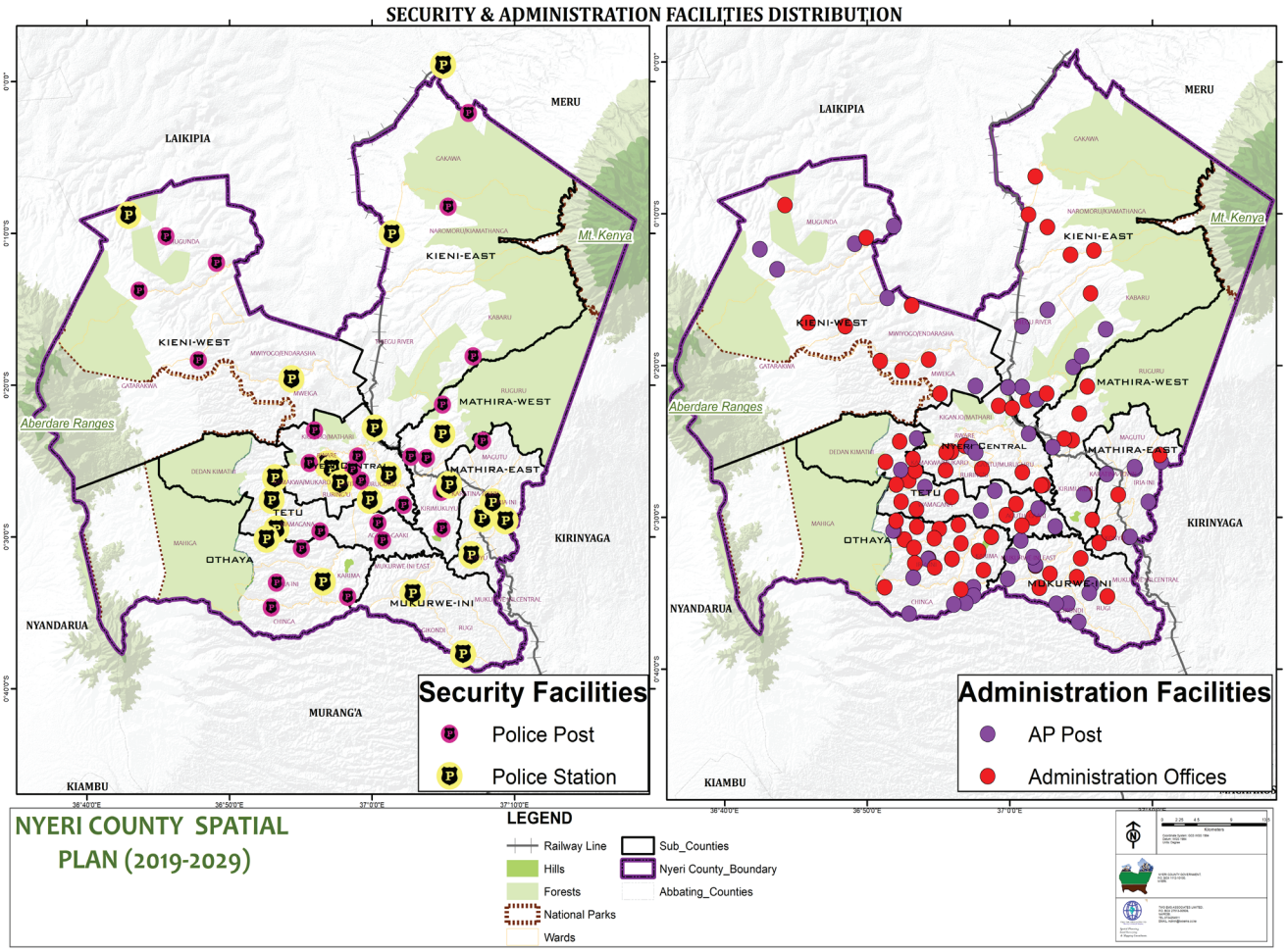
Potential/Opportunities	Constraints
• Nyeri County residents have 90% access to health facilities, either by distances travelled to a health facility, or health facility to population ratio except few wards which have a shortage level 2 and 3 facilities. this means health sector funding can be channelled in provision of medical equipment's, employment of medical personnel and other preventive public health campaigns. • UHC in Nyeri an opportunity for equipping health facilities, human resource boosts across the wards. This will uplift access and quality of medical services especially in Kieni East and West sub-counties.	• Shortage of medical personnel especially Doctors across all medical facilities. the problem is dire in Health centres and dispensaries. • Lack/low supply of drugs within health facilities, especially in health centres and dispensaries. • Inaccessibility to health facilities especially in rural areas, especially in Othaya, despite having a level 4 hospital, there is an acute shortage of local facilities such as health centres. Kieni west and Mathira east and west have need additional/upgrades of dispensaries to health centres. • Inadequate funds to facilitate employment or hire medical consultants that would adequately serve Nyeri County population. • Majority of Level III and II facilities lack title deeds, hence are prone to encroachment.

9.7 Security Facilities

Security is a national government function. However, security has a direct relationship with other sub-sectors of the County. For instance, business environment that is considered attractive to investors has to be very secure. With this knowledge Nyeri County government despite having no mandate over this sector, it is a stakeholder in ensuring all the wards within its jurisdiction are favourable to investors. Moreover, local administration facilities such as chiefs, assistant and deputy County commissioners host community facilities such as social halls. There are 190 law and order related facilities across the County see the table below.

Recent reforms in the security sector included merging of AP and General police service officers under one command. This adds to the number of security personnel within the County. UN recommends 1:450 police: population ratio, while national ratio is at 1:489, a standard which the County is yet to achieve. With projected population of slightly below a million in 2029, County would require 2,223 officers to facilitate law and order. The following maps show distribution of security facilities across wards.

Map 113: Spatial distribution of administration and security facilities



Source: Two EMS Associates, 2019.

Table 39: Security facilities inventory

Facilities	Number
Police station	24
Police posts	26
Administration police posts	54
Administration offices (chief camps, Assistant County Commissioners offices, Deputy County Commissioner etc.)	85
Prisons	1

The distribution map indicates an imbalance especially to the northwest and east of the County. Facilities are concentrated to the south, east and west of the County. As noted earlier a secure region whether true or perceived has a great attachment to development, especially investor confidence. Central, south, west and east parts of the County are highly developed compared to the northern areas.

This can be attributed to security situation a factor that is equated to sparse population of police posts and stations, administration offices and police posts. The situation can be alleviated by upgrading police posts to police stations, while facilitating the stations with human resource and response equipment.

9.7.2.7 Emerging Issues for Security

Potential/Opportunities	Constraints
• Existing police post, Administration facilities that can be upgraded to a police station. Especially in vast Kieni east and west sub-counties. • Majority of the local administration facilities host community infrastructure such as social halls or resource centers. • The Nyumba kumi government policy that seeks to improve community – security personnel relationships.	• Inadequate funding that would facilitate upgrading and human resource provision adequately serve the population. • Sparse and scattered population across the vast Kieni West and East sub-counties. • Insecurity highest in Mukurweini sub-County especially Rugi, Gikondi wards.

9.8 Recreational and Community Facilities

9.8.1 Stadia and Playgrounds

This spatial plan acknowledges that open space and recreation facilities stems from a basic human need for activities which are essential to the mental and physical well-being of the individual and the community. It therefore encourages and seeks to ensure that appropriate opportunities are available to meet the needs of the people in Nyeri County.

Nyeri County has a total of 62.426Ha of land under recreational land use. Recreational land use in the County ranges from stadiums (institutional/public stadia's), Open spaces, community playgrounds and urban parks. According UN WHO and UNICEF proposes 0.4ha for 1000 people, in each area.

As at 2019, County population is approximately slightly below 850,000 and projected to approximately a million meaning an average of 850-1000ha of recreational space is required to meet the threshold now and into the future.

Moreover, Recreational spaces need development in terms of facilities for them to effectively ensure human development and well being. Following are the proposed international standards for recreational facilities in accordance to population catchment.

Table 40: Standards for recreational facilities

Catchment level		Catchment level	Town	Local	Neighborhood
facility		Municipal park	Town park	Local park	Neighborhood park
Population served		50,000-100,000	30,000-50,000	3000 with catchment radius of< 400>m	1200 with catchment radius of< 250>m
Site area (ha)		5-15	2-5	0.4-2	0.1-0.25
Type Of use	Use / purpose	comprehensive	Multi-purpose	Single purpose	Amenity purpose
	Public	yes	yes	yes	yes
	Family only	yes	yes	yes	Local use
	Children play area	yes	yes	yes	yes
	Sport facilities	yes	yes	yes	no

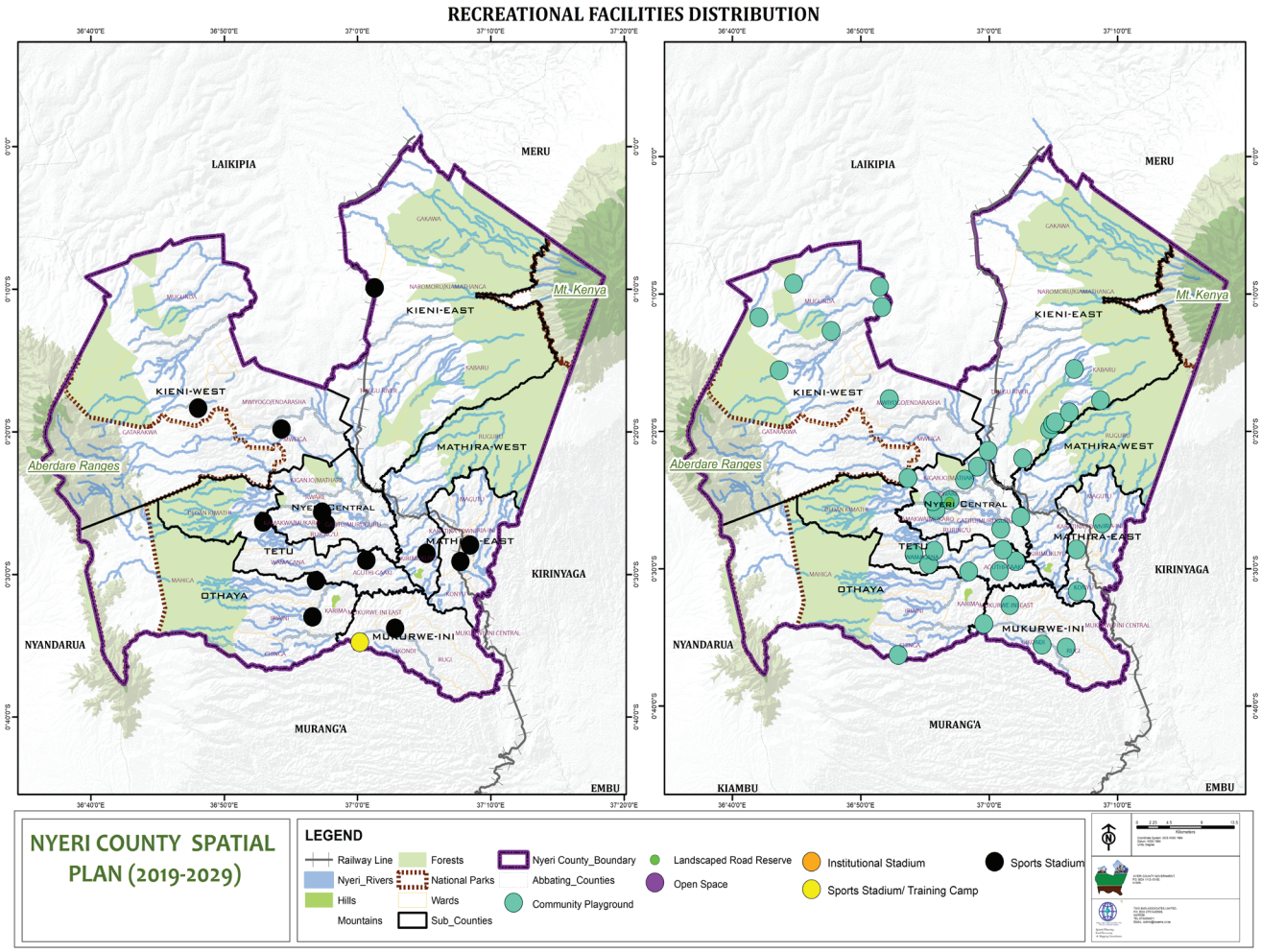
Adapted from: Open Space, Recreation and Sport Facilities Development Guidelines Qatar Master plan, modified by Two Ems Associates Ltd.

The table below shows existing public stadiums within Nyeri County and level of development.

Table 41: Existing public stadiums

Name	area(ha)	Intervention to existing status	Ward location
Mukurweini Stadium	1.43	Needs Facilities, and drainage infrastructure	Mukurweini-Central
Narumoro Stadium	2.57	Not well developed (needs Sporting facilities)	NaruMoru Kiamathanga
Endarasha Stadium	2.15	Not well developed	Endarasha Mwiyogo
Karindi Stadium	2.02	Needs facilities/lacks a fence	Gikondi
Kinunga Stadium	2.40	Needs development (needs Sporting facilities)	Dedan Kimathi
Kaiyaba Stadium	2.75	Needs development (needs Sporting facilities)	Kirimukuyu
Open field	1.22	Used by community and Kagera Primary school	Mahiga
Karatina Stadium	1.48	Needs development (needs Sporting facilities)	Karatina Ward
Kirabu Stadium	2.95	Needs facilities/lacks a fence	Karatina Ward
Gichira Stadium	1.33	Needs facilities/lacks a fence	Aguthi Gaaki Ward
Dedan Kimathi/ kamukunji Stadium	1.36	Fairly done	Rware Ward
Mweiga Stadium	0.05	Fairly done	Mweiga
Othaya Town Stadium	2.85	Fairly done	Iria-ini
Rirungu Stadium	1.46	flooded when it rains, needs engineering solutions	Ruring'u

Map 114: Spatial distribution of recreational facilities



Source: Two EMS Associates, 2019.

Plate 5: Status of Karindi stadium Gikondi ward and Landscaped road reserve margins

Source: Field survey, 2019

9.8.2 Museums

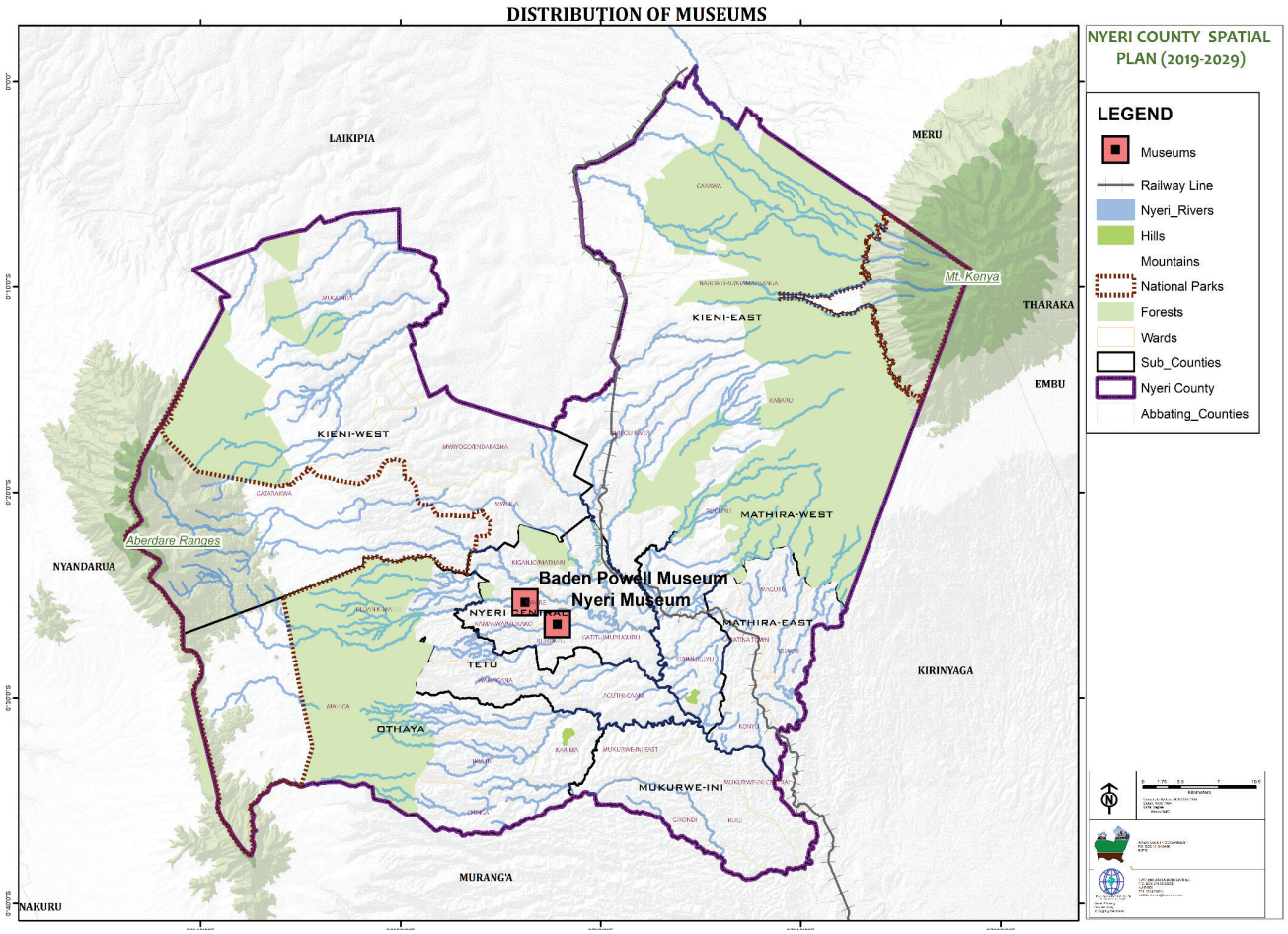
There are two museums in Nyeri County. Nyeri Museum, which is currently run by the National Museums of Kenya, is housed in a National monument which was once used as a "Native law court", built in 1924. Its' main objective was to deal with customary law cases, previously dealt with by clan elders in the villages. As these cases increased, one courtroom could not handle the volume and thus another hall was built.

Thus, the cases were divided among the two courts, with court one dealing with civil cases like pregnancy and debtor cases, and court two dealing with criminal cases like theft and murder.

The first law court is unique in the sense that the seats are inbuilt and concrete, with those on which the judges used to sit on being slightly raised, giving a sense of authority.

Other museums of interest in the County include the Baden Powell Museum. It is named after the founder of the Boy Scout Movement Association, Lord Baden Powell, and is committed to preserving, communicating and exhibiting the heritage of Boy Scout Movement. It also provides a precise history of the movement and is filled with scouting scarfs and other paraphernalia.

Map 115: Spatial distribution of museums



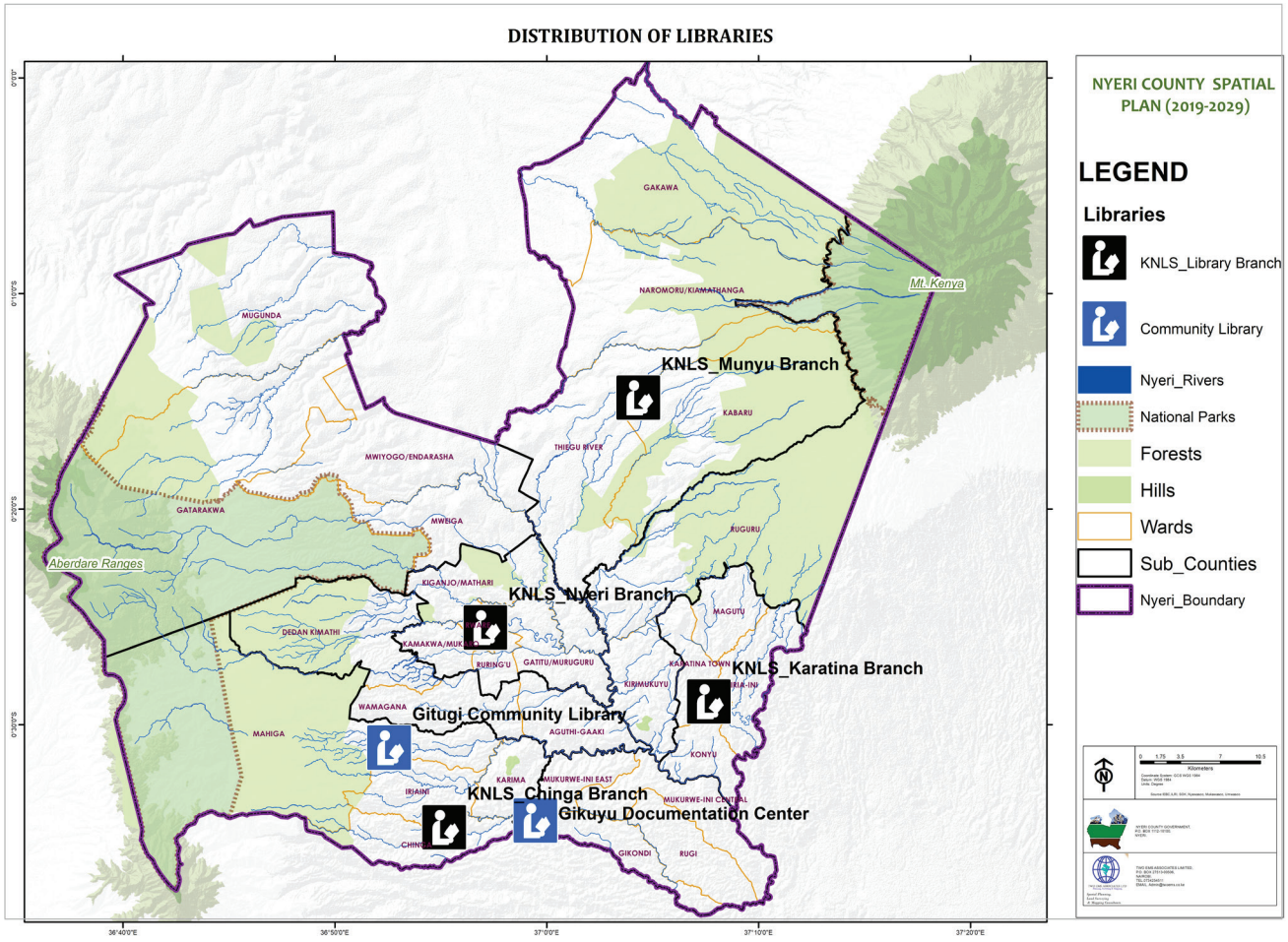
Source: Two EMS Associates, 2019.

Cultural tourism hasn't been well explored in Nyeri, despite the existence of two major heritage facilities. This can be attributed to poor branding and limited space where Nyeri Museum is located. However, Nyeri museum is rich in traditional Kikuyu artefacts, Kenya historical documents, and freedom fighters' weaponries used in the struggle for independence. The museum needs redevelopment or refurbishment and more space allocation that can accommodate visitors, and intensive branding and advertisement.

9.8.3 Libraries

There are four public libraries run by the Kenya National Library Service, located in Nyeri, Munyu, Chinga, and Karatina and one managed by Gitugi tea factory in Gitugi. Moreover there is a Kikuyu Culture documentation center in Mukurwe-ini east ward, which is responsible for collecting, updating and public display of cultural norms of the Agikuyus. According to Urban Areas and Cities Act, a town of at least 10,000 people should be served by at least one library. This shows inadequacy in urban centres such as Narumoro, Mukurweini, Endarasha and Mweiga.

Map 116: Spatial distribution of libraries



Source: Two EMS Associates, 2019.

9.8.4 Cemeteries and Crematoriums

Nyeri County has several public commentaries, including three main ones in Nyeri town. This includes Nyeri Baden Powell and githwariga Public Cemeteries, which are the most popular, and are 90% filled. There is also the Ruguru Community Cemetery, the Muslim Cemetery in Rware, the Hindu/Sikh Crematorium. The County also has an additional four private cemeteries that include the Mathari Missionaries Cemetery belonging to the Catholic Church, the Italian War Cemetery, the British War Cemetery as well as a private cemetery in Amboni, Mweiga town.

Idea of burying is turning out to be a burden to many cities, and towns, however household survey findings indicated that 90% of the residents bury the dead within the land area they reside in. cemeteries named above located within urban areas have a lifespan of 30years where planning guidelines provide for a change of user if need be. However, the idea of burying the dead is slowly losing the momentum in urban areas of County as a result of land pressure in this scenario is the limited land for expansion or for that matter to provide a cemetery land use. Existing public cemeteries such as githwariga are operating at full capacity.

Therefore, to address the increasing demand for public cemetery the spatial will advocate preparation of Local Physical and Land Use Development Plans for Major towns and Market centers, where cemetery land use allocations will be identified and captured.

Plate 6: Photograph of the War Cemetery near Kagumo High School

Source: Field survey, 2019

9.8.5 Resource centres and Social halls

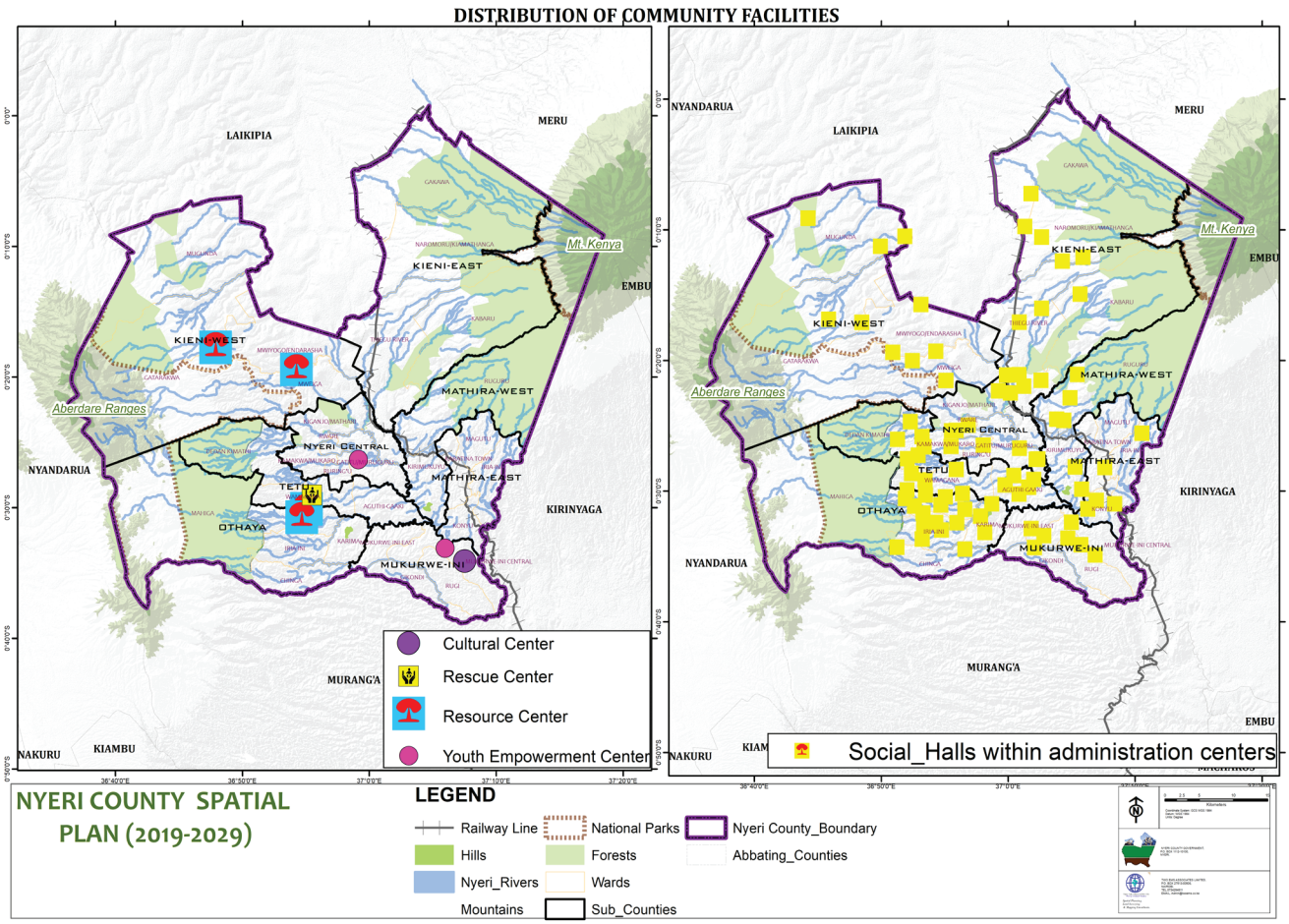
Resources centres are community based flexible facilities that accommodate various functions such as Meeting points, talent development center, temporary community libraries among other functions. Table below shows various resource centres and social halls within the County.Majority of the social halls within the County are owned and managed by religious denominations, while public owned are located within local administration centres across various wards.

Table 42: Resource centres and social halls

Name	Location Ward	Facility Type
Kirerema Youth Center	Mukurweini-Central	Youth Empowerment Center
Githi Heritage and Community Center	Mukurweini-Central	Cultural Center
Machako Rescue and Pastoral Care Centre	Wamagana	Rescue Center
Endarasha Community Resource Center	Endarasha Mwiyogo	Resource Center
Gatitu Adult Continuing Center	Gatitu	Adult Education Center
Children and Youth Empowerment Center	Gatitu	Youth Empowerment Center
Proposed Youth Empowerment Centre	Dedan Kimathi	Youth Empowerment Center
Hombe community central tree nursery	Ruguru	Youth Empowerment Center
Kiamariga community hall	Ruguru	Social Hall
Mahiga resource center	Mahiga	Resource Center
Mumwe community center	Mahiga	Resource Center
Aguthi-gaaki Social Hall	Aguthi Gaaki Ward	Social Hall

Source: Field survey, 2019.

Map 117: Spatial distribution of community facilities



Source: Two EMS Associates, 2019.

Distribution map depicts inequalities in Kieni west and east sub-counties compared to Other sub-counties. Kieni west and East share two facilities, and more to that one is privately owned. This leaves us with one in Endarasha Mwiyogo. Therefore, to facilitate social fabric and unity within the communities in the County this spatial plan will propose development of new resource centres especially in Kieni West and East in areas such as Mathira east and west, Nyeri central, Othaya and Tetu where social halls are owned by religious denominations private-public partnerships would be encouraged to avoid duplication of resources.

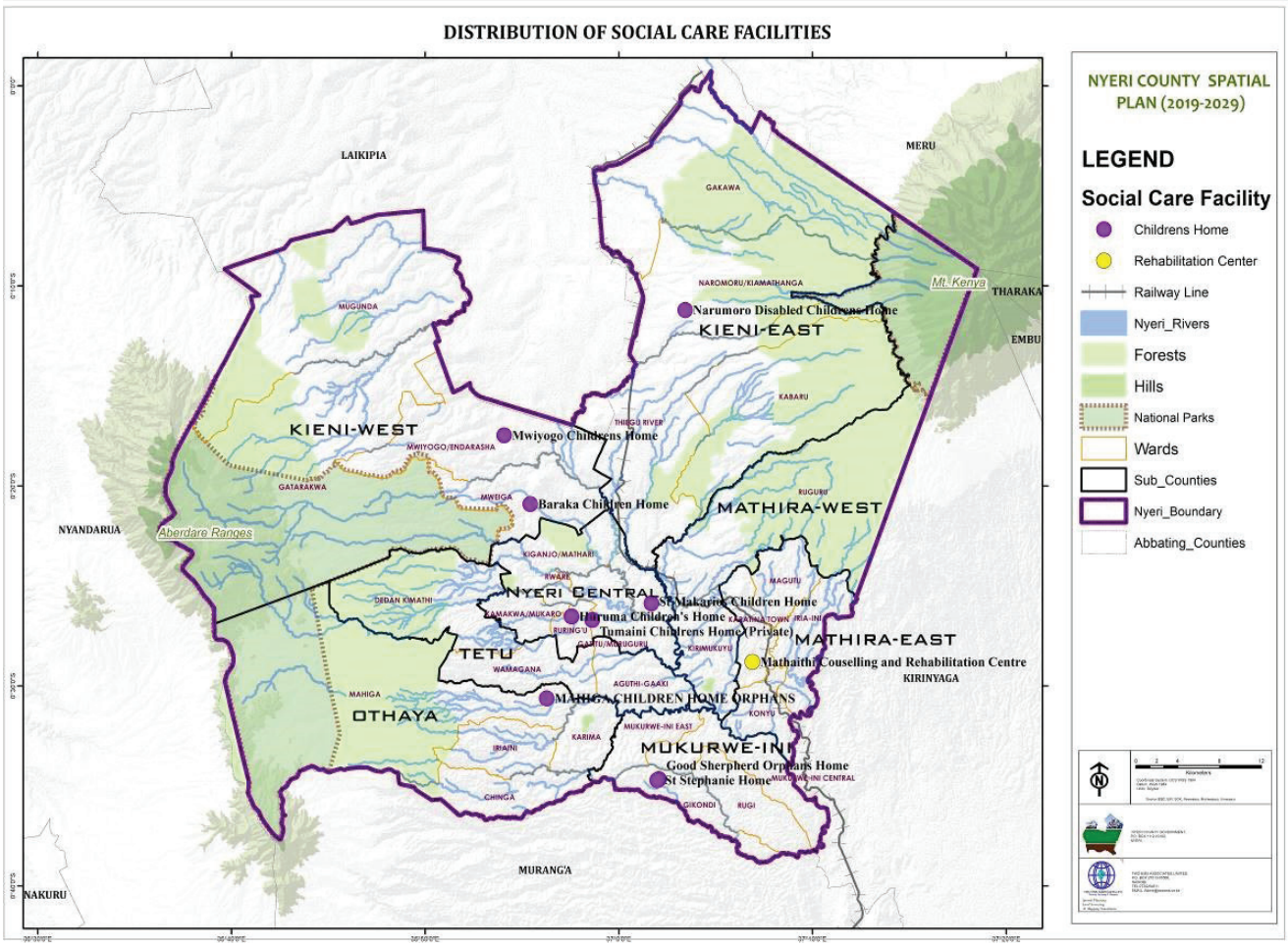
9.8.6 Social Care Facilities

Social facilities include Children's home, orphanages and Rehabilitation Centers. Nyeri county has nine children's home and one rehabilitation center. Social facilities are designed to uplift the less fortunate members of the society such as orphans, the disabled, as well as those who may have ventured into drugs abuse hence suffering from addition. Members of society living in these homes are otherwise cannot cope on their own without physical, emotional assistance. Table below shows Existing social care facilities within the county.

Table 43: Social Care Facilities

Name	Ward	Facility type	Ownership
Narumoro Disabled Children's Home	NaruMoru Kiamathanga	Children's Home	Private
Mwiyogo Children's Home	Endarasha Mwiyogo	Children's Home	Private
Tumaini Children's Home (Private)	Gatitu	Children's Home	Private
Good Shepherd Orphans Home	Gikondi	Children's Home	Private
St Stephanie Home	Gikondi	Children's Home	Private
Mahiga Children Home Orphans	Mahiga	Children's Home	Private
Mathaithi Counselling and Rehabilitation Centre	Karatina Ward	Rehabilitation Center	Private
Huruma Children's Home	Ruring'u	Children's Home	Private
St Makarios Children Home	Kiganjo Mathari	Children's Home	Private
Baraka Children Home	Mweiga	Children's Home	Private

Map 118: Social Care Facilities



Source: Two EMS Associates, 2019.

9.8.7 Fire stations

County is served by two fire stations located in Karatina and Nyeri towns. According to urban areas and cities act standards a fire station should serve a maximum of 50,000 people; this means that the County is highly undeserved by the facilities. With expected population boom to 950,000- 1000,000 then a total of 5 more fire stations are required to meet the standards. However due to limited resources and intensive investments required in developing the infrastructure associated with fires station the plan will provide the facility in areas of dense population settlement and expected growth areas.

Analysis of the equity access to disaster management facilities the plan makes assumption that existing facilities have ability to serve a 20km catchment radius therefore wards such as Kirimukuyu, Mweiga, Kamakwa, Ruringu, Gatitu/Muruguru are partly or well covered. This ensures that wards that limited to no access to this facility are prioritized. The table below analyses the facility coverage to the existing facilities and henceforth expected actions.

Table 44: Disaster management facilities ward based gap analysis

Ward	Sub-County	Population	Fire station	Within 20km Access Radius of Existing Facility	Expected actions in Comparison to Standards @1:50,000 people
Naromoru/ Kiamathanga	Kieni East	26291	No	No	Development of One Facility
Thegu River		21804	No	No	
Kabaru		22084	No	No	
Gakawa		26321	No	No	Intergovernmental Relations with Laikipia County, For the Area to be Served by Nanyuki Station
Mweiga	Kieni West	17264	No	Yes	Adequate Facilitation of Nyeri Town Station to Serve the Area
Mwiyogo/ Endarasha		19446	No	No	Development of One Facility
Mugunda		23712	No	No	
Gatarakwa		18890	No	No	
Ruguru	Mathira West	22946	No	No	Development of One Facility
Magutu	Mathira East	19722	No	No	
Iria-Ini		27652	No	No	
Konyu		21959	No	Partly	Adequate Facilitation of Karatina Station to Serve the Area
Kirimukuyu	Mathira West	28898	No	Yes	
Karatina Town	Mathira	27670	Yes	_	
Gikondi	Mukurwe-Ini	18533	No	No	Development of One Facility

Ward	Sub-County	Population	Fire station	Within 20km Access Radius of Existing Facility	Expected actions in Comparison to Standards @1:50,000 people
Rugi	Mukurwe-Ini	20699	No	No	Development of One Facility
Mukurwe-Ini East		18417	No	No	
Mukurwe-Ini Central		26283	No	No	
Kiganjo/ Mathari	Nyeri Town	23872	No	Partly	Adequate Facilitation of Nyeri Town Station to Serve the Area
Rware		25018	Yes	_	
Gatitu/ Muruguru		21804	No	Yes	
Ruring'u		22160	No	Yes	
Kamakwa/ Mukaro		26419	No	Yes	
Mahiga	Othaya	21846	No	No	Development of One Facility
Iriaini		24536	No	No	
Chinga		21899	No	No	
Karima		19093	No	No	
Dedan Kimathi	Tetu	20686	No	No	Development of One Facility
Wamagana		31003	No	No	
Aguthi-Gaaki		26631	No	No	

9.8.8 Emerging Issues for Recreational and Community Facilities

Potential/Opportunities	Constraints
• Religious denominations such as Catholic, PCEA, AIC, ACK that own and manage community facilities. This provides basis for private-public partnerships in provision of facilities such as social halls. • Plenty of rivers that would provide riparian reserve which would eventually provide sites for recreational facilities. • Availability of museums that would facilitate heritage tourism. With proper branding and advertisement of the facility County has a potential to spur cultural tourism. • Resource centers could be developed as talent develop centers, which provides growth through income generation.	• Inadequate funding to develop various community and recreational facilities. • Inadequate community facilities in Kieni east and west sub-counties • Lack of library in Kieni west, Mukurweini, and Mathira west sub-counties. • Inadequately developed recreational facilities across the County. • County government of nyeri is yet to secure title deeds for majority of recreational, open spaces and community facilities.

CHAPTER TEN:

ECONOMIC PROFILE

Economic analysis is important for development planning as it provides important indicators upon which the rate and level of growth and development of a region can be assessed. Economic performance influences living standards of people and indicates how well people are able to utilize their natural and human resources. For spatial planning to be sustainable, it must respond to the existing economic realities and order economic activities in a sustainable manner.

Information about an area's future population is incomplete without a parallel understanding of the local economy, which largely shapes its future. If the local economy is strong, population growth is usually brisk. In times of economic trouble, though, an area often will experience a loss in population.

The following analysis will therefore provide important indicators upon which the rate and the level of growth of Nyeri County will be measured. These indicators will influence or inhibit the standards of living (and by extension the speed of County development).

The total area under food crops is 60,662ha, with 21,593ha under cash crops, implying that agriculture is the backbone of the County's economy. Other economic activities include; livestock rearing, tourism, trade and industry which are carried out by both large-scale industries and SMEs across the County.

Plate 6: Main Activities in Nyeri County

Crop Farming

Livestock Keeping

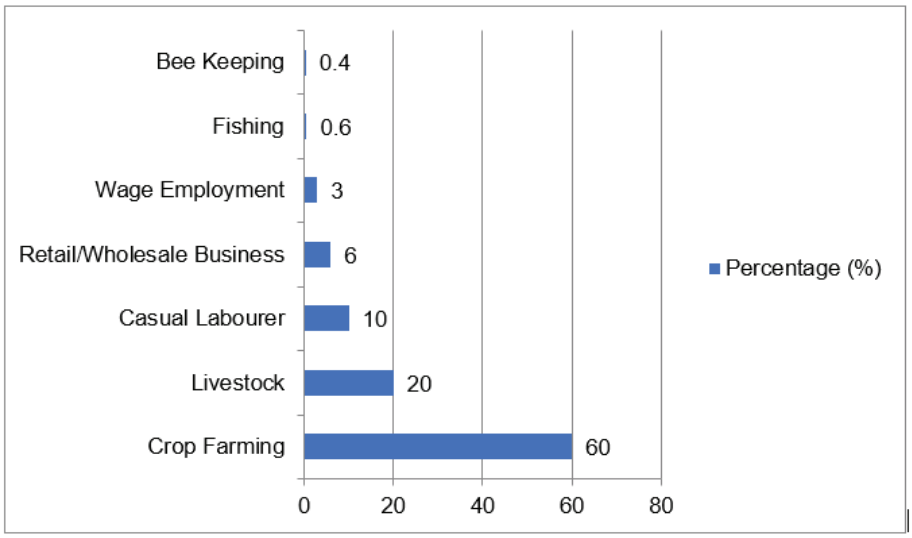
Tourism

Quarrying

Industry

Trade and commerce

Figure 41: Economic activities in Nyeri County



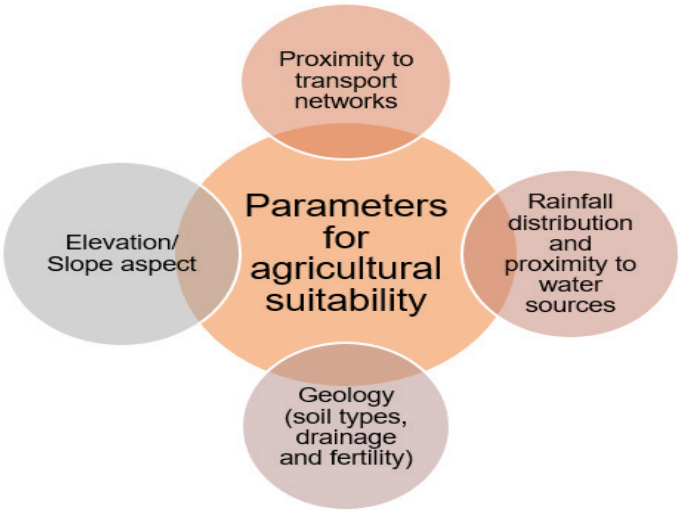
Source: Field survey, 2019

10.1 Agriculture

Agriculture currently employs 33% of Nyeri County population[3] . With an agricultural potential of 758.5km^2 of arable land, agribusiness is one of the main economic activities within the County. Food production, cash crop farming (tea, coffee, horticulture and fruits), livestock rearing, bee keeping, and fisheries constitute the major economic activities.

10.1.1 Agricultural Land Suitability Analysis

Agricultural activities require good geology, well-drained soils and suitable climate. Good transportation networks such as road, rail and air are a necessity for easy movement of raw materials and processed agricultural materials. While Nyeri is a County with highlands and midlands, elevation, slope and aspect come to the decision-making process for identifying suitable land for agricultural development. For suitable site identification, all these parameters were considered during the analysis of potential agriculture zones.



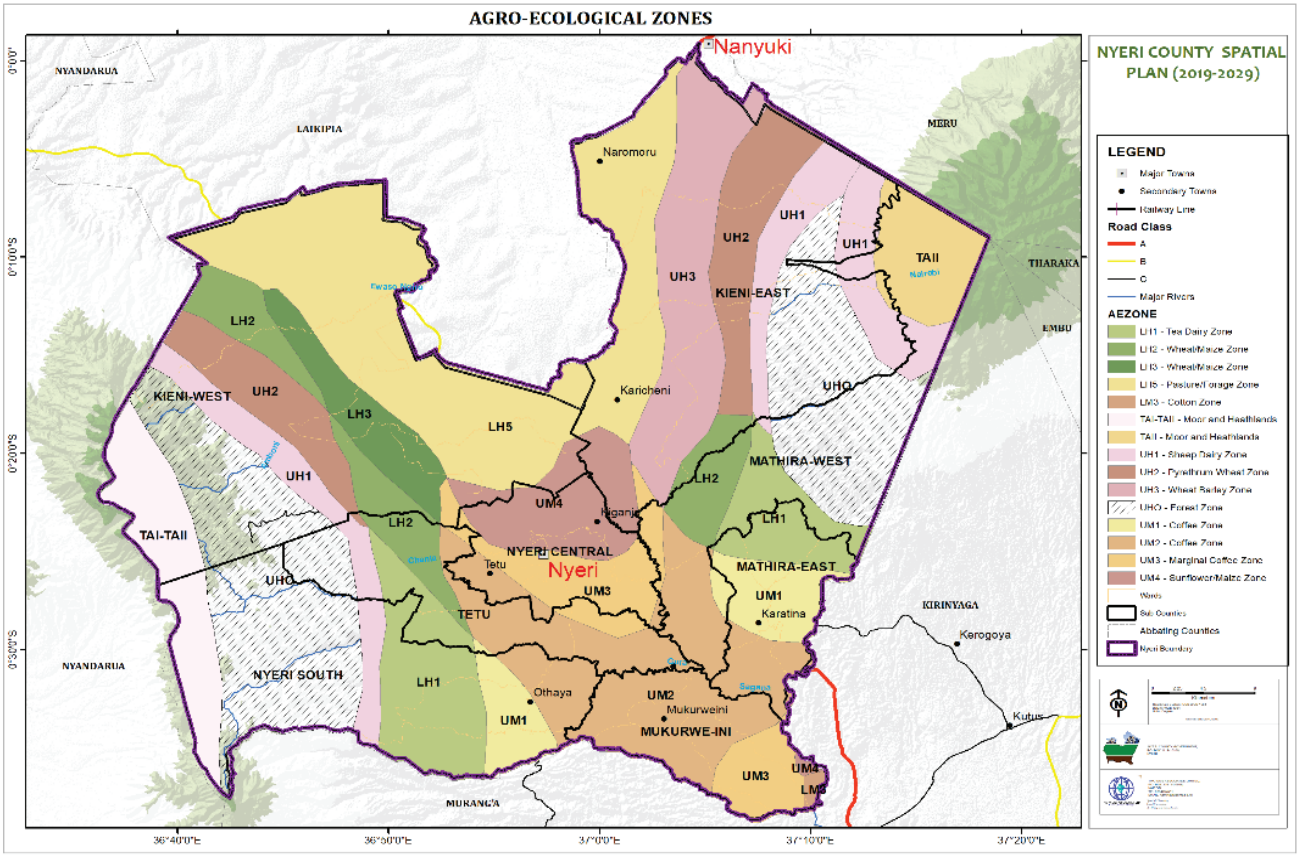
Weighted overlay method (WOM) along with the analytic hierarchy process provides a very assuring outcome for the site suitability assessment of agricultural land use. The method can be useful to the multi-level hierarchical structure of various constraints and criteria (Triantaphyllou and Mann 1995). It has steps to analyze the relative influence of weights on each parameter, before obtaining the final score (Boroushaki and Malczewski 2008; Bunruamkaew and Murayam 2011).

The following section provides an analysis of the potential of crops in the County.

MAIN AGRO-ECOLOGICAL ZONE	ZONES	CROP POTENTIAL
Tropical Alpine Zone	TA I + II	National Park Grazing landw
Upper Highland Zones	UH0	Forest Zone
	UH1	Sheep and Dairy Zone Others: peas, potatoes, maize, cabbage, carrots, celery, radish, endive, rampion, leek, spinach
	UH2	Pyrethrum - Wheat Zone Others: oats, horse beans, potatoes cabbages, kales, carrots, celery, radish, endive, rampion, leek, spinach, pears, plums, apples
	UH3	Wheat- Barley Zone Others: peas, potatoes, Rapseed, Flax, green onions, cabbages, cauliflower, sunflower, carrots, kales, celery, pyrethrum, leek, radish
	UH4	Ranching Zone Livestock – Grassland and Forage
Lower Highland Zones	LH1	Tea – Dairy Zone Others: kikuyu grass, maize
	LH2	Wheat/Maize – Pyrethrum Zone Others: sunflower Kenya White, rapeseed; potatoes, peas, nearly all vegetables
	LH3	Wheat -Maize- Barley Zone Others: kales, carrots, cauliflower, beetroot, spinach, peas, flax, tomatoes, rapeseed
	LH4	Cattle- Sheep- Barley Zone Other: potatoes, tomatoes, green onions, rapeseed, sunflower, wheat

	LH5	Lower Highland Ranching Zone Short savannah grassland. Livestock
Upper Midland Zones	UM1	Coffee-Tea Zone Others: potatoes, sweet potatoes, beans, cabbages, kales
	UM2	Main Coffee Zone Others: Bananas, citrus, avocadoes, passion fruit, arrowroots
	UM3	Marginal Coffee Zone Others: beans; onions, cabbages, sorghum, macadamia nuts, maize, tomatoes
	UM4	Sunflower – Maize Zone Others: finger millet; dolichos beans; potatoes (higher places), sweet potatoes, tobacco (lower places), tomatoes, onions

Map 119: Agro-ecological zones

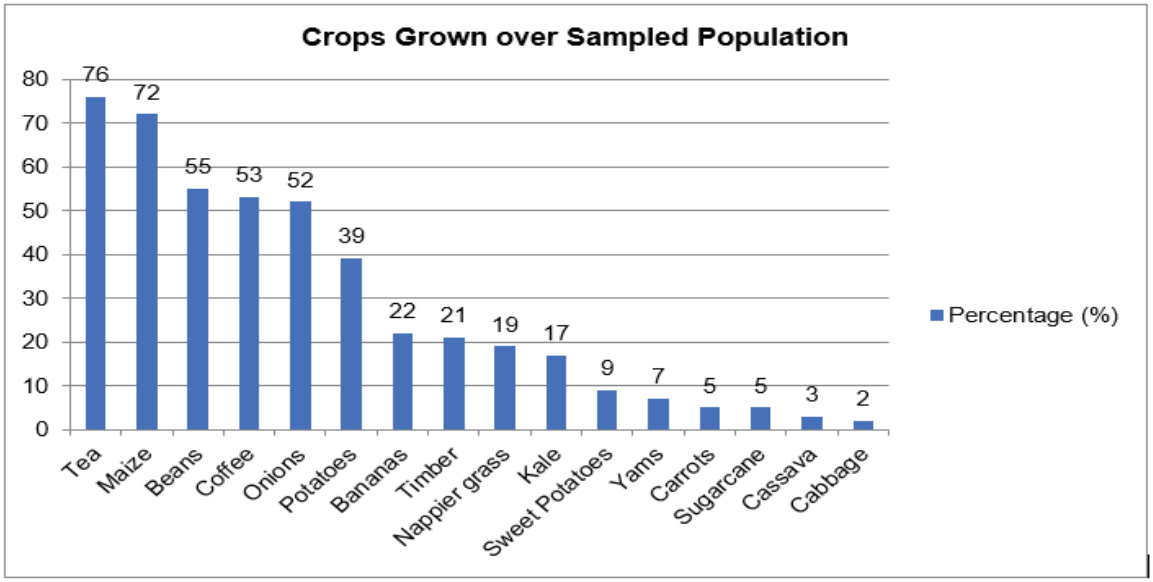


Source: Two Ems Associates, 2019

10.1.2 Crop Agriculture

Cash crops and food crops are grown in the County. The main cash crops are coffee, tea and macadamia. Food crops grown are usually for subsistence use. The production is mostly below the demand of the County. This is mainly due to post-harvesting losses, since most farmers lack adequate storage facilities. Where there is surplus however, it is sold in the markets, to institutions or exported to neighbouring counties like Laikipia. The chart below gives a summary of the crops grown based on the household survey conducted and the number of respondents.

Figure 42: Crops grown



Source: Field survey, 2019

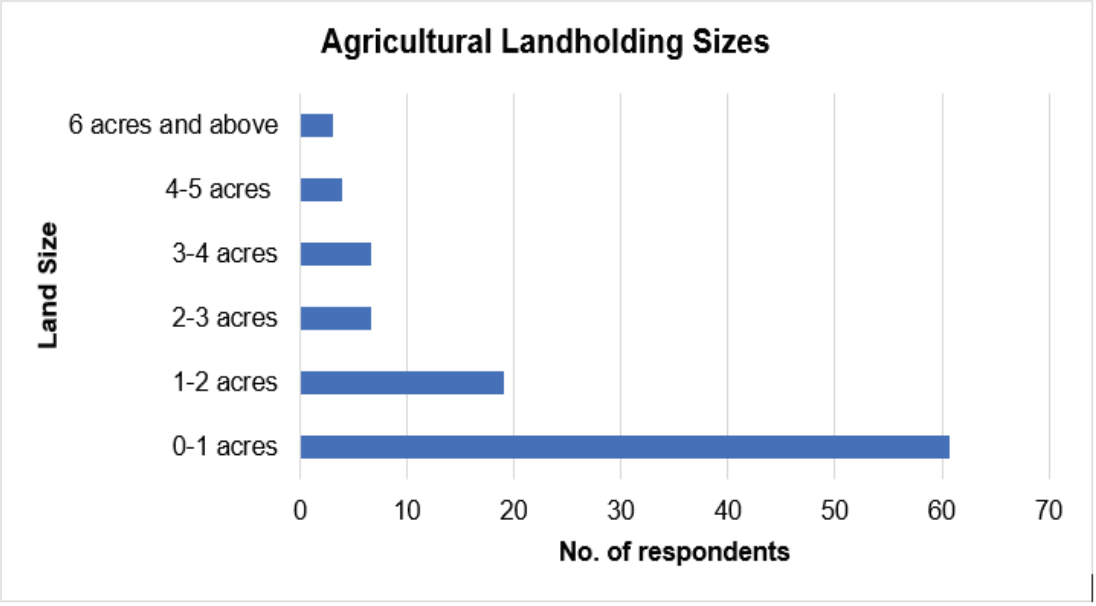
Other crops grown include millet, ground nuts, sorghum, tobacco, green grams, soya beans, watermelons, avcados, and wheat. Coffee and tea are currently facing production challenges as the farmers are uprooting the crop due to low prices and frustration by middlemen. This is a challenge to the economy of Nyeri as the two crops are the some of the high income earners for agriculture and employ large portions of the population compared to other crops.

However, the national government has picked Nyeri as a pilot county in coffee reforms. The government seeks to improve coffee production from 35 million 240 million kilograms per year, and pump in Sh1 billion to buy subsidized fertilizer to improve production per tree.

10.1.2.1 Agricultural Land Size

The County predominantly consists of small holder farms. Medium and large-scale institutional farms are mainly in form of the ranches and conservancies in the northern parts of the County in Kieni East and Kieni West Sub-Counties. From the field survey, majority of farmers in Nyeri have an average land holding size of less than one acre. There is a lot of subdivision of agricultural land into uneconomical farming units, and this might have a long term impact on the food security levels in the County.

Figure 43: Land Sizes



Source: Field survey, 2019

From the field survey, majority of farmers in Nyeri have an average land holding size of less than one acre. The average farm size is 0.7 hectares for small-scale farmers and 4 hectares for large-scale farmers. There is a lot of subdivision of agricultural land into uneconomical farming units, and this might have a long-term impact on the food security levels in the County

10.1.2.2 Agricultural Technologies

Majority of farmers in Nyeri use traditional farming technologies like use of animal drawn carts to farm. The use of tractors in farming remains significantly low compared to oxen and manual labour. This greatly reduces the ability to intensify farming. This situation can be attributed to a number of factors, including the small size of farms (which reduces manipulability of machinery), the lack of agricultural technology, and level of farmer knowledge about available mechanization. For the farmers who used tractors, the machinery/equipment used was hired. The mean cost of hiring for ploughing, harrowing and planting was KES 2,960, 1,850 and 1,800 per acre respectively (Baseline Survey Report, 2014).

Technology	Advantages	Disadvantages
Oxen/ Donkey drawn Carts	• Steadier pulling power. • Good for heavier tasks like ploughing hard or wet ground.	• Less ground coverage. • High maintenance cost as the animals need feeding.
Tractor	• Timely. • Increased productivity.	• High costs
Manual Labour	• Time consuming. • Delays	• Cheap in cost terms.

10.1.2.3 Marketing and Processing

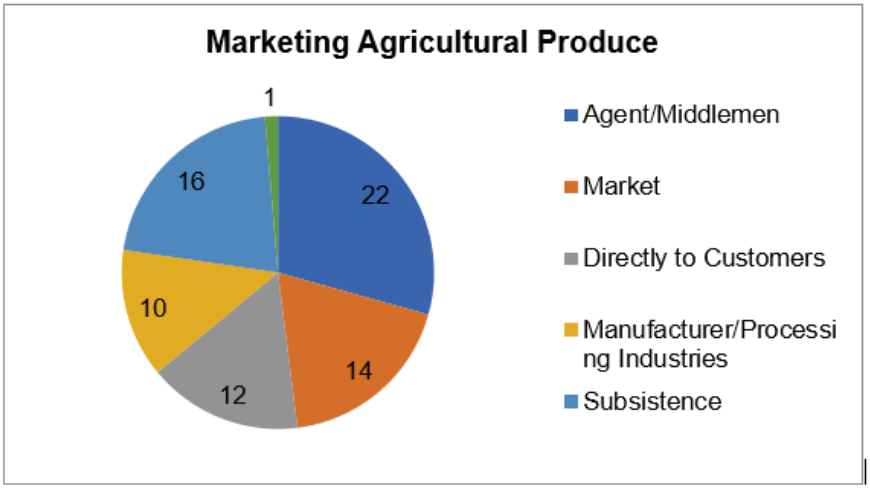
A high percentage of agricultural produce is for subsistence purposes. In the County, the main food storage facilities include; National Cereals and Produce Board in Kiganjo with a storage capacity of 100,000 metric tons; on farm storage granaries and in the farmers houses. Most farmers store their produce in their houses due to low production as a result of small parcels of land.

There are active tea and coffee marketing cooperative that collect; process and sale tea and coffee locally and even export the product. Some of the marketing cooperatives include:

- New Gikaru Coffee CS Ltd
- Gikanda FCS Ltd
- Barichu Coffee FCS Ltd
- Othaya Coffee FCS Ltd
- Rutuma Coffee FCS Ltd
- Rumukia Coffee FCS Ltd
- Ruthaka Coffee FCS Ltd
- Rugi Coffee FCS Ltd
- Giakanja Coffee FCS Ltd
- Gathaithi FCS Ltd
- Githiru Coffee FCS
- Gachatha Coffee FCS Ltd
- Wachuri FCS Ltd
- Thiriku FCS Ltd
- Iriaini FCS Ltd
- Gakuyu FCS Ltd
- New Tekangu Coffee FCS Ltd
- Mathira North Coffee FCS Ltd
- Mugaga FCS Ltd
- Kiama FCS Ltd

The Village Nut Company collects and markets macadamia locally and abroad for local farmers. There are inactive co-operatives in the County like: Nyeri County Vegetables Cooperative.

Figure 44: Marketing of Agricultural Produce



Source: Two Ems Associates, 2019

The chart indicates that farmers (22%) mostly depend on agents and middle men for sale of their crops, which makes them extremely vulnerable to exploitation. This is a situation that can be solved by formation of cooperatives; furthermore, about 16% of the sampled populations grow crops for subsistence purposes. This means that knowledge of agricultural intensification is still low.

Tea and coffee are mainly grown in the highlands while maize and beans are grown in the lowlands. There is need to put incentives in agriculture like subsidized farm inputs to encourage more people into farming to reduces incidences of food shortage.

A summary of the agricultural production in the County is shown in the table below:

Table 45: Crop Production Figures for Nyeri County

CROP	SUB-COUNTY							
	Mathira East	Mathira West	Mukurwe-ini	Nyeri South	Tetu	Nyeri Central	Kieni East	Kieni West
INDUSTRIAL CROPS								
Tea(Kg)	9,374,034	-	-	31,112,177	10,935,819	-	-	-
Coffee(Kg)	7,047,894	2,470,976	8,113,609	2,492,201	2,394,179	752,553	-	-
CEREALS								
Maize(Bags)	40,360	37,875	86,300	20,000	40,800	7,860	13,500	7,720
Bean(Bags)	7,200	3,000	38,500	6,000	18,330	6,200	12,802	5,300
Whea(Bags)	-	-	-	-	-	-	40,110	15,215
ROOTS AND TUBERS								
Irish Potatoes (Bags)	30,000	43,500	12,000	92,000	31,050	18,000	640,000	43,250
Sweet potatoes (Tons)	35	30	330	92	468	264	-	-
Arrow Roots (Tons)	770	80	-	90	320	10	-	-
NUTS AND OILS								
Avocado (Tons)	-	90	250	840	289	310	-	-
Macadamia (Tons)	-	586	-	168	225	2570	-	-
HORTICULTURE AND FRUITS								
Tomatoes (Tons)	-	6672	12	600	713	35	480	80
Cabbage (Tons)	-	74	-	-	17	35	23	80
Bananas (Tons)	-	400	-	112	-	-	-	-

Source: Department of Agriculture, Livestock and Fisheries, 2019

10.1.2.5 Extension Services

Extension services are carried out in various ways in the County such as: Farmer field days, Group trainings, Individual farm visits and Residential courses and exchange tours. To enhance this, the department has collaborated with research institutions such as KARLO Embu and ICIPE on farm trials for best agricultural practices. Demonstration plots have also been established for different technologies such as green house and drip irrigation.

To enhance availability of clean planting materials, such as different types of fodders, sweet potato vines have been established in Kieni East, Kieni West, Mathira West and Wambugu ATC. The challenges faced in the provision of extension services include; Low funding, limited number of staff and the workforce is rapidly ageing at the County level, low capacity to cope with the demand for extension service provision, limited machinery and equipment inhibits staff mobility and shortage of extension officers.

10.1.2.4 Value Addition

Nyeri is reflective of Kenya's capacity for value addition — such processes are poorly developed, and where they exist, value addition is at a small scale. Due to the low productivity of the agricultural sector, value addition has been relegated to small scale production of raw materials. The County faces several challenges in the value addition chain;

- Market access - there is poor road network, high cost of production and low compliance to standards and safety regulations.
- Innovation and technology development - low technology utilization and lack of innovation and use of obsolete technology has led to low quality products.
- Budget Allocation - inadequate budgetary allocation for agricultural value addition infrastructure development.
- Low development of the private value addition sub sector- the entrepreneur development is low in the County

The County government is promoting value chains in fruits, coffee, milk, horticulture, and macadamia nuts.

Figure 45: Coffee farming value chain

10.1.2.6 Irrigation

Irrigation has the potential to increase a single smallholder farmer's income by four times in a single production cycle, particularly by focusing on high value crops, intense cropping, and year-round production. On the other hand, irrigation requires a large amount of water. Given that Kenya is a water scarce nation, competition for the scarce resource is high.

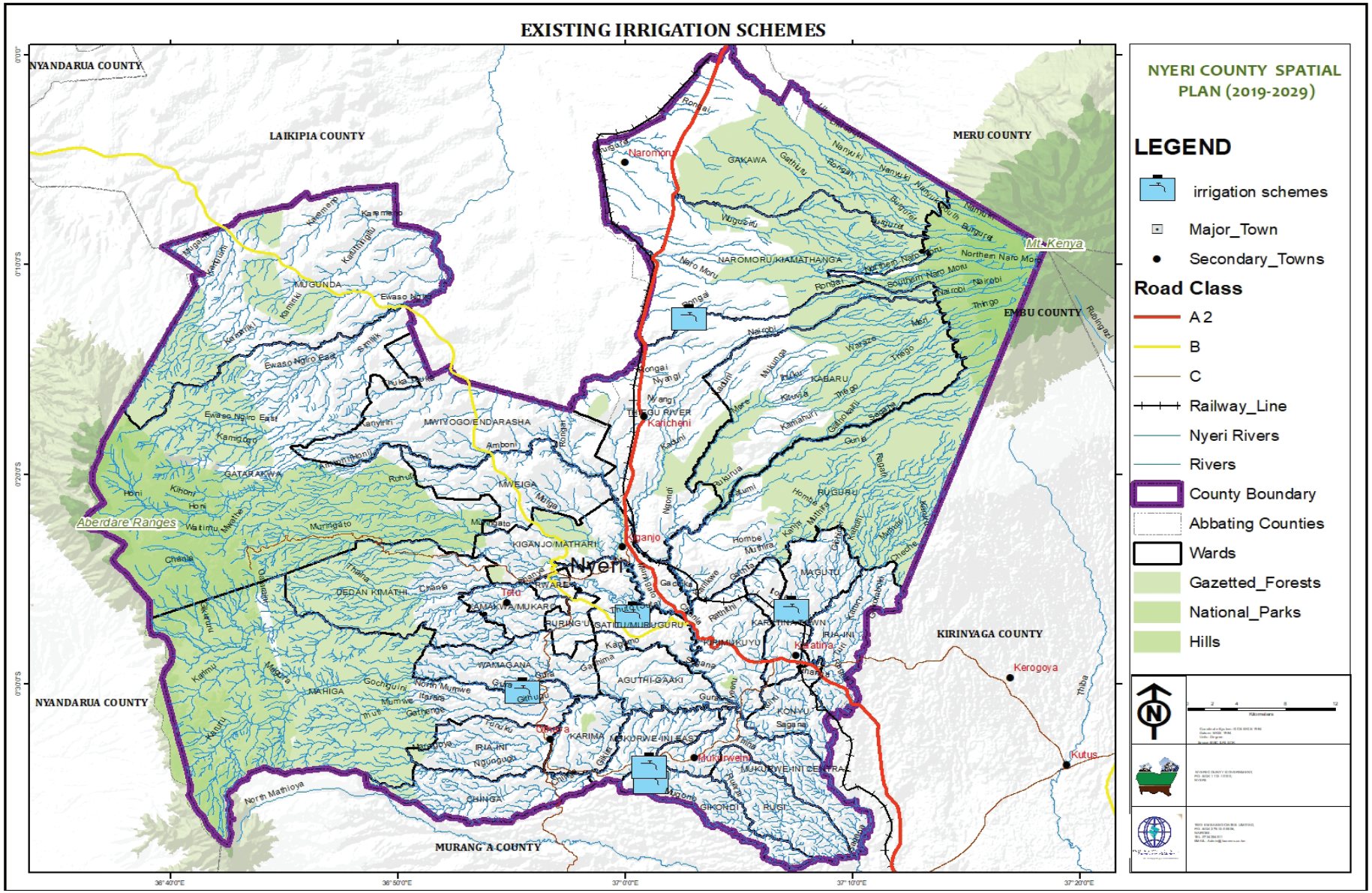
The total area under irrigation in the County is estimated at 2600 Ha and the total no. of households practicing irrigation is 10,400. The irrigation potential in the County is 20,620 Ha from 87 irrigation schemes which will benefit 80,600households. The irrigation schemes in the County are as shown in the table below:

Table 46: Irrigation Schemes in Nyeri County

IRRIGATION SCHEME	AREA IN ACRE	CROPS GROWN
Ndiriti Aguthi Irrigation Project	300	Maize and Horticulture
Gikondi Irrigation Project	300	Maize and Horticulture
Kiirungi Irrigation Project	500	Maize and Horticulture
Riamukurwe Irrigation Project	500	Maize and Horticulture
Gura Ugachiku Irrigation Project	500	Maize and Horticulture
Githiru Irrigation Project	400	Maize and Horticulture
Kirimukuyu Irrigation Project	400	Maize and Horticulture
Thia Kiruka Irrigation Project	300	Maize and Horticulture

Source: National Irrigation Board, 2016

Map 120: Irrigation Schemes



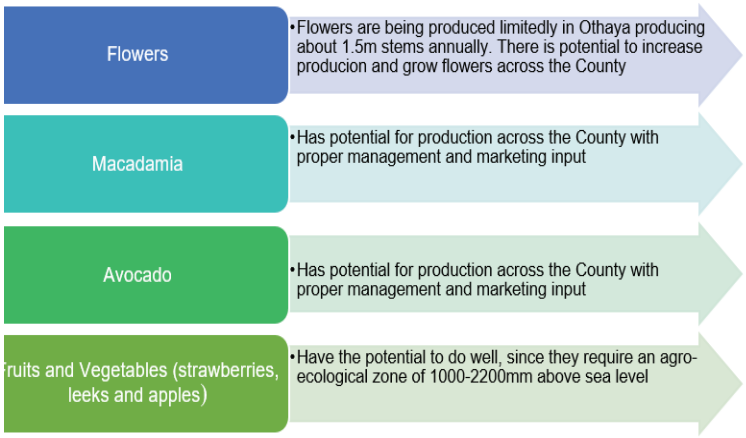
Source: Two Ems Associates, 2019

Other irrigation schemes are Kamoko, Kiruma Minor, Kiandego, Gaithuri, Kiirungi, Thiha-Sagana, Thiha-Micro, Thiha-Kiruka, Njengu, Ereri-Kiremia, Lamuria, Watuka, Endarasha, Nairobi, Sagana, Muteithia, Kariithi, Kihuri and Ndathi-Mbiriri.

The following challenges were identified during stakeholder engagement with farmers from the irrigation schemes:

1. The current land under irrigation has challenges of water rationing and therefore agricultural production potential is not realized.
2. Water shortage from the various rivers and competition with domestic water use.
3. Underground salty water from streams
4. Upstream uptake of water along the rivers affects irrigation in the lower parts of the river
5. The rainy season causes flooding which in turn destroys the weirs.
6. Lack of an irrigation policy has curtailed funding for irrigation projects across the County. However, the National Irrigations Board Act is being reviewed to allow the board's expertise to be applied to small-scale irrigation projects.

To address these challenges, there is need for a compressive plan to harness run off water experienced during rainy seasons either by excavating of water pans, constructing dams or abstracting water from aqua ways. Efficient water utilization technologies should be promoted and more land be put under irrigation.



10.1.2.8 Climate change impacts on crop production

As was with the case with livestock, the effect of climate change on crop production will have the following effects:

- Abnormal onset of the rainy season results in severe consequences, where abrupt floods destroy infrastructure and hamper physical mobility, damage crop fields, increase disease epidemics, death to livestock, and severe impact on livelihoods;
- Increased frequency and severity of droughts has aggravated the aridity of the drylands, making it drier and adversely affecting ecosystems balance (biodiversity and habitats).
- Droughts have led to rampant environmental degradation, resource use conflicts and desertification.

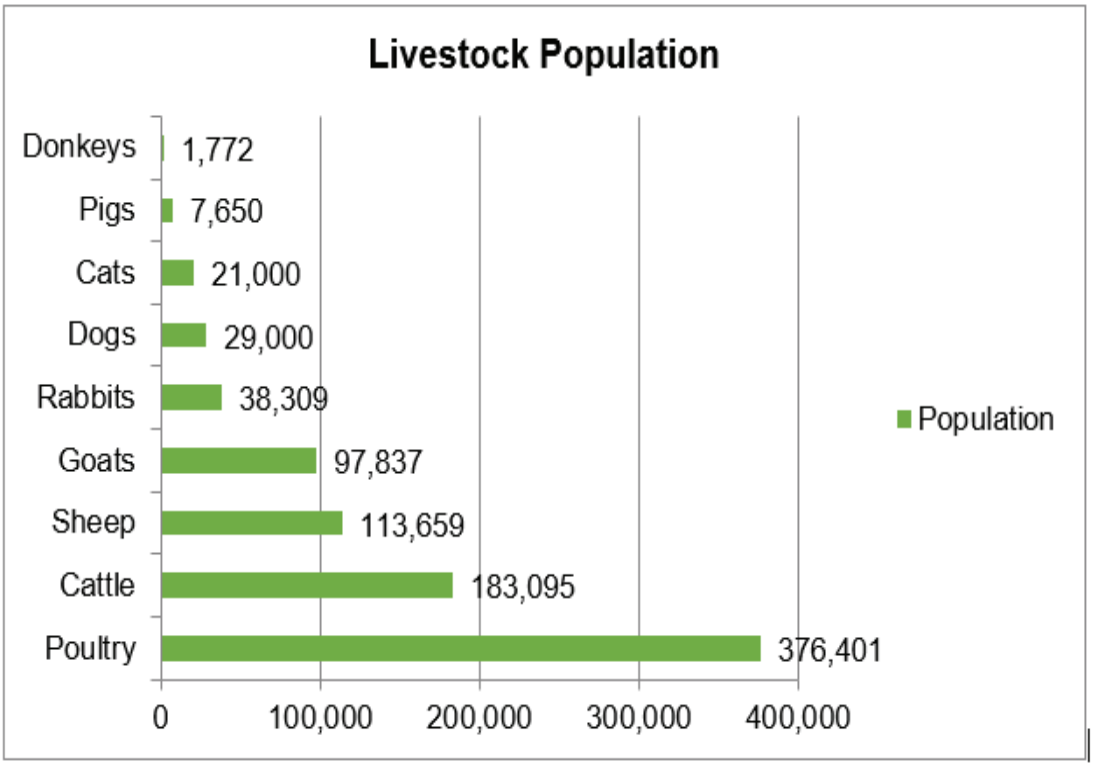
10.1.3 Livestock

Livestock rearing is one of the main economic activities of the Kenyan economy that directly contributes 43% to the agricultural sector, according to the IGAD Livestock Policy Initiative 2003. The main livestock enterprise in Nyeri County is dairy cattle. Other enterprises are as shown in the table below:

LIVESTOCK BREED	BREED
Dairy cattle	Friesian (53%) Ayrshire (32%), Guernsey (4%), Jersey (1%) and cross-breed 10%
Pigs	Large White and Landrace
Sheep	Choriadles, Dorper, Small African red Maasai, Merino breeds and Hampshire dawn
Goats	Germany alpine, crosses of Saneen and Toggenburg
Poultry	Indigenous upgraded Rainbow rooster, Sasso, Kenbro and Kroiler

The land carrying capacity (Livestock per hectare) is five. Bee keeping and other small stock such as rabbits; guinea pigs and quails are also on the increase. There are cases of dog breeding and sale which is a potential for livestock diversification in the County.

Figure 46: Nyeri Livestock Population



Source: Department of Agriculture, Livestock and Fisheries, 2019

The production per animal product and its contribution to GDP in the County is as indicated in the table below:

Table 47: Livestock products and Estimated Livestock Revenue

SUB-COUNTY	LIVESTOCK PRODUCTS					
	Milk (Kgs)	Beef (Kgs)	Mutton (Kgs)	Chevon (Kgs)	Pork (Kgs)	Poultry (Kgs)
Tetu	12,320,850	124,700	53,600	32,800	13,292	10,144
Nyeri South	21,007,985	437,370	42,320	8,613	419	43,959
Kieni East	13,282,048	458520	189005	82030	41500	33100
Kieni West	22,957,500	225,200	61,680	17,800	46,200	8,720
Mathira East	6,679,800	555880	31,900	59827	47,105	84509
Mathira West	12,325,760	24,080	14,114	6560	9340	8150
Mukurwe-ini	15,340,160	144,300	54000	6375	5880	15,000
Nyeri Central	9,020,160	597,000	73,200	39,000	38,519	97,989
TOTAL	**12,934,263**	**2,567,050**	**519,819**	**253,005**	**202,255**	**301,571**
REVENUE	**3,398,965,316**	**876,697,500**	**187,271,220**	**89,833,900**	**61,762,500**	**118,219,600**

Source: Department of Agriculture, Livestock and Fisheries, 2019

Average prices for various livestock products are shown below.

1. Average price for milk is KES 30 per kg
2. Average price for beef is KES 350 per kg
3. Average price for mutton and chevon is KES 380 per kg
4. Average price for pork is KES 300 per kg
5. Average price for poultry meat is KES 400 per kg

Table 48: Hides and Skins Production

TYPE	PRODUCTION FIGURES (KGs)
Hides	6,461,020
Calf skins	14,080
Goat skins	1,368,720
Sheep skins	1,771,680
Wool skins	282,200
TOTAL	**9,897,700**

Source: Department of Agriculture, Livestock and Fisheries, 2019

10.1.3.1 Rearing and Management Practices

The main livestock in the County are crosses of the main dairy breeds like Friesian, Ayrshire, Guernsey and Jersey. The animals are kept mainly in zero-grazing and semi intensive systems especially in Kieni sub counties. There is an existing feedlot in Kilimani Estate near Chaka for the livestock population in the arid Kieni East sub-county.

There are various livestock facilities in the County as shown in the table below:

Sub County		Holding Grounds	Cattle Dips	Spray Races	Crush Pens	Agro/ Vet Shops	Hides And Skins Bandas	Poultry Hatcheries	A I Bull Station	Slaughter Slab/ House
Nyeri Central	0	0	1/19	1	1	45	7	3	-	4
Tetu	0	0	6/37	0	0	46	6	-	-	12
Mathira East	1	1	2/26	0	0	60	4	-	-	10
Mathira West	0	1	7/22	1	1	39	3	-	-	6
Muku-rweini	2(1 for poultry)	0	0/39	0	0	48	3	-	-	7
Othaya	0	0	3/36	0	-	53	2	-	-	6
Kieni West	0	0	3/36	0	75	45	12	-	-	11
Kieni East	0	3	10/22	1	75	65	11	-	-	19
TOTAL	**3**	**4**	**35/236**	**3**	**440**	**354**	**48**	**3**	**1**	**75**

Source: Nyeri CIDP, 2018-2022

The slaughter facilities are categorized as slaughter houses or slaughter slabs and include: ESP slaughter house in Naromoru, Nyeri slaughter house, Kiganjo slaughter slab, Mweiga Slaughter slab, Gakindu slaughter slab, Karatina slaughter house and Kiamariga slaughter slab.

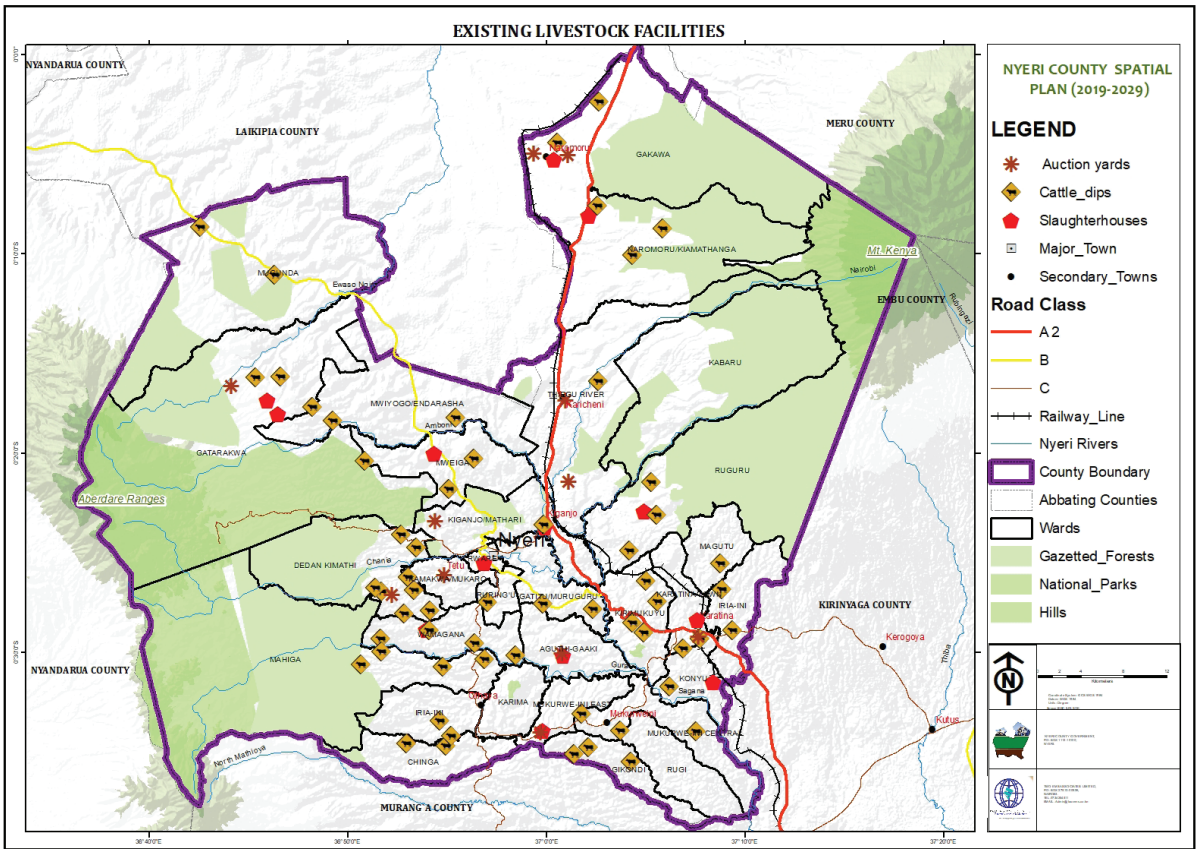
Cattle dips in the county are largely found in the dairy zones of Othaya, Mukurweini, Mathira East, Mathira West and Tetu sub-counties. The cattle dips are not currently in use as most dairy farmers now privately spray their animals within the households. Livestock yards in the County are as shown in the table below:

Table 49: Livestock Yards in Nyeri County

NAME	SUB-COUNTY	SIZE
Ewasonyiro	Kieni West	2 acres
Karicheni	Kieni East	4 acres
Burguret	Kieni East	9 acres
Marumoru Veterinary Clinic	Kieni East	6 acres
AMST Thung'ari	Kieni East	5 acres
Gaaki	Tetu	4 acres
Muhoya	Tetu	1 acres
Tetu	Tetu	1 acres
Huhoini	Tetu	1 acres
Kiganjo	Nyeri Central	¾ acres

Source: Department of Agriculture, Livestock and Fisheries, 2019

Map 121: Existing Livestock Facilities



Source: Two Ems Associates, 2019

10.1.3.2 Extension Service Providers

Extension services are important for the dissemination of knowledge and new technologies. Such services are needed to transform Nyeri from a subsistence economy to a commercial economy.

The core mandate of the livestock department in the County is the provision of extension services including livestock improvement services for cattle, sheep goats and poultry, modern aquiculture's, range rehabilitation and fodder and pasture production.

The challenges faced in using livestock extension services include; inadequate staff, low funding for transportation and the use of vehicles, inadequate and affordable of credit and limited adaptation of new technologies.

The extension services are accessed through field days, demonstrations, seminars and workshops and farm visits. They are distributed at the sub-county levels as shown in the table below:

Table 50: Extension Services

STATION	NO. OF WARDS	NUMBER OF TECHNICAL OFFICERS	STAFF: FARMER RATION
Kieni East	4	3	1 : 12,750
Kieni West	4	3	1 : 9,300
Mathira East	4	4	1 : 7,200
Mathira West	2	3	1 : 14,398
Mukurwe-ini	4	3	1 : 6,100
Nyeri Central	5	3	1 : 9,600
Nyeri South	4	2	1 : 7,830
Tetu	3	3	1 : 10,872
TOTAL	30	25	1 : 10,872

Source: Department of Agriculture, Livestock and Fisheries, 2019

10.1.3.3 Marketing Channels

Livestock cooperatives societies are mainly in the dairy industry. Their mandate is to collect milk from the farmers and market their products. They are especially instrumental in the whole milk value chain from production to marketing. Some of the dairy co-operatives in the County include:

- Endarasha Dairy FCS Ltd
- Island Dairy CS
- Endarasha Dairy FCS Ltd
- Narumoru Dairy
- Ihithe Dairy FCS
- Gaturiri Dairy
- Lamuria Dairy FCS Ltd
- Kirichu Dairy FCS
- Gakindu Dairy CS Ltd
- Mukurweini Wakulima CS
- Lusoi Dairy
- Ngukurani Dairy
- Slopes Dairy CS Ltd
- Ndimu Dairy FCS Ltd
- Ihururu Dairy FCS Ltd
- Gakawa Dairy FCS Ltd
- Gataragwa Dairy FCS Ltd
- Othaya Dairy FCS Ltd
- Watuka Dairy FCS Ltd
- Waraza Dairy
- Mweiga Dairy FCS Ltd
- Orient Snow Dairy Union
- Nairutia Dairy FCS Ltd

There are inactive livestock co-operatives in the County like:

- Kidagata Dairy Goat FCS
- Thuruthuru Dairy FCS Ltd
- Chinga Dairy CS
- Greenland Dairy Processor Union
- Royal Alliance Sacco
- Thegu Dairy CS
- Nyeri County Quail CS
- Nyeri County Milk CS
- Nyeri County Fish Farmers
- Nyeri County Rabbit CS
- County Bananas CS
- Aqua Agribusiness CS
- New United Dairies CS
- Ihwagi Dairy FCS

10.1.3.4 Value Addition

The County government is promoting value chains in fish, honey, dairy, red and white meat, hides and skins. Value addition is done through economic stimulus programmes. Farmers in the region engage in value addition activities on milk through cooperatives that make yogurt and cheese.

Existing and potential value addition opportunities include:

- Dairy processing plants for goat milk
- Beekeeping (Honey)
- Tannery – There are skin bandas across the County but there is no value addition done to the skin and hides from different animals.
- Livestock Auctions- There are only 3 livestock auction markets across the County. There is need to promote auction yards for the sale of livestock and especially in Kieni East and Kieni West where livestock rearing is predominant.

10.1.3.5 Disease prevalence

A number of diseases plague livestock within the County. Disease prevalence is mainly influenced by vegetation, ecology, changes in climate, and other factors. Livestock diseases in the County include: helminthioisis, wound management, mastitis, pneumonia, lumpy skin disease (LSD), Tick borne diseases e.g East Coast Fever (ECF), worm infestation, foot rot, docking, iron injection (pigs) and coccidiosis (poultry). The identified disease prevention and treatment mechanisms are; annual vaccination, dipping, regular deworming, clinical services by veterinary staff, creating awareness on the impact of climatic changes and training on animwal husbandry.

10.1.3.6 Beekeeping

Beekeeping in the County is mainly done in the drier areas of Kieni East and Kieni West sub-counties due to the favorable climatic conditions in these areas. The department of livestock plans to increase productivity in honey among other commodities through educating farmers on modern beekeeping methods, harvesting and processing techniques.

The types of beehives mostly used within the County include; Log hive and KTBH.

Figure 47: Dairy Farming Value Chain

TYPE OF BEE HIVE	ADVANTAGES	DISADVANTAGES
Log bee hive- (Mostly used by traditional farmers)	• It is cheap to make • Can harvest both honey and wax	• Requires cutting down of trees during its construction and harvesting of honey through charcoal burning • The quality of honey is not the best
Kenya top bar bee hive- (second popularly used bee hive)	• Does not require charcoal/firewood burning during honey harvesting • Better quality honey than log bee hive	• Expensive to construct • Bees not comfortable due to heat
Lang troth bee hive	• Best quality honey • Has high honey productions • It provides bigger capacity	• Cannot produce wax • It is expensive

Bee hives in the County are as per the table below

Table 51: Beehives in the County

CROP	SUB-COUNTY								
	Kieni East	Mathira East	Mathira West	Mukurwe-Ini	Kieni West	Nyeri Central	Nyeri South	Tetu	TOTAL
KTBH	295	575	415	1,220	5170	168	-	903	8,773
Langstroth	810	750	350	150	155	1,581	1,200	98	5,094
Log hives	800	150	240	1,500	1118	-	323	746	4,877
Others	160	-	-	150	-	-	-	22	332

Source: Department of Agriculture, Livestock and Fisheries, 2019

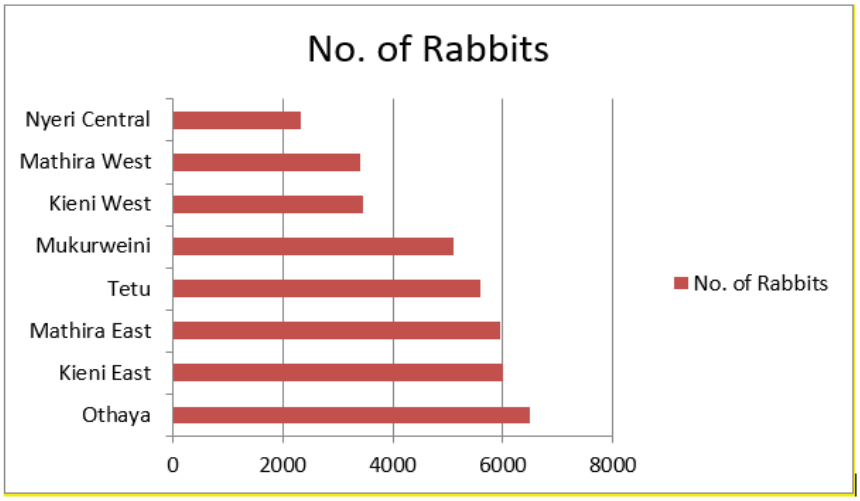
The challenges faced in bee keeping in the County include:

- High prices of equipment and accessories
- Lack of skills and knowledge on how to improve the quality.
- Limited value addition opportunities meaning most of the products are sold raw
- Drought and climate change affect bee keeping
- Highly disorganized market where marketing is on an individual basis
- Agricultural chemicals killing bees in the highlands

10.1.3.7 Rabbit Keeping

Rabbit keeping in the County is done across the county due to the minimal requirements for rabbit keeping and the availability of natural rabbit feed across the county. The department of livestock plans to increase productivity in rabbit meat and harvesting of rabbit waste as fertiliser among other commodities through educating farmers on modern rabbit keeping methods and breeding techniques.

Figure 48: Rabbit Figures in Nyeri County



Source: Department of Agriculture, Livestock and Fisheries, 2019

In 2014, Nyeri County, Nyeri County, the rabbit farmers, the Kenya Agricultural Productivity and Agribusiness Project launched a rabbit breeding and processing plant in Giathenge, Othaya Sub-county.

The challenges faced in rabbit keeping in the County include:

- High prices of equipment and accessories
- Inadequate research and data on rabbit keeping
- Lack of skills and knowledge on how to improve the quality.
- Highly unorganized market where marketing is on an individual basis

10.1.3.7 Fish Farming

Fishing activities within the County happen in both fish ponds and some dams. The fisheries sector has continued to make major contributions to the County's economy. The major challenge that has impacted the sector was the dry period experienced during the month of August and September 2018, which led to drying of fish ponds and seasonal rivers and lowering of water levels in dams which act as natural habitats for fish causing fish death.

Aquaculture is still gaining popularity in the County. The introduction of various fish farming technologies and systems has positively contributed to increased fish production as some of the systems has uplifted the low and slow fish growth experienced in fish ponds. However due to the diminishing fish stock in capture fisheries, it is evident that in order to bridge the gap of high fish demand with low fish supply, there is need to have aquaculture supplies that would be used to produce fish intensively for a shorter period in order to meet the growing demand of fish.

There are several ecological zones in the County which favour the growth of different fish species ranging from warm water fish to cold water fish. As a result, numerous fisheries resources are present in the County including, rivers, fish ponds, streams springs, dams and water pans.

Continuous restocking and monitoring of the resources can increase fish productivity in the County. All tilapia and catfish fingerlings are sourced from outside the County as currently there is no authenticated fish farm for tilapia and catfish fingerlings production in Nyeri County. Trout fish fingerlings are produced at Kiganjo trout farm, which is within the County.

Tilapia and catfish fingerlings are mainly procured from the neighboring counties at a cost of Ksh. 10 to Ksh. 15 depending on size of the fingerling. Trout and ornamental fish fingerlings are readily available within the County.

The challenges faced in fish farming in the County include;

- Poor acceptance by the community of fishing as a viable economic activity
- Lack of skills and knowledge on how to undertake fish farming
- Expensive to establish a fish pond and poor soil retention conditions
- Inadequate technical personnel within the County (one technical staff per Sub County)
- Poor adoption of fish husbandry technology by farmers
- Unregulated fishing in dams and rivers, lack of adequate field operational tools such as fishing gears and water analytical kits
- Low level of investment in the fisheries sector

Table 52: Fish Pond Statistics by Sub-County

ITEM	Kieni East	Kieni West	Nyeri Centralw	Tetu	Othaya	Mukurweini	Mathira East	Mathira West	Total
Number of Farmers	107	241	233	217	141	208	173	266	1586
Total No of ponds	144	274	273	256	183	251	206	306	1893
Total area. of Ponds in M^2	43,200	82,200	81,900	76,800	54,900	75,300	61,800	91,800	567,900
No. of current stocked ponds	117	249	246	233	159	216	180	279	1679
Area of stocked ponds in M^2	35,100	74,700	73,800	69,900	47,700	64,800	54,000	83,700	503,700
No. of Un stocked ponds	27	25	27	23	24	35	26	27	214
No of Dams	13	4	3	3	2	1	3	2	31
Dam acreage M^2	94	25	3	2	15	4	3	4	150

Table 53: Status of Dam Fisheries

Sub County	Name of The Dam	Area in Acres	Species Stocked	Management	Status
Tetu	Kirurumi	¾	Tilapia and catfish	Self-help group	Stocked
	Wandumbi	½	Tilapia	Self-help group	Stocked
	Karangia	½	Not stocked	Self-help group	Not stocked
Othaya	Chinga	13	Tilapia	Chinga dam Self-help group	Stocked
	Thuti	2	Not stocked	Self-help group	Not stocked
Mathira east	Kahigaini	2	Not stocked	Self-help group	Not stocked
	Kiamaina	1	Tilapia	Self-help group	Stocked
Mathira west	Hohwe	1 ½	Tilapia	Self-help group	Stocked
	Ruthagati	1	Not stocked	Self-help group	Not stocked
	Njima	1	Tilapia	Self-help group	Not stocked
	Ngorano	¼	Not stocked	No management group	Not stocked
Mukurweini	Kagunyu	¼	Tilapia	Self-help group	Stocked
	Ichamara	½	Not stocked	Self-help group	Not stocked
	Gakindu	3	Tilapia	Self-help group	Stocked
Kieni west	Njengu	8	Black bass and tilapia	Self-help group	Stocked
	Samaki	10	Tilapia	Self-help group	Stocked
	Birisha	5	Not stocked	Self-help group	Not stocked
	Ngarengiro water pan	2	Not stocked	No management group	Not stocked
	Kinyari	3	Not stocked	Self-help group	Not stocked
	Muthuini	1	Tilapia	No management group	Stocked
	Twin	1	Not stocked	Self-help group	Not stocked
	Tena	5	Tilapia	Self-help group	Stocked
	Kiria	2	Not stocked	No management group	Not stocked
Kieni east	Gatuamba I	1.6	Not stocked	Self-help group	Not stocked
	Gatuamba 2	3	Tilapia	Self-help group	Stocked
	Aguthi	3.5	Not stocked	Self-help group	Not stocked
	Narumoru	6	Not stocked	Self-help group	Not stocked
	Lusoi	13	Tilapia and catfish	Self-help group	Stocked

Nyeri central	Ithenguri	6	Tilapia and catfish	Self-help group	Stocked
	Gathathini	9	Not stocked	Self-help group	Stocked
	Kiboya	27	Not stocked	Self-help group	Not stocked
	Guara	17	Not stocked	Self-help group	Not stocked
	Gatuanyaga	10	Not stocked	Self-help group	Not stocked

Source: Department of Agriculture, Livestock and Fisheries, 2019

10.1.3.8 Climate change impacts on livestock production.

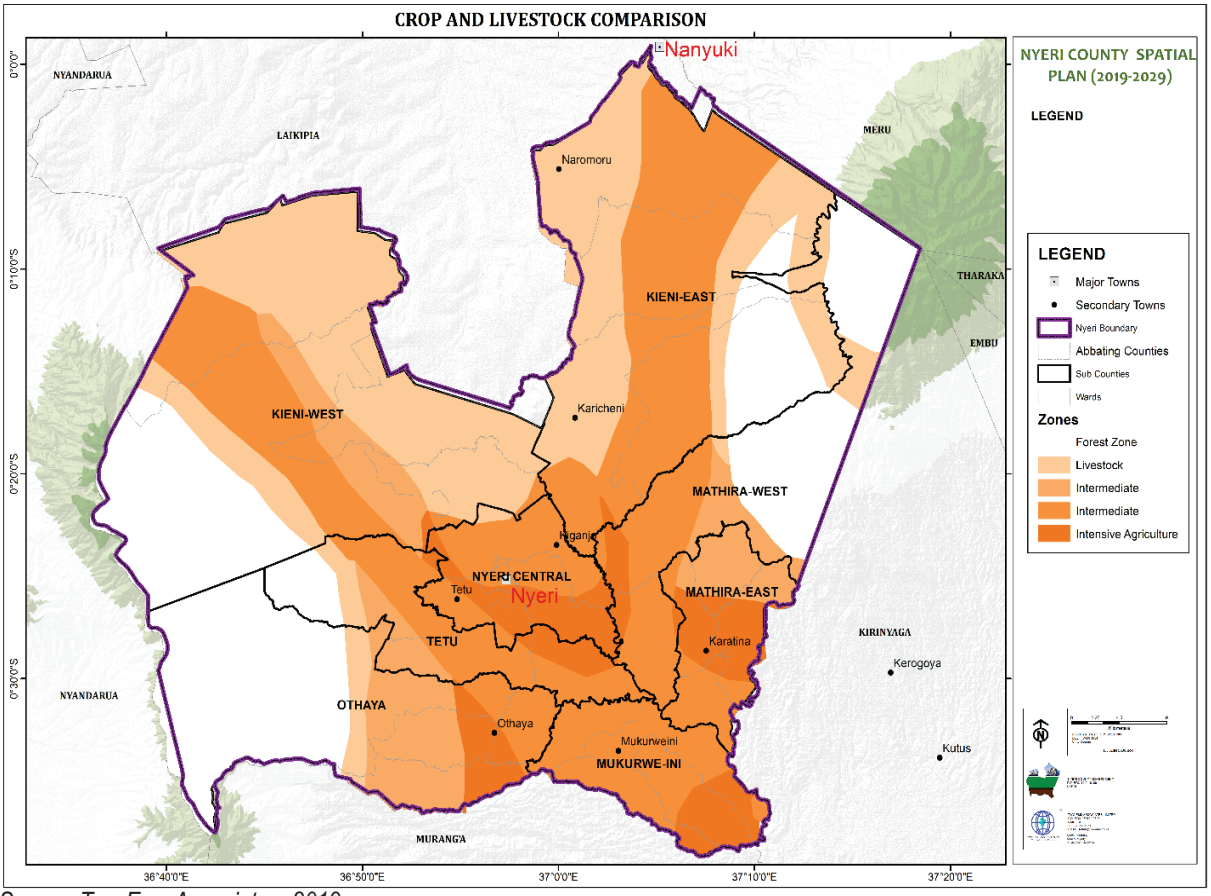
Rainfall contributes a major resource, water, which is a paramount factor for livestock sustenance of life. Water allows pasture growth and is used for drinking. Climate change is expected to have the following effects on livestock:

- Reduced grassland and range land productivity results into less feed for the animals.
- Heat distress suffered by animals will reduce the rate of animal feed intake and result in poor growth performance.
- The most evident climate change effect is the reduced rain levels leading to longer dry periods.
- Inadequate water and increased frequency of drought in certain areas, will lead to a loss of resources, existing food insecurity and conflict over scarce resources such as pastures and water.
- Temperature and humidity variations could have a significant effect on ecto- and endo-parasite infections.

10.1.4 Comparing Crop and Livestock Agriculture

In Nyeri County, Crop agriculture is more predominant in the south while livestock agriculture is predominant in the Kieni East and West sub-counties. The Kieni sub-counties have much more land that is favourable for livestock keeping. Mathira East, Mathira West, Mukurwe-ini, Tetu, and Othaya counties have large tea and coffee plantations with aspects of dairy farming. Nyeri Central is largely commercial thought eh peripheral areas have crop farming.

Map 122: Comparing Crop and Livestock Agriculture



Source: Two Ems Associates, 2019

10.1.5 Gender Related Issues in Agriculture

Gender inequalities and concerns transcend different areas of the agricultural sector, including institutions, programs and households. Nyeri County has tried to include women in the agricultural sector to promote equality in the sector. In the various capacity building meetings held by the department of agriculture, livestock and fisheries, the number of women attending the forums in some areas surpasses that of men. This is an indication that women are involved in the agricultural sector.

Table 54: Gender Participation in Agricultural Forums

FORUM	SUB-COUNTY															
	Mathira East		Mathira West		Muku-rweini		Nyeri South		Tetu		Nyeri Central		Kieni East		Kieni West	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Farm Demonstration	258	375	153	627	68	59	126	184	426	559	282	379	450	700	327	360
Agricultural Barazas	710	412	-	-	-	-	-	-	2200	1529	1038	1014	5400	1289	-	-
Farm Visits	764	952	1387	493	220	150	220	540	343	188	420	438	1800	1400	482	311

Source: Department of Agriculture, Livestock and Fisheries, 2019

10.2 Mining

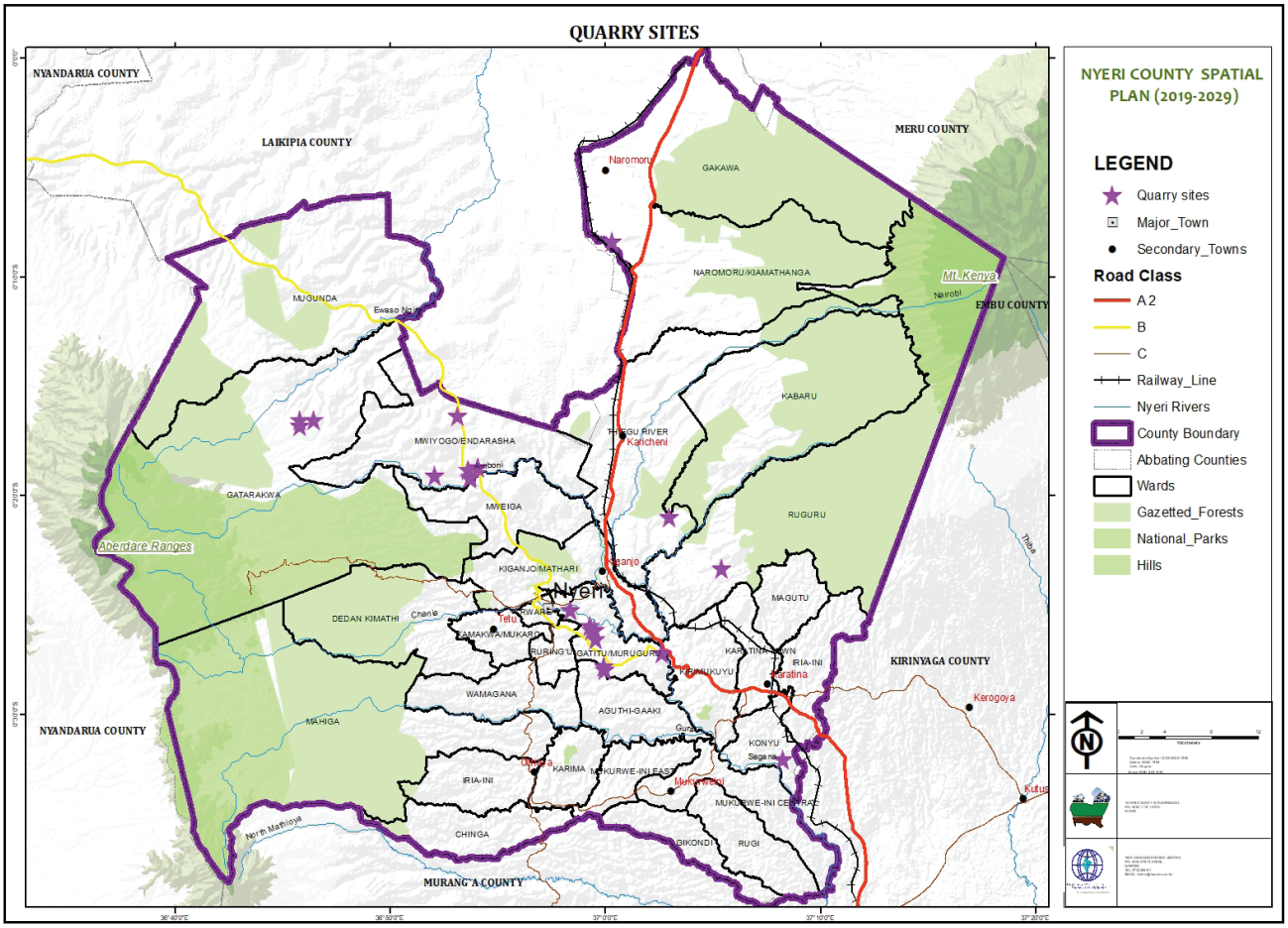
The main mining activities are clay,sand,aggregate,gravel and natural building stones mining in Mukurwe-ini,Nyeri Town,Kieni East,Kieni West and Mathira West Sub Counties.Gravel is the highest with 2.3 million tonnes mined per year and employing about 1,431 persons.Clay mining is the lowest at 2555 tonnes employing 756 people.

Table 55:Quarry sites

Name	Ward	Mineral	Status
Quarry	Gataragwa	Murram	Active
Quarry	Gataragwa	Construction Stone	Active
Murram and Stone Harvesting area	Gataragwa	Construction Stone	Active
Quarry Kirigo	Konyu	Construction Stone	Active
Kangemi Quarry	Rware	Construction Stone	Active
Ballast Quarry	Gakawa	Ballast	Active
Ballast Quarry	Kaburu	Ballast	Active
Ballast Quarry	Endarasha Mwiyogo	Ballast	Active
Ballast Quarry	Endarasha Mwiyogo	Ballast	Active
Ballast Quarry	Endarasha Mwiyogo	Ballast	Active
Quarry	Endarasha Mwiyogo	Construction Stone	Active
Murram Quarry	Endarasha Mwiyogo	Murram	Active
Ballast Quarry	Endarasha Mwiyogo	Ballast	Active
Centurion Ballast	Gatitu	Ballast	Active
Nyeri Concrete	Gatitu	Ballast	Active
Kahuti	Gatitu	Construction Stone	Active
Chania Quarry	Gatitu	Construction Stone	Active
Quarry	Gatitu	Construction Stone	Active
Gaithebura	Gatitu	Construction Stone	Active
Ballast Quarry	Ruguru	Ballast	Active
Marua Quarry	Gatitu	Construction Stone	Active

Source: Two Ems Associates, 2019

Map 123: Quarry sites



Source: Two Ems Associates, 2019

10.3 Trade

Agricultural based Micro, small and medium enterprises (MSMEs) which are private sector driven contributes significantly to the trade in the County. MSMEs have the potential to spur economic growth and poverty reduction (through increased production and employment) of Nyeri County.

The private sector refers to the sector of the economy that is privately owned, either by an individual or a group of individuals. This includes micro-small, medium, and large enterprises, sole proprietors, incorporated companies, and groups. Private sector enterprises are entities that are used to mobilize available services and direct them towards the provision of the goods and services that the market demands (Information Economy Report 2011, UNCTAD).

The private sector plays a critical component in addressing development challenges such as poverty, food insecurity, climate change, and other areas:

1. Growth - Private firms and entrepreneurs invest in new ideas and new production facilities.
2. Jobs - In most counties, the private sector is a major generator of income and a major employer and creator of jobs. Over 90% of jobs in countries are within the private sector.
3. Poverty reduction and inclusive growth - According to extensive research, economic growth contributes significantly to poverty reduction and to higher living standards for the poor.
4. Service delivery - Besides directly contributing to the economic growth, poverty reduction, and job creation, the private sector also provides essential infrastructure that improves living standards.

5. Food security, climate change, and environmental sustainability - Critical public issues related to food security, climate change, and environmental sustainability also depend on the successful operations of private sector firms — such businesses produce food, generate greenhouse gas emissions, and affect the environment. For example, meeting the food challenge highly depends on improving the operations and productivity of agricultural firms. Addressing climate change requires energy efficiency in businesses and utilization of low carbon power technologies. Environmental sustainability requires firms to use and supply appropriate environmental technologies.

The table below is a summary of the sub-sector in the County:

Table 56: Nyeri County Trade Fact Sheet

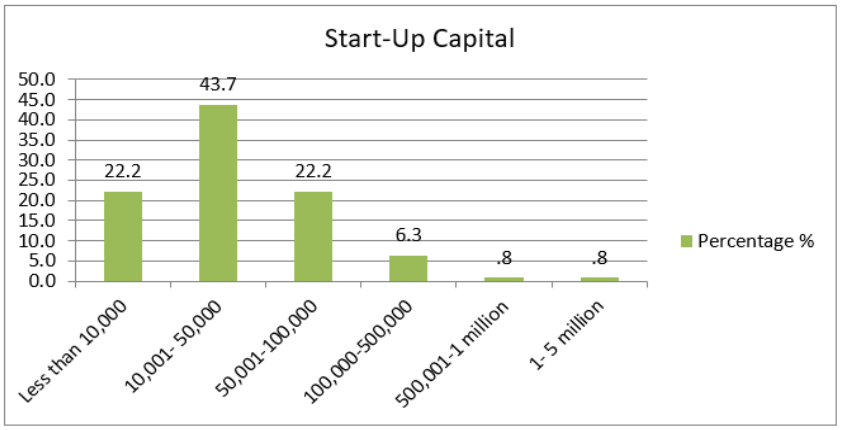
TYPE OF BUSINESS	NO. OF BUSINESSES
Supermarkets	14
Large traders	976
Medium traders	7,326
Small traders	20,687
Kiosks	708
Wholesalers	76
Hawkers	2,542
Transport companies	125
Independent transport operator	70
Petrol stations	130
Storage facilities	109
Communication companies	345
Agricultural dealers	1,624
Large hotels	730
Medium hotels	396
Small hotels	3,137
Other catering & accommodation facilities	33
Butcheries	1,042
Bars	1,402

Source: Department of Trade, Tourism and Cooperative Department, 2019

Majority of the businesses sampled had a start-up capital of less than 50,000 shillings. Based on this result, most businesses can be classified as micro or small enterprises (MSE). There are over 100,000 MSEs in the County, with only a few registered under the registrar of companies. Other MSEs are registered as self-help groups, SACCOs while others belong to non-registered merry-go rounds.

To grow trade in the County, pro-MSE policies should be adopted. The presence of MSEs in Nyeri presents an impetus for new policy formulation and implementation.

Figure 49: Start-Up Capital



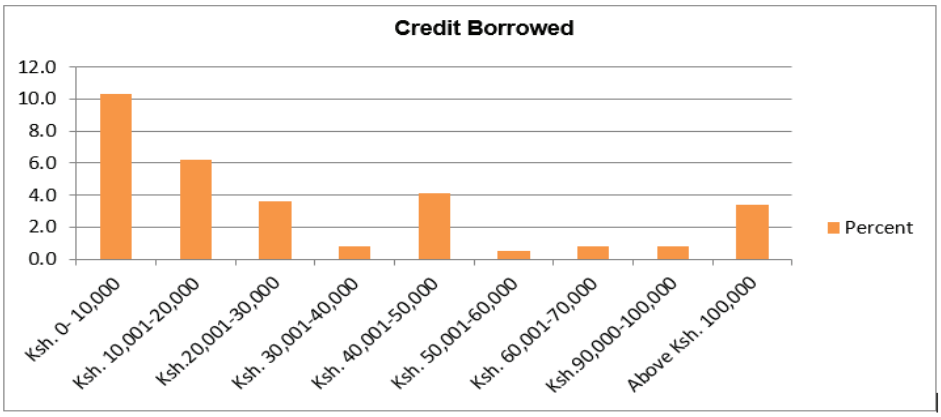
Source: Two Ems, 2019

The source of capital for the businesses ranged from savings, sale of agricultural produce, loans, and contributions from friends and relatives as well as from merry-go-rounds/chamas.

10.3.1 Access to Credit

Access to credit and financial inclusion is an important indicator in business growth and development in any region. Among the sampled population in Nyeri, only 34% have access to credit. Mahiga and Chinga wards had the highest percentage of people with access to credit at 63.6% and 72.7% respectively. The range of credit from final institutions is mainly between Ksh.10, 000 to 30,000. This access to credit has implications on the ability to start and run a successful business in the County.

Figure 50: Credit Borrowed



Source: Nyeri CIDP, 2018-2022

The County has fairly distributed financial institutions as shown below:

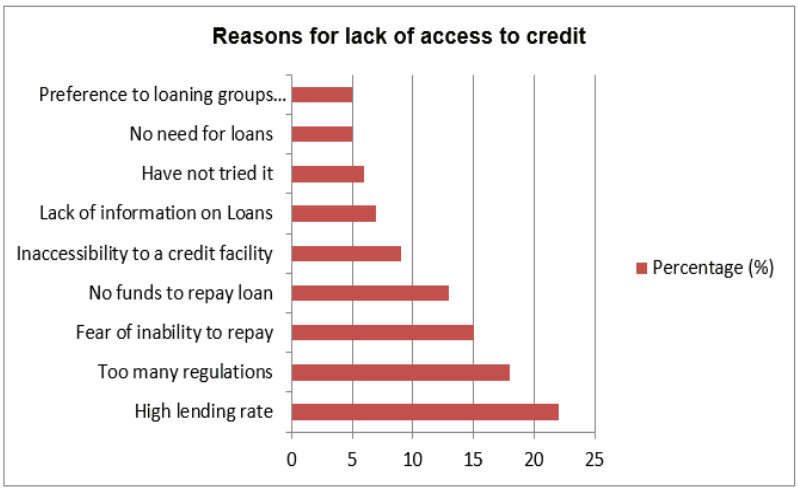
Table 57: Financial Institutions in Nyeri County

SUB-COUNTY	BANKS	SACCO (FOSA)
Nyeri Central	14	4
Mathira	7	2
Othaya	5	1
Mukurweini	2	1
Tetu	1	0
Kieni	5	0

Source: Two Ems, 2019

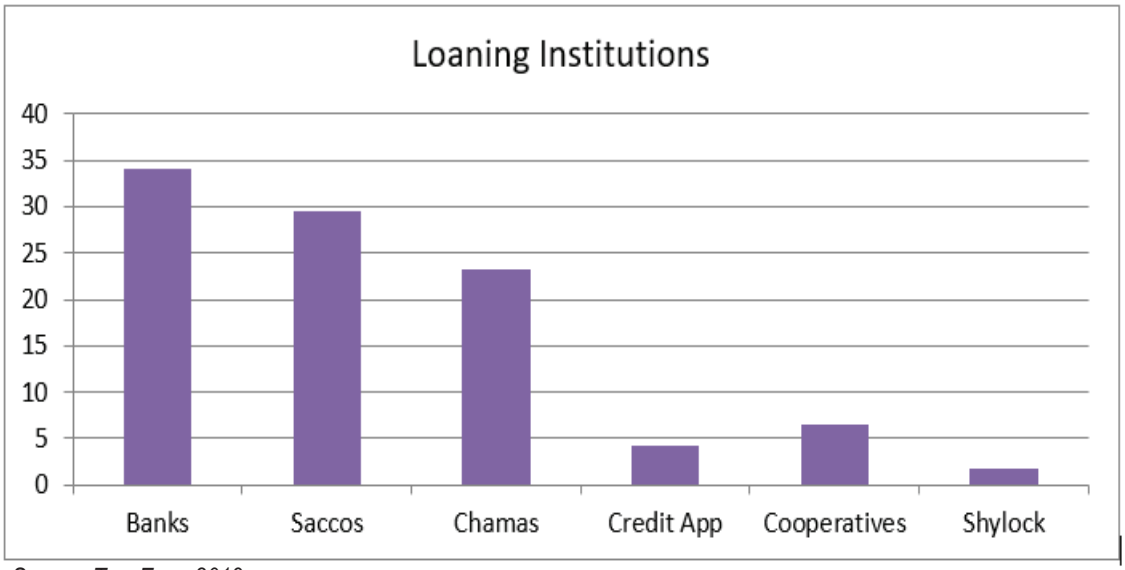
Some of the reasons preferred as to why people have no access to business credit included: inaccessibility to credit facility, lack of knowledge on existing facilities, they did not require credit, the fear of the inability to pay for the credit, among other reasons that indicate challenges that hind effective credit access.

Figure 51: Reasons for lack of access to credit



Source: Two Ems, 2019

The County Government together with the financial institutions should create awareness of accessible lending facilities to business people. The financial institutions should reduce their interest rates. Residents borrow money to start new businesses or boost existing ones, support farming activities, pay school fees, develop land and real estate, purchase land, for medical purposes and domestic uses.



Source: Two Ems, 2019

The sources of collateral given for the loans varies from shares and contributions (in chamas and SACCOS) to title deeds, using a guarantor, using a pay slip, logbooks and house equipment. The following is a table indicating the suggestions on improving access to credit among traders.

Figure 53: Proposed solutions to poor credit access

Education recommendations	Education to the locals
	Sensitization on wise investment of loan money
	Training on Sacco management
Policy Recommendations	Lower Interest rates
	Easing collateral requirements
	Design of repayment periods to match harvesting seasons
	Reduce loan application procedures
	Giving titles for use as collateral
Others	Increase number of facilities
	Formation of groups to ease access to credit
	Improving mobile network

Source: Two Ems, 2019

10.3.2 Business Environment

A majority of the people in the County who were sampled as business people felt that the business environment was conducive. Business returns on the other hand were not as good as would be desired because of lack of adequate designated space by the County for business expansion. To this end, the business owners preferred that the County government should designate space for business expansion in all trade and town centers.

They should also provide small scale business loans at a reasonable interest rate and access to social and physical infrastructure (like water, electricity, street lighting, security and market sheds) to improve the business environment.

The bulk of sampled businesses only had one license, a number had daily permits, and others had no business permit. The lack of business permits implies that there is considerable loss of income to the County which in turn impedes ability to provide services. The County has plans to establish a single permit for all business to reduce the number of permits held by business people and reduce the costs of acquiring multiple licenses.

10.3.3 Markets

Nyeri has various markets ranging from open air-markets, closed markets, roadside markets and periodic markets. Karatina Market, the biggest market in East and Central Africa is located in Nyeri County. The County has plans to develop more markets under the Economic Stimulus Programme.

Some of the ongoing market projects in the County include:

1. Chaka market has the first phase of construction consisting of 41 stalls
2. Karatina wholesale market
3. Asian Quarters which will be called the Nyeri Main Terminus. Located at the Othaya Junction is currently ongoing
4. Ruthagati market is under construction with 10 stalls

Despite having well-constructed markets, traders still prefer selling produce by the roadside which affects traffic especially in the major urban centres like Nyeri, Karatina and Othaya.

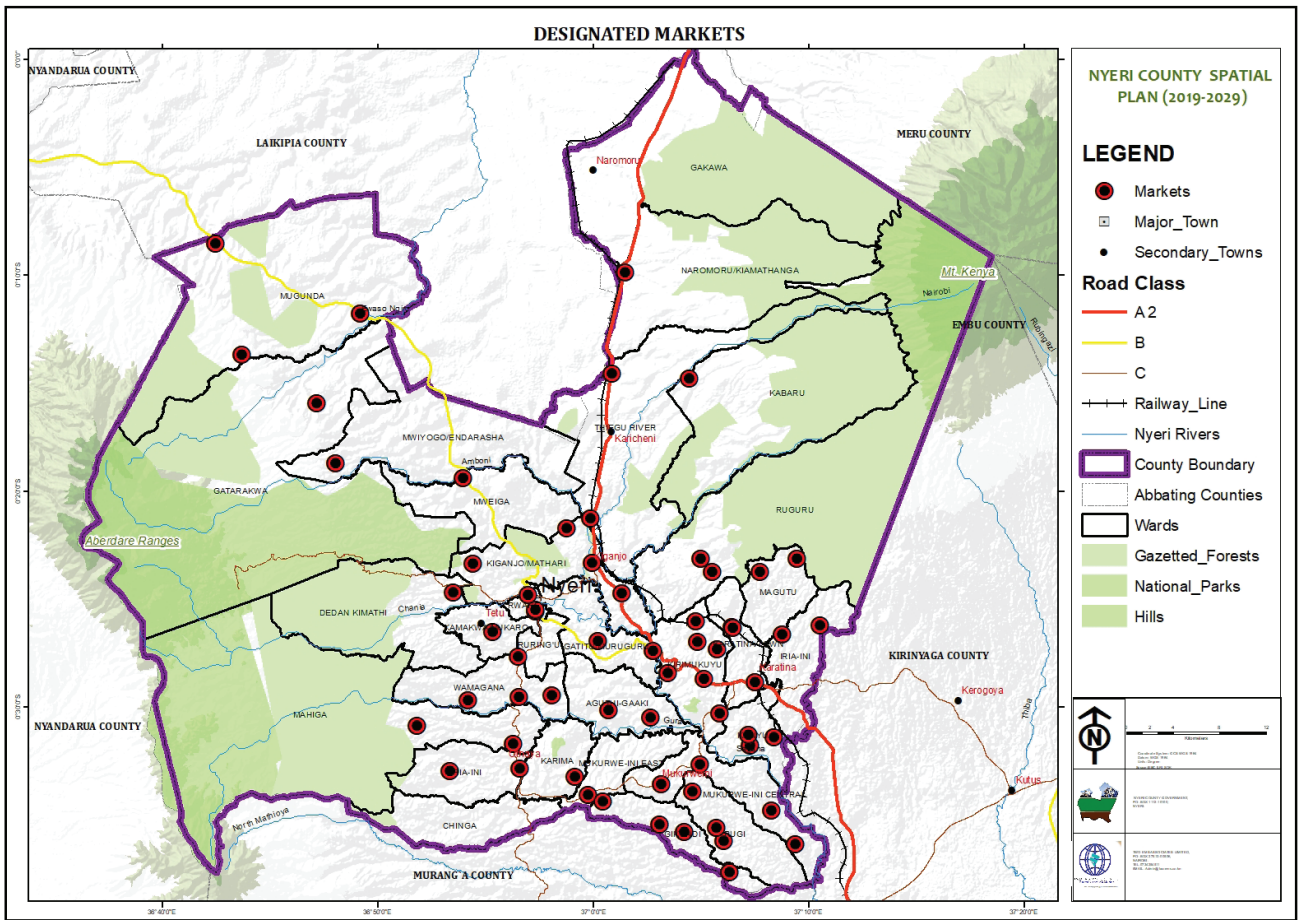
The major designated markets in the County include:

LOCATION PER SUB-COUNTY	MARKET NAME	PRODUCTION
NYERI CENTRAL		
1	Kamukunji	Second-hand clothing Items
2	Nyeri Open Air	Fresh Produce
3	Nyeri Extension	Fresh Produce
4	Kerichu	Fresh Produce
5	Soko Mjinga	Fresh Produce
6	Kamukunji	Fresh Produce
7	New.Mudavadi Enclosed Market	Fresh Produce
8	King'ong'o	Fresh Produce
9	Batian Market	Lockable Stalls Dealing With Assorted Products
10	Kamakwa	Fresh Produce
11	Nyaribo	Fresh Produce
12	Gatitu	Fresh Produce
13	Marua	Fresh Produce
14	Kiganjo	Fresh Produce
OTHAYA		
1	Othaya Wakulima	Fresh Produce
2	Othaya Market	Fresh Produce
3	Othaya Livestock Market	Livestock
4	Witima	Fresh Produce
5	Waihara	Fresh Produce
6	Kagicha	Fresh Produce
7	Ndunyu	Fresh Produce
8	Gitugi	Fresh Produce
MATHIRA EAST		
1	New Karatina Market Hub	Fresh Produce, Cereals, And Lockable Stalls Dealing With Assorted Products
2	Karatina(Marigiti)	Fresh Produce
3	Kiawarigi	Fresh Produce
4	Kiamabara	Fresh Produce
5	Mung'ëtho	Fresh Produce
6	Ihwagi	Fresh Produce
7	Gitunduti	Fresh Produce
8	Karindundu Livestock Market	Fresh Produce
9	Mtumba Stand	Second Hand Clothes
10	Kiaruhiu	Fresh Produce
KIENI EAST		
1	Narumoru	Fresh Produce
2	Chaka	Fresh Produce

3	Munyu	Fresh Produce
4	Kimahuri	Fresh Produce
5	Narumoru Textile	Textiles
KIENI WEST		
1	Mweiga	Fresh Produce
2	Nairutia	Fresh Produce
3	Kiawara	Fresh Produce
4	Endarasha	Fresh Produce
5	Belleview	Fresh Produce
6	Gitegi	Fresh Produce
MUKURWEINI		
1	Kiahungu	Fresh Produce
2	Ichamara	Fresh Produce
3	Kiharo	Fresh Produce
4	Thangathi	Fresh Produce
5	Mihuti	Fresh Produce
6	Kaharo	Fresh Produce
7	Gakindu	Fresh Produce
8	Mweru	Fresh Produce
9	Thaara/Kabuta	Fresh Produce
10	Kiuu	Fresh Produce
11	Muthuthi-Ini	Fresh Produce
12	Wangora	Fresh Produce
13	Karindi	Fresh Produce
14	Karaba	Fresh Produce
15	Gakindu Livestock	Livwstock
TETU		
1	Kiandu	Fresh Produce
2	Ihururu	Fresh Produce
3	Gachatha	Fresh Produce
4	Giakanja	Fresh Produce
5	Ithekahuno	Fresh Produce
6	Mukarara/Wamagana	Fresh Produce
7	Muthinga	Fresh Produce

Source: Two Ems Associates, 2019

Map 124: Markets in Nyeri County



Source: Two Ems Associates, 2019

Most of the markets in the County were constructed during both the County and Municipal Council era. Under the devolved County government era, the County has constructed the following stalls in the markets across the county:

- 299 stalls in Karatina market
- 87 stalls in Mweiga market
- 50 stalls in Gatitu market
- 30 stalls in Gachatha market
- 25 stalls in Karogoto market
- 15 stalls in Kinuga market
- 8 stall in Giagatika market
- 5 stall in Waihara market

10.4 Industry

Most of the industries in Nyeri County are agro-based. However, there are industries that are based on innovation especially in recycling of various materials into new products.

The major industries in the County are flour milling, soft drink processing, tea and coffee processing and milk processing.

Drivers of industrialization in the County include:

1. Availability of raw materials - Majority of the industries can benefit from the local presence of rich agricultural produce from milk produce, coffee, tea and macadamia farms.
2. Existing infrastructure - The laid-down infrastructure (in terms of road networks, water systems, and housing) attracts industrial activities to the area.
3. Availability of regional markets – neighboring counties like Laikipia relies on agricultural produce from Nyeri especially milk.
4. Availability of cheap labour

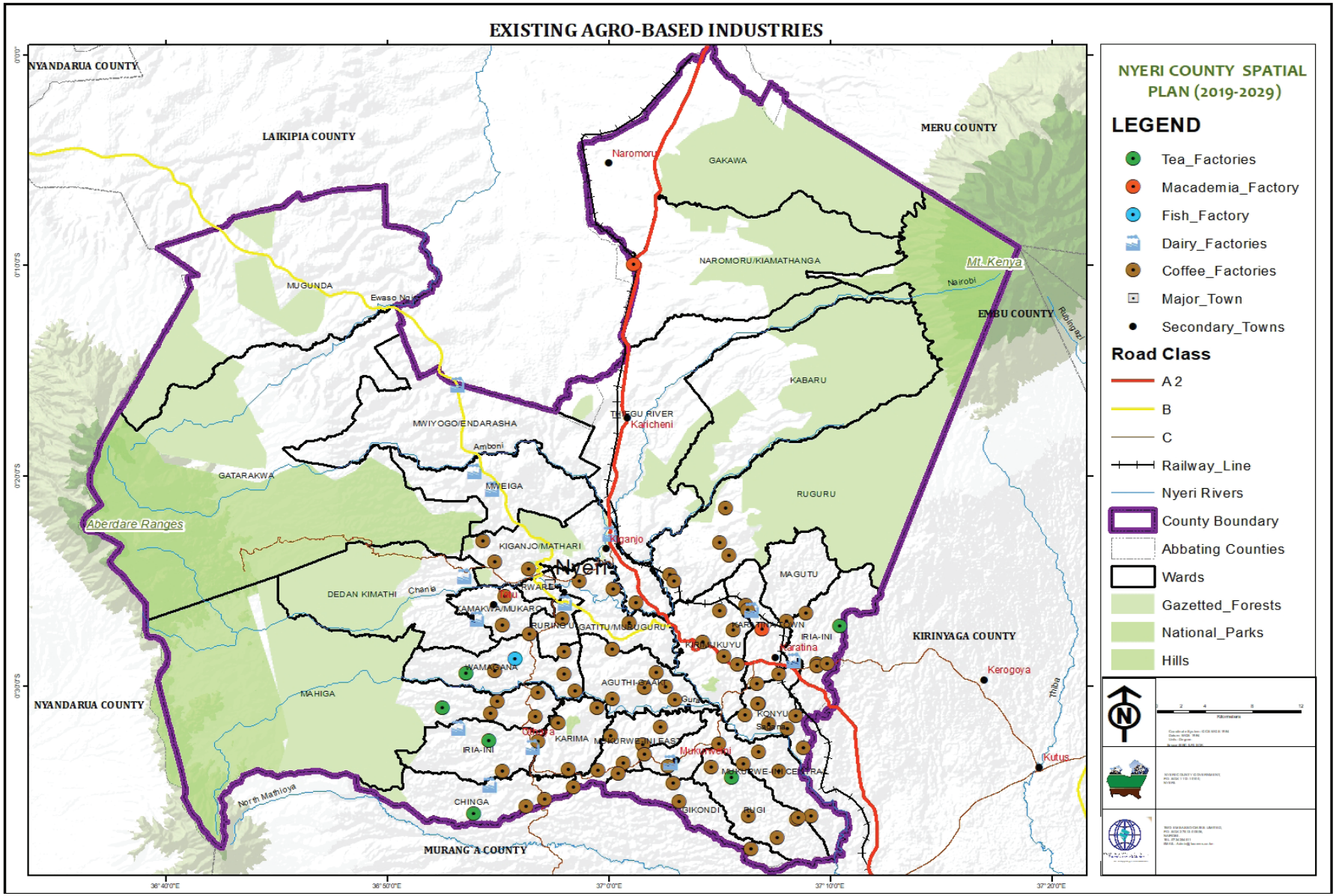
The County potential for industrialization is yet to be fully exploited, which would enhance product maximization. The value chains for tea, macadamia and coffee are not fully exploited in the County. There is need for the County to promote industrialization by capacity building individuals or organizations in various industries, facilitating them with the necessary licenses and providing financial support.

Table 58: Industries in Nyeri County

SUB-COUNTY	INDUSTRIES
Nyeri Central	• Highlands • Coca-cola • Maisha Millers • New KCC • Centurion Ballast • Alfastar (innovation based industry) • Organic Fertiliser makers • Anchor Millers
Tetu	• Ihururu Dairies • Shama Dairies • Gathuthi Tea Factory • Trout Fishing
Othaya	• Othaya Coffee Millers • Chinga Tea Factory • Iriaini Tea Factory • Gitugi Tea Factory
Kieni West	• Canola Oils • Tamarillo Industry
Kieni East	• Ngwa bicycle parts fabricators • Vegetable dehydration
Mukurweini	• Royal Milk Factory • Ceramics making
Mathira East	• Ragati Tea Factory • Salama Millers – Animal feeds
Mathira West	• The Village Nut – Macadamia • Central Millers - Coffee

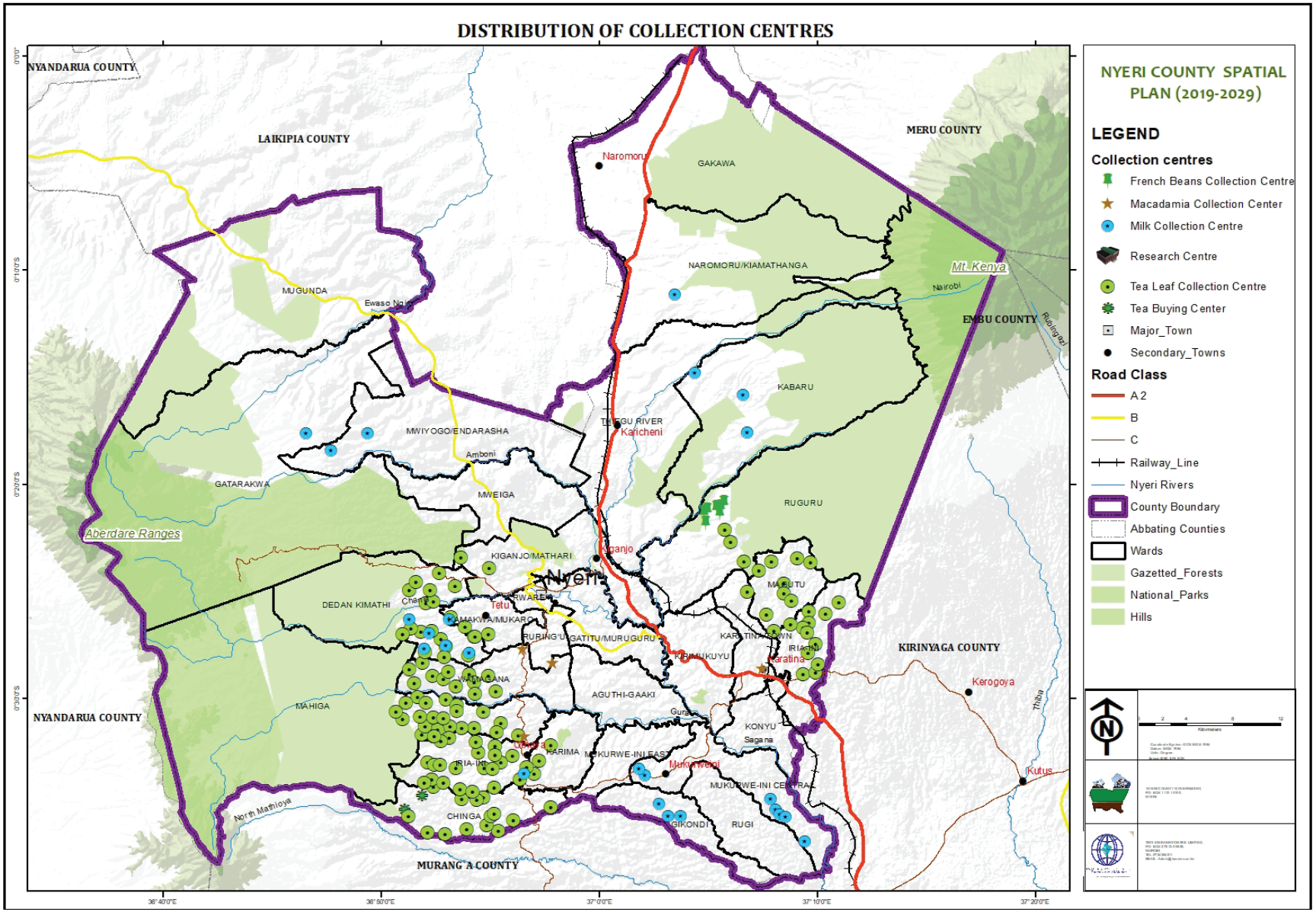
Source: Two Ems Associates, 2019

Map 125: Agro-Industries in Nyeri County



Source: Two Ems, 2019

Map 126: Collection Centres in Nyeri County



Source: Two Ems, 2019

Industrial Profile of the County

Nyeri Central: New KCC

Products: Fresh milk

Value Addition: Packaging milk, production of powdered milk (Safari land) and processing cream for butter production.

Plant Holding Capacity: 300,000 litres of milk but receives 60,000-80,000 litres daily

Catchment Area: Gets milk from cooperatives from Laikipia, Kirinyaga and Nyeri

Employees: 2/3 of the employees are male while 1/3 are female due to the manual nature of the tasks at the plant

Initiatives: Extension services to farmers, training school at Mawingu and supports farmer benchmarking

Source: Field survey, 2019

Mathira East: Ragati Tea Factory

Products: Tea

Value Addition: Process tea leaves

Catchment Area: The factory gets produce from 49 tea leaf collection centres around the area like Gitunduti, Giakaibei, Ihwagi, Muthuthiini, Kariki, Ndumanu, Itiaiti, Kiunjugi among others

Employees: As of December 2018, the plant had 128 employees. Of the employees, 84 were men and 44 were women. The high number of men is because of the bulky lifting associated with the industry.

Initiatives: Extension services to tea farmers, crop husbandry programmes for the neighbouring farmers, branding Ragati tea for marketing and offering scholarships to the neighbourhood.

Source: Field survey, 2019

Mathira West: Village Nut Company (Macadamia)

Products: Macadamia

Value Addition: The only value addition is drying the macadamia nuts.

Plant Holding Capacity: 2,000 metric tonnes annually but receives an average of 1,200 metric tonnes annually.

Catchment Area: Gets macadamia from farmers in Embu, Kirinyaga, Murang'a and Nyeri

Employees: Off the casual labourer employed during the work season, 60% are women. This is because a lot of sorting is involved in the plant which favours women.

Initiatives: Grafting macadamia trees for high quality produce, participating in farmer training dayas, donating tree seedlings within the community, and starting macadamia tree nurseries with education institutions like Dedan Kimathi University and Karatina University.

Source: Field survey, 2019

Kieni West: Canola Oils

Products: Vegetable oils (pumpkin, flaxseed, pumpkin, peanut, chia-seed), Powders, and creams (Arthritis salve)
Value Addition: Pressing various seeds for their oil or powder.
Plant Holding Capacity: Production of canola oils requires around 20 tonnes of canola seeds monthly. Other oils require 300kgs of the various seeds monthly.
Catchment Area: The raw materials are sourced from Nyeri, Laikipia, Meru, Kirinyaga, Narok, the larger Rift Valley and Ukambani regions.
Employees: 6 employees who are all women.
Initiatives: Civic education on the health benefits of using vegetable oils, and acquiring land to grow various vegetables for the raw materials.

Source: Field survey, 2019

Nyeri Central: Alfastar Industries (Recycling and Research)

Products: briquettes from waste, briquette making machines, fencing pole machines and a distiller to get diesel from plastic waste
Value Addition: turning waste into usable materials.
Catchment Area: The raw materials which are generally plastic waste are locally sourced.
Employees: 2 employees who are all men.
Initiatives: Compressing plastic waste and glass to make construction bricks, training individuals and groups on briquette making and biomass production and is in the process of persuading the County to fill potholes with plastic mould.

Mukurweini: Royal Milk Factory/Mukurweini Wakulima Dairy

Products: Milk, Yoghurt
Value Addition: Packing milk, pasteurization of milk and yoghurt making
Plant Holding Capacity: The plant received 954,812 of milk in Jan 2019. Of this, 98,883lts went to making yoghurt
Catchment Area: Nyeri and Murang'a Counties
Employees: The factory has around 300 employees, 70% of whom are men due to the nature of the work in the factory.
Initiatives: Teaching farmers on best dairy practices to increase milk production and offering loans through their Wakulima Sacco to the farmers.

Kieni East: Ngwe Bicycle Fabricators

Products: Improved carts
Value Addition: Uses scrap metal to make improved carts that are easy to use and carry more load than normal carts. Uses old bicycle wheels to the carts to easy their use.
Catchment Area: Gets the scrap metal locally and sells the end product in Nyeri, Narok and Tanzania
Employees: 3 employees, all men
Initiatives: Creating an alliance of all small scale innovators in the sub-County to lobby for better initiatives for the industry in the County.

Source: Field survey, 2019

Nyeri South: Othaya Coffee Millers

Products: Coffee
Value Addition: Turn coffee berries to coffee powder.
Plant Holding Capacity: The plant received 2.2million kgs of red berries in 2018 and 2.4million kgs in 2017.
Catchment Area: The factory gets the coffee from the County farmers.
Employees: the factory has 100 employees, 70 of whom are men and 30 are women.
Initiatives: The factory in collaboration with World Bank have a coffee nursery to produce seedlings for the farmers and training of their employees annually.

Tetu: Ihururu Dairy Farmers Cooperative Society Limited

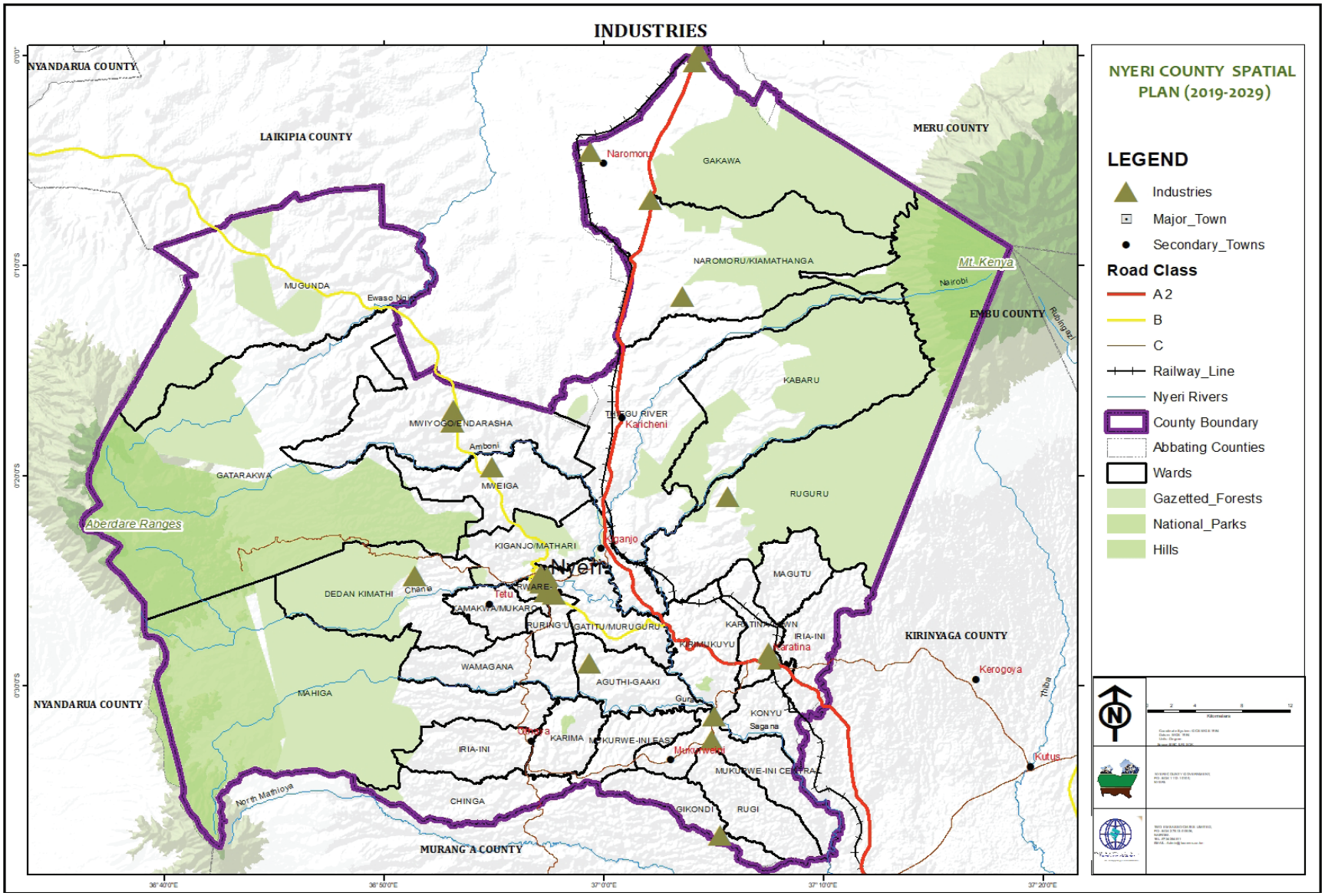
Products: Milk
Value Addition: There isn't any value addition, just cooling the milk and selling it.
Plant Holding Capacity: The plant receives about 3500lts of milk daily
Catchment Area: Tetu Sub-County
Employees: The factory has 26employees, 17 of whom are men due to the nature of the work.
Initiatives: Offering training days, A.I and clinical services to the farmers and plans are underway to set up an agrovet to give quality feeds to the farmers on credit.

10.4.1 Industrial parks

The County has one Industrial park at Karatina and 6 constituencies industrial development centres at Gakindu, Kiawaithanji, Kariko, Othaya, Endarasha and Karatina Kenya Industrial Estate [KIE] site. There are plans to develop Karatina light industries and 2 juakali sites in Mihuti and Mweiga.

Nyeri County has two areas under the Kenya Industrial Estates: one in Nyeri Town near the Majengo slum and the other in Naromoru. Most jua-kali activities occur on the roadside in the major urban areas like Othaya, Narumoru, Nyeri and Karatina. Additionally, there are numerous boda-boda sheds across the County towns and trading centres.

Map 127:Industrial parks



Source: Two Ems Associates, 2019

10.4.2 Lumbering Industry

Nyeri County has 1145 Ha of forest land currently under the PELIS Scheme (Plantation Establishment and Livelihood Improvement Scheme). This is a programme that allows people to plant crops and trees as well as harvest the tree in forests as part of a collaboration between KFS & the County in terms of tree planting activities. Already 341Ha of forests and 208 Ha of natural forests have been planted.

Through this program, the community is involved in the management of forests and some forest associations have been registered by the County and approved by the Kenya Forestry Service. Some of these associations include:

- Mt. Kenya West Nanyuki Forest Association
- Mt. Kenya West Gathiuru Forest Association
- Naromoru Forest Association
- Kabaru Forest Community Forest Association
- Hombe Integrated Community Forest Association
- Ragati Community Forest Association
- Chehe Forest Association

Several economic activities are done using forestry resources. These include:

1. Timber production- This is done both in individual forests and state forests. In state forests, the community members are supposed to acquire pre qualified licenses for timber extraction. The timber milling industries created have provided employment opportunities for locals. Under the Community Forest Associations, there is a felling plan, which states guidelines and the level of utilization of the forests. The plan is in tandem with the forest management plan, which highlights the level of forest development by defining zoning of land uses in forest land.
2. Eco-tourism sites, wildlife is managed in specified areas to avoid human-wildlife conflicts. The community members are encouraged to initiate and protect the ecological sites as a source of livelihood. Tourists rent out the camping sites for safaris and game viewing. However, to improve eco-tourism sites in the County infrastructure improvement and development is necessary.
3. Medicinal plants- The community members sell herbal medicine locally. However, there is need for promotion initiatives and value addition industries.
4. Plantation and livelihood development programme through the Community Forest Associations which allocates the community members land to cultivate food crops to help towards food security

The key challenges in the lumbering industry include:

- Influx of livestock from pastoralist communities, especially during drought seasons.
- Unfavourable court rulings on forestry related cases.
- Political/NGO interference.
- Conflicting objective of Acts of multi-implementing agencies.
- Lack of a clear cost/benefit sharing mechanism between KFS and other stakeholders in forest management.
- Lack of capacity within the County governments. (No technical staff)

When the trees are cut from the timber plantations, they are taken to the saw milling industry and converted into fine timber, off cuts and firewood for use by community members. They are not able to convert the trees into prime wood because of high cost to purchase machinery for that purpose. The licenses required to start the business are two; one for business permit and the other one from the Kenya Forest Service.

Challenges in Industry Promotion

The main challenges faced by the industries in the County are;

- Under-developed infrastructure - The necessary infrastructure such as electricity, roads, sewer system to effectively operate an industry is inadequately provided for. This means that the cost of operating an industry becomes expensive limiting investment in industries.
- Inadequate capital - Some of the industries in the County have stalled due to lack of collateral to access financing
- Lack of capacity building -The people have not been exposed to the possibility and knowledge of operating an industry for value addition purposes. However, increased capacity building among producers would help curb these challenges.

10.4.3 Effect of Industries on the Environment

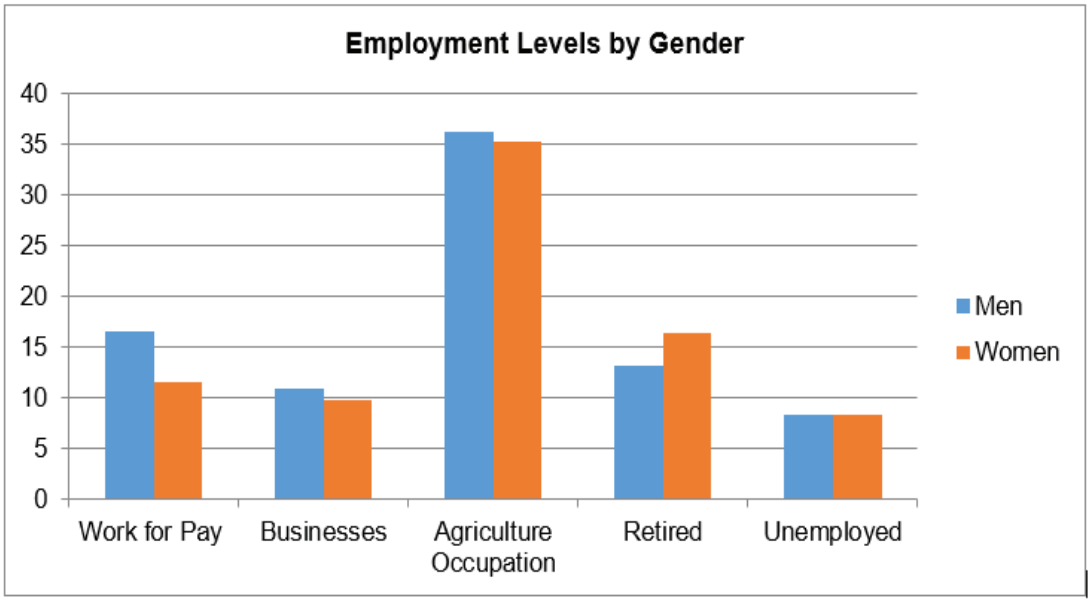
The light industries such as Jua kali sheds and commercial activities found in urban and market centres contribute largely to the pollution of the environment. The manufacturing industries such as abattoirs and slaughter houses cause foul smells to the neighbouring areas due to the lack of sustainable waste management action intervention plans.

Quarrying in the Kiganjo area leaves behind large open excavation sites that are a hazard to the environment. The empty excavation sites are not utilized which is a waste of land. The noise pollution and dust associated with quarrying discourages settlement in areas near the quarries. Logging activities in search of building and road construction materials has depleted the forest cover and turned some parts into shrub land. These activities have also affected groundwater quality via contamination by dissolved and suspended materials.

10.4.4 Gender Issues in Trade and Industry

In Kenya, the male population is engaged more in the mining and quarrying as well as construction industry more than the female population. According to the KNBS and SID findings of 2012, there are more men than women in all economic sectors.

Figure 55: Occupation by Gender



Source: KNBS & SID, 2012

10.3.5 Knowledge Industry and ICT

The main economic activities in Nyeri include farming and commerce. However, locals lack the advanced technological knowhow and training required for smart agricultural practices and business management. Entrepreneurs also require capacity building with respect to marketing. There is a great disconnect in the value chain, and awareness needs to be created if producers are to prosper going forward.

Some of the reasons why residents engage in business despite having no formal training include: Ease of entry, Inherited skills, on-the-job training, only option available, passion, gap in the business market, available capital and need for income. There is need for tertiary institutions within the County to offer training in soil analysis, animal health and entrepreneurship among others in order to fill the human resource gap.

10.4 Tourism

Nyeri County is part of the larger Central Kenya Tourism circuit. Most attractions in this circuit offer adrenaline-pumping adventures such as hikes, kayaking and mountain climbing. The central region is the ultimate destination for enthusiasts who don't mind the steep slopes of Mount Kenya. This is Kenya's high hill region, a land of mountain peaks, spectacular waterfalls and remote alpine moors that provide a unique and breathe taking African Landscape.

It is also an area of coffee and tea plantations and small farms that make up the region's thriving agricultural sector.

The Central Kenya Tourism circuit includes Mount Kenya National Park, Aberdare National Park, Meru National Park, Mwea National Reserve, Ol Donyo Sabuk National Park, dedan Kimathi Wildlife Conservancy, Ngare Ndare Forest, Thomson Falls, Fourteen Falls, Tea Farms in Limuru, and Savage Wilderness Safari for white water rafting.

10.4.1 Tourism Attraction Sites

Tourist attractions in Nyeri include:

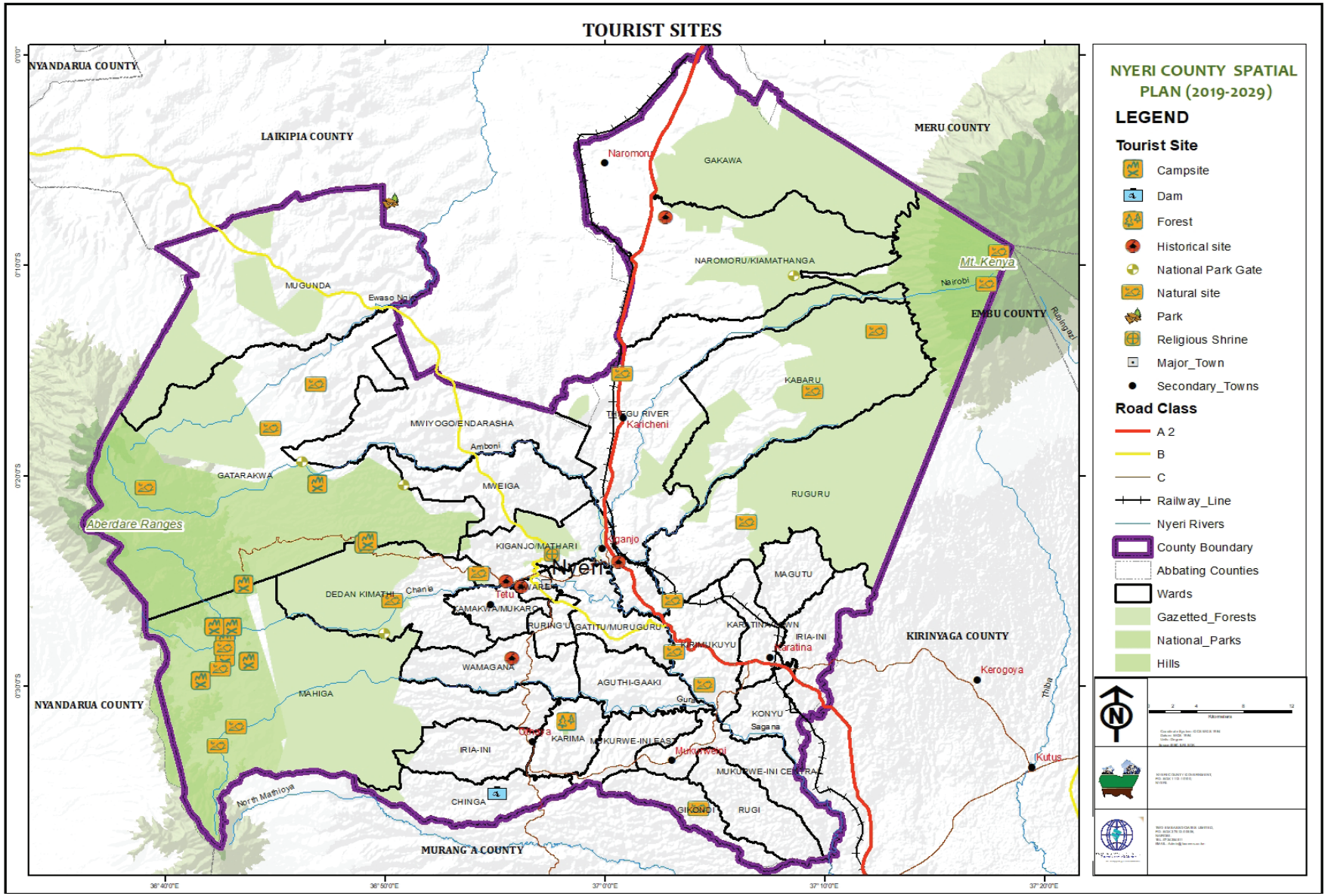
- Parks: Mt. Kenya National Park, Aberdare National Park, Rhino Watch sanctuary and Solio Ranch
- Historical Sites: Paxtu cottage at the Outspan Hotel which also host a scout Museum, Baden Powell graves and Historical Gardens, Kimathi Trench at Kahigaini, MauMau caves in Naromoru, Italian War Memorial Church, Dedan Kimathi Tree Post Office
- Museums: Ruring'u Old Court Museum
- Religious Sites: Blessed Irene Nyaatha Shrine
- Natural Sites: Zaina falls, Tumutumu Hills

Plate 7: Tourist Attractions in Nyeri

Major stakeholders contributing towards marketing of tourist sites and culture of Nyeri county include; the community, County government, Tourism Regulatory Board, the hospitality industry and Magical Kenya.

The map below shows the mapped main attractions:

Map 128: Tourist attraction sites



Source: Two Ems Associates, 2019

a) NATIONAL PARKS:

Aberdare National Park

The protected Aberdare ecosystem covers over 1000 square kilometres. The park has all the big five except the lion. The park however has the bongos which are an almost extinct species.

Some of the attractions in the park include:

- Natural features – it is home to 22 streams and is the most developed facility-wise in Nyeri County. Within the park there are 4 falls and the moorland of the Aberdare ridges is visible. Karuro falls is the longest and has 3 steeps making it inaccessible to many people. Chania falls is also within the Aberdare. The moorland is habitat to most animals in the park.
- Aberdares, is a whole different world with many trekking opportunities around the Dragon,s teeth and twin peaks, the hikes along the river, mountain biking and the opportunity for turaco spotting too is amazing.
- Tree tops lodge – Queen Elizabeth was staying at Tree Tops when she was made a queen and it is a favourite with British tourists. A lot of Mau Mau and the rebellion thereof of 1952 history is associated with Tree Tops.
- Kimathi Post Office – it is a fig tree that where the generals in the Mau Mau rebellion would meet to discuss issues about the fight for independence and leave letters.
- Wildlife – the Aberdare is home to all the big 5 except the lion. The lion is replaced by the bongo. The largest population of the bongo is in the Aberdare. There are about 250 bongos in the Aberdare as of 15 years ago.
- Tropical Forest – the Aberdare is an attraction and is a favourite with Asian tourists.

While in the park, tourists can enjoy activities like:

- Game viewing/ Game drives – these do not need to be guided. People can see animals as they go about their game drives.
- Hiking – hiking is usually guided by wardens to prevent people from warding off into dangerous zones.
- Bird watching – this is done at the moorland and forest area. There are about 290 bird species in the Aberdare.
- Fishing
- Camping

Mt. Kenya National Park

The Mt. Kenya National Park (58870 Ha) was demarcated in 1949. It was the third National Park to be gazetted in Kenya after Nairobi National (1946) and Tsavo National Park (1948). The Sirimon and Naro Moru extensions (12640 Ha) were later added in 1968, bringing the size of the National Park to 71,510 Ha.

Some of the attractions in the park include:

- Wildlife and Bird Biodiversity – Mt. Kenya national park has an assortment of wildlife species and diverse bird species
- Scenic Views – Tourists can view the afro-alpine ecosystem, snow-capped peaks and the mountain lakes, tarns and glacial features.
- Tropical Forest
- Topography - perfect topography for viewing Kenya's wildlife and also magnificent scenic views of inter-locking spurs ideal for film and photography.

While in the park, tourists can enjoy activities like:

- Game viewing/ Game drives
- Hiking
- Bird watching
- Camping

b) FORESTS AND FOREST RESERVES:

In addition to the below listed forests, the region boosts of a number of community forests that are protected by the local community and form ritual sites and community sacred sites. Further, the following forests and forest reserves provide a host of attractions to the County.

Mt. Kenya and Aberdare Forest

This forms the catchment of most rivers in the County and Country as a whole forms an ideal site for eco-tourism as it is a host to the remnants of the tropical rain forest. It hosts unique species of wildlife and birds. Some hotels have set up within the forest to take advantage of the wildlife and the serene environment to attract tourists.

c) MOUNTAINS, HILLS AND CAVES

The County hosts a number of caves. They form the famous Maumau hideouts. The most famous cave is the resting place of the famous Mau Mau fighter, Dedan Kimathi. Other caves are scattered across the County. Most of the caves are in ruins and neglected. Other caves in the County include:

- Gakanga caves
- Gituri Mau Mau caves
- Mau Mau grave site at Kiharo Market in Gikondi
- Wamagana Historical Caves

Mt. Kenya and the Aberdare ranges are ideal for mountain climbing. There are nature trails within the mountains that are an attraction for touristic activities within the County. Mount Kenya is home to the Tagwa corridor which is an elephant corridor as they move across the forest, the wild animal salt lick at Kamunyu in Kabaru ward.

The Watuka Observation Hills serves as a viewing point where a person can see the whole County. The observation hill offers an opportunity to view the serene environment of the whole County.

d) HISTORICAL SITES AND CULTURAL SITES:

The County is home to several historical and cultural sites such as:

- Paxtu cottage at the Outspan Hotel which also a scout Museum
- Baden Powell graves and Historical Gardens
- Kimathi Trench at Kahigaini
- MauMau caves in Naromoru
- Italian War Memorial Church
- Crying Tree of Ihithe
- Dedan Kimathi Tree Post Office
- Ruring'u Old Court Museum
- Blessed Irene Nyaatha Shrine

e) DAMS AND WATERFALLS:

Dams and waterfalls can be exploited for sport tourism like water rafting, sport fishing and canoeing. Some of the dams and waterfalls in the County include:

- Chinga Dam
- Hohwe Dam in Kirimukuyu
- Labora twin dam in Endarasha
- Kiuru dam in Ruring'u
- Gathathini Dam, Lusoi, Thung'ari, Karichen, and Gatuamba Dam in Theigu River
- Zaina Falls
- Sagana Falls
- Ruiruru Falls
- Waterfall at Rotune primary in Mukurwe-ini
- Thimita water fall in Muruguru
- Kahuru water fall in Iriani
- Karangia & Wandumbi dams in Wamagana

10.5.2 Impact of Tourism

Tourism is having an impact to the environment, surrounding communities and County's economy in the following ways:

1. Protected areas such as the National Reserves and conservancies have secured the bio diversity
2. Communities within the tourist attraction sites have gained additional livelihood opportunities through employment and market for their products
3. The County has earned revenue through tourism gate charges to National Parks.
4. A good percentage of the County's revenue comes from tourism. In the year 2017-2018 Aberdare National Park alone received about 35,000 – 42,000 visitors. 2018 had the highest number of recorded visitors. The park makes about 140million annually.

10.5.3 Untapped Tourism Potentials

The untapped tourism attraction potential in the County include; Zania falls, Sporting activities at Chinga dam, Hiking at Nyeri and Tumutumu Hills, Dedan Kimathi Kahiga-ini site, Caves like the Kariba caves and the Maumau caves in Narumoru and slum tourism at the Majengo slums.

10.5.4 Impact of Climate Change on Tourism

Climate change/variability has caused both direct and indirect impacts on forests and their ecosystem. The direct impacts of extreme climate events are floods and droughts. The indirect impacts which are anthropogenic in nature include; silting, soil compaction, and famine. Implications of climate change:

- The impacts of climate change and especially on forests has an impact on the tourism in Nyeri. High rainfall causes inaccessibility of the Aberdare and Mt. Kenya National Parks. This reduces the revenue gained by the County from the sector.
- Long dry periods lead to loss of wildlife which is a touristic attraction for the County. Additionally, the remaining animals invades farms and are killed as part of human-wildlife conflict.
- Long dry periods reduce the amount of water in dams like Chinga which have fishing and boating activites as part of touristic activities,

10.5.5 Challenges faced in the Tourism Sector

The challenges faced in the tourism industry include; human-wildlife conflict, poor infrastructure and communication infrastructure to support the industry, unexposed tourist sites, poor marketing strategies for the County which is caused by limited funds allocated to the tourism department and lack of regional cooperation and support to promote a linked tourism circuit.
Tourism has not been perceived as a high-return sector by private businesses in the County and the hospitality industry and supporting industries are not fully developed to allow for mass marketing hence no single tour operator exists within the County.

10.6 Emerging Issues

SECTOR	OPPORTUNITIES	CONSTRAINTS
Crop Production	• Intensification of the agricultural value chain to meet agricultural demand • Intensification of agricultural research initiatives. • Exploiting potential high value crops • Intensification of irrigated agriculture • Adaptation to climate-smart technologies • Fabrication of small farming machinery (invest in these with jua kali sector). • Establishment of a one-stop-shop to address value addition across the value chain (seed suppliers to farmers to storage to processors) • Involve women in all aspects of crop production	• Reliance on rain-fed agriculture • Low investment in agricultural initiatives • Low utilization of appropriate farm inputs to improve on crop productivity) • Poor infrastructure • Environmental challenges arising from agricultural practices (siltation, overuse of chemicals, deforestation) • Little contribution by the women in crop production
Livestock Production	• Promote diverse livestock keeping like introduction of fish farming. • Promote value addition of dairy products • Disease prevention and treatment • Increase number of extension officers • Capacity building farmers on new livestock keeping techniques.	• Extension service provision • Inadequate marketing strategies • High prices of equipment and accessories • Lack of skills and knowledge on how to improve the quality. • Perception challenge towards improved livestock breeds, fish farming

Livestock Production	• Promote diverse livestock keeping like introduction of fish farming. • Promote value addition of dairy products • Disease prevention and treatment • Increase number of extension officers • Capacity building farmers on new livestock keeping techniques.	• Steep slopes in Mukurwe-ini, Nyeri South and Tetu sub-counties make the establishment of fish ponds difficult • Extension service provision • Inadequate marketing strategies • High prices of equipment and accessories • Lack of skills and knowledge on how to improve the quality. • Perception challenge towards improved livestock breeds, fish farming • Steep slopes in Mukurwe-ini, Nyeri South and Tetu sub-counties make the establishment of fish ponds difficult
Trade and Industry	• A vibrant business environment within the County and conducive regulatory environment • Opportunities to grow trade and industry exist through capacity building of the people and improving of regional markets • Sufficient forest conservation measures have been put in place to ensure sustainable exploitation of forest resources • Myriad of unexploited opportunities from the timber sub sector that have potential to grow the region economy	• Underdeveloped infrastructure • Low capacity building among producers influences the ability start and run a successful enterprise • Access to business capital is poorly developed, with this being a challenge of both perception and availability. • Unexploited potential in value chain and processing. • Undeveloped legal framework • Poor road conditions
Tourism	• Vast biodiversity • Room for zoning of Tourist sites in the County • Inter County partnership in Marketing between Meru, Murang'a, Laikipia and Kirinyaga counties • Investment in requisite facilities such hotels, infrastructure, health and safety. • Creation of proper tracking trails and routes for long distance walking. • Opportunities for: Adventure tourism, Filming, Photography, Auto sports, paragliding, came treks, canoeing and white water rafting	• Lack of sensitization on conservation of tourist resources • The attractions are undocumented • Promote all other attractions to the region, not just the lakes • Poaching and biodiversity degradation is threatening the industry. • Climate change and resultant impacts are affecting the attractions • Human Wildlife conflict is rampant • The scenery is continuously under pressure from increasing population pressure.

CHAPTER ELEVEN:

GOVERNANCE

Governance is an essential tool in determining the level of success or failure of any intervention in the County. The County has several institutions, which play a major role towards development in the region.

11.1. National Government

Physical and Land Use Planning as a practice is a concurrent function shared by both levels of government. The national government is responsible for formulation of policies that set out planning standards to be applied across the country, capacity building and providing technical assistance to counties and coordination of planning by the counties.

The National Government also has a constitutional duty to ensure revenue allocation to enable efficient and effective management and development in the counties. It also plays a role of financing of major projects that requires the governments intervention within the counties.

Key Institutions

In preparation of the County Spatial Plan, key national government institutions involved include among others;

- National Land Commission (NLC): Its mandate is to manage public land on behalf of the national and county governments, as well as monitor and have oversight responsibilities over land use planning throughout the country.
- KENHA is responsible is for the management, development, rehabilitation, and maintenance of Class A, B and C roads. KURA is responsible for the management, development, rehabilitation and maintenance of all public roads in cities and municipalities. KERRA is responsible for the development, rehabilitation, maintenance and management of rural roads in the country.
- National Environmental Management Authority (NEMA) is responsible for the management of the environment, and environmental policy at national and county level.
- Kenya Forest Service (KFS): Its mandate is to enhance development, conservation and management of Kenya's forest resources base in all public forests, and assist County Governments to develop and manage forest resources on community and private lands for the equitable benefit of present and future generations.
- Kenya Wildlife Service (KWS): Its mandate is to conserve and manage wildlife in Kenya, and to enforce related laws and regulations.
- Kenya Power is responsible for ensuring that there is adequate line capacity to maintain supply and quality of electricity across the country.
- Ministry of Education, Science and Technology is responsible for national policies and programmes that ensure Kenyans access quality and affordable school education, post-school, higher education and academic research. The directorate is delegated with the task of coordinating secondary and tertiary education.
- Ministry of Health: It's mandate is to build a progressive, responsive and sustainable health care system for accelerated attainment of the highest standard of health to all Kenyans.

11.1.1 Financial Capacity:

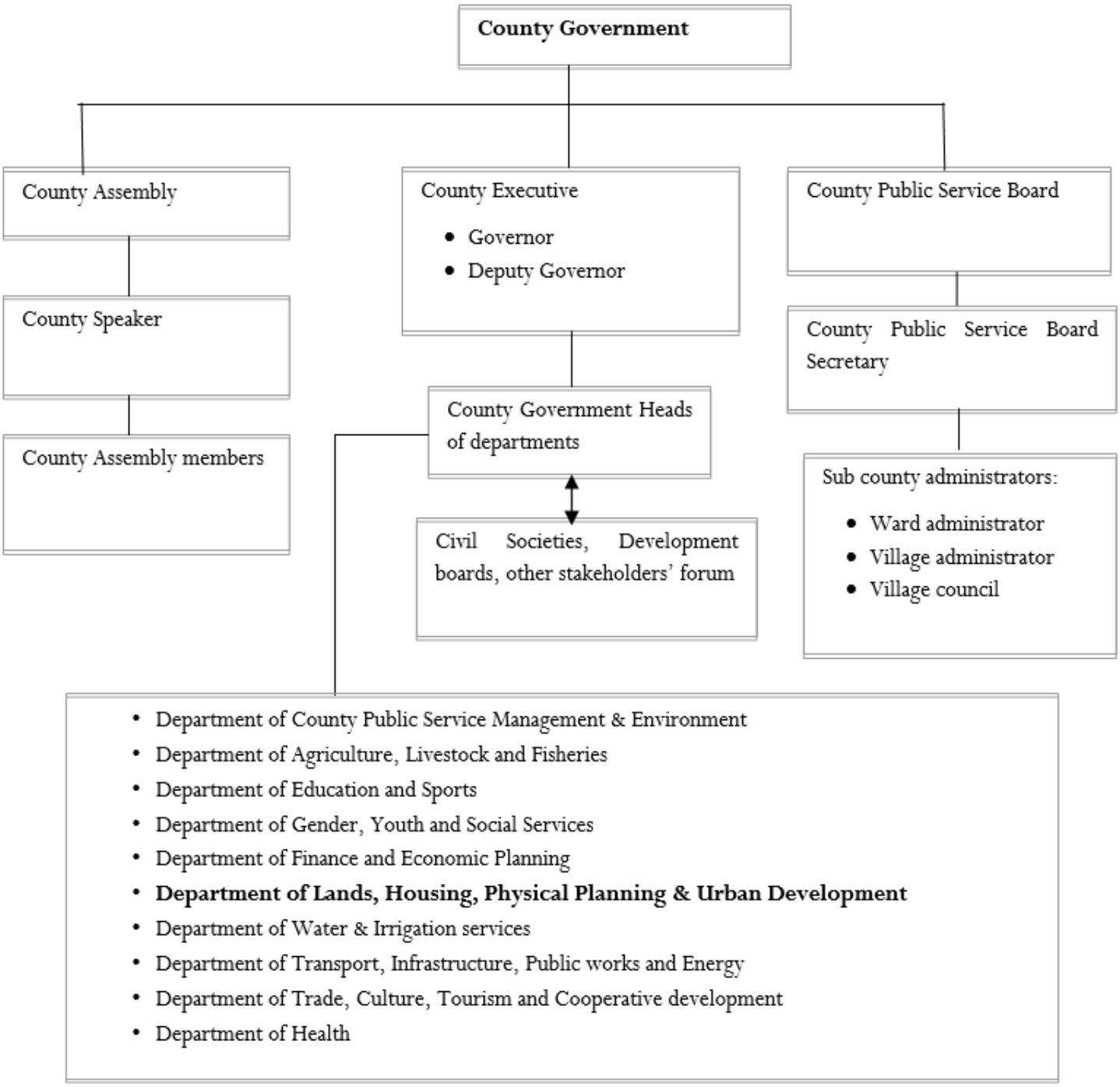
Revenue raised nationally is shared equitably among the National and County Governments. The National Government transferred 43% of its revenues to the County Governments. County Governments may be given additional allocations from the national government's share of the revenue, either conditionally or unconditionally (CRA, 2014).

This has often experienced challenges of; Inadequate funding, corruption, lack of comprehensive budgets from the County governments and controversies between the distinct functions of the County government and National government. Nyeri County was allocated Kshs. 5.7 billion as its equitable shares by the national government as at 2019/2020 budget allocations.

11.2. County Government

The County government is mandated by the constitution to undertake mainly; County legislative processes, exercising executive functions and the establishment and staffing of human resources for the County.

Figure 56: County Government Structure



KEY INSTITUTIONS

The Governor is the chief executive of the county and provides overall leadership inthe county's economic, social and political governance and development; and is accountable for the management and use of the county resources while promoting and facilitating citizen participation in the development of policies and plans, and delivery of services.

The County Assembly, the legislative arm of the county government is a crucial entity within the devolution structure as it is the law-making body and its members are the legal representatives of the community at the County level. The duty to approve all plans including the CSP is vested in the county assembly of Nyeri.

The County Executive Committee (CEC) member in charge of the department of Lands, Housing and Physical Planning is the policy head on matters related to planning. The member oversees planning matters and will be responsible for submitting the plan to the County Assembly for approval.

Hierarchically below, the CEC is the Chief Officer, who is responsible for general administration and coordination of respective county department among other roles, and subsequently the Director of Lands and Physical Planning who heads the Lands and Physical Planning technical department in implementation of all other plans.

Sub-County Administrators are responsible for: Coordinating, managing and supervising the general administrative functions in the Sub County unit; Ensuring effective service delivery; Coordinating developmental activities to empower the community and; Facilitating and coordinating citizen participation in the development of policies and delivery of Services.

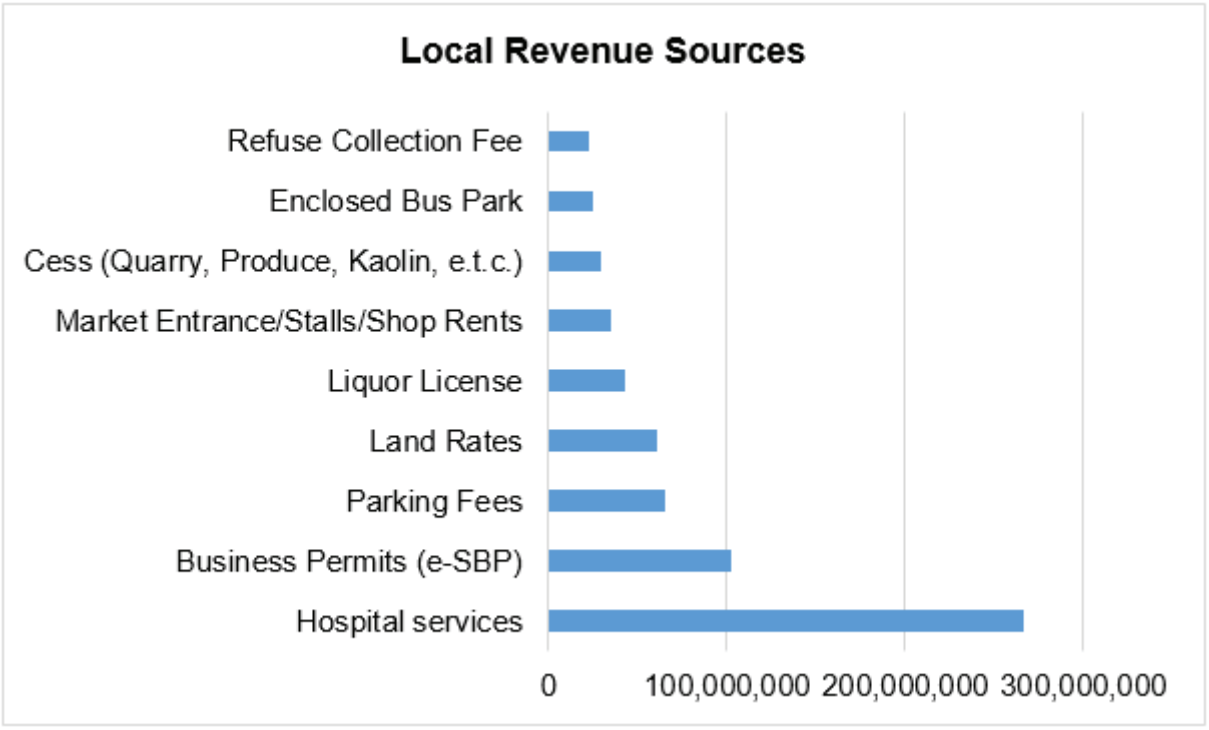
Boards of Municipalities also exist within the County Government and their main roles involve: to oversee the affairs of the city or municipality; to develop and adopt policies, plans, strategies and programmes, and may set targets for delivery of services; and to control land use, land sub-division, land development and zoning by public and private sectors for any land use purpose, within the framework of the spatial and master plans for the city or municipality as may be delegated by the county government among others.

To this effect, the County government will facilitate and monitor the process of preparing the CSP, its formulation and adoption of all the planning proposals within the County.

11.2.1 Financial Capacity:

In financing County budget, Own Source Revenue (OSR) is an integral component for financing. The County collected Ksh 760,228,551 from local revenue sources. The key revenue streams in the County are hospital services, single business permits, parking fees, land rates, liquor licenses, market entrance/stalls/shop rents and cess. Hospital services and business permits fetched the highest amounts of Ksh 266 million and Ksh 102 million respectively.

Chart 9: Revenue Sources in the County

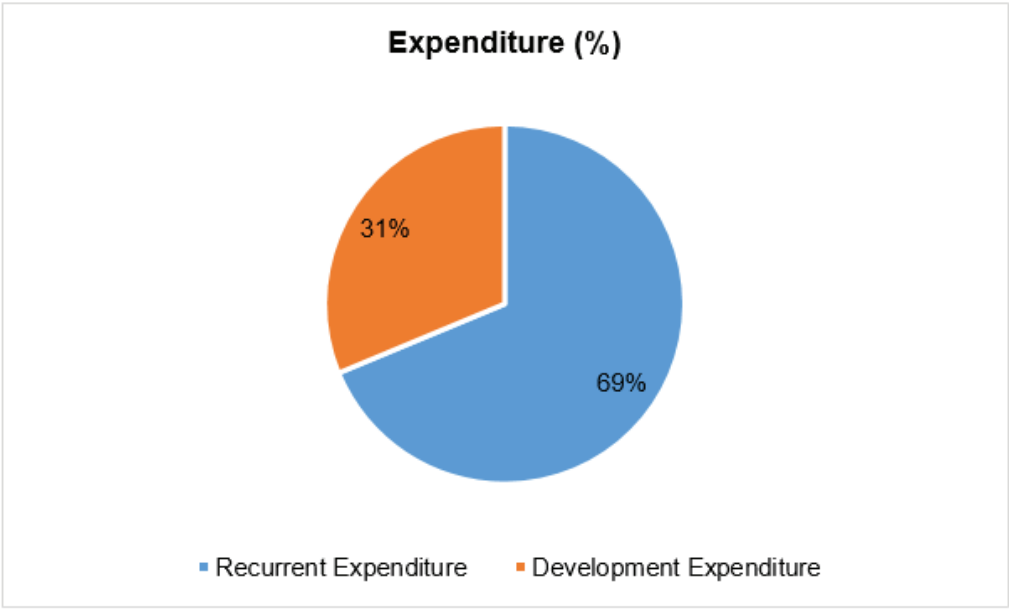


Source: Nyeri County Fiscal Strategic Paper, 2018

The County was allocated Kshs. 4.9 billion as its equitable shares by the national government as at 2017/2018 budget allocations. The County allocated 69% of its revenue to recurrent expenditure and 31% to development expenditure. This distribution is depicted below:

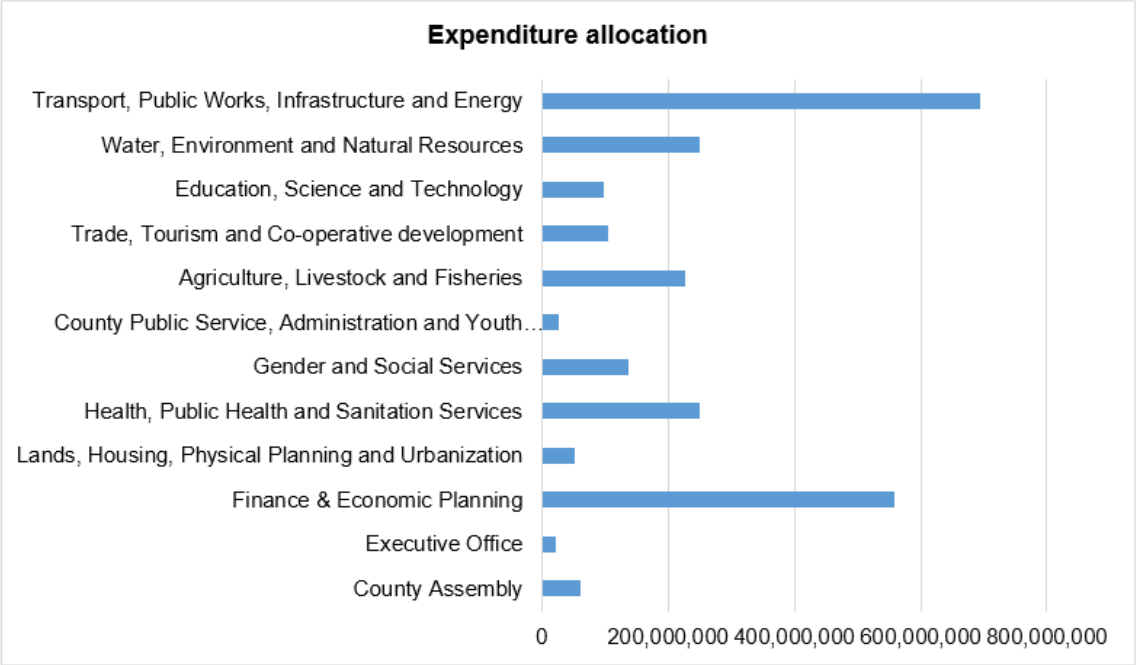
A higher recurrent expenditure may lead to a long-run decline in development output. Shrinking the amount spent on recurrent expenses should be a goal for the County's policy makers as this would enable the economy perform better and would boost prosperity and make Nyeri more competitive.

Chart 10: County Expenditure



Source: Nyeri County Fiscal Strategic Paper, 2018

Chart 11: County expenditure by Sector (FY 2017/2018)



Source: Nyeri County Fiscal Strategic Paper, 2018

11.2.2 Limitations:

1. Inadequate financial resources- The County is experiencing difficulties in finding sufficient, appropriate and continuous funding for their work as the national government allocations are not sufficient for the development in all sectors.
2. Insufficient working facilities- Institutions within the County government lack adequate facilities to aid in project implementation and monitoring. Facilities available are not at par with the County's terrain.
3. Weak information systems- The County Government has overlapping projects where the institutions have failed to distinguish the existing projects in the old dispensation and struggle to compete with each other just for funding
4. Inadequate skilled personnel- The County has not employed the necessary technical staff personnel required to undertake the responsibilities of fast tracking the projects proposed. The existing personnel in most sectors of the County are over helmed by the devolution to serve in the different wards as they await the recruitment of extra personnel
5. Limited capacity within the community to actively participate in development activities prioritization. In 2019/2020 more emphasis will put on common interest groups and stakeholders to improve community prioritization of development needs.

11.3 Relationships Between National and County Governments

The relationship between the County and National governments or intergovernmental relations, is provided for in Article 6 (2) of the Constitution. It states that governments at the national and county levels are distinct and inter-dependent and shall conduct their mutual relations on the basis of consultation and cooperation.

The National and County governments are required to perform their functions and exercise their powers in such a way that:

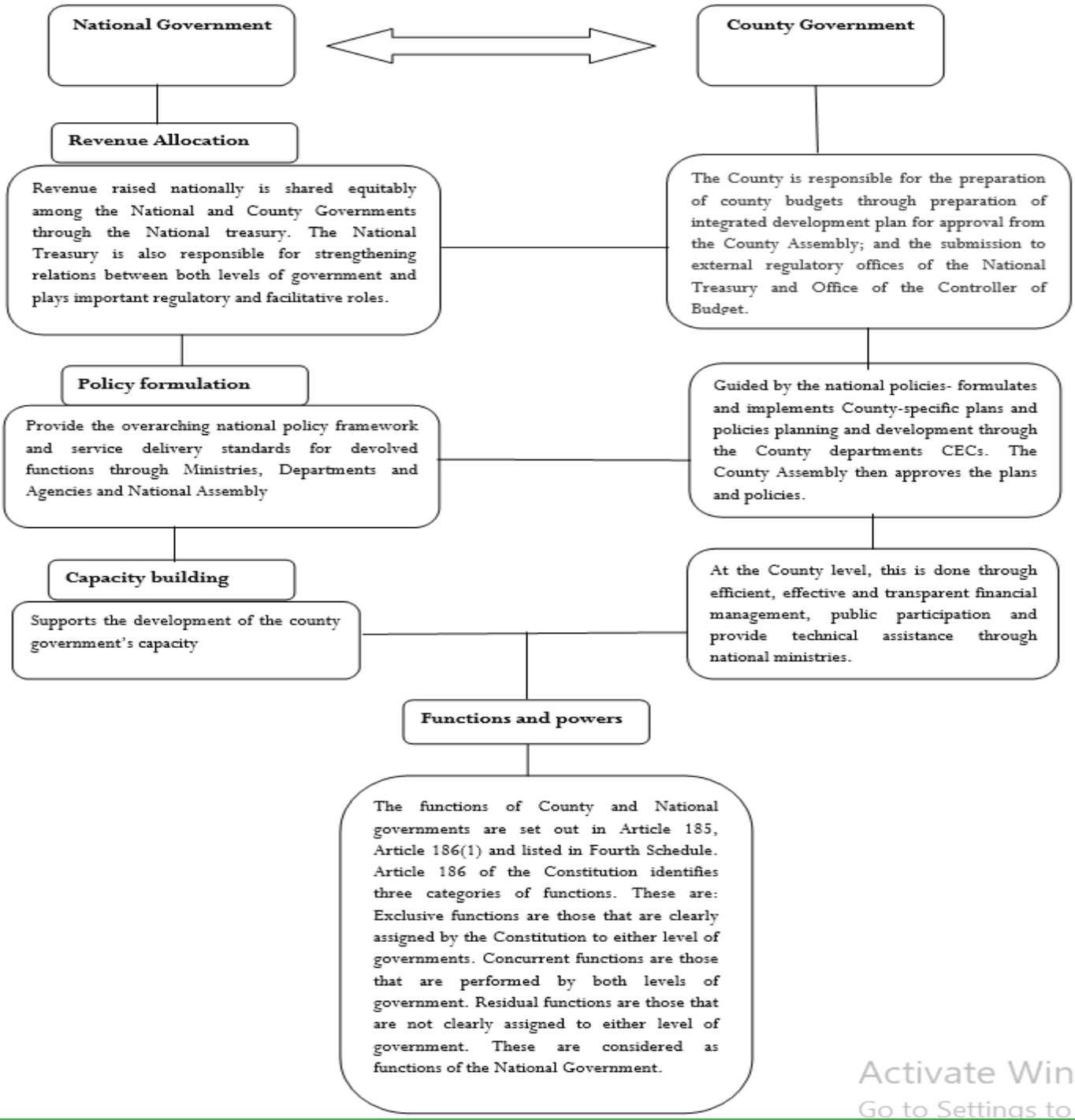
- There is mutual respect for functional and institutional integrity of government at either level.
- There is respect for constitutional status and institutions of government at the either level.
- In the case of county government, there is a duty to respect institutions and structures within it, especially those relating to citizen participation.

• Mutual consultations and support in implementation of laws made by either level of government; and Mutual exchange of information, coordination of policies and administration and capacity building.

The Constitution makes it mandatory for County and National governments to co-operate in the performance of functions and exercise of powers and allows setting up of joint committees and authorities. The same is required of the 47 County Governments in relating with each other.

The Constitution also states that disputes arising between governments (County and National and County and County) should be settled through laid down procedures, including alternative dispute resolution mechanisms such as negotiation, mediation and arbitration.

Figure 57: Synergy between National and County Government



Activate Win
Go to Settings to

11.4 Private Sector

The private sector plays a major role in the County. It has partnered with various development sectors to ensure that the drivers of development in the County are met. The private sector is comprised of; financial institutions, SMEs, educational institutions and credit and savings societies.

11.4.1 Roles of the private sector

1. To promote quality education and training, ICT and innovation in the County
2. To promote and partner with ministry of health in health care provision i.e. construction of private clinics & mission hospitals
3. Provision of training & employment by investing in the establishment of County innovation and skills development centers with linkages to industry stakeholders, who provide opportunities for employment.
4. Provide hospitality services and promote investment in conservation of tourist attraction areas/ sites
5. Promotion of private enterprises and competition to enhance economic development
6. Providing knowledge and expertise on sustainable land/ space utilization and investing resources as per the spatial plans.

Private sector-led growth contributes greatly to poverty reduction. This CSP will contribute in providing good policies and proposals which will enable the County government provide strong institutions and effective public goods and services. The private sector will then drive productivity and participation which will in turn drive economic growth.

11.4.2 Limitations

1. **Lack of infrastructural facilities**

The private sector cannot fully provide for the community's development needs when the County has not availed infrastructure such as; accessible roads, reliable water sources and energy sources.

2. **Lack of sufficient coordination among partners**

There is no coordination among partners implementing community-based programmes, resulting in duplication of services, conflicts and inadequate utilization of resources.

3. **Lack of a County Industrial Development Policy**

This has denied the sector the availability of industrial development guidelines as well as identifying areas of industrial investment.

11.5. Civil Society

According to the World Bank, the Civil society refers to a wide array of organizations: community groups, non-governmental organizations [NGOs], charitable organizations, faith-based organizations that are concerned in the social wellbeing of citizens. They are usually financed by a variety of public and voluntary contributions i.e., grants from foreign organizations and donors, governmental agencies and private organizations.

There are six (6) main Non-Governmental Organizations in the county namely; Caritas Nyeri, World Vision, Green Belt Movement, Child Fund Kenya, Kenya Red Cross and Farm Concern International. These NGOs are mainly involved in social and economic activities including provision of water in dry areas, promotion of planting of trees and support for the OVCs (CIDP 2088-2022).

The county has 14,391 social development groups out of which 4,489 are women groups, 8,564 are self-help groups and 1,338 youth groups. The social development groups are concerned with the welfare of the community, and in particular women and youth in the county.

Other functions of the civil societies in the county include;

- Creation of awareness on rights and privileges of the public/citizens
- Provide technical support & training on food security & modern Agricultural farming methods
- Provision of affordable education institutions for pre-primary and primary education e.g. bridge international academies
- Partnership with the County Government to improve the quality of health indicators in the County
- Provision of Health care, feeding programmes training

- Trainings on environmental management and Conservation of catchments areas

Preparation of the County Spatial Plan recognizes the right of the civil society to participate in the spatial planning process. The Civil Society offers collaboration through various advocacy strategies and can link environmental issues, land tenure and human rights issues to the proposals addressed by the spatial plan.

11.5.1 Limitations:

- Political interference
- Poor coordination with other actors resulting in duplication of projects
- Poor infrastructural facilities
- Poor governance and management
- Inadequate resources to move to extremely rural places
- Limited capacity
- Inadequate networking initiatives

11.6 Cooperatives

11.6.1 Roles:

Nyeri County has approximately 180 registered cooperative societies in the County. Out of these, 143 are active, while 37 are dormant (CIDP 2018-2022). The major types of societies in the county are: marketing (coffee and dairy); Savings and credit (SACCOs); and housing/investment. The role of the cooperatives includes:

Type	Number	Function
Coffee co-operative	23	• Collect; process and sale tea and coffee locally and even export the product. • Provision of extension and advisory services
Dairy co-operative	37	• To collect milk from thefarmers and market their products. They are especially instrumental in the whole milk value chain from production to marketing. • Provision of extension and advisory services
Savings and Credit	101	• Promotion of financial and banking services • Facilitate social develop-ment and wellbeing of its members.

Type	Number	Function
Housing/Investment	19	• Mobilize funds to provide affordable housing and investment opportunities to our members.
Fish co-operative	1	• Provision of extension and advisory services • Introduction of various fish farming technologies

11.6.2 Limitations:

- Weak marketing arrangements- The co-operatives lack marketing strategies and information for agricultural produce and therefore do not fully utilize the potential of resources from farmers. Most of the small-scale farmers are not informed of the financial services accessible to them.
- Limited human resource personnel- The co-operatives have understaffed technical and support staff to handle devolved functions in the various sub counties.
- Poor leadership and management- There are political interferences, which are experienced in the co-operatives election of its management. This has seen election of leaders with political affiliations who are not interested in the social economic development and interests of the members.
- Inadequate financial resources- The co-operatives have poor institutional arrangements, which are unable to mobilize financial resources for extension services and support to development projects.
- Weak policy and legal framework- The regulations put in place concerning co-operatives are not being followed through by registered co-operatives and do not address the operation and management of co-operatives effectively.

11.7 Gender perspective in Governance

In Nyeri County, the representation of women in governance and leadership is moderate. There is gender mainstreaming both in the executive level and department level. However, there is still need for continued strengthening of gender mainstreaming efforts and institutionalizing the gender function in the County Governments.

Number of Electoral Wards in Nyeri County	30
Number of Women Elected as Members of the County Assembly in the 30 wards	1
Number of Women Nominated in the County Assembly	26

LEADERSHIP LEVEL	FEMALE	MALE
Sub County Administrator	4	4
County Chief Officer	3	8
Ward Administrator	1	3
County Chief Executive Member	5	6
County Service Board	3	5
County Director	14	10

11.8 Potential Opportunities and Constraints

Potential Opportunities	Constraints
1. Support by civil society organizations to initiate development projects 2. Devolved funds from the national government to help in steering development 3. Comprehensive policy guidelines to guide development 4. Well-developed institutions and policies in delivering public service	1. Lack of a clear spatial framework to guide development projects 2. Political interference in finance allocation and infrastructure development 3. Limited public participation in planning and implementation 4. Weak linkage between development planning and budgetary allocation 5. Poor interdepartmental linkages and operations

PART III:
SYNTHESIS

CHAPTER TWELVE

SUMMARY OF EMERGING ISSUES

The chapter provides a preliminary summary of the core planning development challenges and opportunities. The issues will provide insight in the development of the plan's vision, goals and objectives and implementation strategies for the County's spatial plan.

12.1 Challenges

Thematic area	Challenges
Natural resources	Topography -The steep and harsh terrain especially in areas with slopes of above 15 degrees pose a challenge in infrastructural development. The cost of infrastructural development is very high in Mt. Kenya slopes, Aberdare ranges and Mukurweini.
	Climatic - Climate change, deforestation and conventional farming systems has promoted massive erosion and decreased water levels in major rivers. The rainfall patterns have changed with the average rainfall received decreasing and increased temperatures experienced across the County.
	Hydrology-Deforestation taking place on the major catchment areas has led to reduced water volumes for major rivers such as R. Sagana, Nairobi. Ewaso Ngiro, Amboni, This has also led to drying up of rivers hence increased demand for water across the County.
	Vegetation-The vegetation cover within the County is decreasing at an alarming rate, especially in Mt Kenya forest reserve and Aberdare ranges, being the major forests. Other forested areas are undergoing increased encroachment, with more land being used for cultivation in Nyeri Forest, Karima Forest, Nyana Forest, South Laikipia forest.
	Wildlife- There is increased human wildlife conflicts due to increased encroachment by human activities into the wildlife ecosystems in Mt. Kenya Forest Reserve, Aberdare Ranges, South Laikipia Forest.
	Energy -Increased use of firewood as source of fuel for domestic and industrial use has led to deforestation across the County.
Population and demography	Rapid population growth and high dependency ratios in the town have over the time put pressure on existing infrastructure
	High unemployment rate- There are limited employment opportunities across the County resulting to incidences of high insecurity
	Pressure on existing resources-The increase in population requires more development funds to build additional social and physical infrastructure
Land	Land degradation- Land degradation is greatly attributed to poor land management practises such as unconventional farming practises and unsustainable quarrying activities. This has led to landslides and soil erosion hence reduced productivity.
	Transboundary issues- There is conflict between Nyeri County and Nanyuki County concerning Nanyuki town
	Incidences of landlessness- The colonial villages created during the colonial administration do not have title deeds leading to informality.

	Encroachment of all public land reserves- The communities have encroached and grabbed public land and the situation has been met with refusal of the communities to give up public land. This has hindered provision of infrastructural and recreational facilities in the County.
	Rapid land fragmentation- Due to the increased population growth, land subdivision is taking place at a very high rate leading to uneconomical land units
	Unsurveyed lands- There are several unsurveyed plots leading to land conflicts especially in rural areas e.g. in Kirimukuyu, Ruguru
	Land conflicts- There are land ownership conflicts in some parts of the County. This is attributed to the lack of title deeds due to the lengthy acquisition of title deed process and presence of unsurveyed land.
Economy	Crop Production – Acidic soils of Iria-ini reduce fertility of the soil and translate to low crop yield. • Areas with landslides (Konyu, Mukurwe-ini Central and Rugi) and soil erosion (Kabaru, Mukurwe-ini East, Gatarakwa, Kirimukuyu, Ruguru, Iria-ini, Karima, Mahiga and Kiganjo) also affects crop yield. • The low level of value addition initiatives for crops across the County leads to loss of produce when in surplus. • Marketing of crop produce in the County is a challenge which results in farmers not getting value for their crops.
	Livestock Production – The main challenge in livestock production is the lack of proper marketing channels and value addition initiatives for milk which is the main product of livestock production in the County. There County is also slow to embrace fish and bee keeping as alternative livestock production avenues.
	Industrialization – The poor state of infrastructure in the County discourages industrialization.
	Tourism – The tourist attractions sites in the County are undocumented making it difficult to exploit especially caves. There is also lack of sensitization on conservation of tourist resources across the County.
Infrastructure	Poor road conditions make some areas inaccessible (especially rural areas during the rainy seasons).
	The lack of designated non-motorized transport spaces has led to frequent accidents involving pedestrians and boda bodas/bicycles in major towns
	Unreliability of water sources such as rivers for household consumption needs.
	Steep Terrain is also a challenge in some areas such as Mukurweini subCounty that experiences landslides,
	Inadequate teaching personnel and learning materials in all public education facilities especially in polytechnics, ECDE, primary and secondary facilities.
	Inadequate health personnel such as Nurses, clinical officers, general physicians, and specialized medical doctors.
	Inadequacy of security facilities in Kieni west.
	Siltation of dams such as Chinga dam, leading to reduced holding capacity of the dam.

Human Settlements	Poorly planned urban settlements- Urban sprawl has led to the encroachment of fragile ecosystem. The urban centres lack physical and land use development plans as well zonation plans. The population growth in urban centres does not match the service provided.
	Poorly regulated rural settlements- The agricultural activities in the rural areas have led to the encroachment of forests reserves and fragile ecosystems. There is excessive subdivision of land in areas with high agricultural potential. There Insecurity in some areas of the County especially in Gikondi ward. The poor access to social infrastructure and amenities. There human-wildlife conflicts in centres adjacent the Mount Kenya and Aberdare gazetted forests. The rugged terrain in making areas difficult to access.
	Inadequate quality housing- There is lack of titles and other identifying documents in some areas. Housing shortages are experienced in urban areas. Poor access to social amenities.

12.2 Opportunities

Thematic area	Opportunities
Natural resources	Topography -The topography offers opportunity for tourism and potential for tapping into scenic features in Mt. Kenya slopes, Aberdare ranges, Mukurweini.
	Climatic - Varied climatic conditions enable varied land uses (such as rangelands offering opportunities for wildlife conservation (eco-tourism potential), humid zones offering opportunities for dairy farming and intensive agriculture.
	Hydrology-Some of the major rivers can be tapped into creating multipurpose dams such as R. Sagana, Nairobi. Ewaso Ngiro, Amboni. They also determine storm water drainage across the County.
	Vegetation-The varied flora provides great opportunity for wildlife ecosystem Mt. Kenya Forest reserve, Aberdare Ranges, Nyeri Forest, Karima Forest, Nyana Forest, South Laikipia forest The forested areas are the main catchment areas for major rivers.
	Wildlife- Presence of various animal species that are tourist attractions Mt. Kenya Forest Reserve, Aberdare Ranges, South Laikipia Forest.
	Energy -Tapping into solar energy as alternative energy source Kieni West and Kieni East. The County has potential in tapping biogas fuel to reduce the demand for energy for domestic and industrial use
Population and demography	A youthful population provides an opportunity for innovation and technology and ensures that there is an available workforce
	In-migration into the town takes place at both the national and international levels. This is an opportunity that can boost the growth of the local economy and spur regional development.
	The population has high literacy levels
	A rich cultural environment provides an opportunity for different cultures to mingle and exchange ideas.

Land	Preparation of zoning regulations- The development of land use regulations will provide opportunity to curb land fragmentation and ensure sustainable and optimal utilization of land
	Land Banking- This will provide an opportunity for the County government to have an inventory of public land and effectively plan for provision of services
	Sustainable land use practices- The community should be sensitized on better agricultural practices to avoid land degradation
Economy	Crop Production- There are opportunities to promote agro-industrial development as there is available produce as raw material for the industries in the County. Irrigation schemes are an opportunity for the County to increase crop yields and open up the drier areas of Kieni Sub-counties to agriculture.
	Livestock Production- Nyeri County can promote value addition in livestock production to involve processing hides and skins.
	Trade and Commerce- There are opportunities in getting traders funds to improve their businesses as well as promote access to credit. There is also need to improve markets to promote trade and commerce in the County.
	Industrialization- There is an opportunity to revive industries that have collapsed like the wheat and onion industries of Kieni West and the cabbage industry in Karatina. Additionally there is need to allocate land for cottage industries to diversify the industrial development of the County
	Tourism- It is important to zone off Tourist sites in the County to enable conservation efforts. There is also an opportunity to market the tourist attractions through an inter-County partnership in marketing between Meru, Murang'a, Laikipia and Kirinyaga counties
Infrastructure	Promotion of inter-County modal linkages
	Opening up/upgrading of strategic rural roads that will spur development and promote security
	Public Private Partnerships in road development
	Availability of resource centres that can be developed further into Innovation and employment centres through provision of enabling infrastructure such as conferencing facilities and linkage to 4G+/5G Fibre-Optic Cables.
	Availability of more than 4.5kV/hr/day/M2 of sunshine in parts of Kieni. This presents an opportunity for solar energy harnessing farms.
	Availability of waterfalls and major rivers, that can be tapped for mini-hydro-electric turbines. Energy produced in these plants will be utilised by tea processing factories.
	The County population has about 90% adequate access to health facilities. An opportunity for the County to concentrate on improving the facilities conditions which is an added advantage.
	Availability of community playgrounds, open spaces, and stadiums spread across the County wards, this means provision of recreational facilities would not necessitate land acquisition. Therefore, the availed fund would be used to develop the facilities instead.
	Availability of privately managed/owned special education facilities for the people living with various forms of disabilities. This provides and opportunity for the County government to explore Public-private partnership in facilitating the less fortunate in the society.

Human Settlements	Urban settlement- There is potential Growth Centre that are likely to spur development within the County. The reclassification of Nyeri urban centres is required since most have outgrown their current designation. There is availability of land as well as space for provision of social amenities. The urban centres are linked to transit corridors.
	Rural settlement- The presence of water sources such as rivers presents an opportunity for Irrigation to boost the food security. There is availability of land for provision of social amenities.
	Housing- Construction skills are taught in local institutions within the County. There is availability of construction materials in the County such sand, building stones, water and grass for thatched houses. There is presence of a National housing policy that gives guidelines for provision of social housing. There is an opportunity for increased investment and funding in the housing sector due to the increased demand.

CHAPTER THIRTEEN:

SCENARIO BUILDING

This chapter highlights the possible future development alternatives given the background of the challenges and opportunities identified. The scenarios developed for the County are as outlined below:

Scenario 1: Nil Intervention.

This scenario highlights the possible future outcomes that will occur in the case where no intervention is taken in the County.

a) Environment.

If no action is taken to protect, conserve and preserve the use of the natural resource in the County, the implications will therefore be as follows;

Excessive Deforestation: Forest depletion due to agriculture and urban development will lead to the extinction of various flora and fauna, desertification, change in weather patterns and further lead to the acceleration of climate change

Soil erosion: Cutting down of trees will accelerate soil erosion in the County, and some of the most affected places will be areas that are downstream on lower terrain. This will also result in the loss of land productivity.

Land infertility: This will result due to poor agricultural activities, and other uncontrolled human activity.

Natural disasters: Natural disasters, which are caused by uncontrolled human activity on steep slopes and deforestation, will lead to the occurrence of landslides, which in turn destroys property and human settlements, leading to loss of investments.

b) Land

Assuming that the land use and management practices existing in Nyeri County continue unabated, the following impacts will be experienced: -

On Agricultural Land:

☐ Excessive land sub-division: Rapid uncontrolled land subdivision in high potential agricultural areas will result in low agricultural yields and foster food insecurity in the County.

☐ Continued settlement on steep slopes will degrade land on these fragile areas leading to soil losses and downstream siltation.

On Rangelands:

☐ Uncontrolled livestock rearing in the communally held rangelands will result in gradual land degradation and soil erosion.

☐ Poor communal land management systems will result in increased land conflicts.

☐ Climatic changes will lead to increased land aridity.

On Urban Land:

☐ Land in urban areas will experience disorderly land use.

☐ Informal settlements will sprout up in urban, town and market centers.

☐ Tracts of land will lay undeveloped, held for speculative purposes.

On Public Land:

☐ Publicly owned parcels of land (such as those owned by government institutions, riparian reserves and infrastructure way leaves) will experience wanton grabbing, hence impeding provision of public services.

c) Tourism

If no action to protect, conserve, preserve and market tourism attractions is taken the implications will be as follows:

1. Destruction of the biodiversity and loss of wildlife present in the Aberdare Forest and the Mt. Kenya forest. This will lead to a drop in the revenue collected both directly and directly in the County. Low revenue will mean loss of jobs, especially to those working in the tourism and hospitality industry.
2. Failure to capitalize on new marketing opportunities.
3. Erosion of market share due to action of competitive destination areas.

d) Human Settlements

The current urban growth in the County is organic and little planning interventions are applied hence unequal growth. If no action is taken to direct urbanization the following scenarios are likely to occur:

- Urban sprawl and growth of informal settlements will be evident in urban centers.
- Population growth in the urban areas will exert disproportionate demand on existing urban services and infrastructure.
- Provision of services and amenities in rural areas will be less.
- The major towns will adopt an uncontrolled vertical form of development.

e) Rural Development

Feeder roads
- Difficulties in transporting agricultural products
- Worsened road surface quality
- Difficulties accessing service centers

Electricity, Water and Sanitation
- Environmental degradation due to over exploitation of natural resources to access energy
- Stalled economic development
- Outbreak of waterborne diseases

Education
- Unequal distribution of schools
- Low transition rates
- High drop out rates
- Poor education quality

Health
- Accessibility challenges
- Ill equipped health centers
- High mortality rates

f) Transportation.

It assumes that the current status of transport system remains unchanged over the next ten years. The future implications will be as follows:

☐ Extreme dilapidated roads due to lack of upgrading and maintenance of roads.

☐ Inaccessibility into and out of rural hinterlands resulting to: lack of access to markets and basic services such as schools and hospitals and eventually high mortality and illiteracy rates.

☐ Lack of public transport means leading to overloading on available transport modes.

☐ Economic backlog due to poor intra and inter linkages and connectivity to markets and centres.

Scenario 2: Tourism Led Growth Scenario.

This scenario capitalizes on the tourism potential of Nyeri County, which is a major economic pillar for the County. This can be achieved by;

a) Marketing and branding of the tourist sites and the rich local culture of Nyeri County.

Hiking in the Aberdare Forest

Hiking in Mt. Kenya (Lake Alice and Shipton's Camp)

b) Promoting the construction and development of tourism supporting infrastructure such as MICE Facilities. (Meetings, Incentives, Conferencing and Exhibition Facilities.) This will further promote Nyeri as a MICE

c) Exploiting untapped tourism potentials in areas such agritourism for the County. Activities around agro-tourism can be organized such as: cheese-making activities, coffee and tea-tasting festivals, etc

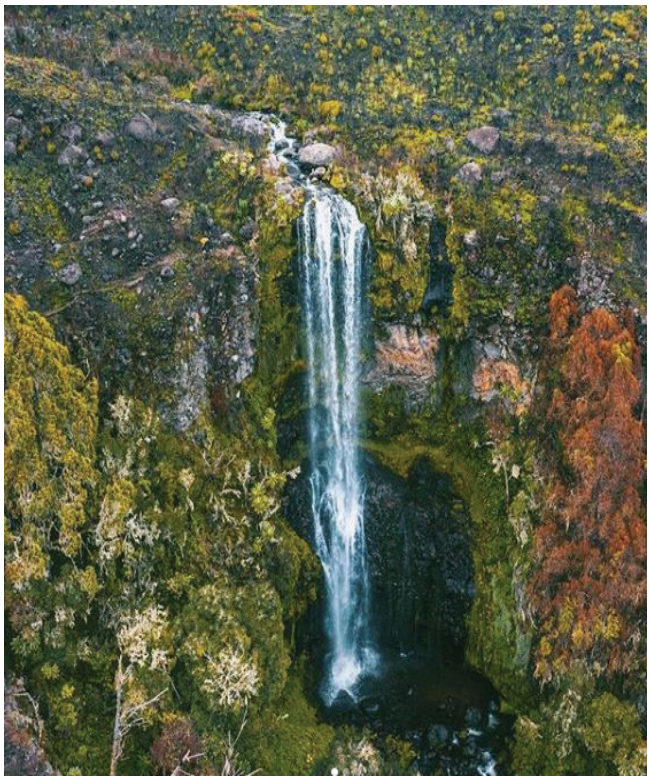
Cheese making

Coffee and tea tasting festivals

Fruit jam making

Required Actions:

- Protection of ALL attraction from the gradual and constant degradation through built up areas and agriculture.
- Establishment of proper trekking trails with necessary infrastructure.
- Promote Cultural Heritage Festival to boost tourism - The festival will include a range of activities like dance, storytelling, preparation of local cuisine and mountain climbing.
- To ease access to through improved access to the tourist attraction sites in the County and improved linkages with other parts of the County and outside the County. Improve linkages between attractions so as to have a smooth tourism circuit.
- The County should attract and partner with the private sector to promote provision of sufficient Hospitality and accommodation facilities near tourism sites through subsidies, appropriate and enabling business environment for investors into the tourism industry.
- Develop tourism action plans for focal points.
- Aggressive marketing campaigns and mapping of all attractions in the County.
- Awareness creation to the local community about the opportunities in tourism.
- Improvement of security to foster the tourism sector.
- Partner with regional Marketing Bodies such as Brand



Scenario 3: Agro-Industrial Scenario.

a) Crop Value Chain.

Objective:

This Scenario explores the possibilities of developing commercially oriented approach to land use. This is achieved by:

1. Maximizing agricultural Production
2. Building the capacity of farmers on intensive small holder. farming and the use of smart farming techniques.
3. Promotion and establishment of agro industrial zones.

To achieve appropriate value chains, the following chains will need to be promoted:

- Coffee value chain.
- Tea value chain.
- Horticulture value chain (Apples, plums, celery, radish, leeks, cabbages, carrots, etc)
- Traditional High Value crops (Sorghum, Millet, Cassava, Sweet Potatoes, cow peas)
- Irish Potatoes
- Macadamia.

Required Actions:

1. To promote sustainable urbanisation, and amass sufficient quantities for industrial production, the concept of industrial zones should be promoted.
2. To allow for ease of access to the zones, collection centres closer to the farmers should be developed. These collection centres can either be industry operated or SACCO operated.
3. For industrial zones to work, proper infrastructure should be provided.
4. To attract private sector, to industrial zones, there must exists external markets.
5. Development of rural infrastructure (roads, water, electricity) to promote production for the industries.
6. Tailor and develop education institutions and programmes that supplement the requirements of the industries.
7. Appropriate research into industrial technology and product mix.
8. An appropriate and enabling business environment for investors into the Business Park and industrial zones.

Horticultural Crops with potential to grow in Nyeri County

b) Livestock Value Chain

To achieve appropriate value chains in livestock production, the following chains will need to be promoted:

- Milk value chain
- Fish value chain
- Poultry value chain
- Honey value chain.

Required Actions:

1. Ensure consistent all year supply of fodder.
2. Promote, facilitate and encourage private sector investment in the livestock value chain through artificial feedlots, providing abattoirs and slaughter houses, leather tanneries, vet services, milk cooling plants, livestock production packaging, and product and animal transportation.
3. Intensification of extension service provision.
4. Agribusiness training to commercialize the sector and efficient capacity building.
5. Improvement of market information systems.
6. Investment in an international market for the products made.
7. Investment on tailored institutions with tailored academic disciplines in beef production through lobbying among existing institutions and incorporating additional institutions.

Scenario 4: Land Management Scenario.

This scenario explores the possibilities of developing the County based on a land management system that seeks to achieve:

1. Coordinated, orderly and compact development of urban areas to prevent urban sprawl into agricultural areas.
2. Promotion of optimal maximization of agricultural land in Nyeri County.

Required Actions:

1. Operationalization of the County Land Policy.
2. Preparation of Physical and Land Use Development Plans for all urban centers to guide in land use and management in urban areas.
3. Establishment of Development Control Guidelines and Regulations in the County.
4. Development of a land information system. (LIS System)
5. Preparation of special land areas spatial plans (such as community land, wildlife corridors, etc).
6. Reclamation of all grabbed or encroached land in urban areas.
7. Secure land tenure for areas that have not been demarcated and surveyed in the County, e.g. colonial villages.
8. Development of a sustainable land management system for private, public and communal land including the following components:

Scenario 5: Spatial Development Corridor Scenar-

Transport corridors are a critical component of any sustainable and inclusive development to facilitate economic growth and poverty reduction.

The objectives of this scenario includes the following:

- ☐ To develop multi modal connectivity among the various transport modes through integration of road, rail and air transport.
- ☐ Assigning functions to the urban areas along the corridor.
- ☐ Integration of urban-rural and regional and international transport networks.
- ☐ To identify missing links in the County and design connecting routes.
- ☐ To promote NMT provision on roads

THE NORTHERN CORRIDOR.

The Northern Corridor is a proposed multimodal trade route linking the landlocked countries of the Great Lakes Region with the Kenyan maritime seaport of Mombasa. It passes through Nyeri County from Nairobi, through Marwa and proceeds to Nanyuki and Isiolo, connecting with the LAPSSET Corridor. The road is designed to be a dual carriageway. It also includes the railway corridor along the same route

Impact of the Northern Corridor to the economy in Nyeri County.

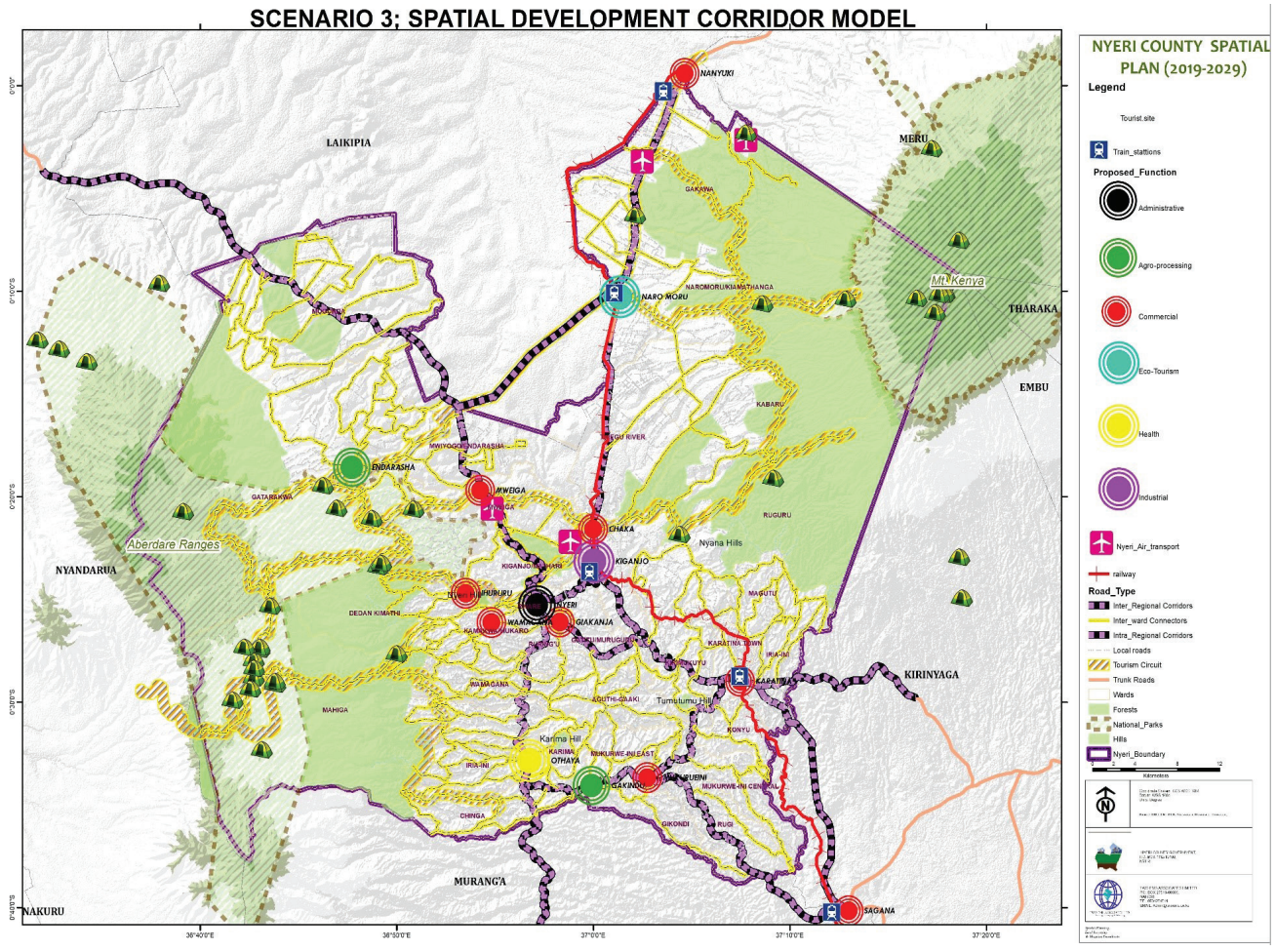
The presence of the Northern corridor in the County will:

- Boost trade and employment along the corridor. One of the flagship projects is the construction of Chaka Market, with an investment of Ksh. 1 Billion, designed to incorporate multiple entities like banks, restaurants and more than 2000 trading stalls for Agricultural traders in the Kieni area.
- Facilitate the production and processing of livestock and agricultural products.
- Enhance multimodal connectivity and linkage to domestic and global markets, hence enhancing global competitiveness.
- Open up rural areas for development.
- Facilitate regional trade and investment with neighbouring countries, e.g. Uganda and DRC.

Required Actions:

1. Assigning of specific functions to the towns along the corridor.
2. Preparation of Physical and Land Use Development Plans for the towns along the corridor. i.e. Karatina, Marwa, Kiganjo, Chaka, Naromoru, Nanyuki, to take advantage of the of road and rail network in the proposed Northern Corridor.
3. Development and upgrading of the tourism circuits linking the main transportation corridor with tourist attraction sites in the County. E.g. in the Aberdares and Mt. Kenya.
4. Reviving the old railway system facilitate transportation of people and goods along the corridor.
5. Upgrading of all the roads linking up agricultural potential areas to facilitate easy movement of agricultural produce.
6. Upgrading of all the airstrips in the County to facilitate travel of both local and international tourists.

Map 129: Spatial Development Corridor Model



Source: Two EMS Associates, 2019

Evaluation of Scenarios.

SCENARIO	IMPACT
Scenario 1: Nil Intervention	If there is no intervention in the County, there will be mostly negative implications which will further lead to the degradation of the County. ☐ It will lead to the deterioration of the County's natural resources, hence destroy the ecosystem and bio-diversity in the County. ☐ It will promote excessivr land subdivision in the County hence threatening the food security of the County due to uneconomical land sizes for agricultural production. ☐ Informal settlements will sprout up in urban, town and market centers due to land of planning in urban areas. ☐ It will lead to economic backlog due to poor intra and inter linkages and connectivity to markets and centres. ☐ It will lead to continued settlement on steep slopes will degrade land on these fragile areas leading to soil losses and downstream siltation.
Scenario 2: Tourism Led Growth Scenario	If the County grows based on Tourism alone, it will lead to: **POSITIVE IMPLICATIONS:** ☐ Promotion of both the existing and proposed tourist sites and the rich local culture of Nyeri County ☐ It will lead to the utilization of untapped tourism potentials in areas such agritourism for the County. ☐ It will foster the promotion of Nyeri County as a MICE destination for holding of Meetings, Conferences and Exhibitions. ☐ Economic development for the towns along the tourism circuit. **NEGATIVE IMPLICATIONS:** ☐ It does not give growth development strategies for the towns within the tourism corridor, which might lead to haphazard and unplanned growth of towns.
Scenario 2: Tourism Led Growth Scenario	If the County grows based on Tourism alone, it will lead to: **POSITIVE IMPLICATIONS:** ☐ Promotion of the tourist sites and the rich local culture of Nyeri County ☐ It will lead to the utilization of untapped tourism potentials in areas such agritourism for the County. ☐ It will foster the promotion of Nyeri County as a MICE destination for holding of Meetings, Conferences and Exhibitions. ☐ Economic development for the towns along the tourism circuit. **NEGATIVE IMPLICATIONS:** ☐ It does not give growth development strategies for the towns within the tourism corridor, which might lead to haphazard and unplanned growth of towns.
Scenario 4: Land Management Scenario	If the County grows based on the Agro-Industrial approach, it will lead to: **POSITIVE IMPLICATIONS:** ☐ Maximization of agricultural production in the County. ☐ The promotion and establishment of agro-industrial zones. ☐ It will go a long way in building the capacity of farmers in the County on the use of smart farming techniques and intensive small holder farming. ☐ It will lead to the maximum exploitation of the value chains of different agricultural products in the County (both crops and livestock) ☐ It will lead to the creation of an appropriate and enabling business environment for investors into the Industrial zones.

	NEGATIVE IMPLICATIONS. ☐ It does not highlight the utiization of the transportation corridors in the County, which comprise of road, rail and air. ☐ It does not address the economic growth strategies the County.
Scenario 5: Spatial Development Corridor Scenario	If the County grows based on the Spatial Developmment Corridor Scenario, it will lead to: **POSITIVE IMPLICATIONS:** ☐ The develop of a multimodal connectivity among the various transport modes through integration and utilization of road, rail and air transport. ☐ It will lead to the integration between land use and transportation, which will foster the creation of self-sustaining economic corridors. ☐ Maximization of agricultural production in the County by linking the agricultural production areas to the transportation corridors and to agro-industrial zones. ☐ It highlights and links the tourism circuit corridor, linking tourism sites across the County to each other, hence promoting the tourism sector. ☐ It promotes the conservation of the environment and eco-system in the County as this also promotes tourism in the County. ☐ It will lead to the creation of agro-industrial zones where agricultural produce will undergo processing and value additon for sale to the external and local markets. ☐ It will prompt to the preparation of growth of Physical and Land Use Development Plans for towns along the development corridors, hence creating growth management strategies for urban areas and human settlements. ☐ It assigns functions to towns, which will anchor the economies of the specific towns. This scenario explores all development sectors in the County hence promoting wholesome developmement across all sectors. More importantly, it links Nyeri County with an international corridor, the Northern Corridor, which is a proposed multimodal trade route linking the landlocked countries of the Great Lakes Region with the Kenyan maritime seaport of Mombasa. It is therefore the preferred scenario of development for Nyeri County.

PART IV:
PLAN PROPOSALS

CHAPTER FOURTEEN:

POLICIES, STRATEGIES AND ACTIONS

Strategies are the courses of action geared to the achievement of the vision of any entity. The strategy formulation process is informed by the existing background documents, synthesis in terms of the potentials, opportunities and constraints of data collected, the consultant's experience and stakeholders' inputs gathered throughout the process.

Disclaimer: The implementation of the projects will commence after 2 years. This is attributed to the fact that the first 2 years of the plan period have been used in plan preparation.

14.1 Environmental Conservation Strategies

a) Forests Conservation Strategy:

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Forests	Promotion of tourism	Diversification of tourism revenue streams: Wildlife tourism	Aggressive marketing of the tourism circuit in Nyeri County, regionally and internationally Mapping of the wildlife migratory routes especially within Mt. Kenya forest and Aberdare forest and zone them for conservation	KFS KWS National Museums of Kenya CGN Private sector	Increased tourism numbers Increased tourism revenue Map showing the wildlife circuit within the county accessible to the public			

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
	Increased forest cover	Afforestation and reforestation of all degraded forests.	Preparation of forest management plans for all gazetted forests, especially county forests (Nyeri Hill forest, Tumutumu forest, Karima hill forest Yana hill forest)	CGN KFS. NEMA KWS.	Increased land cover being dedicated under forests. Increased cover being under agro-forestry. · Minimized human wildlife conflict. Completed forest management plans. Decreased forest encroachment ·		■	■
			Gathiuru Forest, Nanyuki Forest/ Kahurura Forest to be fenced and protected from encroachment and deforestation				■	
			Fencing of county forests; Nyeri hill, Tumutumu, Karima, Nyana hill.				■	■
			Mapping of forest degradation hotspots in Mt Kenya, South Laikipia and Aberdare forest as the key water catchment areas		Forest modelling software detecting and monitoring encroachment within the forests	■	■	
			Encouraging Agro-forestry practices to increase tree stocks in South Laikipia forest		Increased forest cover within agricultural farms	■	■	■
	Promotion of forest tourism	Wildlife tourism, adventure tourism (such as hiking, camping, zip-lining)	Mapping of nature trails and tourism tracks within Mt. Kenya and Aberdare forest.	KFS KWS CGN Private sector	Increased tourism activities within the county Increased revenue collected due to tourism activities	■	■	

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
	Forest protection and conservation	Forest protection from deforestation and encroachment	Erecting of a perimeter fence around county gazetted forests to curb encroachment; Tumutumu forest, Nyeri hill forest, Karima hill forest and Nyana Hill forest	CGN KFS. NEMA KWS. NGOs CBOs. Local communities.	Conservation of biodiversity. Increased forest and vegetated areas. Improved conservation efforts. .			
			Integration of the Chehe Forest Management plan with the County spatial plan					
			Maintaining a forest buffer of at least 60 meters from the forest reserve especially along Aberdare forest and South Laikipia forest in Gataragwa ward.		Implementation of forest laws and limited encroachment into forest reserves.			
			Awareness creation on forest importance and conservation within the County		Increased conservation efforts towards conservation.			
			Awareness of better ploughing and grazing methods to preserve the forests, Aberdare forest, South Laikipia and Mt Kenya forests.		Reduced encroachment into forest ecosystems. Increased tree cover			
		Improved forest management	Participatory forest conservation projects such as ecotourism in Mt. Kenya forest, Tumutumu forest, Aberdare's, South Laikipia, Nyeri hill and Karima hill.	KFS. KWS CGN Local Communities.	Community participation in conservation efforts			
			Effective trans-boundary management of all Forest reserves especially Mt. Kenya and Aberdare Forests		Increased coordination regrading forest conservation and protection. Increased tree planting activities to increase forest cover.			

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
			Participatory forest conservation projects such as ecotourism in Mt. Kenya forest, Tumutumu forest, Aberdare's, South Laikipia, Nyeri hill and Karima hill.	KFS. KWS CGN Local Communities.	Community participation in conservation efforts			
			Effective trans-boundary management of all Forest reserves especially Mt. Kenya and Aberdare Forests	KFS. County governments KWS	Increased coordination regrading forest conservation and protection. Increased tree planting activities to increase forest cover.			
			Deployment of forest department personnel within the major county and national gazetted forests. Provision of phone and network for communication across the county	KFS. KWS	Protection of environmentally fragile zones. Increased patrols and monitoring of activities within the forests. Improved daily updated regarding emergency response in case of forest fires.			
			Developing of updated database system and a monitoring software for forest, especially in monitoring the forest edges of South Laikipia, Mt Kenya and Aberdare forest.	KFS. KWS CGN	Availability of GIS database for all forests across the County.			

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
		Alternative wood fuel energy sources	Encouraging alternative energy sources such as briquettes to reduce demand for firewood and charcoal especially around Aberdare, South Laikipia and Mt Kenya forests	CGN KWS. NGOs CBOs	Reduced use of wood fuel especially cutting down of trees for charcoal burning within the forests			
			Sensitization on use of solar energy especially in Kieni West and East sub counties as substitute energy source		Reduced energy demand Increased use of solar panels Increased use of biogas Increased forest cover			

b) Wildlife Conservation Strategy.

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Wildlife and Scenic Resource	Promotion and conservation of wildlife and scenic resources	Scenic Resources	Conservation of Mau Mau caves in Aberdare forest and Mt. Kenya Forest reserve	CGN KWS KFS National Museums of Kenya	Increased number of tourists to the county to visit the tourist sites Improved connectivity			
			Promotion of Sagana Falls, Ruiruru Falls, Karima Hills, Thimita waterfalls, Crying Tree of Ihithe, Wamagana Historical Caves, Ruringu museum as tourist destination sites within the County.					
			Involvement of local communities (eco-villages) within Aberdare and Mt Kenya forest where historical Mau Mau caves exist.		Improved awareness on the need to conserve and create more eco villages attracting more tourists			
			Promote the identified tourism circuits through branding and investment forums for the County		Established tourist circuit and increased tourism investments within the county; hotels and lodges			
			Improve linkages between tourism attractions sites especially linking Mt. Kenya forest and Aberdare forest		Upgrading of road infrastructure along the tourist circuit to enhance efficiency and improve access to tourist sites			
		Conservation of wildlife resources	Establishment of a buffer of 50m around Tumutumu, Nyana, Nyeri forests Watuka Observation hill	KWS KFS CGN	Reduced human-wildlife conflict Increased wildlife conservation efforts Increased tourism within the County			

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
			Encouraging planting of trees on wetlands especially along major rivers, Sagana, Gura, Amboni, Nairobi and Ewaso Ngiro to be habitats for birds hence encouraging bird watching for tourists.		Increased species of birds hence attracting tourists			
	Reduction of human-wildlife conflict	Human-wildlife conflict management	Control of human wildlife conflict at Kihuyo in Kiganjo Mathari by erecting fence	KFS KWS CGN	Reduced huma -wildlife conflict			
			Completion of fencing of Aberdare National Park in Gataragwa ward		Restricted access into Aberdare forest and Mt Kenya hence limiting encroachment			
			Completion of fencing of Mt Kenya National Park and Reserve					

c) Water Conservation Strategy:

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Water	Sustainable utilization of water resource	Irrigation and flood control	Proposed Gathirathiru dam in Magutu ward	CGN WARMA NEMA. NGOs. WRUAs Local communities	Operational dam and improved access to water for domestic use			
			Expansion of Ragati and Magutu dams to have larger capacity		Increased capacity improving access to water for irrigation and domestic use			
			Rehabilitation of Ichakinyoni dam in Rugi ward		Upgraded infrastructure hence better access to the dam for water			
			Construction of a dam in Gatururu-Gitiruri bridge in Mahiga ward					
			Construction of dams along dams along Gura, Gikira and Ruarii rivers in Mukurweini west		Flood control and more access to water for agricultural use			
			Construction of Dam along River Sagana in Konyu ward		Increased irrigation within the wards and increased agricultural production			
			Proposal to rehabilitate Muriuki Anderson dam in Gatarakwa ward to help in harvesting of irrigation water for farmers					
			Commissioning of a detailed feasibility study along the following major rivers: Sagana, Amboni, Gura, Ewaso Ngiro, Chania for construction of dams					
	Protection of water sources.	Protection of riparian reserves.	All rivers in the County should have their riparian reserves protected (a distance of 30-60 meters on either side based on the highest recorded flood level) depending on the water volume of the rivers.	CGN WARMA NEMA. WRUAs	Conservation and protection of wetlands			

Sectors		Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
			Planting bamboo tree species along riparian reserves to prevent siltation into water bodies and control in soil erosion	Local communities	Increased bamboo trees within the county hence increasing the tree cover.			
			Encourage apiculture along riparian reserves; Sagana river, Amboni, Nairobi river.	NGOs. CBOs CCN	Increased honey harvesting for commercial and domestic markets within the county			
			Controlled abstraction of water through issuing of license by NEMA	CGN	Increased water volumes especially from streams			
			50 meters buffer between irrigation schemes and their water discharge points	NEMA				
		Flood control	Construction of small multipurpose flood control dams especially along major rivers; Sagana, Chania, Gura, Tana, Amboni.	CCN	Reduced flooding downstream			
		Rehabilitation of existing dams	Rehabilitation of existing dams; 1. Kamoino dam Dam in Karima ward, 2. Kiuru Dam in Ruringu ward 3. Karangia and Wandumbi Dams in Wamagana ward	PPP CGN WARMA	Upgraded dams for irrigation and water provision			

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
		Improved water resources management	Preparation of long-term water resources plans especially in Kieni west and Est sub counties experiencing poor access to water. Vibrant community involvement in water resources management. Integration of both modern and ancient water conservation and management measures	PPP CGN WARMA NEMA.	Better managed water resources Reduced demand for water			
		Water springs protection.	100 meters buffer from springs along which trees can be planted.	CGN	Protected water springs			
			Encasing the sources of springs most at risk in concrete, forcing water to flow through a pipe rather than seeping from the ground, thus preventing siltation and contamination from groundwater.	PPP	Clean and safe water for domestic use Increased number of community forums on riparian conservation. .			
			Community maintenance of protected springs coupled with behaviour modification among community members to stop contaminating water sources.	CGN	Elimination of murram harvesting along the minor streams			
		Underground water protection	Underground water reserves require a buffer of 100 meters each. This should be applied in Kieni West and Est where the use of boreholes as the major source of water.	WARMA	Improved underground water quality			
		Wetlands Protection	Buffer of 30 meters from the high-water mark should be maintained; Muringato and Hombe wetlands. Encouraging bamboo tree along wetlands within the county and along riparian reserves.	NEMA.	Conserved wetlands and riparian reserves. Mapped out wetlands for conservation and protection with data easily updated			

d) Soil Conservation Strategy:

Sector	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Soil	Conservation of soil.	Landslide control and management	Afforestation and reafforestation to increase ground cover especially in Igutha, Kiamucheru, Giathugu, Kiirungi and Kigathi areas where erosion is often experienced	CGN NGOs CBOs	Increased tree cover and conservation efforts			
			Creating awareness to residents against developing and cultivation steep slopes areas along Nyana Hill, Kiamucheru Hill, Gikondi, and Rugi ward					
			Encourage contour farming and construction of terraces on slopes above 15 degrees farming in Rugi and Gikondi ward		Reduced soil erosion			
		Soil conservation in the whole County.	Construction of a retaining wall in Wandere landslides in Mahiga ward	CGN	Reduced landslides within the area			
			Controlled charcoal burning activities especially in Mt Kenya forest stations, and Aberdare's	CGN NGOs CBOs	Alternative use of other sources of fuel such as LPG hence reduced charcoal burning			
			Capacity building on proper farming and grazing techniques to encourage soil conservation and eradicate soil erosion		Improved farming practises Improved soil fertility			
			Development in areas of slopes of above 20-40 degrees should be restricted to only planting of trees, grass or bananas	Local Communities	Minimal development especially settlements on steep slopes Increased tree cover within hilly areas.			

e) Murram Soil, Ballast and Construction Stone Strategies:

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Murram soil, ballast and construction stones.	Utilization of the murram soil and stone resources.	Murram soil harvesting.	Murram soil harvesting may be allowed from specific excavation areas in Gataragwa ward	CGN NEMA. WARMA Ministry of Natural Resources. NEMA. Local communities	Controlled murram soil and stone l harvesting Protected quarries and sites Increased safety within sites where stone and murram are mined			
		Stone Mining	No stone mining will be allowed on any steep slopes Kangema.					
			No stone mining shall take place within 100 meters of either side of any physical infrastructure in Kirigo and Gaithebura.					
		Ballast blasting	1km radius buffer recommended for quarry sites in Mweiga, Maragima, Nyaribo, Mureru, Gathigu, Kangema and Kahuti		Controlled ballast and stone harvesting			
			Encouraging afforestation around quarries especially in Kangema, Kihuti, and Mweiga areas.		Increased tree cover within the county			

f) Green Energy Resources Strategy:

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Green Energy	Utilization of green energy resources.	Hydropower generation	Building of dams and construction of hydropower stations along rivers Sagana, Gura, Chania, Ewaso Ngiro.		Alternative sources of energy from solar and biomass supply. Reduced reliance on electricity and wood fuel. Increased supply of hydropower energy			
			Feasibility studies on other possible sites for hydropower generation		Mapped out hydrological sites for potential hydropower generation			
		Solar energy tapping	Tapping of solar energy in sections of Mugunda and Gakawa wards.		Acquired skills on management of the solar energy. Increase in use of solar energy Reduced demand for electricity supply			
		Biogas	Creating awareness in use of biogas energy across the County as an alternative to cooking energy Investing in use of biogas technology to help reduce the demand for energy within the County	CGN NGOs CBOs	Increased use of biogas energy in the County			

g) Land Resource Strategy

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	Medium Term	Long Term
Land	Improved management of Land Resources	Digitized County Land Information System	Development of a digitized County Land Information System within the county lands department	CGN National Land Commission Local communities	Established land information system			
		Land Conflict Resolution	Establishment of community and village elder land dispute resolution committees in the whole County Community meetings for sensitization against land conflict in the whole County	CGN National Government Civil society (NGOs, CBO's and FBO's) Local communities	Reduced land conflicts			
Private (Urban Land)	Sustainable Use of Land Resources	Preparation of Local Physical Development plans to guide urban land use	Preparation of physical development plans for major towns in the County; Othaya, Mweiga, Chaka, Mukurweini, Narumoru.	CGN	Coordinated development in the major towns Manage land speculation			

<table>
<tr><th rowspan="2">Sectors</th><th rowspan="2">Strategies</th><th rowspan="2">Program</th><th rowspan="2">Projects</th><th rowspan="2">Actor</th><th rowspan="2">Outcome</th><th colspan="3">Time Frame</th></tr>
<tr><th>Short Term</th><th>Medium Term</th><th>Long Term</th></tr>
<tr><td>Private (Urban Land)</td><td>Sustainable Use of Land Resources</td><td>Preparation of Local Physical Development plans to guide urban land use</td><td>Preparation of physical development plans for major towns in the County; Othaya, Mweiga, Chaka, Mukurweini, Narumoru.</td><td>CGN</td><td>Coordinated development in the major towns

Manage land speculation</td><td></td><td></td><td></td></tr>
<tr><td>Private (Agricultural Land)</td><td>Sustainable Use of Land Resources</td><td>Control Land Fragmentation</td><td>Development of site-specific subdivision land sizes through enacting of relevant policy and zoning regulation.

<table><tr><th>Agro-ecological zone</th><th>Minimum Land Size</th></tr><tr><td>Low Potential Area</td><td>4 Hectares

10 acres</td></tr><tr><td>Medium Potential Area</td><td>2 hectares

5 acres</td></tr><tr><td>High Potential Area</td><td>1 hectare

2.5 acres</td></tr></table>
Promote intensive cultivation to sustainable incomes among small holder farmers across the County</td><td>CGN

National Land Commission

Local communities</td><td>Economical agricultural land holdings</td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th rowspan="2">Sectors</th><th rowspan="2">Strategies</th><th rowspan="2">Program</th><th rowspan="2">Projects</th><th rowspan="2">Actor</th><th rowspan="2">Outcome</th><th colspan="3">Time Frame</th></tr>
<tr><th>Short Term</th><th>Medium Term</th><th>Long Term</th></tr>
<tr><td></td><td></td><td>Control Land degradation</td><td>Enforcement of the recommended livestock carrying capacity
<table><tr><th>AEZ:</th><th>Proposed Use:</th><th>LU/Ha:</th></tr><tr><td>UH1</td><td>Sheep Dairy zone</td><td>0.3</td></tr><tr><td>UH2</td><td>Pyrethrum zone</td><td>0.4</td></tr><tr><td>UH3</td><td>Wheat/ Barley</td><td>0.4</td></tr><tr><td>UH4</td><td>Ranching/Barley</td><td>0.8</td></tr><tr><td>UM2/UM3</td><td>Coffee zone</td><td>1.1</td></tr><tr><td>UM4</td><td>Upper Sisal Zone</td><td>1.2</td></tr><tr><td>LH1</td><td>Tea Zone</td><td>0.6</td></tr><tr><td>UM1</td><td>Coffee Tea zone</td><td>0.8</td></tr></table></td><td>CGN

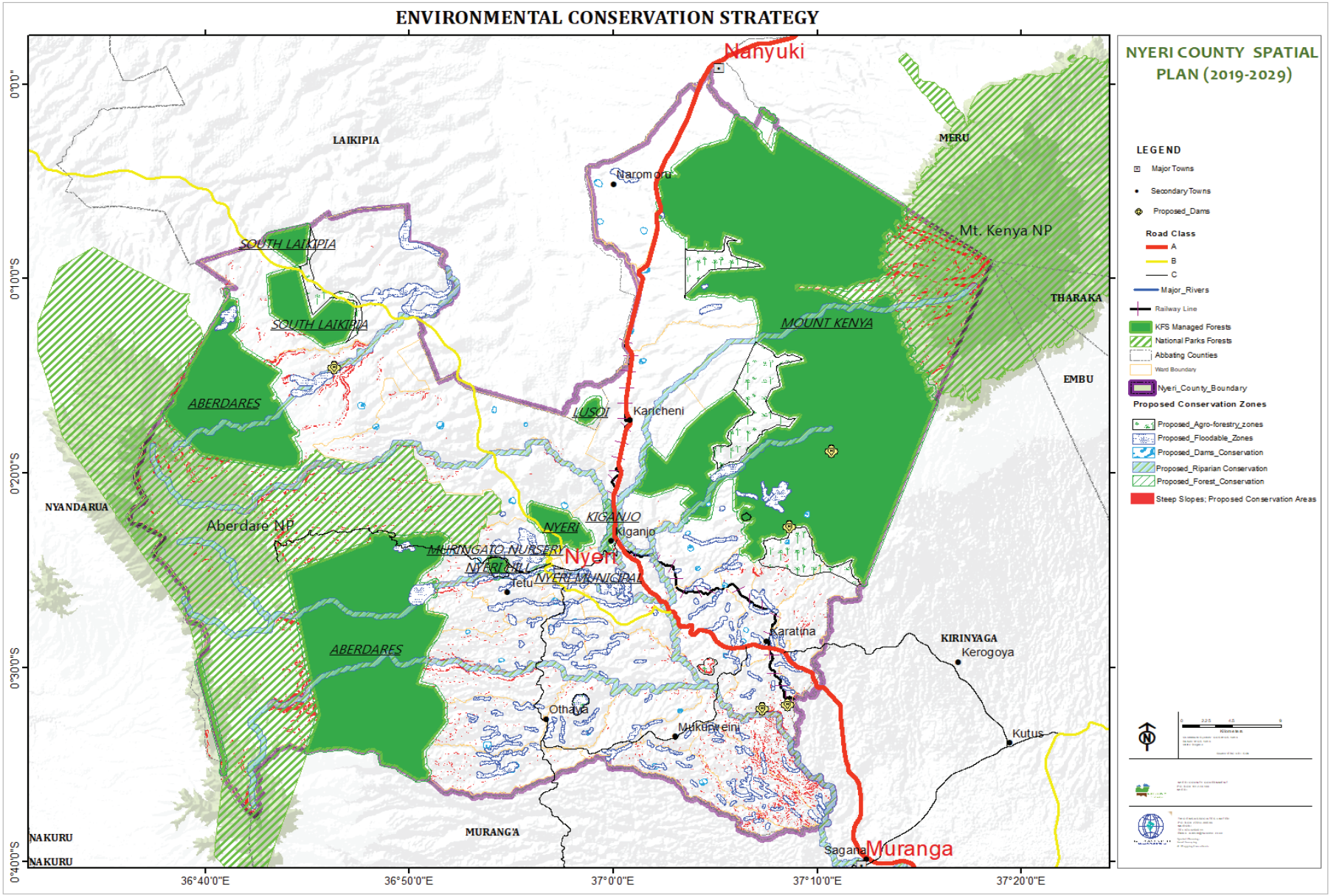
National Land Commission

Local communities</td><td>Minimal subdivision within the county especially within agricultural zones</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>Tenure Promotion</td><td>Speeding up and easing the process of issuance of title deeds especially in the colonial villages</td><td>CGN

National Government</td><td>Increased security of tenure</td><td></td><td></td><td></td></tr>
</table>

Sectors	Strategies	Program	Projects	Actor	Outcome	Time Frame		
						Short Term	**Medium Term**	**Long Term**
		Soil Conservation	Soil fertility monitoring across the County Bench terracing on areas with slopes greater than 15% in the County Community sensitization on soil conservation techniques	CGN Local communities	Enhanced soil fertility knowledge Reduced soil erosion			
Public Land	Preservation of public Land	Control of land grabbing	Identification and mapping of all public land across the County and establishing of land banks within the county. Repossession and fencing of grabbed public land (open spaces, road and public utilities reserves) across the County Public participation in surveying and planning to reserve public lands	CGN National Land Commission	Increased information on public land in County Secured public lands			
		Soil Conservation on Riparian Reserves	Planting protective shrubs and trees to protect riparian reserves in the County; Muringato, Hombe among others. Community sensitization on the importance of protecting soil on riparian reserves across the County	CGN Local Communities	Increased riparian soil conservation Increased community awareness on riparian reserves soil protection			
Gender Inclusivity in Land Matters	Women Empowerment	Inclusion of women in land matters	Community sensitization on the rights of women to own land in the whole County Involvement of women in decision making on land issues across the County	CGN NGOs CBOs Local Communities	Gender equity in land matters			

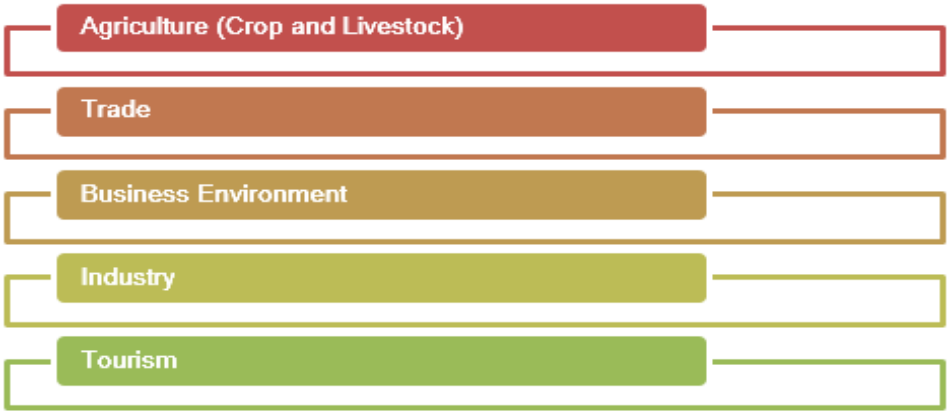
Map 130: Environmental conservation strategy



Source: Two EMS Associates, 2019.

14.2 Economic Development Strategy

The goal of the economic strategies is to boost the economic growth of the County by strengthening the economy in the following sub-sectors:



a) Agriculture (Crop Production) Strategies:

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
Agriculture	Value Chain Maximization: (Maize, irish potatoes, cabbage, carrots, onions, wheat, macadamia, avocado, mangoes) Traditional High Value crops (Tea, Coffee)	Improve Access to farm Inputs by:	Regulate counterfeit agricultural inputs into the market in the County.	National Government, CGN, Financial Institutions, KALRO, Wambugu Farm ATC,Local Communities	Improved access to farm inputs leading to small holder farmer development			
			Farm inputs subsidies/ farm input loans in the County	National Government, CGN, Financial Institutions, KALRO, Wambugu Farm ATC,Local Communities	Improved access to farm inputs leading to small holder farmer development			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Encourage private sector stockiest through subsidized rates in the County	National Government, CGN, Financial Institutions, KALRO, Wambugu Farm ATC,Local Communities	Improved access to farm inputs leading to small holder farmer development			
			Sensitization on the importance of using improved Input varieties in the County. Upgrade present research on applicable farm inputs e.g. improved seed varieties in the County	National Government, CGN, Financial Institutions, KALRO, Wambugu Farm ATC,Local Communities	Improved access to farm inputs leading to small holder farmer development			
			Promote the formation of farmer SACCOs that promote farm input supply at affordable prices in the County		Improved access to farm inputs leading to small holder farmer development			
		Soil fertility monitoring and testing:	Research on soil samples for their water content, PH and salinity levels cross the County	National Government,C-GN,KALRO,ATC,Donors Government,C-GN,KALRO,ATC,Donors	Appropriate soil health schemes in the County			
			Establishment of a soil testing center in every sub-county (Nyeri, Wamagana, Narumoru, Mweiga, Karatina, Mukurweini, Othaya and Thunguma towns		The County will have an existing soils condition report to advise farmers on type of agricultural activity to undertake			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Capacity building to farmers on suitability crops across the County					
			Issuance of the soil health cards to farmers across the County					
			Developing an update system on the condition of soils in the County					
			Promoting and capacity building on organic farming to reduce acidity of the soil					
		Control and management of crop diseases	Promote farm-based disease monitoring and management in the whole County Promote the use of organic pesticides in the whole County	CGN KALRO	Reduction and eradication of crop disease			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Use of technology in agriculture:	Encouragement of research and development of innovative small holder technological know-how in the whole County Improve agriculture mechanization in the whole County Invest in commercially subsidized farming machinery in the whole County. Sensitization on the economic benefits of agricultural mechanization in the whole County Promote technology-based farm management systems in the whole County Capacity building of women and youth on emerging trends in crop and livestock production in the whole County	CGN	Effective and efficient agricultural methods Intensive agriculture Mechanized agriculture Increased productivity Women and youth participation in agriculture			
		Diversifying crop breeds	Encourage new breeds of crops for better yields and resistance to pests and diseases	CGN Wambugu Farm ATC	Diversified agricultural products			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Replacing the old tea clones with new high yielding drought tolerant clones					
			Diversify tea breeds to green and purple tea for diverse tea markets locally and internationally within Ragati and Gathuthi tea factories.					
			Incorporating Orthodox tea in all tea factories alongside the already existing CTC method					
			Encourage growing of avocado, macadamia and apples in the tea zones to compliment the tea revenues.					
		Promotion of agricultural irrigation projects:	Preparation and implementation of an irrigation policy for County-based irrigation programs Promote run-off water and roof catchment-based irrigation in the whole County	National Irrigation Board CGN Private Sector NGOs	Irrigation lead agriculture			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Up scaling, upgrading and revival of existing irrigation and water projects like - Upper and Lower Maguto irrigation scheme in Karatina Town Ward for horticulture - Sagana irrigation scheme in Mukurwe-ini Central Ward - Hohwe Dam in Kirimukuyu Ward - Revival of Kahuoine water project in Mahiga ward - Kaharo & Gathero irrigation schemes in Gikondi ward - Gathathini, Lusoi, Thung'ari, Karichen, Gatuamba dams in Theigu River ward - Ndathi-Mbiriri irrigation project in Kabaru ward Development of irrigation projects in - Konyu ward along River Tana - Iria-ini Ward along river Thuti, river Gikira, river Mumwe, or river Gura. - Mugunda ward along river Ewaso Nyiro, or river Karimino - Magutu ward along river Ragati - Iriani ward along river Kururu - Kabaru ward along Nairobi river - Narumoru ward along Narumoru river - Endarasha ward along Amboni river					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Improving efficiency and effectiveness of extension service provision:	Increasing number of extension officers to complement aging extension work force. Investment in extension officer mobility in the whole County. Promote participation of women farmers in extension training courses.	CGN NGOs	Effective and efficient extension services			
		Improve access to markets:	Encourage and build the capacity of farmers to form and run marketing SACCOs. Use local mass media to communicate and inform on existing marketing channels. Establishment of regional and international bilateral marketing agreements by the County.	CGN Private Sector NGOs	Improved market incomes Reduced exploitation of farmers by brokers and middlemen			
			Revive the inactive cooperatives in the County like; - Nyeri County Vegetables Cooperative Society - Nyeri County Bananas Cooperative Society - Kidagata Dairy Goat FCS - Thuruthuru Dairy FCS Ltd - Chinga Dairy CS - Greenland Dairy Processor Union					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			- Royal Alliance Sacco - Thegu Dairy CS - Nyeri County Quail CS - Nyeri County Milk CS - Nyeri County Fish Farmers - Nyeri County Rabbit CS - County Bananas CS - Aqua Agribusiness CS - New United Dairies CS - Ihwagi Dairy FCS Improve transport infrastructure to ease transportation of agricultural produce to the markets Improve security in the County to reduce theft of agricultural produce for the markets especially coffee berry and macadamia nuts Encourage women in join co-operatives in the whole County Training of both men and women farmers on the market dynamics in the whole County					
		Improve access to agricultural credit:	Sensitize to counter the fear of acquiring loans across the County. Lobby for farmer friendly MFIs and lending products in the County. Strengthen access to land for women and youth to enable collateral advantage. Capacity building on how to access affordable credit eg. Uwezo fund, WEF.	National Government CGN Banks and MFIs NGOs Agricultural Finance Cooperation (AFC)	Improved agricultural Lending			

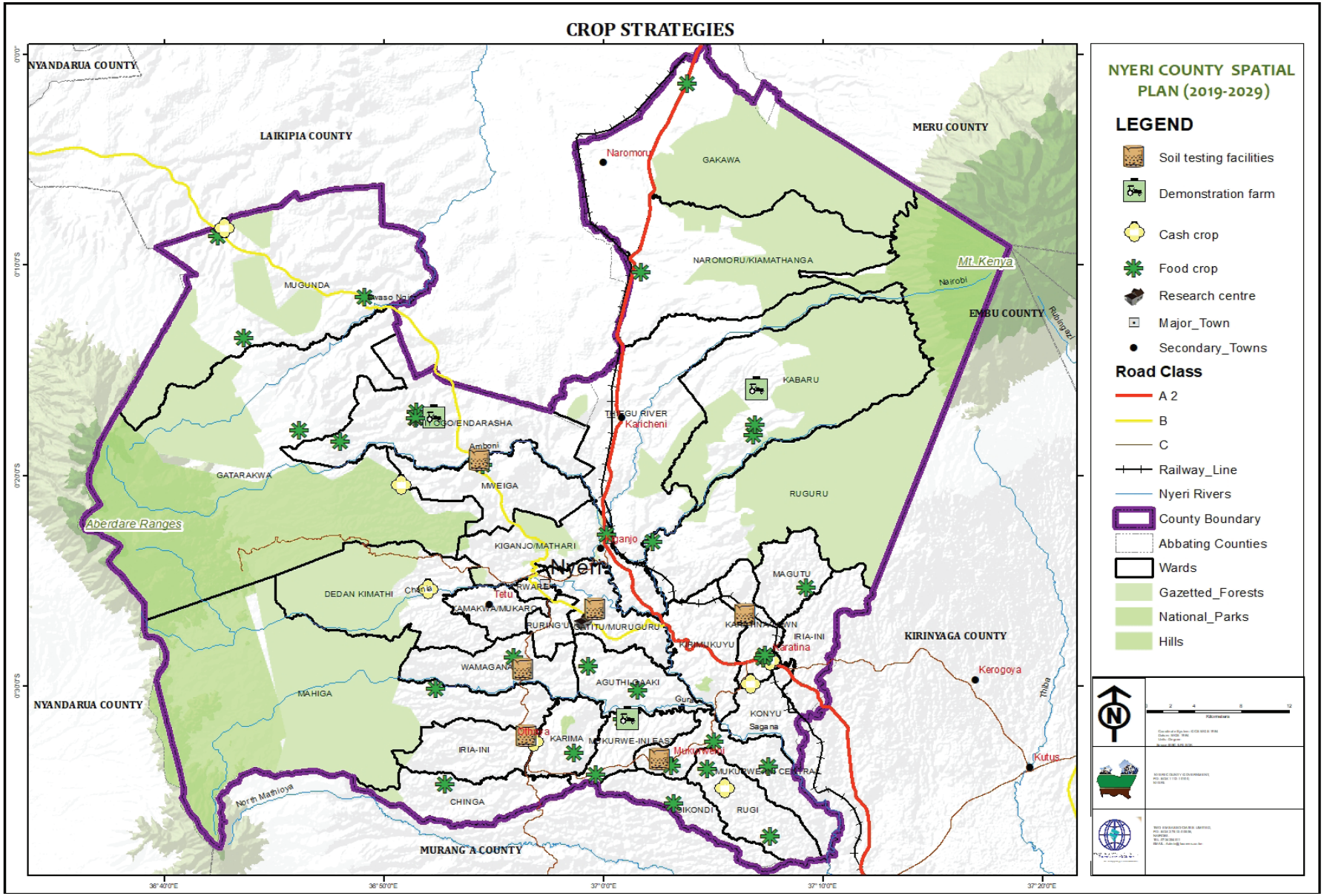
Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Promotion of climate Smart Agriculture	Research into potential climate smart agricultural initiatives across the County. Sensitization and off take of climate smart agricultural techniques across the County Enhance Equitable access to and use of NRM/ weather/CC adaptation advisory services and appropriate technologies particularly for vulnerable groups in the whole County Promote research on the effect of climate change to emergence and prevention of new crop pests and diseases	CGN Tea and coffee research institutes NGOs and bilateral organizations	Improved climate change resilience			
		Promote farmer education and capacity	Promote capacity on: Crop varieties and crop intensification techniques across the County. Soil fertility and soil preservation across the County Crop disease management Value addition Marketing Crop pests and disease prevention and treatment across the County Tailoring education programs at technical and village polytechnics in agricultural production across the County	CGN NGOs	Farmers with improved farming capacity			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Need for demonstration farms to promote good agricultural practices in Endarasha. Warazo and Tambaya Set up an agricultural research centre at Wambugu farm Set up seminars on empowerment of women farmers through training, facilitation, and networking in the whole County	CGN NGOs	Farmers with improved farming capacity			
		Investment on the revival of stalled high potential crops	Revival of onion as an alternative cash crop in Kieni West sub-County Introduction and farmer capacity building on high value potential crops such as horticulture in Kieni East and West sub-counties	National Government CGN KARLO Wambugu Farm ATC	Revival of onion production and other high value potential crops in the County			
	Promote Agro-Industrial Development	Facilitation of Investors	Attraction and facilitation of investors through innovative PPPs in industrial investment in the County.	National Government	Agro Industrial led growth and Development			
		Establishment of Industries	Construct avocado collection centres in Kamoini, Giakaibei, Gititu, Wamagana, Thangathi, Chinga Construct of an avocado processing plant in Mukurweini and Munyange Construction of macadamia processing plant in Karatina and Gatarakwa. Construction of a potato collection centre in Gatarakwa	CGN Private Investors				

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Establishment of Industries	Construction of a potato processing plant in Mwiyogo and Narumoru Construction of a tea processing factory in Ngooru Construction of a banana processing plant in Tambaya and Kiawaithanji Construction of a banana ripening and collection centre in Mihuti Construction of a wheat milling industry in Kiawara and Nairutia Construction of an arrowroots and sweet potatoes processing industry in Ichamara Construction of a carrot packaging industry in Karatina Construction of a horticulture industry in Kimahuri to process cowpeas and French beans Construction of a storage and collection centre for horticulture produce in Charity and mikundi Construction of an onion industry in Nairutia Construction of an onion storage and collection facility in Mwiyogo	National Government CGN Private Investors NGOs National Government CGN Private Investors NGOs	Agro Industrial led growth and Development			

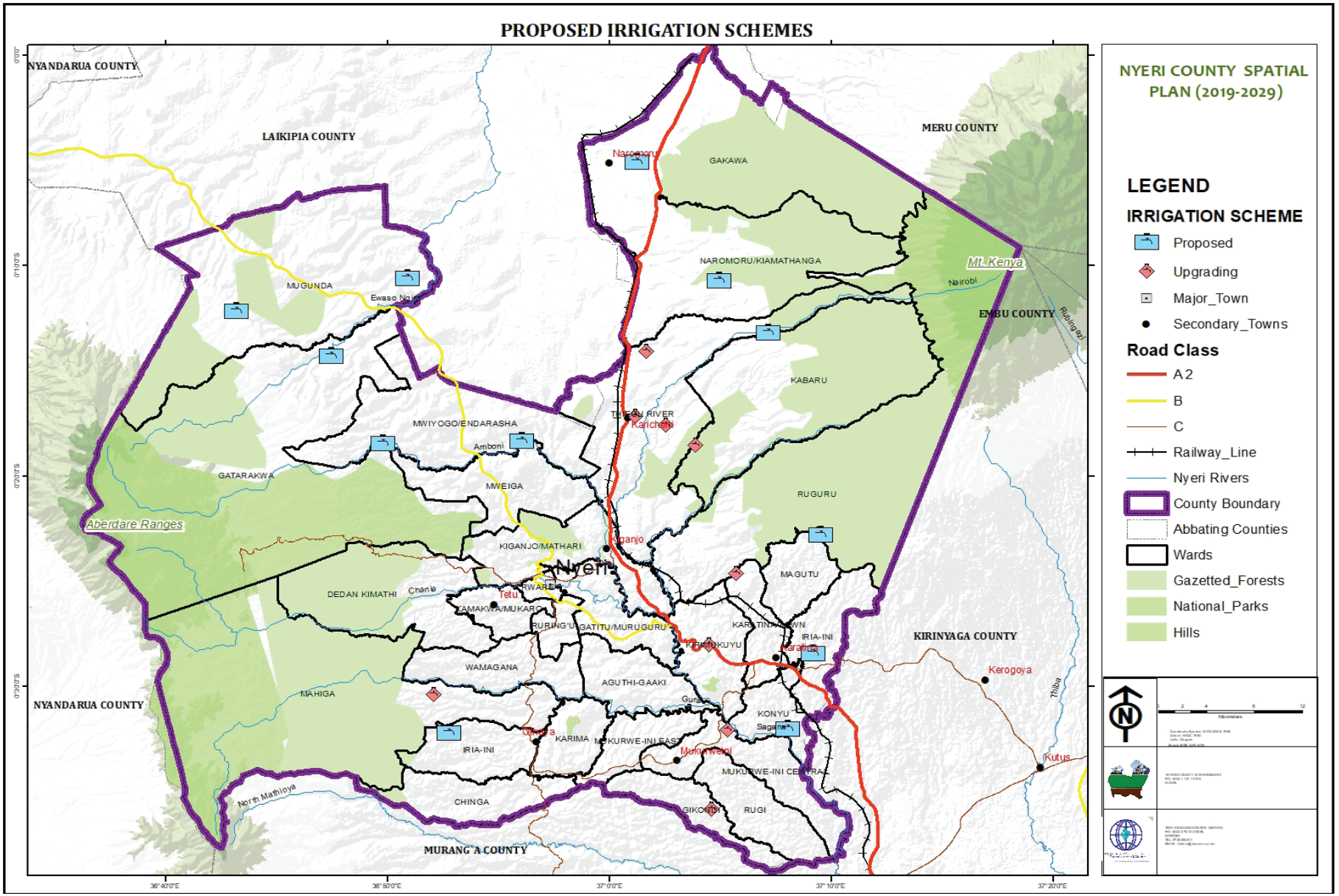
Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Establishment of Industries	Construction of Mangoes processing plant in Kamwa Construction of storage facility Giathangu cereal depot, Mweiga silo and gakindu silo	National Government CGN Private Investors NGOs	Agro Industrial led growth and Development			
		Upgrading existing industries	Upgrade and expand the Othaya Coffee Millers factory to roast, value addition and branding local Nyeri coffee					
		Reviving of collapsed industries in Nyeri County:	Reviving the cabbage industry in Karatina					
		Construction and revival of storage facilities	Construction of a potato storage facilities in Ndathi Construction of silos/storage in Gakindu and Mweiga Revive the NCPB silos in Kiganjo	National Government CGN Private Investors NGOs				

Map 131: Crop strategy



Source: Two EMS Associates, 2019.

Map 132: Proposed Irrigation Schemes



Source: Two EMS Associates, 2019.

b) Agriculture (Livestock Production) Strategies:

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
Agriculture (Livestock Production)	Livestock Value Chain Maximization: Cattle Meat Milk Goats Sheep Rabbits Fishing Wool Honey	Improve livestock breeds:	Capacity building on the importance of rearing improved livestock breeds and appropriate animal husbandry techniques. Promote the use of A.I. on improved livestock breeds to counter attitude change. Promotion of zero grazing to counter the reducing grazing fields and improve dry matter feeding in Kieni East and West sub-Counties. Provision of credit and livestock training facilities to women to encourage them to participate in livestock production.	CGN Private Sector Wambugu Farm ATC	Improved livestock breeds			
		Improve access to pasture:	Promotion of Hay stores (strategic reserves) for dairy animal feed in Ihururu, Wamagana, Ruring'u and Mahiga Hay storage facility at Narumoru, Mweiga, Gakawa and warazo CGN to provide seeds for pasture in the whole County.	CGN	Established strategic pasture reserves			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Improve access to veterinary services/	Converting some of the existing cattle dips to vet units with AI services, vaccination points, and holding grounds in Mukurweini, Othaya, Mathira East and West, Tetu and Nyeri Central sub-counties. Creation of new vet units with AI services, vaccination points, and holding grounds in Munyu, Lusoi, Bagdad, Manyata and Aguthi. Promotion of private veterinary service providers and Community Animal health Workers (CAHW) in the County Promotion regular vaccination, and disease control initiatives in the County Establishment of an animal laboratory in Narumoru, Mweiga, Nyeri, Othaya, and Karatina.	CGN Private Sector Wambugu Farm ATC	Accessible and affordable animal health Reduced emergency response time to livestock pests and diseases.			
		Improve efficiency of extension services:	Adequate staffing to promote extension services to the ward level Improve facilities especially transport facilities in the County to reduce the time the extension officers reach the farmers Improve knowledge on extension services for vulnerable groups.	CGN Wambugu Farm ATC	Efficient and effective extension service provision			

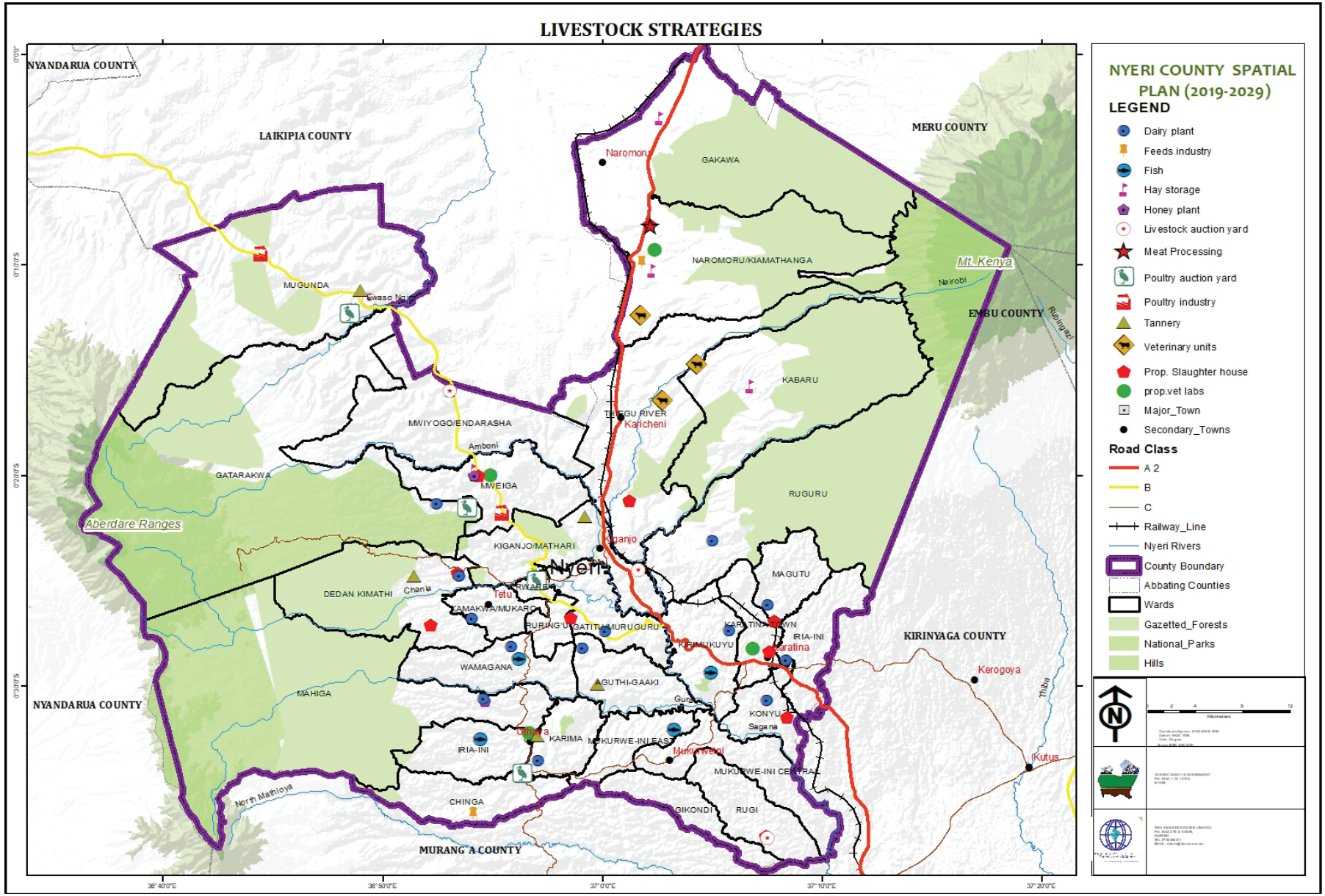
Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Diversifying livestock breeds	Encourage new breeds of crops for better yields and resistance to pests and diseases	CGN Wambugu Farm ATC	Diversified agricultural products			
		Promote marketing infrastructure and markets:	Promote the cooperative movement in the livestock sector in the County	CGN Private Sector NGOs	Improved livestock performance as an economic venture Reduced exploitation of farmers by brokers and middlemen			
			Improving physical linkages between farmers and markets in Kieni East and West sub-counties; The road from Mweiga – Endarasha – Watuka to Kiawara should be tarmacked to improve agriculture					
			Improve security in the County to reduce theft of agricultural produce for the markets especially for poultry in Mukurweini ward					
		Promotion of disease-free zones:	Development of a County Livestock Policy on meat hygiene Disease control and revenue collection.	CGN	Nyeri as a disease-free zone			
		Promotion of fishing as an alternative source of income:	Formulate a County fishing policy.	CGN	Fishing as a vibrant economic activity			
			Improve access to fishing gear for farmers and dam users in the County. Promote fish farming as an alternative economic activity		Improved value addition for fish Reduction of post-harvestloss in fishing			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Reviving Njima dam in Kirirmukuyu for fish farming					
			Develop value addition on fish within the County					
			Promote fish farming cooperatives to market fish					
			Sensitization of women on fish farming as a viable income stream					
		Promotion of commercial bee keeping:	Formulate a County bee keeping policy.	CGN	Improved Income from honey			
			Improve access to beehives for farmers in Kieni East and West sub-counties.					
			Promote bee keeping as an alternative economic activity in Kieni East and West sub-counties					
			Revive stalled bee keeping projects at Karima ward					
			Promote bee keeping cooperatives to market honey.					
			Develop value addition on honey within the County					
			Sensitization of women on bee keeping as a viable income stream					
			Construction of honey processing plant in Mahiga					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Promotion of Rabbit keeping as a viable alternative:	Capacity building on rabbit rearing techniques and benefits in the County Provision of rabbit breeds to farmers in the County. Revive stalled rabbit keeping project for the youth in Karima ward Sensitization of women on rabbit keeping as a viable income stream in the whole County.	CGN and Development Partners	Improved farmer income from rabbits			
		Establishment of livestock-based Industries	Construction of a milk processing plant (for cow milk) in Gatitu, Wamagana, Konyu and Gikumbo, Mutathini, Kiamariga, Mahiga, Kiaganda Construction of a milk processing plant (for goat milk) in Gatarakwa and Ngandu. Construction of an animal feed industry in Narumoru Construction of tanneries in Kiawara, Othaya and Kiganjo Construction of a modern slaughterhouse at Karundas, Huhoini, Ihururu, Micha, Ngamwa, Karura, Endarasha	National Government CGN Private Sector	Promotion of livestock based industrial growth			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Establishing auction yards at Kiawara and Kirichu, Kanyagia, Kamwa Establish a poultry auction yard at Mugunda, Gatarakwa, Chinga and Nyeri, Establish and egg selling market in Mukurwe-ini Construction of a fish hatchery in Iria-ini	National Government CGN Private Sector	Promotion of livestock based industrial growth			
		Upgrading and expanding existing industries	Expand the tannery at Dedan Kimathi University Upgrading the Ihururu milk cooling plant to a processing plant					
		Reviving of collapsed industries	Reviving the fish processing plant in Wamagana					

Map 133: Livestock strategy



Source: Two EMS Associates, 2019.

c) Agro-Forestry Promotion Strategies:

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME (Years)		
						1-3	4-7	8-10
Agro-Forestry	Promotion of Agro-forestry and Forest management	Improved forest management and agro-forestry	Participatory forest conservation and management projects such as honey harvesting, ecotourism and sustainable charcoal burning/ logging in the County Increased forest department personnel for the County Developing of updated database system and monitoring software for forest management in the County Provide tree seedlings to increase forest cover and enable sustainable forest management	National Government KFS CGN Local communities CBOs.	Enhanced Benefits from forest Community participation in conservation efforts Improved initiative by communities in forest management Improved forest cover			
			Increase investment in research, education and extension services for forest management in the County.					
			Expand the PELIS program In Aberdare and Mounty Kenya eco-systems to benefit more people living near forest					
			Establish the lumbering zones in Gatarakwa and Kabaru					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME (Years)		
						1-3	4-7	8-10
		Promoting afforestation in the County	Conducting agro-forestry practices to increase tree stocks in the County.	KFS CGN Local communities CBOs.	Increased number of afforestation programmes Increased number of participatory projects			
		Alternative wood fuel energy sources	Organizing alternative energy sources campaigns such as briquettes to reduce demand for firewood and charcoal in the County Encouraging substitutes like Bamboo farming in the County	CGN Local communities CBOs.	Reduced reliance on wood fuel			

d) Trade and Industry Strategies:

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
Trade	Improvement of Business Environment to encourage economic growth	Preparation and implementation of a Pro MSE and industry policy in Nyeri	Preparation of a trade policy for the County Improvement of trade licensing and revenue collection streams in the County	CGN MSEA	Pro –MSEs growth policies			
		Harmonization of single business license fees by:	Establishment of one stop shop licensing in the County Involving traders in decision making in the County Improve on issuance of licenses to avoid unscrupulous traders in the County Regulation of fees to make them business friendly in the County. Regulation of taxes required to operate within the markets to be fair to local traders in the County.	CGN	Harmonized Single business permit			
		Establishing the SEZ site	Establishing the Kiganjo SEZ site for branding and marketing of agricultural products for export The Chaka and Kiganjo area are proposed industrial zone.	CGN of Nyeri	Improved agricultural marketing			

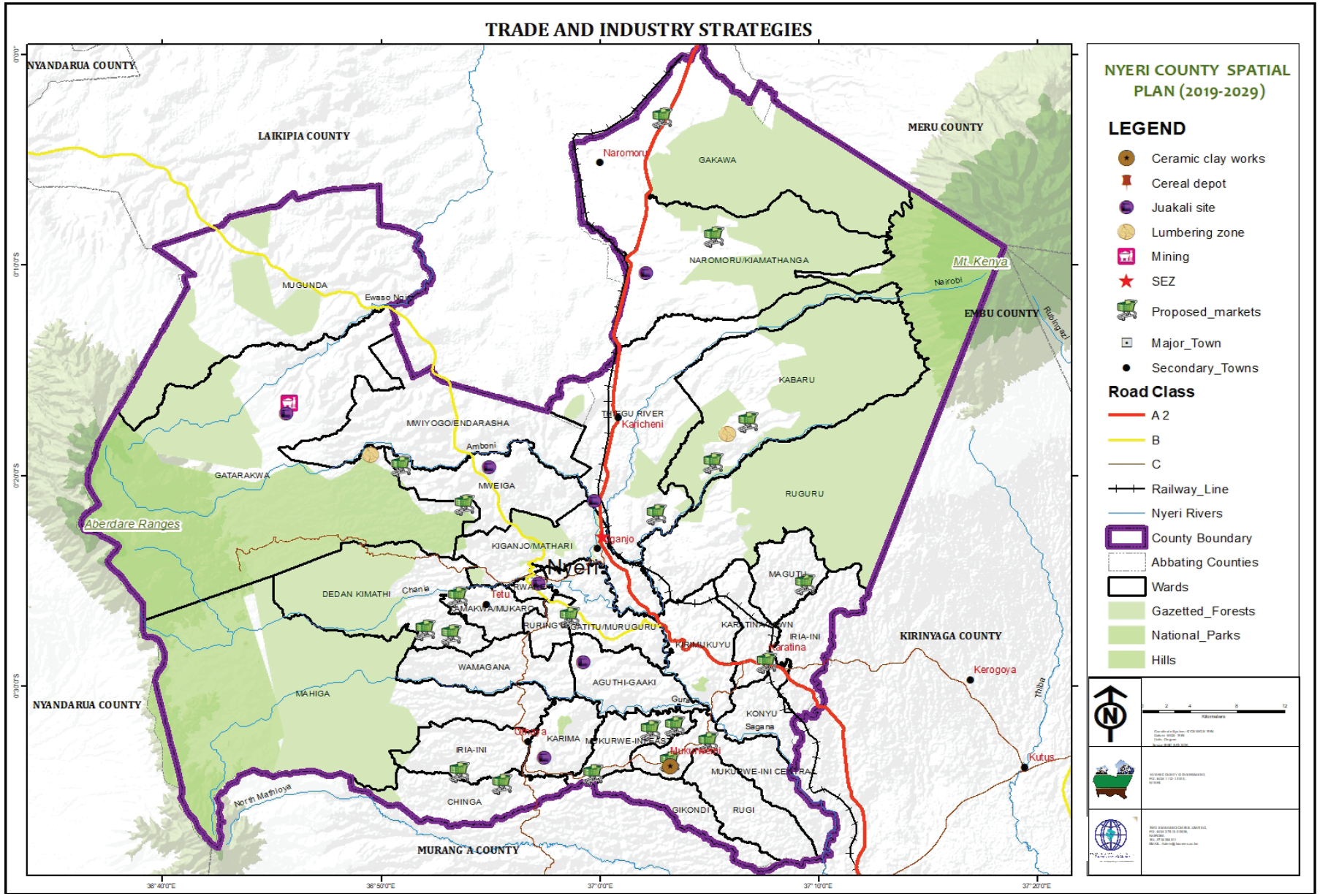
Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Construction and reviving stalled of market stalls:	Creation of proper designated markets in Konyu ward- Gatarakwa ward Ruguru ward Narumoru ward Ruring'u ward Aguthi – Gaaki ward Kiganjo ward Gakawa ward	CGN	Operational market stalls			
			Completing stalled market projects within the County.					
			Introduction of supporting infrastructure like street lighting, toilets, waste management points, water points and storage facilities within all markets across the County.					
			Promote access to the markets through proper road infrastructure					
			Designate waste disposal space in all markets in all market centres					
			Redesign the drainage system in major markets in all market centres Construction of public toilets in all markets in all market centres					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Improve access to business financing	Sensitization to counter fear of borrowing in the County Tailoring lending to small business best captured by MFIs in the County Developing women-friendly business loans	CGN MFIs NGOs	Improved business financing			
		Improved access to infrastructure for businesses	Connection of trading centres to water and electricity Improvement of County roads to all major trading centres in the County	CGN WSPs KPLC	Improved infrastructure connection for business growth			
		Skills improvement for better managed MSEs	Skills needs assessment in the County Skills improvement plans and policy in the County Formulation of training programmes in the County Equip vocational training centers with business training facilities in the County Capacity building of youth and women on business and financial management in the County Support of women-based enterprises like those making kiondos and bracelets	CGN MSEA MFIs	Improved business efficiency through a skilled business community			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
Private Sector Facilitation	Inclusion of the private sector in development of Nyeri County	Engagement of private sector	Identifying local content and training needs in the County Fostering dialogue around security issues in the County Establish and promote an Annual Investment Forum in the County to attract investors to participate in Nyeri's economy.	CGN Private Sector Development Partners	Boosted investors' confidence & protection			
Industry	Promoting Industrialization	Promotion and development of cottage industry:	Expansion of the existing KIE sites in the County Construction of a juakali zone in Chaka and Othaya, Naromoru, Nyeritown, Kiawathanji, Watuka, Mweiga Provision of subsidized machinery for jua kali artisans in each sub-County	CGN NGOs	Vibrant Cottage Industries			
		Formation and investment in regional markets:	Regional and international marketing agreements	CGN of Nyeri and neighboring CGNs	Increased regional markets			

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
(Mining - Industry)	Investment in mining industry development	Economic empowerment for miners and quarry owners	Offering of subsidized machinery to ballast beaters & quarry miners in Chaka Oversee formation of a strong miners' union/association for quarry owners Promote ceramic making from clay in Mukurweini Promote murram harvesting in Gatarakwa	CGN Private Sector MFIs	Observation of personal safety for miners Formation of a miners' association Eradication of chain of brokers Income stability for miners Economic viability of mineral resources.			

Map 134: Trade and Industry strategy



Source: Two EMS Associates, 2019.

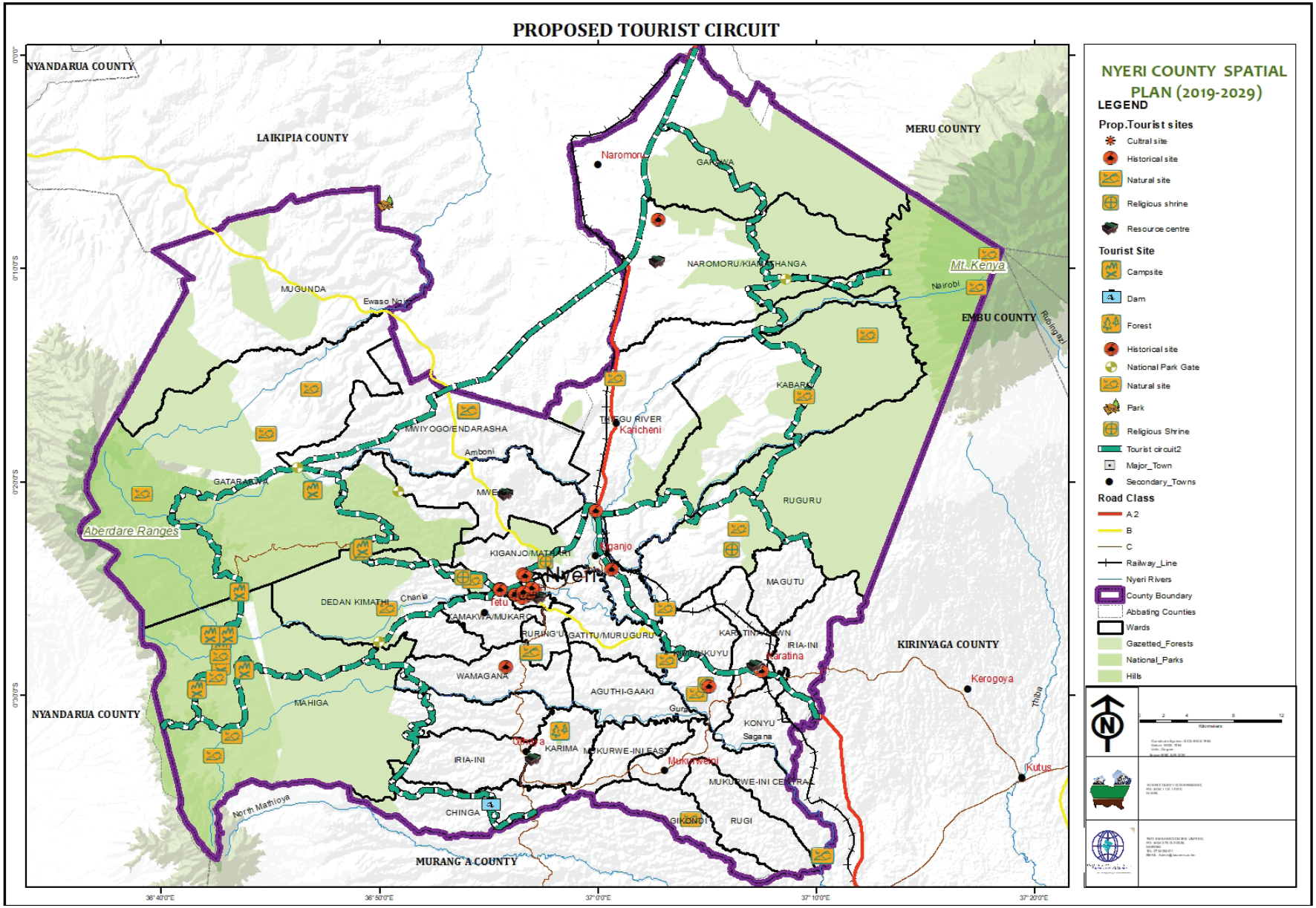
e) Tourism Development Strategies:

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
Tourism Development	Investment in the tourism sector	Promote private sector involvement and investment in Tourism	Marketing of the tourism circuit regionally and internationally	CGN,Private Sector	Regional corporation for sustainable tourism exploitation			
			Establishment and efficient management of a circuit management body in the County and regionally	CGN,Private Sector	Regional corporation for sustainable tourism exploitation			
			Innovative incentives to the private sector to encourage their investment in the County	CGN,Private Sector	Regional corporation for sustainable tourism exploitation			
			Establish an Annual Festival for the County to showcase various tourist attraction and the culture of the residents to promote tourism.	CGN,Private Sector	Regional corporation for sustainable tourism exploitation			
		Investment in tourism	Creation of information centres at Nyeri entry point towns (Narumoru, Mweiga, Karatina, Othaya)	CGN KWS, Private Sector, Kenya Tourism Board.	Commercially viable tourist attractions Increased numbers of tourists: both local and international tourist. .Increased revenues to the County.			
			Establish Nyeri and Karatina, Mweiga, and Narumoru as MICE destination (Meetings, Incentives, Conferencing and Exhibitions)					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
		Promote Sport tourism	Promote tourism activities along Chinga dam to involve water sports and sport fishing	CGN KWS, Private Sector, Kenya Tourism Board.	Commercially viable tourist attractions Increased numbers of tourists: both local and international tourist. .Increased revenues to the County.			
			Promote zip-lining activities in Aberdare ranges					
			Promoting Rhino Charge activities within the County					
		Promote Wildlife and Scenery based Tourism	Promote bird watching activities in the County especially in Aberdare and Mounty Kenya National Parks					
			Promote viewing of wildlife like elephants and buffalos at Treetops, The Ark, and Serena Mountain Lodge					
			Promote forest tourism within the various forests through hikes and biking of nature trails within Aberdare and Mount Kenya National Parks					
		Promote Cultural Tourism	Promotion of cultural centres like the Outspan and Narumoru/Kiamathanga centres to promote the culture of the people of Nyeri County					
			Promote cultural festivals and Miss Tourism events where the ethnic communities can display their culture through music and dance.					

Sector	Strategies	Program	Projects	Actors	Outcome	TIME FRAME(Years)		
						1-3	4-7	8-10
			Offer support in in the following aspects of culture: **Craft:** beadwork, weaving, tapestry, pottery, jewelry, ceramics, mosaic, leather, wireworks. **Music:** traditional music, contemporary, etc. **Design:** textile design, Jeweler design, fashion design**, craft design** **Performing arts:** Traditional dance, drama / production, etc.					
		Promote Historical Tourism	Promotion of historical centres in the County like Paxtu cottage at the Outspan Hotel, Baden Powell graves and Historical Gardens, Kimathi Trench at Kahigaini, MauMau caves in Naromoru, Italian War Memorial Church, and Dedan Kimathi Tree Post Office					
		Promote trade tourism	Promote Karatina and Chaka markets as tourist attractions					
		Infrastructure investment and improvement	Construction of tourism missing links within the County: the link between Nakuru and Nyeri County through the Aberdare should be completed to promote tourism.	CGN	Roads being an enabler of tourism promotion			

Map 135: Proposed Tourism Circuit



Source: Two EMS Associates, 2019.

14.3 Integrated Transportation Strategy

Transport is a critical component of any sustainable and inclusive development to facilitate economic growth and poverty reduction. The transport sector in the County is faced with poor road connectivity and condition, underutilized airfields and railway lines, and lack of NMT facilities. There is need for quality and integrated transport systems to enable economic growth and social development in the region.

The strategy proposes the development and maintenance of sustainable and efficient transport systems, prioritizing the development of strategic transport corridors to enable global competitiveness. Additionally, promoting the integration and development of NMT facilities across all rural and urban infrastructure. This will facilitate the development of transport towns to take advantage of the improved transport systems.

Toward Internationalization and regionalization of transportation infrastructure

This Development strategy emphasizes the promotion of economic regionalization through the higher speed and level of efficiency in cross-border transportation which can be expected to increase. The strategy is to achieve "the smooth movement of people and goods" between Nyeri County and neighbouring counties and Countries. Achieving this will require Restoration, Improvement and Development of Railway Network and connecting it to the LAPPSET corridor station at Isiolo .

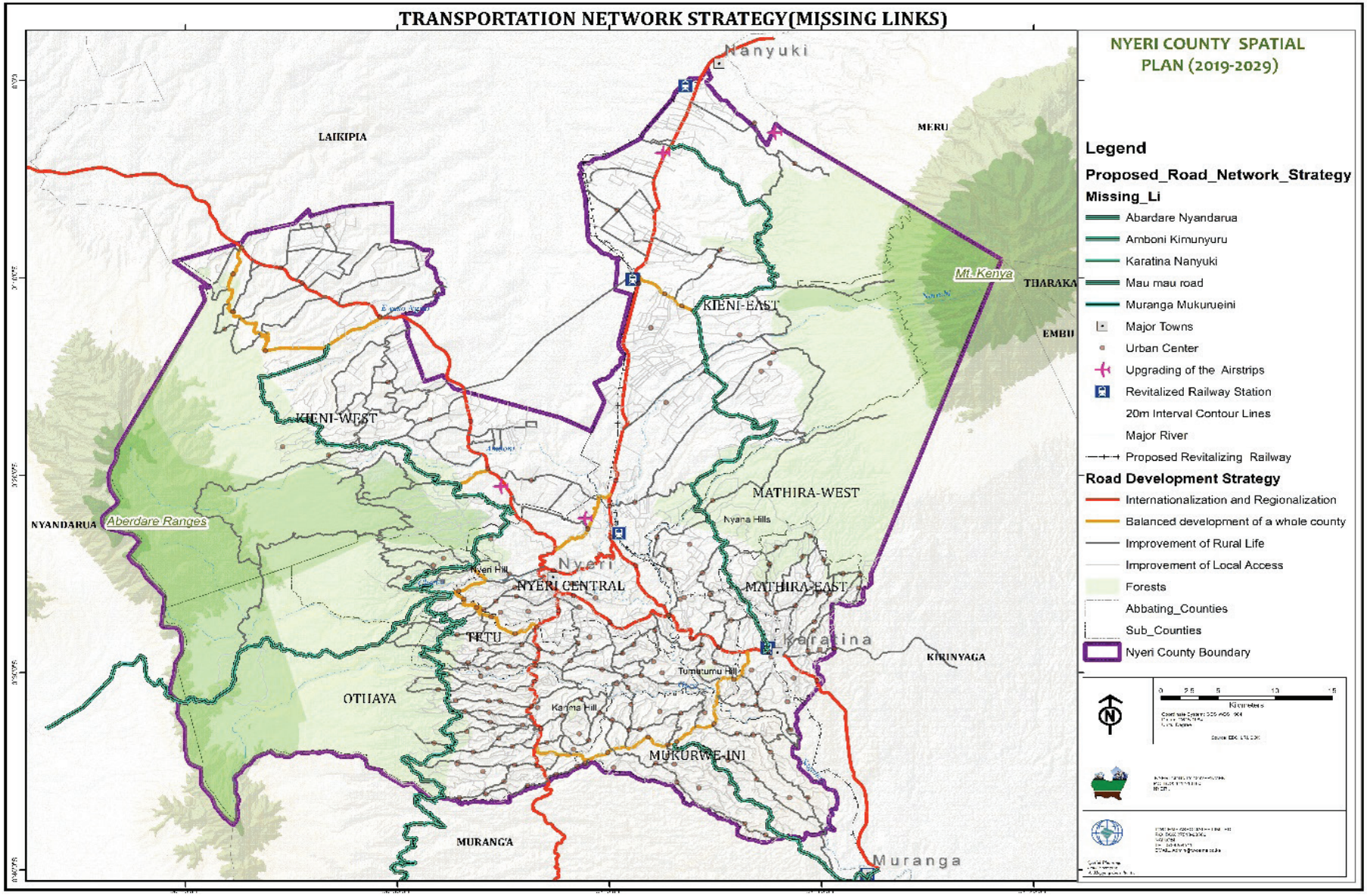
Application of International Standards through Improvement and Development of Trunk Road System for the A 2 road and class B roads by not only having a smooth motorable surface type but also developing special spaces to accommodate other road users including cyclist, pedestrian and service lanes. The airstrips in Nyaribo and Mweiga should also be expanded and redeveloped to regional standard for swift movement of goods and people to other local airports in the country.

Toward balanced development of a whole county

When road, railway and air transportation networks are expanded around the entire county, the movement of people and goods from urban to rural, as well as from rural to urban areas, becomes possible. This then forms a foundation for balanced county development.

Therefore, iimprovement and development of key linkage corridors across the entire county, Strengthening of Road Maintenance System, Normalization and Standardization of roads and road traffic in the county, Development and Introduction of Intermodal Transportation System, Facilitation of Intermodal Connection, Transportation Safety Measures and Improvement and Development of Transportation Terminals can Contribute to balanced county Development.

Map 136: Missing Links



Source: Two EMS Associates, 2019.

Toward sustainable urban development and improvement of urban life (Urban transportation)

Economic disparities between the urban area and rural areas are wide in the county, and the migration of populations from rural areas to the urban area has continued over a long period. Private sector investment, tends to be strongly concentrated in the urban area, and this has also been continuously true of economic activity. Restricting the concentration of population and economic activity in the metropolitan area is difficult, and the concentration as well as overcrowding of major towns is a significant development issue. Although the severity of urban transportation problems including, severe traffic congestion during peak periods brought on by the rapid increase of motorization, together with the associated economic losses and adverse environmental effects are not major issues in the county.

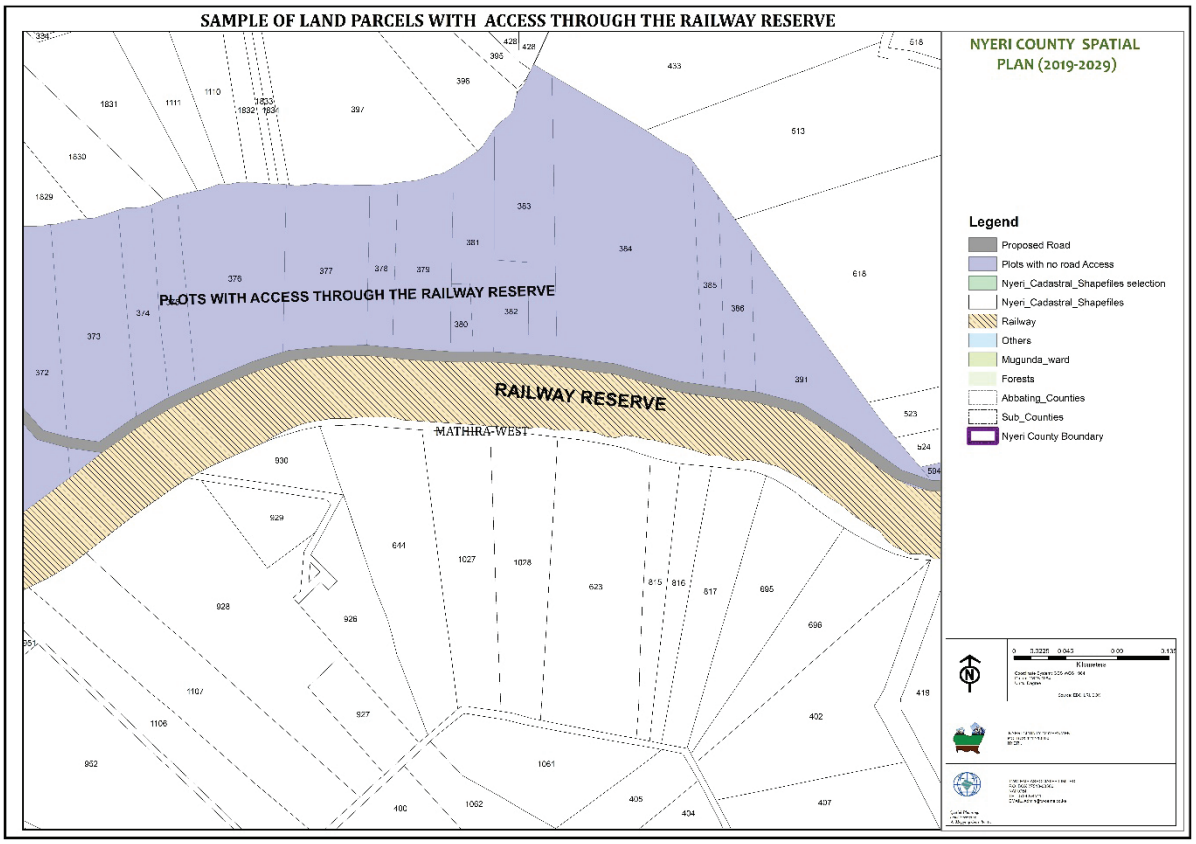
It will be essential to take precautionary measures by expanding transportation capacity by improving existing roads and developing new roads in order to caution these problems. However, since there are limits to how far transportation capacity can be expanded in limited urban areas, promoting the transition from individual automobile transportation to public transportation is crucial. Therefore, the improvement of public transportation services, and the management of demand for individual automobile transportation are also very important issues.

The following measures are proposed; Traffic Capacity Increase of Arterial Roads, Intersections and Bridges under the Jurisdiction of municipalities in the county, Restoration and Improvement of Secondary Roads and their Maintenance System under the Jurisdiction of municipal authorities, Promotion of Private Sector Participation in Urban Transportation, Improvement of Bus Services, Introduction of Rail-based Public Transportation Services especially from Naromoru to Karatina through kiganjo railway stations, Management Improvement of Public Transportation Service Providers and Improvement of Urban Transportation Operation and Management.

Toward equitable access to all property

This plan is proposing a policy to ensure that all parcels in the county are connected by road network which is in a good condition to support the connectivity and development. The land owners who lack official access roads especially those who own property around the forests and railway reserves are proposed to compulsory surrender portion of their land with a minimum width of 6 meter for road reserves to accommodate road development and other utility services. Below is a sample design for a portion of Kirimukuyu registry section whose plots are accessed directly from the railway and a proposed road network to serve the plots.

Map 137: Sample of land parcels with access through the railway reserve



Source: Two EMS Associates, 2019.

Toward sustainable rural development and improvement of rural life (rural transportation)
Although it is difficult to find the relevance for rural infrastructure development from the point of view of profitability and efficiency, the development of feeder roads that connect residences, farm villages, schools, medical facilities, markets, and the like, which are located some distance from trunk roads are extremely important for improving people's lives, and also with regard to the contemporary issue of poverty reduction. Road developments that go beyond rural management and maintenance capacities should be avoided, and it is desirable to utilize appropriate technology that will allow sustained management and development with local resources.

The following measures are proposed; Provision of Basic Transportation Infrastructure and Services to Secure Civil Minimum. Enhancement of Transportation Safety and Reliability. Maintenance and Improvement of Public Transportation Services with a view to Satisfying Civil Minimum. Establishment of Road Development and Maintenance System based on Participation of Local People.

The table below gives a highlight of some of the specific roads which have been proposed for development to support the above strategies;

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
Transport	Road connectivit	- Opening strategic roads (Flagship) - Development of sustainable and climate-resilient road infrastructure.	**Upgrading and tarmacking of strategic roads;** **Balanced development of the whole County** • Nyeri-Ihururu-Kinunga-Kiandogoro-Tosha-Naivasha • Endarasha-Mwiyogo-Naromoru via Solio ranch. • Ichamara-Kimondo-Thangathi-Kiuu-Kirinyaga (joining A2) • Mukuruweini-Mihuti-Karundu-Gakurue-Kariru-Kimathi-Sagana. • Kagocho-Karindun-du-Mukurweini road • Nyeri-Nyaribo-Chaka-Kiganjo (Modal Interchange) • Kimunyuru-Embaringo-Gakanga-Watuka-Charity-Endarasha	Ministry of roads and infrastructure, CGN KERRA KENHA KURA	Improved access to regional and county connectivity. Decongestion of existing routes Enhanced global competitiveness. Improved agricultural linkages to markets Improved linkages to tourists' sites			

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
			• Mweiga-Amboni-Endarasha • Amboni-Nyarugumu-Ihururu-Ihwa-Kinunga-Kagogi-Muthua-ini-Kagwathi • Irigathathi-Manyata-Gathioro – Nanyuki town • Karundas-Kairi-ManstoneMere-Judea-Bagdad-Kurkulet-Munyu **Improvement of rural life** • Kurkulet-Munyu-Kairi-Ndathi • Nairutia-New City-Karai • Gathaithi–Karandi-Ndumanu-Kagochi-Kabiruini-Kiamariga-Kirichu • Naromoru–Gurucu-Soweto- Kariokor road • Naromoru – Guruai – Irigathi - Manyatta • Gataithi- Karandi- Hundu-Ndumanu- Kagochi road	Ministry of roads and infrastructure, CGN KERRA KENHA KURA	Improved access to regional and county connectivity. Decongestion of existing routes Enhanced global competitiveness. Improved agricultural linkages to markets Improved linkages to tourists' sites			

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
			• Kagochi-Gitunduti-Kabiruini-Kiamariga-Hiriga-Kirichu • Kiricheni-Lusoi- Munyu-Karkulet-Bagadad to join Judea • Mathari-Ihwa-Kinuga-Kagogi-Muthua-ini-Giteero-Kiamwathi • Gathenge-Kagumo-Kanunga-Kaheti-Mukurwe-ini • Mweiga-Amboni-Endarasha-Charity-Watuka-Gakanga-Embaringo-Kiamunguru • Ndingamano-Karangia-Gachatha-Kangaita • Karindi-Mukurwe-ini, Gikondi-Muthuthini-Karaba-Mutoga-Thaara • Mweiga-Mwireri-Chaka-Karundas-Iruri-Judea-Manyata—Irigithati-Guruai-NaroMoru-Nanyuki	Ministry of roads and infrastructure, CGN KERRA KENHA KURA	Improved access to regional and county connectivity. Decongestion of existing routes Enhanced global competitiveness. Improved agricultural linkages to markets Improved linkages to tourists' sites			

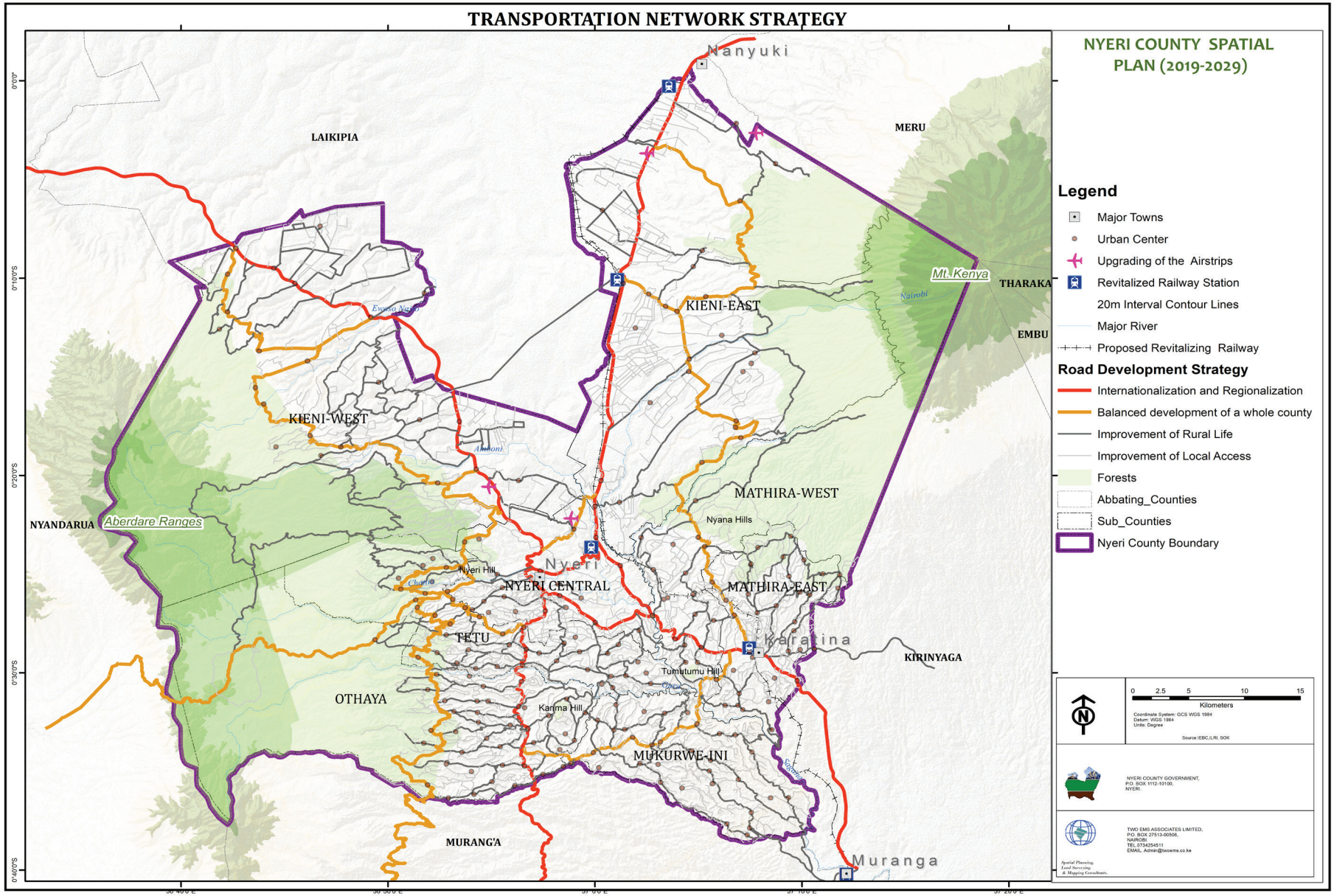
Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
			• Mumbuni-Kariko-Kabebero-Gitugu-Huvoini-Tosha-Kirurumi • Mukuruweini-Gikondi-Muthuthini-Karaba-Mutonga-Thaara • Karatina-Karindundu-Kiamambara-Mungetho-Chieni-Gakuyu-Thagathi • Nairutia-Mugunda-Kimuri-Gatarakwa-Kiawara-Muringa • Endarasha-Charity-Watuka-Gakanga-Embaringo-Kimonyoru ***Tourism roads*** • Nanyuki-Gathioro-Manyatta-Judea-Kamunyu-Ndathi • Naromuro-Mwiyogo-Kihuhiro-Wandere park gate. • Nyeri-Mathari-Ihururu-Njonguini-Ruhuruini	Ministry of roads and infrastructure, CGN KERRA KENHA KURA	Improved access to regional and county connectivity. Decongestion of existing routes Enhanced global competitiveness. Improved agricultural linkages to markets Improved linkages to tourists' sites			
		Construction of bridges	Development of new bridges: - All the roads across River Gura river, Chania, Sagana etc	Ministry of roads and infrastructure CGN	Improved access and connectivity.			

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
		Construction of bridges	- Bridge to be constructed (Kwa John bridge) - Wathairo bridge - Ngura Road Bridge - Karuraini (Githima bridge) Muhoya bridge - Bridges across Karege, Gituchu, (Kiahuria, Karege, Githegethe secondary schools - Hombe Bridge and Gathira Bridge - Bridge/culvert near Gakawa dispensary	Ministry of roads and infrastructure CGN KENHA KERRA KURA	Improved access and connectivity.			
	Toward sustainable urban development and improvement of urban life	- Design attractive and comfortable walk-able and cycle-friendly streets by including features such as landscaping, benches convenience facilities, and street lighting to create "dignified spaces". - Classify all urban roads/streets according to their desired distinct functions and design them accordingly	-Construction of walkways and bicycle lanes in Mweiga, Nyeri, Chaka, Karatina, Mukurwe-ini Othaya, and Endarasha. -Construction of crossing points for NMT users, including proper signage on the direction of flow of vehicles	Ministry of Roads and Infrastructure CGN KENHA KURA	Improved NMT infrastructure Reduced number of accidents Reduced traffic congestion			

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
		Development of other road transport facilities	- Construction/rehabilitation of drainage system on all roads - Construction of modern parking lots all urban centres - Incorporation of Disabled friendly parking bays in all municipalities and towns - Construction of modern bus park in Mukurweini, Othaya, Karatina, Mugunda, Magutu and Naromoru	Ministry of roads and infrastructure	Improved road infrastructure Reduced number of accidents Reduced traffic congestion			
		Dualling of A2 highway	Marua-Kiganjo-Nanyuki (continuation of on-going dualling which is expected to end at Marua)	KENHA	Improved access to regional and county connectivity. Decongestion of existing routes			
		Development of transport towns in: • Naromoru • Kiganjo • Karatina	Preparation of a feasibility study and detailed physical development plan for the towns	Ministry of lands and physical planning Ministry of roads and infrastructure	Improved economic status of towns Orderly and coordinated development			

Sectors	Strategies	Program	Projects	Actor	Outcome	TIME FRAME (YEARS)		
						1-3:	4-7:	8-10:
	Develop multimodal connectivity among the various transport sectors	Improvement of air transport infrastructure	Upgrading of airstrips to an all-weather standard with all necessary equipment's. such as: - Nanyuki Airstrip - Nyaribo Airstrip - Mweiga Airstrip - Mt. Kenya Airstrip	Kenya Airports Authority Ministry of roads and infrastructure	transport in the County Enhanced multimodal connectivity Alternative means of transport			

Map 138: Transportation network strategy



Source: Two EMS Associates, 2019.

14.4 Human Settlement Strategy

The Human Settlement Strategy has sub-strategies for planning of urban areas and planning of rural catchments. The urban strategy proposes the improvement of existing urban areas through preparation of local physical and land use development plans for all major centres as well as growing centres. The rural development strategy proposes the servicing of rural areas and the conservation of prime farmlands.

Overall, specific centres will be upgraded to the next tier based on the urban areas and cities act while others will retain their status. Moreover, some centres will retain their existing functions while others will be assigned other functions due to the dynamic economic nature of Nyeri.

Table 59: Proposed Functions of Centres

HIERARCHY	FUNCTION						
	Adminis-trative	Agri-hub	Indus-trial	Agricul-ture	Health	Eco-tour-ism	Commercial
Municipality	Nyeri						Karatina
Town			Kiganjo, Endarasha		Othaya	Naru Moru	Mweiga, Mukurweini, Wamagana, Ihururu, Cha-ka, Giakanja
Market centre		Gakindu		Kabiruini, Kiamariga, Nairutia, Kiamwathi, Gachatha, Kagere, Kiahungu, Mihuti, Marua, Ka-ngundu-Ini, Kiawarigi, Milimani, Gatitu, Muthua-Ini	Tumu		Nyaribo, Ga-cami, Gitun-duti, Ngu-rano, Iruri, Hiriga, Mbiri-ri, Kimuri, Kiambogo, Charity, Am-boni, Mwire-ri, Watuka Kimahuri, Gatarakwa, Ihwa, Chania, Ndumanu, Kanjuri, Giakaibei, Mugunda

Rural centre				Gichiche, Munyu Ngandu, Maston Village, Maston Irigithathi Guruai Soweto Kariokor Manyata Ndathi			

Source: Two Ems Associates, 2019

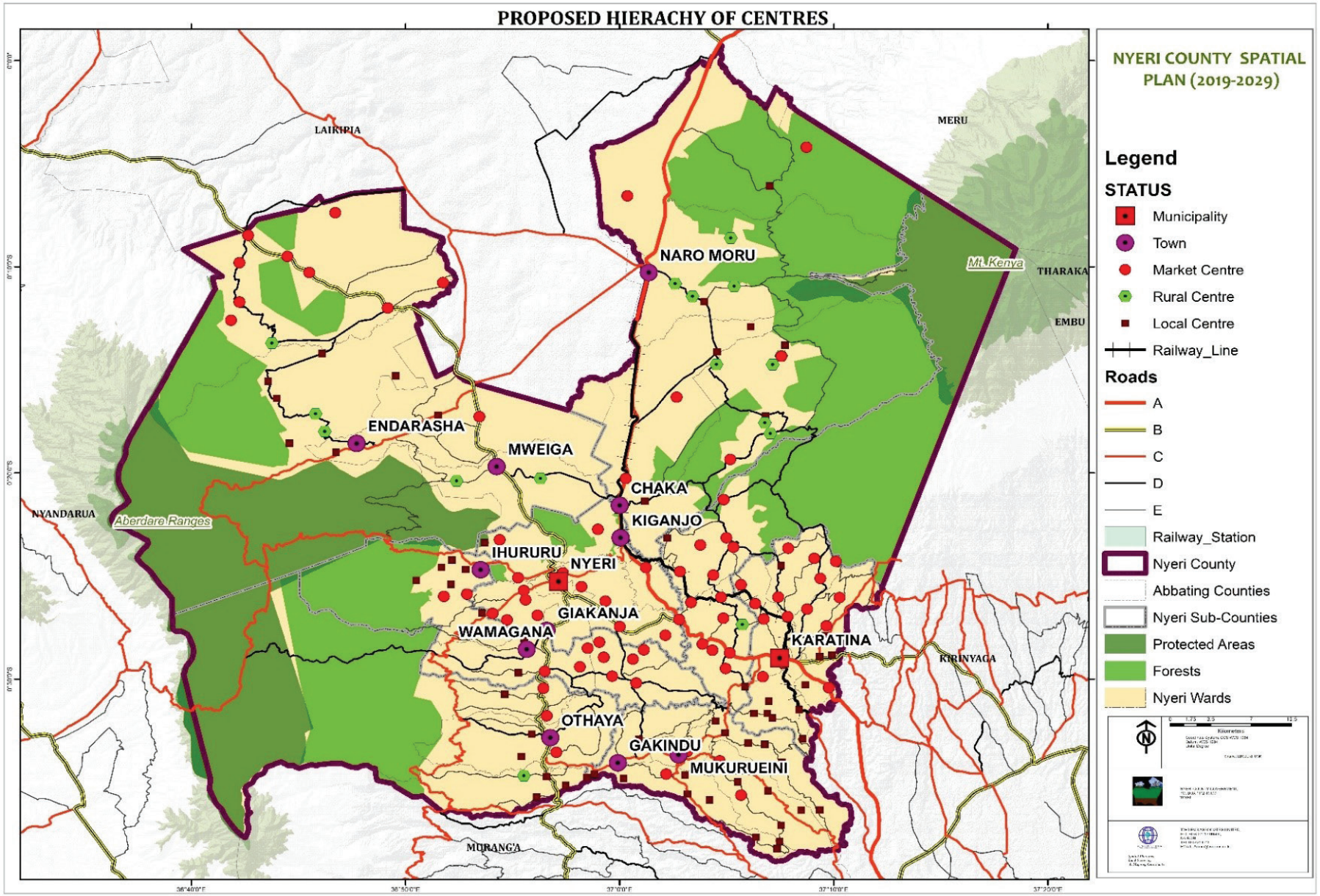
Sector	Strategy	Program	Projects	Actors	Outcome	Time Frame (years)		
						1-3	4-7	8-10
Human Settlement	Planning of urban centres	Preparation of Local Physical and Land Use Development Plans to zone land-use activities and promote control development.	Preparation and updating of physical development plans to provide zoning regulations in major towns in County.	Private sector. Department of lands. County Department of Lands, Physical Planning, Housing and Urban Development	Planned urban areas with urban infrastructure and amenities.			
			Preparation and implementation of physical and land use development plans for rapidly emerging urban centres and corridors in County.		Planned urban centres			
			Identification of informal settlements for upgrading and urban renewal sites in major towns.		Well planned urban centres			
		Control urban sprawl	Delineating urban areas to encourage vertical development and more compact urban areas. (Nyeri, Karatina, Othaya, Mweiga, Kiganjo, Mukurweini, Wamagana, Ihururu, Endarasha, Naru Moru, Chaka, Giakanja)	County Department of Lands, Physical Planning, Housing and Urban Development	Delineated urban areas			
			Delineate and zone land uses based on zoning regulations to curb rapidly upcoming towns to respect urban fringes and control urban sprawl.		Delineated urban fringes			

Sector	Strategy	Program	Projects	Actors	Outcome	Time Frame (years)		
						1-3	4-7	8-10
		Essential service provision for urban centres	Rehabilitation/ establishment of public utilities in major towns such as sewerage treatment systems/ plants, water treatment plants and landfills/ dumpsites in all major towns.	County Department of Transport, Public Works and Infrastructure	Serviced urban settlements.			
			Establishment of NMT infrastructure in all major centres.	County Department of Transport, Public Works and Infrastructure	Existence of NMT infrastructure			
			Installation of CBD-wide street lighting systems for all major centres which.	County Department of Lands, Physical Planning, Housing and Urban Development Kenya power.	Existence of streetlights in all principle towns			
			Rehabilitation of markets and bus-parks within all major centres.	County Department of Transport, Public Works and Infrastructure	Existence of modern bus parks and market centres			
			Establishment of waste collection systems in market centres including public toilets.	County Department of Transport, Public Works and Infrastructure	Existence of waste collection systems and public toilets in markets			
			Ensuring reliable electricity supply to all urban centres to support business.	County Department of Transport, Public Works and Infrastructure and Kenya power.	Electricity supply in all centres			

Sector	Strategy	Program	Projects	Actors	Outcome	Time Frame (years)		
						1-3	4-7	8-10
		Improved urban aesthetics	Preparation of town-wide beautification plans for the CBDs of major towns (greening along major arteries/ roundabouts, urban furniture and landmarks, repainting of old structures)	County Department of Lands, Physical Planning, Housing and Urban Development	Green and clean CBDs.			
			Having community town clean-up days monthly to raise awareness on behavioural change for cleaner urban centres	County Department of Transport, Public Works and Infrastructure.	Green and clean CBDs.			
		Classification of urban centres.	Identifying urban centres to be classified and application for conferment of appropriate status.	County Department of Water, Environment, Natural Resources and Sanitation	Hierarchized urban centres.			
		Urban housing	Encourage PPP initiatives to promote investment in housing sector and Provide services that induce development of urban housing.	County Department of Lands, Physical Planning, Housing and Urban Development NLC	Adequate and affordable houses.			
		Protection of Public land	Clearly mark out and fence public land within urban centres to protect it from land grabbing, to provide space for future expansion or construction of public utilities/ facilities	Private sector.	Fenced public land in urban areas.			

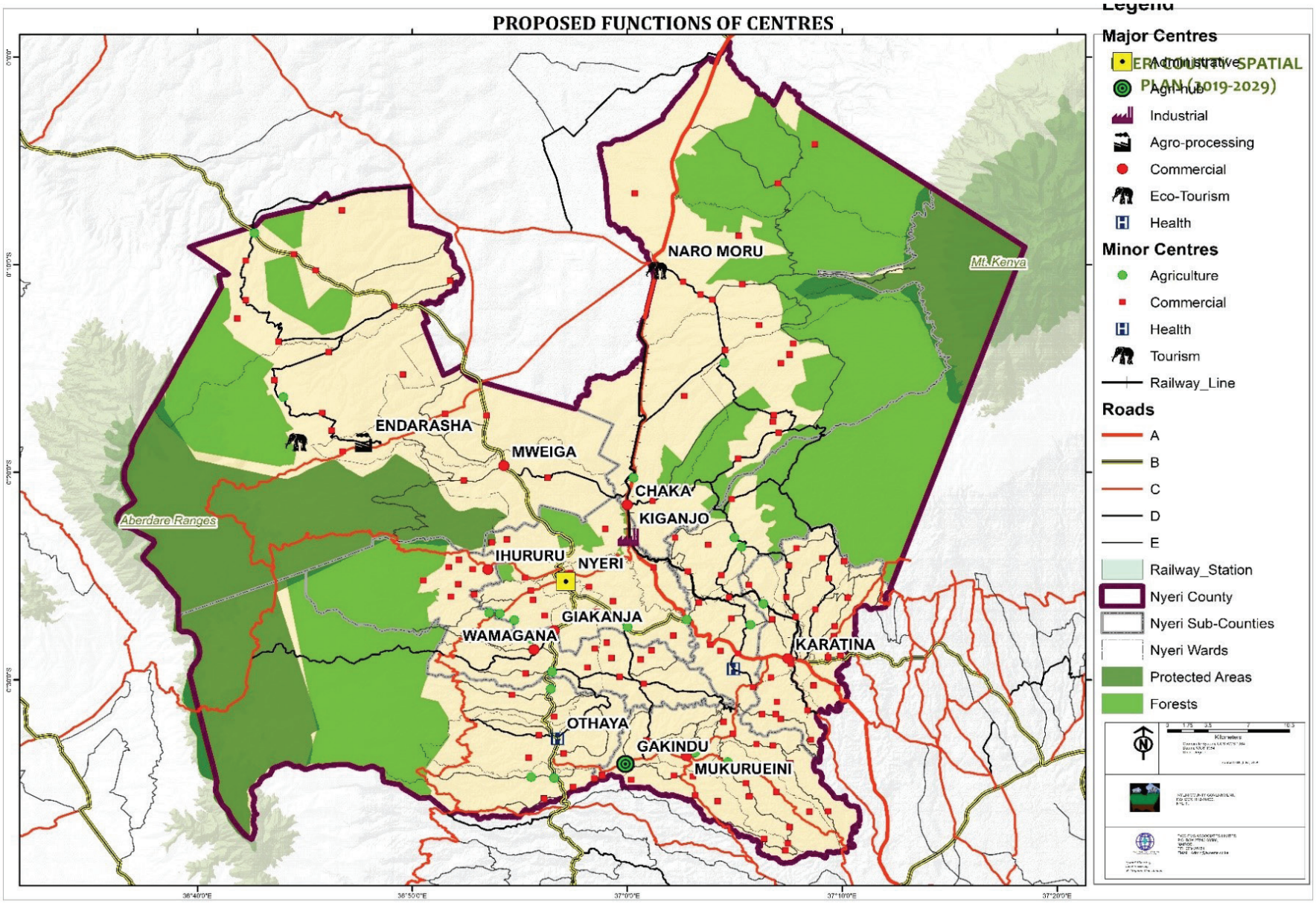
Sector	Strategy	Program	Projects	Actors	Outcome	Time Frame (years)		
						1-3	4-7	8-10
	Planning for the rural hinterland	Improved service provision to rural settlements	Construction and maintenance of feeder roads.	KURA, KERRA, County Department of Lands, Physical Planning, Housing and Urban Development	Rehabilitated feeder roads			
			Provision of mobile social services (mobile maternity clinics, libraries and water bowsers) to cater for the dispersed settlements in the County.	County Department of Transport, Public Works and Infrastructure. County Department of Health Services	Well serviced rural areas			
		Restricted expansion of rural settlements into ecologically fragile areas.	Identify and relocate settlements on ecologically fragile areas.	County Department of Lands, Physical Planning, Housing and Urban Development	Conserved ecologically fragile settlements			
			Zoning and conservation of ecologically fragile areas to prevent encroachment.	County Department of Lands, Physical Planning, Housing and Urban Development	Resettlement and conservation plans.			
			Sensitization and involvement of public in protection and conservation of eco-fragile ecosystems.	County Department of Water, Environment, Natural Resources and Sanitation.	Existence of fragile ecosystems manned by communities.			
		Rural housing	Promotion of low-cost housing using local housing technology and materials to construct decent and affordable houses.	County Department of Lands, Physical Planning, Housing and Urban Development	Descent and serviced rural housing.			
			Encourage local research institutions to explore on appropriate building technology suited for the County's rural areas. Promote Public Partnerships to encourage investment in the Housing sector	County Department of Lands, Physical Planning, Housing and Urban Development PPP	Affordable and sustainable housing.			

Map 139: Proposed Hierarchy of Centres



Source: Two Ems Associates, 2019

Map 140: Proposed function of centres



Source: Two Ems Associates, 2019

14.5 Appropriate infrastructure and services provision strategy

Infrastructure forms the key enabling component in achieving the plan vision of "transforming lives through advancement of infrastructure, economic prosperity, food security and environmental conservation". The Plan has developed infrastructure-based proposals based on inadequacies of the baseline situations, stakeholder responses and engagement, plan proposals of other County plans such as CIDP, regional plans such as Mt-Kenya Region Economic Block, and National Plans such as Vision 2030. Therefore, the resultant strategies are an amalgamation of inputs at all planning levels as envisaged by the County Governments Act 2012.

a) ICT and Energy

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
ICT	Improve access to ICT.	Connect all resource centers to 4G+/5G Fiber Optic Cable/Loon internet.	Name	Ward	Proposals	Nyeri County Government Public works department, Safaricom, Airtel, Telkom. Investors and developers. Local community.	Job creation for the youth. Efficient access to information.	1-3	4-7	8-10
			Mahiga resource center	Mahiga	Connect to Fiber Optic Cable/Loon internet					
			Mumwe community center							
			Kiamariga community hall	Ruguru						
			Kirerema Youth Center	Mukurweini-Central						
			Children and Youth Empowerment Center	Gatitu						
			Endarasha Community Resource Center	Endarasha Mwiyogo						
			Machako Rescue and Pastoral Care Centre	Wamagana						
			Githi Heritage and Community Center	Mukurweini-Central						
			Chaka Resource Center	Thegu River						
			Kiboya Resource Center	Gakawa						
			Naromoru Resource Center	Naromoru Kiamathanga						

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
			Name	Ward	Proposals	Nyeri County Government Public works department, Safaricom, Airtel, Telkom. Investors and developers. Local community.	Job creation for the youth. Efficient access to information.	1-3	4-7	8-10
			Nairutia Resource Center	Mugunda						
			Kiawara Resource Center							
			Mweiga Town Hall	Mweiga						
	Improve public service delivery	Connecting all government offices to Fiber optic cable	All Nyeri County government offices across all wards.				Efficient Public service delivery			
Energy	Improve use of renewable energy as a source of electricity Especially to households and tea factories.	Construction and operationalization of a solar harnessing farm	Proposed development of a Solar Farm		Mugunda, Area between New-city and Kiawara, Rurii and Muringa.	Nyeri County government department of public works, KENGEN, KETRACO, KPLC, investors and developers Local community.	Improved access to electricity in the County. Minimized deforestation. Especially by the KTDA factories, who are the major wood consumer in processing of tea.			
		Construction and operationalization of a Mini-Hydroelectric Turbines	Name		Project details					
			Proposed Chinga HEP		Proposed HEP To be aligned with Chinga falls					
			Proposed Gura HEP		Proposed HEP To be aligned with Gura river falls					
			Proposed Kariba HEP		Proposed HEP To be aligned with Ruiru River falls (Kariba Falls)					

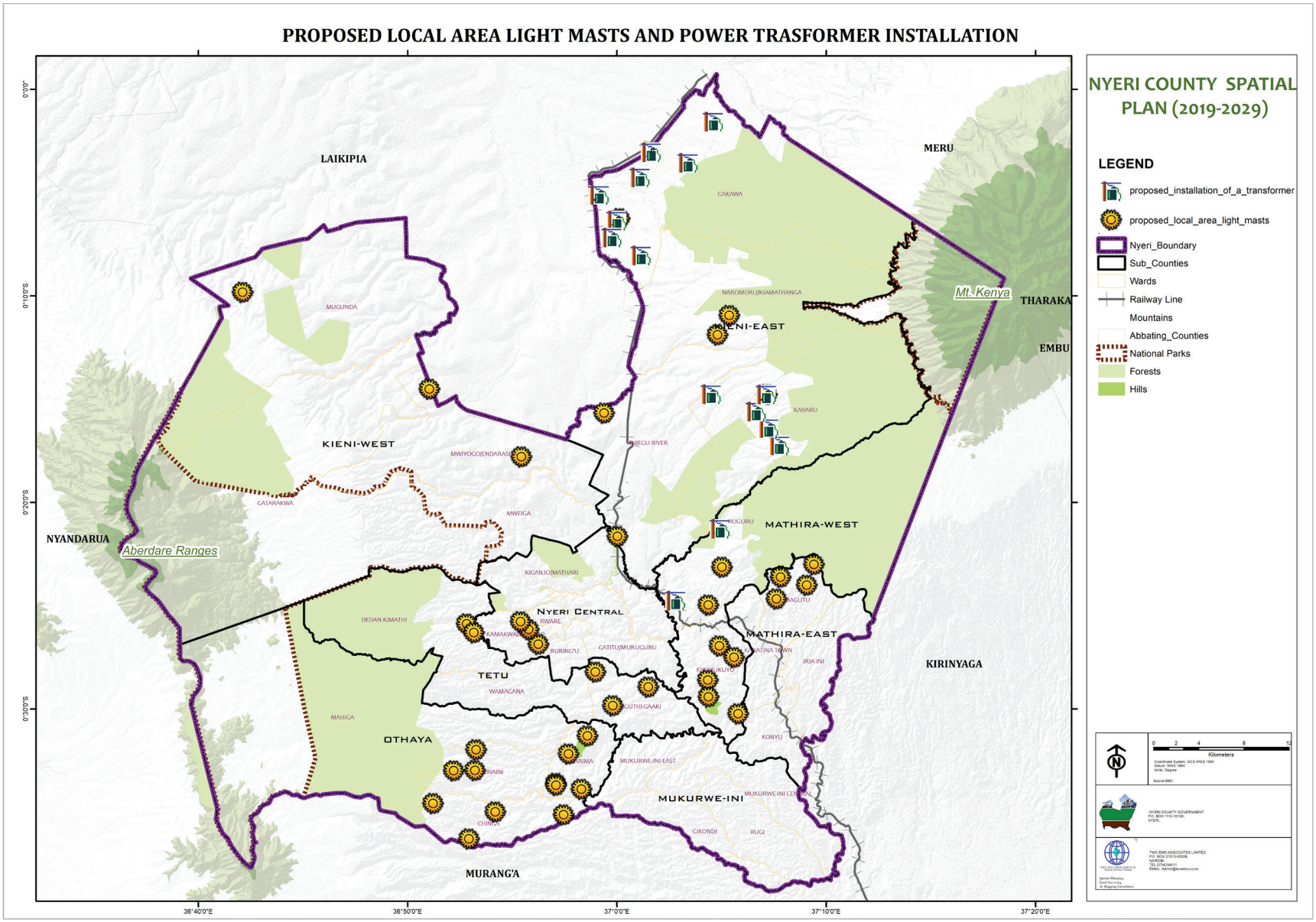
Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Proposed Magura HEP	Proposed HEP To be aligned with Magura river falls					
			Proposed Chania HEP	Proposed HEP To be aligned with Chania river falls					
		Construction and operationalization of power evacuation infrastructure	Proposed Endarasha Sub-Station and transmission lines	Proposed 33/11kv Endarasha is expected to grow exponentially to major town, providing services to residents Within the area and its environs.					
Energy	Improve security through supply of electricity	Development of security lights across the county	**Project name**	**Area**	Nyeri County government department of public works in collaboration with Rural Electrification and Renewable Energy Corporation and KPLC	Improved security and business working hours			
			Proposed security light	Mutathini area, Aguthi-gaaki ward					
			Proposed security light	Kangatia area, Aguthi-gaaki ward					
			Proposed security light	Aguthi-gaaki ward					
			Proposed streetlighting	at chaka town access roads					
			Proposed streetlighting	Rititi Kirimukuyu					
			proposed streetlighting	Thaithi trading center					
			proposed streetlighting	Kiangoma center					
			proposed streetlighting	Karogoto center					
			proposed streetlighting	Ngorano area, near Health center					
			Proposed streetlighting	Ngandu center					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
Energy			**Project name**	**Area**	Nyeri County government department of public works in collaboration with Rural Electrification and Renewable Energy Corporation and KPLC	Improved security and business working hours			
			proposed streetlighting	near kiamariga market and its immediate environs					
			proposed streetlighting	Near Ihuririo primary school					
			Proposed street lights	Kianganda center, karima ward					
			proposed street lights	Gatugi area, Karima ward					
			proposed streetlights	Giathenge center, karima ward					
			proposed streetlighting	Kiruga area, karima ward					
			proposed streetlight	Kanjuri center					
			proposed streetlights	Kangochi center, Magutu					
			proposed floodlight	Gitero, kamakwa ward					
			proposed floodlight	gitathini area, kamakwa/ mukaro ward					
			Proposed floodlights	Kamakwa center, kamakwa mukaro ward					
			Proposed floodlight	Ihwa center, kamakwa/mukaro ward					
			proposed floodlight	Kinunga center, kamakwa/ mukaro ward					
			Proposed flood mast	Kiinu, chinga ward					
			Proposed floodmast	Mairoini center, chinga ward					
			Proposed floodlight	Muirungi center, chinga ward					
			proposed floodlight	Gitiga-kaburaini roads junction					
			Proposed floodlight	Mucharage center, near mucharage dispensary, chinga ward					
			proposed floodlight	Manyatta area, Narumoro kiamathanga					
			proposed floodlights	Gaikuyu area, magutu ward					
			proposed floodlight	Gitunduti center, magutu ward					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
Energy			**Project name**	**Area**	Nyeri County government department of public works in collaboration with Rural Electrification and Renewable Energy Corporation and KPLC	Improved security and business working hours			
			Proposed light mast	waihara area, iria-ini ward					
			Proposed light mass	Kairuthi area, iria-ini ward					
			Proposed light mast	Mahiga area, Endarasha mwiyogo ward					
			Proposed light mast	Mwihoko area, Endarasha mwiyogo ward.					
			Proposed light mast	Mugunda area, mugunda ward					
			Proposed light mast	Nyange area, Thegu river ward					
			Proposed light mast	kiboya area, Gakawa ward					
			Proposed light mast	warazo area, kabaru ward					
Energy	Improve access to clean energy	Transformer installation	**Project name**	**Area**	Nyeri County government department of public works in collaboration with Rural Electrification and Renewable Energy Corporation and KPLC Lastmile project would facilitate implementation of this initaitive	Reduced use of kerosene, charcoal and firewood			
			Proposed electricity transformer	Guara area, gakawa					
			Proposed electricity transformer	Tiger Ngerima area, gakawa					
			Proposed electricty transformer	Burguret area, Gakawa ward					
			Proposed electricity transformer	Wathituga area, Gakawa ward.					
			Proposed electricity transformer	Tambuzi area, Gakawa ward					
			Proposed electricity transformer	Kiboya area, Gakawa ward					
			Proposed electricity transformer	Kiboya area, Gakawa ward					
			Proposed Electricty transformer	Mureru area, Gakawa ward					
			Proposed electricity transformer	Kabaru ward, near forest slope academy					
			Proposed electricity transformer	Ebenezer area, Kabaru ward					

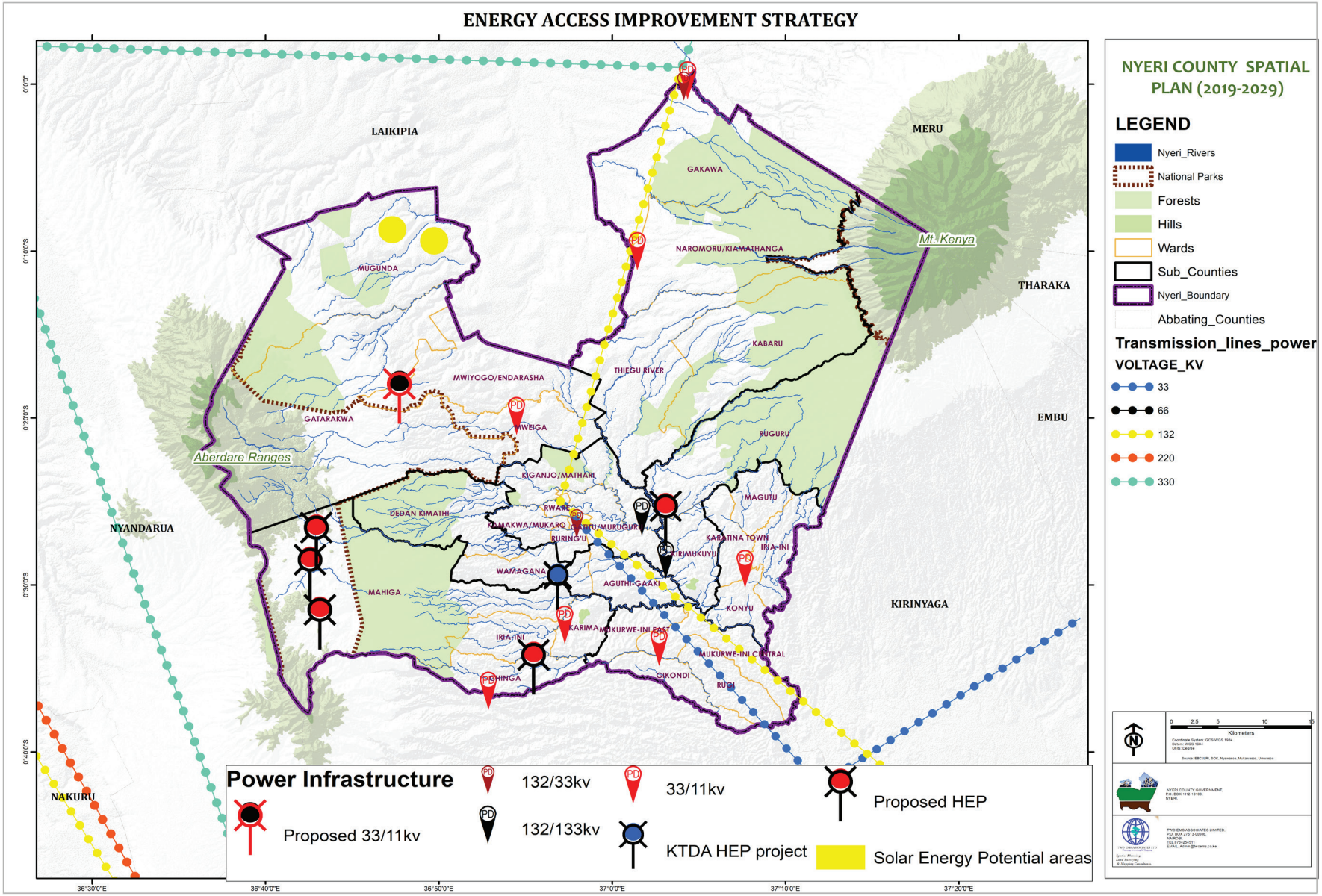
Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
Energy			**Project name**	**Area**	Nyeri County government department of public works in collaboration with Rural Electrification and Renewable Energy Corporation and KPLC Lastmile project would facilitate implementation of this initaitive	Reduced use of kerosene, charcoal and firewood			
			Proposed electricity transformer	Warazo jet area, Kabaru ward					
			Proposed electricity transformer	Munyu area, Kabaru ward					
			Proposed electricity transformer	Jet area, Kabaru ward					
			Proposed electricity transformer	Iruri areas, Ruguru ward. facilitate connections in iruri shopping center					
			Proposed electricity transformer	Gatuaganga area, Ruguru ward					

Map 141: Transformer and security light masts installations



Source: Two EMS Associates, 2019.

Map 142: Energy access strategy



Source: Two EMS Associates, 2019.

b) Water access

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
-Water	To improve household access to water.	Rainwater harvesting	Public-private partneships in water harvesting, this can be practised in Mahiga, dedan kimathi, Iriani, magutu, Iria-ini and Ruguru wards		Nyeri County government department of water. Private investors, local community.	Improved access to water at household level			
		Development Rehabilitation, upgrading works of existing water reservoirs.	Name	Proposal	Nyeri County government department of public works, Tana water and services Board, NYEWASCO, OMWASCO, TEAWASCO, NARUWASCO. Central Government, Donors such as world bank, African Development Bank. Local community	Improved access to water Improved irrigation. Improved living standards.			
			Establishment of Kieni west water and sewerage company (KIWEWASCO)	Headquarters at Kiawara, the company will be respeonsible for supplying water in Gatarakwa, Endarasha/ Mwiyogo and Mugunda wards. The company will develop and maintain sub-county wide water distribution infrastructure in partnership with existing local water schemes. Local water schemes will be intergrateand interlinked into one distribution system. Main water reservoir will be at Githura and Kiria dam, and water treatment works located at Githura. KIEWASCO will have two intakes at Aberdares using weirs at honi and ngarenyiro rivers. The expected design capacity of WTP is 10,000M3/day				

<table>
<tr><th>Sub-sector</th><th>Strategies</th><th>Programs</th><th>Projects</th><th>Actors</th><th>Outcomes</th><th colspan="3">Timelines</th></tr>
<tr><th></th><th></th><th></th><th></th><th></th><th></th><th>1-3</th><th>4-7</th><th>8-10</th></tr>
<tr><td></td><td></td><td></td><td>Establishment of Kieni east water and sewerage company (KIEWASCO)

Headquarters at Narumoro Town, the company will be respeonsible for supplying water in Gakawa, Kabaru, Narumoro/kiamathanga and parts of Thegu river wards. The company will develop and maintain sub-county wide water distribution infrastructure in partnership with existing local water schemes. Local water schemes will be intergrateand interlinked into one distribution system. The expected design capacity of WTP is 10,000M3/day.

Main water reservoir will be Kabendera dam and Kaburiani dam, while Water treatment plant at Kabunda.

OMWASCO water infrastructure proposed projects
<table><tr><th>Project name</th><th>Ward</th><th>Proposal</th><th>Project details</th></tr><tr><td>Kihuri Water T-works</td><td>Iria-ini</td><td>Proposed</td><td>To 10,000 m 3 / day, plain</td></tr></table></td><td></td><td></td><td></td><td></td><td></td></tr>
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Sub-sector	Strategies	Programs	Projects	Actors	Outcomes	Timelines		
						1-3	4-7	8-10

OMWASCO water infrastructure proposed projects

Project name	Ward	Proposal	Project details
Chinga Water Treatment works	Chinga	Proposed upgrading	Existing treatment capacity 5000m3/day, upgrading to
Proposed Njigari water treatment works	Mahiga	Proposed Water T-works	Treatment capacity of 700m3/day,
Proposed Kaharo water treatment works	Mahiga	Proposed Water T-works	Treatment capacity of 7000m3/day, plain

Upgrading and rehabilitation of TEAWASCO water treatment works at Mathakwa, Titie and Zaina from current supply of 12,000m3/day to 20,000m3/day, this will reduce Nonrevenue water from 38% to less than 30% especially in Titie theng'eng'e scheme.

Upgrading and rehabilitation of MAWASCO water treatment works at Ragati and Ihwagi from current supply of 11,000m3/day to 20,000m3/day.

Expansion of MAWASCO water distribution to Northern parts of Iriaini ward which lack pipe network coverage

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Upgrading and rehabilitation of NYEWASCO water treatment works at Kangemi, Rware from current supply of 17,000m3/day to 28,000m3/day. Water distribution network should be expanded to cover all parts of Mweiga ward especially, Amboni.						
			Dams and water pans						
			Kamburaini Dam	Proposed Extension of use To provide water for the locals, through KIEWASCO lines					
			Kabunda Water Project Earth Dam	Proposed for upgrading and WTP To be integrated into KIEWASCO infrastructure improvement program. site for Water-treatment works.					
			Kabendera Water Dam	Proposed for upgrading To be integrated into KIEWASCO infrastructure improvement program.					
			Githura Dam	Proposed Rehabilitation Rehabilitation of the dam and eventual connection to existing NYEWASCO water pipe network will ensure water supply in Gatarakwa, Mugunda and Endarasha/ mwiyogo wards.					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
			Chinga Dam	Proposed De-siltation De-siltation will help OMWASCO and TEAWASCO achieve the intended Design capacity of 28,300m^3/day.						
			Hohwe Dam	Proposed De-siltation De-siltation Increases water volumes, Dam is key provision of water to MAWASCO, especially in water supply for Karatina Town.						
			Kiria Dam	Proposed Rehabilitation and WTP At this point water from Githura Dam will be integrated. Hence the point would provide site for WTW (water treatment works)						
		Rehabilitation, and Upgrading of local community water schemes.	Name	Ward	Proposals					
			NYEWASCO Water Treatment Ponds	Gatitu	Proposed Upgrading Especially on Pipe infrastructure. once upgraded the project would be helpful in bridging water supply gap in Mweiga and Endarasha Town.					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
			Name	Ward	Proposals					
			Stalled Water Projects	Endarasha Mwiyogo	Proposed for re-Installation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					
			All Existing Water local water projects		Proposed for Augmentation To be integrated into NARUWASCO infrastructure improvement program.					
			Tetu Aberdare Water Sewerage Company	Wamagana	Proposed for rehabilitation. Rehabilitation works of the existing distribution network.					
			All Existing Water local water projects	Endarasha Mwiyogo	Proposed for Augmentation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
			Name	Ward	Proposals					
			All Water Tanks owned by OMWASCO	Gikondi	Proposed for Augmentation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					
			All Existing Water local water projects	Gatarakwa						
			All Community Water Projects	Mweiga	Proposed for Augmentation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					
			All Existing Water local water projects	Mugunda	Proposed for Augmentation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					

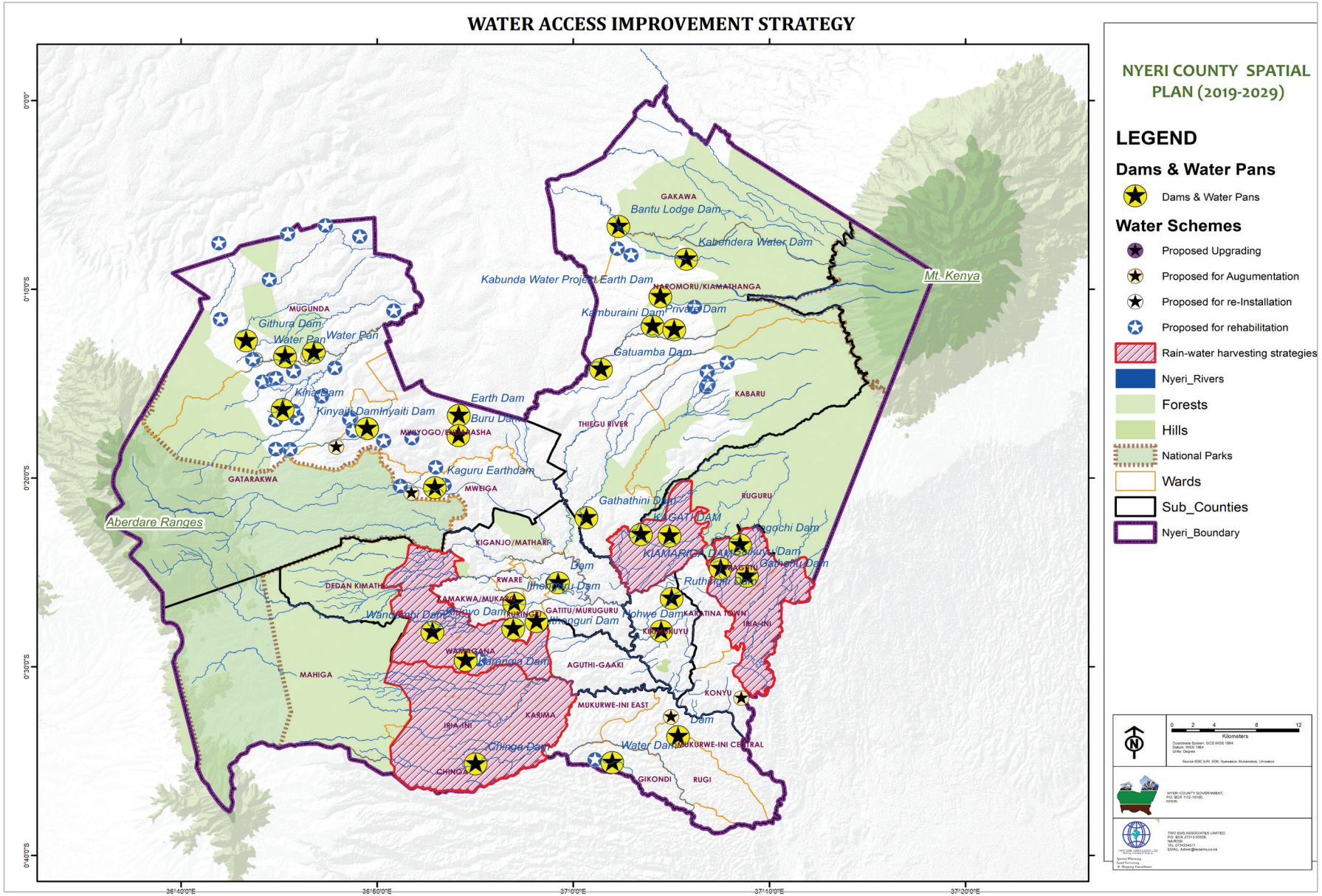
Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
			Name	Ward	Proposals					
			Kabunda Water Project		Proposed for Augmentation. To be integrated into NARUWASCO infrastructure improvement program.					
			Endarasha Self Help Water Project	Endarasha Mwiyogo	Proposed for Augmentation With Completion of rehabilitation works, the project is to be inter-linked with the NYEWASCO distribution network.					
			Simbara Amboni Water Project	Mweiga						
			Gatarakwa Water Project	Mugunda						
			Borehole name		**Proposal**					
			Gaturiri (Not equipped)		Equip and Power the borehole					
			Muturanguru		Provide power for increased extraction					
			Labura		Provide power for increased extraction					
			Ngano Thayu		Provide power for increased extraction					
			Ikumari Samaki		Provide power for increased extraction					
			Muthuini		Provide power for increased extraction					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Borehole name	**Proposal**					
			Ruirii	Provide power for increased extraction					
			New City	Provide power for increased extraction					
			Kinyaiti	Provide power for increased extraction					
			Wangata	Provide power for increased extraction					
			Kabati Treffos	Provide power for increased extraction					
			Kabati	Provide power for increased extraction					
			Kamuhiuria	Provide power for increased extraction					
			Arimi Kiamathaga	Provide power for increased extraction					
			Ragati Ebeneza	Provide power for increased extraction					
			Thungari A	Provide power for increased extraction					
			Thungari B	Provide power for increased extraction					
			Barguret	Provide power for increased extraction					
			State lodge	Provide power for increased extraction					
			Mugunyu	Provide power for increased extraction					
			Kamburaini	Provide power for increased extraction					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Borehole name	**Proposal**					
			Kamangura	Provide power for increased extraction					
			Guara	Provide power for increased extraction					
			Green Borehole	Provide power for increased extraction					
			Ndiriti Aguthi	Provide power for increased extraction					
			Kaaga Borehole	Provide power for increased extraction					
			Mureru	Provide power for increased extraction					
			Narumoru township	Provide power for increased extraction					
			Judea Borehole	Provide power for increased extraction					
			Gitwe Borehole	Provide power for increased extraction					
			Mapema	Provide power for increased extraction					
			Nyange borehole	Provide power for increased extraction					
			Embaringo Borehole	Provide power for increased extraction					
			Gitegi Borehole	Provide power for increased extraction					
			Expages borehole	Provide power for increased extraction					
			Mahiga Borehole	Provide power for increased extraction					

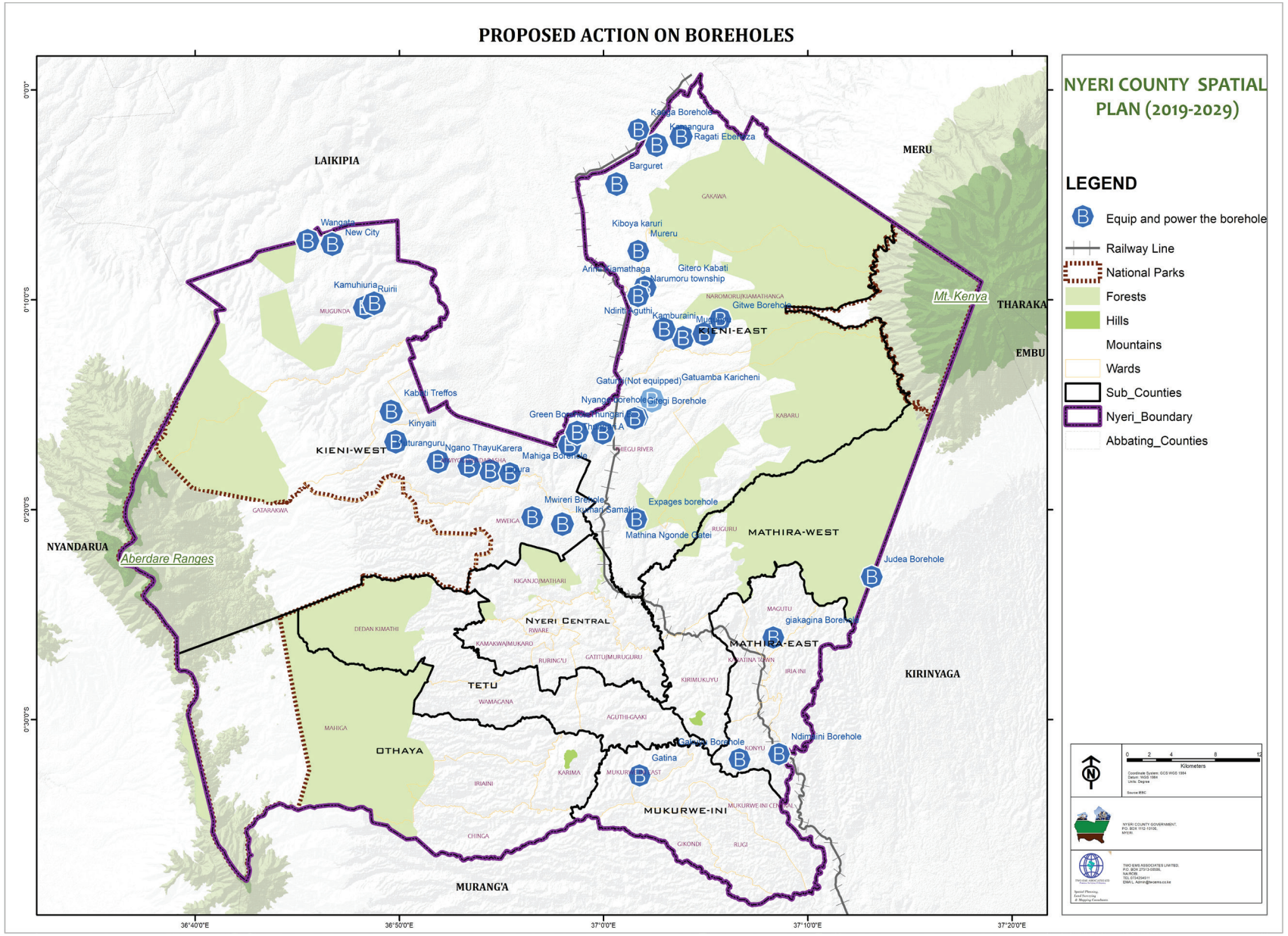
Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Borehole name	**Proposal**					
			Mwireri Borehole	Provide power for increased extraction					
			Ndimaini Borehole	Provide power for increased extraction					
			Gakuyu Borehole	Provide power for increased extraction					
			giakagina Borehole	Provide power for increased extraction					
			Gatina	Provide power for increased extraction					

Map 143: Water access improvement strategy



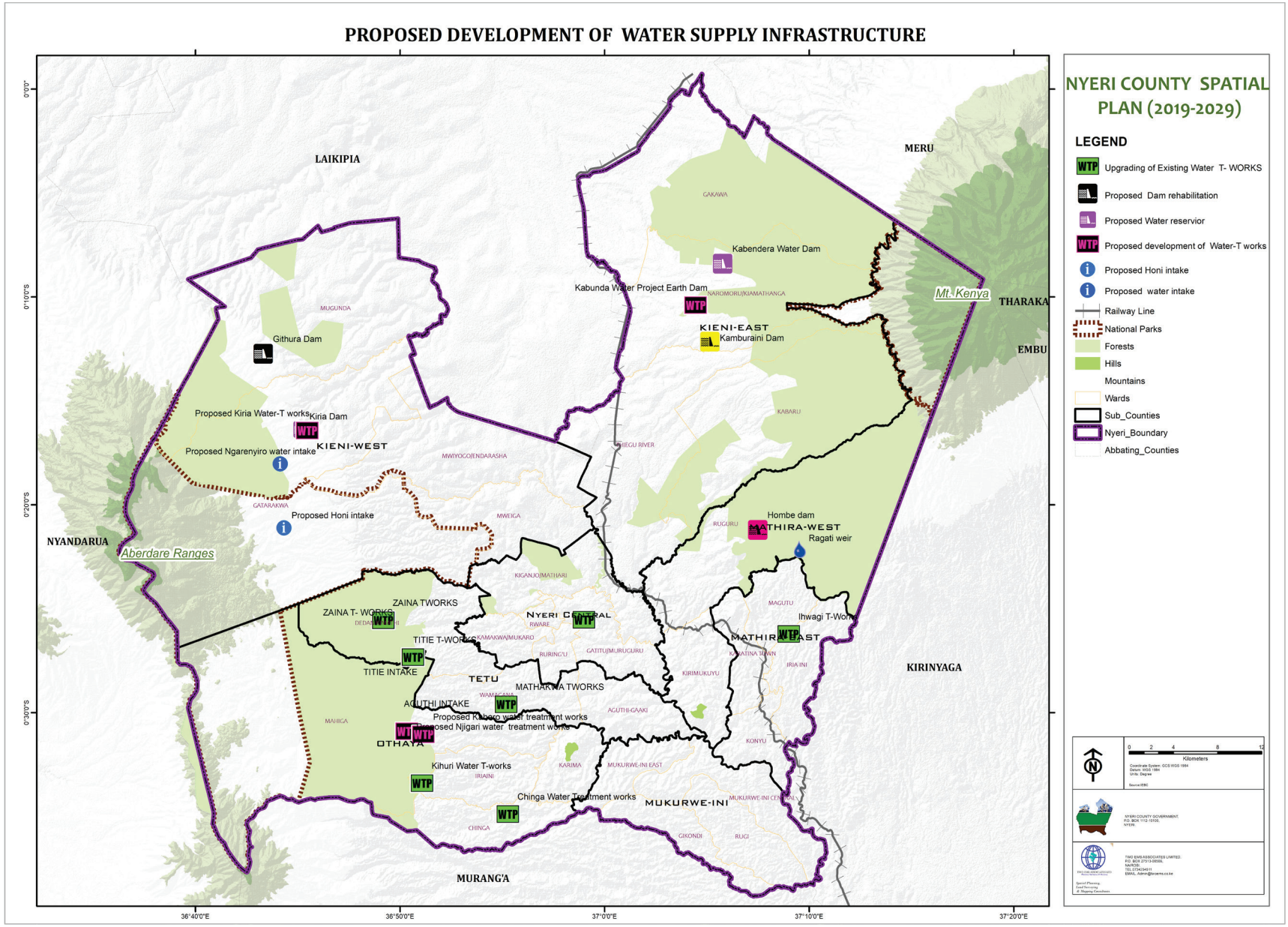
Source: Two EMS Associates, 2019.

Map 144: Proposed mechanisation of boreholes



Source: Two EMS Associates, 2019.

Map 145: Development of water infrastructure



Source: Two EMS Associates, 2019.

c) Sanitation

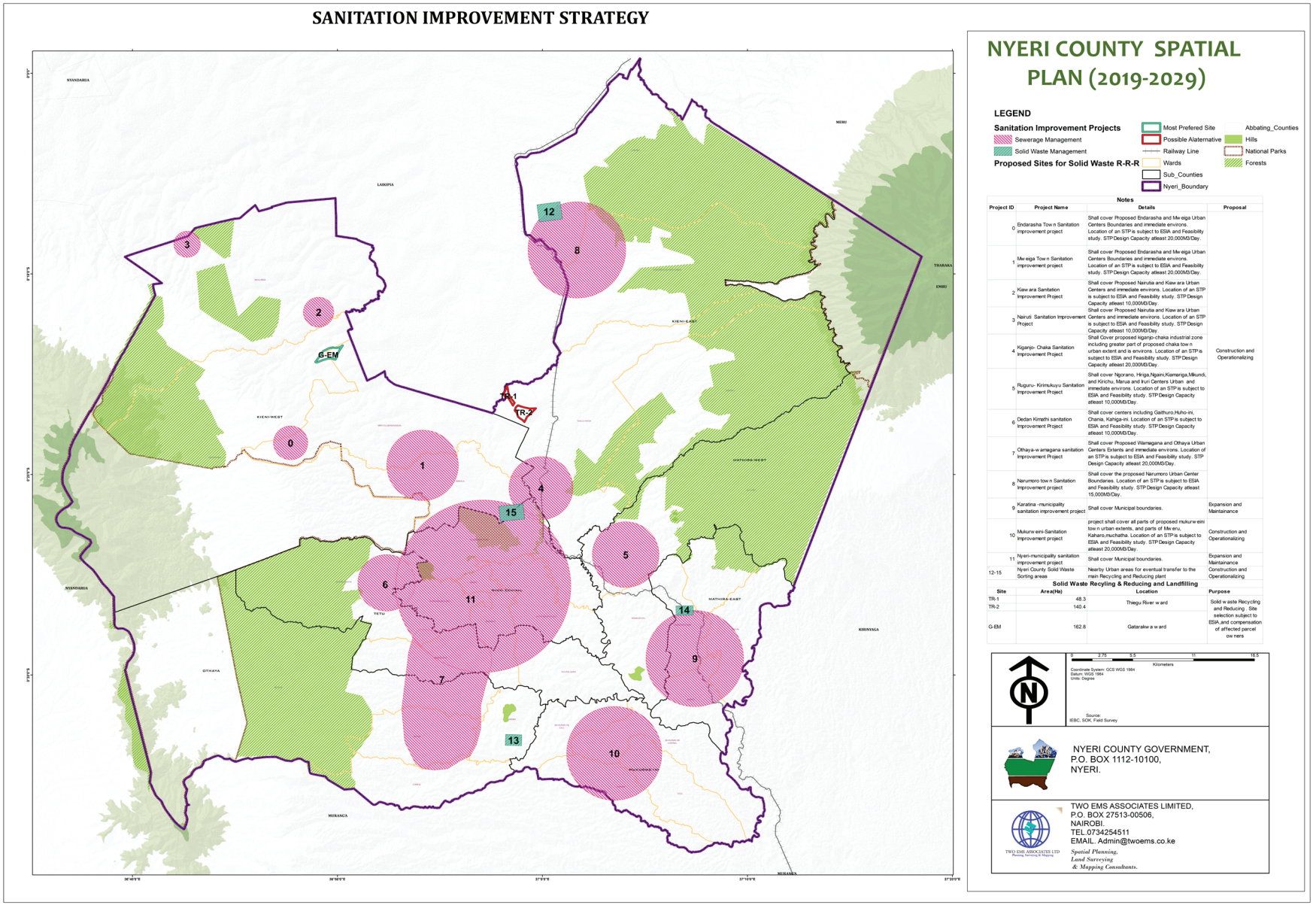
Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
Sanitation	Improve access to sanitation infrastructure.	Construction and operationalization of sewer trunk lines and Sewerage Treatment Plants	Project Name	Details	Nyeri County government department of public works, Tana water and services Board, NYEWASCO, OMWASCO, TEAWASCO, NARUWASCO.	Improved health amongst the County resident.			
			Endarasha - Mweiga Sanitation improvement project	Shall cover Proposed Endarasha and Mweiga Urban Centers Boundaries and immediate environs. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 20,000m^3/Day.					
			Nairutia - Kiawara Sanitation Improvement Project	Shall cover Proposed Nairutia and Kiawara Urban Centers and immediate environs. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 10,000M3/Day.	Local community.	Increased population production levels across all sectors.			
			Kiganjo- Chaka Sanitation Improvement Project	Shall Cover proposed Kiganjo-Chaka industrial zone including greater part of proposed Chaka town urban extent and is environs. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 20,000m^3/Day.		Conservation of ground water from pollution.			

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Project Name	**Details**					
			Dedan Kimathi sanitation Improvement Project	Shall cover centers including Gaithuri, Huho-ini, Chania, Kahiga-ini. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 10,000 m^3/ Day.					
			Othaya-Wamagana sanitation Improvement Project	Shall cover Proposed Wamagana and Othaya Urban Centers Extents and immediate environs. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 20,000 m^3/Day.					
			Naromoru town Sanitation Improvement project	Shall cover the proposed Naromoru Urban Center Boundaries. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 15,000 m^3/ Day.					
			Karatina -municipality sanitation improvement project	Shall cover Municipal boundaries.					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Project Name	**Details**					
			Mukurweini-Sanitation Improvement project	Project shall cover all parts of proposed Mukurweini town urban extents, and parts of Mweru, Kaharu, Muchatha. Location of an STP is subject to ESIA and Feasibility study. STP Design Capacity at least 20,000 m^3/Day.					
			Nyeri-municipality sanitation improvement project	Shall cover Municipal boundaries.					
		Construction and operationalization of Solid waste Management Plant.	Name	Details	Nyeri County government department of public works, Central government, Donors such as world bank, Local community.	Beautiful environment, Minimal soil air and pollution.			
			Proposed Nyeri County Solid Waste Management Plant	Within the agreed site of the three identified in section 9.5.2. {Two sites: TR-1 & TR-2 in Thiegu river ward and one site in Gatarakwa ward G-EM.} (See Map below/ GIS database for Parcels affected) Location of the Project is subject to ESIA and Feasibility study.					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Project Name	**Details**					
			Proposed Nyeri County Solid Waste collection and sorting centers Alternative waste management practices such as incineration, use of bio-diesel generators, anaerobic digesters is encouraged	Shall accommodate waste from Naromoru town and its environs					
				Shall accommodate waste from Othaya, Wamagana and Mukurweini towns and environs					
				Shall accommodate waste from Karatina town and its environs					
				accommodate waste from Nyeri town Chaka and Kiganjo towns					
			Proposed Landfills	Two sites (TR-1 & TR-2), in Thiegu river ward and one site G-EM in Gatarakwa ward. (See Map below/ GIS database for Parcels affected) Subject to ESIA and community participation the county government department of environment shall determine the appropriate site for development.	Nyeri County government department of environment, Donors such as world bank, Local community				

Map 146: Sanitation strategy



Source: Two EMS Associates, 2019.

e) Education

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education	To promote Nyeri County as an Education Tourism Hub. Through provide quality education, training and research programmes to ensure competitive human resource base	ECD, Primary and Secondary education facilities improvement	Improve human resource in all Public ECDs. Primary and Secondary schools. Moreover, the following actions have been proposed to improve accessibility to ECDE and secondary education.				NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	Project details			1-3	4-7	8-10
			proposed public ECD	Samaki area, mweiga ward	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Rure-ini area, mweiga ward	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Kabaru ward, public ecd	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Ebenezer, kaba-ru ward, within warazo jet area	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	near gitubu-ruru-maganyoni road, kabaru ward	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Rure-ini area, mweiga ward	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Gatarakwa (Gakanga)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Gatarakwa (Kabati)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Mugunda (Kiawara)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Mugunda (Ru-rii)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Mugunda (Niru-tia)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Mweiga (Mwireri)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Kiganjo Mathari (Kiganjo Town)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Kiganjo mathari (kiganjo town)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Iriaini (Nda-ruini)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Iriaini (Kamunyaka)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					
			proposed public ECD	Rugi (Gumba)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15 - 0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Karima (Othaya Town)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Kabaru (Maston Village)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	gakawa(kiboya)	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Gakawa	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Gakawa	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					
			proposed public ECD	Gakawa	Construction and Equipping	Public Mixed ECDE facility, Minimum Land Size 0.15-0.25Ha and 1-4 Classes					

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Timelines		
									1-3	4-7	8-10
Education							NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools						Timelines		
			Name	Location	Proposals	project details			1-3	4-7	8-10
			proposed public ECD	Kiamariga cen-ter, Ruguru	Redevel-opment	Classes are in poor condition need re-construction, water and electricity connection.					
			proposed public ECD	Ruguru	Proposed for construction	two stream classes, playground, play facilities such as swings, water and electricity connection.					
			Proposed Gatitu primary and Ecd	(Gatitu center) Gatitu Muru-guru	Proposed for construction	Public Mixed and Primary school ECDE facility, Minimum Land Size 3Ha and minimum 2 streams per classes and 1-4 Classes for ECD.					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
Education						NCG - education department. Central Government Donors Local community Investors and developed.	Increased accessibility to schools and improved learning conditions.			
			ECD and primary schools					Timelines		
			Name	Location	project details			1-3	4-7	8-10
			Kahara Primary School and Ecd	Kirimukuyu	Additional of classes, preferably vertical development					
			Ithenguri Primary School	Ruring'u	Additional of classes, preferably vertical development					
			Giakanja Primary School	Ruring'u	Additional of classes, preferably vertical development					
			Chirongi Primary School	Ruring'u	Additional of classes, preferably vertical development					
			Secondary schools					Timelines		
			Name	**Ward**	**Actions**			1-3	4-7	8-10
			Ithenguri Secondary School	Ruring'u	proposed for vertical development					
			Giakanja Boys Secondary School	Ruring'u	proposed for vertical development					
			Hiriga mixed sec sch	Ruguru	Proposed for Expansion					
			Kiamariga sec	Ruguru	Proposed for Expansion					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
		Tertiary facilities	Name	Ward	Proposals	NCG - education department. Central Government Donors Local community Investors and developed.	Improved learning conditions. Improved employment opportunities. Skills gained from the facilities will be used to provide skilled labor.	Timelines		
								1-3	4-7	8-10
			Kiamathaga Polytechnic	NaruMoru Kiamathanga	Proposed upgrading to a TVTC.					
			Mungaria Youth Polytechnic	Kirimukuyu	Provide Learning equip-ment's.					
			Mahiga Youth Polytechnic	Mahiga	Provide Learning equip-ment.					
			Gachuku Youth Polytechnic	Konyu Ward	Provide Learning equip-ment.					
			Kiamabara Youth Polytechnic	Konyu Ward	Provide Learning equip-ment.					
			Gathugururu Youth Polytechnic	Mukuruweini Ward	Provide Learning equip-ment.					
			Kiawamururu Youth Polytechnic	Mukuruweini Ward	Provide Learning equip-ment.					
			Unjiru Youth Polytechnic	Karima Ward	Provide Learning equip-ment.					
			Gathinga Vocational Training Centre	Aguthi Gaaki Ward	Provide Learning equip-ment.					
			The Nyeri Nation Polytechnic	Rware Ward	Provide Learning equip-ment.					
			St. Joseph Wazaro Catholic Youth Polytechnic	Kabaru Ward	Provide Learning equip-ment.					

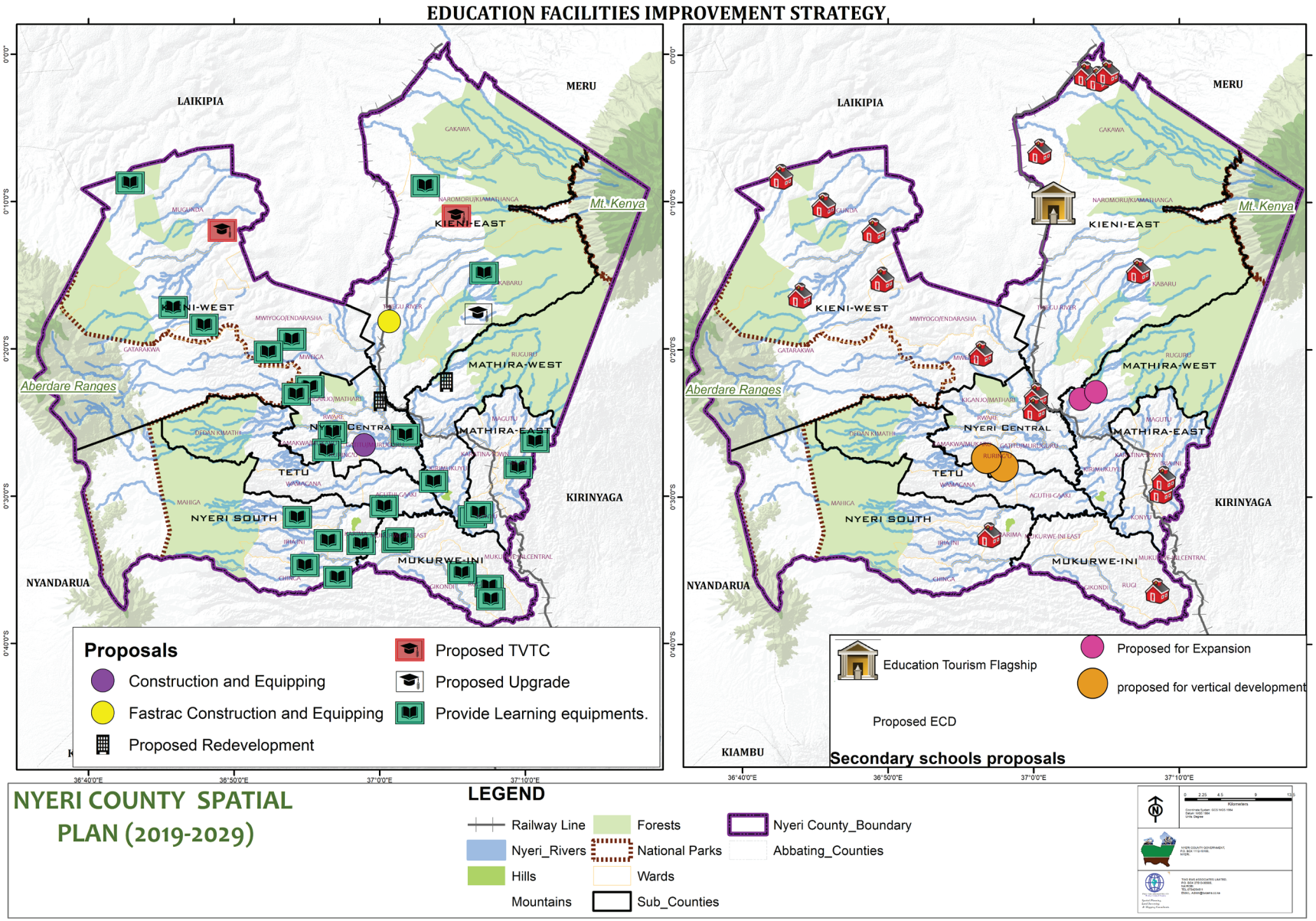
Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
		Tertiary facilities	Name	Ward	Proposals	NCG - education department.	Improved learning conditions.	Timelines		
								1-3	4-7	8-10
			Gitero Vocational Training Centre	Kamakwa Ward	Provide Learning equipment.					
			Kiahurio Polytechnic	Iriaini	Provide Learning equipment.					
			Mururuini Polytechnic	Iriaini	Provide Learning equipment.	Central Government	Improved employment opportunities. Skills gained from the facilities will be used to provide skilled labor.			
			Rutune Polytechnic	Rugi	Provide Learning equipment.					
			Youth Center	Rugi	Provide Learning equipment.					
			Giathugu Youth Polytechnic	Rugi	Provide Learning equipment.	Donors				
			Kiaguthu Polytechnic	Chinga	Provide Learning equipment.					
			Kagongo Polytechnic	Chinga	Provide Learning equipment.	Local community				
			Gachika Youth Polytechnic	Kiganjo Math-ari	Provide Learning equipment.					
			St. Joseph Brothers	Kiganjo Math-ari	Provide Learning equipment.	Investors and developed.				
			Kihuyo Polytechnic	Kiganjo Math-ari	Provide Learning equipment.					
			Kieni Youth Empowerment Centre	Mweiga	Provide Learning equipment.					
			Amboni Youth Polytechnic	Mweiga	Provide Learning equipment.					
			Othaya Polytechnic	Iria-ini	Provide Learning equipment.					

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
		Tertiary facilities	**Name**	**Proposals**	NCG - education department. Central Government Donors Local community Investors and developed.	Improved learning conditions. Improved employment opportunities. Skills gained from the facilities will be used to provide skilled labor.	**Timelines**		
							1-3	4-7	8-10
			Endarasha Youth Polytechnic	Provide Learning equipment.					
			Watuka Polytechnic	Provide Learning equipment					
			Kimahuri Polytechnic	Proposed Upgrade to VTC					
			Nairutia Technical Polytechnic	Provide Learning equipment					
			Stalled polytechnic	Proposed Redevelopment					
			Proposed Miesha TTI	Construction and Equipping					
		Education Facilities Flagship	**Name**	**Proposals**	Nyeri county government department of education, Central Government. Donors such as ADB, World Bank, European Union. Local Community.	Improved revenues from tourism sector. The facility is expected to attract local tourist from Northern Kenya and greater Mt-Kenya region. As the only such facility is in Nairobi. Developing the facility in Narumoro will be a big boost to county economy.	**Timelines**		
			Narumoro Education Center	Construction and Equipping of the center with an international standards library equipped with books and ICT infrastructure that would educate visitors rich history of Nyeri and Kenya and a research lab					

			Name	Ward	Facility Type	Proposal	Action	Actor		Timelines		
	Improve Access to Adult Education Facilities	Development of at least One facility per Sub-County.	Mahiga Adult Education Center	Mahiga	Adult Education Facility	Improve human resource	Equipping			1-3	4-7	8-10
			Njengu Adult Education Centre	Mweiga	Adult Education Facility	Improve human resource, and facilities such as hostels	Equipping					
			Proposed Ngorano Adult Education Center	Ruguru	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library	Construction and Equipping					
			Proposed Karatina Town Adult Education Center	Karatina Town	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library	Construction and Equipping					
			Proposed Nyeri Central Adult Education Center	Kamakwa	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library	Construction and Equipping					
			Proposed Mwiyogo Town Adult Education Center	Mwiyogo/ Endarasha	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library	Construction and Equipping					

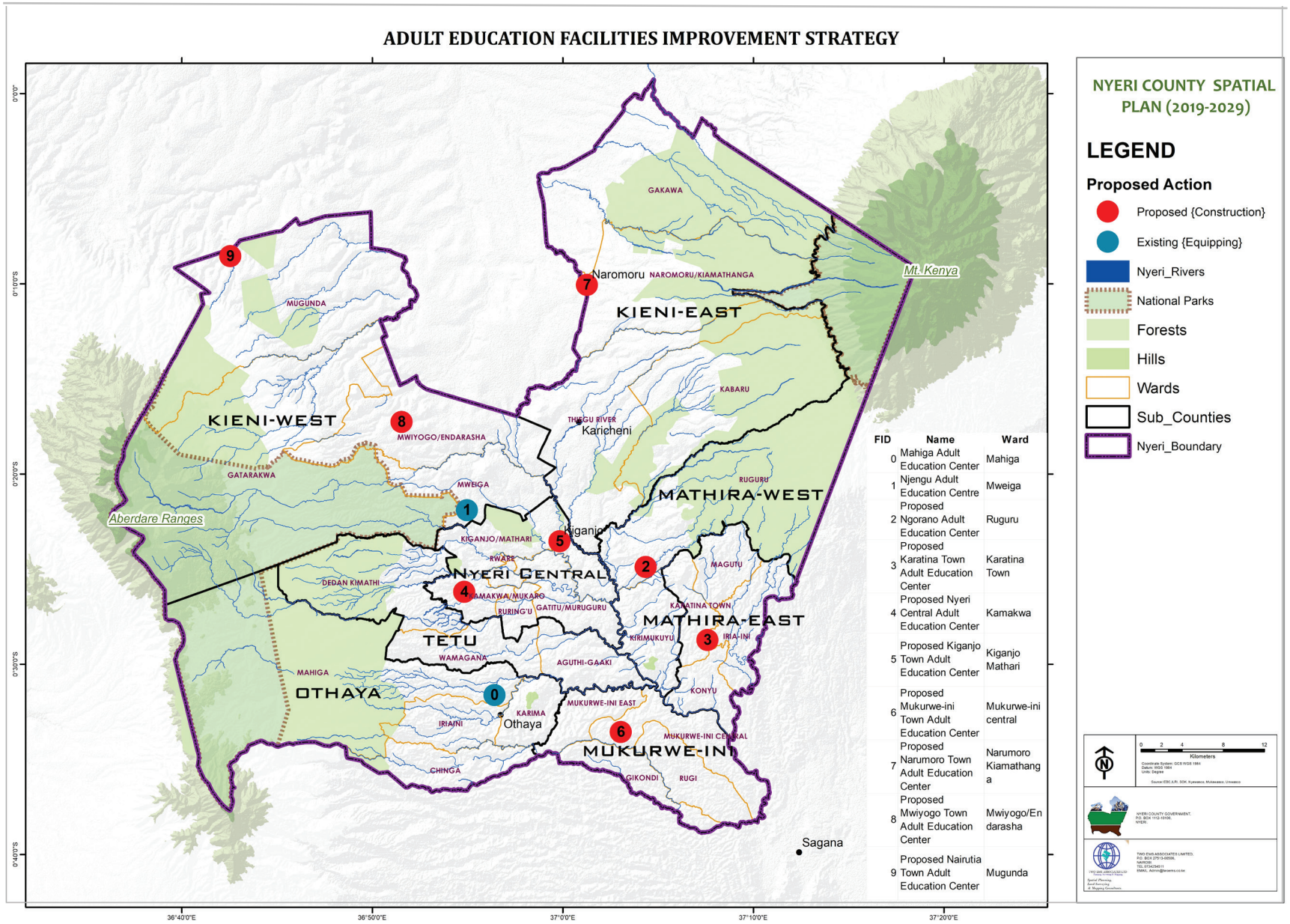
			Name	Ward	Facility Type	Proposal	Action	Actor	Outcome	Timelines		
			Proposed Kiganjo Town Adult Education Center	Kiganjo Mathari	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library						
			Proposed Mukurwe-ini Town Adult Education Center	Mukurwe-ini central	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library						
			Proposed Narumoro Town Adult Education Center	Narumoro	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library						
			Proposed Mwiyogo Town Adult Education Center	Mwiyogo/ Endarasha	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library						
			Proposed Nairutia Town Adult Education Center	Mugunda	Adult Education Facility	Proposed For Developed on 0.25 ha land, with two classes @55m2, abulation block and a library						

Map 147: Education facilities strategy



Source: Two EMS Associates, 2019.

Map 148: Adult Education facilities Improvement Strategy



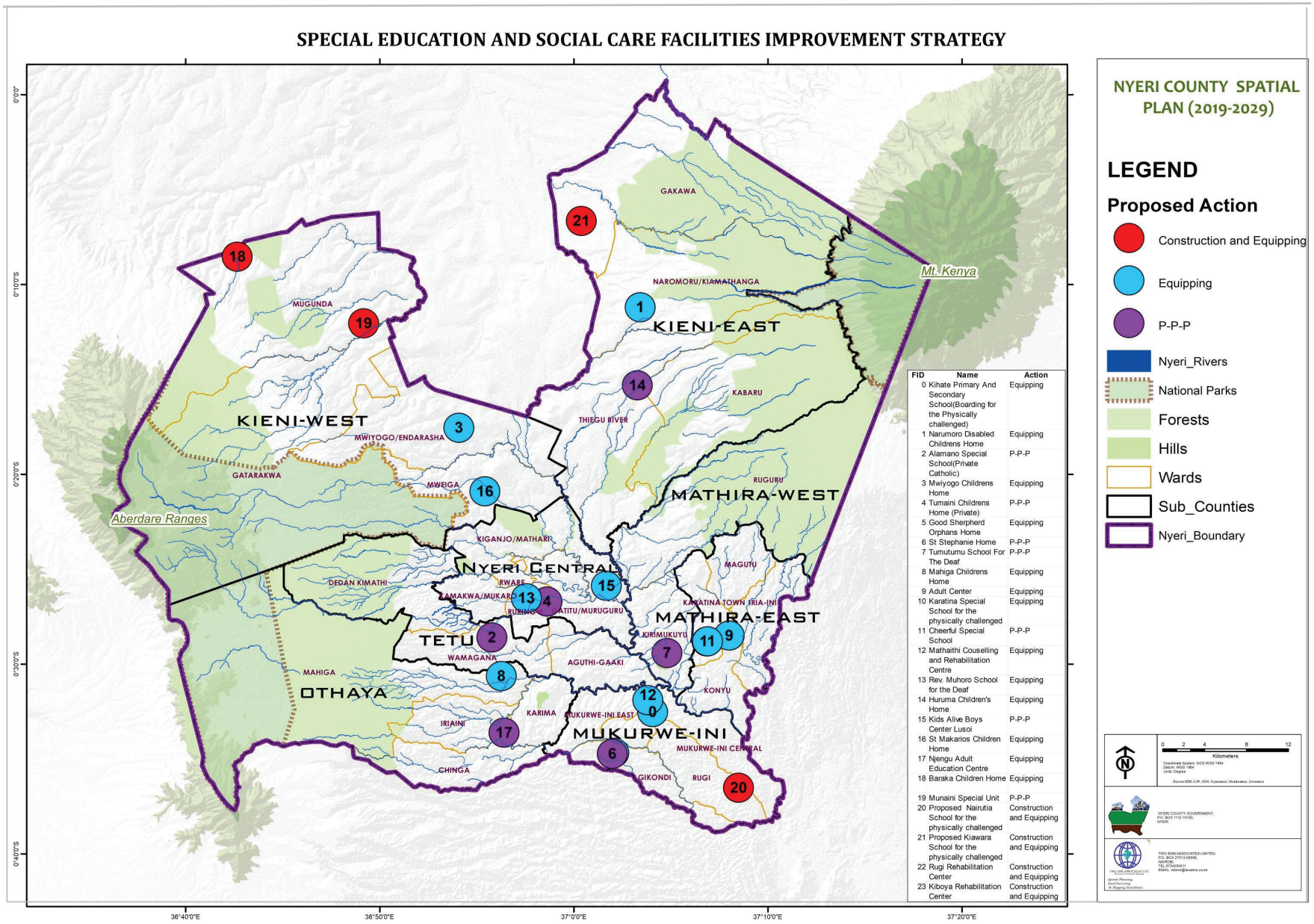
Source: Two EMS Associates, 2019.

e) Social Care facilities

Sub-sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
Social Care Facilities	Improve Access to Social Care Facilities	Development of Children homes, Adult education centers and Rehabilitation centers.	**Name**	**Action**	Nyeri County government department responsible for social services, Central Government, Private developers and investor, Donors, Local community, NGOs such as Red-cross.	Improved quality of life for the less fortunate members of the society. With the specialized education population in this group can integrate into the society and participate productively in the broader economy.			
			Kihate Primary and Secondary School (Boarding for the Physically challenged)	Equipping					
			Narumoro Disabled Children's Home	Equipping					
			Alamano Special School (Private Catholic)	Public-Private-Partnership (P-P-P)					
			Mwiyogo Children's Home	Equipping					
			Tumaini Children's Home (Private)	P-P-P					
			Good Shepherd Orphans Home	Equipping					
			St Stephanie Home	P-P-P					
			Tumutumu School for The Deaf	P-P-P					
			Mahiga Children's Home	Equipping					
			Karatina Special School for the physically challenged	Equipping					
			Cheerful Special School	P-P-P					
			Mathaithi Counselling and Rehabilitation Centre	Equipping					

Sub - sector	Strategies	Programs	Projects		Actors	Outcomes	Timelines		
							1-3	4-7	8-10
			Name	**Action**	Nyeri County government department responsible for social services, Central Government, Private developers and investor, Donors, Local community, NGOs such as Red-cross.	Improved quality of life for the less fortunate members of the society. With the specialized education population in this group can integrate into the society and participate productively in the broader economy.			
			Rev. Muhoro School for the Deaf	Equipping					
			Huruma Children's Home	Equipping					
			Kids Alive Boys Center Lusoi	P-P-P					
			St Makarios Children Home	Equipping					
			Baraka Children Home	Equipping					
			Munaini Special Unit	P-P-P					
			Proposed Nairutia School for the physically challenged	Construction and Equipping					
			Proposed Kiawara School for the physically challenged	Construction and Equipping					
			Rugi Rehabilitation Center	Construction and Equipping					
			Kiboya Rehabilitation Center	Construction and Equipping					

Map 149: Special Education facilities Improvement Strategy



Source: Two EMS Associates, 2019.

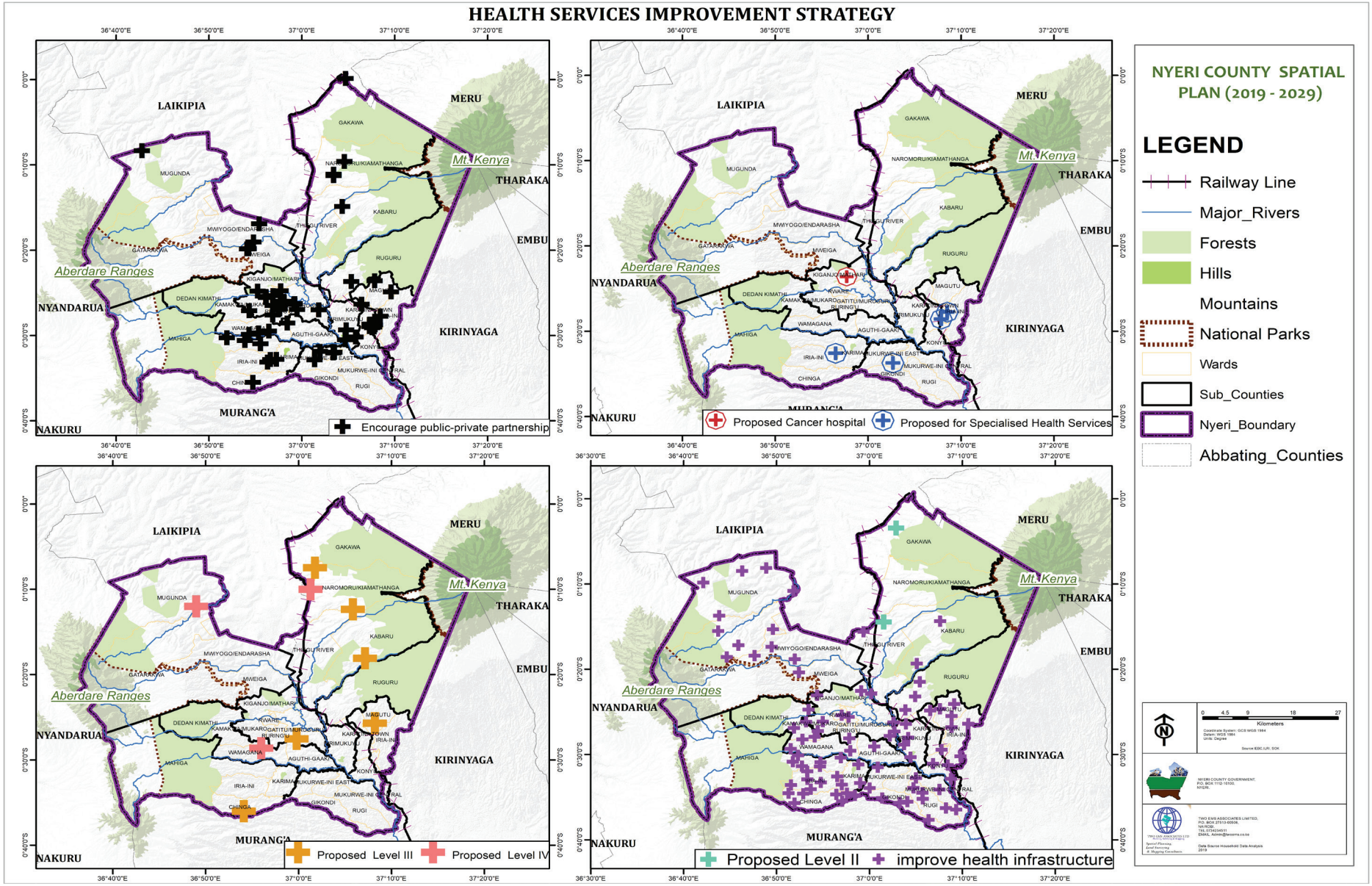
f) Health

Sub - sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
Health	Provision of quality healthcare and efficient service delivery	Human Resource	Improve the number of Nurses, Clinical officers, general physicians and Specialized Doctors in all dispensaries, health centres, Level IV and Level V.			Nyeri County government department of health services. Donors, Universities and colleges such as KMTC. Private Medical Consultants. National Government through UHC programme	Improved health care services across the County, that would transform the County into a health hub.			
		Facilities provision and upgrade	Name	Ward	Proposals	Nyeri County government department of health services. Donors, National Government through P-P-P and other county initiatives programme	Improved health care services across the County.	1-3	4-7	8-10
			Proposed Gituamba Dispensary	Thegu River ward	Proposed Level II					
			Karatina General Hospital	Karatina Ward	Proposed for Specialized Health Services					
			Mukurweini Sub County Hospital	Mukurweini-Central	Proposed for Specialized Health Services					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
		Facilities provision and upgrade	Name	Ward	Proposals	Nyeri County government department of health services. Donors, National Government through P-P-P and other county initiatives programme	Improved health care services across the County.			
			Othaya Hospital	Iria-ini	Proposed for Specialized Health Services					
			Proposed Dedan Kimathi university cancer hospital	Kiganjo / Mathari	Proposed Cancer Hospital					
			Proposed Kiawara Level IV hospital	Mugunda ward	Proposed Level IV					
			Naromoru Health Centre	Naromoru Kiamathanga	Proposed Level IV (under construction)					
			Wamagana Health Centre	Wamagana	Proposed Level IV					
			Mureru Dispensary	Gakawa Ward	Proposed Level III (up grading)					
			Ndathi Dispensary	Kabaru Ward	Proposed Level III (up grading)					
			Kamburaini Dispensary	Naromoru Kiamathanga	Proposed Level III (up grading)					
			Gatitu Dispensary	Gatitu	Proposed Level III (up grading)					
			Gitimaini Dispensary	Magutu	Proposed Level III (up grading)					
			Kagicha Dispensary	Chinga	Proposed Level III (up grading)					
			Proposed Gathiuru dispensary	Gakawa ward, gathiuru	Construction and equipping					

Sub-sector	Strategies	Programs	Projects	Actors	Outcomes	Timelines		
						1-3	4-7	8-10
		Medicine and related provision.	Improve the number of Ambulances in all Level IV, and at least one in every health center.	Nyeri County government department of health services. Donors, National Government through UHC programme	Improved health care services across the County.			

Map 150: Health strategy

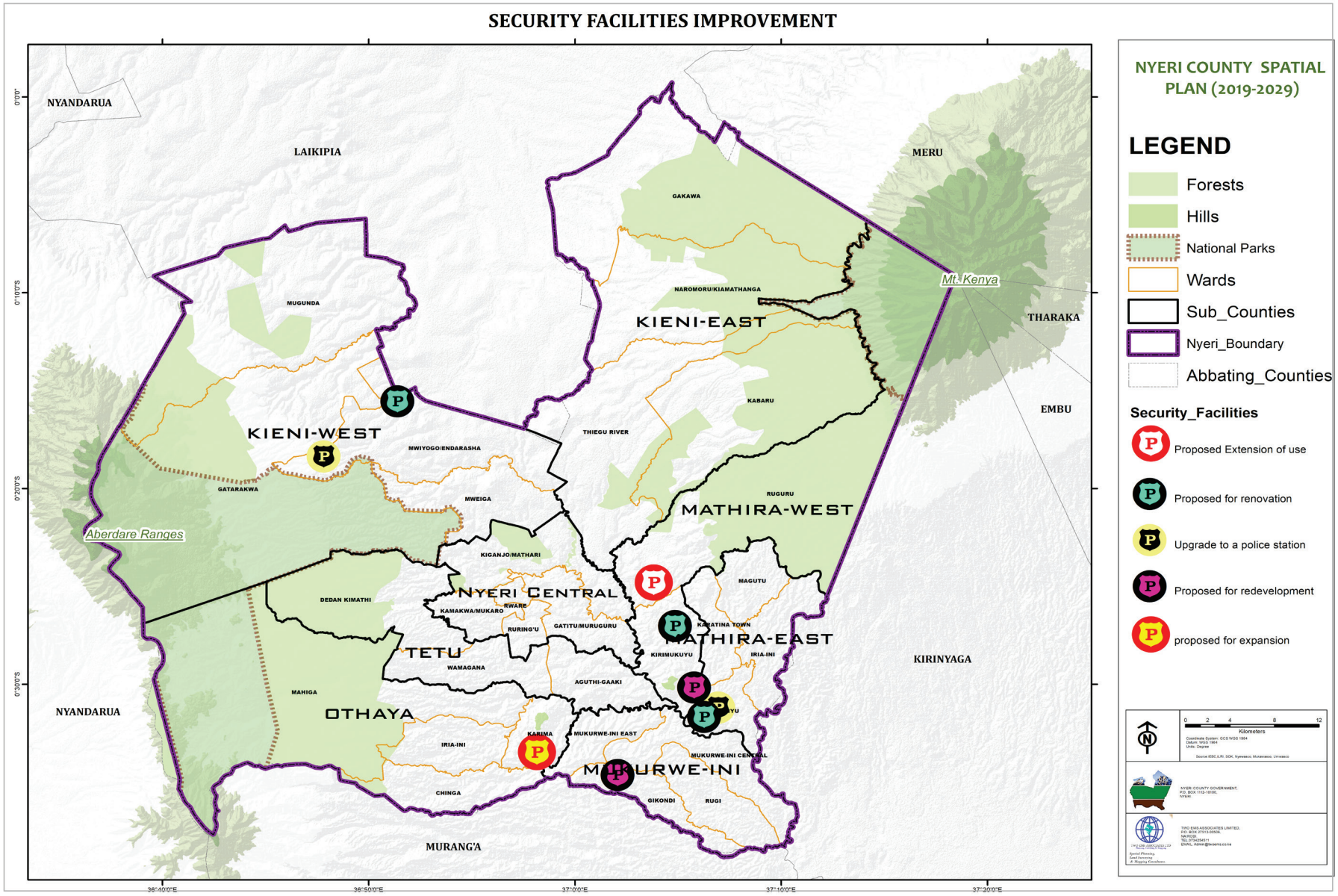


Source: Two EMS Associates, 2019.

g) Security

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
								1-3	4-7	8-10
Security	Enhance security status to enable economic development	Facilities redevelopment, renovation and upgrading	**Name**	**Ward**	**Proposals**	Central Government ministry of interior, Nyeri County government department of public service. Local community	Improved security and fast response across all the wards.			
			Mwiyogo AP Post	Endarasha/ Mwiyogo	Proposed for redevelopment			■		
			Endarasha Police Post	Endarasha/ Mwiyogo	Upgrade to a police station			■		
			Chief Office Gikondi	Gikondi	Proposed for redevelopment				■	
			Kiamabara Police Station	Kirimukuyu				■		
			Chief Camp Konyu	Kirimukuyu	Proposed for renovation			■		
			Ngunguru Chief Camp	Kirimukuyu	Proposed for redevelopment			■		
			Rititi Police Post	Kirimukuyu	Proposed for renovation					
			Ngorano Police Post	Kirimukuyu	Proposed Extension of use				■	
			Itemerini Assistant Chiefs Office	Karima Ward	proposed for expansion					■
		Human resource and equipping the facilities	Provision of adequate number of Police vehicles in all the police posts and stations across the ward.			Central Government ministry of interior, Nyeri County government department of public service. Local community	Improved security and fast response across all the wards.	■	■	■

Map 151: Security facilities strategy



Source: Two EMS Associates, 2019.

m) Recreational Facilities

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
			Name	**Ward**	**Actions**			1-3	4-7	8-10
Recreational	To provide quality green spaces for the wellbeing of the County residents.	Facilities Redevelopment, upgrading and land scaping	Karatina Stadium (Flagship Project)	Karatina Ward	Proposed for Upgrading	Nyeri County government departments responsible for sports and department of public works. National Government Ministry of sports and culture. NGOs such as UN-HABITAT. Investors and developed, Local community	Improved access to recreational facilities. Improved quality of life.			
			Dedan Kimathi/ Kamukunji Stadium (Flagship Project)	Rware Ward	Proposed for Upgrading					
			Mweiga Stadium (Flagship Project)	Mweiga	Proposed for Upgrading					
			Rirungu Stadium Flagship Project (National Government)	Ruring'u	Proposed for redevelopment					
			Othaya Town Stadium	Othaya	Proposed for Landscaping					
			Karindi Stadium	Gikondi	Proposed for High Altitude Training Camp					
			Mukurweini Stadium	Mukurweini-Central	Proposed for Development					
			Naromoru Stadium	Naromoru Kiamathanga	Proposed for Development					
			Endarasha Stadium	Endarasha/ Mwiyogo	Proposed for Development					
			Kinunga Stadium	Dedan Kimathi	Proposed for Development					
			Kaiyaba Stadium	Kirimukuyu	Proposed for Development					

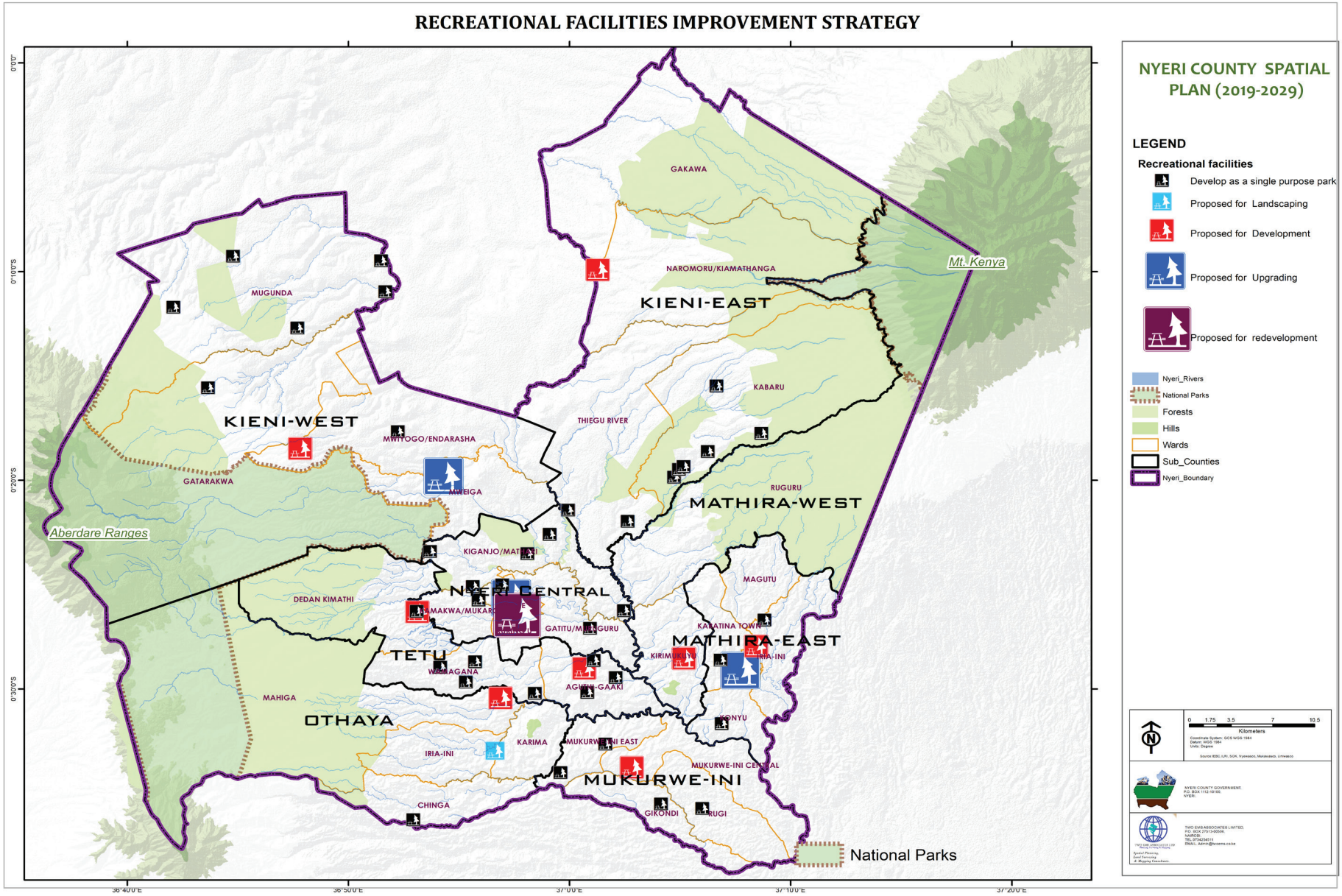
Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
Recreational			**Name**	**Ward**	**Actions**	Nyeri County government departments responsible for sports and department of public works. National Government Ministry of sports and culture. NGOs such as UN-HABITAT. Investors and developed, Local community	Improved access to recreational facilities. Improved quality of life.	1-3	4-7	8-10
			Kagere Community Sports Field	Mahiga	Proposed for Development					
			Kirabu Stadium	Karatina Ward	Proposed for Development					
			Gichira Stadium	Aguthi Gaaki Ward	Proposed for Development					
			Mukarara Recreational Center	Wamagana	Develop as a single purpose park					
			Mathakwa_ini Playground	Wamagana	Develop as a single purpose park					
			Kaiguri Playground	Wamagana	Develop as a single purpose park					
			Wamagana Sports Field	Wamagana	Develop as a single purpose park					
			Mwiyogo Community Playground	Endarasha Mwiyogo	Develop as a single purpose park					
			Githuri Community Playground	Gatitu	Develop as a single purpose park					
			Kaharu Playfield	Gikondi	Develop as a single purpose park					
			Embaringo Community Playground	Gataragwa	Develop as a single purpose park					
			Kiawamururu Community Sports ground	Mukuruweini Ward	Develop as a single purpose park					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
Recreational			**Name**	**Ward**	**Actions**	Nyeri County government departments responsible for sports and department of public works. National Government Ministry of sports and culture. NGOs such as UN-HABITAT. Investors and developed, Local community	Improved access to recreational facilities. Improved quality of life.	1-3	4-7	8-10
			Ihiga Community Playground	Konyu Ward	Develop as a single purpose park					
			Mathaithi Playground	Karatina Ward	Develop as a single purpose park					
			India-ini playground	Mukuruweini Ward	Develop as a single purpose park					
			Kaigonde Community Playground	Aguthi Gaaki Ward	Develop as a single purpose park					
			Muthinga Volleyball Playground	Aguthi Gaaki Ward	Develop as a single purpose park					
			Gichira Volleyball Court	Aguthi Gaaki Ward	Develop as a single purpose park					
			Kigongo Community Playground	Rware Ward	Develop as a single purpose park					
			Mbiriri Football Ground	Kaburu Ward	Develop as a single purpose park					
			Mbiriri Community Playground	Kaburu Ward	Develop as a single purpose park					
			Mbiriri Volleyball Pitch	Kaburu Ward	Develop as a single purpose park					
			Mapema Community Volleyball Pitch	Kaburu Ward	Develop as a single purpose park					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
Recreational			**Name**	**Ward**	**Actions**	Nyeri County government departments responsible for sports and department of public works. National Government Ministry of sports and culture. NGOs such as UN-HABITAT. Investors and developed, Local community	Improved access to recreational facilities. Improved quality of life.	1-3	4-7	8-10
			Ndathi Community Volleyball Pitch	Kabaru Ward	Develop as a single purpose park					
			Kangangi Community Playground	Kabaru Ward	Develop as a single purpose park					
			Kamakwa Volleyball pitch	Kamakwa Ward	Develop as a single purpose park					
			Kinunga Playground	Kamakwa Ward	Develop as a single purpose park					
			Ihwagi Community Playground	Iriaini	Develop as a single purpose park					
			Mweru Playing Ground	Rugi	Develop as a single purpose park					
			Maragima Community Playing Ground	Thegu River	Develop as a single purpose park					
			Chaka Playing Ground	Thegu River	Develop as a single purpose park					
			Muirungi Community Playing Ground	Chinga	Develop as a single purpose park					
			Nyaribo Community Playing Ground	Kiganjo Mathari	Develop as a single purpose park					
			Kahiga Community Playing Ground Right	Kiganjo Mathari	Develop as a single purpose park					

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
Recreational			**Name**	**Ward**	**Actions**	Nyeri County government departments responsible for sports and department of public works. National Government Ministry of sports and culture. NGOs such as UN-HABITAT. Investors and developed, Local community	Improved access to recreational facilities. Improved quality of life.	1-3	4-7	8-10
			Kahiga Community Playing Ground Right	Kiganjo Mathari	Develop as a single purpose park					
			Nyaragumu Playing Ground	Kiganjo Mathari	Develop as a single purpose park					
			Mathari Community Playing Ground	Kiganjo Mathari	Develop as a single purpose park					
			Show Ground	Kiganjo Mathari	Develop as a single purpose park					
			Tanyai Community Playing Ground	Mugunda	Develop as a single purpose park					
			Rurichu Playing Field	Mugunda	Develop as a single purpose park					
			Rurichu Community Playing Ground	Mugunda	Develop as a single purpose park					
			Kiambogo Public Ground	Mugunda	Develop as a single purpose park					
			Launch pad recreational	Mugunda	Develop as a single purpose park					

Map 152: Recreational facilities strategy



Source: Two EMS Associates, 2019.

n) Community Facilities

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Timelines		
Community Facilities	To provide adequate access to library services	Construction and equipping of libraries	Name	Ward	Proposal	KNLS, Nyeri County Government Education Department. Developers and investors. Local community.	Improved Access to library services.	1-3	4-7	8-10
			Proposed Kiawara Library	Mugunda	Proposed Community Library					
			Proposed Endarasha Library	Endarasha Mwiyogo						
			Proposed Chaka Library	Thegu River						
			Proposed Mukurweini Library	Mukurweini-central						
			Proposed Ngorano Library	Ruguru						
			Proposed Wamagana Library	Wamagana						

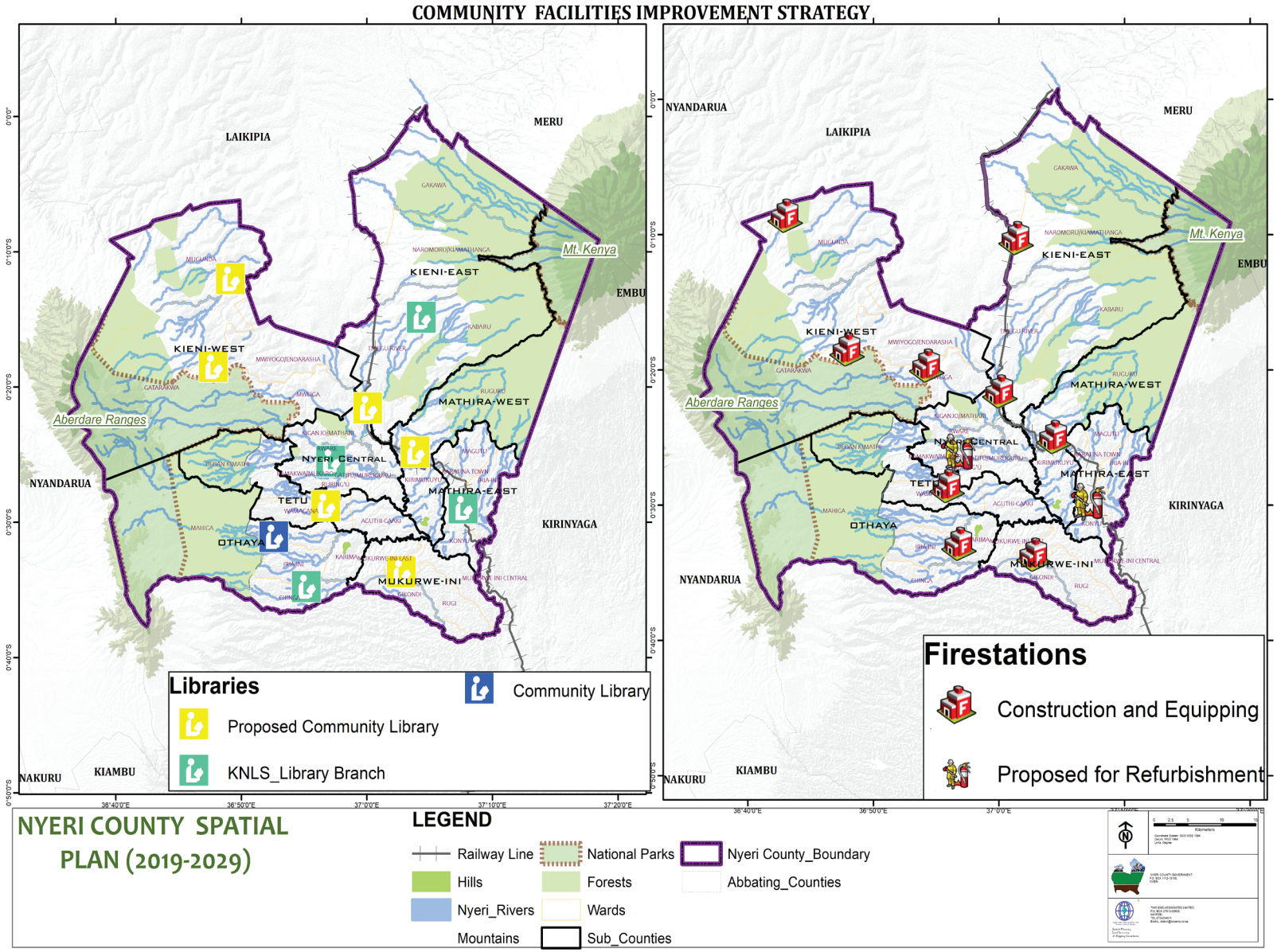
Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Time lines		
	To provide adequate access to disaster management facilities.	Construction and equipping of fire brigades.	Name	Ward	Proposal	Particulars	Nyeri County Public works department. Donors (World bank) Developers and Investors Local community	Improved investor confidence in the County, hence more investments. Improved preparedness and response in cases of a disaster	1-3	4-7	8-10
			Proposed Ngorano Fire station	Ruguru	Construction and Equipping	Fire engine and Hydrants, and water points					
			Proposed Mukurweini fire station	Mukurweini-Central							
			Proposed Othaya fire station	Iriani							
			Proposed Naromoru fire station	Naromoru Kiamathanga							
			Proposed Wamagana fire station	Wamagana							
			Proposed Endarasha fire station	Endarasha/ Mwiyogo							
			Proposed Mweiga fire station	Mweiga							
			Proposed Chaka fire station	Thegu River							

Sub-sector	Strategies	Programs	Projects				Actors	Outcomes	Time lines		
	To provide adequate access to disaster management facilities.	Construction and equipping of fire brigades.	**Name**	**Ward**	**Proposal**	**Particulars**	Nyeri County Public works department. Donors (World bank) Developers and Investors Local community	Improved investor confidence in the County, hence more investments. Improved preparedness and response in cases of a disaster	1-3	4-7	8-10
			Nyeri fire station	Rware	Proposed for Refurbishment	Additional Fire Engines					
			Karatina fire station	Karatina Town							
			Proposed Nairutia Fires Station	Mugunda	Construction and Equipping	Fire engine and Hydrants, and water points					
	To improve access to community meeting halls	Construction and Equipping social halls and resource centers.	**Name**	**Ward**	**Proposals**		Nyeri County government department responsible for social services. Donors such as World bank, ADB, Developers and Investors, Local Community.	Improved access to social halls, Improved unity and social fabric amongst Nyeri Residents. Promotes fast conflict resolutions.	1-3	4-7	8-10
			Mahiga resource center	Mahiga	Equipping (conferencing facilities)						
			Mumwe community center	Mahiga							
			Kiamariga community hall	Ruguru	Equipping and Redevelopment (conferencing facilities)						
			Kireremа Youth Center	Mukurweini-Central	Equipping (conferencing facilities)						
			Children and Youth	Gatitu							
			Endarasha Community Resource Center	Endarasha Mwiyogo							

Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Time lines		
	To improve access to community meeting halls	Construction and Equipping social halls and resource centers.	Name	Ward	Proposals	Nyeri County government department responsible for social services. Donors such as World bank, ADB, Developers and Investors, Local Community.	Improved access to social halls, Improved unity and social fabric amongst Nyeri Residents. Promotes fast conflict resolutions.	1-3	4-7	8-10
			Machako Rescue and Pastoral Care Centre	Wamagana	Equipping (conferencing facilities)					
			Githi Heritage and Community Center	Mukurweini-Central						
			Chaka Resource Center	Thegu River	Construction and Equipping (conferencing facilities) Provide ICT (develop an innovation hub)					
			Kiboya Resource Center	Gakawa	Construction and Equipping (conferencing facilities) Provide ICT (develop an innovation hub					
			Naromoru Resource Center	Naromoru Kiamathanga	Provide ICT (develop an innovation hub)					
			Nairutia Resource Center	Mugunda	Provide ICT (develop an innovation hub)					
			Proposed renovation of Kariki social hall	Iriaini ward mathira	(fix the following) Walls made of iron sheets, torn roof, lack of power and lack of sanitation facilities					

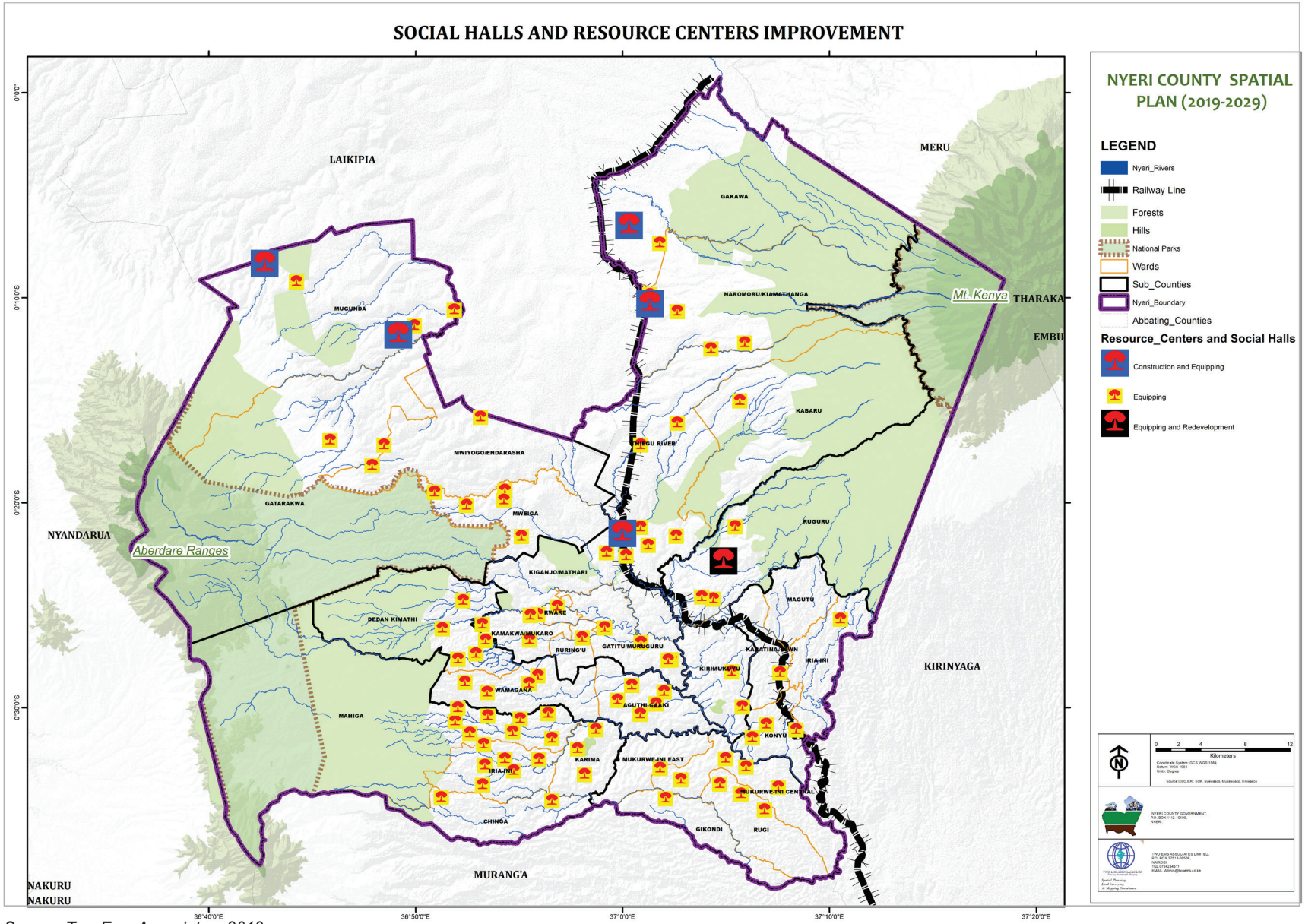
Sub-sector	Strategies	Programs	Projects			Actors	Outcomes	Time lines		
	To improve access to community meeting halls	Construction and Equipping social halls and resource centers.	Name	Ward	Proposals	Nyeri County government department responsible for social services. Donors such as World bank, ADB, Developers and Investors, Local Community.	Improved access to social halls, Improved unity and social fabric amongst Nyeri Residents. Promotes fast conflict resolutions.	1-3	4-7	8-10
			Kiawara Resource Center	Mugunda	Construction and Equipping (conferencing facilities) Provide ICT (develop an innovation hub					
			Mweiga Town Hall	Mweiga	Equipping (conferencing facilities)					
			Provision of Conferencing facilities in all Social halls situated within administration facilities across all wards							

Map 153: Community facilities improvement strategy



Source: Two Ems Associates, 2019

Map 154: Social Halls and Resource Centre Facilities strategy



Source: Two Ems Associates, 2019

PART V:

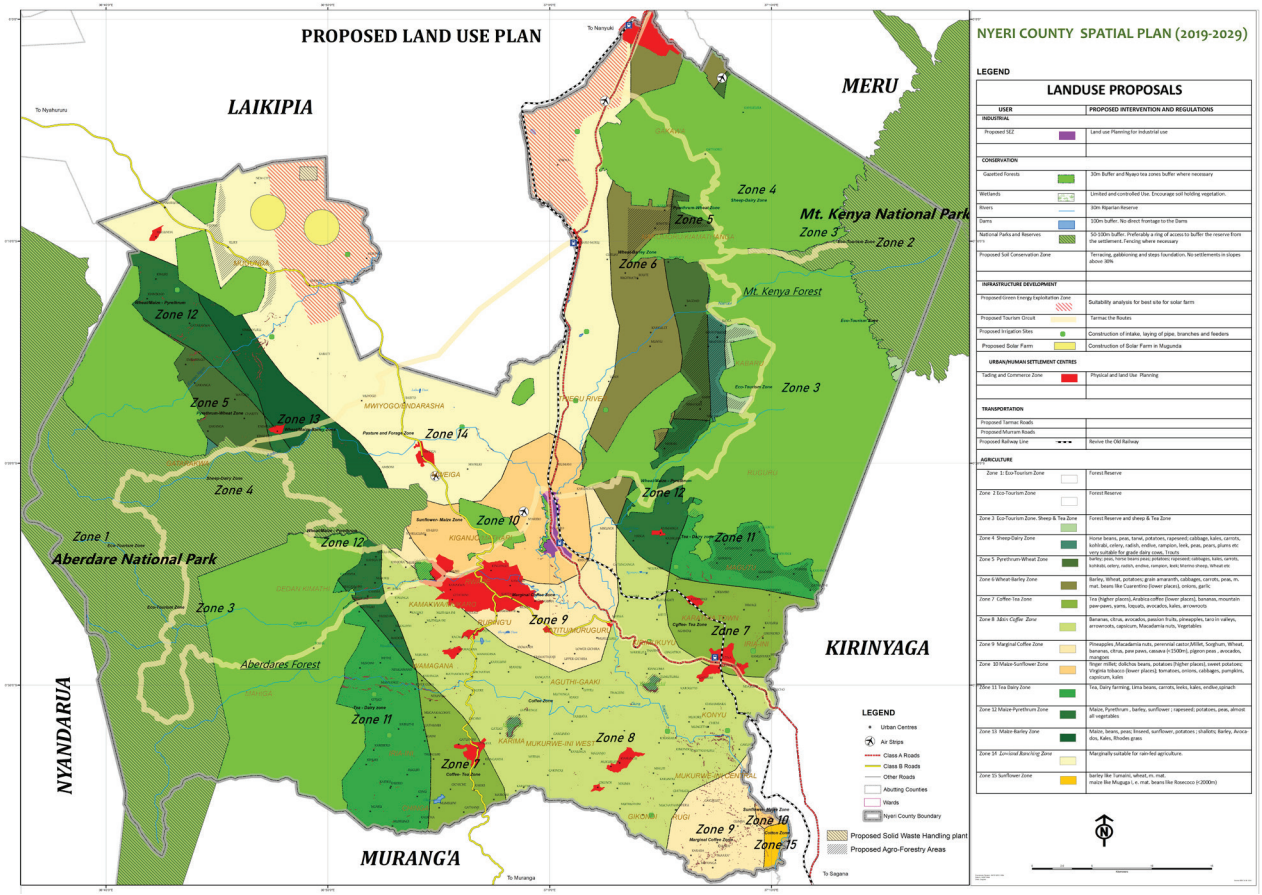
SPATIAL DEVELOPMENT FRAMEWORK

CHAPTER FIFTEEN:

SPATIAL DEVELOPMENT FRAMEWORK

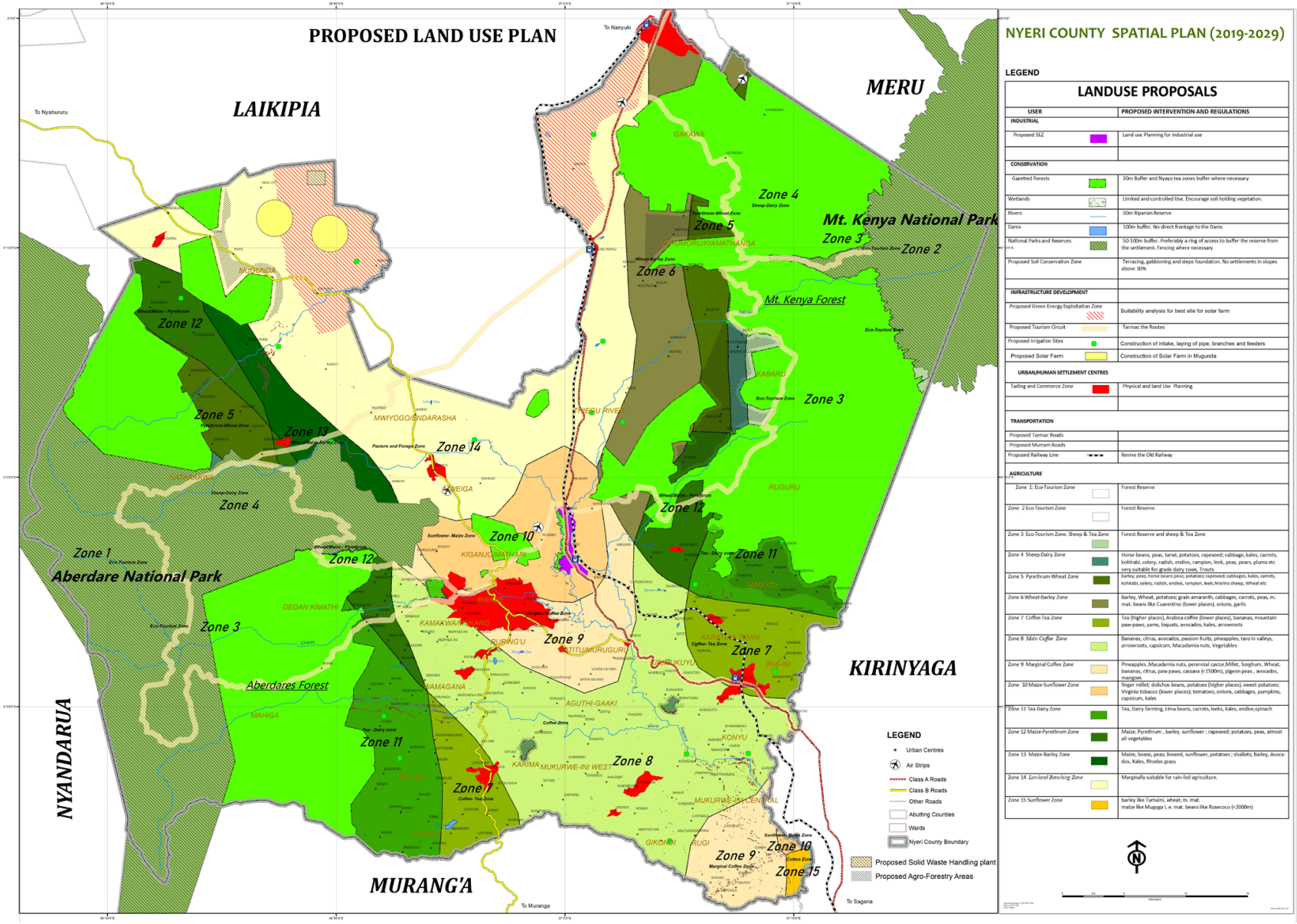
This chapter presents the County spatial structure that indicates the broad land uses, transportation connectivity proposals, existing and proposed infrastructure facilities and areas of economic activities, following an integration of the various scenarios envisioned. The County spatial structure has further been depicted at smaller scale using the sub-counties as planning units. Policies and standards have also been assigned to each proposed land use to ensure harmony and equity in the County upon implementation.

Map 155: Proposed Land Use Plan



Source: Two Ems Associates, 2019

Map 155: Proposed Land Use Plan



Source: Two EMS Associates, 2019.

15.1 Land Management Policies:

Land management policies form an important instrument that guides the general behaviour over the use of land.

The overall land management policies will include:

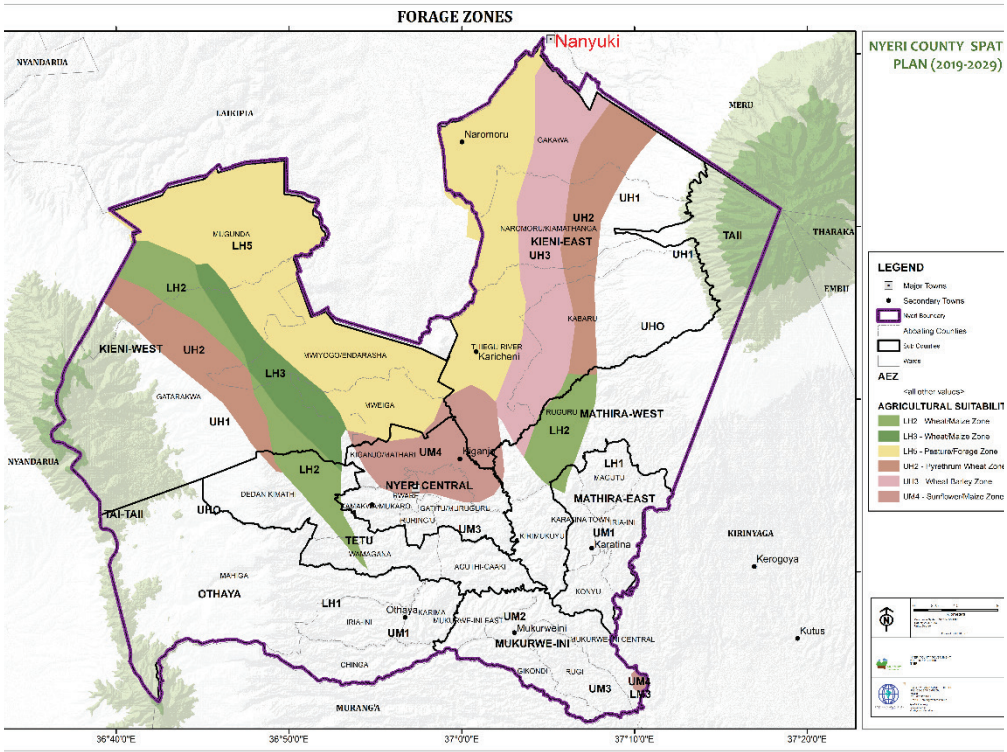
ENVIRONMENT	• Restriction of development around forests, rivers and wetlands/ swamps • Restriction of development to approved uses only along immediate boundaries of fragile site buffers
TRANSPORTATION	• Restriction of development along transportation wayleaves.
INFRASTRUCTURE	• Restriction of development along infrastructure wayleaves. • Restriction of development to approved uses within the vicinity of social infrastructure facilities
ECONOMY	
a). Agriculture	The overall Agriculture policy: • Stringent restriction of development of urban settlements on highly capable agricultural land areas. • Restrict agriculture on slopes that are above 40
b). Trade	• The County Trade Policy should encourage compact market development so as to put order in the way markets are organized and contained in various urban centres.
c). Industry	• The County Industrial should put restrictions on the locations of industries near densely populated zones and near environmentally sensitive areas.
d). Tourism	• The Tourism Policy should seek to put restrictions on structural development around scenic sites to eco-tourism developments only.
URBANIZATION	The overall urbanization policies should aim to: • Encourage the compacting of urban areas. • Enforce urban fringes/ edges so as to curb urban sprawl.
PUBLIC LAND	The policy on public land should emphasize on: • Immediate inventorying and periodical review of the state of public land in the County. • Retention of all public lands under the respective government ownership unless their disposal will serve an overarching County/ National interest.

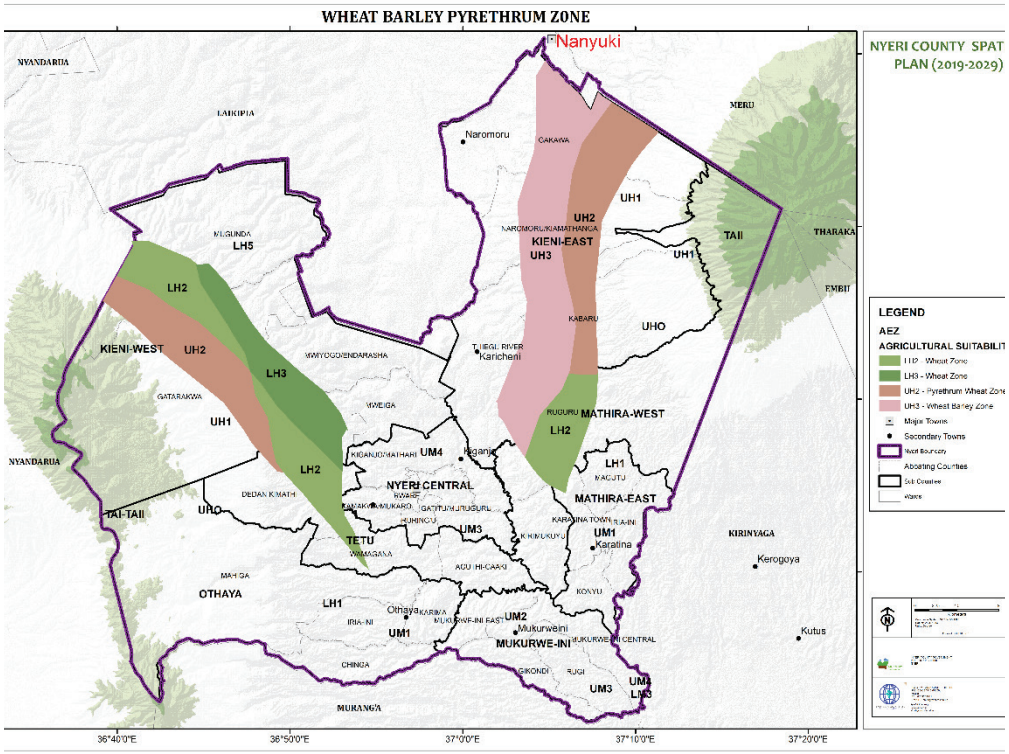
15.2 Land Use Planning Standards

1. Undeveloped Land/Natural Environment:

ZONES:	STANDARDS:
• Riparian Reserves:	• All rivers in the County should have their riparian reserves protected (a distance of 30 meters on either side) • Planting of appropriate tree and shrub species along riparian reserves to prevent siltation into water bodies • NEMA must license any abstraction of water or effluent discharge into water sources. • 100-meter buffer from springs along which trees can be planted along all springs and streams. • No person shall cultivate or undertake any development activity within full width of a river or stream to a minimum of 6 meters and a maximum of 30 meters on either side based on the highest recorded flood level. • Sustainable uses of wetlands allowed by EMCA 2009 Regulation such as apiculture.
• Forest Areas	• A buffer zone of 60 metres from national gazetted forests should be maintained
• Wetlands	• A buffer zone of 30 metres from the high-water mark edge should be maintained. • Development permission for wetland zones must be sought. • Prohibited activities include car washing, location of sanitary facilities and solid waste disposal as they can cause pollution.
• Slope Areas	• Construction of terraces on slopes above 15 degrees especially in Gikondi, Mukurweini and Rugi wards • Development in areas of slopes of above 40 degrees should be restricted to only planting of trees, grass, tea, sugarcane or bananas • Contour farming is encouraged in areas with slightly steep slopes 5-15 degrees
• Tourism Zones	**Areas of scenic beauty and cultural villages** • Provide a buffer zone of 50 meters from the edge • The buffer zone can be used for provision of outdoor furniture, management of solid waste and sanitation • Provide major road access to these tourist sites • Provide for land for hotels and lodges **Protected Areas/ National parks and game Reserves** • Delineate areas • A buffer zone of 50 meters is recommended around the park. • Forest reserve should be buffered by 60-meter reserve use the reserve on compatible land use. • Wildlife corridor of 3 km is recommended for migratory routes along the major animal corridors; Laikipia -Mt. Kenya elephant corridor
• Flood Prone Areas	• A buffer zone of 30 metres from the high-water mark edge should be maintained. (Uses such as damming and channelling for rice or fish farming are allowed).
Mines and Quarries	• A buffer of 500m radius for small and medium scale mining mines shall be maintained. • A 1km radius buffer shall be maintained for large scale mines and encourage planting of trees to act as a buffer around the mines.

2. AGRICULTURE LAND USE

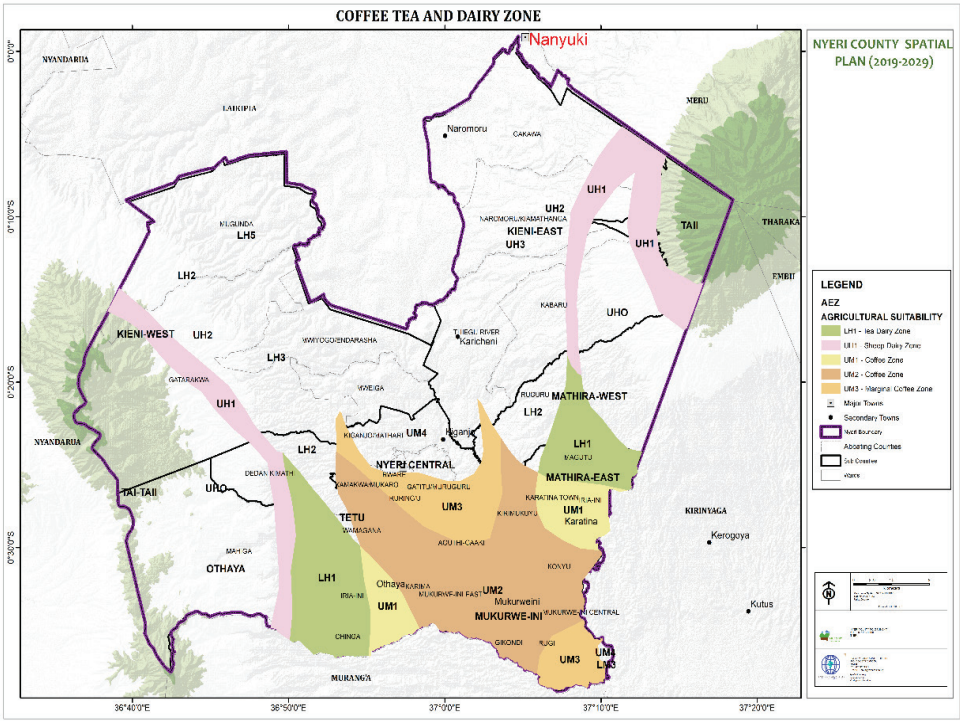
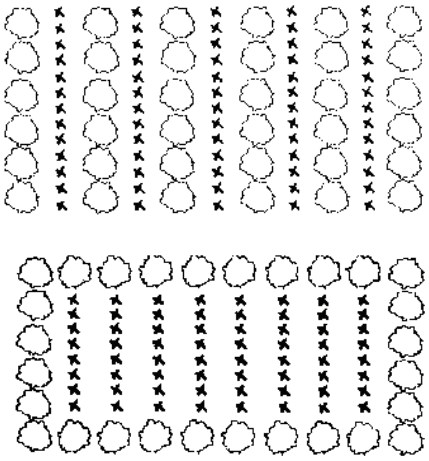
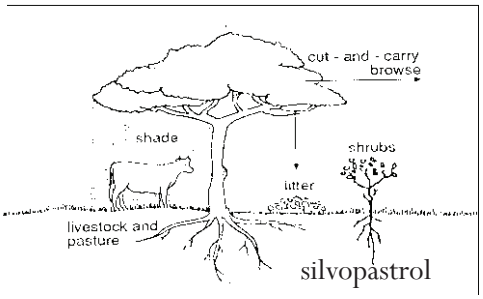
ZONES:	STANDARDS:
Pasture/Forage zones	• Land sizes >4ha for both coffee and dairy farming areas. • Nyeri County government shall provide veterinary units incorporating abattoirs/ slaughterhouses, feed lots, holding grounds, vaccination centres instead of cattle dips along livestock routes or close to livestock markets • Grazing reserves shall be in the major traditional wet and dry season grazing areas and along livestock migration routes. • The zone shall be required to maintain the recommended livestock carrying capacity • Irrigated agriculture and crop diversification are encouraged 
Wheat/Barley/ Pyrethrum production zone	• According to Kalro, pyrethrum does well in a land size of between 0.5 – 1.0 hectares. Value addition should be done where pyrethrin found in the flower can create aerosols, agricultural sprays and Livestock sprays. • I acre piece of land produces 20 bags of wheat. • 1 Acre of land can produce 52 bags of Barley. For optimum production, one needs to plant 150 seeds per square meter at a consistent depth and spacing.

ZONES:	STANDARDS:
Wheat/Barley/ Pyrethrum production zone	
Coffee, Tea and Dairy farming production zones	• Land sizes >1ha for both coffee and dairy farming areas. • Dairy farming shall be intensive with exotic/crosses breeds encouraged. • Coffee farming shall be intensive with Arabica, Batian variety. • Residential development units ground coverage shall not exceed 20-30% of the total land size. • The following dairy stocking shall be used depending on lot sizes.

Type of animal	**Floor space per animal (m^2)**		**Trough Length per animal(cm)**
	Covered area	**Open area**	
Cows	6-9	24-30	51-61
Young stock	4.5-6	15-18	38-51
Pregnant cows	30-36.5	55-61	61-76
Bulls	36.5-42.5	61-76	61-76

This data has been referenced from the The Food and Agriculture Organization (FAO).

Where dairy farming and coffee growing are practised within the same lot, use of natural manure and biogas production are encouraged.

ZONES:	STANDARDS:
Coffee, Tea and Dairy farming production zones	
Agro-forestry farming (all Agro-ecological zones)	The following types of Agro-forestry practices maybe applicable in all Agro- ecological zones at farm hold level, Agro-silvicultural, silvopastrol and Agro-silvopastrol systems may be applied depending on crop seasonality and sensitivity to sunlight and household needs for firewood for cooking and heating. • Agro-Silvicultural is the intercropping of timber and fuelwood species and/or fruit and other useful trees with vegetables and other crops in a common space, at the same time. • Silvopastrosal is the combination of fodder plants, such as grasses and leguminous herbs, with shrubs and trees for animal nutrition and complementary uses. • Agro-silvopastrol is a land-use system which includes the planting of trees and/or shrubs, crops, and rearing of cattle.   Agro-silvicultural systems • Can also be practised for commercial ventures where minimum land sizes of 400ha shall apply. • For commercial Agro-forestry ventures (saw milling) a minimum of 1/4 or 100ha shall be under tree vegetation at any time.

3. INDUSTRIAL LAND USE

ZONES:	STANDARDS:
Major Industrial areas	• The total site area for a major industrial area should be between 500-1200 acres • for a town with a population of 200,000 and 5000,000. • Separation from residential areas through buffer zones (10-30metres) is essential. • An Environment Impact Assessment (EIA) needs to be conducted to determine suitability of location of the industry.
Light Industrial Areas/ Jua Kali	• They should be located on the major internal routes of the township with separated access from residential feeder roads. • The probable total area of each industrial area should range from 10-50 hectares. An area of 10-20 small firms without creating congestion in the residential areas. • Buffers (10-30metres) should be created between these estates and homes such as major internal roads, shopping and commercial centres, community buildings and school etc.
Land Allocation	• The percentage allocation of land in an industrial area/estate depending upon the type of industries and the extent of the industrial area/estate is as follows; (a)Workshops.....50-55% (b)Organized open space.....10-15% (c)Utilities, services of facilities.....20-25% (d)Roads, parking lots.....15-20% (e) Others 5-10%

3. URBAN LAND USE

Granting of Town or Municipality Status to an Urban Centre:

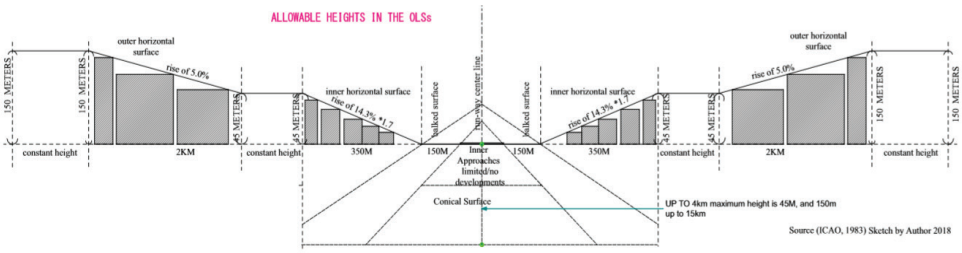
	Additional Criteria:	Essential Services:	Administration:
MUNICIPALITY STATUS **Resident Population: 250,000**	• Integrated Development Plan •Demonstrable revenue collection or revenue collection potential •Demonstrable capacity to generate sufficient revenue to sustain its operations. •Capacity to effectively and efficiently deliver essential services to its residents •Institutionalised active participation by its residents in the management of its affairs; •Sufficient space for expansion; •Infrastructural facilities, including but not limited to street lighting, markets and fire stations and have a capacity for functional and effective waste disposal.	Planning and Development Control, Traffic Control and Parking, Water and Sanitation, Street Lighting, Outdoor Advertising, Cemeteries and Crematoria, Public Transport, Libraries, Storm Drainage, Ambulance Services, Heath Facilities, Fire Fighting and Disaster Management, Control of Drugs, Sports and Cultural Activities, Electricity and Gas Reticulation, Abattoirs, Refuse Collection, Solid waste management, Air noise, Child Care Facilities, Pre-Primary Education, Local Distributor Roads, Conference Facilities, Community Centres, Hotel Homestays, Guest Houses, County Hospital, Constituent University Campuses, Polytechnic, Training Institution, National School, County School, Municipal Stadium, Stadium, Airport, Airstrip, National Theatre, Theatre, Library Service, Administrative Seat, Financial Hub, Museum, Historical Monument, Fire Station, Emergency Preparedness, Postal services, National TV station, National Radio Station, Regional Radio Station, Community Radio, Casinos, Funeral Parlour, Cemetery, Recreational Parks, Management of Markets, Marine Water front, Animal control and welfare, Religious Institution, Organized Public Transport.	• Administered on behalf of the County Government by a Board of a Municipality and a Manager • Board shall be a body corporate
TOWN STATUS **Resident Population: 10,000**	• Integrated Development Plan • Demonstrable economic, functional and financial viability. • Capacity to effectively and efficiently deliver essential services to its residents • Sufficient space for expansion.	Street Lighting, Cemeteries and Crematoria, Libraries, Heath Facilities, Sports and Cultural Activities, Abattoirs, Refuse Collection, Solid waste management, Air noise, Child Care Facilities, Pre-Primary Education, Community Centres, Guest Houses, Homestays, Polytechnic, Training Institution, County School, Airstrip, Unclassified roads, Museum, Historical Monuments, Postal services, Regional Radio Station, Community Radio, Funeral Parlour, Cemetery, Recreational Parks, Management of Markets, Marine Water front, Animal control and welfare, Religious Institution	• Administered on behalf of the County Government by a Town Committee and a Town Administrator • Town Committee shall be a body corporate

	Additional Criteria:	Essential Services:	Administration:
MARKET CENTRE STATUS **Resident Population: 2,000**	•An integrated urban area development plan in accordance with the Urban Areas and Cities Act and any other existing law.	Street Lighting, Health Facilities, Sports and Cultural centres/facilities, Abattoirs/ Slaughterhouse, Refuse Collection, Solid waste management, Child Care Facilities, Pre-Primary Education, Community Centres, Primary school, Bus park, Road network/streets/walkways/sideways/cycle ways, Recreational parks, Animal control and welfare	• A market centre shall be governed and managed by the county government.

Source: Urban Areas and Cities Act, 2019

4. Transport Land Use

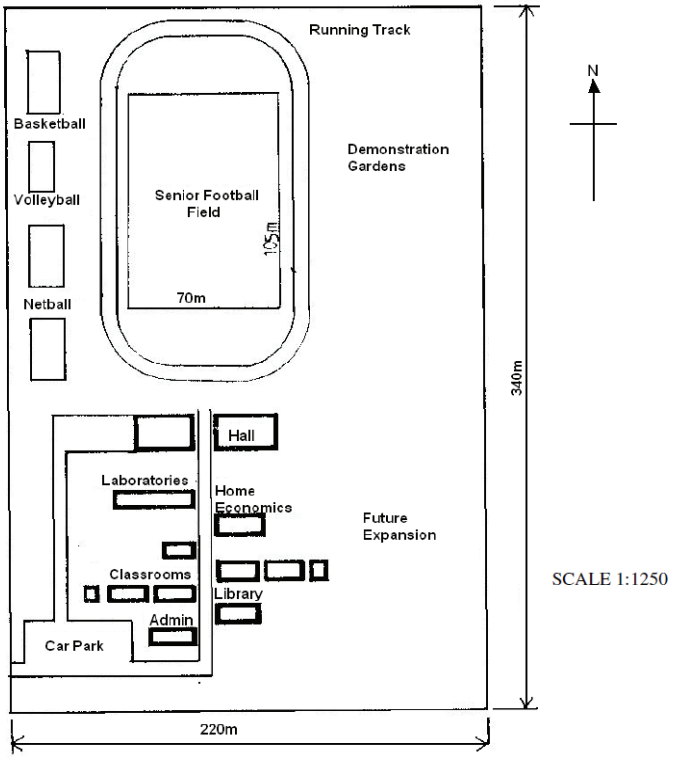
Sector	Planning Standards:
Rural road network	**International trunk road (class A road)** • They are provided with a road reserve of 60-110 meters. • No direct access of a property to a Class A road • Buffer zones of 10 meters should be provided all along giving access abutting properties • Developments should come after the buffer zone and should be provided with acceleration and deceleration lanes • The junctions should be at minimum of 300meters • Petrol Service Station can be planned with acceleration and decelerations of 80-100meters after the 10metre buffer **National trunk road (class B roads)** • They are provided with a road reserve of 60-110 meters. **Primary roads (Class C roads)** • All designated urban centers should be linked by means of primary roads as a minimum. They are provided with a road reserve of 40 meters. **Secondary roads (class D roads)** • All designated rural centres should be linked by means of secondary roads as a minimum. They are provided with a road reserve width of 25 – 30 meters. • Minor roads (class E roads) • They range between 3 to 5 Km and are provided with a road reserve width of 20-25 meters.

Sector	Planning Standards:
Railway	1.60m way leave 2.A buffer of 30m to be reserved on either side of the railway line 3.Design gradient 4.TOD development around the rail stations should be adopted- however mixed use precincts as opposed to pure dominant use. Mixed use development should consist of commercial; residential and office spaces are favourable. 5.Residential area along the TOD shall be High density, while a buffer provided for noise screening. 6.Parallel transport corridors may be provided adjacent Rail corridor, this may include bike lanes, pedestrian ways, Highways, or green planted corridor.
Airport and airstrips	**STANDARDS (ICAO, IATA, FAA, KAA, KCAA, Other Policy documents)** • Residential developments should not be within 2.5 km east or west of the airports from the runway edges, and 4km from the end of the runways in the approaches (ICAO I. C., 1987). • Education facilities should not be within 2.5 km east or west of the airports from the runway edges, and 4km from the end of the runways in the approaches (ICAO I. C., 1987). • Development heights to be observed at slopes of 14.3% (a maximum height of 12.8M/KM) from the end of the inner approach surface up to 4kms, and 5.0% (maximum height of 15.0M/KM) from the 4km -15km in the approaches (ICAO I. C., 1987).
Airport and airstrips	 • Encourage compatible land uses such as industrial, hospitality industry, recreational open spaces, banking, office space, lodging facilities, agriculture etc. (development, 2018) (FAA 2018) • Agriculture land use is very compatible but limited to crops that do not attract birds such as wheat and birds (Kai Ming Li, 2007), (development, 2018) (Kenya R. o., 2002) (ICAO I. C., 1987) • Facilitative infrastructure should be provided such as roads to access, water and sewer to encourage industrial and commercial developments, provision of solid waste infrastructure to ensure full control of scavenger birds (ICAO I. C., 1987) • Establishing airport city character is key for identity in the competitive global market (Kasarda & Stephen, 2014). • According Federal Aviation Authority a local general aviation airport is required to have at least, 3400-5000ft run-way length, run-way strength of 30,000 SW supporting 12,500-60,000 pounds of aircraft weight. Run-way End Identifier Lights and well grooved surface. Also the airport is required to be fenced with designated entry and exit points, a land use coordination plan or zoning plan is also required to ensure efficient future airport expansion, minimal land use incompatibility especially the noise sensitive developments such as residential, education, health facilities, and religious facilities amongst other noise sensitive developments (Transportation, 2012).

5. Services

a) Education

Institution	Distribution	Location	Land requirements
Pre-primary schools	They should be attached to primary schools They follow the pattern of distribution of primary school at 4000catchment population. A kindergarten independent of primary school should be provided for 2500 catchment population.	Nursery schools should be located within and integral to residential areas. The recommended walking distance is 300-500meters in urban areas and 1-2 kilometre in Rural areas.	The land requirement of 0.15-0.25hectares is required for every primary school. Similar amount of area land is required for every 2,500 people in low-income areas and 3500 people in high-income areas. Where land limited consider vertical development of a maximum of two levels (ground floor and first floor)
Primary schools	The pattern of distribution should be for every 4000-catchment population in rural areas and 3500 population in urban areas	They should be within residential areas related to principle pedestrian networks. At gross densities of 50 persons per hectare and above, each primary school should be within easy walking distance of 1km in urban areas and between 1.5-2km in Rural areas	They should cover a minimum area of 3.5 Ha Schools are encouraged to build storied buildings for economy. Teaching staff accommodation if provided, it requires another 0.8 Ha Where land limited consider vertical development of a maximum of two levels (ground floor and first floor) Figure 56 sample site plan
Secondary schools	The pattern of distribution should be for every: 5000-catchment population for secondary mixed day and boarding secondary school. 8000, - catchment population for a sub-county level boarding secondary school. 25,000 catchment population for county secondary schools. 100,000 catchment population for Extra county boarding secondary school	They should be within residential areas At gross densities of 50 persons per hectare and above, each secondary school should be within an easy walking distance of 2km for secondary day schools. At gross densities lower than 50 persons per hectare students will probably be taken to school by car or by public transport, this shall apply for sub-county and county schools.	Minimum land area for Extra county, County, and Sub-County Secondary education facility shall be 15 acres (6. Ha). For Mixed day secondary schools, the following guidelines apply considerate of no. of streams: One stream- 3.4 Ha Two streams- 3.5. Ha Three streams- 4.5. Ha

Institution	Land requirements
Secondary schools	Urban Day Secondary School 
University	The land size for a University should be at least 50 hectares made up of the following: • 20 hectares or more to support up to 500 students. • 10 hectares or more for the main campus. • 2 hectares or more for any University land. • 2 hectares or more for open spaces and car parking exclusively. • 2 hectares of land set aside for sewerage plant where there lacks Local Authority sewerage system. • 5 hectares or more for outdoor sports for 500 students. • A University offering agriculture as a course should in addition provide 10 hectares of land for a farm.

b) Recreational Areas

	Planning standards
Recreation in regional context	•Provided with public access of a minimum 9m. •Cater for recreation use by providing car-parking spaces, picnic sites and refuse disposal facilities of at least 5.0 ha for a catchment population of 50,000+ •Compatibility of tourist and recreational developments with surrounding land use patterns, cultural values of the local population and not injurious to the natural attraction of the area.
Recreation at community level	(a) Parks • A small area of recreational space within walking distance of at least 0.25ha for a population between 2000-3,000, 1.0ha for a catchment population of 3,000-10,000. • Closely located within community centres and social halls, health centre, local shops, primary and secondary schools. • It can be used as a landscaping buffer between major roads and the housing areas and between industrial areas and housing. • It should include 1-2 playing fields and children's equipped playgrounds. (b) Social Halls and Community Centres: • The pattern of distribution should be for every 20,000-catchment population. Land requirement of 0.25 hectares to be in positions along main pedestrian routes

c) Public Purpose

Sector	Services	Land Allocations
Health services	They should be easily accessible by an ambulance and be provided with basic infrastructural services. Dependent on the level of health service, it is necessary to reserve adequate land for future expansion and for public cemeteries near health facilities.	• (LEVEL VI) National referral hospital- 20Ha • (LEVE V) County referral hospital- 8Ha • (LEVEL IV) Sub -County hospital- 8Ha • (LEVEL III) Health centre- 3Ha • (LEVEL II) Dispensary- 2Ha • (LEVEL I) Community Health Unit.- Every link facility shall provide office space for the community health unit/s attached to it, to serve as a resource center.) • Nursing homes- 0.4Ha • Veterinary clinics 0.1Ha

Sector	Services	Land Allocations
Community centre	Every centre should have a community centre which will provide the following facilities: - • Library/Resource centre • Social hall • VCT centre • Public telephone • Amphitheatre (Cultural dances, cinema etc.)	The proposed minimum area should be 1Ha.
Police stations	They should be located within residential neighborhoods	Proposed space requirements for the various levels of stations are: • Police stations- 2.0 ha. • Police post- 0.25 ha • Patrol base- 0.1 ha
Fire stations	The land requirement is a minimum of 0.4 hectares to include station, staff accommodation and drilling area. A small fire station would require 1 fire engine and at least 30 staff members to cover a population of between 50,000-100,000 people.	
Libraries	The land requirements should be 0.4 hectares for this facility	
Administrative areas	They should be sited away from the industrial but closer to residential or commercial zones respectively to allow close interaction with general public. Factors for their location: • Geographical centrality • Spatial compactness • Public parking • Accessibility	

6. PUBLIC UTILITIES

Sector	Services	Land Allocations
ENERGY	**Electricity** **Guidelines** 1. Source and ability of electricity supply should be in accordance to electricity usage requirements for domestic, commerce and industry. 2. Main receiving sub-stations require a minimum of 5% of the exterior spaces that are reserved for landscape. 3. Main receiving sub-stations 275KV are not suitable to be close to residential areas, open spaces and public facilities. Require buffer zones in between sub-stations and other land uses (about 50m). **Mini-HEP power Utilities** 4. Shall be installed where there is a natural waterfall. 5. Installation shall not cause significant disruption of the biodiversity within the production zone. 6. Each Project is subject to Environmental Impact Assessment before commencement. 7. Cost and benefits of each such project shall be such that one Mini-HEP project is adequate to operationalised one Tea Factory. **Solar Energy Utilities** 8. Shall be installed in areas that receive solar insolation greater than 4w /hr/m2. 9. Minimum land area for the solar farm shall be 40ha. 10. An Evacuation sub-station shall be provided within the vicinity of the farm. 11. Minimum access road shall be 15m 12. A buffer zone of at least 100meters should be provided.	**Way leave Requirements** Capacity of line- Way leave 11 KV..... 10m 33KV..... 20m 40KV 20m 66KV 30m 132KV Single circuit towers 50m 132KV Double Circuit towers 60m **Electricity sub-stations** *Electricity substation Land requirements Size and function* **Type Requirement Condition** Main receiving sub-station 1.6 ha Buffer zones Main distribution sub-stations 45mx45m Building entry ways **Electricity sub-stations** Single chamber- 16.5mx13.5m Double chamber 17mx13.5m

<table>
<tr><td>Water</td><td>Provision of these facilities should consider catchments population to be served and the per capita consumption in the relation to the available water.
1. Ground water reserves require buffer zones of 500 meter (bore holes) between one to the next.
2. Springs protection require a buffer zone of 100meters.
3. Tree planting is therefore encouraged in these areas.
Water reticulation systems
1. Provide for water facilities such as water intake points, and pipeline way leave. where possible 2000mm diameter long utilities duct should be provided along roads shoulders for water and sewer pipelines
2. Buffer zones should be provided in areas where these facilities are located.
3. Intake points treatments work and communal water points require buffer zone of 10 meters (radius)
Commercial water points
1. Provided for in informal settlements.
2. They should be at 500m (boreholes) from one another.
3. They should preferably occupy an area of 3 x 3 m.</td></tr>
<tr><td>Sewage</td><td>Sewage collection and sewage treatment plants be considered for all settlements with a population of 3,000 or more having an urban layout.
• In settlements where an integrated sewage scheme is not provided provision should be made for septic tanks.
• Factors for consideration in locating a sewer treatment plant (STP)
i.Locations of drinking water sources, surface water intakes and groundwater wells;
ii.Adequacy of isolation from residential areas and land use surrounding plant site; • Prevailing wind directions;
iii. Susceptibility of site to flooding;
iv. Suitability of soil conditions;
v. Adequacy of site for future expansion and/or provision for additional treatment stages;
vi. Suitability of site with respect to access to receiving body of water or other means of treated sewage effluent disposal;
vii. Assimilation capacity of receiving water body;
viii. Acceptability of site with respect to sludge disposal/utilization options on site or access to areas off site; and
ix. Subject to ESIA
x. Design capacity
xi. Minimum land size for a STP is 10 acres, while a buffer zone of the following Linear Separation distances between sewage works and sensitive land use

<table><tr><th>STP capacity</th><th>Distance</th></tr><tr><td>Equal to or Less than 500 m3 /d</td><td>100 m (330 ft)</td></tr><tr><td>Greater than 500 m3 /d but Less than 25,000 m3 /d</td><td>150 m (490 ft)</td></tr><tr><td>Equal to or Greater than 25,000 m3 /d</td><td>greater than 150 m (490 ft)</td></tr><tr><td>Sewage Lagoons</td><td>100 to 400 m (330 to 1,300 ft)</td></tr></table></td></tr>
</table>

Solid waste management	The following guidelines apply for location of waste disposal and sorting points • Located away from; Airports (at least 2 - 5 km & outside of the approach and take off zones), populated areas (200 m away), Wetlands, national parks and areas with precious flora and fauna, Seismic Impact Zones, Flood Prone Zones, ground and surface water sources and historical, religious, and other important cultural sites or heritages. • Sufficient consultations must be carried out to avoid conflicts with the neighboring community members. • Existing site utilities such as underground pipes or conduits (for sewage, storm water, etc.) must be avoided unless their relocation is feasible. • Areas must be easily accessible by delivery vehicles. • EIA must be carried out. • At least 12-20acres are required for the purpose of waste management. • Application of GIS may be adapted. Use of sensors linked to a GIS web format platform, that will be placed, in waste bins at a level considered optimum weight capacity. Once this level is reached the sensor send signal to the waste collectors for urgent and prioritized collection. • County government of Nyeri is required to acquire compact garbage trucks for maximum payload. With improved prioritized collection and compacting of waste during the loading ensures the county collects 1.5 times more compared to use of flat pile collection trucks. **Waste reducing and Recycling plant.** • Priorities must be given for promoting source separation and sorted waste collection. • In the waste management plan priorities must be given on waste recycling and resource recovery and to reduce the amount of final disposal. • When handling biodegradable waste and waste not containing any toxic contaminants priorities must be given for biological processing such as composting, anaerobic digestion or any other appropriate biological processing for stabilization of waste. • Land filling shall be encouraged to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing. • Operator shall be required to take adequate mitigatory measures to minimize possible pollution of air, water and soil from the plant • The county government of Nyeri or the contracted reducing plant operator may use modern technologies of waste reducing such as Microturbine Technology that generates electricity from waste gases including but not limited to Methane, use of Bio-diesel generators that refines used waste oils, tease, grease into biofuel, Anaerobic digesters that decomposes wastes into electricity. • The solid waste management facility should meet the requirement of the Waste Management Regulations, 2006 (Legal Notice No. 121) and the subsequent amendments, then it shall follow the Environmental Impact Assessment Process in order to obtain the environmental clearance.
	• Prior approval for the building plan needs to be obtained from the relevant Local Authority • Attention should be given to collect and transport obnoxious waste separately as much as possible • At least 12-20acres are required for the purpose of waste management.

Cemetery	• For a population of 10,000 provide 1.0ha for land use allocation of a public cemetery. • Re-use of the facility shall be implemented once at least every 30 years. • The public cemeteries should be conveniently located relative to the health facility, major open spaces, and other compatible public utilities. • Avoid residential areas when locating cemeteries. • Cemeteries should be landscaped with suitable vegetation adapted to the climatic conditions of the location.

15.3 Elements of a Structure Plan:

A structure plan is a framework that sets out strategic planning policies on space, broad zoning document, as well as a policy instrument. The structure plan comprises of a physical zoning plan map indicating the broad land uses, transportation connectivity proposals, existing and proposed infrastructure facilities and areas of economic and environmental activities, following an integration of various alternatives envisioned. Policies and standards are also assigned to each proposed land use to ensure harmony and equity upon implementation of the plan, through the next ten years.

This structure plan is a result of comprehensive analysis of the County using various tools such as land capability analysis, land availability/ suitability analysis, transportation analysis, infrastructure gap analysis, human settlements analysis, and environmental sensitivity analysis. In particular, this section was deeply rooted in inputs collected from rich public participation through ward-specific forums for the general public, meetings with both the County executives and County MCAs, as well as technical validation meetings involving both national and County government planners.

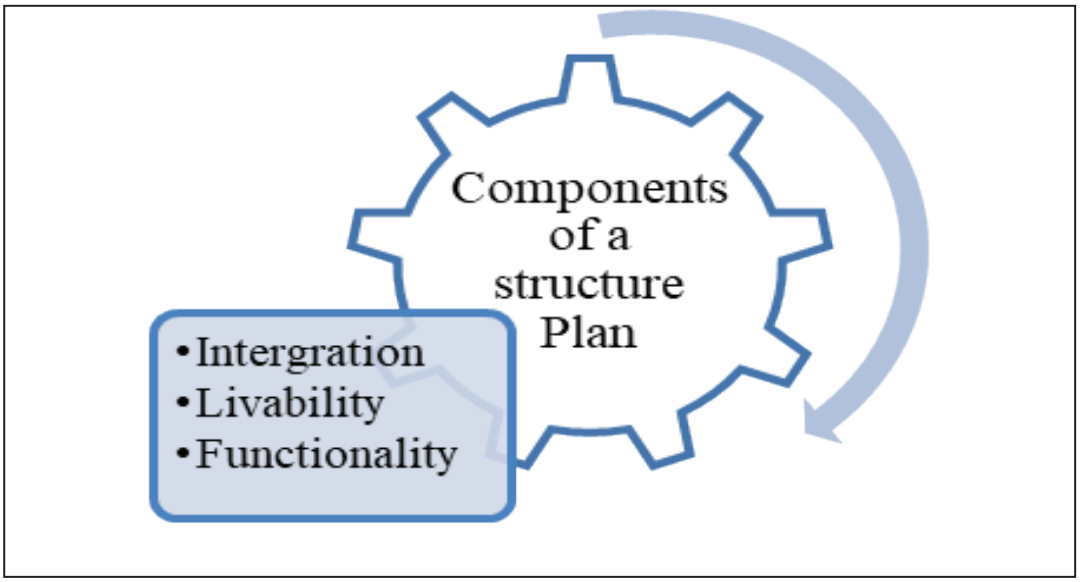
There are three main elements of a structure plan as depicted below:

15.3.1 Rationale for Preparation:

As illustrated by the analysis in the previous chapters, Nyeri County is facing a myriad of challenges that if unchecked could have catastrophic consequences into the future. The consequences of business as usual would be increased forest degradation, uncontrolled soil erosion and degradation, environmental hazards, and unchecked urban sprawl all of which would have devastating impacts on incomes, food security and overall quality of health of County residents. A spatial structure plan is therefore important because the various County problems all have an implication on land (are either land use problems or land related problems), and therefore require a land-based solution.

This structure plan therefore is being prepared with the aim of guiding integrated development of all sectors on space, which it desires to achieve through three key pillars:

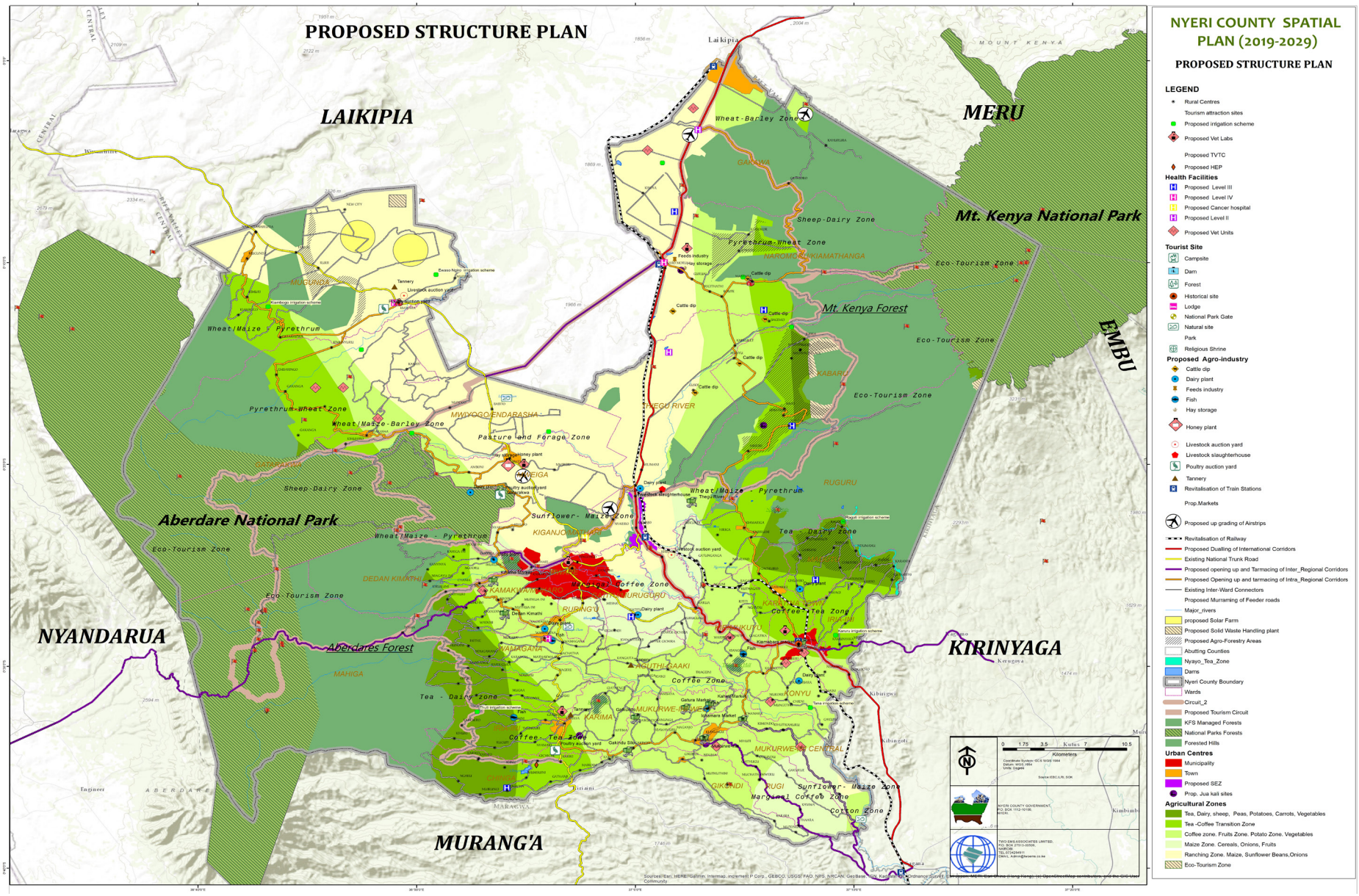
Figure 59: Structure Plan Concept



Source: Two Ems Associates, 2019

Preparation of a structure plan is also crucial as there exists a need to provide a link to higher level plans, as well as providing an anchor for detailed planning within other lower-level plans. At the national level, this plan shares the national objectives of competitiveness (through selective concentration of activities), spurring economic development, conserving the environment and creating liveable human settlements. At the County-level, this plan aims to create sectoral integration across the economic, social and environmental sectors.

Map 156: Proposed Structure Plan



Source: Two EMS Associates, 2019.

CHAPTER SIXTEEN:

ACTION PLANS & AREAS FOR STRATEGIC INTERVENTION.

These are critical transformation projects with high multiplier effects and with potential to kick-start the economy of Nyeri County. They aim at:

- Improving the image and beauty of the County, giving it a unique identity.
- Establishing development projects which trigger a profound ripple effect of positive, multi-dimensional change in the county's building blocks.
- Enabling all sectors to operate effectively and efficiently.

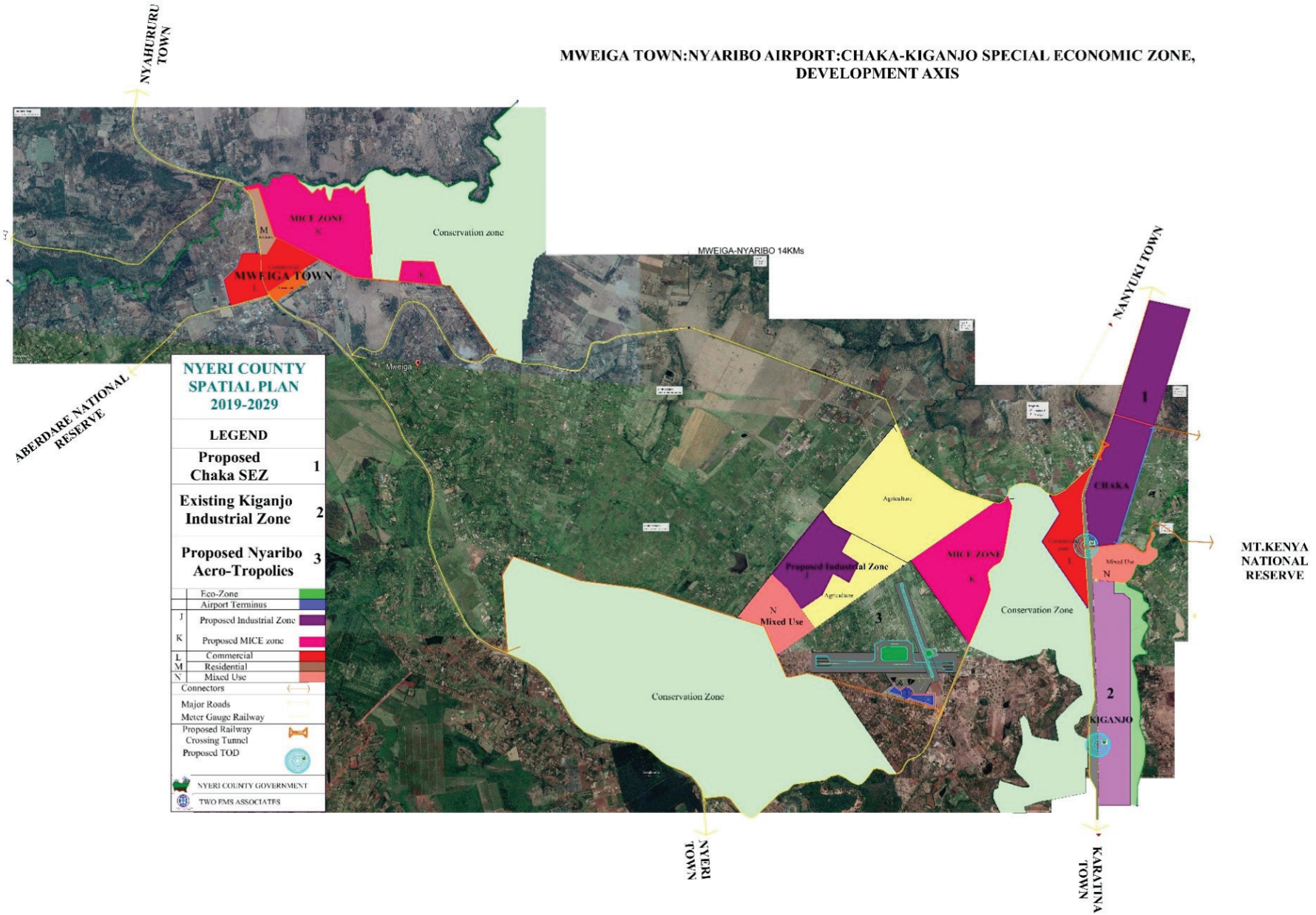
These projects have been categorized into various areas of strategic interventions, which include:

- Tourism promotion areas
- Economic promotion areas
- Environmental conservation areas
- Strategic Roads Flagship.
- Leadership and Governance Flagship.

The above areas of strategic intervention have been represented spatially in 2D and 3D format. The following is map showing the locational context of the spatial development axis for the major Tourism and Economic promotion areas in the county. It spatially depicts the Mweiga-Kiganjo Axis, which represents the development axis of the following action areas:

- MICE Facility at Mweiga.
- Aerotropolis at Nyaribo Airstrip.
- Special Economic Zone – Chaka area.
- Transit Oriented Development (TOD) – Kiganjo Area

Map 157: Chaka-Kiganjo Development Axis.

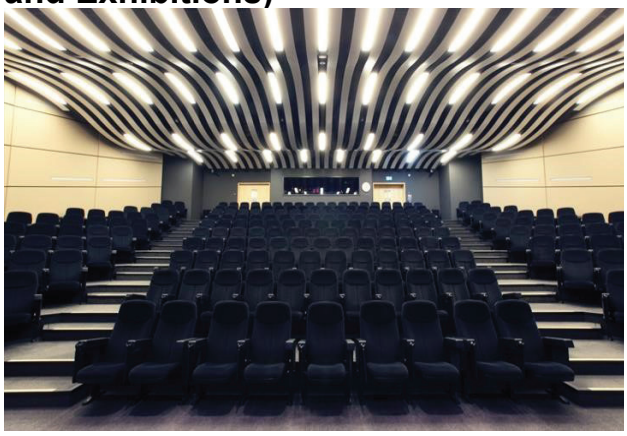


Source: Two EMS Associates, 2019.

16.1 Tourism Promotion Areas.

These highlight major tourism promotion areas in the county:

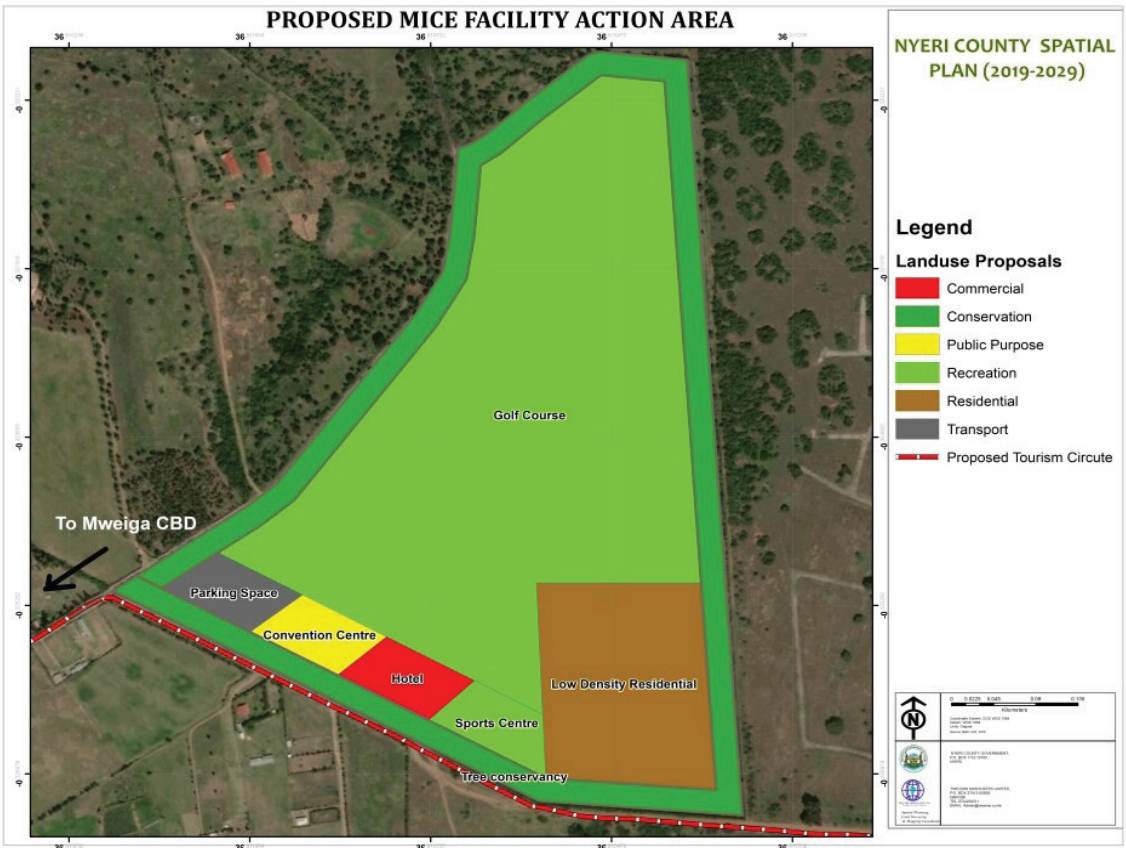
16.1.1 Branding Nyeri as a MICE Destination (Meetings, Incentives, Conferencing and Exhibitions)



Nyeri County can borrow from Naivasha and brand itself as a MICE destination. This is because it is only two hours away from the capital city, Nairobi, and it already has existing support infrastructure like hotels and road infrastructure. Nyeri County will establish itself as the destination for team building activities, conferences and an outlet from the busy city life of Nairobi. Areas like Mweiga and Chaka are ideal for outdoor activities as they have warmer temperatures and there is space to create places for outdoor activities.

The following are design impressions of a MICE facility in Nyeri County, located in Mweiga.

Map 158:Proposed MICE Facility in Mweiga.



Design Justification:

The proposed facility is located in Mweiga town, 700 metres from the B5 road (Nyeri-Nyahururu Road.) It measures 77 Acres, with the amenities such as a Convention centre, Hotels and Restaurants, a Sports and Recreation centre as well as ample parking space and 5-Star accommodation for visitors. It also has a golf-course for recreation purposes. The facility linked to Nyaribo airstrip, which is 14km away, through the newly constructed Mweiga-Chaka link road. It is also linked to the Kiganjo Railway station, which is 16km away through the same road. The facility is therefore accessible through air, rail and road transportation modes and is well linked to the transportation facilities.

Figure 60: 3D Design Impressions of the facility. (Hotel Club House and Pool area.)

Figure 61: 3D Design Impressions of the facility. (Meetings and Convention Centre.)

Figure 62: 3D Design Impressions of the facility. (Golf Course)

Figure 63: Pictorial Representation of the Activity Areas.

Source: Two EMS Associates, 2019.

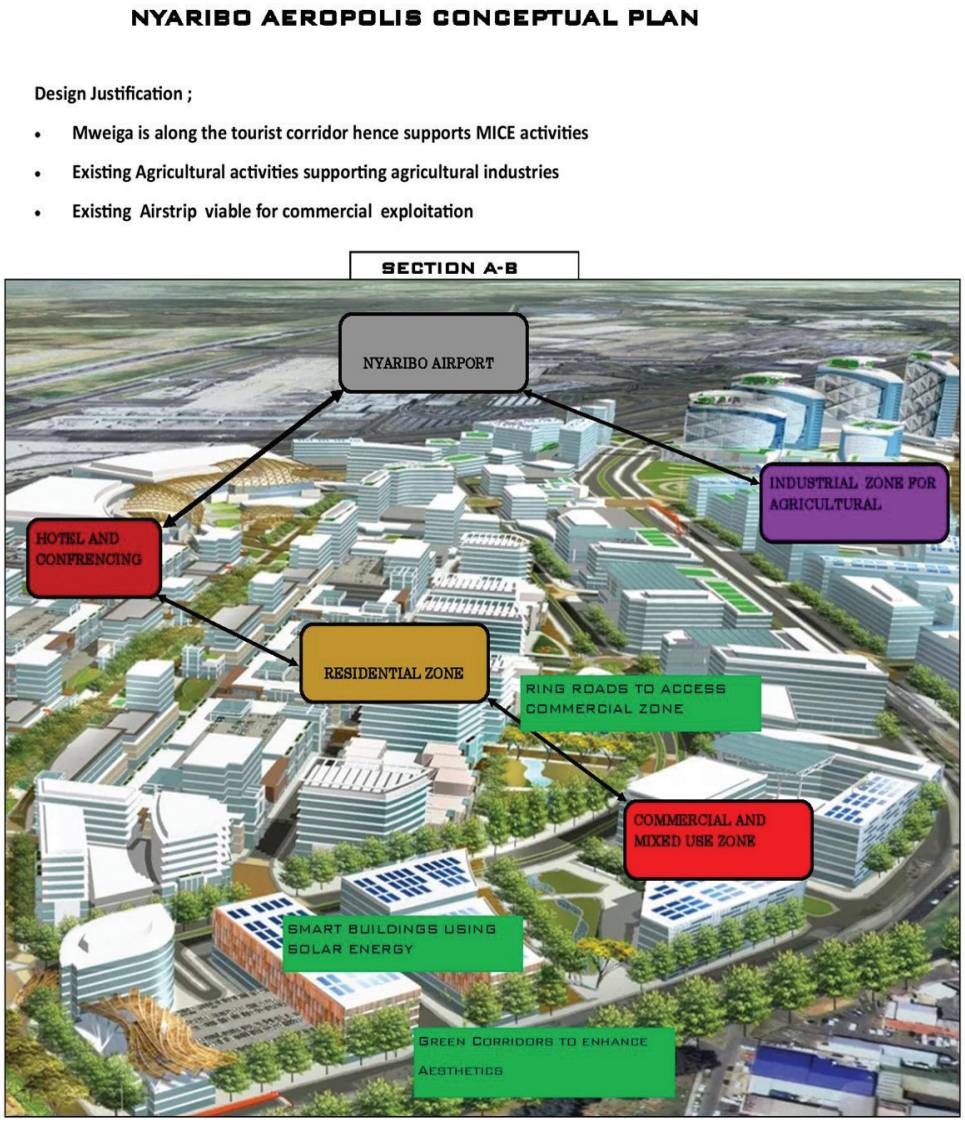
16.1.2 Nyaribo Aerotropolis.

Nyeri County is home to historical, natural and cultural tourist sites which have great potential when fully exploited. The plan proposes expansion of Nyaribo airstrip to be an airport, supporting the agricultural, tourism and hospitality industry within the region.

Nyaribo aerotropolis will spur growth enhance the growth of major urban centres within the region. Through this airport, the agricultural and horticultural products in the region will be able get to regional and international markets on time.

The following is a spatial depiction of the 3D design impression of the Nyaribo aerotropolis in Nyeri County.

Figure 64: 3D Design Impressions of the Nyaribo Aerotropolis.



16.1.3 Annual Nyeri Festival

The annual Nyeri festival aims at bringing tourists, both local and international to the County with the intention of marketing Nyeri as a tourist destination. The festival will also serve as an avenue to market local agricultural products and promote the need for value addition of the agricultural products. The annual festival brings together the Nyeri County government officials, Nyeri residents, National government officials, Investors and Entrepreneurs.

The festival will have the following activities:

b) Coffee and Tea tasting

Mathira, Tetu and Othaya sub-counties produce tea and coffee that is recognized worldwide. The coffee and tea tasting events can be held in different locations within the coffee and tea growing areas and take advantages of unique areas like:

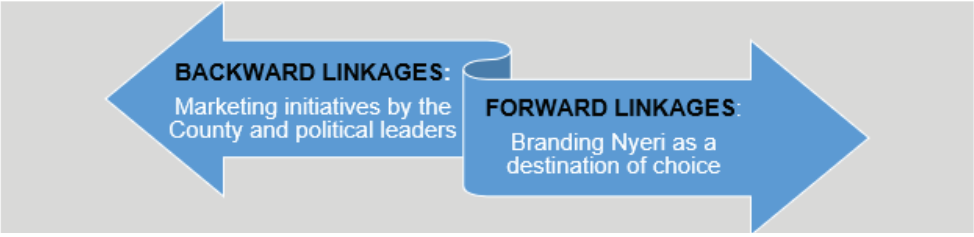
- Mau-mau caves across the three sub-counties
- Prof Wangari Maathai's hometown and residence
- The former President Kibaki's residence
- The scenic views of the tea plantations

c) Cheese Tasting

Nyeri County produces a lot of milk that can be made into diverse dairy products like ghee, butter and cheese. The activity is to brand dairy products from Nyeri for local and international markets. This will also encourage setting up of value addition on dairy products. It will also promote the rearing of dairy goats and making diverse products from the goat milk.

The annual festival should also be supported by an interactive online portal, with a one-stop mechanism for visitors who would like to attend the festival and also people and groups who would want to organise and have conferences and exhibitions in Nyeri.

A forward linkage is created when the growth of a particular industry encourages investment/ leads to the growth in subsequent stages of production/ of industries that use its output as input. A backward linkage is created when a when the growth of an industry leads to the growth of the industries that supply it. This flagship project is expected to create the following forward and backward linkages:



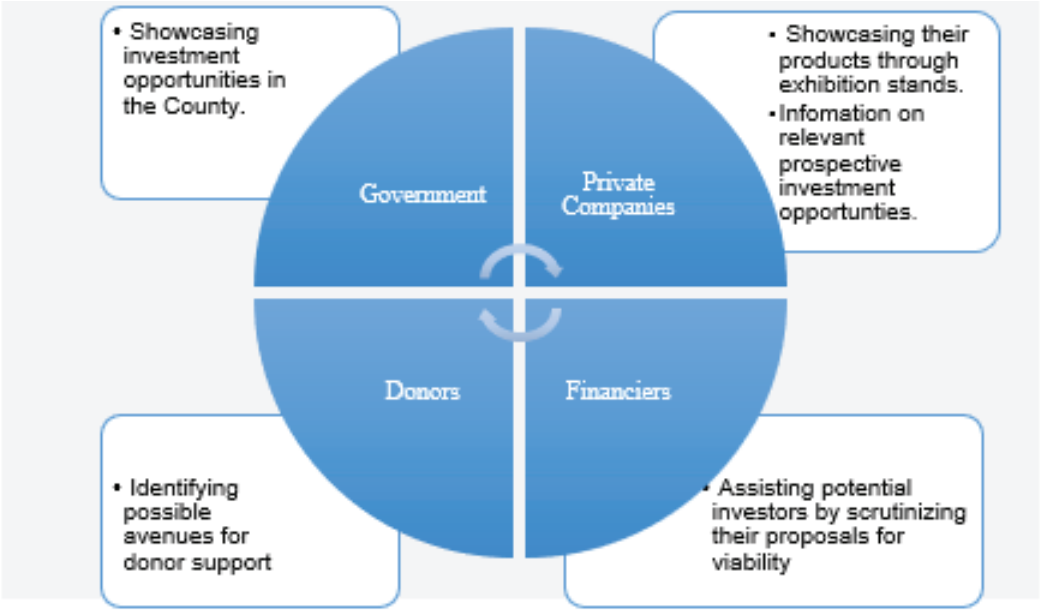
Prerequisites for Success:

- Strong political goodwill
- Robust County economic and business environment policy and laws
- Vibrant branding and marketing campaigns by the County
- Anchoring summit on a plan

16.2 Economic Promotion Areas.

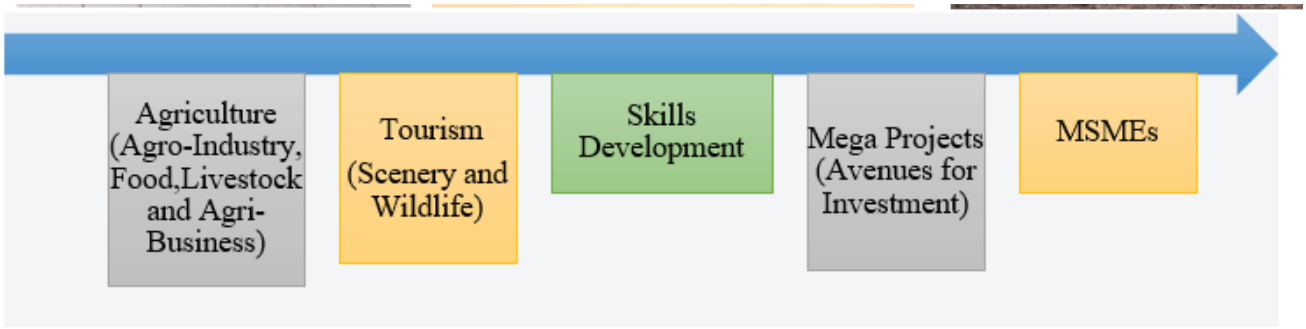
16.2.1 Annual Investment Summit

The Annual Summit brings together the Nyeri County Government officials, Nyeri residents, National Government officials, Investors and Entrepreneurs to showcase the investment opportunities in the County. The County should take advantage of the summit by giving economic incentives for all investors to draw them to Nyeri. The summit is expected to promote various connections as illustrated below:



Investment Summit

The investment summit aims to establish the Nyeri Entrepreneurship Expo Summit which invites investors to the County to see what the County has to offer. The County niches to be promoted as the main focus sectors are proposed to include:



The investment summit should also be supported by an interactive online portal, with a one-stop mechanism for investors that want to invest in the County.

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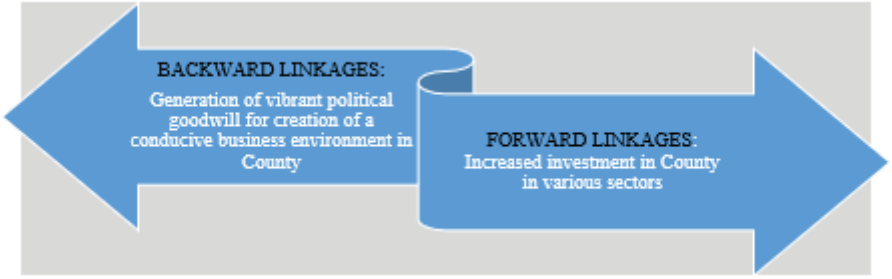


Prerequisites for Success:

- Strong political goodwill
- Robust County economic and business environment policy and laws
- Vibrant branding and marketing campaigns by County
- Anchoring summit on a plan

16.2.2 Investment in Industries: Agriculture, Lumber & Mining

Agriculture is the backbone of Nyeri County. There is need to create value addition and marketing opportunities in agriculture to ensure higher market prices for agricultural products. The flagship project aims at promoting economic growth of the County through industrial development that will spearhead poverty reduction and inclusive growth.

Objectives:

a. To promote an attractive investment environment in order to develop the agricultural, lumbering and mining sector

b. To create direct and indirect employment opportunities

c. To encourage export competitiveness in the County

1. SPECIAL ECONOMIC ZONE

This plan proposes a Special economic zone at Chaka. The function of the SEZ is to receive agricultural products from various processing plants and collection centres for branding and marketing. The location of the SEZ is due to supporting infrastructure like rail and road transportation links.

This SEZ will be propelled through the facilitation of general or specific industrial infrastructure, incentives, technical and business services primarily for the export market.

The SEZ is proposed to have the following components:

- Modern storage facilities

The storage facilities will comprise of refrigerated storage for perishable goods, and dry storage facilities for food produce that is required to be in room temperature and drying silos for cereals to avoid storage pests like weevils and diseases.

- Loading zones

The loading zones are to allow large volume trucks to be packed and unpacked with produce from the collection centres and for export.

- A one-stop shop

The one stop shop is to enable the farmers in Nyeri County to have a place to get all their farming solutions in one place.
It also gives an opportunity to offer local establishment like hotels a place to buy high quality food products.

- **Agri-business incubation centers**

Agri-business incubation is a venture that seeks to grow upcoming agri-business by providing mentorship, capital and technology where possible.
This will help to attract the youth towards agri-business and help to incorporate technology into agriculture

- **Demonstration farm**

The demonstration farm is aimed at teaching farmers' practices for improving value of their output for a wider market reach.

- **Agriculture Training and Research Center**

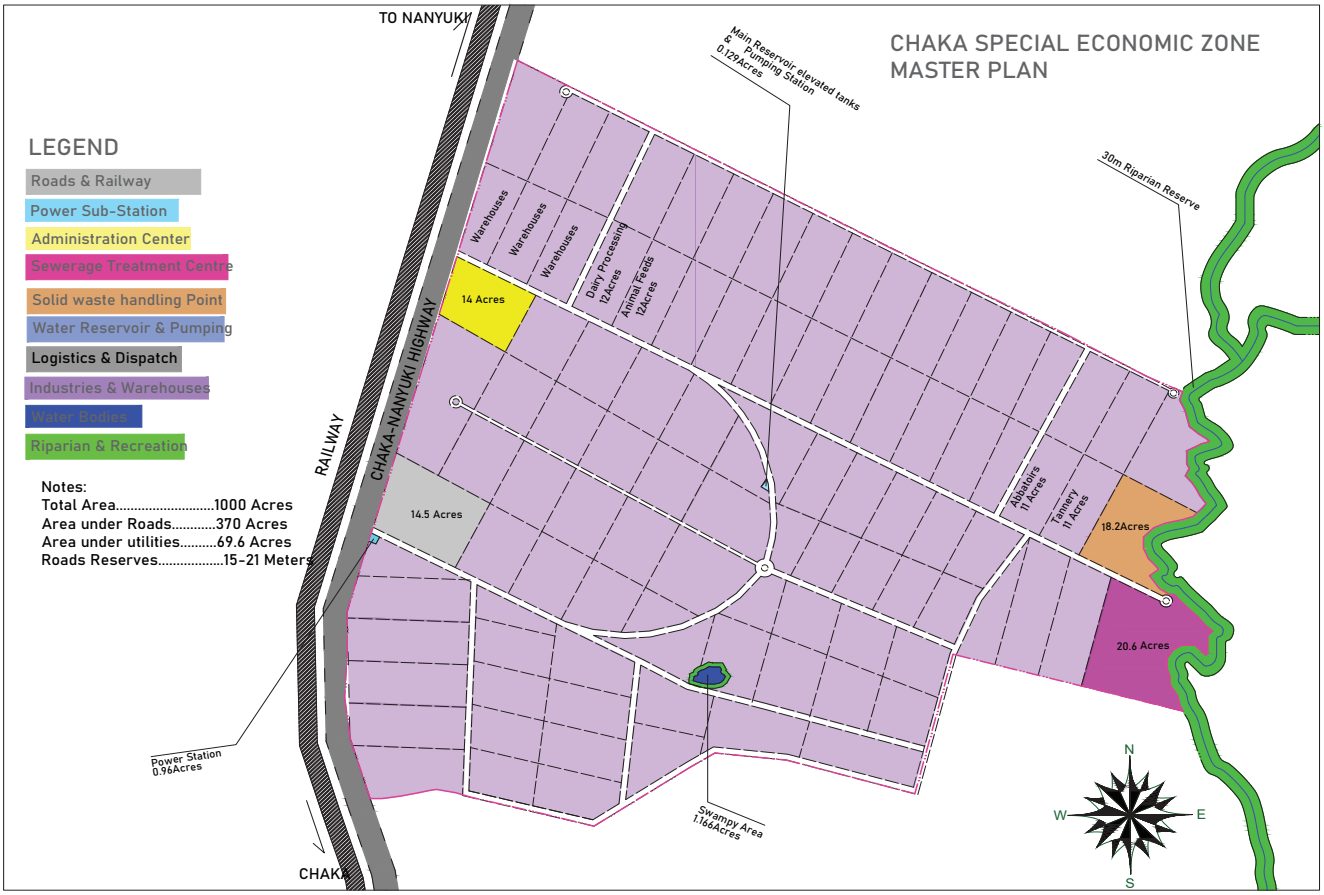
The training and research centre is to allow scientists to research on improved agricultural breeds on crops and livestock that are suitable to the County and that are resistant to local pests and diseases.
The research facility will also research on high yield crops and livestock

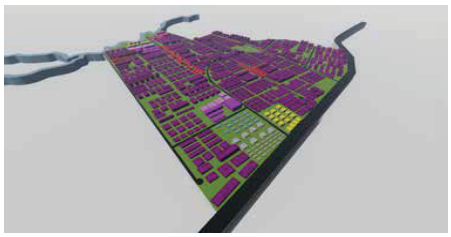
Prerequisites for Success

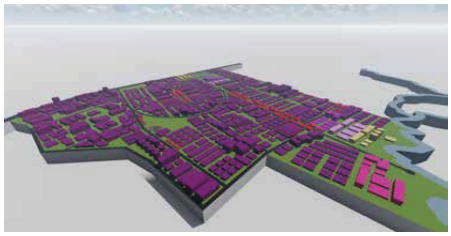
- Strong SEZ policy (at both national and County government level) providing attractive tax incentives.
- Feasibility study on an appropriate location and a site
- Agro-Industrial SEZ Master Plan
- Development of a strong transport system for export of produce.
- Anchoring on a spatial plan

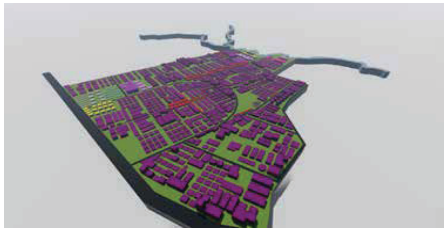
The following is a conceptual model of the Special Economic Zone at the Chaka area:

Figure 65: Conceptual plan and 3D impressions for Chaka Special Economic Zone (SEZ)









LEGEND

Industries

Solid waste treatment plant

Warehouse

Administration centre

1. Warehouse
2. Dairy processing
3. Animal feeds
4. Administration centre
5. Industries
6. Swamp
7. Sewage treatment plant
8. Solid waste handling point
9. Tannery
10. Abbatoirs

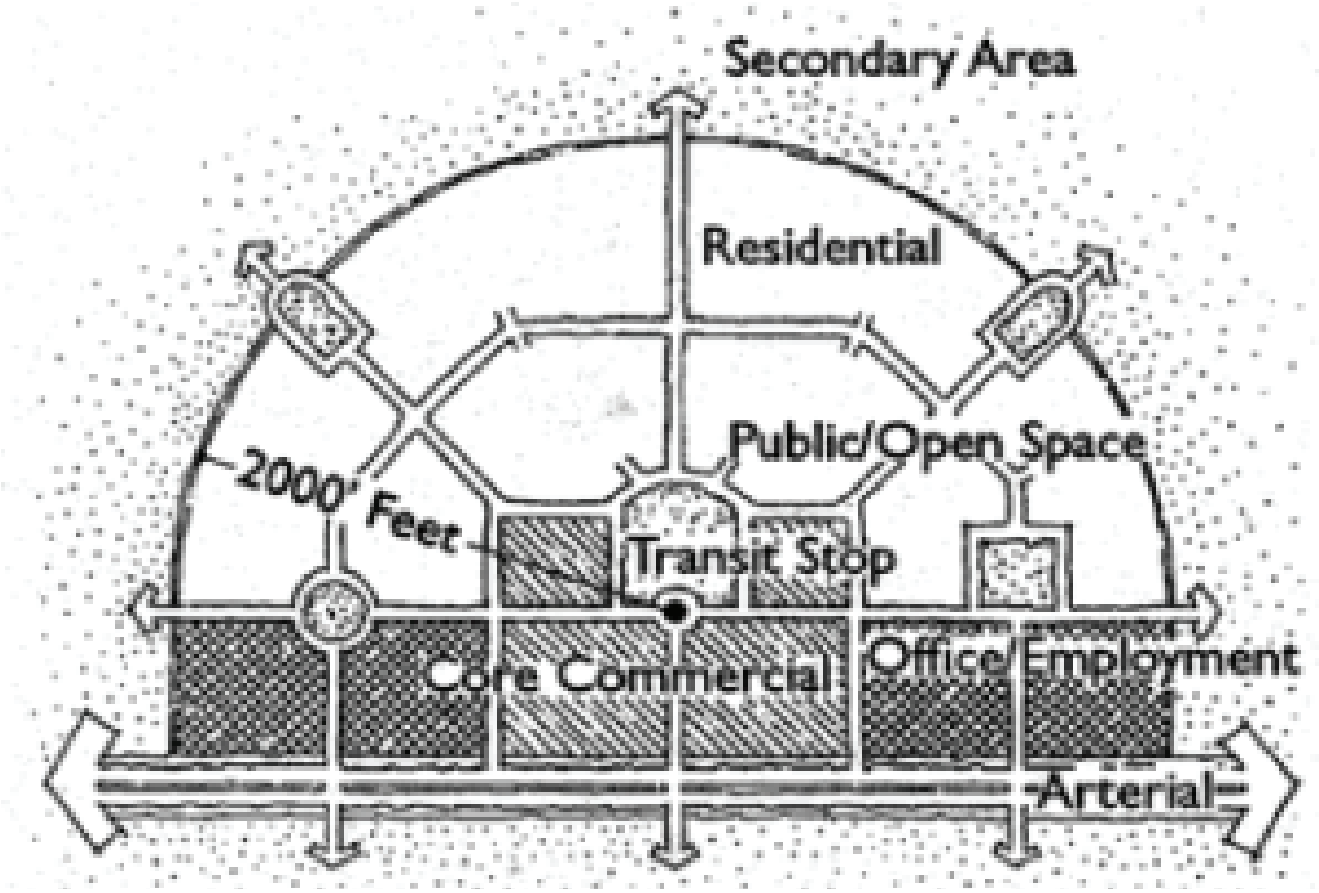
CHAKA SPECIAL ECONOMIC ZONE MASTER PLAN

Source: Two EMS Associates, 2019.

2. Transit Oriented Development in Kiganjo area.

Kiganjo is proposed to develop based on Transit-oriented development (TOD) principle. This is a kind of design and planning principle which is walkable, compact, mixed-use, higher-density development within walking distance of a transit facility.

Figure 66: Conceptual layout of Transit Oriented Development (TOD)



Source: http://transportpolicy2013.blogspot.com/2013/06/transit-oriented-development-without.html

The strategy has been chosen due to the strategic location of the town. It has an existing railway station and it is also a long a Trans-African highway. (The Great-North Road). The town is also in close proximity to the airstrip at Nyaribo, the Special Economic Zone and ultra-modern market at Chaka. The TOD is therefore generally proposed to provide a mix of residential and commercial uses and is designed to make public transit successful, enhance the convenience and safety of walking and bicycling, and provide for a vibrant, liveable community at Kiganjo.

The action plan has provided for high density residential area. Community facilities including playing grounds, social halls, ECD, health centre among others. Kiganjo is therefore envisioned to have the following TOD key characteristics;

- It contains a walkable, high-quality pedestrian environment that integrates streetscaping.
- The highest housing densities are located closest to the transit canter in order to decrease sprawl and promote compactness.
- The transit centre is also at the centre of a destination that has a diverse, mixed-use development.
- Parking is carefully located, designed, and managed. Most importantly, the community has quality public transit facilities and service.

The following is a conceptual model of the Special Economic Zone at the Chaka area:

Figure 67: Conceptual plan for Kiganjo Special Economic Zone (SEZ)

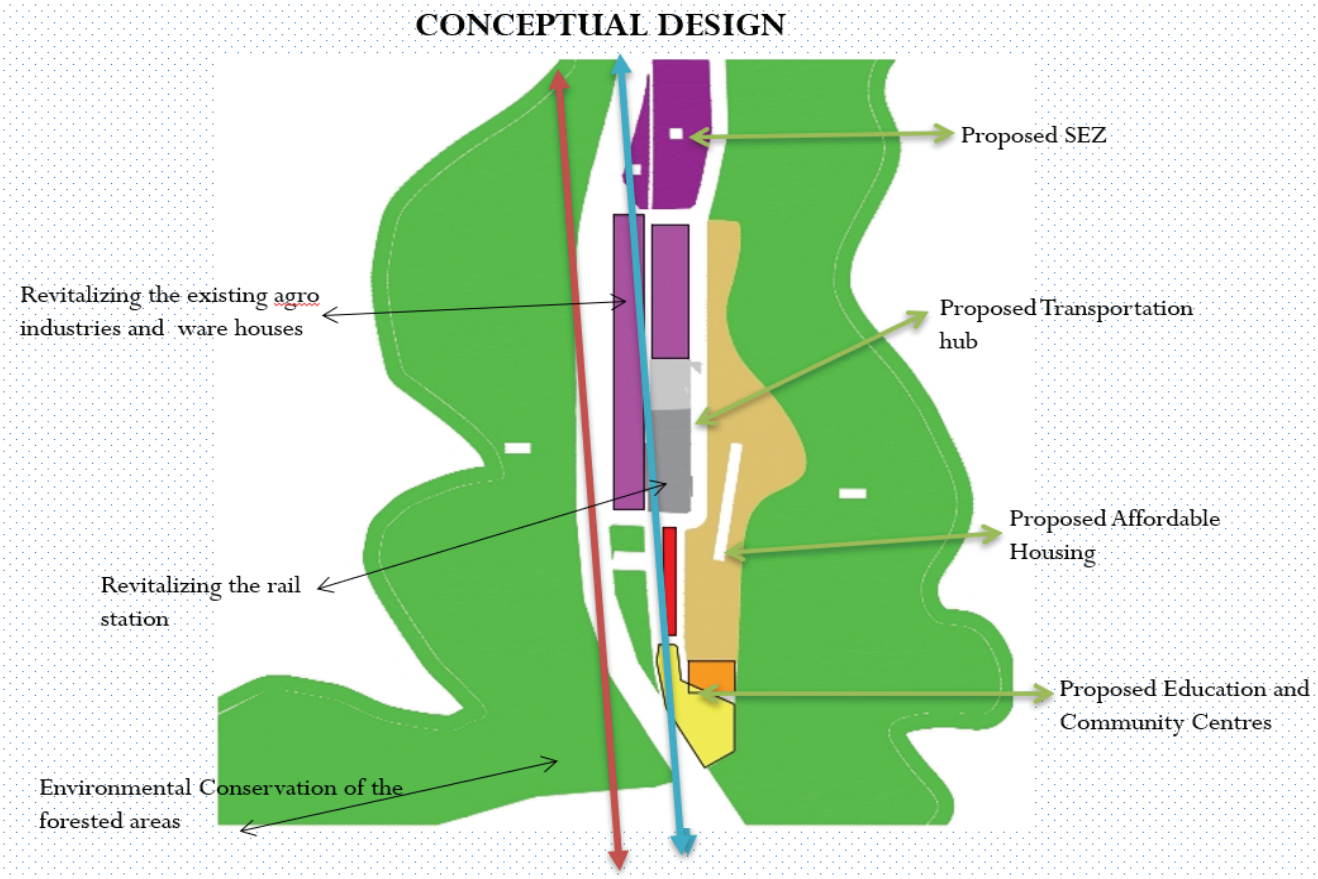


Figure 68: 3D impressions of parking and bus station

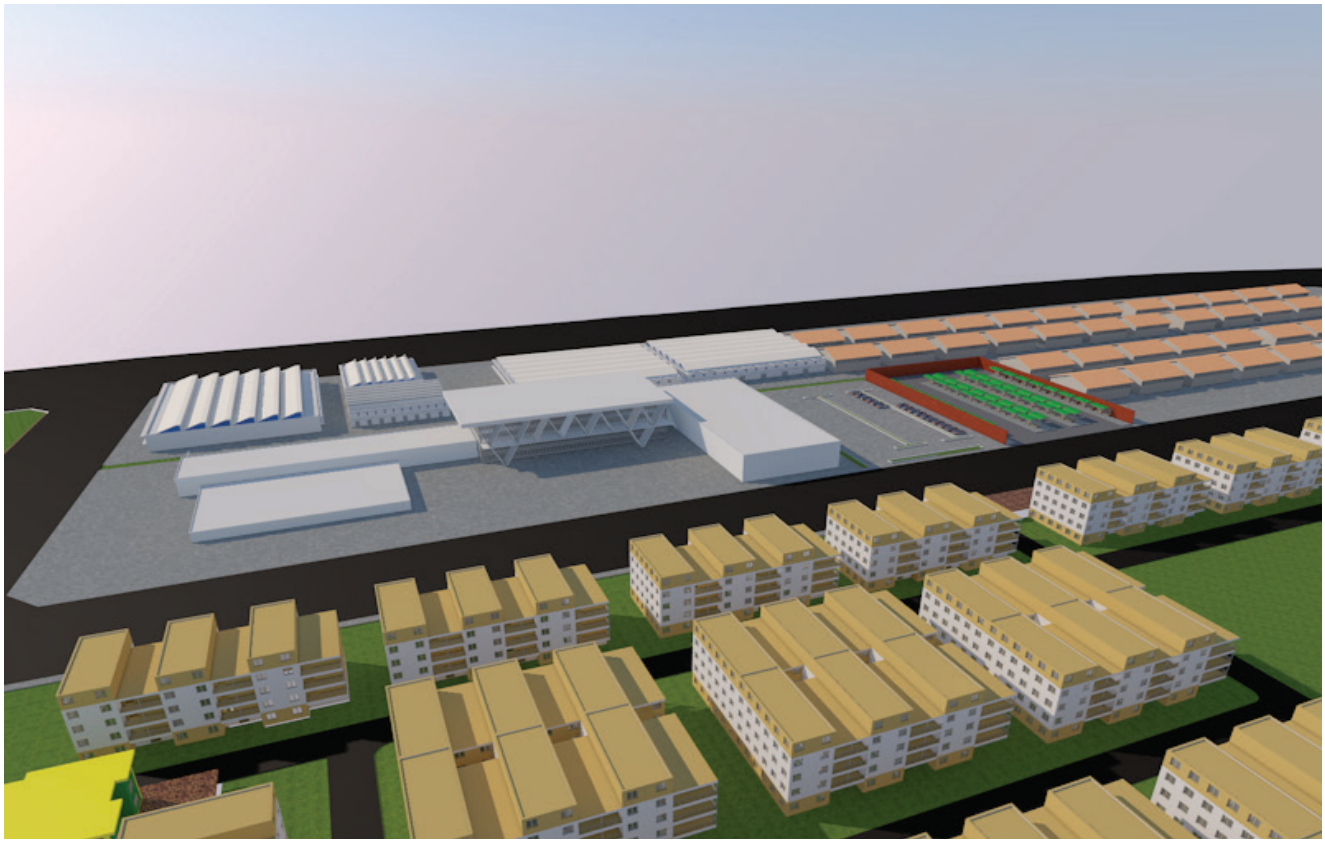


Figure 69: 3D impressions of Kiganjo railway station

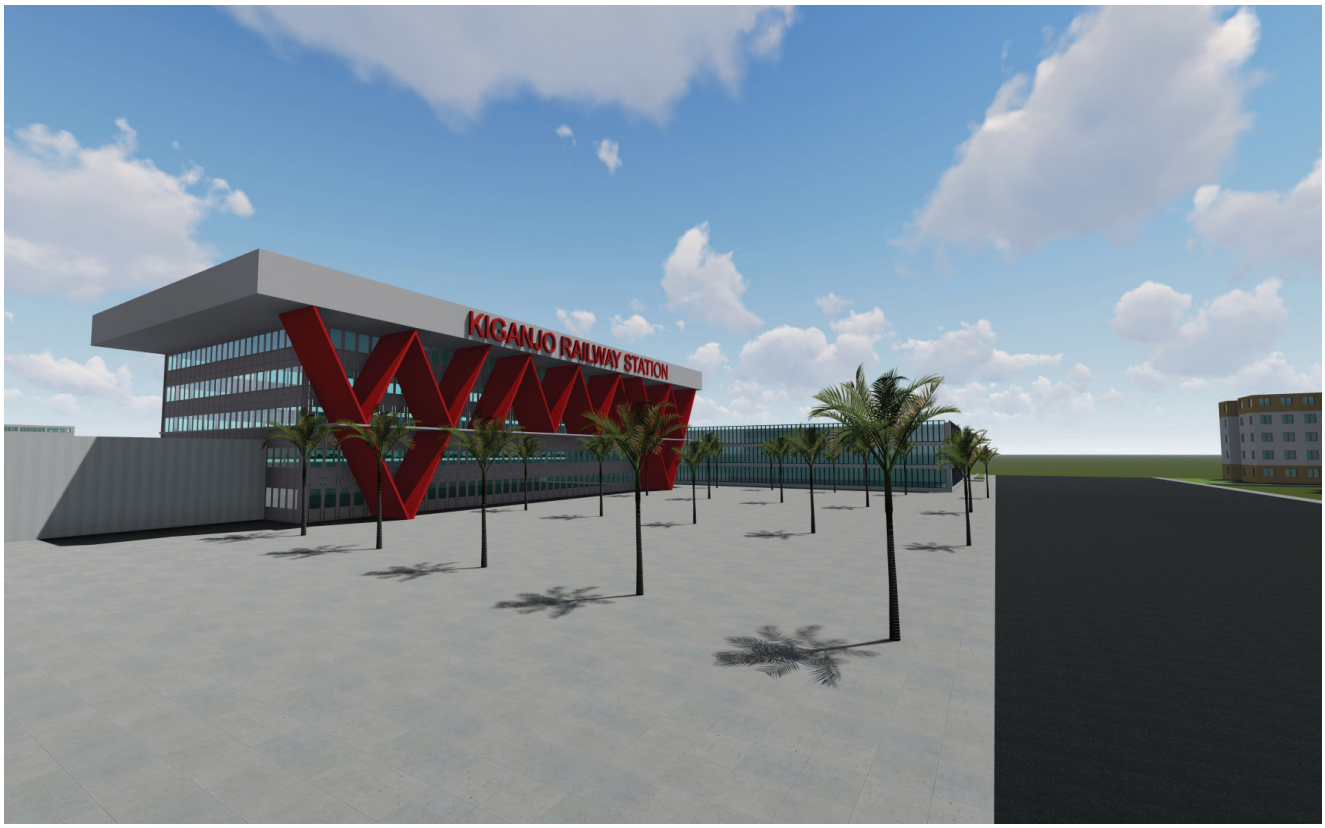
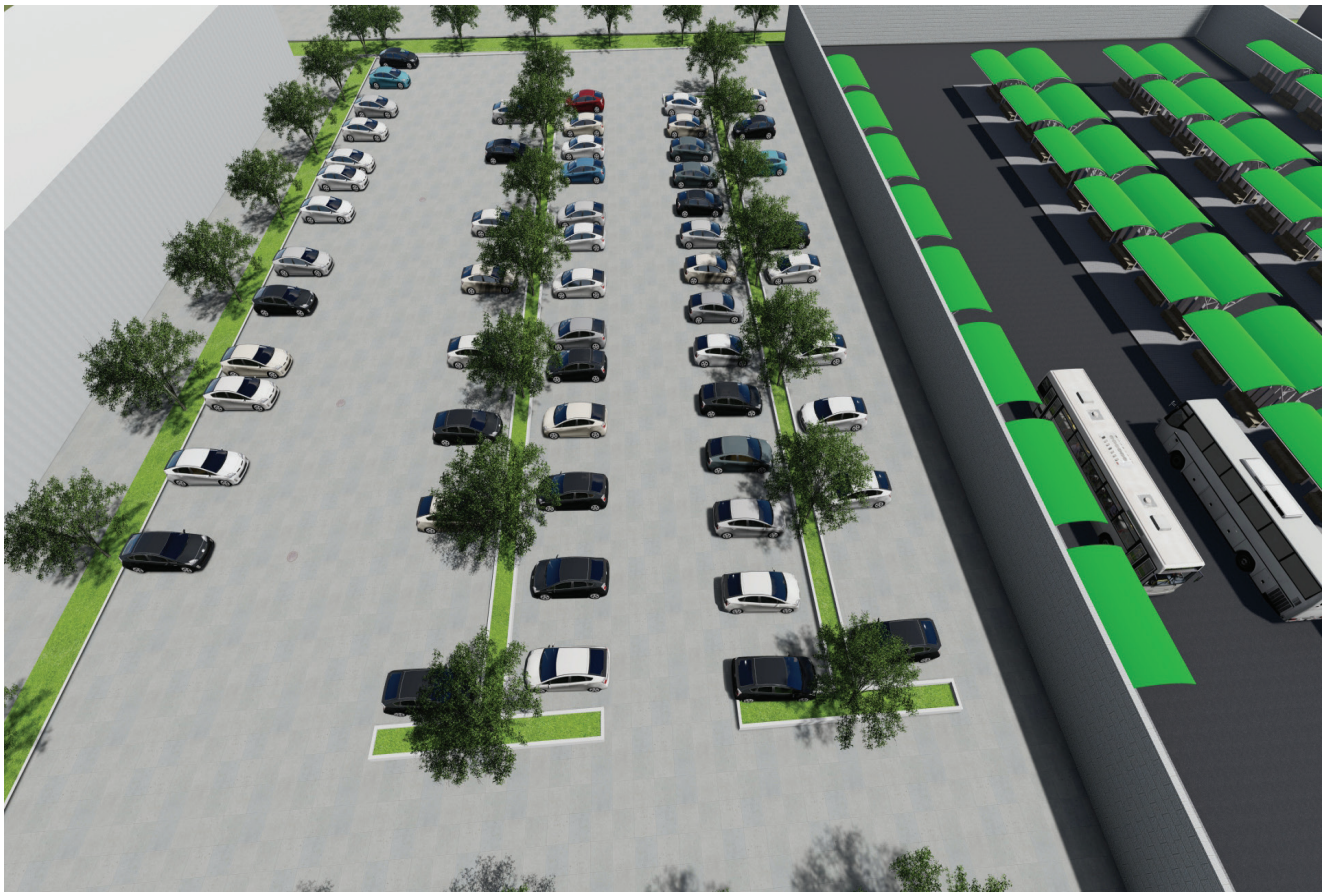


Figure 70: 3D impressions of parking and bus station



2. FOREST-BASED INDUSTRIES

Nyeri County is served by two major forests in the Mount Kenya and Aberdare ecosystems. There are other forests in the County that face the problem of extinction due to uncontrolled logging of the forest trees.

The project will follow the KFS PELIS model where locals are allowed into certain parts of the forest that are already deforested to grow various tree species for sustainable logging. The registered forest farmers can also supplement forestry with beekeeping and grow medicinal herbs that do well in forest areas. The proposed logging zones are in Gatarakwa and Kabaru.

a) Industrial clusters

Industrial clusters refer to a group of firms and institutions located in close proximity whose businesses are interlinked located in close proximity through value and supply chains, labour, and use of similar inputs, technology, and complementary products.

The forest business clusters will consist of both primary and secondary forest product manufacturers. They will be involved in providing both pre-processed and final products.

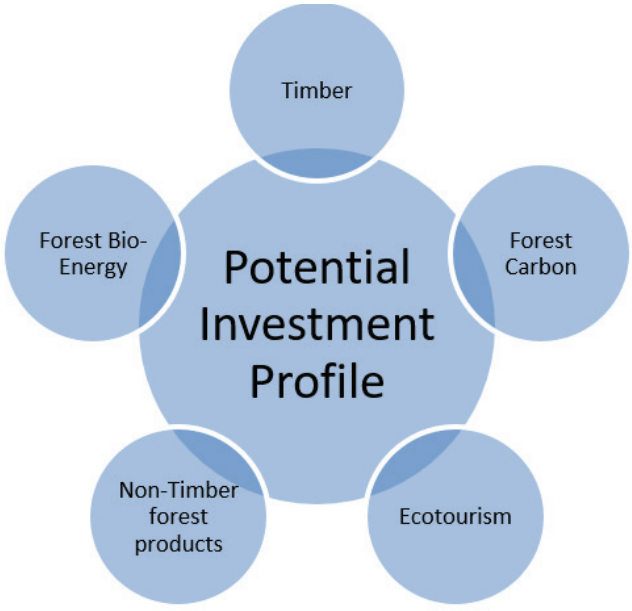
The proposed forest industry subsectors include:

The proposed services to be offered include:Research and training centres, Capacity building and Extension services.

b) Promotion of Forest based enterprises

This flagship project targets the small-scale forest farmers and business people. It aims at providing enormous capacity and options for creating employment and additional income generation through forest-based enterprises development, marketing, and value addition of different products.

The proposed forest-based sector investment profile is as follows:



Prerequisites for Success

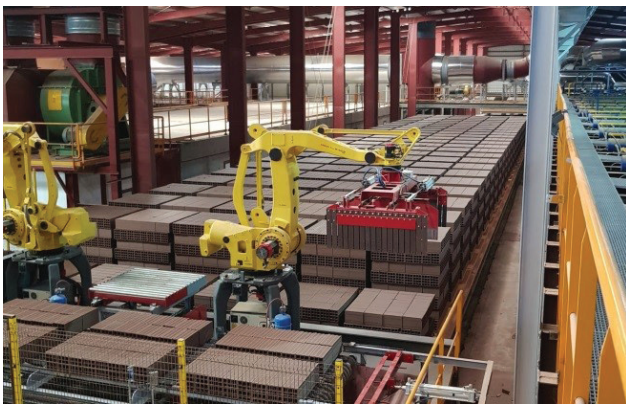
- Feasibility study on an appropriate location and a site
- Establishment of a strong forest Policy framework (at both national and County government level)
- Development of the transport system for export of produce.

Activities of the flagship project

- Rehabilitating degraded forest areas and promotion of farm forestry
- Development of Plantation programmes- The development of a 5-year felling plan for each forest conservancy and division, which includes annual replanting targets, would ensure harvesting levels are sustainable across the country.
- Forest conservation and management
- Development of an independent body to manage activities of the enterprises
- Involvement of community through community forest associations
- Market promotion

3. MINING (CERAMIC INDUSTRY)

The Mukurweini area has clay soils that are potential in supporting a ceramic industry. There have been small scale ceramic industries in the area that have failed due to high costs of production. The flagship project aims at development of the emerging mining sector to attract local and foreign investors to invest capital and expertise into the industry and to promote local economic development for the County and communities. Some of the products from the ceramic industry would be ceramic tiles, utensils and decorations.



Activities of the project

- ☐ Policy planning and development. This requires formulation of policies on taxation, government participation, industrial relations, safety and environment, and procurement and personnel that are in line with international mining industry standards
- ☐ Strengthening of technical industries
- ☐ Preparation of basic geological and project information
- ☐ Organization of investment conventions

Prerequisites for success

- Creation of an enabling regulatory environment
- Development of a conducive macro-economic environment for mining investment
- Development of the infrastructure systems
- Effective benefit sharing agreements.
- Community participation in multiple uses of mineral resources.

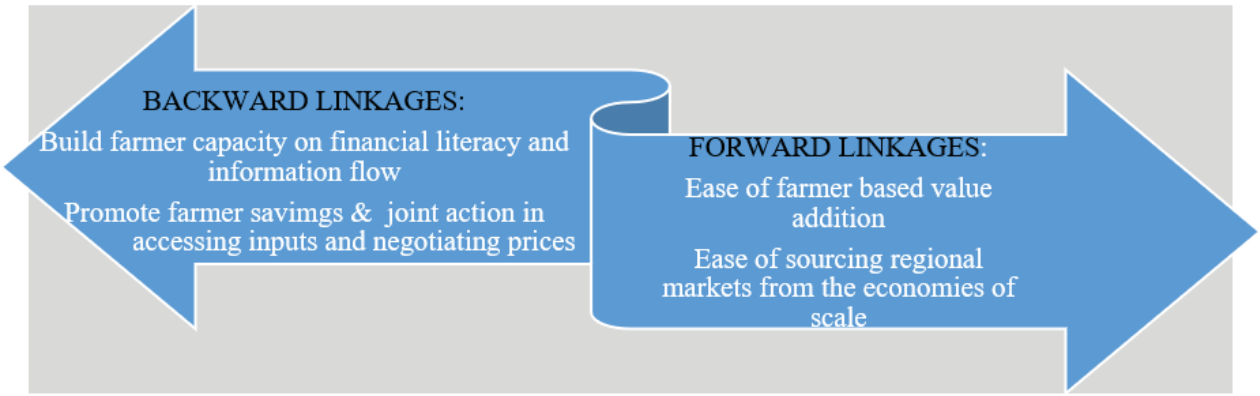
16.2.3 Enhancement of Farmer Cooperatives

Agriculture is the backbone of Nyeri's economy. Most agricultural value chains are largely influenced by poor marketing of produce, problem of accessing farm inputs and limited capacity of farmers to intensify agricultural production. Cooperatives in general, should not be viewed as societies helping their members only, but should be considered as tools for social change and institutions for community development.

The flagship aims to promote joint action in marketing of agricultural produce and accessing quality farm inputs through farmer owned cooperative movement and build the capacity of farmers in agricultural techniques that can intensify production.

Activities within the flagship:

- Implement a flexible cooperative law
- Impose a single taxation model for cooperatives
- Clearly defined competition rules among organization
- Policies and measures to support farming cooperatives and technical (extension) assistance, especially in for small scale farmers



Prerequisites for Success:

1. There must be technical support on implementation of cooperative societies development policies.
2. Facilitate easy registration and deregistration of cooperative societies
3. An institutional framework that facilitates and enhance linkages among cooperative stakeholders, both locally and internationally
4. There should exist a conducive environment for the cooperative movement networking in the areas of production, processing, marketing, financing and investment and to operate effectively and efficiently.

Further, this flagship seeks to create institutions that are transparent, accountable, and ethical as well as result oriented.

The goal is to enact and operationalize the necessary policy, legal and institutional reforms required to strengthen public transparency and accountability. Kenya Vision 2030 stresses on the improvements in resource mobilization with focus on the involvement of the private sectors.

16.2.4 Private sector-driven resource mobilization

Pre-requisites for success

1. Regular community and civic education and sensitization on devolution at ward level.
2. Integration of County leadership efforts: scheduled meeting of Governor, Senator, MPs, MCA's, DC and chiefs to coordinate efforts of the County
3. Establishment of an Independent Public Monitoring and Evaluation Committee at ward level for public scrutiny on a quarterly basis, of development projects
4. Formation of Ward Development Committee per Ward to oversee how, where and when resources are allocated and spent
5. Creation of awareness and sensitization of communities at ward level regarding intended development projects
6. Implementation of village administrators and council of elders leadership as proposed in the Constitution
7. Transparency of County, ward and village expenditure for clear understanding of budgetary allocation at grass root level

16.2.5 Private Sector Facilitation

The private sector is a basic organizing principle of economic activity in a market based economy where:

- Private ownership is an important factor
- Markets and competition drive production
- Where private initiative and risk-taking set activities in motion.

This is a facilitative flagship project which aims at assisting Nyeri County; Increase exports of goods such as animal and crop products and services regionally, benefit from increased market access and enhance growth prospects and reduce poverty.

It is proposed that the County government of Nyeri partners and forms voluntary and collaborative relationships with the private sector. Private sector actors may include:

Rationale for Private Sector Inclusiveness:

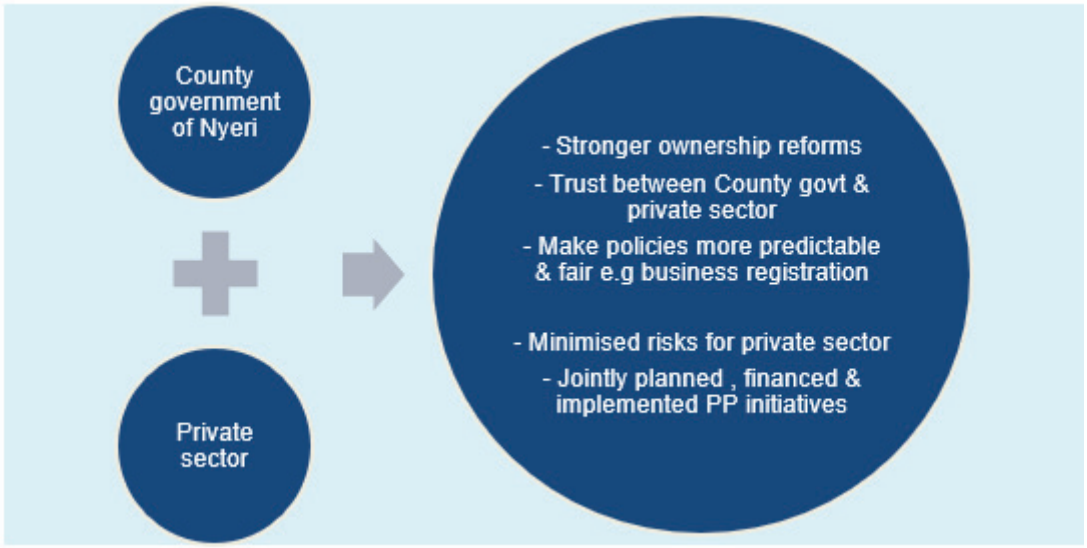
The private sector is the main driver of economic growth as it represents the main source of employment creation. It also creates and delivers goods and services as well as new technology and innovation. Furthermore, the private sector will expand revenue channels for the County government of Nyeri.

Employment creation

Innovation & technology

Main driver of economic growth

This flagship project is anticipated to bring in the following results:



Prerequisites for success

- Active County government support for private sector development
- Adequate and good quality infrastructure within Nyeri County
- Effective measures designed to combat crime and insecurity in the lowlands
- Reduced legal, regulatory and administrative barriers to business registration
- Reformation of County government institutions for better service delivery to the private sector

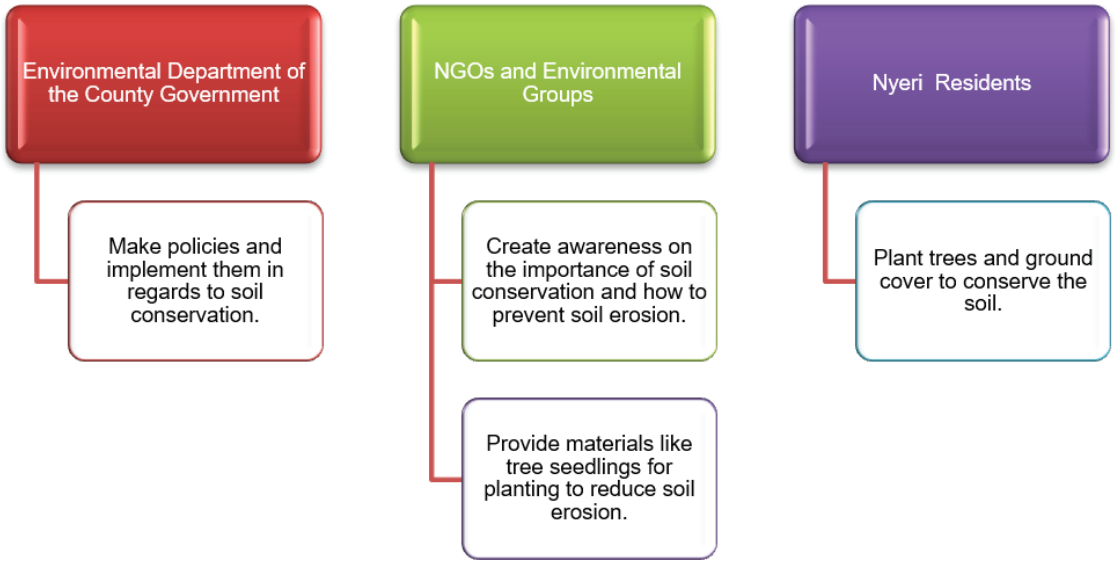
16.3 Environmental Conservation areas

Landslides and soil erosion are some of the key challenges experienced within the County. However, there is urgent need to undertake projects that will help in soil conservation and protection of ground cover minimizing instances of landslides and erosion.

Objectives of the Flagship.

- To ensure sustainable soil conservation measures are put in place.
- To reduce the effects of soil erosion
- To curb water pollution in major rivers and streams
- To promote use of sustainable agricultural farming methods
- To ensure public engagements in soil conservation measures

Some of the actors towards realization of this flagship include;

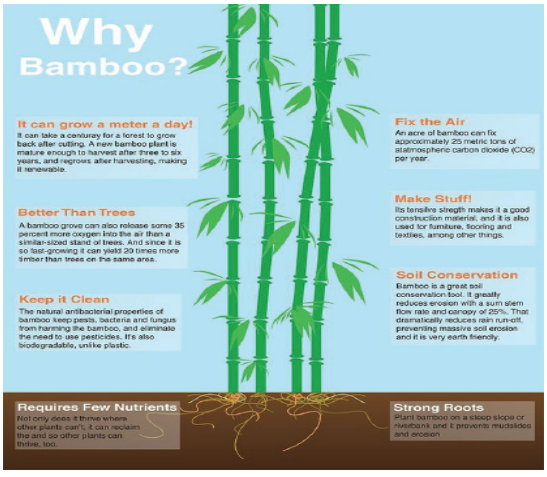


1. BAMBOO TREE PLANTING

Planting of bamboo trees along the steep slopes and riparian reserves is important in curbing soil erosion because they help in soil stabilization especially in steep slopes. Encouraging farmers to practice bamboo farming on their farms is these areas will also improve the soil fertility. In addition to just soil conservation, bamboo trees can be used for paper hence a source of livelihood to the farmers.

Objectives of Bamboo planting:

- To promote afforestation.
- To promote soil conservation
- To improve air quality
- To preserve and improve biological diversity.

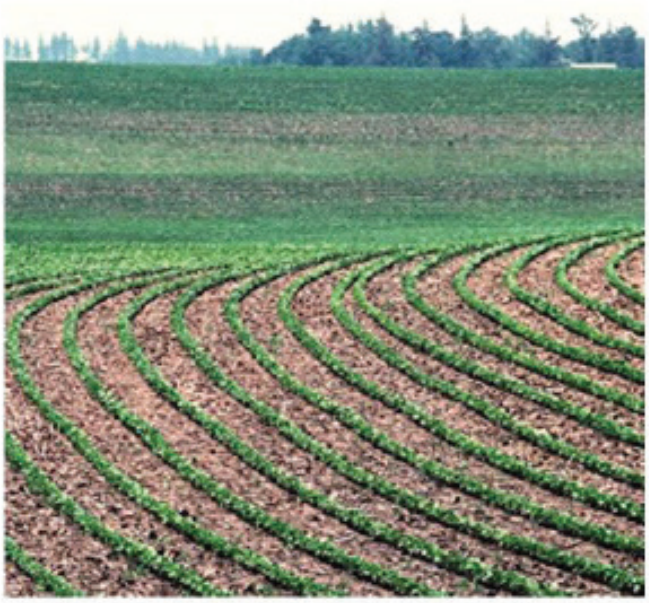


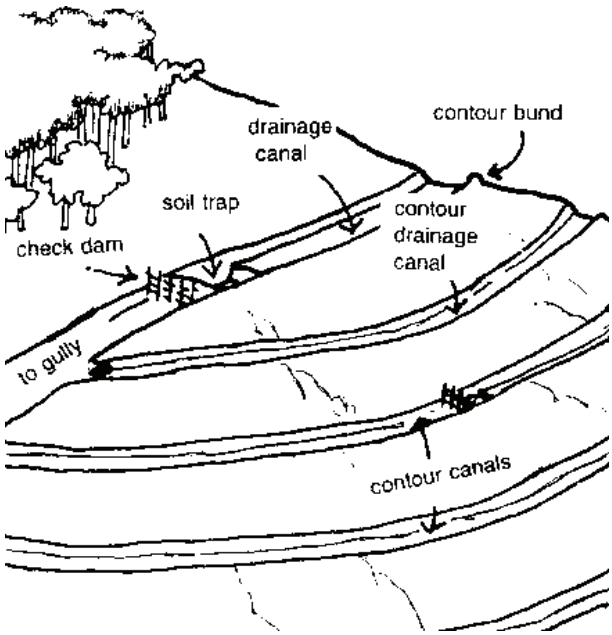
2. CONTOUR FARMING

This is a soil conservation practice where farmers especially those on steep slopes plant crops and tress across or perpendicular to contours on a farm. This method is very efficient in controlling soil erosion and landslides as it creates man made water breaks that not only helps in water penetration into the soil but also helps in conservation of the topsoil. For effectiveness, this method needs one to create equal levels on the ground.

Objectives of Contour farming:

- To promote soil conservation
- To increase ground cover
- It improves water retention in the soil hence maintaining fertility
- Increases yield production to farmers.

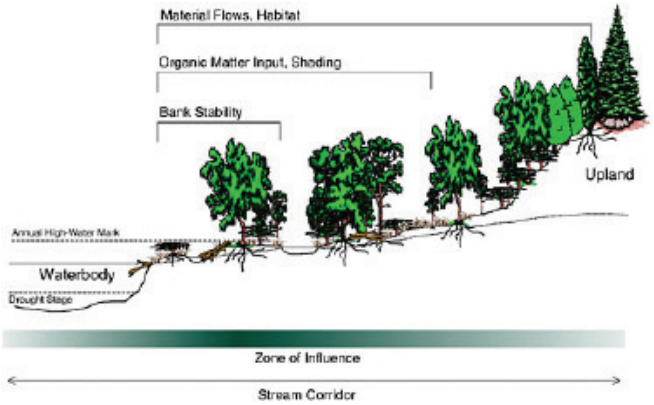


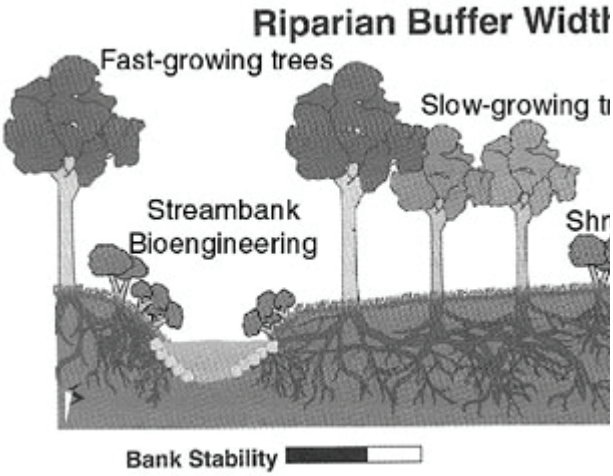


3. RIPARIAN CONSERVATION

In conservation of the riparian reserves it is important to undertake the following activities ;

- Apiculture
- Terracing and building of gabions on steep slope areas
- Reafforestation

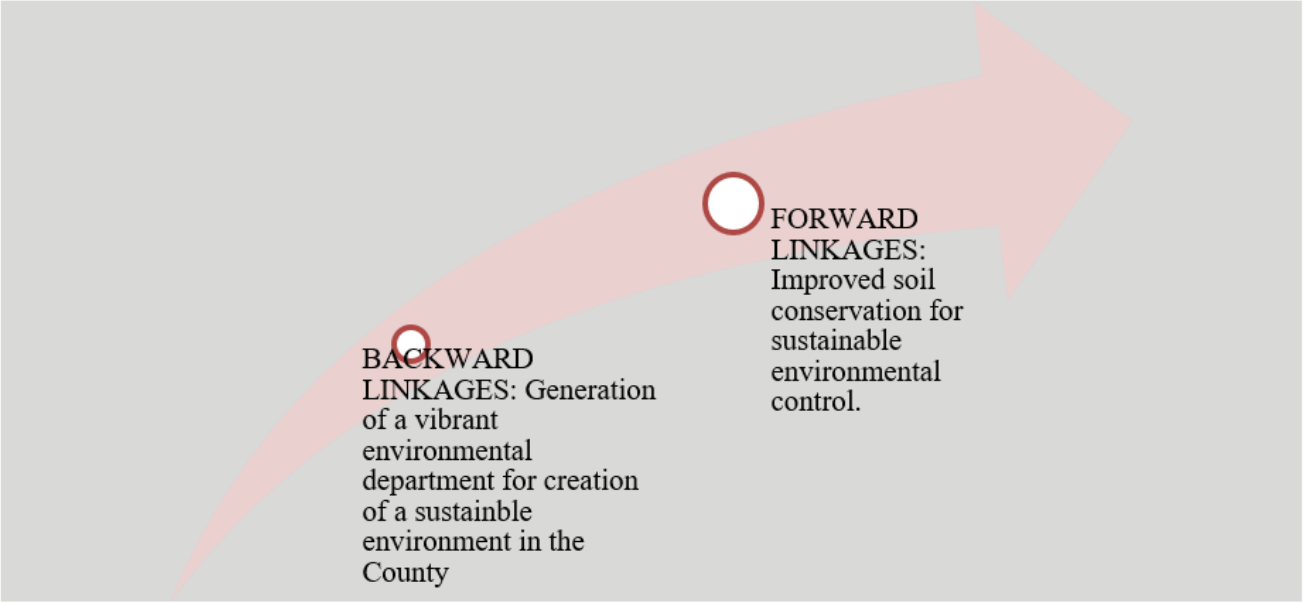




Objectives of Riparian Conservation:

- Water quality protection
- Flood control
- Stabilization of water flow in streams and rivers
- Habitat for aquatic and terrestrial wildlife
- Aesthetic and recreational benefits

In undertaking the above activities, the following will be key towards achieving the said milestones;

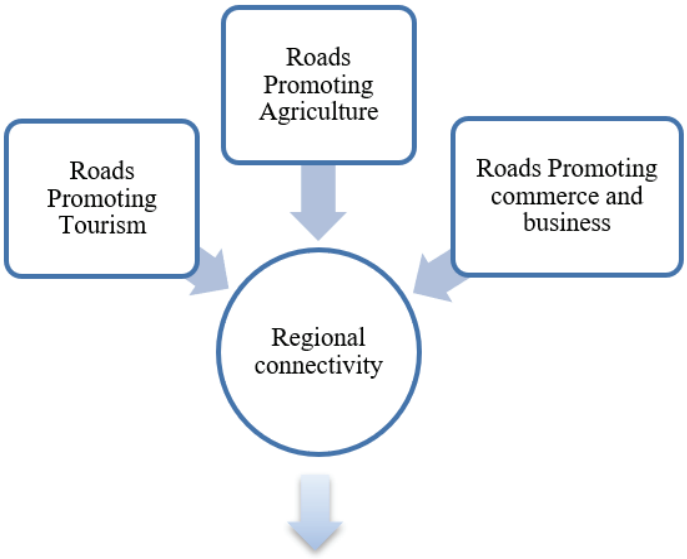


Prerequisites for Success:

- Strong policy and implementation facilities from the environmental department of the County Government.
- Efficient public participation and stakeholder involvement towards sustainable environmental conservation.

16.4 Strategic Roads Flagship.

The County will boost economic growth by developing its transport infrastructure. The flagship project will focus on enhancing connectivity to promote competitiveness of Nyeri County with its neighbouring counties. This can be done through:



The objectives of this flagship project are:

1. To create an enabling business environment for trade of pillars of County economy
2. To promote maximum utilization of the County's rich natural resources
3. To promote security.
4. To establish an improved transport connectivity

Road promoting Agriculture:

This will enable connectivity in the rich agricultural areas of the County that are currently underserved by good roads:

- Karindi-Mukurwe-ini, Gikondi-Muthuthini-Karaba-Mutoga-Thaara
- Mweiga-Amboni-Endarasha-Charity-Watuka-Gakanga-Embaringo-Kiamunguru
- Kimunyuru-Embaringo-Gakanga-Watuka-Charity-Endarasha-Mwiyogo
- Amboni-Nyarugumu-Ihururu-Ihwa-Kinunga-Kagogi-Muthua-ini-Kagwathi

Roads promoting tourism:

This includes construction, upgrading and maintainance of roads used to access tourism destinations across the County:

- NaroMuro-Mwiyogo-Kihuhiro
- Mweiga-Mwireri-Chaka-Karundas-Iruri-Judea-Manyata—Irigithati-Guruai-NaroMoru-Nanyuki
- Gathaithi-Itundu-Ndumanu-Kagochi-Iruri-Karundas-Chaka-Mwireri-Mweiga-Amboni
- Njogu-ini-Mathari-Nyeri-Nyaribo-Chaka-Karundas-Iruri-Kagochi-Ndumanu-Itundu-Gathaithi
- Nyeri-Mathari-Ihururu-Kihuhiro

Roads promoting Commerce and Business:

This include construction and upgrading of road to promote commerce in the County:

- Ihithe-Kiandogoro-Mutubio-Ndunyu Njeru Road.
- Narumoru-Karich-Milimani-Chaka-Kiganjo-Kirichu-Marua
- Mweiga-Babito-Kiawara-Rurii-Tanyai-Nairutia
- Narumoru-Karicheni-Milimani-Kiganjo-Kigongo-Nyeri-Kiamwathi-Giakanja-Gachatha-Kagere-Gacami-Othaya-Kariki.

16.5 Leadership and Governance Flagship

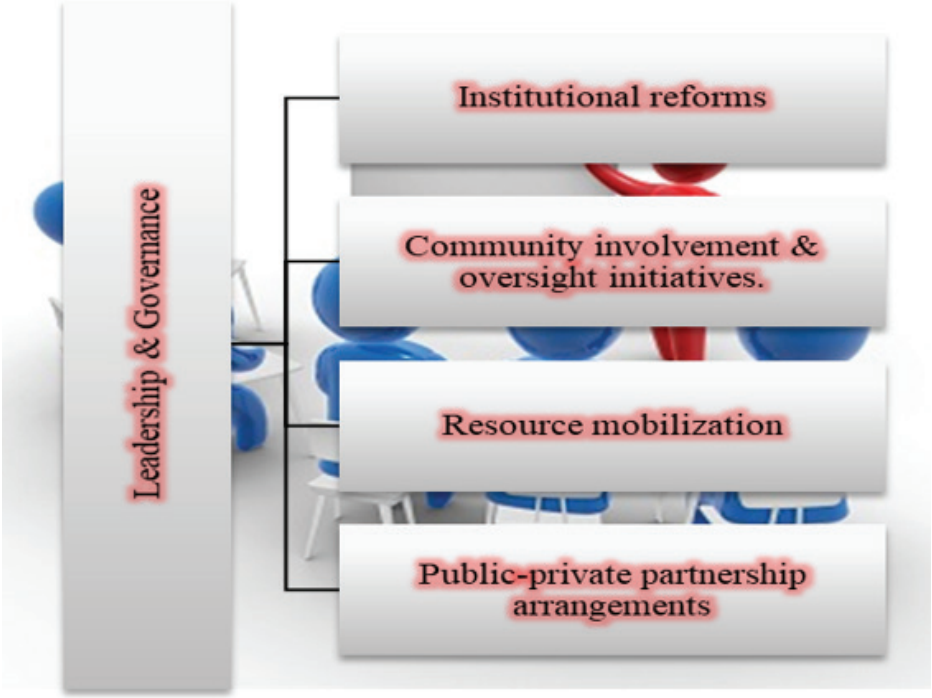
VISION: Transparency and Accountability Towards Equitable Resource Allocation

Rationale

The main aim of this facilitative flagship is to create an enabling environment for the productive sector and all the other sectors of the economy to operate efficiently

Objectives

- Public Accountability per Ward through formation of Independent Public Monitoring and Evaluation Committee
- Civic Education and sensitization of community per ward on ongoing and planned development projects based on roles of leaders
- Integration of County Leaders per quarter of the year to take stock of development issues in region.



PART VI:
PLAN IMPLEMENTATION

CHAPTER SEVENTEEN:

PLAN IMPLEMENTATION STRATEGY

17.0 Overview

The ability of the planning system to implement policies and proposals is perhaps the most important test of its effectiveness. To this effect, this chapter lays a roadmap for effective plan implementation, monitoring and evaluation. This chapter also outlines the Capital Investment Plan, which comprises of all proposed projects in the county, factoring in the timelines for implementation of the same as well as the associated financial costs of each project. The chapter consists of the following components:

17.1 Institutional Framework for Plan Implementation.

Proper plan implementation relies on a sound institutional set up. The successful implementation of this Plan will greatly depend on the level of detail and attention given to ensuring that the implementation schedule provided for this plan is followed.

Given the multi-disciplinary nature of the County Spatial Plan, this plan proposes creation of an implementation and coordination committee to facilitate its implementation. The committee should consist of key executive officers from the thematic areas. The thematic areas will all be GIS based, attached to a GIS laboratory. Each of the key officers should be mandated with strategic projects to implement. They will also ensure that the thematic areas are regularly updated in the GIS database for the County.

Furthermore, a Plan Implementation and Coordination Committee composed of County and National Government Representatives shall be established to oversee effective implementation of the Plan projects and subsequently ensure proper management of the allocated funds.

In addition, the committee members must not be more than two-thirds from one gender, and a representative of disabled persons, the youth and marginalized communities must be incorporated into the committee.

The appointment of the Committee Chairperson is critical to ensure all activities and resources necessary for the implementation of the Plan projects are well coordinated and organized so as to add value to the development process. It is proposed that the Chairperson be a member of the committee with full understanding of plan execution.

A professional consultation team comprising of Physical Planners, Environmentalists, Water Engineers, Agriculturalists or any other relevant profession will be from time to time consulted on the development of certain projects for the Plan implementation.

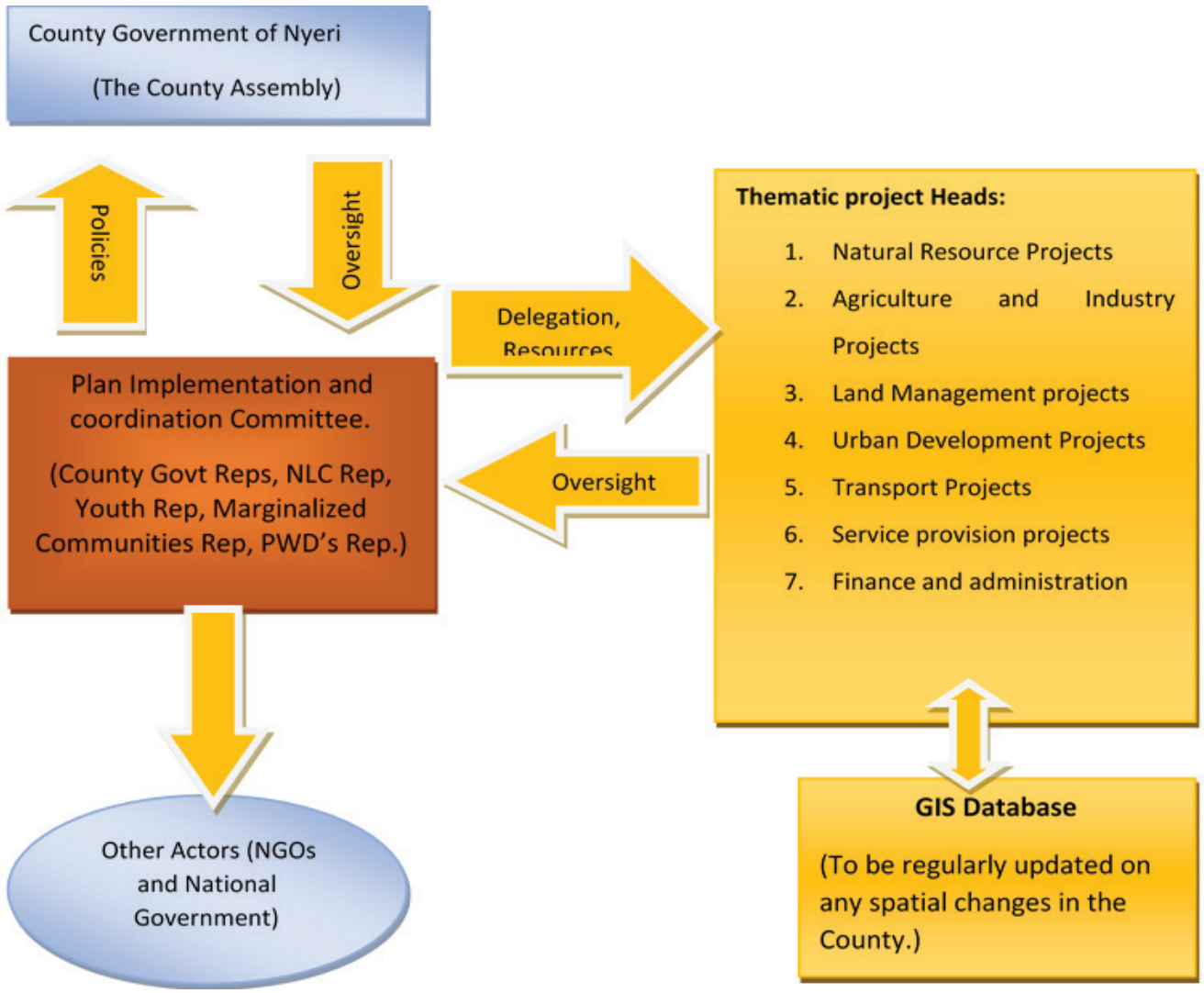
The Plan Implementation Coordination Framework desires to maximize the use of available resources, avoid duplication, ensure accountability, reduce implementation delays, conflict and improve the capacity of the members. and projects;

The functions of the implementation committee will include:

- Understanding and implementing the strategies
- Establishing an effective communication and dialogue between all parties involved in implementation;
- Facilitation of administrative procedures;
- Availing implementation resources;
- Oversee the setting up of reliable baseline data to facilitate M&E functions; and
- Revision of the plan every five years.

All involved stakeholders shall assume collective responsibility of the plan implementation to ensure proper use, management and conservation of the desired Spatial structure of the County.

The following schematic diagram best illustrates the coordination framework as well as the reporting mechanism in the implementation of the Plan.



Members of the Plan Implementation & Coordination Committee

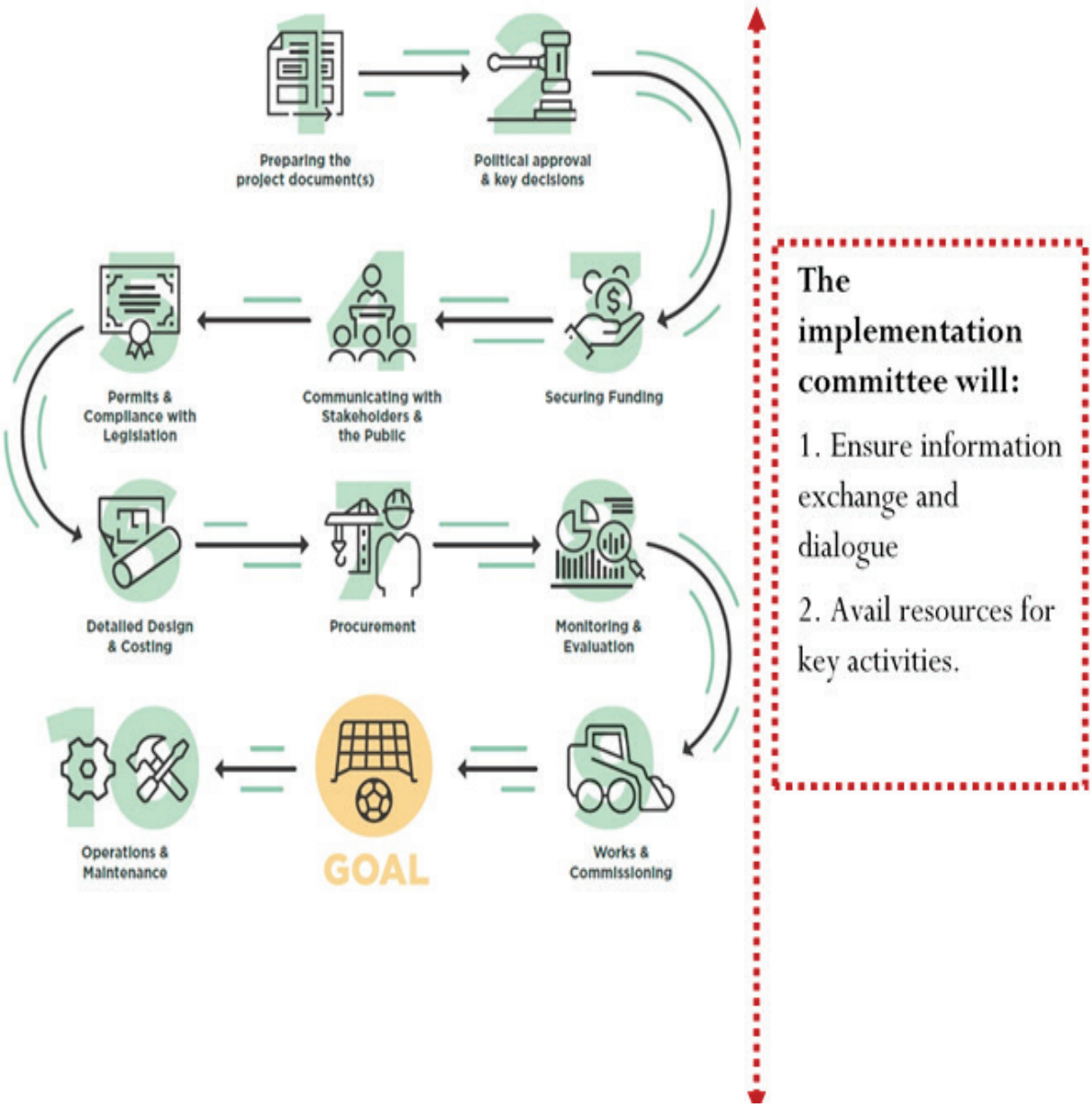
The coordination committee should constitute of:

1. The Chief Officer (Lands, Housing, Physical Planning and Urban Development) or any relevant person appointed by the Chief Officer, to manage the implementation process. He/She will oversee all functions of the coordination committee including the implementing heads of departments;
2. Representatives from National Government Institutions at the County Level:
   - -National Land Commission
   - -Kenya Forest Service (KFS)
   - -Kenya Wildlife Service (KWS)
   - -Kenya Power (KPLC)
   - -Kenya Dairy Board
   - -National Museums of Kenya
   - -Coffee Board of Kenya
   - -Kenya Tea Development Agency (KTDA)
   - -National Environmental Management Authority (NEMA)
   - -Water Resources Authority (WRA)
   - -Kenya Urban Roads Authority (KURA)
   - -Kenya Rural Roads Authority (KeRRA)
3. County Heads of Departments (HODs) in the following departments:
   - -HOD Agriculture, Livestock, and Fisheries;
   - -HOD Water and Irrigation Services
   - -HOD Public Service Management & Environment
   - -HOD Education, Sports, Science and Technology;
   - -HOD Health;
   - -HOD Trade, Culture, Tourism and Cooperative Development
   - -HOD Gender, Youth and Social Services;
   - -HOD Transport, Infrastructure, Public works and Energy
   - -HOD Finance and Economic Planning.
4. One representative of disabled persons, marginalized communities and the youth
5. Representatives from Water Service Providers in the County (NYEWASCO, OMWASCO, MAWASCO, TEAWASCO, NAROWASCO)
6. Professional consultation team (Physical Planners, Engineer, Agriculturalist, and any other relevant profession)

NB: Committee members must not be more than two-thirds from one gender.

Each strategic project lead is assigned resources and manpower to achieve the strategic projects. The head is solely responsible for management of the projects and reports to the coordinating unit.

The following schematic diagram best illustrates the cycle followed in strategic project implementation.



17.2. Communication Strategy

Why a communication strategy:

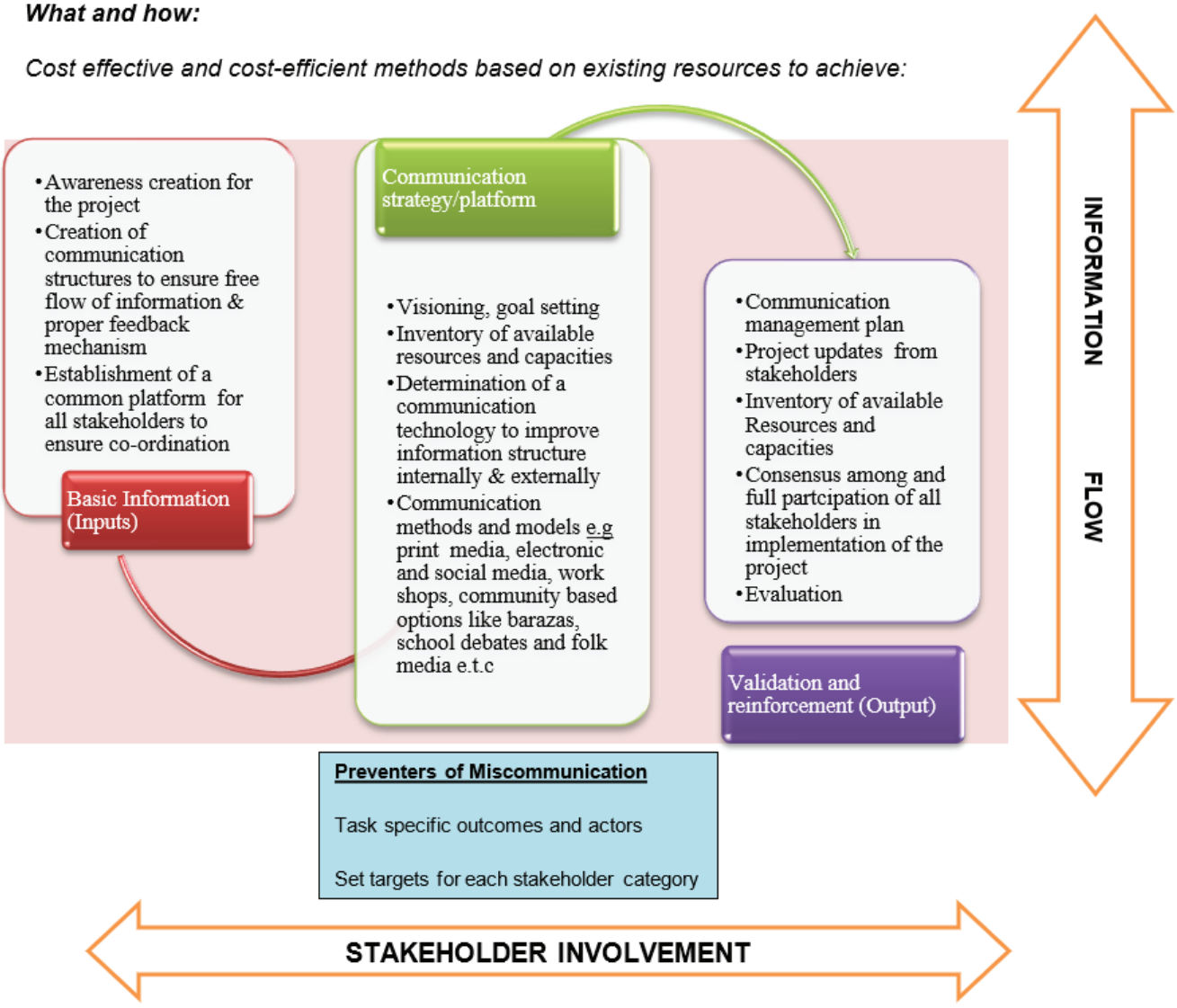
- Effective exchange of information between all concerned stakeholders and built consensus with common vision for realization of the Nyeri County Spatial Plan;
- Efficient communication structures and channels to ensure free flow of information and proper feedback mechanisms between identified stakeholders; and
- Effective transmission and sharing of information and ideas among various players involved in planning process, implementation, monitoring and evaluation of the Nyeri County Spatial Plan.

Whom:

Community leaders and members, representatives of marginalized groups (women, the disabled and indigenous people) Nyeri County Executive and County Assembly policy makers, staff of line government offices, donor

What and how:

Cost effective and cost-efficient methods based on existing resources to achieve:



PRODUCT OF THE PROCESS ABOVE SHOULD CULMINATE IN A COMMUNICATION ACTION PLAN

WHAT/ TASK	RESOURCES FOR TASK	WHEN	HOW	RESPONSIBLE	TARGET AUDIENCES		
					SPONSOR	PROJECT TEAM	WHO?
Activity name	Based on existing and required resources	Timelines	Meeting	Project Manager	Approve	Receive	

Outcomes:

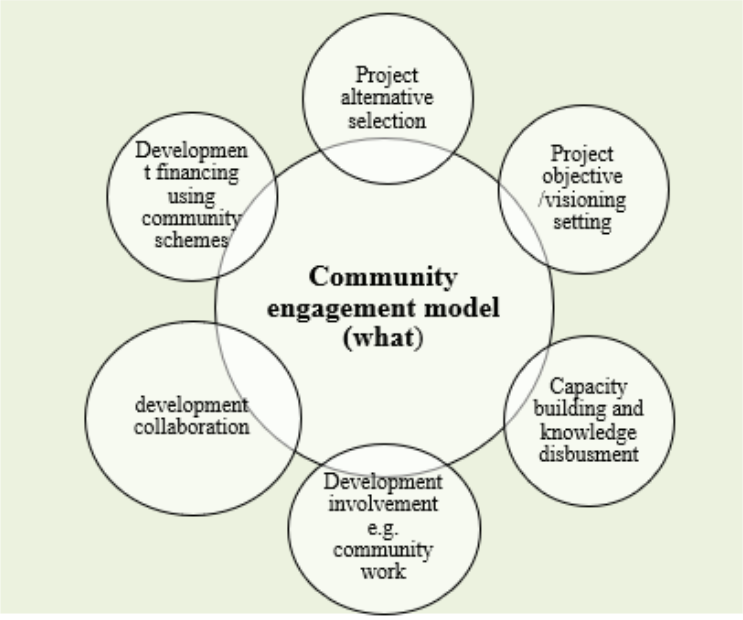
- Awareness, understanding and support by the communities.
- Creation of communication structures and channels to ensure free flow of information and proper feedback mechanisms.
- Participation and consensus of all stakeholders in the planning and implementation of upgrading.
- A common platform for all stakeholders to facilitate the coordination of the various stakeholder activities in the upgrading.

17.3 Community Participation Framework

The residents of Nyeri County will form a key component for the implementation of this plan. They therefore must be actively engaged throughout the implementation process. This will ensure that effective citizenship is promoted through project ownership and implementation support. Principles of effective engagement should be observed to ensure proposals herein have community goodwill. Principally, the plan may only result to growth if the community owns the implementation.

Proposals for effective participation:

- Conduct community participation forums in a language understood by all.
- To counter inherent bias, participatory spaces be separated based on perceived bias e.g. political affiliation, gender, security.
- Engagement must be transparent and not merely a rubber-stamping exercise.
- It should be clear to all what the results from public engagement will be used for.



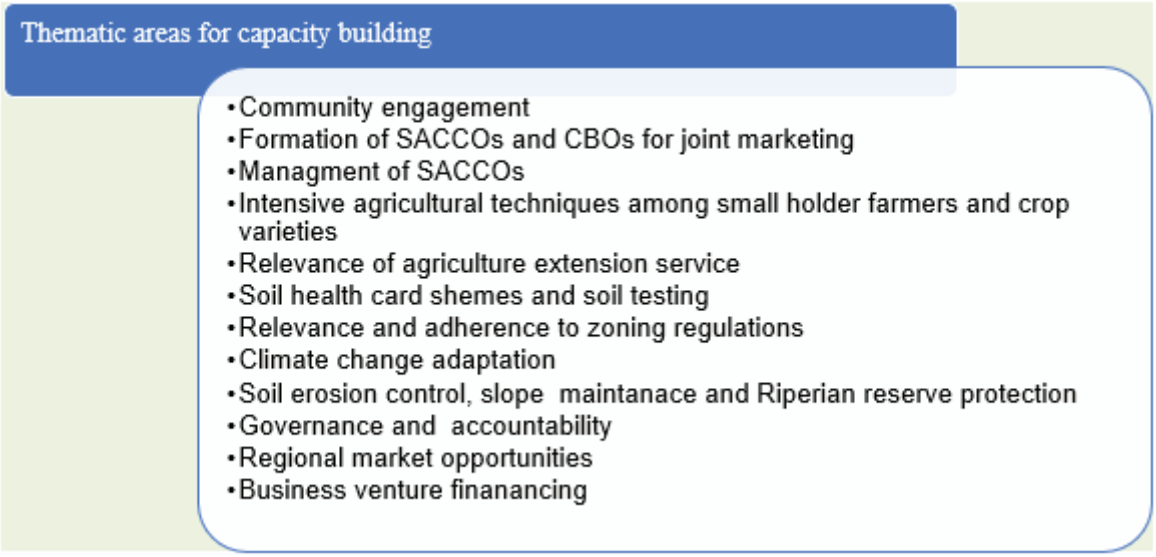
Engagement framework (How):

1. Individual engagement
2. Using popular mass media (Radio, Television and Posters)
3. Social Media
4. Bulk SMS services
5. Public hearings and Barazas

17.4 Capacity Building Framework

Capacity is the ability of individuals and organizations or organizational units to perform functions effectively, efficiently and sustainably. Capacity building is an evidence-driven process of strengthening the abilities of individuals, organizations, and systems to perform core functions sustainably, and to continue to improve and develop over time.

Many of the proposals herein are solely dependent on the improved capacity of the residents of Nyeri. This capacity building strategy is meant to help the County Government to enhance their approaches and plans and therefore becomes the prerequisite for successful implementation of the plan.



Proposals

- To ensure all stakeholders are aware of proposals herein, training for implementation unit and County assembly should be held. This training should extend to all officers in all technical offices.
- All County Departments within the implementation coordination unit should have capacity building budget and accountability procedure.
- Capacity building should be part and parcel of the communication plan and every engagement forum.
- Capacity building forums should follow the principals of effective engagement.
- Each thematic knowledge areas should hold capacity building workshops annually per sub Ward.

17.5 Implementation Log Frame

(See plan strategies presented in section 14. for implementation log frame).

17.6 Capital Investment Plan

17.6.1 Overview

The County Government of Nyeri is constitutionally required to plan, fund, design, construct and maintain infrastructural assets that enable the county and its people as well as the economy to flourish. However, the desired infrastructural investment for Nyeri County requires capital that far exceeds available resources to the County Government making a case for the County to build capacity to appraise and prioritize its investment decisions. Hence there is an increasing need to establish and maintain a process of planning and funding capital investment as a regular activity integrated with the county together with its other activities and based on principles of good public management. For this to happen, the County Government of Nyeri must identify and prioritize the most beneficial investments, those that will meet long term goals, for conservation, mobility, sustainability, healthcare, revenue generation and broad-based prosperity.

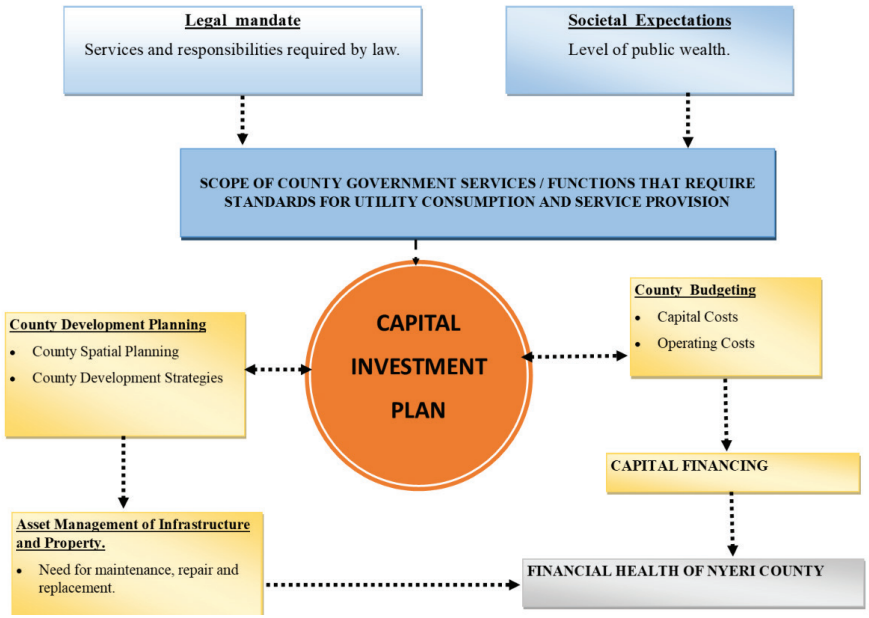
In developing this CIP, all possible Nyeri County Capital Investments were considered together, and funding programs were developed and size taking all capital need into account. All programs and projects were selected guided by Nyeri County vision of "transforming lives through advancement of infrastructure, economic prosperity, food security and environmental conservation".

17.6.2 Need for a Capital Investments Plan

Nyeri County requires to invest in infrastructure and the social improvement assets that should enhance the economic and social development of its communities. Hence the county needs to create an investment framework that ensures sustainable development in the county that would enhance the welfare of the people of Nyeri. Investment is understood as investment in the acquisition or building of new assets; or major repair and replacement of existing assets that have an economic life longer than one year and a value above a specified threshold.

The total capital investment for any period of time (that is, the entire Capital Investment Plan) and the individual projects included in it can be financed through a combination of sources. Usually, sources of financing are defined for separately each capital project (or for a group of similar projects, such as street repairs in different parts of the city). This will include capital investment by the County Government of Nyeri, the National Government, National Agencies and institutions established for the provision of public services, enterprises set and owned by the County Government for the provision of public utility services. CIP also may include investment by the private sector through public-private partnerships (PPP) as well as by NGOs whose mission intend to improve the welfare of the communities in Nyeri.

Figure 71: Needs of a CIP



Source: World Bank CIP Guidelines (2011)

The figure above depicts how Capital Investment Plan should ideally relate to other activities with Nyeri County. The blue boxes illustrate conceptual, legal, social, and economical factors that establish a fundamental context of the CIP. It highlights the first key principle of good public management as properties and infrastructure in which the County invests should be only those needed for the services and utilities that the County is requires to provide for its communities. The services to be provided are either mandatory services required by law or discretionary services recommended in National or County policies. For example, the Constitution requires County Governments to provide healthcare services thus the County should invest in establishing adequate healthcare facilities. However, a County may decide to acquire/ build and operate a rehabilitation center for drug addicts, providing this rehabilitation center is a discretionary service.

The challenge here is that laws very often are silent about the specific content, quantities and qualities of the services that Counties must provide. In such cases, societal norms and expectations come into play since all services come from public financial resources that belong to the people. In any event, service provision mandates, along with societal expectations and the wealth in the public sector, form the scope of the standards for public utilities and provision of services that the County must address in its Capital Investment Planning Process

The grey boxes show three interrelated factors that provide input to the Capital Investment Planning process; sources of projects, funding and financing. Finally, the orange box depicts a very important aspect of CIP: Decisions related to capital investment, county budgeting, and financing all directly impact the County's financial health and its future ability to fund services for its communities

17.6.3 Approach for Developing the Nyeri CSP Capital Investment Plan

The CIP is based upon strategic priorities that enhance conservation and improvement of the biodiversity and heritage in Nyeri as well as boost economic development in Nyeri, with emphasis on sustainability. The set priorities shall guide investments on maintenance and modernization of existing infrastructural assets that may have deteriorated or setting up new infrastructure to meet current stakeholder needs and requirements.

The Nyeri County Spatial Plan Implementation Matrix was generated after comparison of impacts of different development scenarios of investments across various sectors and county wards in order to provide a better understanding of the most efficient and strategic allocation of resources to achieve goals for the Nyeri County Spatial Plan. Projects were selected from the Plan Implementation Matrix which, incorporated public input and detailed all known project ideas including strategy, relevant actors and expected outcome of implementing a project.

The plan has established different funding programs which incorporate the capital responsibilities of the County Government of Nyeri. The programs are sector based highlighting funding allocations for each program based on stakeholder input, and technical staff recommendations. Program sizes were initially established to ensure that they were enough to cover projects already underway. A two-phase process was then used in allocation of the remaining funds. The first phase allocates restricted-use funds to projects within the first five years (2019-2024) and those that are legally or in some way mandated. Allocations were then continued in the following five years (2024-2029) based on the strategic priorities.

Particular investments were considered for funding after the programs were defined, phased and assigned a funding level based on the priority of the program, the types of funding available for it, and the ability of the program to achieve the Nyeri CSP strategic goals. In addition, this CIP is informed by and will inform other planning efforts within Nyeri County, including the Integrated Strategic Urban Development Plans (ISUDPs), the County Integrated Development Plan (CIDP) and Resource Area Management Plans

Finally, there will be a public review process of the Nyeri CSP after two years, during which this CIP will incorporate input from elected leaders, county technical officials, business groups and other key stakeholders about other priority projects that best facilitate the sustainable development of Nyeri County and require funding for planning, construction or both. This plan is a living document that will be regularly reviewed, with adjustments made as required. Annual updates will reflect the most current funding levels and status of the projects.

The CIP becomes a rolling plan, linked to the annual budgetary process.

1. The previous year's budget is removed from the CIP period; and
2. Current year capital budget expenditures are approved as part of the total budget.

17.6.4. Impacts of the CIP

The Capital Investment Plan has direct and multifaceted impact on local life;

- Quality of life-The quality of life in Nyeri County and its attractiveness to people and business depend on the quality of public infrastructure and related services, which are an outcome of local Capital Investment Planning. Given that public funding for capital projects usually is limited, making the right choices among competing investments becomes an important factor in the County's long-term vitality and competitiveness.

- Long-lasting spatial effects- Capital investments projects impact local life after the projects have been implemented. Locating public capital investment wisely and according to sectorial demand can serve as a catalyst to attract private sector capital investment -on top of public investment- in a location and thus create renewal or growth. Errors in allocating public projects can dramatically reduce the County's utility and waste the limited public resources. Erroneous choices also have negative socioeconomic implication.

- Fiscal legacy- Capital investment by the County Government often requires some form of long-term borrowing. Moreover, even if new properties and infrastructure are acquired or built without borrowing, making wise choices is important because funding spent unwisely could be used better elsewhere. In addition, capital investment usually leads to ongoing annual operation and maintenance expenses.

17.6.5 Challenges of the CIP

There are several substantial challenges in dealing with CIP in Nyeri County.

- Demands and desires for capital investments are always higher than available funding hence the leaders will prioritize their projects that best facilitate the sustainable development of the County.
- There is an intrinsic timing challenge. On one hand, allocating funding for capital projects should be done annually within the County's budgeting cycle. On the other hand, complex infrastructure projects may require several years of preparation and 'packaging' before external financing (grants or loans) can be sought.
- Contemporary approaches to evaluate options for complex infrastructure usually exceed the County Government's technical capabilities.
- Capital Investment Planning is an evolving area of public management thus all devolved governments across the world are continuously trying new approaches.

17.6.6 Principles in Preparation CIP

In preparation of the Nyeri County Capital Investment Plan the following assumptions were put into consideration;

- County Government will take care of assets if they are only provided to County Government services to constituents or perform mandatory obligations of the County Government.
- Since financial resources available to the County Government for capital projects are limited, a process will be established to evaluate the competing needs of various Government services to maximize the use of the financial resources in the areas of high priority.
- Local financial policy will be formulated and enacted to define in which assets to invest, capital investment priorities and financial sources.
- The approach will be multiyear.
- Capital Investments will be considered within the frameworks of life cycle costing and assessment of alternatives.
- The process and results should be inclusive and transparent involving all departments, senior and junior staff, Local community and the public.

These principles will ensure that the County Government does not spend its limited resources on 'frivolous' investment in projects, all needs are compared objectively, prudent long-term fiscal policy is exercised, innovative solutions at the project level are considered and individuals have effective channels through which to express their preferences.

This framework balances the conflicting interests and preferences of different stakeholders (Residents, Businesses, Utility companies etc.) are perhaps its strongest feature. Such balancing makes this CIP itself reasonably resilient after changes of ruling party or ideology. Nevertheless, the above principles need to be made compatible and with the complicated realities in which the County Government operates.

17.6.7 Funding Strategy for CIP

The list of projects prioritized in this CIP is nothing more than an expression of the County needs and preferences. In order to achieve the objectives of the Nyeri County Spatial Plan as well as the national objective of accelerating economic growth and poverty reduction, a proper funding strategy of this CIP is critical. Since financial resources available for capital investment define what can be implemented, the approval of this CSP containing the CIP has an impact on the county budgeting process.

In addition, the Government needs to plan for and incorporate the after-acquisition life cycle costs of new or renovated assets in budget forecasts during the plan implementation period. Nyeri County has an established budgeting process that requires approval of the Nyeri County Spatial Plan incorporating this CIP to be eligible for county development funding from the exchequer and to allow for capital investment spending as part of the county's budgetary cycle.

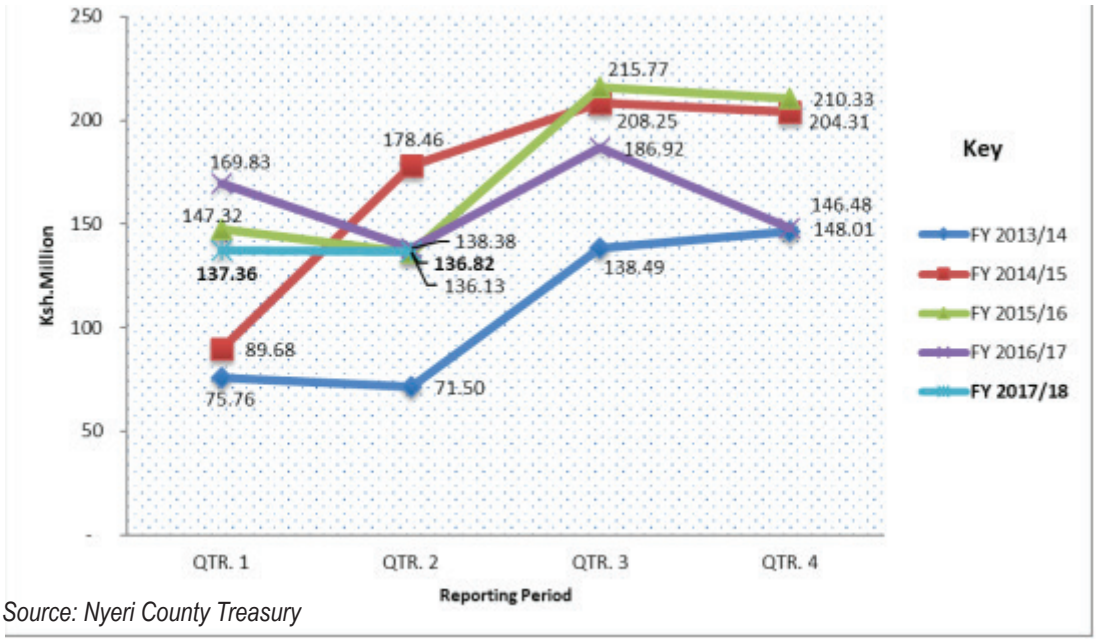
Funds mobilization is key to the implementation of the identified County priorities. To ensure that the funding of the projects have been effectively been done, the first fiscal year of the Capital Investment Plan, 2019/20 has been set aside to carry out a massive funds' mobilization for the projects. This will ensure that projects will only commence once funds have been guaranteed.

Some capital investment needs in this CIP will be addressed using non-financial or nontraditional solutions. On the demand side, the CIP considers reduced cost for new infrastructure through urban planning that promotes compact human settlement areas. On the financing, building, and operating side, engagement of the private sector in the process through various forms of public-private partnerships is encouraged. Land-based financing which entails the mobilization of the economic value of the Government-owned land and Government's power to impose fees and charges, in particular on developers, or to sell "development rights" to generate additional revenues to fund infrastructure is also promoted in this CIP to enhance Nyeri county's financial capacity.

17.6.8 Funding the Projects

The 2019/20 Capital Budget will represent the funding for the first year of the CIP. Projects in the first year of the plan generally represent the County's most immediate investment priorities. Projects that are included in the plan are stated as priorities but are not guaranteed for funding as the plan reflects the stated needs within the County. In this regard, the CIP is intended to be a fluid document that will be subject to change each year as priorities are re-assessed and as additional information on funding streams become more defines. The mobilization of these funds is critical if the County Government of Nyeri will have to contribute to the overall goals of accelerating economic growth and poverty reduction in Nyeri.

Figure 72: Nyeri County, Trend in Local Revenue Collection from first quarter of FY 2013/14-FY 2017/18



Source: Nyeri County Treasury

17.6.9 Sectoral Development Projects

a) Environmental Conservation Strategy

PROJECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
EC001	Preparation of forest management plans for all gazetted County forests. (Tumutumu Forest, Nyana Forest, Nyeri Forest & Karima Hill)	4	No	80	20											25,000,000
EC002	Planting of indigenous trees at forest degradation hotspots.	600,000		70	30											12,500,000
EC003	Erecting of a perimeter fence around gazetted forests for access restriction; Tumutumu Forest, Nyana Hill Forest, Nyeri Hill forest, Karima Hill etc.	4	M	80	20											75,000,000
EC004	Construction of dam along River Ewaso Ngiro; Maguta Ward.	1	No	60	40											30,000,000,000
EC005	Construction of Dam along River Sagana in Konyu ward	1	No	70	30											30,000,000,000
EC006	Commissioning of a detailed feasibility study along the following major rivers: Sagana, Amboni. Ewaso Ngiro, Chania for construction of dams.	4	No	70	30											120,000,000

PROJ-ECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
EC007	Construction of small multipurpose flood control dams especially along major rivers; Sagana, Chania, Gura, Tana, Amboni	5	No	80	20											85000000000
EC008	Rehabilitation of existing dams; Kamoino dam in Karima ward, Kiuru Dam in Ruringu ward Karangia and Wandumbi Dams in Wamagana ward	4	No	50	50											3,000,000,000
EC009	Construction of hydropower stations along river Sagana, Gura, Chania	3		80	20											725,000,000

Procurement and Selection of Consultants; funds

Project Implementation

Project Evaluation and Monitoring

b) Economic Development Strategy

PROJECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
EDS001	Establishment of a soil testing center in every sub-county headquarter	8	No	80	20											290,000,000
EDS002	Up scaling, upgrading and revival of existing irrigation and water projects like Upper and Lower Maguto irrigation scheme in Karatina Town Ward for horticulture, Sagana irrigation scheme in Mukurwe-ini Central Ward and Hohwe Dam in Kirimukuyu Ward	3	No	80	20											150,000,000
EDS003	Revival of; Kahuoine water project in Mahiga ward Kaharo & Gathero irrigation schemes in Gikondi ward, Gathathini, Lusoi, Thung'ari, Karichen, Gatuamba dams in Theigu River ward,Ndathi-Mbiriri irrigation project in Kabaru ward	9	No	80	20											450,000,000
EDS004	Development of irrigation projects in Konyu ward along River Tana, Iria-ini Ward along river Thuti, river Gikira, river Mumwe, or river Gura. Mugunda ward along river Ewaso Nyiro, or river Karimino Magutu ward	10	N0	70	30											450,000,000

	along river Ragati Iriani ward along river Kururu Kabaru ward along Nairobi river Narumoru ward along Narumoru river Endarasha ward along Amboni river															
EDS005	Set up an agricultural research centre at Wambugu farm	1	No	100												25,000,000
EDS006	Reviving stalled onion industry in Chaka/Kiganjo	1	No	100												5,000,000
EDS007	Hay storage facility at Narumoru	1	No	100												2,086,240
EDS008	Establishment of an animal laboratory in Narumoru, Mweiga, Nyeri and Karatina	4	No	80	20											200,000,000
EDS009	Construction of vet units in Munyu, Lusoi, Bagdad, Manyata and Aguthi with with AI services, vaccination points, and holding grounds	5	No	80	20											700,000,000
EDS010	Revive stalled bee keeping projects at Karima ward	1	No	100												10,000,000
EDS011	Revive stalled rabbit keeping project for the youth in Karima ward	1	No	100												15,000,000
EDS012	Creation of proper designated markets in Konyu ward Gatarakwa ward Ruguru ward Narumoru ward Ruring'u ward Aguthi – Gaaki ward Kiganjo ward A wholesale market in Karatina	8	No	80	20											40,000,000

EDS013	Construction of a milk processing plant (for cow milk) in Gatitu, Wamagana, Konyu and Gikumbo	4	No	80	20											750,000,000
EDS014	Construction of a milk processing plant (for goat milk) in Gatarakwa and Chaka	2	No	80	20											250,000,000
EDS015	Construction of an animal feed industry in Narumoru	1	No	100												160,000,000
EDS016	Construction of tanneries in Kiawara, Othaya and Kangaita Expand the tannery at Dedan Kimathi University	3	No	80	20											150,000,000
EDS017	Construction of a modern slaughterhouse at Karundas	1	No	100												10,000,000
EDS018	Establishing auction yards at Kiawara and Kirichu	2	No	100												20,000,000
EDS019	Establish a poultry auction yard at Mugunda, Gatarakwa and Chinga	3	No	80	20											35,000,000
EDS020	Construction of a fish hatchery in Iria-ini	1	No	100												5,000,000
EDS021	Construct avocado collection centres in Kamoini, Giakaibei, Gititu, Wamagana, Thangathi	5	No	80	20											10,000,000
EDS022	Construct of an avocado processing plant in Mukurweini	1	No	100												70,000,000
EDS023	Construction of macadamia processing plant in Karatina	1	No	100												70,000,000
EDS024	Construction of a potato collection centre in Gatarakwa	1	No	100												10,000,000

EDS025	Construction of a potato processing plant in Mwiyogo and Narumoru	2	N0	100												60,000,000
EDS026	Construction of a tea processing factory in Ngooru	1	No	100												450,000,000
EDS027	Construction of a banana processing plant in Tambaya and Kiawaithanji	2	No	100												50,000,000
EDS028	Construction of a wheat milling industry in Kiawara	1	No	80	20											250,000,000
EDS029	Construc-tion of an arrowroots and sweet potatoes processing industry in Ichamara	1	No	80	20											20,000,000
EDS030	Construction of a carrot packaging industry in Karatina	1	No	100												15,000,000
EDS031	Construction of a horticul-ture industry in Kimahuri to process cowpeas and French beans	1	No	80	20											320,000,000
EDS032	Construction of an onion industry in Nairutia	1	No	100												50,000,000
EDS033	Upgrading the Ihururu milk cooling plant to a process-ing plant	1	No	80	20											75,000,000
EDS034	Upgrade and expand the Othaya Coffee Millers factory to roast, value addition and branding local Nyeri coffee	1	No	100												250,000,000
EDS035	Reviving the collapsed onion industry in Chaka/ Kiganjo	1	No	100												13,000,000
EDS036	Reviving the cabbage industry in Karatina	1	No	100												20,000,000

EDS037	Reviving the fish processing plant in Wamagana	2	N0	100												25,000,000
EDS038	Construction of a potato storage facilities in Ndathi	1	No	100												10,000,000
EDS039	Construction of a banana processing plant in Tambaya and Kiawaithanji	2	No	80	20											150,000,000
EDS040	Revive the NCPB silos in Kiganjo	1	No	100												200,000,000
EDS041	Expansion of the existing KIE sites in the county	1	No	100												15,000,000
EDS042	Construction of a juakali zone in Chaka and Othaya Promote ceramic making from clay in Mukurweini	2	No	80	20											450,000,000
EDS043	Creation of information centres at Nyeri entry point towns (Narumoru, Mweiga, Karatina, Othaya)	4	No	80	20											600,000,000
EDS044	Promote Karatina and Chaka markets as tourist attractions	2	No	80	20											50,000,000
EDS045	Establish Nyeri and Karatina, Mweiga, and Narumoru as MICE destination (Meetings, Incentives, Conferencing and Exhibitions)	2	No	80	20											35,000,000

Procurement and Selection of Consultants; funds

Project Implementation

Project Evaluation and Monitoring

c) Integrated Transport Strategy

PROJECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
ITS001	Upgrading and tarmacking of strategic roads; (Inter-county roads) Nyeri-Ihururu-Kinunga-Kiandogoro-Tosha-Naivasha (39km)	39	KM	60	40											1,365.000,000
ITS002	Endarasha-Mwiyogo-Naromoru via Solio ranch. 14km in Nyeri County	14	KM	80	20											490,000,000
ITS003	Ichamara-Kimondo-Thangathi-Kiuu-Kiriyaga (joining A2) (17km)	17	KM	70	30											595,000,000
ITS004	Mukuruweini-Mihuti-Karundu-Gakurue-Kariru-Kimathi-Sagana. (20km)	20	KM	60	40											700,000,000
ITS005	Intra-County roads Nyeri-Nyaribo-Chaka-Kiganjo (Modal Interchange) (14km)	14	KM	70	30											490,000,000
ITS006	Kimunyuru-Embaringo-Gakanga-Watuka-Charity-Endarasha (35km)	35	KM	60	40											1,225,000,000
ITS007	Mweiga-Amboni-Endarasha (16km)	16	KM	70	30											560,000,000
ITS008	Amboni-Nyarugumu-Ihururu-Ihwa-Kinunga-Kagogi-Muthua-ini-Kagwathi (28km)	28	KM	40	60											980,000,000
ITS009	Irigathathi-Manyata-Gathioro – Nanyuki town (17km)	17	KM	70	30											595,000,000
ITS010	Karundas-Kairi-Manstone-Mere-Judea-Bagdad-Kurkulet-Munyu (29km)	29	KM	70	30											1,015,000,000
ITS011	Feeder Roads Kurkulet-Munyu-Kairi-Ndathi (25km)	25	KM	40	60											875,000,000

ITS012	Nairutia-New City-Karai (13km)	13	KM	30	70											455,000,000
ITS013	Gathaithi–Karandi-Ndumanu-Kagochi-Kabiruini-Kiamariga-Kirichu (31km)	31	KM	60	40											1,085,000,000
ITS014	Naromoru–Gurucu- Soweto-Kariokor road (10km)	10	KM	80	20											350,000,000
ITS015	Naromoru – Guruai – Irigathi – Manyatta (9km)	9	KM	80	20											315,000,000
ITS016	Gataithi- Karandi- Hundu-Ndumanu- Kagochi road (10km)	10	KM	80	20											350,000,000
ITS017	Kagochi-Gitunduti-Kabiruini-Kiamariga-Hiriga-Kirichu (21km)	21	KM	60	40											735,000,000
ITS018	Kiricheni-Lusoi-Munyu-Karkulet-Bagadad to join Judea (20km)	20	KM	80	20											700,000,000
ITS019	Mathari-Ihwa-Kinuga-Kagogi-Muthua-ini-Giteero-Kiamwathi (18km)	18	KM	70	30											630,000,000
ITS020	Gathenge-Kagumo-Kanunga-Kaheti-Mukurwe-ini (17km)	17	KM	70	30											595,000,000
ITS021	Mweiga-Amboni-Endarasha-Charity-Watuka-Gakanga-Embaringo-Kiamunguru (34km)	34	KM	40	60											1,190,000,000
ITS022	Ndingamano-Karangia-Gachatha-Kangaita (14km	14	KM	80	20											490,000,000
ITS023	Karindi-Mukurwe-ini, Gikondi-Muthuthini-Karaba-Mutoga-Thaara (26km)	26	KM	60	40											910,000,000
ITS024	**Tourism roads** Nanyuki-Gathioro-Manyatta-Judea-Kamunyu-Ndathi (45km)	45	KM	40	60											1,575,000,000

ITS025	Naromuro-Mwiyogo-Kihuhiro-Wandere park gate. (22km within Nyeri County)	22	KM	100												245,000,000
ITS026	**Agricultural Roads** Mweiga-Mwire-ri-Chaka-Karun-das-Iruri-Ju-dea-Manyata—Iri-githati-Guruai-Nar-oMoru-Nanyuki (30km)	30	KM	40	60											1,050,000,000
ITS027	Mum-buni-Kariko-Kabe-bero-Gitugu-Hu-voini-Tosha-Kiru-rumi (15km)	15	KM	70	30											525,000,000
ITS028	Karatina-Kar-indundu-Kia-mambara-Mun-getho-Chieni-Ga-kuyu-Thagathi (19km)	19	KM	70	30											665,000,000
ITS029	Nairutia-Mu-gunda-Kimu-ri-Gatarakwa-Ki-awara-Muringa (6km)	6	KM	100												210,000,000
ITS030	Endarasha-Chari-ty-Watuka-Gakan-ga-Embaringo-Ki-monyoru (18km)	18	KM	70	30											630,000,000
ITS031	Development of new bridges: All the roads along Rivers Gura river Chania, Sagana etc Bridge to be constructed (Kwa John bridge) Wathairo bridge Ngura Road Bridge Karuraini (Githima bridge) Muhoya bridge Bridges across Karege, Gituchu, (Kiahuria, Karege, Githegethe sec-ondary schools Hombe Bridge and Gathira Bridge Bridge/culvert near Gakawa dispensary	17	No	80	20											850,000,000
ITS032	Construction of walkways and bicycle lanes in Mweiga, Nyeri,Chaka,Kara-tina, Mukurwe-ini, Othaya, and Endarasha	7	No	80	20											39,500,000

ITS033	Construction of modern parking lots in all urban centres	10	No	70	30											350,000,000
ITS034	Construction of modern bus park in Mukurweini, Othaya,Karatina, Mugunda, Magutu and Naromoru	6	No	70	30											3,600,000,000
ITS035	Preparation of a feasibility study and detailed physical development plan for the towns	12	No	100												360,000,000
ITS036	Improvement of air transport infrastructure Nyaribo Airstrip Construction of standard terminal building with improved security screening, lounges and shops for effective service delivery. Expansion of runway and parking bays.(3.4 km)	3.4	No	70	30											134,000,000
ITS037	Mt. Kenya Airstrip To have regular maintenance. To be fitted with emergency response equipment.	1	No	80	20											82,000,000
ITS038	Mweiga Airstrip Tarmacking of the runway.(1.4 km) Construction of standard terminal building with improved security screening, lounges etc for effective service delivery.	1.4	KM	70	30											64,000,000

Procurement and Selection of Consultants; funds

Project Implementation

Project Evaluation and Monitoring

d) Human Settlement Strategy

PROJECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
HS001	Preparation and updating of physical development plans to provide zoning regulations in major towns in county (Municipality and Town).	12	No	60	40											648,000,000
HS002	Preparation and implementation of physical and land use development plans for corridors in the county.	3	No	70	30											102,000,000
HS003	Installation of CBD-wide street lighting systems for all major centres.	36	No	60	40											1,530,000,000
HS004	Rehabilitation of markets and bus-parks within all major centres.	36	No	100												180,000,000
HS005	Zoning and conservation of ecologically fragile areas to prevent encroachment	1	No	100												50,000,000

Procurement and Selection of Consultants; funds

Project Implementation

Project Evaluation and Monitoring

e) Infrastructure Development Strategy

PROJECT ID	PROJECT	QTY	UNIT	PHASE		PHASE 1					PHASE 2					APPROXIMATE COST (in Kes)
				1 (%)	2 (%)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	
IDS001	Connect all resource centers to 4G+/5G Fiber Optic Cable Mahiga resource center Mumwe community center Kiamariga community hall Kirerema Youth Center Children and Youth Empowerment Center Endarasha Community Resource Center Machako Rescue and Pastoral Care Centre Githi Heritage and Community Center Chaka Resource Center Kiboya Resource Center Narumoro Resource Center Nairutia Resource Center Kiawara Resource Center Mweiga Town Hall	18	No	70	30											1,980,000,000
IDS002	Connecting all Nyeri county government offices across all wards with internet.	30	No	80	20											6,000,000
IDS003	Upgrading of Gichira health centre in Aguthi Gaaki Ward to a Sub-County Hospital	1	No	80	20											270,000,000
IDS004	Upgrading of Endarasha health center to a Level 5 in Endarasha Mwiyogo Ward	1	No	80	20											389,000,000
IDS005	Upgrading of Narumoro health centre to a Level 4 in Naru-Moru Kiamathanga Ward and Wamagana health centre in Wamagana Ward	2	No	70	30											540,000,000

IDS006	Proposed Maternity wing in Ichamara dispensary in Mukurweini-central and Ruriguti dispensary in Iria-ini Ward	2	No	100												50,000,000
IDS007	Construction, and equipping the facility (Dedan Kimathi university cancer hospital in Kiganjo Ward)	1	No	80	20											389,000,000
IDS008	Completion and Equipping of Gatuamba dispensary in Mukurweini-central	1	No	100												5,000,000
IDS009	Upgrading of Mureru dispensary, Ndathi dispensary, Kamburaini dispensary, Gatitu dispensary, Kagicha dispensary and Gitimaini dispensary to a health centre.	6	No	80	20											54,000,000
IDS010	Construction and operationalization of a Mini-Hydroelectric Turbines (across rivers Chinga, Gura, Magura, Chania)	4	MW	70	30											259,584,000
IDS011	Proposed Endarasha Sub-Station and transmission lines	1	KM	80	20											250,000,000
IDS012	Rehabilitation, upgrading works of existing water reservoirs (Kamburaini Dam, Kabunda Water Project Earth Dam, Kabendera Water Dam, Githura Dam, Chinga Dam, Hohwe Dam, Kiria Dam)	7	No	80	20											105,000,000
IDS013	Rehabilitation, and Upgrading of local community water schemes (NYEWASCO Water Treatment Ponds in Gatitu, Stalled Water Projects in Endarasha Mwiyogo, TEAWASCO in Wamagana, All Community Water Projects in Mweiga)	13	No	70	30											195,000,000
IDS014	Construction and operationalization of sewer trunk lines and Sewerage Treatment Plants (Endarasha - Mweiga Sanitation improvement project, Nairutia - Kiawara Sanitation Improvement Project, Kiganjo- Chaka Sanitation Improvement Project,	9	No	80	20											3,870,000,000

	Dedan Kimathi sanitation Improvement Project, Othaya-Wamagana sanitation Improvement Project, Naru-moro town Sanitation Improvement project, Mukurweini-Sanitation Improvement project, nyeri-municipality sanitation improvement project Proposed Nyeri County Solid Waste Management Plant.															
IDS015	Construction and equipping of libraries (Kiawara Library in Mugunda, Endarasha Library in Endarasha, Chaka Library in Thegu River, Mukurweini Library in Mukurweini-Central, Ngorano Library in Ruguru and Wamagana Library in Wamagana	6	No	80	20											85,000,000
IDS016	Construction and equipping of fire brigades ; Ngorano Fire station in Ruguru, Mukurweini fire station in Mukurweini-Central, Othaya fire station in Iriani, NaroMoru fire station in Wamagana, Wamagana fire station in NaroMoru Kiamathanga, Endarasha fire station in Endarasha/Mwiyogo, Mweiga fire station in Mweiga, Chaka fire station in Thegu River, Nyeri fire station in Rware, Karatina fire station in Karatina Town, Nairutia Fires Station in Mugunda	11	No	70	30											166,508,322
IDS017	Construction and Equipping social halls and resource centers. Mahiga resource center in Mahiga, Mumwe community center in Mahiga, Kiamariga community hall in Ruguru, Kirerema Youth Center in Mukurweini-Central, Children and Youth Empowerment Center in Gatitu, Endarasha Community Resource Center in Endarasha Mwiyogo, Machako Rescue and Pastoral Care Centre in Wamagana,	14	No	70	30											225,000,000

	Githi Heritage and Community Center in Mukurweini-Central, Chaka Resource Center in Thegu River, Kiboya Resource Center in Gakawa, Narumoro Resource Center in Naromoru Kiamathaga, Nairutia Resource Center in MugunNaromoruda, Kiawara Resource Center in Mugunda, Mweiga Town Hall in Mweiga															

Procurement and Selection of Consultants; funds

Project Implementation

Project Evaluation and Monitoring

17.6.9 Summary of Capital Investment

No:	Sector:	Total Approximate Cost Phase 1 (Ksh)	Total Approximate Cost Phase 2 (Ksh)
1	Environmental Conservation Strategy	109,252,750,000	39,704750,000
2	Economic Development Strategy	5,869,086,240	1,116,000,000
3	Integrated Transport Strategy	17,617,300,000	10,227,200,000
4	Human Settlement Strategy	1,608,200,000	901,800,000
5	Infrastructure Development Strategy	6,782,664,625	2,093,427,696

Summary of Capital Investment Costs per Phases

No:	Phases:	Amount (Ksh)
1	Phase One (2019/2020-2023/2024)	141,130,000,900
2	Phase Two (2024/2025-2028/2029)	54,043,177,700

17.7 Monitoring and Evaluation Log Frame

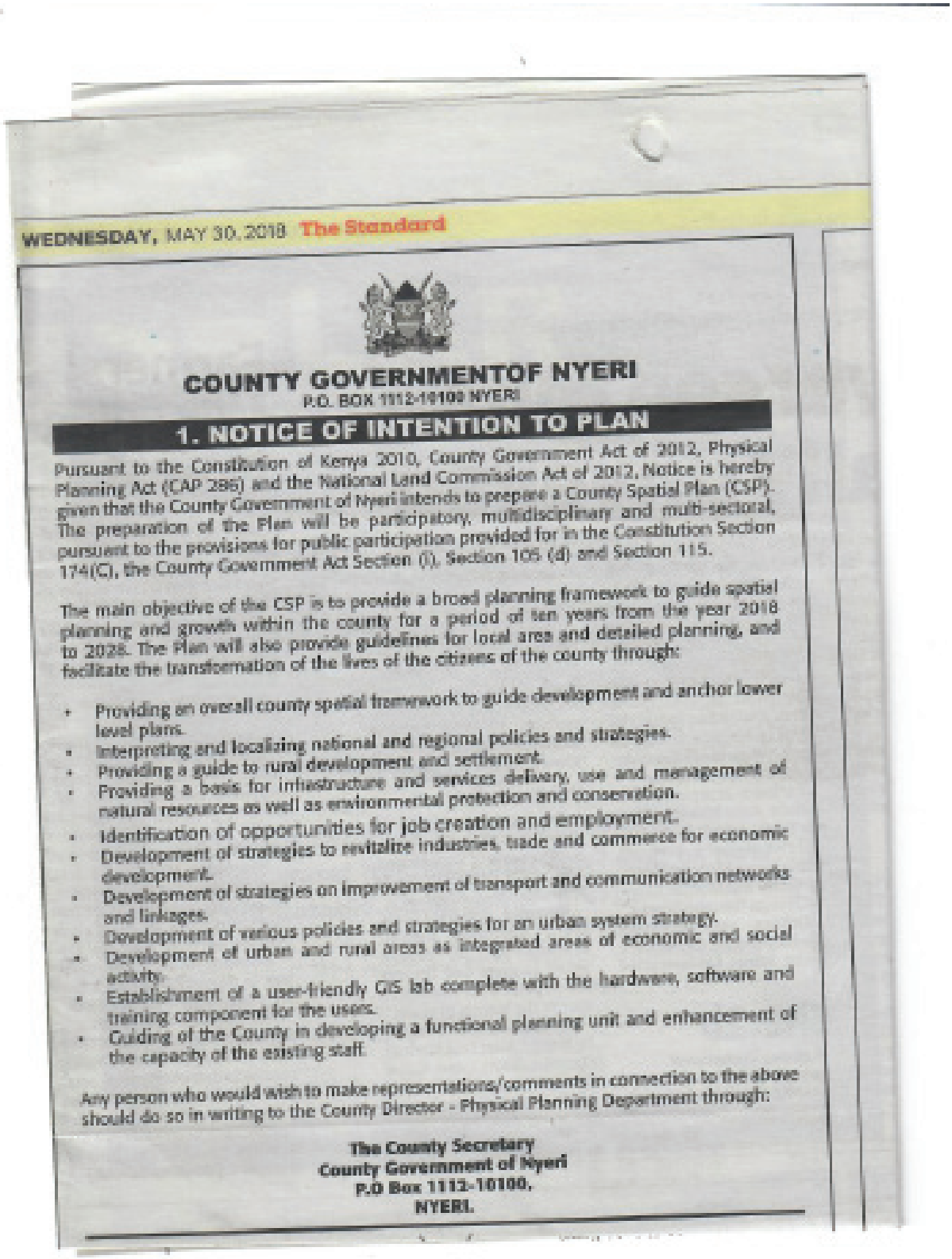
Monitoring and evaluation of the progress made in implementation of this plan will be the task of the coordination unit.

Impact	Expected Outcome	Indicators
Spatial Impacts	Controlled Urban Development	Growth occurring within the delineated urban edges and not beyond. Hence control of urban sprawl
	High land values across the County	Areas of highly controlled development.
	Highly controlled land use structure for the County.	Reduced degradation and depletion of natural resources.
Economic Impacts	Increased production capacity of the County	Increased Food Security in the County.
		Increased intra and interCounty trading opportunities.
	Increased County Revenue base	Improved basic service delivery for the residents by the County Government of Nyeri
		Increased County revenue collection.
	Increased investment opportunities in Nyeri County	Increased number of investors in the County
		Enhanced trading capacity of the County.
		Increased employment opportunities in the County.
		Diversified economic activities in Nyeri County.
	Enhanced infrastructural capacity of Nyeri County	Improved, efficient transport options & reduced travel time.
	More vibrant and formal economic spaces	Increased entrepreneurship & revenue circulation in the County.
Social impacts.	Improved health service delivery.	Reduced disease prevalence and mortality rates.
	Preservation of heritage value and culture.	Reduced dilution of cultural heritage & Increased heritage tourism in the County.
	Improved quality of education delivery	Increased literacy levels in the County.
	Improved access to water and sewer services	Increase in the number of household connections to potable water and sewer services.

	Improved access to affordable energy options	
Environmental impacts	Conservation and management of all indigenous forest areas in the County	Increased forest cover in the County
		Community participation in conservation efforts.
		No loss of natural forest.
	Conserved and protected water catchment areas	All rivers, springs and wetlands ecosystems to be gazetted and secured.
		Increased civic awareness on environmental issues.
		Increased and sustained water supply in the County.
	Improved wildlife conservation	Increase in the number of tourists visiting the County

ANNEXES

Annex One: Notice of Intention to Plan



WEDNESDAY, MAY 30, 2018 The Standard

COUNTY GOVERNMENTOF NYERI
P.O. BOX 1112-10100 NYERI

1. NOTICE OF INTENTION TO PLAN

Pursuant to the Constitution of Kenya 2010, County Government Act of 2012, Physical Planning Act (CAP 286) and the National Land Commission Act of 2012, Notice is hereby given that the County Government of Nyeri intends to prepare a County Spatial Plan (CSP). The preparation of the Plan will be participatory, multidisciplinary and multi-sectoral, pursuant to the provisions for public participation provided for in the Constitution Section 174(C), the County Government Act Section (), Section 105 (d) and Section 115.

The main objective of the CSP is to provide a broad planning framework to guide spatial planning and growth within the county for a period of ten years from the year 2018 to 2028. The Plan will also provide guidelines for local area and detailed planning, and facilitate the transformation of the lives of the citizens of the county through:

- Providing an overall county spatial framework to guide development and anchor lower level plans.
- Interpreting and localizing national and regional policies and strategies.
- Providing a guide to rural development and settlement.
- Providing a basis for infrastructure and services delivery, use and management of natural resources as well as environmental protection and conservation.
- Identification of opportunities for job creation and employment.
- Development of strategies to revitalize industries, trade and commerce for economic development.
- Development of strategies on improvement of transport and communication networks and linkages.
- Development of various policies and strategies for an urban system strategy.
- Development of urban and rural areas as integrated areas of economic and social activity.
- Establishment of a user-friendly GIS lab complete with the hardware, software and training component for the users.
- Guiding of the County in developing a functional planning unit and enhancement of the capacity of the existing staff.

Any person who would wish to make representations/comments in connection to the above should do so in writing to the County Director - Physical Planning Department through:

The County Secretary
County Government of Nyeri
P.O Box 1112-10100,
NYERI.

Annex Two: Notice of Completion to Plan

SERIKALI YA KAUNTI YA NYERI

S.L.P 1112-10100, NYERI

SHERIA YA MPANGO WA ARDHI NA MATUMIZI YAKE
(Namba 13 ya 2019)

ILANI YA KUKAMILISHWA KWA MPANGO WA USTAWISHAJI ARDHI NA MATUMIZI YAKE

Anwani ya Mpango: **Mpango wa Ustawishaji Ardhi na Matumizi Yake wa Kaunti ya Nyeri**

ILANI inatolewa hapa kwamba matayarisho ya Mpango wa Ustawishaji Ardhi na Matumizi Yake uliotajwa hapo juu yalikamilika tarehe 23 Juni 2020. Mpango huo wa Ustawishaji Ardhi na Matumizi Yake unahusiana na ardhi inayopatikana katika Kaunti ya Nyeri. Nakala za Mpango huo kama ulivyoandaliwa zimetumwa kwa ajili ya ukaguzi wa umma katika ofisi ya Afisa Msimamizi wa Kaunti-ndogo za Kieni Mashariki, Kieni Magharibi, Mathira Mashariki, Mathira Magharibi, Nyeri ya Kati, Mukurweini, Tetu na Othaya.

Nakala hizo zinapatikana kwa ukaguzi bila malipo na yeyote anayetaka kufanya hivyo katika anwani iliyotajwa hapo juu baina ya saa tatu asubuhi na saa kumi na moja jioni, siku za kikazi.

Mtu yeyote mwenye nia kama hiyo ambaye angependa kutoa maoni ya kuunga mkono au kupinga Mpango huo wa Ustawishaji Ardhi na Matumizi Yake anaweza kutuma maoni yake hayo kwa njia ya maandishi ili yapokelewe na Waziri wa **Kaunti (CECM) anayehusika na Mpango wa Ardhi na Miundomsingi, S.L.P 1112-10100, Nyeri** katika muda usiozidi siku **sitini (60)** kuanzia tarehe ya kuchapishwa kwa ilani hii, na sharti maoni kama hayo yaeleze sababu za kutolewa kwayo.

Tarehe **05 Agosti, 2020.**

DKT. KWAI WANJARIA
WAZIRI WA KAUNTI ANAYEHUSIKA NA MIPANGO YA ARDHI NA MIUNDOMSINGI

KAUNTI YA NYERI

TWO EMS ASSOCIATES LTD

Planning, Surveying & Mapping