



Siaya County Government

Siaya County Physical and Land Use Development Plan

County Government of Siaya

2023-2033



PLAN APPROVAL

Certificate

I certify that the plan has been prepared as per section 110 of the County Government Act 2012 and the physical planning standards and guidelines.

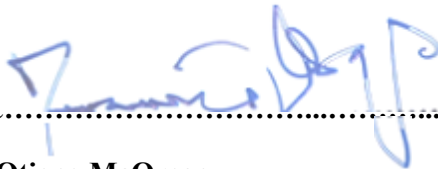


24th July, 2023

Signature..... Date.....

Plan. Maurice Ondeyo Ochieng
County Director of Physical and Land Use Planning

RECOMMENDED



24th July, 2023

Signature..... Date.....

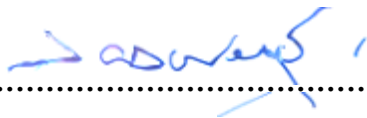
Maurice Otieno McOrege
County Executive Committee Member

APPROVAL

Hansard No. **018** Date **29th March, 2023**

Siaya County Assembly

ENDORSED



24th July, 2023

Signature..... Date.....

H.E. James Orengo
Governor


FOREWORD

The Siaya County Physical and Land Use Development Plan (SCPLUDP) has been prepared through a participatory and a multi-sectoral approach involving all the County stakeholders. The Plan addresses key elements to guide the environmental, economic and social spatial development framework. It will guide all development activities projects, programmes, budgets and investments in Siaya County while mainstreaming climate change adaptation to foster a climate resilient development. It also seeks to provide geographical expression of Siaya County about socio-economic wellbeing. All this will be achieved through integrated sectoral coordination of policies affecting the spatial organization and setting the direction for the human settlement as well as related natural resource management while taking cognizance of the seventeen Sustainable Development Goals (SDGs).

The Plan is by design a flexible, dynamic framework capable of responding to changing circumstances and guaranteeing the future development of Siaya County. It will provide a blueprint within which the County can confidently address the challenges and deliver the exciting opportunities that lie ahead. The approach adopted during the preparation of the County Physical and Land Use Development Plan was highly participatory, collaborative and consultative, which brought on board participants from diverse backgrounds, including the community, County and other National departments, agencies, professionals, and civil society, among others. This conforms with the Constitutional requirements on public participation in policy making which is a step towards providing the requisite basis for the implementation of the Plan as provided for in Article 196 of the Constitution.

The County Physical and Land Use Development Plan provides a framework for the efficient, productive and sustainable use of land as advocated for in both the Constitution and the National Land Policy. Further, it provides strategies and policies to facilitate sustainable exploitation of the huge potential the county possesses in agriculture, tourism, energy, water and forestry. It is also expected to reduce inequalities within the County that have existed before devolution by ensuring that these areas are no longer perceived as low potential but as differently endowed. It also supports the implementation of strategic county projects specifically the flagship projects spelt out under Kenya Vision 2030, Lake Region Economic Block Blueprint, the Kenya Government BIG 4 Agenda and the *Nyalore manifesto* by indicating their spatial locations and providing a framework for absorbing the spatial impacts of these projects. It aims to address the disconnect that has existed for a long time between physical and economic planning.

Challenges such as rapid and unregulated urbanization, environmental degradation of the county's diverse ecosystems, skewed/unbalanced development in favour of high potential areas, poor economic performance in the areas of agriculture, tourism and industry due to sub-optimal use of land and under utilization of the rich natural resource endowment will be addressed through the proper and coordinated implementation of this Plan. The Plan provides a framework for dealing with these challenges through the formulation of planning and development strategies, policies and measures under which projects and other priority programs will be implemented for the next 10 years.



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H.E. James Orengo
GOVERNOR

ACKNOWLEDGEMENTS

The Siaya County Physical and Land Use Development Plan was prepared with the support, contribution and efforts of many actors in the public and private sectors. We acknowledge their role and contribution towards the drafting of this plan. My Sincere appreciation goes to the residents of Siaya County, who through various stakeholder participation presented their views to shape the vision of the plan. To the partners, the business community, religious institutions, leaders of the various disciplines, staff members of the County Government of Siaya, members of the County Assembly, The Hon. Speaker, the Deputy Governor, The Governor, Hon. James Orengo, special appreciation for the invaluable input and support.

Special thanks to the *Pre-Envero* Consultants, who carried out the exercise, led by Plan. Dr. Fredrick Omondi Owino, Prof. Patrick Hayombe and Dr. Joshua Wanga. Equally, the County Directors of: Physical and Land Use Planning, Survey and Housing and Urban Development, played important roles in providing technical guidance, quality assurance and oversight of the process. Many thanks to the various National and Siaya County heads of Departments for collaborating with the Department of Lands, Physical Planning, Housing and Urban Development and for availing requisite data, maps, and statistics for the County's Physical and Land Use Development Planning exercise.

We appreciate the role played by the County Government structures (Sub County and Ward Administrators) in the coordination and mobilization of stakeholders during the exercise. We also commend the Office of the President and Internal Security, especially the Chiefs and Assistant Chiefs for maintaining order during the exercise.

We also recognize the participation of Ward Managers. Finally, we appreciate all non state actors for their valuable input throughout the planning process.



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Charles Siso

CHIEF OFFICER

EXECUTIVE SUMMARY

This County Physical and Land Use Development Plan is the first of its kind for Siaya under the new Constitution of Kenya, 2010, which created 47 County Governments, Siaya being one of them. The Plan has a vision to have '*A county that can harness socio-economic and natural capital for human development.*' This plan defines the general trend and direction of spatial development for the county, covering the entire thirty Wards in the six Sub counties, namely; Gem, Ugenya, Ugunja, Alego, Bondo and Rarieda. It is a ten (10) year term Plan spanning the period from 2023 to 2033. The preparation of the County Physical and Land Use Development Plan is a requirement under the County Government Act, 2012 which provides for all County Governments in Kenya to prepare and implement County Physical and Land Use Development Plans.

The County Physical and Land Use Development Plan has been prepared within the existing legal and policy frameworks. The County Government Act, 2012, the Urban Areas and Cities Act, 2012, Amendment 2019 and the Physical Planning Act (Cap 286) repealed by the Physical and Land Use Planning Act No 13 of 2019 guided the preparation of the Plan and gave it requisite legitimacy. Policies that espouse the broad objectives of the National Government and the County Government within given sectors provide the principles that put them into effect. These are, Sustainable Development Goals, The Kenya Vision 2030, National County Physical and Land Use Development Plan, The National Land Policy and The National Urban Development Policy.

The purpose of the County Physical and Land Use Development Plan is to provide a county spatial structure that defines how its space will be utilized to ensure optimal and sustainable use of land. This will facilitate the achievement of the land policy principles of efficiency, equity, sustainability and productivity, and promote the attainment of social, economic and environmental goals and objectives. Further, the Plan provides strategies and policies to deal with challenges including urbanization, regional imbalances/inequalities, rural under development, environmental degradation, and under utilization of the massive resources available in the country. The Siaya County Physical and Land Use Development Plan is organized into seven parts.

Part 1, Background and the Planning Context: The background covers the purpose of the plan, vision, objectives and scope of the County Physical and Land Use Development Plan. The planning context includes the location and size, administrative units, the approach used in plan preparation, constitutional, policy and legal framework as well as linkage to other plans.

Part 2, Situation Analysis: Presents the base maps, physiographic characteristics, population and demography, land, land tenure and categorization, environment and natural resources, human settlement and urbanization, transport, infrastructure and services, and economic base of Siaya County.

Part 3, Synthesis: This section presents the summary of planning issues including opportunities, challenges and potentials, and scenario building.

Part 4, Plan Proposals: This part covers policies, strategies and actions, and a spatial structure that leads to the actualization of the desired future state, spatial structure depicting the vision of the county and land use zoning, the system of green and open spaces as well as the system of human settlement.

Part 5, Spatial Development Framework and Action Plans: Land use structure and plan, future land requirement for the key sectors, land use zoning plan. This section also includes policies, strategies and actions for the proposed land use zones.

Part 6, Plan Implementation Strategy: This section highlights programmes and projects for the development of land, areas for priority spending, capital investment framework and monitoring and evaluation framework.



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Maurice Otieno McOrege

COUNTY EXECUTIVE COMMITTEE MEMBER

LIST OF ACRONYMS

CBD	Central Business District
CCO	County Chief Officer
CECM	County Executive Committee Member
CIDP	County Integrated Development Plan
CIP	Capital Investments Plan
DFRD	District Focus for Rural Development
ECD	Early Childhood Development
ERSWEC	Economic Recovery Strategy for Wealth and Employment Creation
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Geographic Positioning System
ICT	Information Communication Technology
JOUST	Jaramogi Oginga Odinga University of Science and Technology
KENHA	Kenya National Highways Authority
KFS	Kenya Forest Services
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
LREB	Lake Region Economic Block
RCMRD	Regional Centre for Mapping of Resources for Development
RDAs	Regional Development Authorities
RPDP	Regional Physical Development Plans
MDG	Millennium Development Goals
MSE	Medium Sector Enterprise
NGO	Non-Governmental Organization
NDPs	National Development Plans
NEMA	National Environment Management Authority
NIB	National Irrigation Board
NLC	National Land Commission
NSP	National County Physical and Land Use Development Plan
PLUPA	Physical and Land Use Planning Act
PPA	Physical Planning Act
RTPC	Rural Trade and Production Centres
SCPLUDP	Siaya County Physical and Land Use Development Plan
SDG	Sustainable Development Goals
WARMA	Water Resources Management Authority
SEA	Strategic Environmental Assessment
SME	Small and Medium Enterprise
TOR	Terms of Reference

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INDEX TERMINOLOGY

Action Plan: A flow of activities, describing actions, responsible authorities on actions, outcomes expected, temporal, organizational and financial implications;

Agricultural Land: Is a land designated for cultivating agricultural cultures;

Balanced Development: A principle which aims to equal the development of different regions within a territory;

Cadastral Parcel: These are areas of agricultural, forest, pasture, and graze land registered in cadastre registers;

Centralized Economy: An economy in which economic conditions by the central level of governance;

Challenges of Spatial Development: Unsolved issues which seek urgent attention;

City: Implies the settlement which is set as such by the County Government, Urban Areas and Cities Act, building on the construction scale, activities and other characteristics of an urban character;

Compact, Concentrated Development: Development which aims for rational space utilization, through densification of construction and development within a limited space;

Concepts: A way of thinking towards the achievement of a desired condition. The concept of the idea helps in searching for the solution to the problem. Concepts may be topics or appropriated phrases which may secure a more focused investigation;

Construction Conditions: Are conditions which determine the type, size, construction manner, safety conditions and any other condition on object construction;

Construction Land: Island on which objects are built per the Regulatory Plan, respectively the urban plan, or another act issued per this Law and provide for object construction;

Construction Lines: Imply the boundary point which defines the territory on which construction is allowed within the construction plot;

Constructional parcel: Is a land allowed for the construction of objects projected by a plan, comprised of one or more cadastral parcels or parts of plots;

County Physical and Land Use Development Plan: This means the plan of controlling, using and developing space such as the territory of the municipality, special zone and the territory of Siaya. This plan describes the timelines and includes actual projections of investments;

EIA, SIA, EIA, GIA: Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Economic Impact Assessment (EIA), General Impact Assessment (GIA). All these are studies which should warn of the potential impacts of a policy, strategy, plan or investment proposed;

Environmental Degradation: Negative impact on the environment, with a tendency for the destruction of its values;

Feasibility and Cost-Benefit Analysis: The first one is the social and economic reasonability of a project (investment evaluation), while the second searches for a balance between the costs and benefits, usually over a proposed investment;

GDP: Gross Domestic Product - measures the monetary value of final goods and services - that is, those that are brought by the final user - produced in a country in a given period of time;

GIS: Geographical Information System – an information system which aims to provide all data with a geographical-spatial reference. Important because it provides the location for the monitored phenomenon;

Green Areas - Belts: Areas which are under strict control of development. The purpose of green belts is to control the unlimited expansion of construction areas, halt the joining of adjacent cities, prevent encroachment into the landscape, protect the environment and the specific character of historical cities and assist urban regeneration, encouraging reclamation of poorly used land and other types of land;

Informal Settlements: Human settlements which are not allowing to the residents to enjoy their rights to an adequate standard of living, adequate housing in particular. Therefore, informal settlements can have the following features: formal possession of property, deprivation or inadequate access to basic services, inadequate or non-participation in governing; high risk;

Infrastructure Plan: This is a description of the plan of existing installation and facilities, underground and superficial, in the field of transport, electricity, gas supply, oil, water supply, waste water systems, telecommunications and other installations;

Investment Capacity Assessment: Analysis of existing investment capacities for the future, including all aspects and opportunities of investment, starting from existing natural resources, human resources, and local budgets, the private sector and international financial organizations;

Key Issues of Spatial Development: A group of issues identified as the most important in the process of drafting the County Physical and Land Use Development Plan, and relevant to future spatial developments of Siaya, which in principle are agreed upon through a consultation process;

Land Use: Implies the existing or the proposed designation of the use of the land parcel;

Linkage Analysis: Analysis through which potential links between two phenomena, strategies or projects are researched, for a geographical region, or a smaller location in review;

Location: Is the place where construction works are undertaken following a certain plan, or another act issued based on this Law;

Market Economy: Economy which is based on conditions of the free market, competition and provision of services/supply based on real demand;

Monitoring and Evaluation: A process of observing and evaluating the realization of a task;

Monocentric Development: Development which aims monopoly of administrative, social, economic and other functions in a single city –usually a capital city;

Objectives: Parts of the stated goal or a manner of realization of the goal;

Policies: A way, accepted by decision-makers, for achieving one or more goals. An appropriate orientation is followed by one or a group of actors in addressing a problem or issue of interest. An effort to define and amend a rational basis for action or non-action. A decision or a set of decisions implies the selection of one of a series of alternatives;

Polycentric Development: Development which consists in the development of more than only one strong centre in a territory, and insists on equal/complementary distribution of key functions of development;

Preparatory Works in Planning: These are research, analysis, data compilation, information and technical support for the needs of drafting urban documentation;

Principles: Usually values are proposed and continuously agreed upon to be respected in the future. In our case, the values to be respected are the ones during and after the approval of the plan, namely its implementation;

Priority: The primary objective in the process, is assessed as important and very urgent;

Protected Area: Is the spatial part which is designated to preserve natural, cultural-historical and archaeological resources, protect the environment against pollution or provision of spatial conditions for unhampered exertion of activities, and safety of inhabitants and space around it;

Public Consultations: These are thematic meetings, possibly with a targeted public, through which issues and orientations are presented, and what is more important, respective recommendations are obtained to complement the materials presented;

Regulating Lines: Imply the boundary point between the construction plot and the use right to the public road;

Scenarios: These are assumptions of potential situations in future development. The key principle in working with scenarios is the question – What If?;

Sector Reports: Are analytical documents in which the substantial parts of sector strategies are explicated, addressing spatial aspects of the respective sector. This covers sectors under the competency of the department;

Settlement: Means an area of urban or rural character, agricultural land, city and other settlements proclaimed by the County as housing area;

Spatial Analysis: An analysis which enables a recognition of the spatial distribution of issues addressed, conclusion on trends and problem regionalization among others;

Spatial Conflicts and Synergies: Policies of different levels and sectors in a location may be contradictory – representing a conflict, or may complement each other – considered a synergy;

Spatial Indicators: Indicators used for monitoring development in space;

Spatial Information System: A system of spatial data;

Special Protected Zone: It is an area defined by the map, or a specified area surrounding a monument, building, group of buildings, the whole village or the city's historic centre that is protected from any development or activity which may damage its historical context, cultural, architectural or archaeological, natural environment or under visual aesthetic;

Strategic Alternatives: These are opportunities, different options for action/solution of a problem;

Strategic Planning: Planning oriented towards solving key problems, concentrated planning of a limited number of issues and promoting pro-active processes about development;

Strategy: A sorting of actions in achieving an objective;

SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats): The Strength, Weakness, opportunity and Threat (SWOT) analysis facilitates the classification of identified issues within one of these four groups, and facilitates management in the planning process;

Targets/Goals: Parts of the vision, identifying the focus of tendencies for a medium or long term;

Territorial Cohesion: A principle by which it is aimed to have better spatial links, without considering administrative borders, but realized through an improved social, economic and environmental cooperation;

The Siaya County Physical and Land Use Development Plan: A document by which the future Spatial Development of Siaya is described;

The Spatial Development Profile: A document which describes the existing situation of spatial development in Siaya County;

The Vision: A statement on the future desired state based on the existing situation;

Urban Area: Is the land with set boundaries, within which urban construction is planned;

Urban Documentation: Is the set of documentation comprised of the Spatial (Urban) plan; urban permit; urban consent; analysis, studies and other documents drafted in preparatory works on planning and regularization of space, and which contain data on the actual and potential use of territory;

Urban Growth: Different aspects of the growth of a settlement unit – city, territorial/physical aspects, social/demographic, economic aspects;

Urban Norms: Is the norm of County Physical and Land Use Development Planning, conditions and rules abided in drafting planning documentation;

Urban-Rural Context (conflict): Clarification of the mutual relation of development in urban per rural area;

Urban-technical Norms: These are spatial or technical conditions which define the position, mutual relations of building infrastructure and safety of buildings;

Village: A settlement in which the population vastly deals with agricultural activities;

PART I- INTRODUCTION

CHAPTER 1: BACKGROUND

1.1 Purpose of the Plan

The purpose of a County Physical and Land Use Development Plan is to guide development for a period of ten years and facilitate the transformation of the lives of citizens of the county through interpreting and implementing national and regional policies, guiding the use of land, integrating sectoral policies and providing policies on which to anchor lower level plans.

1.2 Objectives

The main objective of the Siaya County Physical and Land Use Development Plan is to provide an overall Integrated County Spatial Development of the County for the period 2023-2033. The specific objectives of the Plan include:

- i) To assess the available resources, their level of utilization and potential.
- ii) To indicate infrastructure and services levels and distribution and enable the County Government to prioritize investments in infrastructure development.
- iii) To provide strategic guidance in respect of the location and nature of development within the county.
- iv) To 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.
- v) To set out a capital investment framework for the county's development programs.
- vi) To undertake a strategic assessment of the environmental impact of the spatial development framework.
- vii) To mainstream climate change adaptation in order to foster climate resilient development.
- viii) To identify programs and projects for the development of land within the county.
- ix) To provide a framework for coordinating County development programmers and strategies to avoid duplication of projects and wastage in the use of both financial and human resources.
- x) To form the basis for preparing sectoral programmes and projects.
- xi) To identify areas where strategic intervention is required.
- xii) To indicate areas where priority spending is required.
- xiii) To form the basis for seeking donor funding and public/private partnership in the development of the county.

1.3 Vision

A thriving economy with vibrant and sustainable agricultural, tourism, industrial and urbanization-led development that will empower the people of Siaya County. The vision of this plan was derived from the aspirations of residents of Siaya County and other stakeholders, based on the challenges and opportunities that exist. These aspirations are as indicated below:

- A flourishing industry-driven economy;
- Self-sufficiency in food production;
- A vibrant and sustainable tourism industry;
- A thriving economy with vibrant well-planned centers;
- A protected, conserved and clean environment;
- Positive cultural change;
- Efficient and effective infrastructure and institutions;
- Effective and direct involvement of residents in development of the area; and

- Empowered and self-sustaining institutions

1.4 Scope of the Plan

The Siaya County Physical and Land Use Development Plan (SCPLUDP) covers a detailed analysis of the sectoral and spatial structure of the County. It covers a land surface area of 2,530km² and the water surface (Lake Victoria) area is 1,005 km². The Plan is a medium-term County Physical and Land Use Development Planning framework and regional development strategy with a planning horizon of ten (10) years from 2023-2033 and shall be subject to five (5) year reviews. It discusses the current situation in Siaya County highlighting the sectoral and thematic constraints in the County that inhibit the economic vibrancy, environmental sustainability and community development. It also appraises significant County Physical and Land Use Development Planning and development challenges in the County and proposes robust strategies with pragmatic sectoral programmes and investments to solve the identified constraints.

The Plan offers the Spatial Development Strategy for Siaya County that depicts all existing physical features, spatially illustrates all national and regional development projects in the county and guides physical development activities in Siaya County. It aims to address pertinent issues such as human settlement patterns, urban and rural development, utilization of natural resources, transport and infrastructural development and attracting suitable investment in Siaya County. The Plan aims to comply with the strategies, policies and objectives of the National Spatial Plan (NSP), and complement the programmes identified in the Siaya County Integrated Development Plan 2023-2027. It shall also seek to mainstream contemporary issues of climate change adaptation, disaster risk reduction, utilization of green renewable energy and gender parity. The plan purposes to facilitate its full implementation and therefore includes a comprehensive plan implementation strategy detailing realistic programmes, their respective estimated costs and time frames and appropriately matched with institutional responsibility with an applicable Monitoring and Evaluation (M&E) framework for implementing the proposed programmes and investments.

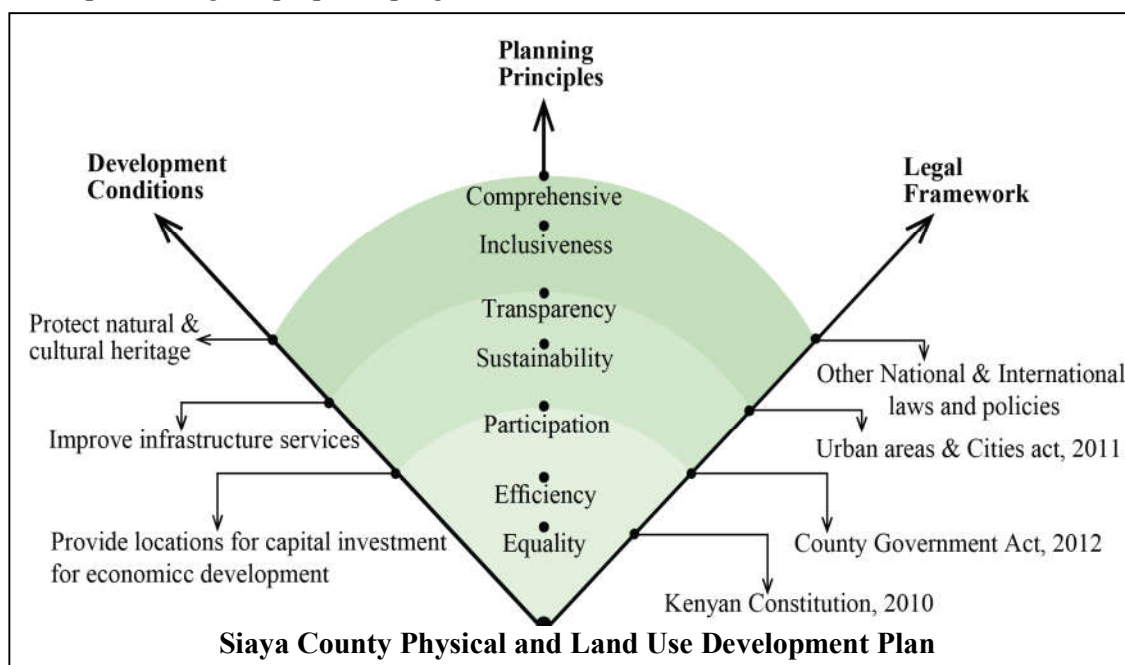


Figure 2. 1: Conceptual Framework Plan Development

1.5 Organization of the Plan

This document is divided into seven parts:

- Part 1: Introduction- stating the background and the scope of the plan;
- Part 2: Situation- analysis of the thematic areas;
- Part 3: Synthesis- of emerging issues and scenario building;
- Part 4: Plan proposals;
- Part 5: Spatial Development Framework and Action Plans;
- Part 6: Implementation Framework; and appendices

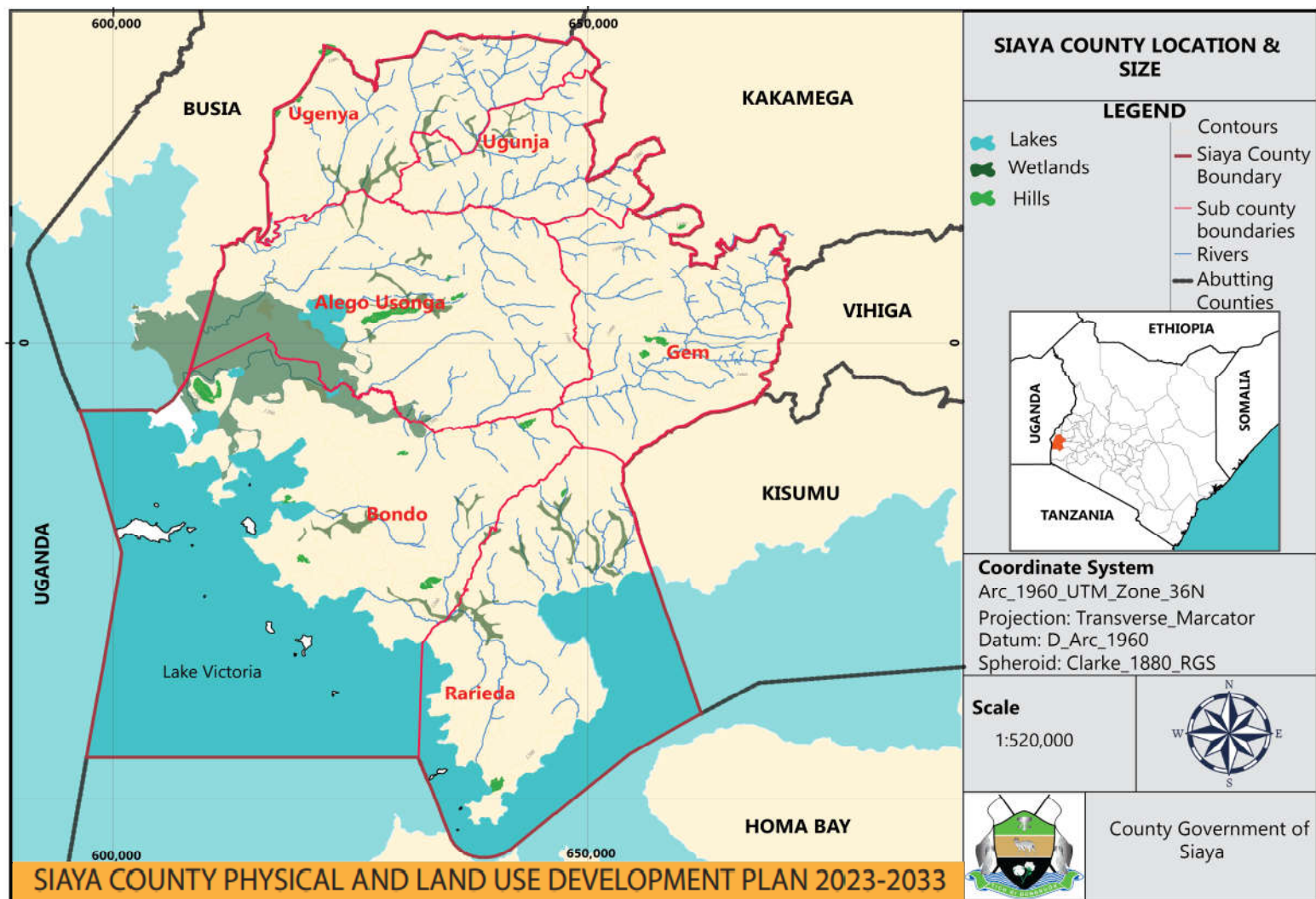
CHAPTER 2: PLANNING CONTEXT

2.1 Location and Size

Siaya County is one of the 47 counties in Kenya located in East Africa. It is one of the six counties in the Nyanza region of western Kenya forming the Lake Basin Economic block. The land surface area of Siaya County is 2,530 km² and the water surface (Lake Victoria) area is 1,005 km². It is bordered by Busia County to the North West, Vihiga and Kakamega Counties to the North East, Kisumu County to the South East and Homa Bay County across the Winam Gulf to the South (Figure 1.3). The water surface area forms part of Lake Victoria (the third largest freshwater lake in the world). It approximately lies between latitude 0° 26' South to 0° 18' North and longitude 33° 58' and 34° 33' East. Mother nature has been kind to Siaya County, giving it a potential advantage in terms of economy, culture, climate, and tourism, the World's second largest freshwater Lake Victoria gives the County a competitive advantage in tourism, irrigation and supply of fresh water to its residents.

2.2 Administrative Units

The County landscape comprises a land surface area of about 2,530km² and a water surface area of 1,005 km² and is sparsely dotted with highlands, wetlands and agricultural lands. Administratively, the county is divided into six Sub-Counties and 30 Wards, both of which are devolved planning units for resource allocation and service delivery (Map 2.1). The County is divided into six administrative sub-counties namely; Gem, Ugunja, Ugenya, Alego-Usonga, Bondo and Rarieda. Alego-Usonga sub-County is the largest, covering an area of 605.8 km² and has the most locations (Table 1.2 and 1.3). The sub counties are further divided into wards with the county having a total of 30 wards.

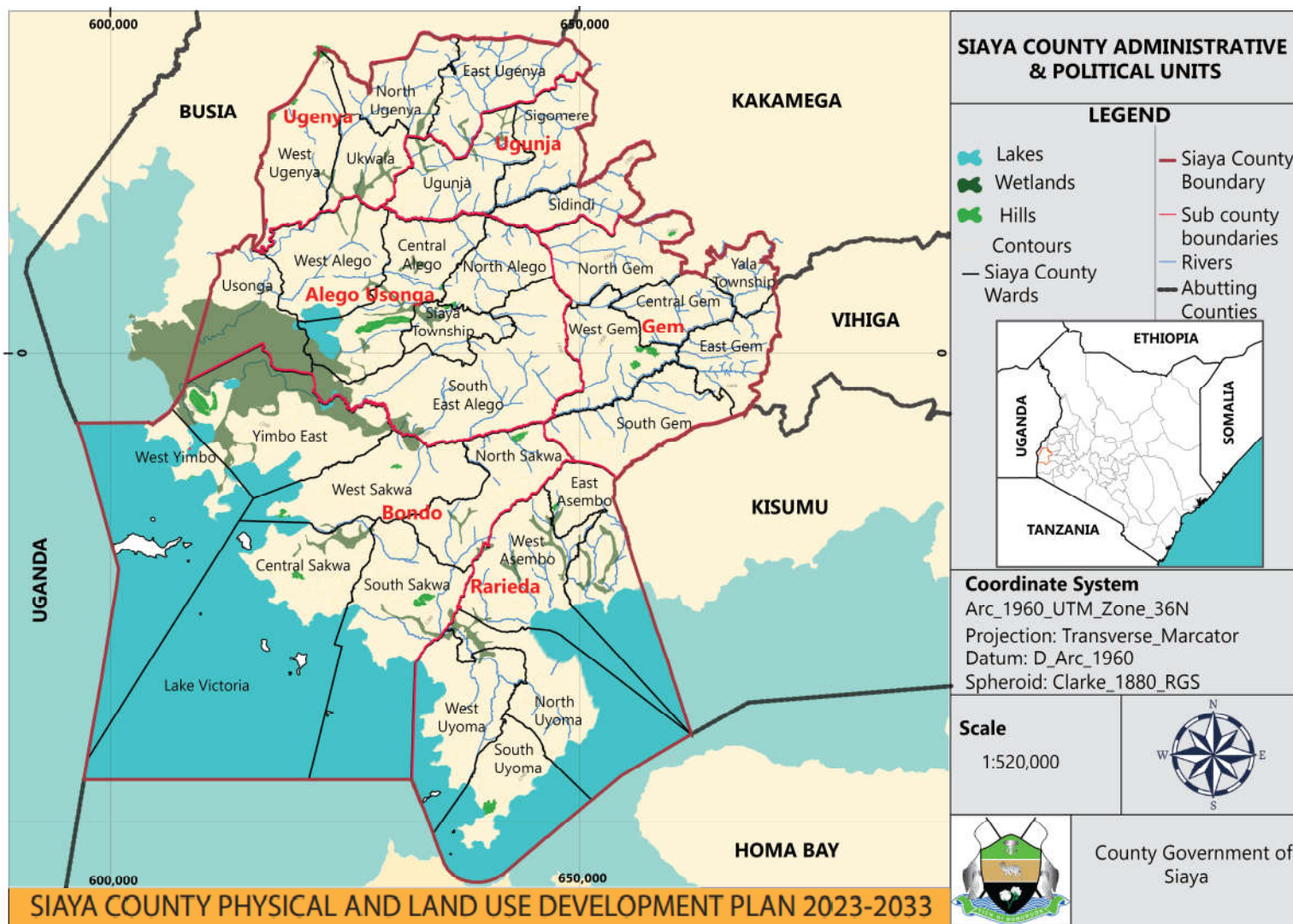


Map 2.1: Siaya County Location in Kenya

Table 2.1: County Administrative Units

Sub-County	No of Wards	Ward	Ward Area	Sub Location	Area (Km2)
Alego Usonga	6	Township	42.6	Mulaha, Nyandiwa, Karapul	605.8
		Usonga	79.2	Sumba, Nyadorera A, Nyadorera B	
		North Alego	53.8	Hono, Nyalgunga, Ulafu, Nyamila, Umala, Olwa	
		South East Alego	191.5	Mur-Ngiya, Bar Agulu, Barding, Masumbi, Nyangoma, Pap-Oriang, Randago, Bar Osimbo, Pap Oriang, Nyajuok, Mur-Malanga, Bar Olengo	
		Central Alego	139.8	Kadenge, Obambo, Ojuando A, Nyandiwa, Kochieng A, Kochieng B, Ojuando B, Koyeyo, Kakumu kombewa, Komolo	
		West Alego	98.9	Kaugagi Udenda, Gangu, Kaugagiudenda, Mahola Ulawe, Sigoma Uranga, Kaburauhuyi, Kalkada Uradi, Komenya Kowala, Komeka Kalaka, Kodiene,	
Gem	6	North Gem	86	Ndere, Nyabeda, Malanga, Got Regea, Maliera, Lundha, Asayi, Sirembe	405
		South Gem	63.3	Kaudha West, Kaudha East, Kanyadet, Ndori, Rera, Kambare, Onyinyore, Gombe	
		East Gem	71.9	Ramula, Uranga, Lihanda, Marenyo	
		Central Gem	52.5	Siriwo, Kagilo, Gango, Nyandiwa, Nyawara	
		Yala Township	46.1	Nyamninia, Sauri, Anyiko, Jina	
		West Gem	85.2	Dienya West, Dienya East, Wagai West, Wagai East, Nguge, Uriri, Malunga West, Malunga East, Malunga Central	
Ugenya	4	North Ugenya	68	Kagonya, Sega, Jera, Nyamsenda, Ligala	322.3
		East Ugenya	97.3	Anyiko, Sihay, Ramunde, Kathieno A, Kathieno B, Kathieno C	
		Ukwala	55.9	Doho West, Doho East, Simur, Simur East, Yenga, Siranga, Simur Kondiek	
		West Ugenya	101.1	Sifuyo West, Sifuyo East, Masat West, Masat East, Karadolo West, Karadolo East, Ndenga, Uyundo, Nyalenyia	
Ugunja	3	Ugunja	80.3	Magoya, Rambula South, Rambula North, Ugunja, Ambira, Ngunya, Umala, Ligege	200.9
		Sigomere	68.4	Got Osimbo, Mungao, Sigomre,	

Sub-County	No of Wards	Ward	Ward Area	Sub Location	Area (Km2)
				Madungu, Asango East, Asango West, Tingare East, Tingare West	
		Sidindi	52.2	Simenya, Yiro East, Yiro West, Ruwe, Uhuyi	
Bondo	6	North Sakwa	96	Bar Kowino, Ajigo, Bar Chando, Abom	593
		South Sakwa	102.7	West Migwena, East Migwena, Got Abiero, Nyaguda	
		Central Sakwa	85.2	Ndeda/Oyamo, Uyawi, Nyang'oma	
		West Sakwa	109.8	Maranda, Kapiyo, Usire, Utonga, Nyawita	
		East Yimbo	159	Got Ramogi, Usigu, Nyamonye, Bar Kanyango, Pala, Othatch	
		West Yimbo	40.3	Got Agulu, Usenge, Mahanga, Mitundu	
Rarieda	5	North Uyoma	73.9	Masala, East Katwenga, West Katwenga, Ragengni, Ochieng'a	403.4
		South Uyoma	57.8	Ndigwa, Lieta, Naya	
		East Asembo	78.5	Omiamalo, Omiadiere, South Ramba, North Ramba, Omiamwalo	
		West Asembo	101.1	Nyagoko, Siger, Memba, Mahaya, Akom	
		West Uyoma	92.1	Nyabera, Kokwiri, Rachar, Kobengi, Kagwa	



2.3 Methodology

2.3.1 Plan Preparation Process

The preparation of the Siaya County Physical and Land Use Development Plan entailed an inclusive, multi-sectoral and participatory approach involving all the county departments and external stakeholders through a consultative process (Figure 2.2). Thematic and targeted consultations were made and consensus was built in line with the constitutional requirements for participation of stakeholders in the planning process. The preparation of the County Physical and Land Use Development Plan was steered by a technical working committee which drew representation from all the line departments in the county. Sensitization and public awareness meetings were held across all the Sub Counties with representations across all the wards in the county.

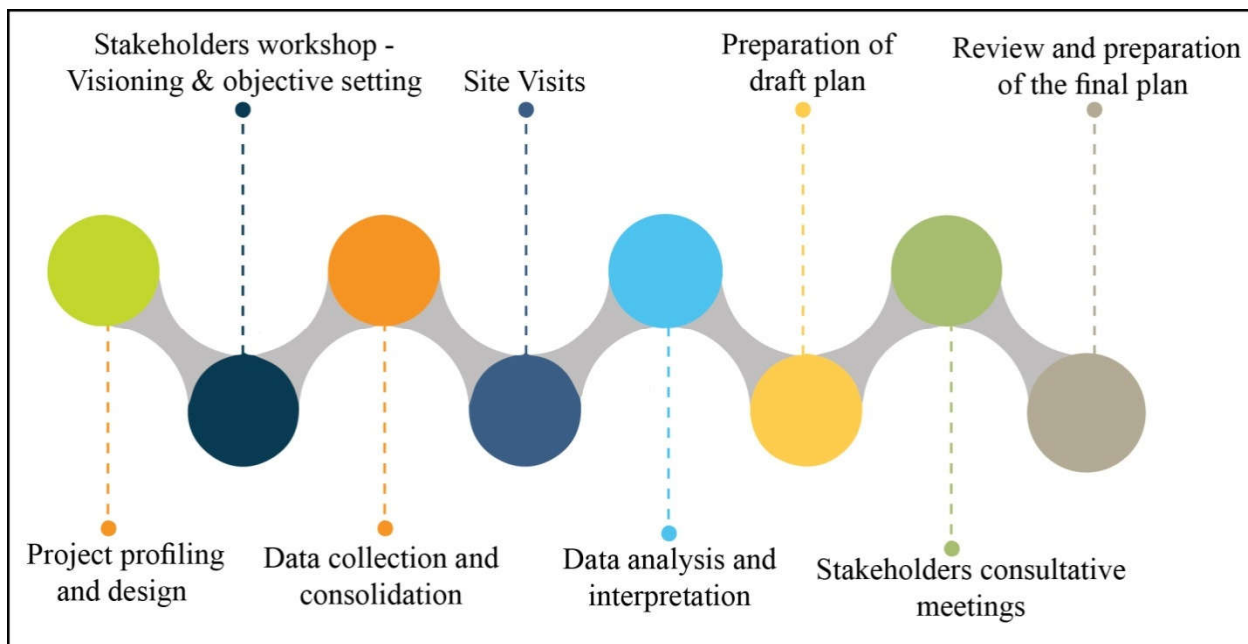


Figure 2.1: Planning Process and Methodology

Stage 1: Project profiling and design: The project proposal contained the broad problem statement, project Terms of Reference (TOR) and the project goals and objectives. The TOR specify, among other things the client/employer, sources and disbursement of project funds, time frame, specifications on professional staff requirements and project administration/management structure.

Stage 2: Data Collection and Consolidation: This involved detailed stakeholder engagement, field surveys and studies. Geographic Positioning System (GPS) was used to collect spatial data. The data from GPS was used to generate Maps using Arc GIS version 10.1. Remote Sensing was also used to collect geospatial data.

Stage 3: Site Visits: This was to familiarize with the sites and general direction on the scope of the work. The site visits covered the entire county. Photography and observation were used during the site visits as complementary tools for data collection.

Stage 4: Data Analysis and Interpretation: The activities here included linking the data collected from the field with the already existing survey information. The main purpose was to produce accurate and up-to-date maps for planning and infrastructure development in the county.

Stage 5: Preparation of Digital Topographical Maps: The activities here included: Production of accurate Maps using Arc GIS Version 10.1; digitization of cadastral information of all registered parcels of land; and carrying out digital Mapping for the whole county

2.3.2 Public Participation and Consultation

The planning process included the largest possible range of stakeholders in the preparation of the County Physical and Land Use Development Plan while promoting principles of inclusivity, transparency, efficiency, equality and sustainability. The County Physical and Land Use Development Plan is a multi-sector plan, which includes sectoral programmes, projects, interventions and strategies within the society. Involving all stakeholders that have an impact or are affected by the Plan is essential in implementing principles of public participation and ensures transparency in preparing the Siaya County Physical and Land Use Development Plan (CPLUDP).

In all stages of the plan, public consultations have been held, where documents which represent conclusions of different stages were presented: challenges and opportunities of Spatial Development, the Vision and Strategic Goals, and the Spatial Development Strategy. Discussions and comments from these meetings have served to enrich and support the process of preparing the CPLUDP. Public consultations on challenges and opportunities of Spatial Development, the Department of Physical Planning, Survey, Housing and Urban Development organized public consultations on development challenges and opportunities of Siaya County, in cooperation with Pre-Envero Consultants, local and international NGO's participated in these public consultations including citizens, intellectuals, and businessmen. The purpose of the organization of these consultative public meetings, inviting participation from all national structures and citizens was to develop a plan that serves the interest of the stakeholders. Public participation acted as the launch and inauguration of the work of the CPLUDP.

Public meetings were a one-day stakeholder workshop, usually with agendas divided into three parts, the thematic presentation from planning team members, continuing with a session on thematic area discussions and finally the plenary session in the afternoon. The consultation process contributed to the awareness of the stakeholder and other actors on the importance of planning, active participation in decision-making, and guarantees obtaining support for the plan. In this way, participants have gained experience in participation, providing opportunities to enhance these experiences in the process of drafting other plans. The consultation process was realized according to the projected framework of the preparation process, and was successful, in the aspect of democratization and transparency in decision-making. All the interested parties were allowed to give comments and suggestions on CPLUDP preparation (Plate 2.1).



Plate 2.1: Stakeholder Participation and Consultation at Jaramogi Oginga Odinga University of Science and Technology. Bondo

2.4 Constitutional, Policy and Legal Framework

This plan has been prepared within the context of the provisions of the Constitution of Kenya 2010; Kenya's Vision 2030, the national development blueprint; Sustainable Development Goals; pertinent sectoral policy frameworks; strategies of the National Spatial Plan; relevant legislative provisions; Siaya County's planning co-ordination; and stakeholder concerns. These are discussed below:

2.4.1. The Constitution of Kenya 2010

The Constitution of Kenya 2010 is Kenya's supreme law and establishes the basis and principles for planning and provides aspirations to be attained through County Physical and Land Use Development Planning. The Constitution espouses county planning to be a concurrent function between the National and County Governments. In the Fourth Schedule, Part 1 (21) mandates the National Government to set the general principles of land planning and the coordination of planning by the counties and in the Fourth Schedule, Part 2 (8) tasks County Governments to undertake County planning and development. It further gives the National Land Commission the function to monitor and have oversight responsibilities over land use planning throughout Kenya under Article 67 (2)(h). In Article 66(1), the Constitution of Kenya gives explicit powers to the National and County governments to regulate the use of any land and property, in the interest of land use planning.

The Constitution of Kenya provides a package of environmental, economic and social rights which are mandatory in Article 42 and compels state organs to deliver on them. These rights include the right to a clean and healthy environment and: (a) attainment of the highest standard of health which include the right to health care services, including reproductive health care; (b) access to adequate housing and reasonable standards of sanitation; (c) freedom from hunger and access to adequate food of acceptable quality, (d) access to clean and safe water in adequate quantities; (e) access to social security; and (f) access to education as outlined in Article 43(1). Article 60 (1) states that land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable. It also requires state organs to ensure, equitable access to land; sustainable and productive management of land resources; and sound conservation and protection of ecologically sensitive areas. Finally, Article 61(1) states that all land in Kenya belongs to the people of Kenya collectively as a nation, as communities and as individuals.

2.4.2. Sessional Paper No. 3 of 2009 on National Land Policy

The National Land Policy serves as the overall framework that outlines key measures required to address the critical issues of land administration, access to land, land use planning, restitution of historical injustices, environmental degradation, conflicts, the unplanned proliferation of informal urban settlements, outdated legal framework, institutional framework and information management. It also addresses constitutional issues, such as compulsory acquisition and development control as well as tenure. It recognizes the need for security of tenure for all Kenyans despite their socio-economic status and including women, pastoral communities, informal settlement residents and other marginalized persons.

The National Land Policy inspires a multi-sectoral approach to land use and champions the provision of providing social, economic and other incentives that provide an enabling environment for investment, agriculture, livestock development and the exploitation of natural resources. The policy guides all government agencies to ensure that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation.

The National Land policy demands sound and sustainable environmental management of land-based resources and thus requires that dealings in such land will be guided by conservation and sustainable utilization principles. The policy, further, advocates for the formulation and implementation of planning principles and guidelines for national, regional, urban, peri-urban and spontaneous settlements in a transparent, accountable, sustainable, comprehensive and participatory manner. This aspiration of the policy heavily influenced the preparation of the Siaya County Physical and Land Use Development Plan.

2.4.3. Sessional Paper No. 1 of 2017 on National Land Use Policy

The national land use policy aims to guide optimal utilization and productivity of land-related resources (national, county and community) sustainably and desirably by providing the legal, administrative, institutional and technological framework. The Policy is premised on the philosophy of economic productivity, social responsibility, environmental sustainability and cultural conservation and is informed by principles of efficiency, access to land use information, equity, elimination of discrimination and public benefit sharing.

The Policy notes several factors that affect land use in Kenya including geographic and ecological features, population distribution, social, historical, cultural and economic factors as well as administrative, institutional and policy instruments, investment, urbanization and land. It identifies key measures to be taken by national and county governments, including Siaya County, to ensure efficient, productive and sustainable use of land, and all land users. These include sound land use practices, conservation and enhancement of the quality of land and land-based resources and the proper management of demographic and health parameters. The policy bids County governments to institute mechanisms designed to induce productive land use and encourage the application of efficient technology for the intensification of land use.

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The National Land Use Policy recommends the preparation of land use plans at both national and county levels with the full participation of all stakeholders and strict implementation strategies. It recommends the mapping and documentation of all land uses in the country as well as encourages the development of a framework for incentives to encourage maintenance of forest cover, and land banking for industrial, commercial, agricultural, residential and infrastructure development.

2.4.4 Physical Planning Act Cap 286 (Repealed)

The Physical Planning Act, 1996 (PPA), vests in the National Director of Physical Planning the responsibility for preparing urban and regional physical development plans in Kenya. It gives power to local authorities (currently the County Governments) to regulate development within their areas of jurisdiction and therefore charges them to prepare urban and regional physical development plans for areas falling in their jurisdiction. It also stipulates the planning, preparation and approval processes with the National Director providing policy, standards and professional guidance to the counties. This is the planning process which has been adopted in this project. This Act has since been reviewed to conform to the Constitution of Kenya, 2010 and other emerging enabling legislation.

2.4.5 Physical and Land Use Planning Act No. 13 of 2019

Just like the repealed PPA Cap 286, the Physical and Land Use Planning Act (PLUPA), No. 13 of 2019, gives the responsibility of preparing County Physical and Land Use Development Plans to the County Director of Physical and Land Use Planning within their respective counties. This is spelt out under PART II Section 20 of the Act and details the responsibilities of the County Director of Physical and Land Use Planning. It also stipulates the planning preparation and approval processes within their areas of jurisdiction.

2.4.6 County Governments Act, 2012

The County Government Act seeks to give effect to Chapter 11 of the Constitution and provide for the powers, functions and responsibilities of county governments to deliver services and to

provide for other connected purposes. The County Governments Act, 2012 section 104 provides for the County Government to plan for the county and that no funds shall be appropriated outside a planning framework developed by the County Executive Committee Member in charge of County Physical and Land Use Development Planning and approved by the County Assembly.

The planning framework to be prepared must integrate economic, physical, social, environmental and County Physical and Land Use Development Planning issues. It requires that the County Physical and Land Use Development Plan should set out basic guidelines for a land use management system in the county considering any relevant guidelines, regulations or laws. The law, further, provides for the establishment of county planning units at the county departments, urban areas, sub-counties and wards. These planning units are the responsible authorities mandated to coordinate integrated development planning, ensure the establishment of a GIS-based database system and facilitate effective implementation of the planning function within the county. It premises that approved County plans shall be binding on all sub-county units for developmental activities within a County.

2.4.7 Urban Areas and Cities Act, 2011 and Amendment 2019

This Act has been formulated in pursuit of Article 184 of the Constitution which calls for National legislation to provide for the classification, governance and management of urban areas and cities (UA&C). The Act covers among others the following: classification and establishment of urban areas and cities; governance and management of urban areas and cities; delivery of services; Integrated Development Planning; financial provisions; miscellaneous and transitional provisions. There are also important provisions within the schedules including: Classification of cities and towns by services; Rights of, and participation by residents in affairs of their city or urban area; and preparation of an Integrated Plan.

Following this Act, every city, municipality and town are expected to operate within the framework of integrated development planning. This act has not been fully operationalized and has been subjected to review.

2.4.8 National Land Commission Act, 2012

Section 5 (2) e gives the National Land Commission (NLC) the responsibility to manage and administer all unregistered trust land and unregistered community land on behalf of the County Governments per the principles of land policy set out in Article 60 of the Constitution and the national land policy. It stipulates the operations, powers, responsibilities and additional functions of the NLC and provides a linkage between the Commission, County Governments and other institutions dealing with land and land-related resources. It gives the NLC powers to monitor and have oversight responsibilities over land use planning throughout the Country. This means that the NLC will have an active presence in every County and is thus an important stakeholder in land use planning and all land-related matters.

Other laws form the legal framework for this CPLUP. Some of these legislations include but are not limited to: Land Act No.6 of 2012, Land Registration Act No.3 of 2012, Environmental Management and Co-ordination Act, 1999, Water Act, 2002, Public Health Act (Cap 242), Agriculture Act (Cap 318), Rev.1986, Survey Act (Cap 299), The Building By-Laws (Grade I &II), 1968, Housing Act (Cap 117), and Community Land Act.

2.5 Linkage to Other Plans

County Physical and Land Use Development Planning responds to development issues related to the growth of a region. Some major challenges addressed by County Physical and Land Use Development Planning include; the disconnect between County Physical and Land Use Development Planning and other types of planning, unstructured stakeholder participation making it ineffective and development initiatives that are not integrated into the County Physical and Land Use Development Planning framework.

2.5.1 The Sustainable Development Goals of 2015

The Sustainable Development Goals (SDGs) are at the core of the 2030 Agenda for Sustainable Development, which was ratified by all UN member states at the 2015 United Nations General Assembly. Their 17 goals and 169 targets address critical issues facing the world today, including the eradication of extreme poverty, tackling global inequality and climate change, promoting sustainable urbanization and industrial development, protecting natural ecosystems, and fostering the growth of peaceful and inclusive communities and governing institutions. Through global mobilization for action on sustainable development, the SDGs mark a potential turning point in the socio-economic and political priorities that shape development on our planet. Siaya County is a territory where women and men, girls and boys, live, where they work to create their livelihoods and where dreams are made. This is where poverty and inequalities are tackled, where health and education services are provided, where ecosystems are protected, and human rights must be guaranteed, the CPLUDP provide a road map for more balanced and equitable urban development. The mounting challenges posed by climate change, environmental degradation, food security, and civil unrest and violence, need different development solutions from those of the previous century. The SCPLUDP offer a set of integrated objectives which can help to bring about a more sustainable vision of urban development, one that provides equal opportunities to all inhabitants of the County, promotes healthy living environments with access to green spaces, and is resilient in the face of everyday disasters and climate risks.

2.5.2 The Sywnerton Plan of 1955

This pre-independence plan of Kenya aimed at intensifying the development of agricultural practices in the colony of Kenya. The plan specifically targeted expanding native cash crop production through improved markets and infrastructure, the provision of appropriate inputs and consolidation of land. The post-independence planning included the preparation of Sessional Paper No. 10 of 1965 on African Socialism and its application to planning in Kenya. The objectives of the paper included; political and social justice, human dignity, freedom of conscience, freedom from want, disease, exploitation, equal opportunities and equitable distribution of high and growing per capita incomes. Intensification of agriculture and other economic activities, poverty eradication, open and collaborative leadership, improved health services and sustainable planning of human settlements are the key focus of the Siaya County Physical and Land Use Development Plan.

2.5.3 Kenya's Vision, 2030

The Kenya Vision 2030 is the country's current long-term development blueprint covering the period 2023-2033. It aims at transforming Kenya into a globally competitive and newly industrializing middle-income country by providing a high quality of life to all its citizens by 2030. The Vision is based on three "pillars": the economic, the social and the political pillar. The economic pillar aims to improve the prosperity of all Kenyans through an economic development

program, covering all the regions of Kenya, and aiming to achieve an average Gross Domestic Product (GDP) growth rate of 10% per annum beginning in 2012. The social pillar seeks to create just, cohesive and equitable social development in a clean and secure environment. The political pillar aims to realize an issue-based, people-centred, result-oriented and accountable democratic system. All planning initiatives in Kenya should therefore be guided and informed by the national aspirations and goals as outlined by Vision 2030 which is to be implemented in successive five-year Medium-Term Plans.

The main aspirations of Vision 2030 are that all development projects undertaken within the state across the thematic sectors should all aim to achieve the objectives set under the vision. The vision has “flagship” projects, which are expected to take the lead in generating rapid and widely shared growth. The Vision identifies key thematic sectors which are to be given priority in acting as key growth drivers in the journey to 2030. These include Infrastructure; Energy; Security; Tourism; Agriculture; Wholesale/Retail Trade; Manufacturing; Financial Services; and Business Process Outsourcing. The SCPLUDP is designed to align with Vision 2030 with the strategies of provision of infrastructure, enhanced governance approach, sustainable economic and environmental growth as well as sustainable human settlement strategy.

2.5.4 The National Spatial Plan 2015–2045

The National Spatial Plan is prepared as a means of implementation of Vision 2030, which identifies the County Physical and Land Use Development Plan as a foundation for transformation and an anchor for all the proposed flagship projects. The Siaya County Physical and Land Use Development Plan is prepared as a guideline to ensure that the county follows similar planning standards in implementing the development of social, demographic, environmental, economic and infrastructural projects within the county.

2.5.5 The Lake Region Development Block Economic Blueprint

The Economic Blueprint for the Lake Basin Region was born out of the understanding that strategic connections between counties with shared interests seated in a desire for mutual benefit can be an effective and intelligent means of increasing the possibility of creating notable development impact across several counties. Additional reasons for a regional Blueprint are:

1. Access to New & Expanded Markets
2. Economies of Scale for example, Large labour force
3. Comparative County strengths
4. Youth – The Demographic Dividend
5. Shared Resources for example, Lake Victoria, River Yala, River Nzoia and Mt. Elgon among others.
6. Shared values i.e., economic growth as a vital Development Imperative to support the ailing social sectors such as Education and Health.

The counties that constitute the Lake Region in this blueprint are Bungoma, Busia, Homa Bay, Kakamega, Kisii, Kisumu, Migori, Nyamira, Siaya and Vihiga. They have similar ecological zones and natural resources, including analogous cultural histories that date back to historical migrations and trading routes. Thus, a partnership between the counties is both essential and timely and creates a practical framework through which county government efforts can be pooled to harness the abundant natural resources, build on existing strengths and address

challenges. The proposed flagship projects substantively link to CPLUDP strategies for the improvement of the well-being of the residents of Siaya as illustrated in Table 2.2.

2.5.6 Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya

The post-colonial era witnessed the development of urban and regional planning through deliberate development of policy documents aimed at achieving national development goals. In 1965 the Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya was adopted. This paper provided the main policy framework for development in all sectors of the economy in the country (GoK, 1965). It spelt out the need to correct development imbalances created by earlier policies, recognize the role of urban, regional, local and rural levels of development in the national economy and decentralize and redistribute development and planning. Based on this policy, comprehensive five-year development plans addressing development needs in all sectors and regions since 1966 have since been prepared. The Kenya Government recognizes the need to plan and control how resources are used according to Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya. The power to plan and implement are important features of the whole government system, both at the national and county government levels. In this regard, the government recognizes four aspects of planning namely physical, environmental, social, financial and economic planning (GoK, 1965). It also recognized that all these aspects of planning must be closely coordinated even on routine matters.

Table 2.2: Linkage between County Physical and Land Use Development Plan and LREB

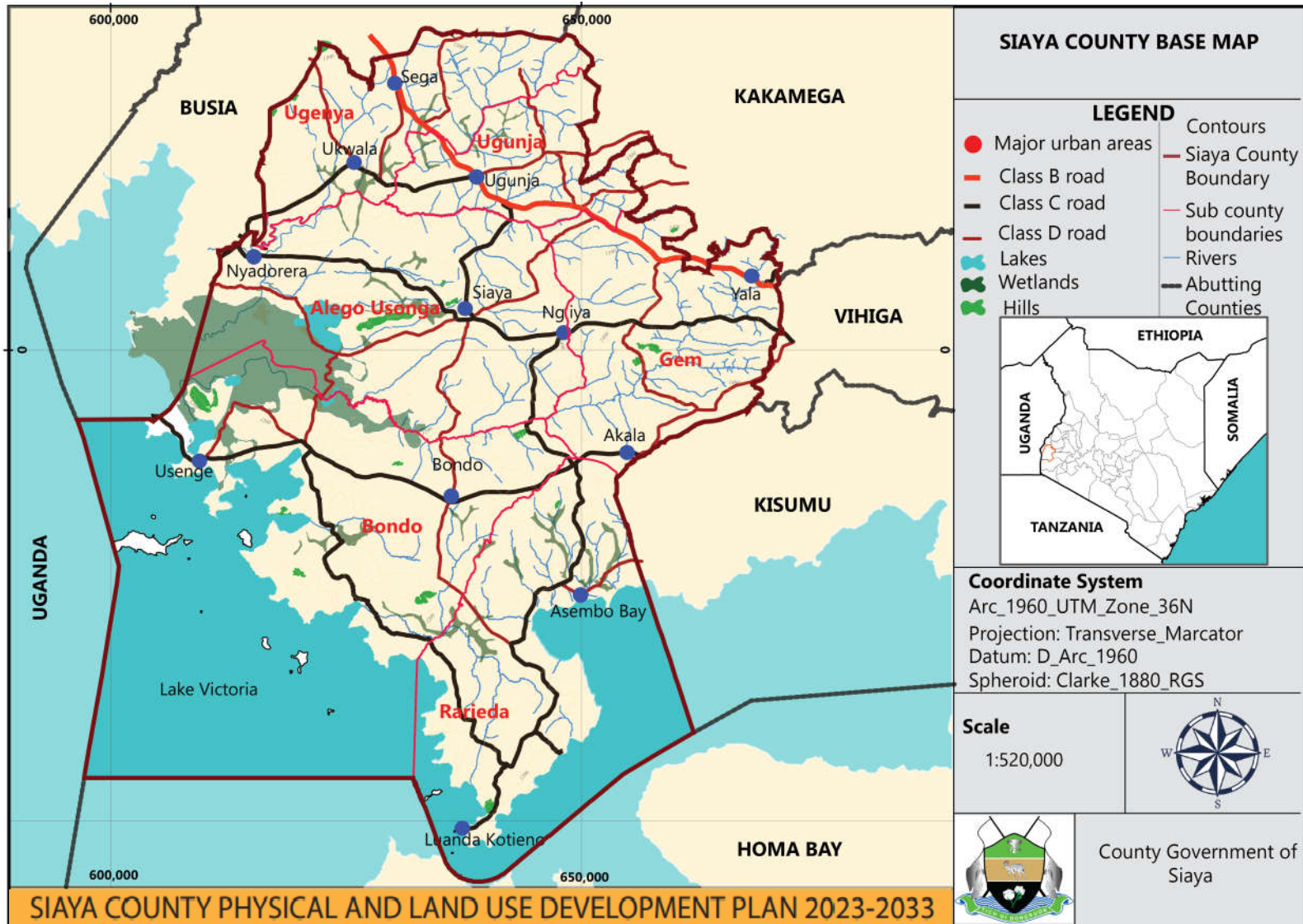
NO	LREB Flagship project	CPLUDP Objectives
1	Proposed Flagship Project for Agriculture: Establishment of an Agricultural Commodities Exchange	Improving Irrigation, Fish Auctions, enhanced Value Chains and Agro-processing Factories
2	Proposed Flagship Project for Tourism: Creation of a Lake Region Tourism Circuit	Conservation of Nature and Wildlife, Culture, Heritage, Ecotourism
3	Proposed Flagship Project for Health: Establishment of Specialist Hospitals in each county.	Planning for Centres of Excellence, Schools for children with disabilities
4	Proposed Flagship Project for Education: Creation of Centres of Excellence in each county.	ICT/Digitization of Health and Enhancement of County referral hospitals
5	Proposed Flagship Project for ICT: Improving service delivery through ICT.	Regional Bank All ICT planning for ICT centres
6	Proposed flagship project for Financial Services: Creation of a Regional Bank	Enhanced financial services
7	Proposed Flagship Project for Infrastructure: Creation of a Lake Region Ring Road	Lake Victoria Ring Road • Road concessions • Great Lake Basin Railways • Water Ways

2.5.7 Siaya County Integrated Development Plan 2023-2033

Siaya County Integrated Development Plan 2023-2033 is a policy blueprint that will guide development in the county between 2023 and 2033. The document discusses the county's spatial development framework, natural resource assessment, key county development priorities, strategies and programmes to be implemented in the next five years. In each sector, the chapter outlines the county sectoral introduction and sectoral project and programme priorities. The Siaya CIDP advocates the development of a sustainable spatial framework that supports sustainable development in the County.

PART II: SITUATIONAL ANALYSIS

CHAPTER 3: BASE MAP



Map 3.1: Base Map

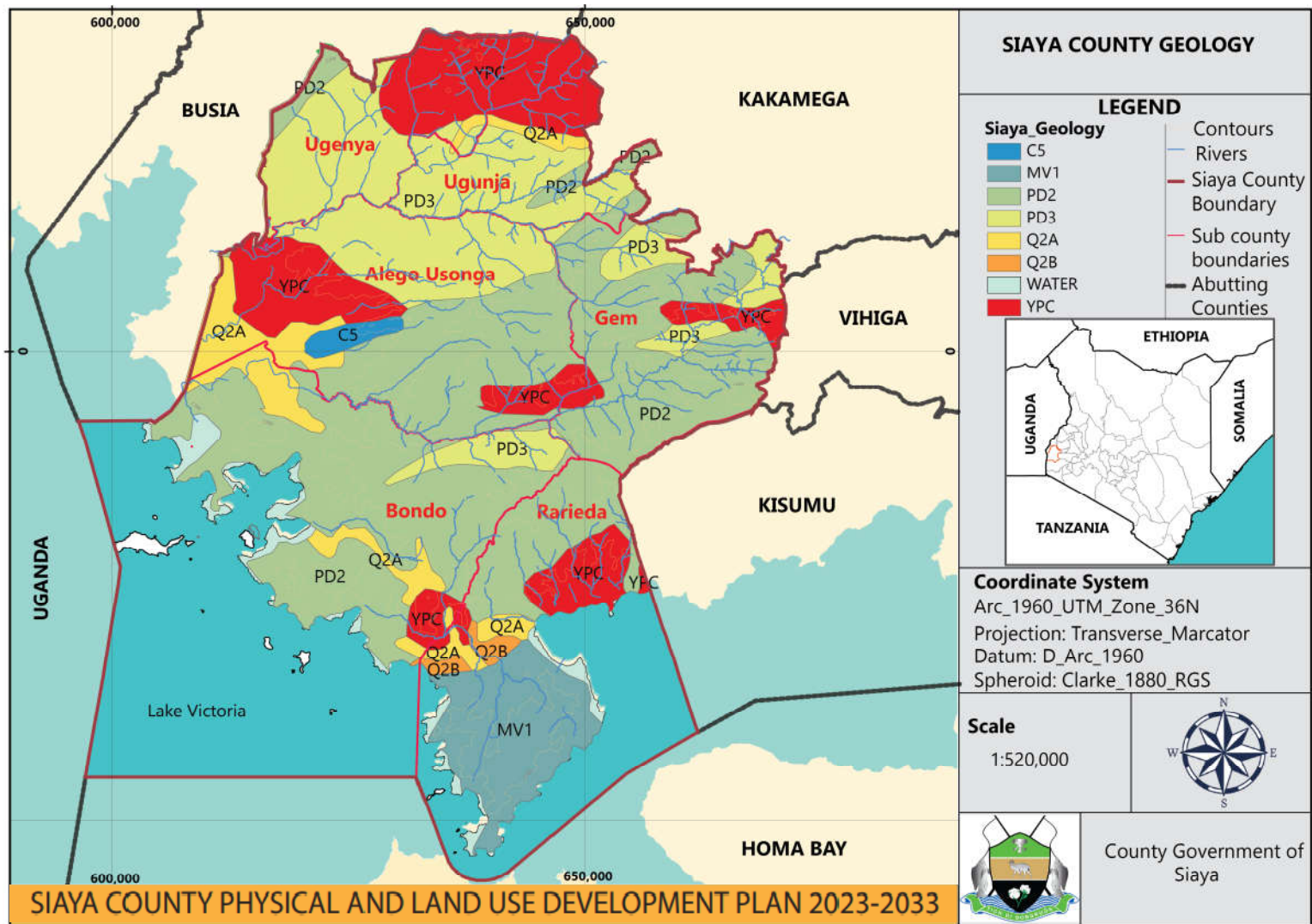
CHAPTER 4: PHYSIOGRAPHIC CHARACTERISTICS

4.1 Introduction

Siaya County is endowed with great potential for the physical and biological environment as natural capital for growth and development. These factors include Topography, Geology, Soils, agroecological, climate (rainfall and temperature), water resources, and landscapes. The County has three major geomorphological areas namely: Dissected Uplands, Moderate Lowlands and Yala Swamp. These areas have different relief, soils and land use patterns. The altitude of the County rises from 1,140m on the shores of Lake Victoria to 1,400m above sea level on the North. There are hills found in the County namely: Mbagha and Akara in Alego Usonga; Odiado in Ugenya; Regea, Rawalo and Nguge in Gem; Usenge, Ramogi Hills, Got Abiero, Sirafuongo in Bondo and Rambugu and Naya Hills in Rarieda. There are also Islands which include Oyamo, Mageta, Ndeda, Magare, Sirigombe, Yalombo and Sifu. Rivers include Nzoia and Yala which enter Lake Victoria through Yala Swamp and other smaller rivers (Wuoroya, Siga, Fuludhi, Alwala, Abura) which traverse the County. The features have a bearing on the overall development potential of the County. High altitude areas of the Ugenya and Ugunja sub-counties and parts of the Gem sub-county experience higher rainfall hence suitable for agriculture and livestock keeping. The low altitude areas of Bondo, Rarieda, parts of Alego Usonga and part of Gem Sub Counties experience less rainfall and thus are suitable for cotton growing and drought-resistant crop varieties.

4.2 Geology

The geology of Siaya County is composed of Nyanzian and Kavirondian systems, known as the Nyanza Craton, considered as oldest rocks in the country (over 2,500 million years). The Nyanzian system is mainly composed of lavas and pyroclastics with minor sediments and banded ironstones (Map 4.1). The Kavirondian, which rests uncomfortably on the Nyanzian, consists of grits, sandstones, greywackes and conglomerates. Both the Nyanzian and Kavirondian systems are isoclinal folded about axes that have an east-westerly trend. Kavirondian is only slightly younger than Nyanzian but folding in the two systems has a similar orientation. Numerous granitic bosses and batholiths have intruded the Nyanzian and Kavirondian. The Kavirondian intrusions were more but the pre-Kavirondian are also widespread and the two systems are discernible. The Archean Nyanzian Craton in Siaya County with metallic mineralization of base and precious metals is known to occur: gold, copper and silver have been mined in the past. These rocks include basalts, websites and rylites, which consist of coarse and fine aggregates used in the construction industry. They also have potential for ferrous and non-ferrous metals.



Map 4.1: Siaya County Geology

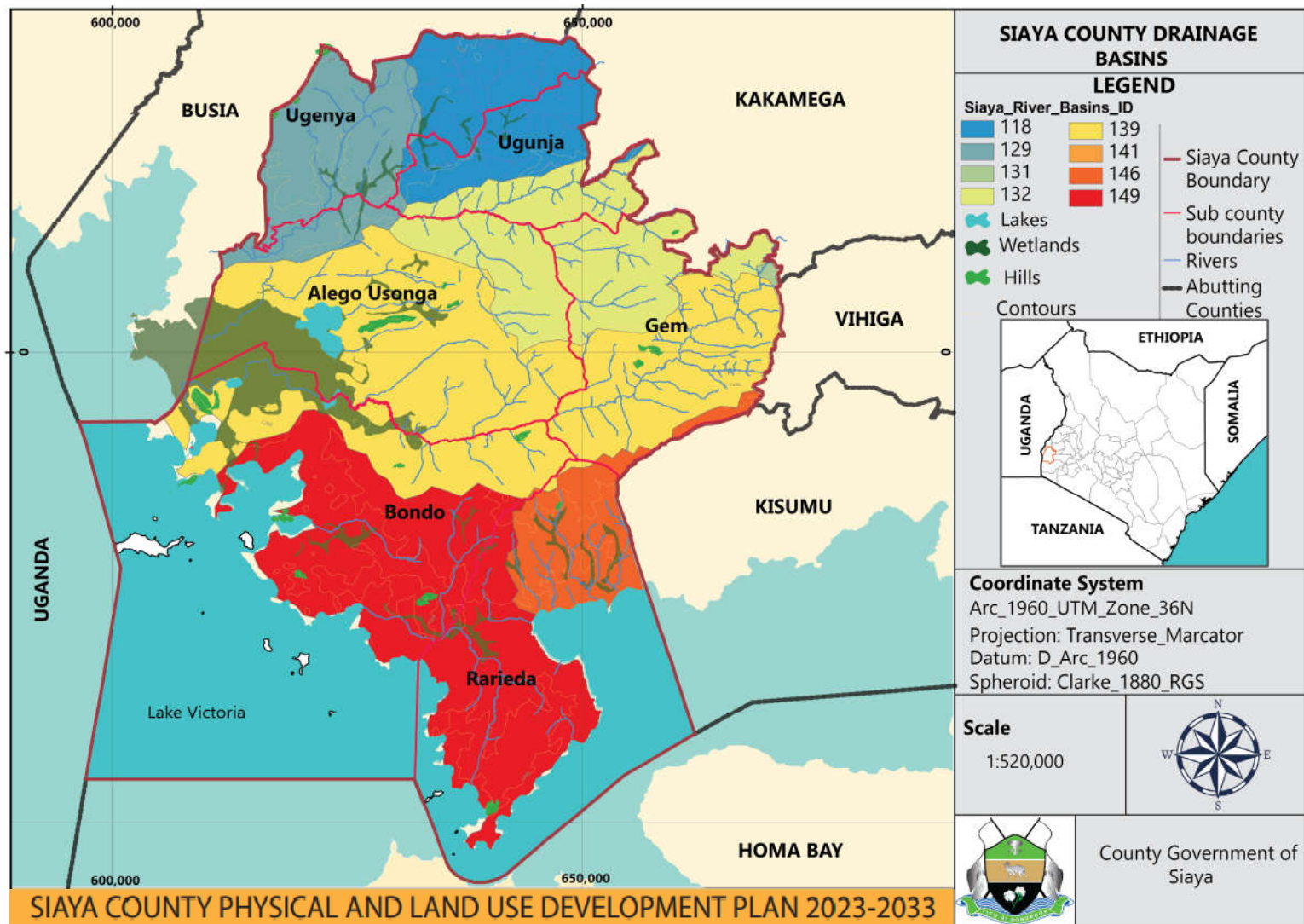
4.3 Hydrology

4.3.1 Siaya County Water Resources

Water resources are a key element of the natural resource capital to facilitate socio-economic development. Siaya County prides to host most of the water sources in the Republic of Kenya, namely, Lake Victoria, Yala Swamp, Rivers Yala and Nzoia and other smaller rivers contributing to the main surface, sub-surface and groundwater reserves. Lake Victoria is a dominant water body in Siaya County covering a third of the total land area. Development of Siaya County water resources is hinged on the lake and the two rivers and their tributaries. Lake Victoria offers greater opportunities in the fishing industry, lake transport and trade, water utilization and therefore high population within this environment.

4.3.2 Siaya Drainage Basins

Siaya County as a hydro-geological landscape is discerned into three sub-drainage basins all 3 draining into Lake Victoria (Map 4.2): Sub-drainage 1: as defined by River Nzoia, and its tributaries to the North as represented by Basin ID 108, 118, 129 and 132; Sub-drainage 2 as defined by River Yala and its tributaries to the central areas as represented by Basin ID 131 and 139; and Sub-drainage 3: a defined by a smaller conglomeration of rivers to the south as represented by Basin ID 146 and 149. The two major rivers, Nzoia and Yala dominate the drainage basin of the county and are sources of Yala Swamp, other small lakes and groundwater resources to the North.



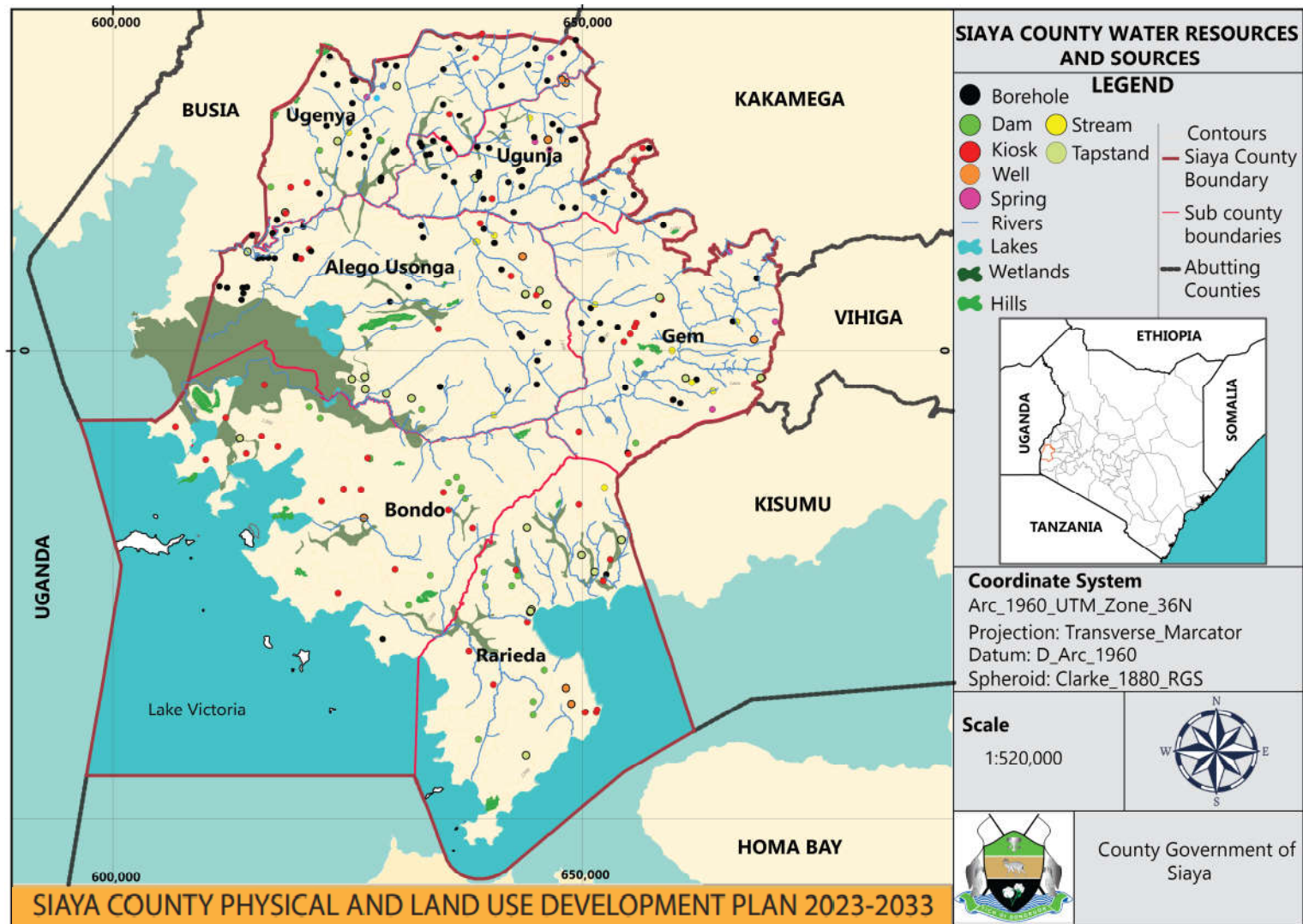
Map 4.2: Siaya County Drainage Basins

4.3.3 Surface and Ground Water Resources in Siaya

About a third of Siaya County comprises surface water, mainly Lake Victoria and Other smaller lakes and two big rivers. Siaya County has a total area of 3,535 square kilometres with a natural water mass of 1,005 square kilometres. The surface water resources include lakes, rivers, swamps (wetlands) and water pans/dams. The major lakes are Lake Victoria, Lake Kanyaboli and Lake Sare to the West. River Yala and Nzoia are major rivers that traverse the county characterized by several tributaries that drain into Lake Victoria. The seven major tributaries (small rivers) are Huro, Akala North, Nyamonye, Wuoroya, Dande and Seme Awach which have a combined discharge rate of 7.42m³/sec. They are potentially important sources of water needed for both farming and domestic use. 18 wards out of 30 traversed with major rivers have irrigation potential with water sources from River Nzoia and River Yala.

There are several swamps, wetlands, dams and pans. The major Swamp in the county is Yala Swamp to the West. About 30 water pans, commonly known as dams by the common public, exist in Siaya County. They are used to collect run-off water, store and available for use by humans and watering animals. This alternative is particularly suitable for drier parts of the County in Uyoma, Sakwa and Usonga which have several suitable sites for small dams. Water pans have been done to help boost the water volume in the county, more specifically in the Rairieda sub-county. Surface water in the County should be used for human consumption, only 16 out of 30 wards have at least one water pan or earth dam. The surface water resources are suffering from widespread environmental contamination from both man and livestock. Surface water in the County should be used for human consumption only after treatment. Concentration for springs and boreholes to the Northern part, the regions traversed by the two major river systems indicate higher groundwater potential to the North. The same shows that there seems to be low groundwater potential to the South especially in Bondo and Rairieda Sub Counties.

Groundwater reserves are found in the Nyanzian rock aquifer system and the Kavirondian rock aquifer system (CIDP 2018-2022). Groundwater potential is guaranteed in the county; however, it diminishes as one approaches the lake. There are several springs and shallow wells as underground waters and some are drawn through boreholes. Underground water potential is generally scarce and more so pronounced in Bondo and some parts of Siaya. The northern parts of the county, especially in Ugenya, and Ugunja sub-counties, have realized abundant subsurface water resources, the same to Alego-Usonga and parts of Gem, where shallow well are predominant.

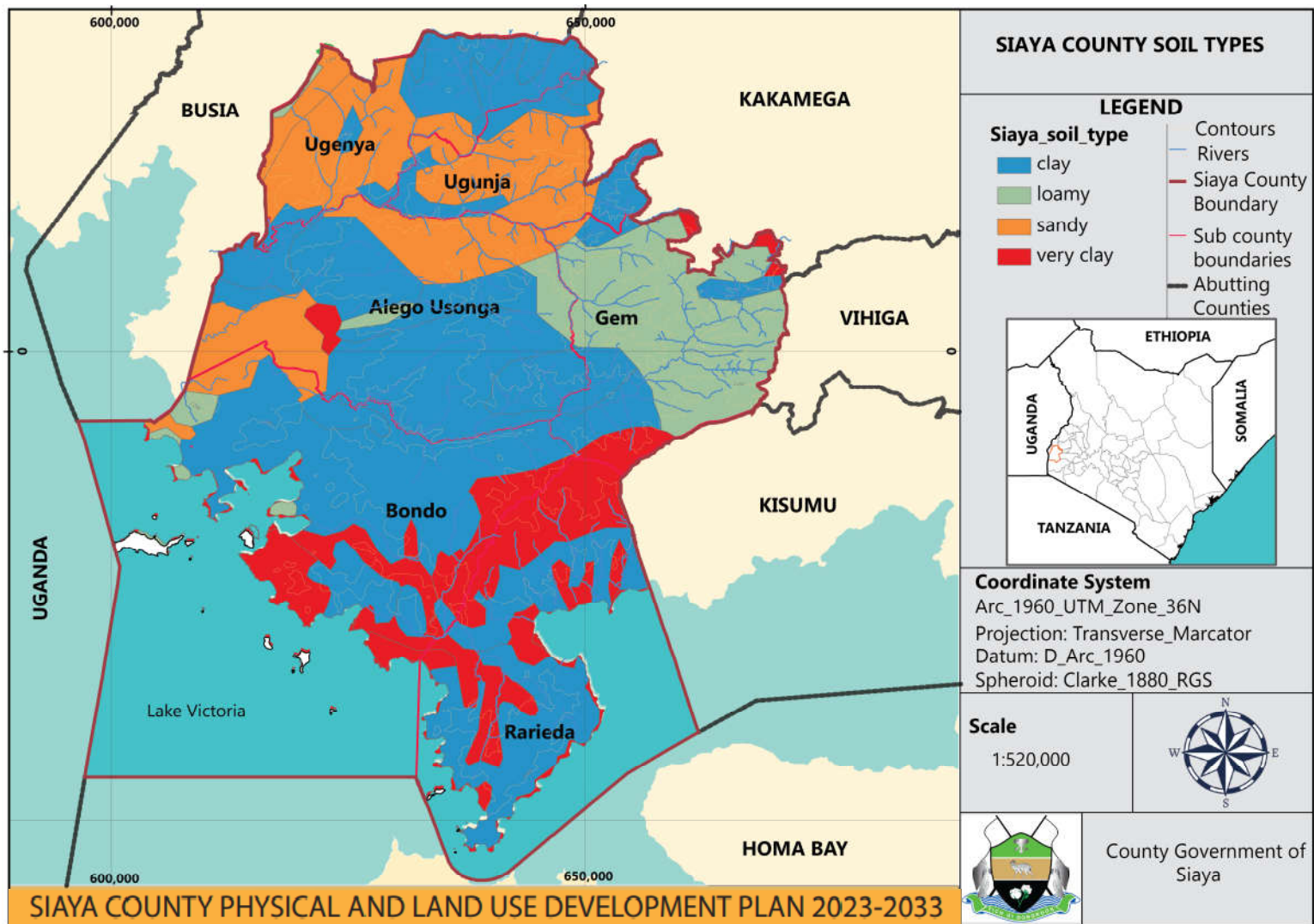


Map 4.3: Siaya County Water Resources and Source

4.4 Soils

Siaya County is mainly a peneplain of very old folding of a great variety of bedrocks as the base for many different soils but only a few are fertile by nature. The peneplain slopes very gently downward from northeast to southwest of Siaya County. The peninsula (Uyoma) in the south is covered by old basic igneous rocks (basalts, andesites), where *Phaeozems* and *Nitisols* developed with high fertility (Ul B1, Ul B5 and Ul B7) but the climate is semi-arid. The other part with *Nitisol* is in the humid northeast, with high leaching forming *dystic* soils (Um D 1) with moderate fertility.

Most of the soils of the lower-level uplands are developed upon acid granites, sandstones or conglomerates that are of low fertility. The central southwestern part is formed by intermediate igneous rocks. Most of these soils are of moderate fertility, over years have formed two different soil types: on interfluvies, shallow *Ferralsols* over *petroplinthite* (“murram cuirass soils”) with low fertility plus other limitations, and fertile *Nitisols* on the valley sides. In the valley bottoms in the southern parts, the soils are mainly poorly drained, often mottled and subject to flooding. Along the Yala River, young *alluvial* soils are found. They usually vary greatly in texture and colour over short distances, but may have a relatively high natural fertility before the river enters the Yala Swamp where *humic Gleysols* and *dystic Histosols* are found, and require special attention during cultivation (Map 4.4). This illustrates the soil typology of Siaya County, indicating in Gem and Ugenya sub-counties have loamy soils. While in Alego and most soils are clay and sandy in the Ugunja sub-county and very sandy in parts of Rarieda.



Map 4.4: Siaya County Soils

4.6 Climate

4.6.1 Rainfall

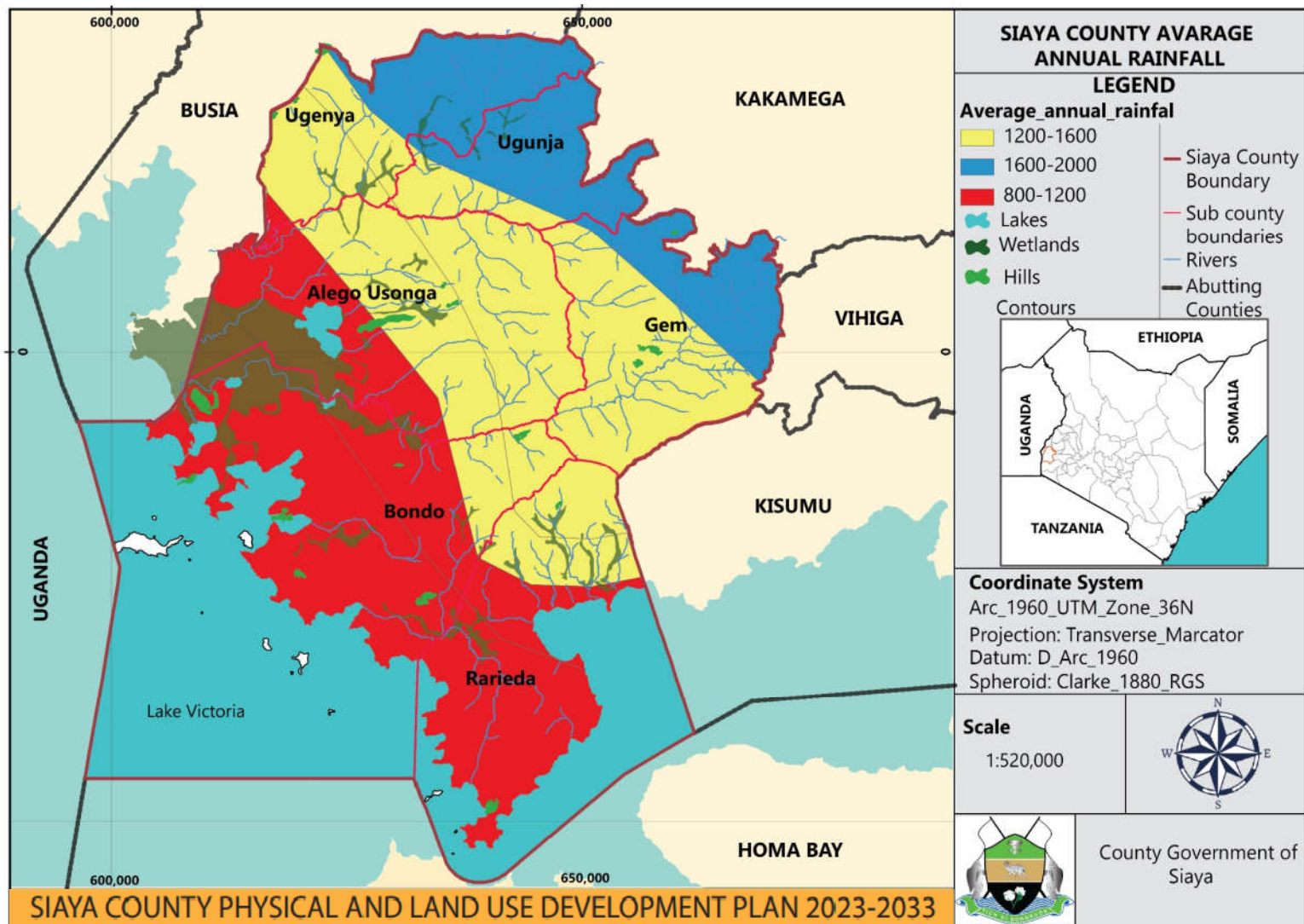
Rainfall is not evenly distributed in Siaya County. There are three distinct regions with varied annual rainfall amounts. The Northern part, covering Ugunja and small portions of Ugenya and Gem Sub Counties experiences the highest rainfall annually standing at between 1600-2000 mm. The central region covering a larger percentage of Lower Ugenya, and upper parts of Alego Usonga and Gem-Sub Counties experience the second highest rainfall annually standing at 1200-1600 mm. The southern region covering Bondo and Rarieda receives the lowest rainfall annually at 800- 1200 mm. Rainfall reliability for first and second rains is about 66% with most areas receiving less than 700mm reliable amount.

Table 4.1: Siaya County Annual Rainfall per Station

No. and altitude	Name of station	Agro-Ecological Zone and Sub-zone	Kind of records	Annual Rainfall mm	Monthly rainfall in mm											
					J	F	M	A	M	J	J	A	S	O	N	D
8934031 1465 m	Yala, St. Mary's School	LM 1 l ^ m i	Average 66%	1838 1635	68 37	95 80	152 136	262 250	260 244	132 124	106 97	155 140	148 132	131 120	136 118	104 78
8934059 1219 m	Oholo Chief's Camp	LM 1 l ^ m i	Av 66%	1718 1656	65 47	71 44	139 88	275 175	251 210	114 66	113 77	144 133	163 101	148 106	138 102	97 54
8934127 1256 m	Ukwala Dist. Office	LM 2 l ^ (m/s) i	Av 66%	1527 1375	54 30	93 70	154 105	244 185	190 138	80 55	67 45	118 70	138 93	165 105	150 110	74 55
8934140 1167 m	Kadenge Yala Swamp	LM 3 m ^ (s/vs)	Av 66%	1139 1081	70 40	49 43	124 81	186 124	146 91	45 26	50 33	65 40	82 52	103 73	145 91	73 54
8934141 1524 m	Malanga Chiefs Camp	LM 1 l ^ m i	Av 66%	1735 1643	69 38	82 54	159 105	281 189	243 169	102 66	94 60	172 112	157 101	133 87	144 104	100 69
8934153 1524 m	Ujimbe Ochieng's Farm	LM 1 l ^ m i	Av 66%	1596 1515	59 39	67 44	159 103	220 153	205 134	91 60	115 73	159 101	155 100	139 85	137 60	89 60
9034021 1234 m	Usigu Sub-Health Centre	LM 4 (m/s) + vu	Av 66%	977 736	56 37	66 20	108 65	151 84	129 71	47 30	32 17	44 33	32 24	49 30	101 78	81 51
9034022 1137 m	Ongielo Asembo Disp.	LM 3-4 (m/s) + (vs)	Av 66%	1079 957	42	62	125	196	132	67	55	65	72	64	116	83
9034036 1219 m	Bondo Water Supply	LM 3 m ^ (s/vs)	Av 66%	1139 1063	54 42	52 27	119 87	176 108	130 90	64 41	59 39	76 48	89 56	114 81	125 102	83 52
9034037 1220 m	Akala Health Centre	LM 2 l ^ (m/s) i	Av 66%	1248 990	57 37	72 51	142 87	239 147	205 149	87 51	66 32	104 61	116 70	126 56	150 111	83 47
9034104 1219 m	Nyangoma Catholic Mission	LM 4 (m/s) + vu	Av 66%	993 935	59 41	58 39	116 79	177 114	133 92	51 40	35 24	63 43	55 37	68 47	124 85	54 35

NB: rainfall selected from typical stations with at least 15 years of record

Source: Farm Management Handbook



Map 4.5: Siaya County Rainfall Distribution

4.6.2 Ecological Conditions

The County spreads across agroecological zones LM1 to LM 5. According to the Kenya Soil Survey and Integrated Regional Development Plan for the Lake Basin Development Authority, the lower part of the County and especially the shores of Lake Victoria can be categorized into semi-humid, semi-dry Lower Midland zones (LM4 and LM5). These zones cover the whole of Uyoma in Rarieda Sub-County and Yimbo in Bondo Sub-County. The lower central parts of the County, covering the whole of Sakwa and Asembo in Bondo and Rarieda Sub-counties respectively and the lower parts of Boro Division are classified as the midland zone LM3. The northern part of the

4.6.3 Agro-Ecological Zones

Siaya County shows the typical agroecological zoning of West Kenya: It is dry near Lake Victoria and wet about 50 km northwards, with an intermediate transition. There is a marked increase in rainfall due to local convergence of the daily lake winds with the South-east wards' parts being in a generally low-pressure area over the heated uplands. Thus, the annual average rainfall increases from 800 mm at the lake shore to 2000 mm near the border with Kakamega County. The agroecological zones extend from a poor Livestock-Millet Zone (LM5) to a good Sugar Cane Zone (LM1).

4.6.3.1 Lower Midland Sugarcane Zone (Subzone LM 1 I^m i)

The Lower Midland Sugar Cane Zone with a long cropping season followed by medium and intermediate rains is common in Sigomere Sub-location in Siaya County, with predominant soil type of chromic and *Orthic Acrisols* and *Rhodic Ferralsols*, partly *petroferric* phases, and *Dystric* phases, with *Dystric Nitisols*, with variable and high rainfall. The first rainy season expected is 750 – 950 mm (SW-NE) in 10 out of 15 seasons and the second rainy season is > 600 – 800 mm. The 60% reliability of the growing periods during the 1st and 2nd rainy seasons is more than 190 and 130-150 days respectively. During the first rainy season, the following crops are prioritized maize and bean intercrop, sorghum, cassava, groundnuts, cowpeas and sweet potatoes and the second rainy season is maize and beans intercrop, sweet potatoes and cowpeas. In addition, we have a few cooking bananas and pawpaws, passion fruit, mangoes and avocados planted to improve nutrition. Poor quality and degrading soil, and water resources and *Striga* infections are identified as constraints on agriculture in Siaya County. Other constraints include a lack of investment in environmental conservation: soil and water technologies. The improvement of soil fertility in this subzone is very necessary, given that soil nutrients have been severely depleted through continuous cropping of agricultural land without replenishing the soil nutrients.

4.6.3.2 Marginal Sugarcane Zone Subzone LM 2 I^{m/s} i

The Lower Midland Marginal Sugar Cane Zone with a long cropping season followed by a (weak) medium to short one and intermediate rains as is common in Umala Sub-location in Siaya County (FMHB,2011). The predominant soil type in this subzone is *Orthic Acrisol*, with *Orthic Ferralsols*, stony and partly *petroferric* phases, with rock outcrops. The rainfall variability is a factor, first rainy season we expect >700 – 800 mm in 10 out of 15 seasons and in the second rainy season > 500–680 mm. The 60% reliability of the growing periods during the 1st and 2nd seasons is more than 180 and 110-120 days, respectively. In this Subzone crops grown are prioritized as: maize and beans intercrop, sorghum, cassava, sweet potatoes and sole maize. The same applies during the second rainy season, which has less rain and moisture. The permanent crops grown include: cooking bananas, avocados, mangoes, pawpaws and passion fruits. Sugarcane is not grown because of transport problems

to the factory. Soil fertility improvement is necessary, given that soil nutrients have been severely depleted, with continuous cropping of agricultural land without replenishing the soil nutrients to increase crop yield, particularly for the staple maize crop.

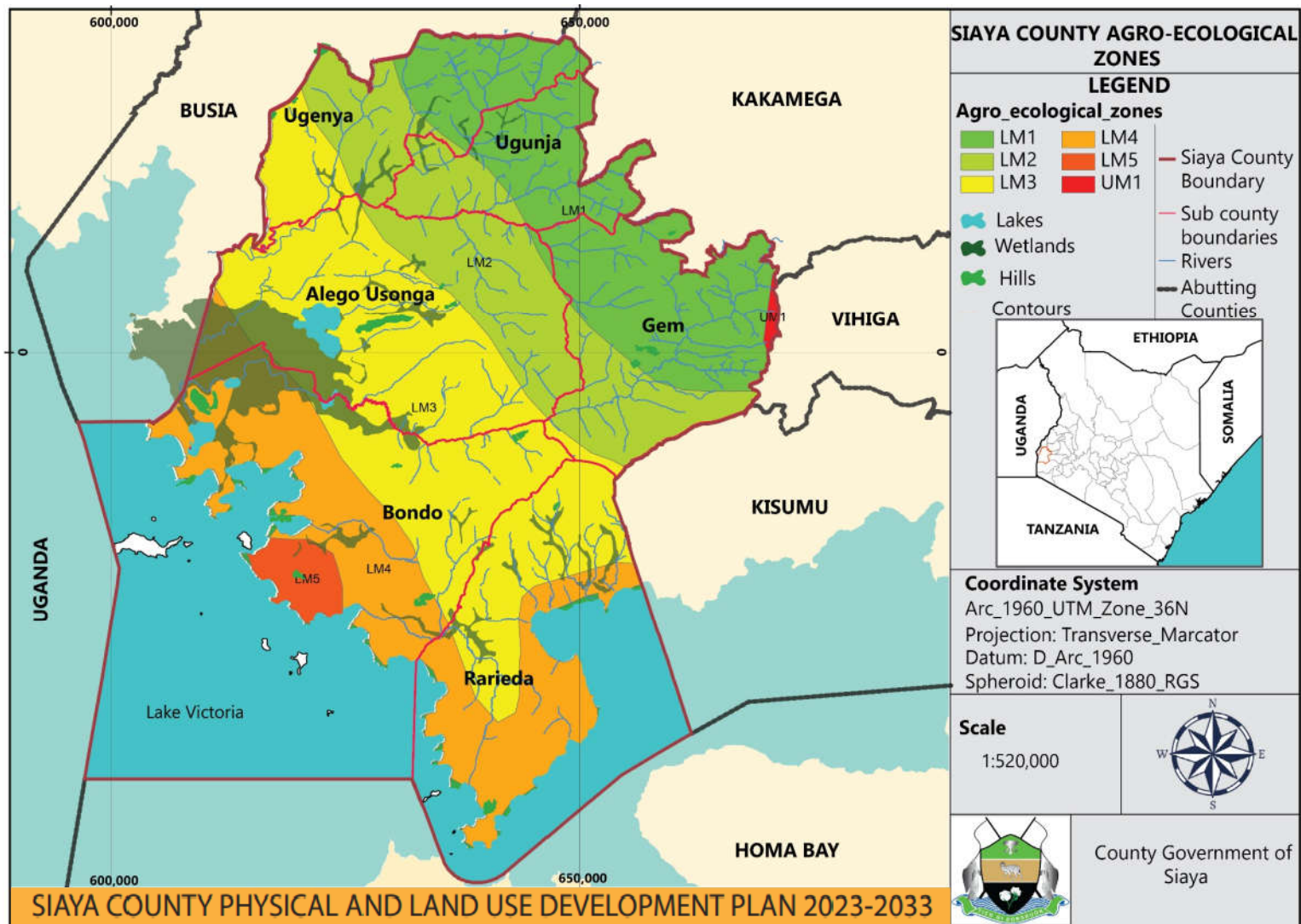
4.6.3.3 Lower Midland Cotton Zone Subzone LM 3 m⁺(s/vs)

The Lower Midland Cotton Zone with a medium cropping season followed by a (weak) short to very short is common in Ajigo Sub-location in Bondo Sub-County (FMHB, 2011). The predominant soil type in this subzone is *Orthic Luvisols* and *Eutric Cambisols*, *petroferic* and *lithic* phases, partly stony phases, with *Lithosols* and rock outcrops. The rainfall variability is a problem, the expectation during the first rainy season is more than 480 – 600 mm (increasing from SW to NE) in 10 out of 15 seasons and in the second rainy season more than 340 mm. The 60% reliability of the growing periods during the 1st and 2nd seasons is 140-155 and 75–85 days, respectively. This subzone is associated with the growing of cotton, but the cultivation is limited. In this subzone, crops grown during the first rainy season, are prioritized as are: maize and beans intercrop, sorghum, cassava, sole maize, groundnuts, sole beans and sweet potatoes. During the second rainy season, the crops grown are ranked as follows: maize and beans intercrop, sole maize, sole beans and sorghum. Mangoes are a permanent crop grown by farmers in this Subzone, while chances of additional crops are: the pumpkin butternut could replace the cotton (the seeds contain protein and fat), the physic nut (*Jatropha* contains 30% oil), Sunflowers and Desmodium (trap crops for *Striga* in rotation with the cereals). Soil fertility improvement is necessary in this Subzone given the low productivity. Technical approaches to overcome low soil productivity include (i) mulching with crop residues, (ii) hand spreading of household wastes, animal manure and compost, (iii) corralling of livestock on fields and (vi) intercropping. Hereby, the proportion of yield increase varies with the agroecological setting (soil types and rainfall) and the rates and frequencies of applying these amendments.

4.6.3.4 Lower Midland Cotton Zone Subzone LM 3 m + (vs/s)

The Lower Midland Cotton Zone with a medium cropping season and a (weak) very short to short one is common in Nyawita Sub-location in Bondo Sub-County (FMHB, 2011). The predominant soil type in this subzone is a complex of *chromic* and *Orthic Acrisols* and *dystic Cambisols*, *petroferic* or *lithic* phases and partly stony phases, and *Lithosols*, partly stony phase. The rainfall variability is a factor and in the first rainy season, there is the expectation of more than 420–540 (SW-NE) mm in 10 out of 15 seasons and in the second rainy season > 200–330 mm. The 60% reliability of the growing periods during the 1st and 2nd seasons is 135-145 and 60–75 days, respectively. In the subzone, during the first rainy season, crops grown are prioritized as maize and beans intercrop, sorghum, sole maize and groundnuts, while in the second rainy season maize and beans intercrop, sole maize. Mango is a permanent crop grown by farmers. The soils are of low productivity and improvement mechanisms are recommended as in the neighbouring subzone.

Food insecurity in this subzone is a factory of land shortage which is explained in terms of low and declining crop yields. There is strong evidence that yields can be raised through applications of external nutrient inputs, specifically the Nitrates N and Phosphates P inputs added individually or in combinations. Soil fertility replenishment options include: mulching with *Tithonia* or manuring with *Jatropha* cake, at the on-farm level, rated for further adoption by farmers as more extension work is encouraged even through other dissemination media.



Map 4.6: Siaya County Agro-Ecological Zones

4.7 Emerging Planning Issues, Opportunities and Challenges

1. The livelihoods of most county residents depend on natural resources that are highly vulnerable to environmental degradation and the effects of climate change.
2. Erratic and unpredictable rainfall patterns: Rainfall potential is unevenly distributed leaving drier areas and causing challenges to access to water.
3. Drainage and Water Resources: Fluctuation of water volumes, pollution of watercourses from urban and agro-activities and limited groundwater resources
4. Some groundwater sources are saline. Groundwater potential is high in the northern half of the County.
5. Water resources based in Siaya County are sufficient for use but not adequately harnessed for use as inadequate water supply persists.
6. Low-lying planes encourage flooding.
7. Areas with shallow soils are unsuitable for agriculture.

CHAPTER 5: POPULATION AND DEMOGRAPHY

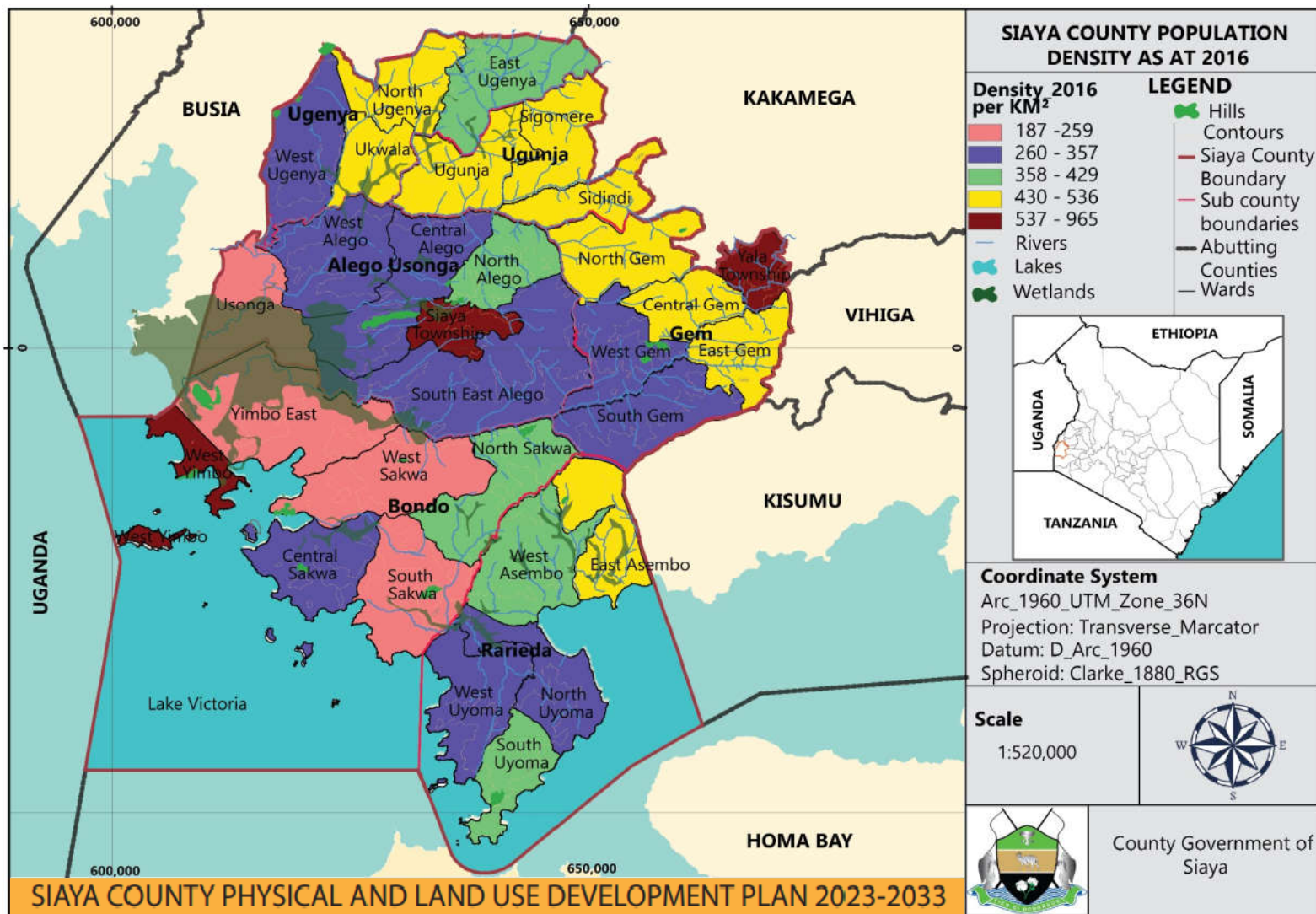
This chapter gives information on population size and composition; population density and distribution, population projection for special age groups and demographic dividend potential. Kenya in her implementation of United Nations principles and recommendations for census has been undertaking decennial census since 1969. The 2019 Kenya Population Housing Census (KPHC) was the latest conducted premised on the theme “*Counting our people for the implementation of the Vision 2030*”. The County has not undertaken a census since 2013 but has relied on the Figures in the 2019 KPHC reports by the Kenya National Bureau of Statistics (KNBS) to project her population.

5.1 Population Size and Composition

Population size, structure and distribution against the county resource endowment are major challenges to the setting of priorities for development and implementing plans. In 2009, the population of the county was 842,304 consisting of 398,986 males and 443,318 females. This Figure was projected to increase to 1,027,795 consisting of 488,077 males and 539,718 females in 2019. The population has been further projected to rise to 1,114,735 comprising 529,646 males and 585,088 females and 1,285,971 comprising 610,179 males and 675,792 females in 2022 and 2030 respectively. The population of the county is dominated by females at 53 per cent against 47 per cent for males due to the high mortality rate for males between ages 0 years to 19 years and high life expectancy for females. The rapidly increasing population requires increased investments in basic social infrastructure and utilities such as schools, health facilities, water, sanitation and services.

5.2 Population Density and Distribution

The county's population density increased from 333 people per square kilometre in 2009 to an estimated 388 people per square kilometre in 2019. It is further anticipated that with the increase in projected population, the population density will increase to 415 and 476 in 2022 and 2030 respectively. High-potential areas include South Alego, Ukwala, North Ugenya, Central Ugenya, Yala, Wagai, Central Sakwa, Mageta Island and Asembo Central locations. Low potential areas include South West Alego, Usonga, West Sakwa, Usigu and East Uyoma locations. There are large nuclear settlements along major fish landing beaches such as Misoro, Luanda Kotieno and Kamarigo in Rarieda Sub-County; and WichLum, Usenge, Uhanya, Honge and Nangoo in Bondo sub-County.



Map 5.1: Siaya County Population Density 2016

5.3 Population Structure and Projection

Under 1 year: The population of children under 1 year is estimated as 34,905 (17,588 males and 17,317 females) in 2019 and accounts for 3.6 per cent of the total population. The population in this category is projected to increase to 37,361 (18,826 males and 18,535 females) and 42,804 (21,568 males and 21,235 females) persons in 2022 and 2030 respectively. This population is vulnerable to preventable illnesses hence specific health interventions should be focused on immunization, nutrition and dietetics and the provision of Long-Lasting Insecticide Treated Nets (LLTINs) to reduce high incidences of morbidity and mortality.

Under 5 years: The population which includes the pre-primary school age group (children between 3-5 years) is estimated at 165,619 (83,160 males and 82,460 females) in 2019 and accounts for 16.9 per cent of the total population. This category of the population is projected to increase to 177,273 (89,011 males and 88,262 females) and 203,099 (101,979 males and 101,120 females) persons in 2022 and 2030 respectively. This implies that measures have to be put in place to ensure that under 5 years' mortality rate is reduced from the current 72 per 1000 live births (according to KDHS 2014) to less than 70 per 1000 during the plan period. This population also requires targeted interventions on sanitation, nutrition and dietetics, increase ECDE centres, and employment of more instructors to prepare and equipped early learners with the requisite knowledge and ensure high retention and transition rates to primary education.

Primary School Going (6-13 years): The population of the primary school age group is estimated at 220,334 (111,334 males and 109,000 females) in 2019 accounting for 22.4 per cent of the total population. This population is projected to increase to 235,838 (119,168 males and 116,670 females) and 270,195 (136,529 males and 133,666 females) persons in 2022 and 2030 respectively. There is a need to increase primary school facilities and employment of more teachers to cater for the growing numbers of pupils and enhancement of retention and transition rates to secondary schools. This population also requires targeted interventions on sanitation, nutrition and reproductive health and can serve as important change agents for the adoption of healthy behavioral practices within the community.

Secondary School Going (14-17 Years): The population of the secondary school age group is estimated at 98,324 (49,524 males and 48,800 females) in 2019 accounting for 10.0 per cent of the total population. The population of this group is projected to increase to 105,243 (53,009 males and 52,234 females) and 120,575 (60,731 males and 59,844 females) persons in 2022 and 2030 respectively. This population calls for continued investment in socio-economic infrastructure like schools, training institutions and a strategy to ensure high retention and transition rates to colleges.

Youth Population (15-35): It is estimated that 264,680 (125,746 males and 138,934 females) are young person's accounting for 27.0 per cent of the total population. This population is projected to increase to 283,313 (134, 594 males and 148,720 females) and 324,587 (154,202 males and 170,385 females) persons in 2022 and 2030 respectively. Due to the increasing youth population, there will be a need for more programmes that address youth issues such as training, health, recreation facilities and employment opportunities. There is also a need to increase the number of sports and recreational facilities to engage youth in sports and various recreational activities. In addition, this group is most affected by HIV and AIDS in the county. This calls for specific interventions aimed at addressing the scourge.

Reproductive Age Group (15-49 years): The female reproductive population is estimated at 222,846 in 2019 representing 22.7 per cent of the population and is projected to increase

to 238,527 and 273,276 persons in 2022 and 2030 respectively. The continued increase in the population of this age group will require more resources to meet the rising demand for family planning and improvement of maternal and child health services. Furthermore, strategic interventions must be put in place to increase: the percentage of skilled deliveries from 65 per cent in 2019 to 90 per cent, the 4th Ante Natal Clinic (ANC) from 50 per cent to 80 per cent and the percentage of women screened for cervical cancer from 20 per cent to 65 per cent within the plan period. In addition, deliberate interventions will be directed towards the reduction of maternal mortality within the same period.

Labour Force (15-64 years): The labour force population is estimated at 476,485 (209,486 males and 266,999 females) in 2019 and this number is projected to increase to 510,013 (224,226 males and 285,787 females) and 584,313 (256,892 males and 327,421 females) persons in 2022 and 2030 respectively. These economically active people represent 48.5 per cent of the total population therefore there is a need for more resources to be channeled to employment-driven investments to reduce the burden of dependency and poverty. Besides there is a need to maximize the availability of universities and set up appropriate tertiary training institutions to cater to the primary and secondary school drop-outs to boost skills and competency within the county.

Aged Population (65 years and above): The aged population is estimated at 52,524 (21,275 males and 31,248 females) in 2019 accounting for 5.3 per cent of the total population. This category of the population is projected to increase to 56,219 (22,772 males and 33,447 females) and 64,410 (26,090 males and 38,320 females) persons in 2022 and 2030 respectively. The low population of the aged can be attributed to the low life expectancy rate of both males and females which stands at 38.3 and 43.6 respectively. This group is mostly affected by non-communicable conditions such as cardiovascular diseases, cancers, diabetes and mental health, which need to be focused on during the plan period. There will be a need for the expansion of social protection initiatives targeting this group to reduce the dependency ratio while uplifting the living standards of this group.

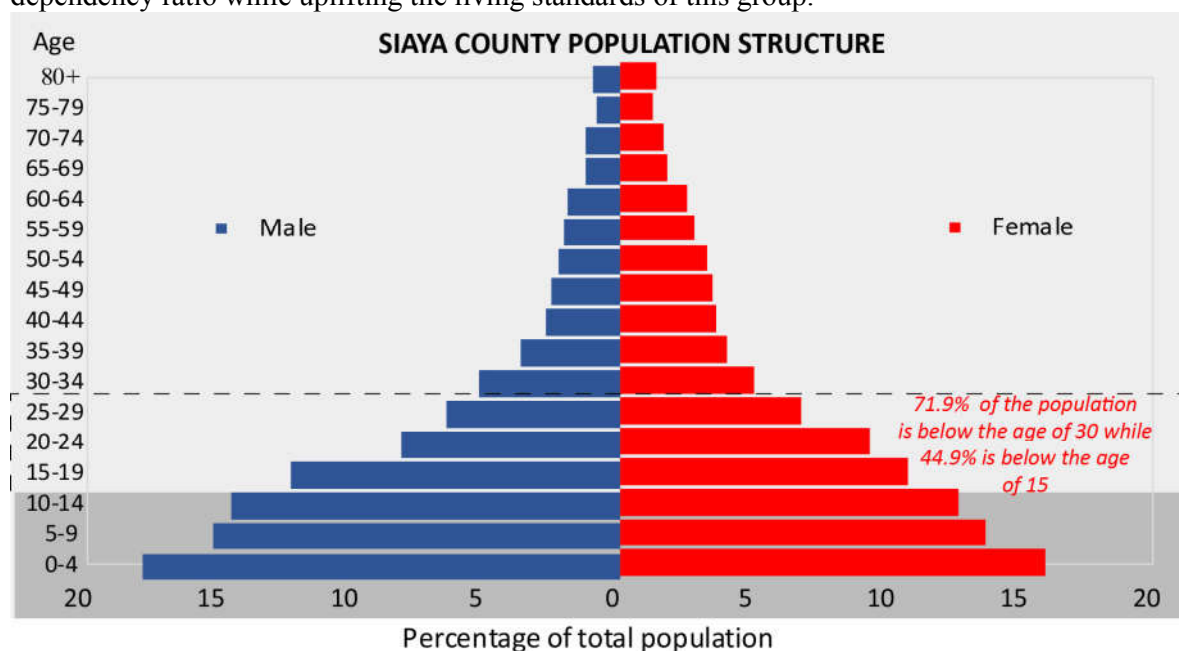
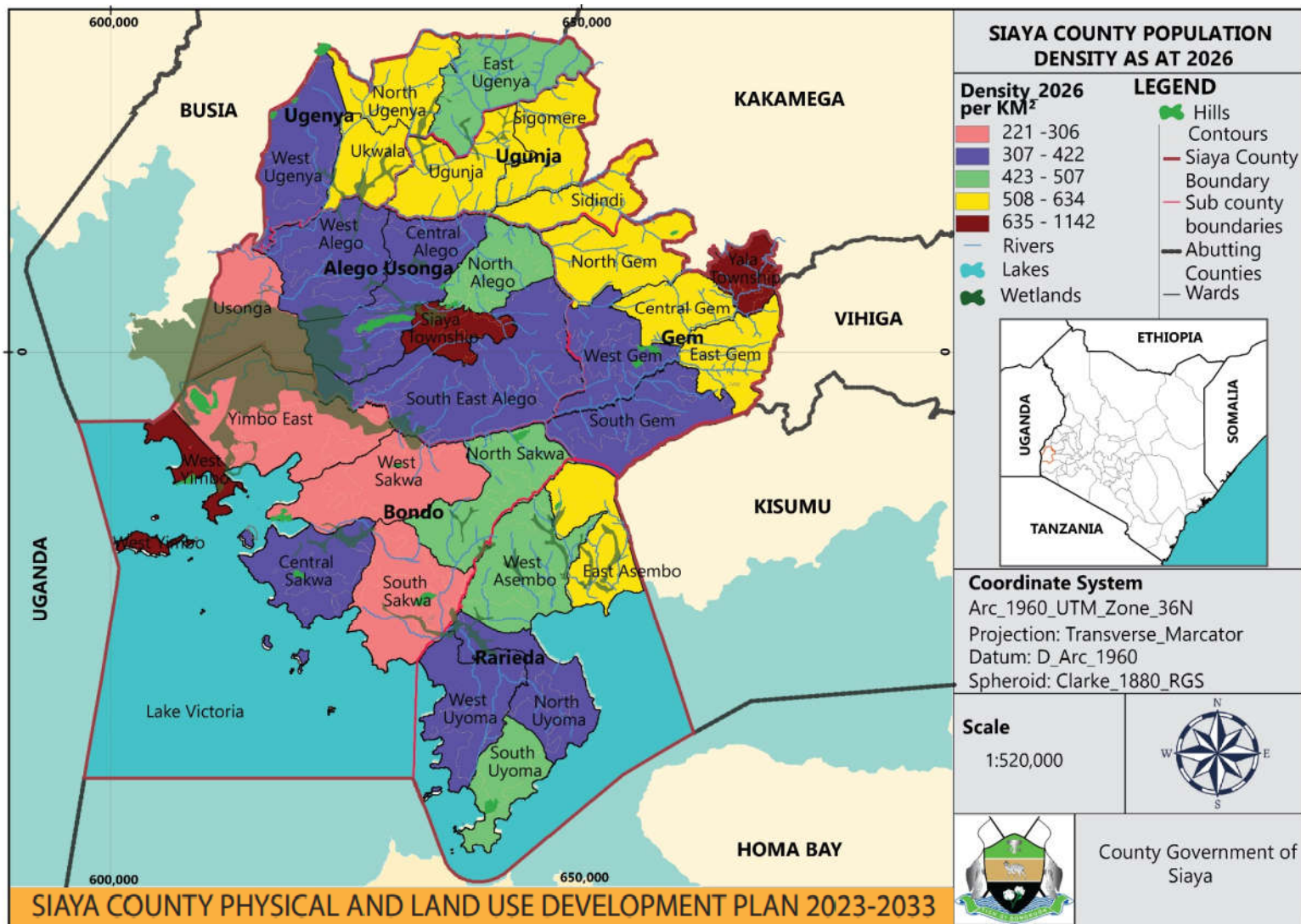


Figure 5.1: Siaya County Population Structure

Table 5.1: Population Projection by Age Cohort

Age cohort	Baseline 2009: Census			Current Estimates:2019			Projections:2022			Projection:2030		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	71,362	70,716	142,078	79,972	79,932	159,904	81,390	81,196	162,585	82,267	81,830	164,097
5-9	60,960	60,710	121,670	72,846	73,078	145,924	77,059	76,992	154,050	79,315	78,955	158,270
10-14	58,296	56,248	114,544	68,089	66,666	134,755	73,216	72,172	145,388	80,599	78,907	159,506
15-19	49,220	47,825	97,045	60,128	56,773	116,900	63,959	61,587	125,546	74,459	72,510	146,969
20-24	32,725	41,443	74,168	44,965	42,950	87,914	49,528	46,568	96,096	56,051	55,189	111,240
25-29	25,961	30,135	56,096	33,419	37,404	70,823	38,629	38,927	77,556	47,140	46,326	93,466
30-34	20,981	22,328	43,309	25,969	35,355	61,325	29,926	37,322	67,248	40,133	40,791	80,924
35-39	14,793	17,932	32,725	20,909	28,407	49,317	23,440	33,470	56,910	31,491	36,493	67,984
40-44	11,118	16,082	27,200	17,119	23,129	40,248	19,790	29,286	49,076	24,629	40,213	64,842
45-49	10,390	15,486	25,876	13,029	18,390	31,419	15,212	21,268	36,480	20,263	34,049	54,312
50-54	9,074	14,541	23,615	10,850	17,572	28,422	12,607	19,631	32,238	17,086	26,411	43,497
55-59	8,414	12,265	20,679	10,549	16,423	26,971	11,590	18,291	29,880	15,675	22,823	38,498
60-64	7,712	11,083	18,795	9,625	14,261	23,886	10,478	15,868	26,346	12,742	19,782	32,524
65-69	5,107	7,732	12,839	7,576	10,790	18,366	8,668	12,369	21,038	10,205	15,381	25,586
70-74	5,175	7,173	12,348	5,696	7,808	13,505	6,555	8,986	15,541	8,596	11,941	20,537
75-79	3,539	5,464	9,003	3,765	5,612	9,377	4,087	6,108	10,195	5,550	8,411	13,961
80+	4,159	6,155	10,314	3,571	5,168	8,739	3,513	5,048	8,561	3,978	5,780	9,758
Total	398,986	443,318	842,304	488,077	539,718	1,027,795	529,646	585,088	1,114,735	610,179	675,792	1,285,971

Source: KNBS-2009 Kenya Population and Housing Census



Map 5.2: Siaya County Projected Population Density 2026

5.4 Demographic Characteristics

5.4.1 Indicators of Well-being

Over the past ten years, the welfare of the County citizens has shown significant improvements. Further, the headcount poverty in Siaya has declined across the county since 2005/06. The notable poverty decline could be attributed to the fact that more resources have been devolved to the county. There have also been many pro-poor programmes such as; social protection programmes for the poor and vulnerable groups, initiatives for the less privileged where both the incidence and depth of poverty are high, and affirmative action in public procurement and access to credit in favour of the youth and women.

5.4.2 Literacy

The population aged over 15 years that can read and write is 79.75 per cent, while those who cannot read and write is 18.25 per cent. Efforts will be made to ensure that more formal as well as informal institutions are established to further improve the county's literacy level. The county government plans to equip and staff the adult learning centres and establish resource centres in all sub-locations in the county.

5.4.3 Life Expectancy

The average lifespan in Siaya County is estimated to be 40 years under today's social, economic and health conditions, a staggering 16 years shorter than Kenya's average of 56.6 years, and more than a quarter century shorter (Kenya Institute for Public Policy and Research, 2014). It is reasonable to believe that the unfavorable conditions that prevailed during the period of economic sabotage resulting in the collapse of local industries had a negative impact. These also resulted in a greater level of poverty. The vast majority of the population is jobless, while employment opportunities are minimal. In all the six sub-counties areas, agriculture is the only way to create incomes necessary for survival, often pawn to in safety and risks associated with this activity. In search of safer income sources, a considerable number of male family heads are inclined to abandon their homes, only to move towards urban areas, which provide more opportunities for a better life. A considerable part of the rural areas is disconnected from access to roads and other infrastructures. Basic services like schools and health facilities are often far from settlements and represent one of the main causes of life quality decline in the rural settlements.

5.4.4 Morbidity and Mortality

Routine data collected at health facilities in the county indicate that the major causes of morbidity in the county are: Malaria (54%) respiratory tract infections (15%) and diarrheal diseases (4%). These 3 preventable illnesses are also the main causes of childhood morbidity in the county. It is important to note that the burden of non-communicable conditions in the county such as cardiovascular diseases, diabetes, cancers, and mental health, has not been quantified. The current child mortality rates for the county (NNMR 39/1000 live births, IMR 111/1000 live births, U5MR 159/1000 live births) are among the highest in the county. The majority of these deaths are due to preventable and treatable illnesses. Of importance also is the fact that majority of the childhood deaths are due to an underlying factor of HIV/AIDS and malnutrition.

5.4.5 Fertility

This growth is largely a result of high fertility, which is currently 5.5 children per woman, compared to a national average of 4.6 children per woman. This number has declined from

8.8 children per woman in 1998, mostly because of increasing demand for smaller families and the use of modern contraception. Addressing barriers to access and use of family planning would further reduce fertility.

5.4.6 Employment and Income Levels

Wage employment in the county forms approximately 17% of the total employment opportunities scattered across various sectors including agriculture, Non-Governmental Organizations, the government and the transport industry. Agriculture alone provides approximately 61% of all employment opportunities in the county. The urban self-employed comprise 14 per cent of the total labour force while 8 per cent is rural based. Most people in the rural areas are self-employed and engaged in small-scale businesses operating kiosks selling groceries, foodstuffs, small hotels and 'boda boda services and undertaking small-scale farming. Urban self-employment includes those in businesses like shop keeping, hotels, chemists, hairdressing foodstuff trade, and cottage industry among others. The County's labour force was projected to be 430,300 in 2012 out of which 189,181 were men and 241,119 were women. It is projected that this will increase to 452,815 in 2015 and 468,497 in 2017. Given these dynamics, there will be a need to invest in key sectors of the economy to create employment opportunities for this force. It is estimated that approximately 40% which translates to 172,120 persons in the county's labour force is unemployed. These high levels of unemployment may be explained by low access to affordable credits, lack of collateral and more often overreliance on white-collar jobs with total disregard for self-employment. In this regard, more opportunities need to be created to address the unemployment problem. The county government has put in place various programmes that will expand opportunities for the youth and women. Nonetheless, there is a need for more interventions by all stakeholders to complement the government's initiatives.

5.5 Social Analysis

5.5.1 Culture and Heritage

Siaya County is predominantly occupied by the Luo community constituting 90% of the county population. Siaya residents just like other communities in Luo counties do not practice the traditional method of circumcision to initiate boys to manhood, instead, their initiation involved the removal of six lower teeth which is no longer practiced today.

Wife inheritance is another Luo custom, it is whereby, if a man dies, one of his brothers or close relatives inherits the widow and must meet all of her marital requirements. The Luo mourning ceremony (tero buru) is widely practised in Siaya County. It is a unique, elaborate and dramatic ceremony that symbolizes the departure of a loved one.

Although the majority of county residents are Christians, many still uphold most of their traditional cultural customs, especially in rural areas. The residents of Siaya county have fish and ugali as the main food, this is usually accompanied by a variety of vegetables that includes; Kunde, osuga, kales, cabbages, dek, stories, legends, riddles and proverbs are an important part of Luo culture, the predominant group in Siaya County. They are traditionally recited in *siwindhe*, the grandmother's house. In traditional belief, the ancestors continue to play a significant role in the people's daily lives and are therefore held in high esteem. Christianity has fused most notably with traditional beliefs and customs in independent churches which have attracted a large following. For example, Nomiya Luo Church and Legio Maria Churches.

Traditionally, the Luo residents of Siaya County wore minimal clothing. Animal hides were used to cover private parts, but there was no stigma. The primary crops are maize (corn), millet and sorghum. Sugarcane is also an important crop in the county. Important animals include sheep, goats, chicken, and cattle which are used for bride wealth. Siaya County residents consider their entire traditional way of life to be an important community resource.



Plate 5.1: Siaya County Food Culture and Artefacts

5.5.2 Emerging Planning Issues, Opportunities and Challenges

- i) High population growth.
- ii) The increased unemployment rate among the young population.
- iii) Pressure on limited natural and economic resources.
- iv) High dependency rate.
- v) Increased ageing population.
- vi) An increasing population of the school-going population.
- vii) Increasing poverty levels.
- viii) Erosion of local culture.
- ix) Un-mapped cultural heritage sites.
- x) Unprotected cultural sites.
- xi) Low investment in cultural and heritage conservation.
- xii) Rich cultural heritage.

CHAPTER 6: LAND

6.1 Land Tenure

Land ownership in Siaya County is categorized as either *private land, public land or community land* as per Kenyan regulations. Private land forms most of the land in the county which is owned by private individuals. The rights and interests of this category of land have been fully ascertained through the process of land adjudication and therefore relatively easy to acquire for investment purposes. There however still exist sections whose rights and interests have not been determined and the county government needs to intervene to have the process finalized. Approximately 2059 square kilometres of land is arable and a major form of land use is peasantry agriculture. Only a small portion of Siaya town has been set aside for industrial use. There is a need to demarcate more land for industrial use in major urban centres in the county. Most of the lands in the rural areas are under general boundaries prone to a lot of boundary disputes, while in urban centres there are fixed surveys which are free from disputes. The first category requires that this general survey be geo-referenced to reduce the number of disputes arising from the boundaries.

Land use in Siaya is defined by major categories as; Wetlands, Lakes, Shallow dams, Shrubs and Grasses, Big Trees, Rivers/Streams, Settlements, Farm Lands, Mixed vegetation, Marshy vegetation, Ponds, and thick vegetation. It is also categorized as Arable Area, Non-Arable Land, Water Mass, Rural Area and Urban. Due to unsustainable resource utilization as a result of the increasing population and demand for food, the county has experienced huge and unsustainable changes to land use that if left unchecked will set the county on a difficult path. The land use under the settlement, farmland land and degradation are in continuous increase, as land cover under forest and vegetation is declining. Analysis of Land use in the county over a period from 1984 to 2014 further reveals a serious decline in land cover under wetlands and other fragile ecosystem.

Table 6.1 Surface Areas by Category

Category	Area (Km ²)
Total Area	2530
Arable Area	2059
Non-Arable Land	471
Water Mass	1,005
Rural Area	2,105
Urban Area	425

Source: Department of Lands, County Government of Siaya

6.1.1 Mean Holding Size, Land Suitability, Use and Availability

The average farm size in the County varies from sub-County to sub-County, for instance, the average farm size for small-scale farmers in Bondo sub-County is approximately 3.0 Ha while in Alego Usonga sub-County is 1.02 Ha. The average farm size for large-scale farms stands at approximately 7.0 ha. Due to the high cost of processing land transactions and succession charges, there are a lot of informal land subdivisions in the County.

6.1.2 Percentage of Land with Title Deeds

As of 2012; 259,124 farmers had been issued with title deeds. Most of these titles, however, bear the names of the forefathers while the current occupiers of the land are third-generation owners with no titles. This means that there is limited collateral for securing loans to undertake different kinds of business, hence reducing the possibility of micro-investments

within the County and the region at large. During the plan period, efforts are expected to be made to formalize land ownership.

6.1.3 Incidence of Landlessness

Siaya County is majorly inhabited by families that trace their land ownership mostly based on their ancestral lineage. The culture of land ownership is under threat following the emerging trend of leasing or selling land for commercial endeavors. This trend is likely to lead to cases of landlessness soon. In Ugunja, Gem and Ugenya there is limited land for agriculture due to the high population densities. Following the 2007/2008 post-election violence, a percentage of the residents of the County were displaced from various parts of the County. Limited cases of landlessness in Siaya County.

6.1.4 Land Conversion/Change of Use

Siaya County has rapidly growing urban areas notably at Siaya and Bondo. The demand for housing in urban areas has put pressure on the available land for settlement. Agricultural land in rural areas is gradually getting fragmented as people construct new homes. Although the majority of the rural land is predominantly used for crop farming, deforestation is gradually making the land fallow. Climatic factors have also contributed to the decline in forest cover. Demand for razing and agricultural land has made the farmers encroach on ecologically sensitive and conservation land in search of pastures. This is particular to the wetland at Yala Swamp where large-scale agricultural activities have been taking place. Local farmers have continued to demand for land for cultivation as well as for grazing. In urban areas, the lands are getting smaller every day such that land acquisition for capital projects is difficult. Examples are waste disposal sites in Siaya, Ugunja, Bond and Usenge. Efforts should be put in place to control sub-divisions of land parcels into smaller pieces that prohibit farming. Land banking or land pooling for large-scale farming is thus a necessity. It can be summarized that there is a high tendency of diverting land meant for agriculture to settlements, especially in both rural and urban areas. Similarly, there is a high rate of land subdivision due to the sale of private lands in both urban and rural areas. Some lands have been converted to quarries and landfills as a result of stone mining and gold mines. Land encroachment by livestock is also a factor in ecologically sensitive areas.

Land conversion rates in Siaya are as follows: -

6.2 Land Use

There are major categories defining land use in Siaya. They are; Wetlands, Lakes, Shallow dams, Shrubs and Grasses, Big Trees, Rivers/Streams, Settlements, Farm Lands, Mixed vegetation, Marshy vegetation, Ponds, and thick vegetation. Due to unsustainable resource utilization as a result of the increasing population and demand for food, the county has experienced huge and unsustainable changes to land use that if left unchecked will set the county on a difficult path. The land use under settlement, farmland and degradation is in continuous increase, as land cover under forest and vegetation is declining. Analysis of land use in the county over the period from 1984 to 2014 reveals a decline in land cover especially on the fragile ecosystems.

Siaya County land has been classified into the following uses;

- Settlement- this entails the built environments for both residential and commercial purposes. Some areas are purely for commercial settlements in urban areas and as well rural areas. There are hardly industrial lands in Siaya.
- Transportation- this cover lands under roads, rail and airstrips in Siaya County. Some land has been reserved for Sega and Migwena airstrips.

- **Vegetation cover**-these includes the forested areas especially along hilly grounds like in Got Odima and Got Ramogi Hills. They also include green buffers in ecologically sensitive areas classified as either dense forests, parks, shrubs, plantations or conservation areas.
- **Water bodies** -include land occupied by rivers, lakes, streams, ponds, shallow wells and wetlands. The water bodies are both perennial as well as non-perennial.
- **Agricultural lands**- This category entails cultivated land, fallow land, farmhouses, horticultural, range land as well as crop fields. The main food crops include; maize, sorghum, millet, beans, cowpeas, cassava, sweet potatoes, groundnuts and finger millets while the main cash crop includes cotton, rice, sugar cane and groundnuts. Some of the emerging crops in the County include irrigated rice, palm oil, chilli, passion fruits and grain amaranth. Vegetables produced in the County include tomatoes, onions and kale while fruits grown in the region are; mangoes, pawpaw, bananas, oranges and watermelon. Food crops cover a total land area of 150,300 ha while the cash crops occupy 2,500 ha. The average farm size for a small-scale farmer is 1.5 ha and 7.0 ha for a large-scale farmer. Due to small farm holdings and the resulting limited benefits and economies of scale, the practice of mechanized agriculture is heavily constrained.

6.2.1 Land Use Patterns

Table 6.2: Land Use percentages generated from a classified Landsat-8 Satellite Image

	Category of Land use	Area in Ha	Percentage of County (%)
1	Urban and Rural Settlements	6,645	5.85
2	Green Vegetation/Agricultural Land	135,097	24.25
3	Water Bodies (Lakes, Wetlands, Rivers, Ponds)	99,814	17.91
4	Wetlands	4253	0.76
5	Hills	1916	0.19
6.	Bare Ground/Open spaces (non-Vegetated)	100493.1	18.04
7.	Others		33.0

Source: United States Geological Society Earth Observation Research Satellites

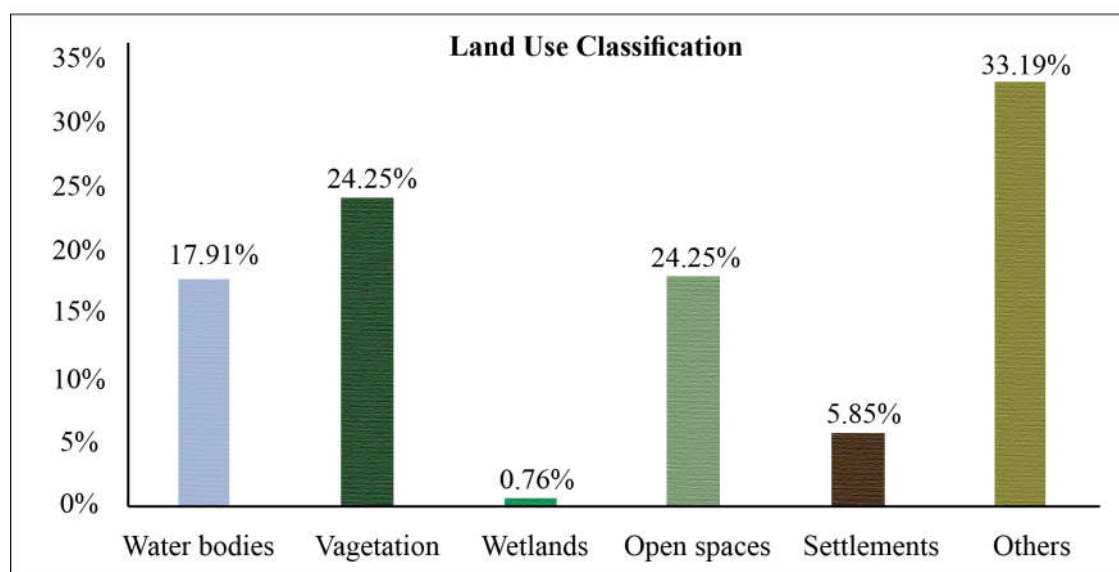
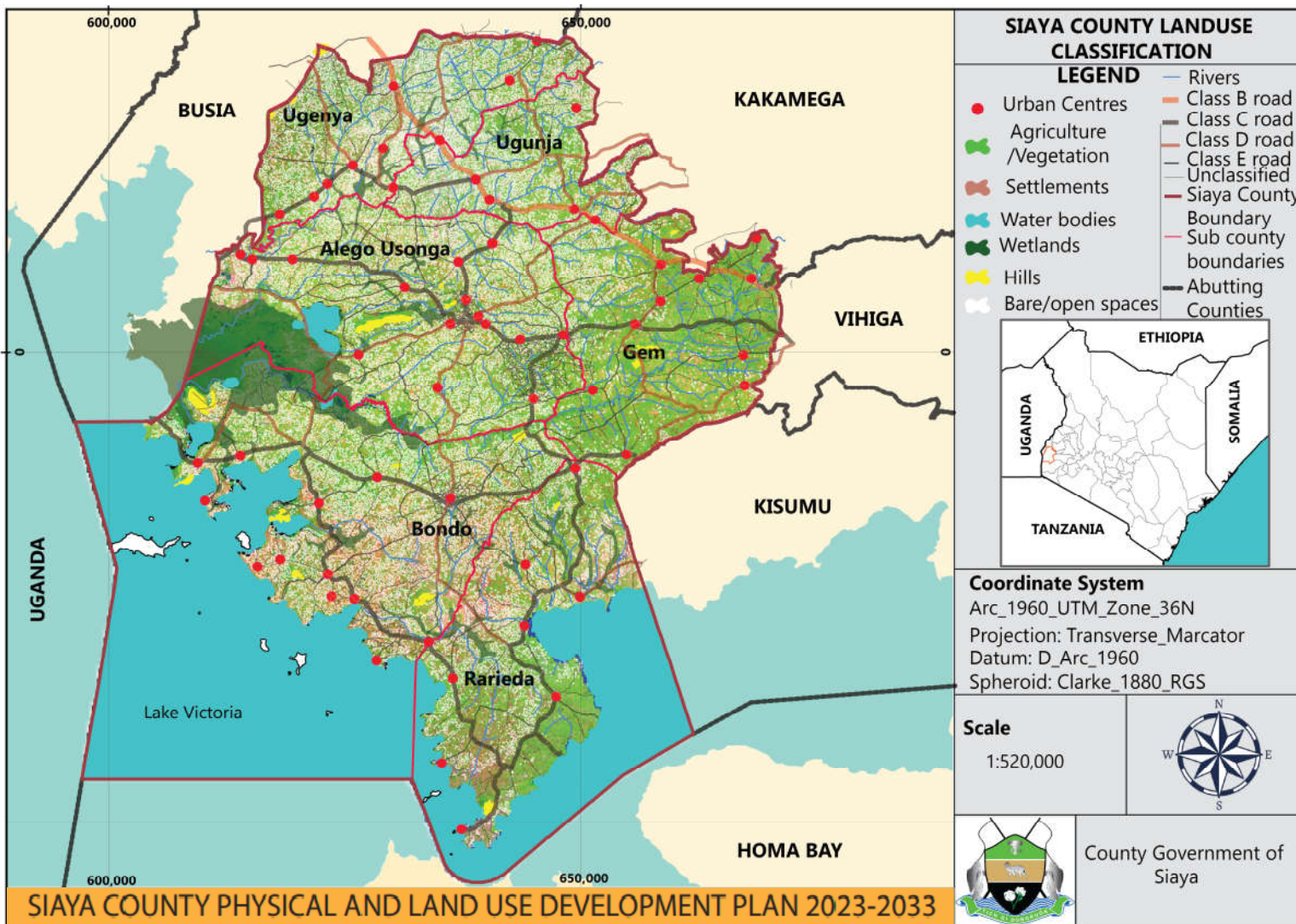


Figure 6.1: A Graph Indicating Land Use Percentages



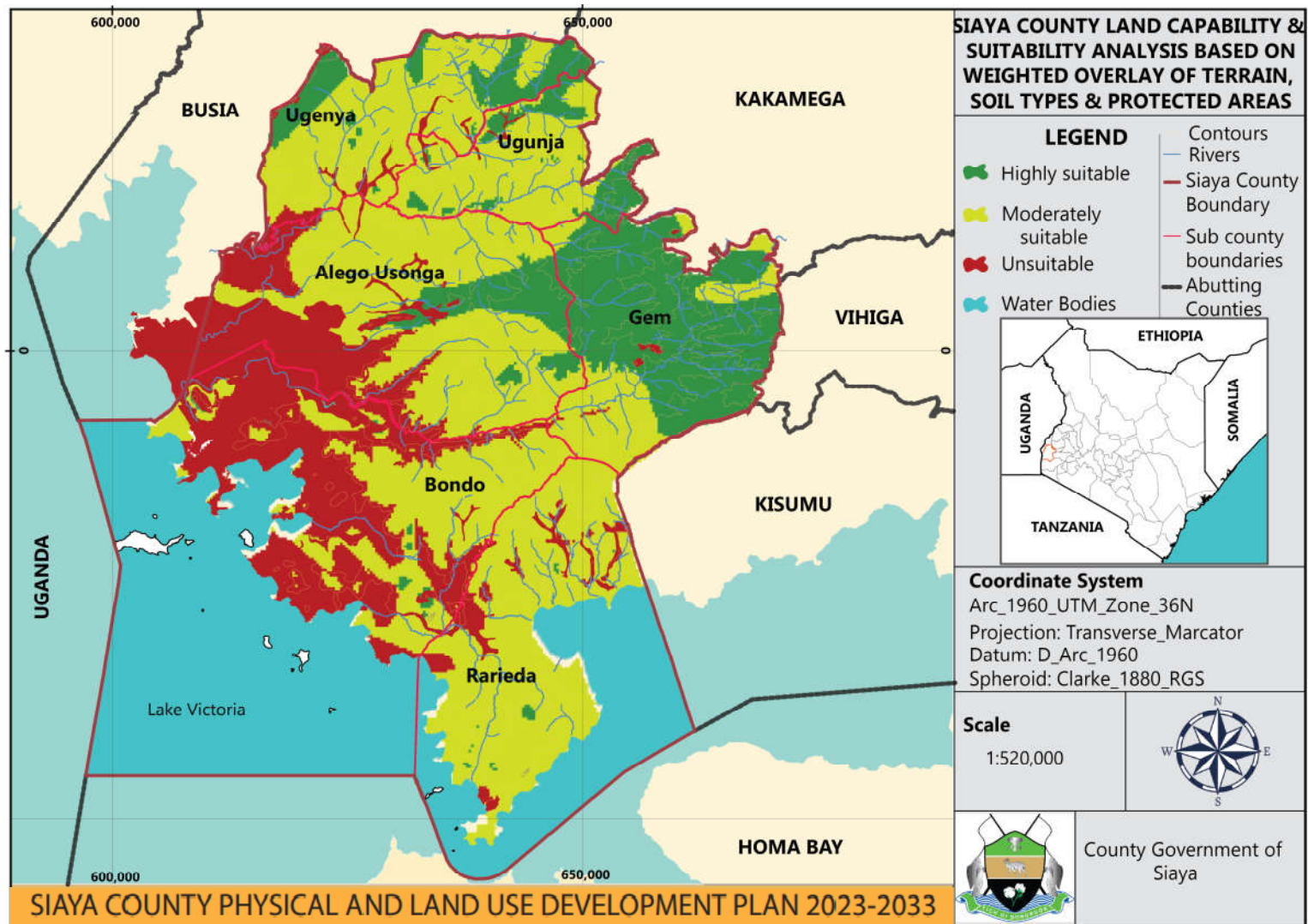
Map 6.1: Siaya County Land Use Classification and Distribution

6.2.2 Land Capability and Suitability Analysis

Siaya land capability refers to the potential of land to be used in the context of arable land and non-arable land. Arable land encompasses land used as forests and other plantations. The purpose of land capability analysis is to help one understand how various land types fit to use for crop production. The county land use viewed in this context refers to how county land is being used currently for agriculture, pastures and forestry. In short, we attempt to describe to what extent the county land has been used to sustain the types of activities. Often a lot of factors that deal with land quality/capability according to the Food and Agricultural Organization (FAO) revolve around the factors that influence soil quality and climate. Therefore, the nature of the terrain is a critical determinant.

There are several factors under consideration in land capability classifications in Siaya County. Some of the determinants of land capability include areas prone to soil erosion hazards, and areas prone to flooding in Yimbo, Alego Usonga, and Ugenya. Other factors are dependent on soil depth and type of soil. Many parts of the waterfront are loamy with occasional sandy beaches, the majority of the parts of the county have good deep loamy agricultural soils notable in Gem Sub County, Ugenya and Alego Usonga and Ugunja. In certain instances, block and deep cotton soils existing Uyoma. Several parts of Sakwa have limitation in the soil in terms of its rocky nature. In such areas, the soil capability is limited as far as agricultural production is concerned. Other factor related to climate plays a critical role in determining soil capability. The southeastern coastlines of Siaya County in Bondo and Uyoma exhibit low soil capability as a result of arid and semi-arid conditions.

In an attempt to establish land capability in Siaya County the following factors were assessed during the situational analysis through participant discussions with various panels. Soil depth, soil textures, soil permeability, general soil drainage conditions, soil salinity, soil alkalinity, soil toxicity and the availability of nutrients. The majority of Siaya County has good soils for agricultural production. However, there exist some parts of the county in Uyoma and Sakwa with arid climates. Lower parts of Alego Usonga are wet due to the presence of river deltas and Yala wetlands. Many parts of Ugenya and Ugunja have good agricultural lands.



Map 6.2: Siaya County Land Capability and Suitability Analysis

6.2.3 Emerging Planning Issues, Challenges and Opportunities

- Continuous land fragmentation in rural and urban areas. In rural areas, this has led to reduced acreage of farmlands under agricultural/food production. In urban areas, this has resulted in underutilized parcels for the development of settlements. County governments find it difficult to acquire land for various infrastructural development within urban centres.
- The land use under the settlement, farmland land and degradation are in continuous increase, as land cover under forest and vegetation is declining.
- Analysis of Land use in the county over the period from 1984 to 2014 further reveals a serious decline in land cover under wetlands and other fragile ecosystems.

CHAPTER 7: ENVIRONMENT AND NATURAL RESOURCES

7.1 Environment

The livelihoods of most county residents depend on Natural resources that are highly vulnerable to environmental degradation and the effects of climate change. Rapid population growth places enormous pressure on natural and environmental resources such as fisheries, forests, water, and land. Already scarce resources such as fisheries and farmland must be divided among more people, resulting in overexploitation. Fish stocks are dwindling due to overfishing and changing water temperatures, and people living in lowlands are frequently displaced due to flooding. As the country's population increases, these pressures on resources will be magnified. Article 42 of the Constitution of Kenya states that every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. The Siaya County Physical and Land Use Development Plan identifies the entire county as an environmentally fragile space and seeks to prioritize the protection and conservation of environmentally sensitive areas.

7.1.1 Appraisal of National Policies on Environment

The promulgation of The Constitution of Kenya 2010 and other new developments like climate change marked an important chapter in Kenya's environmental policy development. Hailed as a 'Green' Constitution, it embodies elaborate provisions with considerable implications for sustainable development. These range from environmental principles and implications of Multilateral Environmental Agreements (MEAs) to the right to a clean and healthy environment as enshrined in the Bill of Rights. Chapter V is entirely dedicated to land and the environment. It also embodies a host of social and economic rights which are environmental such as the right to water, food and shelter, among others. Several policies as outlined below have been formulated to help manage and conserve the environment.

7.1.1.1 The National Environmental Policy, 2013

This Policy proposes a broad range of measures and actions responding to key environmental issues and challenges. It seeks to provide the framework for an integrated approach to planning and sustainable management of natural resources in the various policy measures which mainstreams sound environmental management practices in all sectors of society throughout the country and recommends strong institutional and governance measures to support the achievement of the desired objectives and goal.

7.1.1.2 The National Land Policy

It provides a framework of policies and laws designed to address land management for sustainable development. The National Land Policy provides a legal framework for land policy implementation, Land Use Guidelines and preparation of Strategic Environmental Assessment (SEA) Reports.

7.1.1.3 Wetlands Management and Coordination Policy, 2013

The goal of this policy is to ensure the wise use and sustainable management of wetlands to enhance the sustenance of the ecological and socio-economic functions of Kenya's wetlands for the benefit of present and future generations. This is based on the principles and values of, among others, wise use, precautionary principle, public participation, devolution and ecosystem-based management, taking cognizance of national and international cooperation. This policy, therefore, sets out policy statements on how the Government intends to address wetland conservation and management challenges.

7.1.1.4 Wildlife Policy, 2007

This Policy proposes a broad range of measures and actions responding to wildlife conservation challenges. It seeks to balance the needs of the people of Kenya with opportunities for sustainable wildlife conservation and management countrywide. Wildlife resources in Kenya are valuable natural endowments that must be sustainably managed for present and future generations. Wildlife resources offer a range of benefits and opportunities for local and national economic development, improved livelihoods and provision of environmental goods and services such as watershed protection and carbon sequestration.

7.1.1.5 Forest Policy, 2014

This Policy proposes a broad range of measures and actions responding to the challenges faced by the forest sector. It is based upon the views and expert opinion of those participants drawn from the public and private sector, and civil society organizations. Several strategic initiatives have been introduced to improve and develop the forest resource base; integrate good governance, transparency, accountability, equity and poverty reduction into the forest. It also presents the issues and the policy recommendations that have been identified, analyzed and debated by the stakeholders. It will provide the basis upon which the ongoing governance, administrative and legislative reform process will be continued. It seeks to balance the needs of the people of Kenya with opportunities for sustainable forest conservation, management and utilization. It is also particularly informed by the Constitution, national land policy, Transition to Devolved Government Act, 2012, Inter-governmental Relations Act, 2012, Land Act, 2012 as well as the National Climate Change Response Strategy, which underscores forestry's unique role in both climate change mitigation and adaptation.

7.1.1.6 Sessional Paper No. 3 of 2016 on National Climate Change Framework Policy

This Policy's focus is on the interlinkages between sustainable national development and climate change. Climate change adversely impacts key sectors that are important to the economy and society: Environment, Water and Forestry; Agriculture, Livestock and Fisheries; Trade; Extractive industries; Energy; Physical Infrastructure; Tourism; and Health. This Policy, therefore, elaborates intervention measures that can help to achieve the goal of low carbon climate resilient development. This Policy was developed to facilitate a coordinated, coherent and effective response to the local, national and global challenges and opportunities presented by climate change. An overarching mainstreaming approach has been adopted to ensure the integration of climate change considerations into development planning, budgeting and implementation in all sectors and at all levels of government. This Policy, therefore, aims to enhance adaptive capacity and build resilience to climate variability and change, while promoting a low-carbon development pathway.

7.1.1.7 Forest Policy, 2014

This Policy proposes a broad range of measures and actions responding to the challenges faced by the forest sector. It is based upon the views and expert opinion of those participants drawn from the public and private sector, and civil society organizations. Several strategic initiatives have been introduced to improve and develop the forest resource base; integrate good governance, transparency, accountability, equity and poverty reduction into the forest. It also presents the issues and the policy recommendations that have been identified, analyzed and debated by the stakeholders. It will provide the basis upon which the ongoing governance, administrative and legislative reform process will be continued. It seeks to balance the needs of the people of Kenya with opportunities for sustainable forest conservation, management and utilization. It is also particularly informed by the Constitution,

national land policy, Transition to Devolved Government Act, 2012, Inter-governmental Relations Act, 2012, Land Act, 2012 as well as the National Climate Change Response Strategy, which underscores forestry's unique role in both climate change mitigation and adaptation.

7.1.1.8 Siaya County Physical and Land Use Development Plan Policy Statements

- All environmentally sensitive areas shall be protected and utilized sustainably. These are wetlands, marine ecosystems, forest ecosystems and mountain ecosystems.
- All environmentally fragile areas shall be conserved and utilized sustainably.
- All Siaya county and national government agencies shall integrate environmental concerns in policy formulation, resource planning and development processes.

The Siaya County Physical and Land Use Development Plan supports the mainstreaming of climate change into all the planning processes.

7.1.2 Green and Open Spaces

Quality open space provision plays an important role in improving the quality of life of residents. It provides quiet, breathing space and acts as a clearing house allowing for a range of open-air activities. It further contributes to health conditions, air quality as well as to pleasantness of residents. All areas should be supplied with open space based on population density at an average ratio of around 11 square meters per resident (international standard), or around 0.4 ha for 1,000 for residential neighbourhoods (ISUD, 2013). Green and open spaces include forests, hills and protected green areas.

7.1.2.1 Forests and Hills

Destruction of forests and hills in the county, and the resultant biodiversity loss is a key environmental challenge. The environmental challenges are aggravated by increased population growth, agricultural expansion, over-dependence on wood fuels, and low levels of afforestation and accelerated deforestation in the county. The loss of forests and wetlands is envisaged to increased loss of habitat, change in micro-climate, loss of integrity of the ecosystem, crop yields as well as a decrease in food security. Wood fuel harvesting has been recognized as a major reduction of forest cover. The following data provide information on the number and size of gazetted forests and forest production.

Table 7.1: Size of Gazetted and Non-Gazetted Forests

	2013	2014
Number of gazetted forests	2	2
No. of Non-gazetted forest	20	20
Size of gazetted forest (ha)	345.00	345.00
Size of non-gazetted forest (ha)	1,290.70	1,290.70

Source: Kenya Forest Services, Siaya County

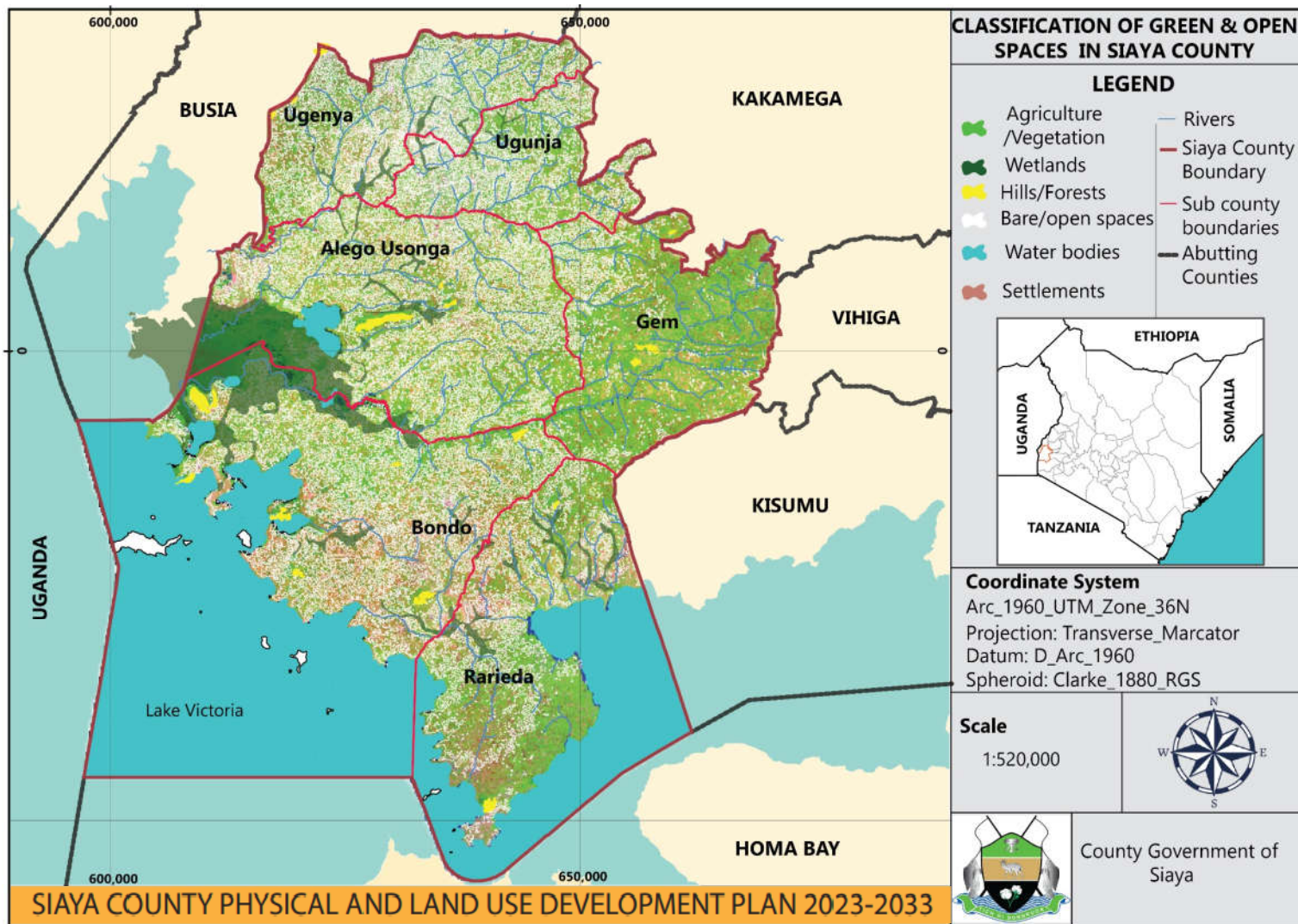
7.1.2.2 Protected Green Areas

There are seventeen (17) protected green areas and hills in Siaya County namely: Regeya, Odiado, Aduwa, Mbaga, Akara, Onyanje, Nguge, Naya, Abom, Rambugu, Usire, Serawongo, Utonga, Usenge, Rembo, Odidi, Ramogi and Abiero. The other category of protected areas includes wetlands such as the Yala swamp. It is Kenya's largest papyrus swamp and freshwater wetland covering 17,500 ha in Siaya, Bondo and Busia counties. Three smaller lakes lie within the swamp: Kanyaboli, Nyamboyo and Sare. It is a crucial site for threatened papyrus birds and endangered sitatunga and one of the last remnants of Lake Victoria's

diminishing cichlid population. It also hosts two native Lake Victoria tilapias virtually eliminated from the lake due to Nile perch predation.

7.1.2.3 Classification of Green and Open Spaces in Siaya County

Green spaces in Siaya County can be classified as areas under vegetation (24.25%), open spaces (18.03%) and green protected (0.95%) areas such as hills and Yala Swamp. The area under vegetation comprises hills and forests (Figure 7.1). Most of the green open spaces are found in Gem, Alego Usonga and the eastern part of the Rarieda sub-counties. Open spaces on the other hand are found mainly in Ugenya, Bondo and Ugunja sub counties. Settlements in these areas are not so dense.



Map 7.1: Classification of Green and Open Space

7.1.3 Pollution

The major cause of pollution and other environmental damage is the increased population in Siaya County and the neighbouring counties. Most human activities have harmful effects on the environment. Transport, agriculture and trade in products for consumption are major components of pollution. Another issue which needs to be attended to is waste management (solid and liquid) in the county. The protection of biological diversity, and natural resources, and remedying contaminated land are also issues addressed by the County Physical and Land Use Development Plan. The most developmental challenge in the county is to strike a balance between sustainable development and environmental management and utilization. The main environmental problems in Siaya County are land and soil degradation, loss of biodiversity and ecosystem, deforestation, overgrazing, a decline in agricultural productivity and water scarcity. Climate change and climate variability have been causing grave socio-economic problems. The lack of proper waste collection and disposal systems from urban domestic sources has become a real menace. Water and air pollution have also become major sources of public health problems. The Kenya Vision 2030 is the country's development plan to transform Kenya into a "middle-income country providing a high-quality life to all its citizens by the year 2030" (Kenya Vision, 2030). The vision has put environmental conservation on its agenda. It also aspires to have a clean, secure and sustainable environment by 2030. The vision aims to improve pollution and waste management through the design and application of economic incentives. In addition, the country will harmonize environment-related laws for better environmental planning and governance.

7.1.4 Biodiversity

Biodiversity is the representation of the millions of different species on the earth and the genetic diversity within these species. Biodiversity is important because humans depend on animals and other species to live and grow and much as animals and other species depend on humans to live and grow. Biodiversity is important because certain organisms have economic value such as plants being made into medicine such as Aloe Vera which is found in less densely populated areas of Bondo, Ukwala and Rarieda sub-counties. These plants have value to the ecosystem and are a source of natural beauty and recreation. Diseases or insects such as army worms, crickets and grasshoppers which are part of the ecosystem have at times wiped out a food crop in Siaya county. These insects which are almost becoming extinct are a good source of food for human beings as well as animals. This has been a result of the clearing of vegetation to pave the way for farming and building structures. This has drastically led to changes in land use in the county.

7.2 Climate Change and Disaster Management

Environmental degradation in Kenya and Siaya County in particular directly contributes to the impacts of climate change as is witnessed in the rising costs of water treatment, food imports and health services. These are increasing human vulnerability and health insecurity which drains the county's economic resources. The expansion of human activities into marginal areas leading to the clearance of natural habitats such as forests and wetlands has been a major driving force behind land degradation throughout the country. The continuous loss of biological resources due to flooding translates into the loss of economic potential and options for commercial development.

7.2.1 Climate Resilience

It is a process that strengthens the ability of all to mitigate vulnerability to risks from, and adapt to changing patterns in, climate hazards and variability, capacity of social, economic

and ecosystems to cope with a hazardous event or trend or disturbance. For example, a combination of nature-based solutions and building improvements, like planting street trees and installing green roofs, can help mitigate extreme heat. Actions like these are especially important in historically marginalized communities, where climate impacts can exacerbate existing inequalities. Flood risk along rivers (River Yala and Nzoia), for instance, can be reduced by restoring wetlands and other natural habitats in flood plains, by restoring their natural courses, and by using trees to create shade. Urban areas can be cooled by parks and ponds and by greening streets and buildings' rooftops and walls. Extreme weather events have shown that resilience is an essential component of any comprehensive climate action program because climate change is both a global and a hyper-local issue. The causes and the broad impacts affect everyone, but resilience efforts must be executed at the asset, neighborhood, or individual level. It will take a combined and coordinated effort, like none ever seen before, to address this issue. The good news is that addressing these risks can protect people and property, and also generate economic activity that will create domestic jobs and drive prosperity.

7.2.2 Flood and Erosion Endangered Areas

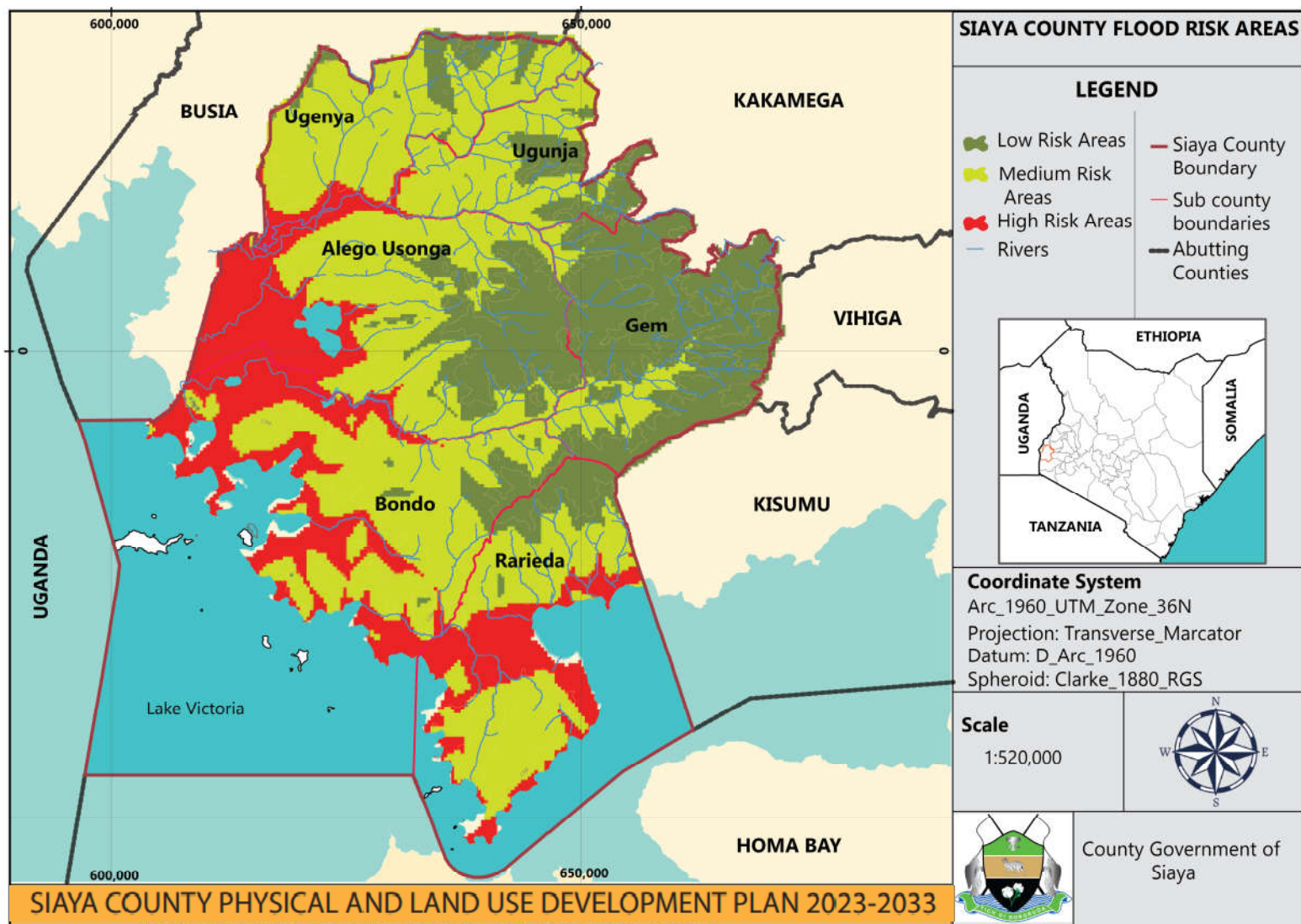
There are areas within Siaya County which are prone to flooding during the rainy seasons. Usonga location in the Alego Usonga sub-county has been experiencing flooding in the months of April and October. Flooding also occurs along river banks, beaches, down hills, plains and market centres. The flooding at times forces the community to move to other areas for their safety and that of their animals. To place control over flood-endangered areas, the County Government of Siaya through the Department of Lands, Physical Planning, Housing and Urban Development, and Water Management, in cooperation with competent authorities on the economy, finance, agriculture, forestry, trade, industry, public services, communications, transport, energy, rural development, housing, construction and environmental protection, must compile a Plan on Flood Administration as the only means of minimizing consequences or even minimize flooding. Mapping register and presentation of flooding endangered areas (Figure 7.2), and coverage of the flooding wave are of utmost importance.

7.3 Natural Resources

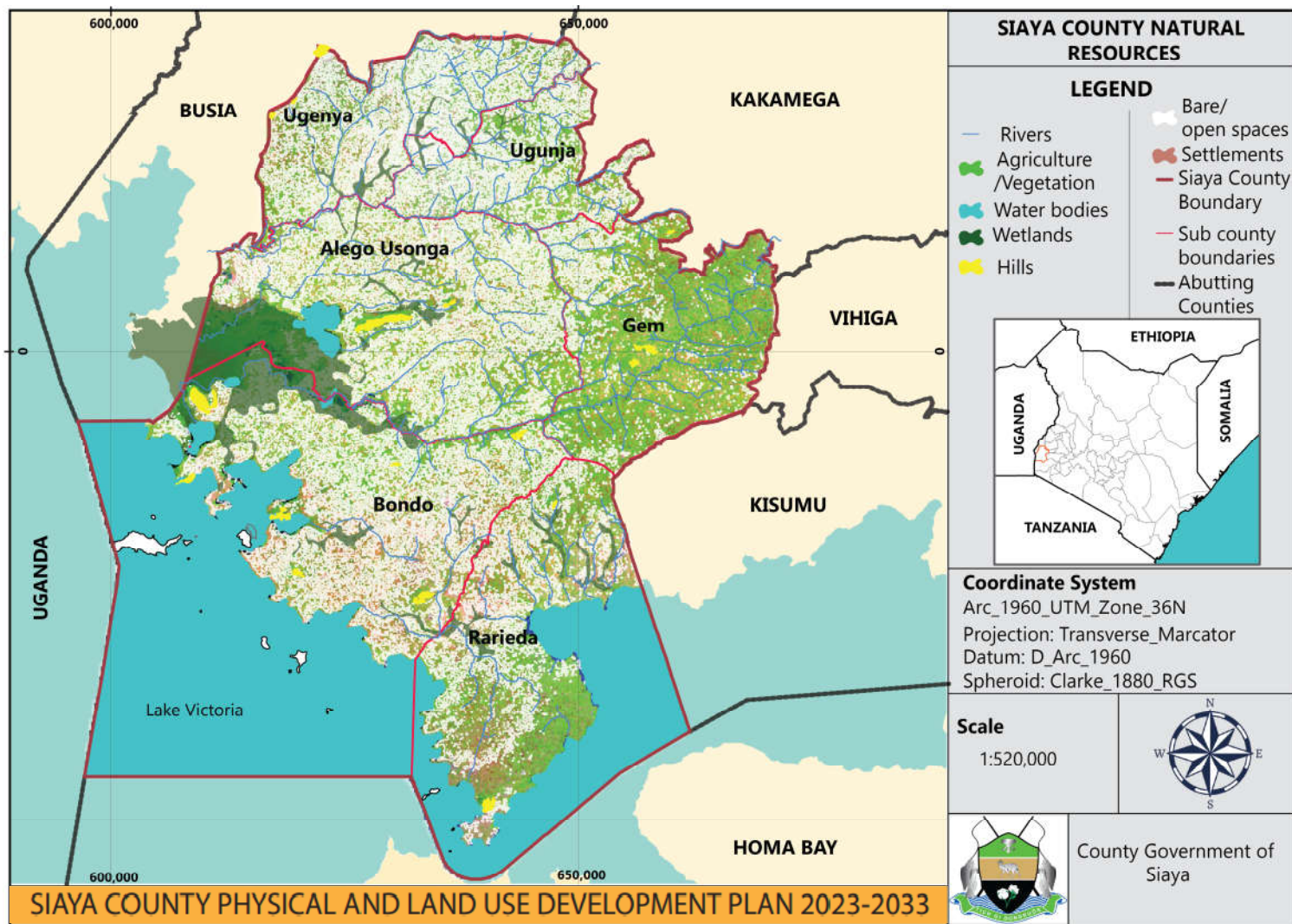
Siaya County is endowed with several natural resources ranging from minerals, water bodies (Lake Victoria, Lake Kanyaboli, Lake Sare, River Yala, River Nzoia and their tributaries namely Huro, Akala North, Nyamonye, Wuoroya, Dande and Seme Awach), wetlands, forests, hills and mountains.

7.3.1 Emerging Development Issues

- Sporadic flooding causes threats to life and property.
- Erosion causes hazardous consequences to water flows, land, forests, objects and other immovable properties.
- Insufficient preservation, protection and rational exploitation of natural resources



Map 7.2: Siaya County Flood Risk Areas



Map 7.3: Distribution of Natural Resources in Siaya County

CHAPTER 8: HUMAN SETTLEMENTS AND URBANIZATION

8.1 Introduction

Human settlements result from the concentration of people and activities in a region due to population growth, the rapid transformations of space, social and cultural values and aspirations of people, emerging technologies and economic systems. They can be categorized as either rural or urban i.e., dispersed or nucleated and are characterized by a mosaic of built and natural spaces for economic and social activities. Rural settlements are homogenous and sparsely populated, and practice agriculture as the most predominant economic activity. Urban settlements on the other hand are heterogeneous, densely populated, and primarily contain non-agricultural aspects of the economy such as commerce, industry and services. A settlement pattern of a region affects its overall economy, quality of life, governance and environmental integrity. In conceptualizing the Siaya County Physical and Land Use Development Plan, it is paramount to select, adopt and promote a regional settlement pattern for its integrated, balanced and sustainable development.

8.2 Patterns and Trends of Human Settlements

Settlement patterns in the County follow the agroecological zones where high-potential areas have the highest population density in the County. Such high-potential areas include South Alego, Ukwala, North Ugenya, Central Ugenya, Yala, Wagai, Central Sakwa, Mageta Island and Asembo Central locations. The low areas include South West Alego, Usonga, West Sakwa, Usigu and East Uyoma locations which have low population densities. Other factors such as transportation corridors and fish landing bays equally define settlement patterns and the direction of growth in the County. There are large nuclear settlements along major fish landing beaches such as Misor, Luanda Kotieno and Kamarigo in Rarieda Sub-County; and WichLum, Usenge, Uhanya, Honge and Nangoo in Bondo sub-County.

8.3 Rural Settlements

Siaya County is characterized by dispersed rural settlements which constitute 89.2 % (751,464) of the total County population based on the 2009 census. The rural is characterized by large to small-scale agriculture which contributes to 79% of the household incomes. The level of infrastructure facilities in the rural areas in Siaya County is poor. The main issues in the rural areas of the County are high illiteracy levels, unemployment, poor electricity connections, lack of sewer lines, and lack of piped water supply. Thus, it is important to address these needs in the development of the County.

8.4 Housing

Housing typologies in Siaya County have been characterized based on construction materials as permanent and semi-permanent¹. Permanent buildings are constructed using materials that have a lifespan of 2 decades and beyond such as tiles, iron sheets, ballast, cement, wood and iron bars. Semi-permanent structures are constructed using materials that cannot maintain stability for more than a decade such as clay, wood or grass. According to the Kenya Bureau

¹ County Government of Siaya. (2013). *The County Integrated Development Plan 2013 – 2017*

of Statistics (2013), the following findings have been documented about construction materials².

8.4.1 Flooring

It is approximated that earth floors constitute 70.1 per cent of households, cement floors (29.0 per cent), tiles (0.40 per cent), and wooden floors (0.40 per cent). Bondo Sub County has the highest share of cement floors at 42%. That is twice Gem Sub County, which has the lowest share of cement floors. Bondo constituency is 13 percentage points above the county average. In regards towards, Siaya Township tops with a share of 68% for cement floors.

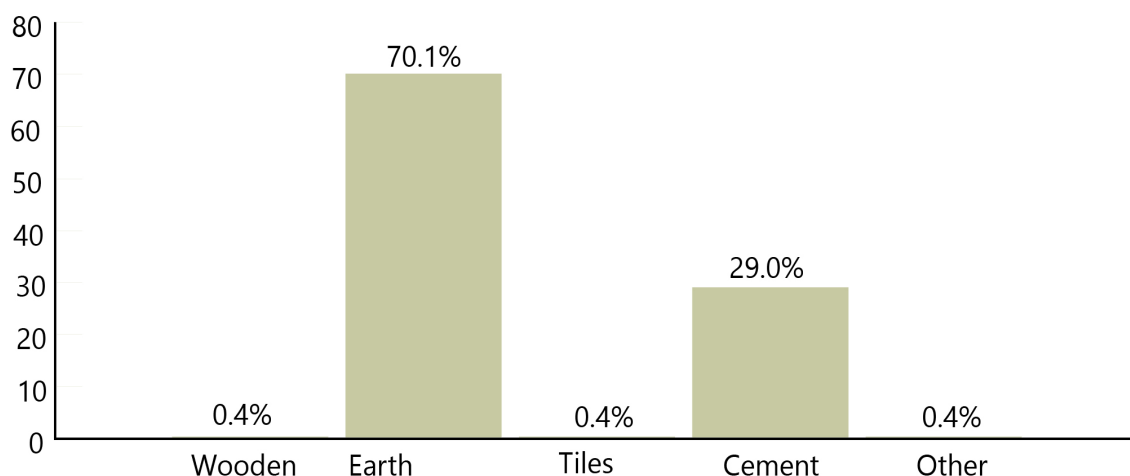


Figure 8.1: Percentage Distribution of Households by Floor Material in Siaya County

8.4.2 Roofing

Less than 1% of the County residents live in homes with concrete roofs, while 66% have corrugated iron sheet roofs. Makuti/grass roofs constitute 32% and asbestos sheets 0.9 %. Bondo Sub County has the highest share of corrugated iron sheet roofs at 78% while Ugunja Sub County has the lowest. West Yimbo ward has the highest share of corrugated iron sheet roofs at 87% while East Ugenya ward has the lowest share of corrugated iron sheet roofs. Ugenya Sub-County with the highest share of grass/makuti roofs at 46% while East Ugenya ward has the highest share of grass/makuti roofs at 57%.

² Kenya National Bureau of Statistics. (2013). *Exploring Kenya's Inequality: Pooling Apart of Pooling Together*.

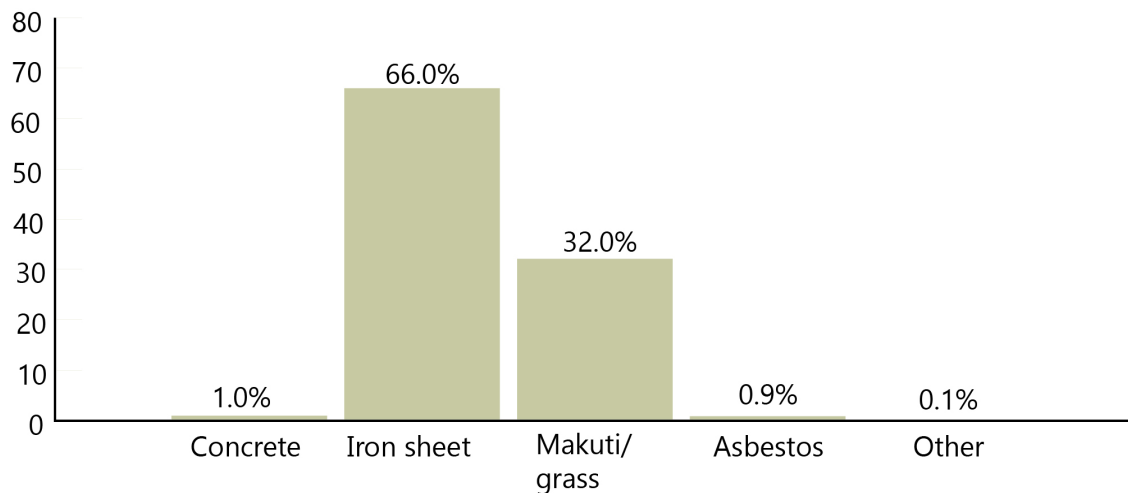


Figure 8.2: Percentage Distribution of Households by Roof Material in Siaya County

8.4.3 Walling

In Siaya County, 15% of homes have been built with brick or stone walls and 83% mud/wood or mud/cement walls. Less than 1% has wood or corrugated iron sheet or grass/thatched walls and 1% has tin or other walls. Alego Usonga Sub County has the highest share of brick/stone walls at 18% while Gem Sub County has the lowest share of brick/stone walls. Siaya Township ward has the highest share of brick/stone walls at 56% while Central Alego ward has the lowest share of brick/stone walls. Rarieda Sub County has the highest share of mud with wood/cement walls at 86% while Alego Usonga Sub County has the lowest share of mud with wood/cement. Central Alego ward has the highest share of mud with wood/ cement walls at 93% while the Siaya Township ward has the lowest share of mud with wood/cement walls.

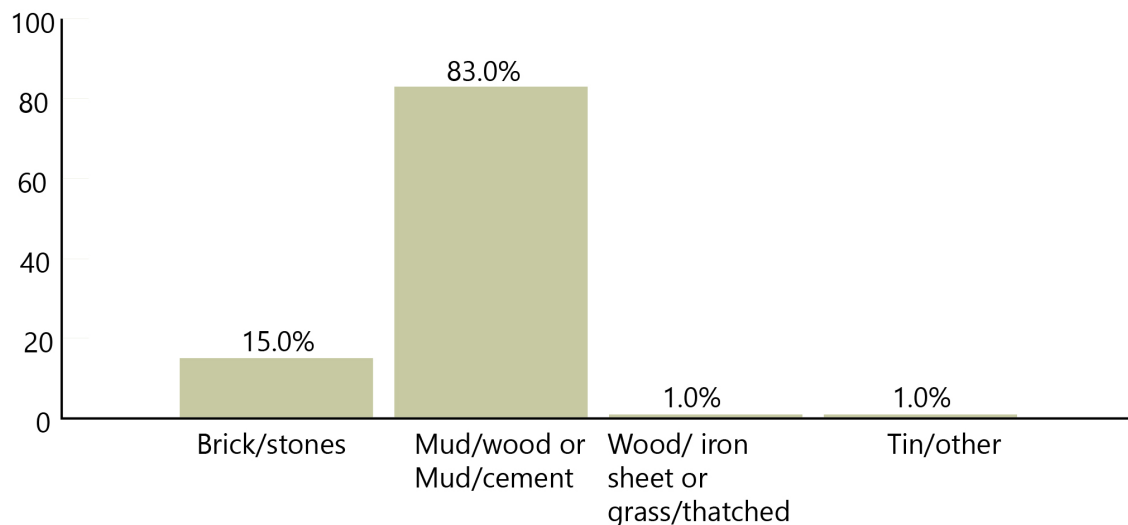


Figure 8.3: Percentage Distribution of Households by Wall Material in Siaya County

8.4.4 Housing Providers

Housing providers in the rural areas are mainly by individual owners while in the urban areas, provision is by private developers, National Housing Cooperation and Ministry of Housing for civil servants. Government housing is mainly for administrative offices are 233; 15 units

of High Grade (HG) 104 units of Medium Grade (MG) and 139 units of Low Grades (LG).

³The distribution of these housing units in the County is as summarized below:

Table 8.1: Siaya County Housing Providers

Sub County				Police line		AP. Line		Totals
	HG	MG	LG	MG	LG	MG	LG	
SIAYA	8	72	49	65	0	1	23	218
BONDO	3	6	2	2	28	0	15	56
GEM	0	15	52	0	16	0	4	87
UGENYA	3	7	14	2	22	0	6	54
UGUNJA	0	2	6	0	0	0	0	8
RARIEDA	1	2	16	0	0	0	0	19
TOTALS	15	104	139	69	66	1	48	442

Source: Siaya County Housing Office cited in the County Integrated Development Plan 2013 – 2017

8.5 Urbanization and Evolution of Planned Settlements

Over the years urban centres of Siaya County were planned and developed by preparation of local physical development plans as mandated by the Town Planning Act of 1948 and the Land Planning Act of 1961. These urban centres included: Bondo, Siaya, Yala, Ukwala, Ugunja, and Rarieda formerly division headquarters for the original Siaya District. Later these towns graduated as district headquarters and are the current sub-County headquarters. Other towns have evolved due to strategic socio-economic activities: Usenge is a major fish landing beach and Ugunja is a strategic location on Kisumu-Busia Road. Ukwala is the oldest major urban centre in Siaya County formerly hosting Nyanza colonial headquarter and Law Courts. Asembo Bay (Kamito) was a port connecting Siaya County and Homabay and by extension greater East Africa, however, it lost its port function due to a decline in Lake Transport compared to more convenient road transport.

8.5.1 Urban Settlements

Urban centres are the focal points for commerce, industrial development, scientific innovations, recreation, governance, cultural transformation as well as service delivery systems. Within Siaya County, there are 14 urban centres with a total urban population of 90,840 in 2009 which is about 10.8% of the total population. The most dominant urban centres in the County include Siaya, Bondo, Nyadorera, Ugunja, Sega, Yala, Aram, Akala, Luanda Kotieno, Sigomere, Sidindi, Aboke, Usenge, and Ndori. These towns currently perform specific strategic functions based on socio-economic and natural resource capital in the neighbourhood. Access to basic facilities and services such as; Water and sanitation is not good in all the major urban centres within the County. Slums are upcoming, especially along the beaches. The existing settlements /build-up is given in Figure 8.1. The population share of the urban centres is summarized in the table below.

Table 8.2: Urban Population and Settlements in Siaya County, 2009

Sr. No.	Urban centre	Urban Population	% Urban Population to Total Urban Population
1.	Bondo	33,468	36.8%
2.	Siaya	22,586	24.9%
3.	Usenge	10,098	11.1%
4.	Ugunja	7,242	8.0%
5.	Yala	6412	7.1%

³ County Government of Siaya. (2013). *The County Integrated Development Plan 2013 – 2017*

Sr. No.	Urban centre	Urban Population	% Urban Population to Total Urban Population
6.	Ukwala	5,187	5.7%
7.	Others	5,847	6.4%

Note: * - % indicates % of the Urban population to the total urban population of Siaya County.

Source: KNBS, 2009

8.5.2 Hierarchy and Functionality of Towns

The hierarchy of towns is based on the percentage share of urban population and functionality of towns which is as highlighted below: -

Bondo Town is ranked first among the six most populated towns with a percentage urban population of 36.8%. The town was formerly a division and district and currently Bondo Sub-County headquarter. It is emerging as an *education hub* hosting a university (Jaramogi Oginga Odinga University of Science and Technology), tertiary institutions (Bondo Medical Training, and Bondo Technical Training Institute) and Maranda High (a national school), other schools are Bar Kowino, Nyamira, Jaramogi, Bar Chando, Bondo Township, and Nyawita). Bondo lies at the heart of a *fishing zone* (10km from the Lake) and major fish landing beaches such as Usenge, Uhanya, Wichlum, Misor, and Luanda Kotieno among others. The strategic location of the lake generates a multiplier effect in infrastructural development. Currently, the town hosts one of the largest open-air markets in the County and availability of financial institutions such as commercial banks (Kenya Commercial Bank, Equity Bank, and Cooperative Bank); Hotels such as Pride, Kings, Switel, Legacy, Don, Acacia Resort; commercial shops; and Bondo Cereal (silos). Other public institutions include Sub-County Hospitals and Police Stations, Post Offices and Magistrate Courts and other Government Sub-County Departments (Agriculture, Education, National Administration, Forestry, Lands, Culture and Fishing.). The town also hosts Non-Governmental Organizations (Red Cross, World Vision, Plan International, and Care Kenya). Bondo Township in terms of infrastructure within the Central Business District (CBD) and other peripheral areas has tarmacked roads, electricity and water reticulation system.

Siaya Town is the second town in rank with 24.9% of the urban population, and was formerly the district headquarter from 1970 and currently is the County headquarter within the devolved government structure. It is the *Governance hub* of the County as it hosts the Governor's Office and County Cabinet (County Executive Committee), Chief Officers, and County Directors of Department offices. The town also hosts the County Assembly (the Legislative) arm of the County Government. As a *commercial hub*, Siaya Town performs regional financial functions: Commercial banks (Kenya Commercial Bank, Equity Bank, and Cooperative Bank), Hotels (Mwisho Mwisho, Siaya Central, County Club, Distinction Gardens, Villa, and White Castle). As an *Educational hub*, the town hosts Siaya Medical Training College, Siaya Technical Institute and Agricultural Training College. Other schools include Mbag (Girls and Mixed), Ng'iya, Siaya Township, Mulaha, Siaya Central, Hono, Ndere, Karapul, St. Juliana, Barding, Holy Crossed, and Christian). Other public institutions include County Referral Hospital (Level 5), Police Station, National Administration, Magistrate Court, Huduma Centre, and Post Office. Other National Government and County Offices (and Sub-County) are National Environmental Management Authority (NEMA), Kenya Forest Service, Kenya Wild Life Service, Water Resource Management Authority (WRMA), Water Service Board (WSB), Agriculture, Health, Lands, Fisheries, Industry, Trade, Culture, Sports). The township also hosts Non-Governmental Organizations (Red Cross, World Vision, Plan International, and Care Kenya). Siaya Township in terms of

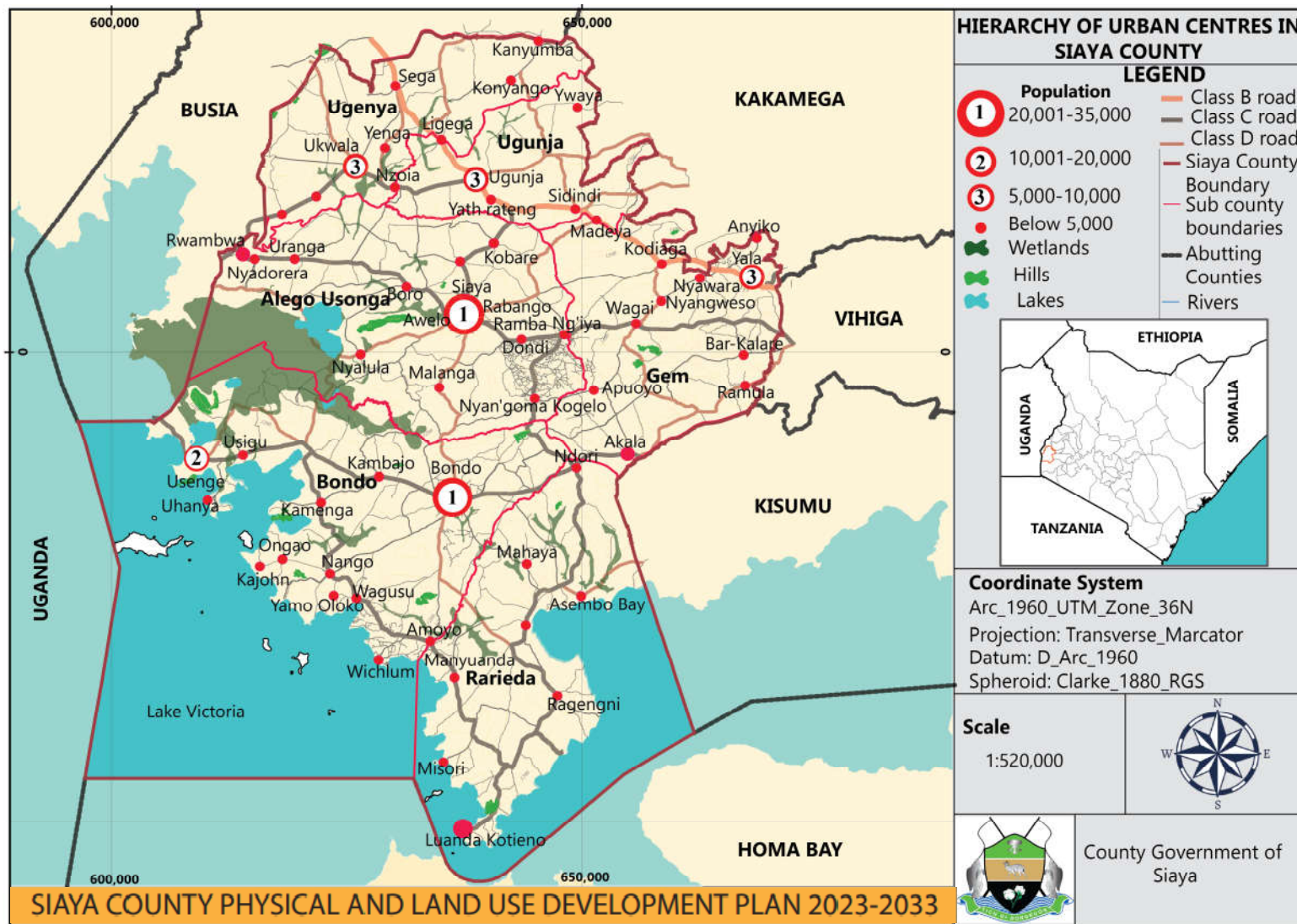
infrastructure within the Central Business District (CBD) and other peripheral areas has tarmacked roads, electricity and water reticulation system.

Usenge Town is ranked third urban centre in Siaya County (11.1% urban population) and hosts a Chief's office as an administrative function. This town is unique in terms of natural endowment, and location on the shores of Lake Victoria which serves as a fish landing area. The port handles traded goods and services as it is an entry point of most of the fish harvested from Busia, Siaya, Kisumu County and also from Uganda and Tanzania which gives it an international economic advantage. The town has a road connection to Bondo and Kisumu City, therefore a transport hub connecting the County and Lake. As an *ecotourism hub*, the town is endowed with various tourist destination areas and Islands such as Mageta, Migingo, Mfangano, Mbita and Rusinga and is Located within Got Ramogi Forest Reserve and Yala Swamp (Dominion Farms). Usenge Township in terms of infrastructure within the Central Business District (CBD) and other peripheral areas has tarmacked roads, electricity and water reticulation system

Ugunja Town is fourth in rank with an 8.0% share of the urban population. It serves as the Ugunja sub- county headquarter and is a major transportation hub traversed by a class B road (Kisumu-Busia Road). Due to its strategic position in the County, the town has been growing both spatially and demographically over the years. As an Educational hub, Ugunja town has various educational institutions.

Yala Town is the fifth in rank and was formerly a divisional and district headquarter. Currently, the town serves as the headquarter of Gem Sub-County which gives it an administrative identity. Yala Town hosts the following urban functions: It is a *transport hub* with a railway terminus (Kenya-Uganda Railway) and Kisumu-Busia Road (International Road to Uganda) thus a strategic transport corridor. Yala Town as an *Education hub* hosts Moi University Odera Akongo Campus, and other schools (Yala High School, Ulumbi, and Maliera). The town has the potential to develop as an *Industrial hub* of Siaya County as it has a sugar factory (Ulumbi Juggery) and transport connectivity as a location advantage and is located in an agro-ecological sugar zone. In terms of commercial activities, it has no banking services other than financial agents, but with several commercial shops and duka wallas, Hotels (Yala Resort, Ndanu Falls Resort). As a *communications hub*, the town serves as a suitable location for the installation of communication masts due to its high elevation compared to other regions of the County. Its hosts various sub-regional stations such as Nyamninia Radio Station, Safaricom and Airtel masts. In terms of infrastructure within the Central Business District (CBD) and other peripheral areas, it has tarmacked roads, electricity and a water reticulation system.

Ukwala Town is ranked as the sixth urban centre in Siaya County, formerly a division and district headquarters respectively and currently, the Ugenya sub-county headquarter. This township, historically, is one of the oldest urban centres in Siaya County. Ukwala was formerly, the colonial regional headquarters for Central Nyanza (present Busia, Siaya, and Kisumu Counties) and hosted the oldest judicial system (colonial court). It, therefore, has the potential to remain the *Judicial hub* (establish Courts at Lower to Higher Levels) of the county. In terms of commerce, several shops and a post office have been established. It hosts several educational facilities (Ukwala, Yenga), while public institutions include: a magistrate court, police station, national administration, forest, agriculture, trade, sports, and culture). Ukwala Township in terms of infrastructure within the Central Business District (CBD) and other peripheral areas has earth roads, electricity and a water reticulation system.



Map 8.1: Hierarchy of Urban Centres in Siaya County

8.5.3 Classification of Potential Growth Hubs and Drivers for Development

Transport hubs: Siaya County is strategically positioned to other regions and especially to Uganda, Busia and Kisumu Counties through the Kisumu-Busia Road, Usenge-Bondo-Kisumu Road, and Nyadorera-Siaya-Kisumu Road and Lake Victoria connecting to Kisumu, Homabay, Migori, Busia and Uganda. This gives it a regional advantage stimulating growth and development that attracts growth centres and in itself forming a key growth corridor.

Ecotourism and Fishing hubs: The County is predominantly recognized for its fishing activities and ecotourism along the beaches of Lake Victoria and Kanyaboli, promoting economic growth and development.

Education hubs: These institutions include Jaramogi Oginga Odinga University of Science and Technology (Bondo), Proposed Barack Obama University (Siaya), Kenya Medical Training Colleges (Bondo and Siaya) and Technical Institutes (Siaya and Bondo) which attract population and infrastructural development making them key growth nodes.

Governance hubs: These are classified as towns due to their administrative functions and include county headquarters (Siaya), Sub- County headquarter (Bondo, Ugunja, Ukwala, Yala, Siaya, and Aram) Ward administrative centres, and priority towns (Yala, Ukwala and Ugunja).

Industrial hubs: These are regions that will serve as industrial centres of the county. They will be developed with special packages and a special focus on industrial development. An example of this town is Yala which has potential for sugar processing industries.

Commercial and Agriculture hubs: These towns majorly serve as an impetus for the exchange of goods and services.

Medical hubs: Include regions with highly specialized medical facilities in the county. These hubs include Siaya (Siaya County referral hospital), Bondo (Bondo sub-county hospital), Usenge (Got Ambira sub-county hospital), Yala (Yala sub-county hospital), Ugunja (Ambira sub-county hospital), Ukwala (Ukwala sub-county hospital), Madeya (Inuka sub-county hospital), and Madiany (Madiany sub-county hospital).

8.5.4 Urbanization Strategies in Kenya

According to the National Human Settlement Strategy (1978), the hierarchy of settlement centres was enumerated for the country to concentrate facilities and services required by the populace living within towns and their hinterlands.⁴ As a result, urban settlements were classified as functional levels based on their range and level of services and scale of hinterland served. The five categories of centres are as follows⁵:

a. Growth Centres: these are growth poles with potential for urban and industrial growth as well as have the capability to induce growth in larger centres that offer one or more specialized growth functions and which can accommodate major redistribution of the population. They will be linked with the national trunk road system.

b. Service Centres:

i. Urban Centre: This is the highest category of planned service centres. An urban centre is expected to have a residential population of over 5,000 and has a full range of services associated with a town with a treated piped water supply, a sewerage system and a disposal plant. It should be able to serve a rural hinterland of 100,000-150,000 population, have a

⁴ Nyandarua District Regional Development Plan, 2001-2030: An Integrated Plan for Sustainable Regional Development (2003).

⁵ Human Settlements in Kenya, A Strategy for Urban and Rural Development, Physical Planning department, Ministry of Lands and Settlement, 1978

specialized hospital, secondary schools and other specialized services. They should function as reception centres for rural migrants seeking employment and social amenities.

ii. **Rural Centre:** It is intended to serve about 40,000 population with a residential the population of between 2,000 and 10,000 inhabitants. The centre should have a secondary school, a health centre, better shopping facilities and bigger markets. It is expected to eventually have piped water supply, a sewerage disposal system, telephone services and full postal and banking facilities

iii. **Market Centre:** It approximately serves 15,000 rural populations and a residential population of less than 2,000 people. The centre is designated for the development of a public water supply, a sub-post office, telephone facilities, a police post, a local bus service and other social, commercial and local administrative services.

iv. **Local Centre:** It is at the lowest level of the service centre designated to serve the local needs of people within walking distance. It should contain a primary school, several shops, a dispensary, a public water supply system and an open-air market. It should serve 5,000 populations from the hinterland who are not residents in the centre.

8.6 Settlement Pattern Options for Developing Siaya County

This plan explores various options for the development of regions of Siaya County. These options and their implications are discussed below:

8.6.1 Mono Centre

The spatial structure of human settlements in this case is characterized by only one strong nucleus (node) which develops and there is no existence of important function in other centres. In the case of Siaya County, Siaya has been the central point of all development and administration hence, such a model would promote stronger growth. However, this would lead to the stagnation of other regional towns as well as the concentration of development in a single area.

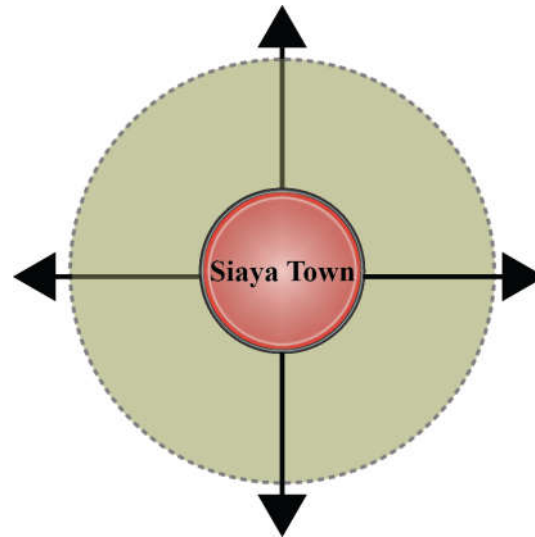


Figure 8.4: Monocentric Spatial Pattern

8.6.2 Twin City Development

There is the development of two strong nuclei which serve as the primary focus for growth and development. For example, in Siaya County – Siaya with another node – possibly Bondo – which can perform the function of competing or supplementing each other. This model enhances vibrant transport interconnectivity, growth and development between the two nuclei. This however leads to the retardation of other towns in the region.

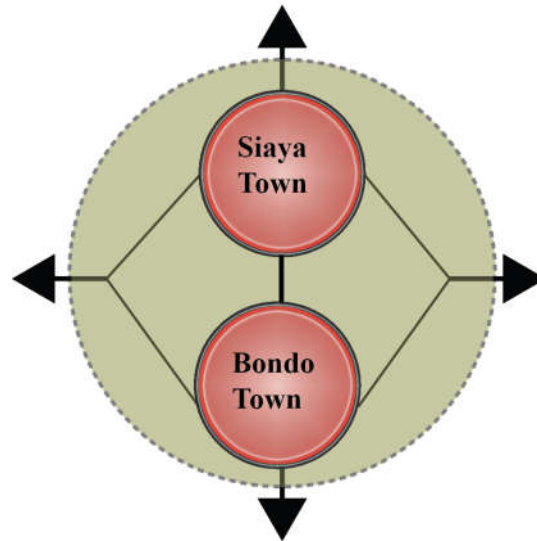


Figure 8.5: Twin City Development

8.6.3 Poly-Nucleated Spatial Pattern

The concept promotes balanced regional development by concentrating on development in various urban settlements. In this model, all centres have the same relevance and have the right of “spatial participation” in planning. The centres are strongly interconnected transportation systems – both public and private. In such a scenario, planning considerations should spatial equity in urban development and sustainable urban-rural linkages, development of necessary infrastructure, ensure prudent governance and protection of natural and cultural heritage. This type of model accelerates the growth of regional towns

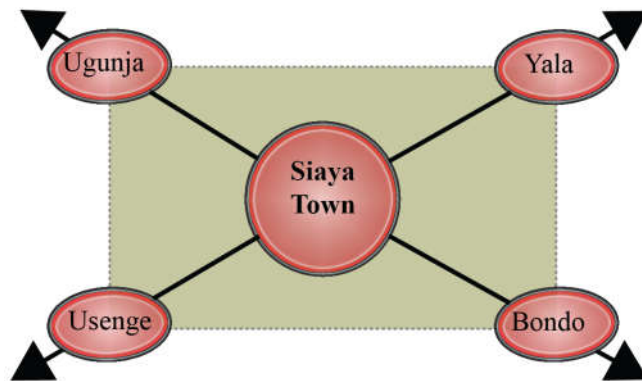


Figure 8.6: Poly Nucleated Spatial Pattern

and if not well planned can result in the deceleration of the core urban centre – in this case, Siaya town.

8.6.4 Bi-polar Corridor Spatial Pattern

In this case, minor settlements emerge along transportation corridors connecting strong nuclei. This promotes vibrant development corridors with strong interconnectivity core centres. In Siaya County, Bondo to Siaya, Siaya to Nyadorera, Siaya to Ugunja, Ugunja to Yala. However, this type of spatial structure may result in the retardation of other areas.

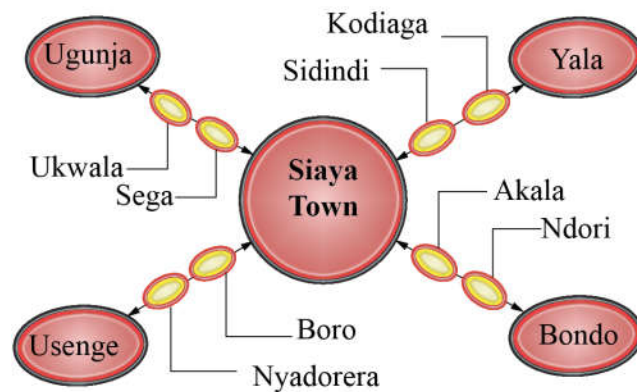


Figure 8.7: Bi-polar Corridor Spatial Pattern

8.6.5 Transit Corridor Cum Ring Development

This type of spatial structure allows for the development of human settlements along transportation corridors and rings. This promotes high intensity of development along the core centres with strong transport connectivity which requires intense investments.

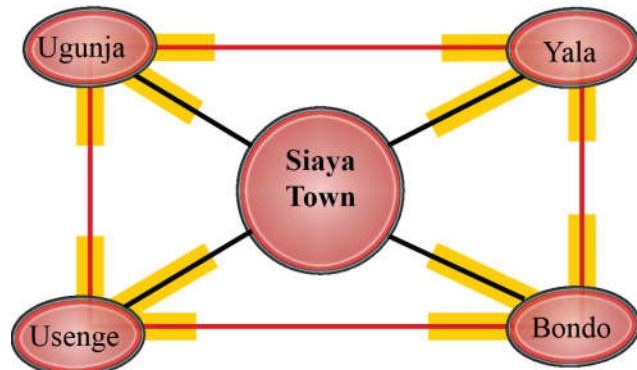


Figure 8.8: Transit Corridor cum Ring Development

8.6.6 Proposed Spatial Pattern for Siaya County

The proposed spatial pattern is an integration of various development and growth models. To promote balanced regional development with a strong transport inter-connectivity of settlements with transit-oriented developments in the County, the following spatial patterns are adopted:

1. Transit Corridor cum Ring Development Strategy
2. Nodal-Oriented Development Strategy
3. Balanced Regional Development Strategy

This spatial pattern is perceived as an integration of Siaya with other urban areas in the County to promote balanced regional development.

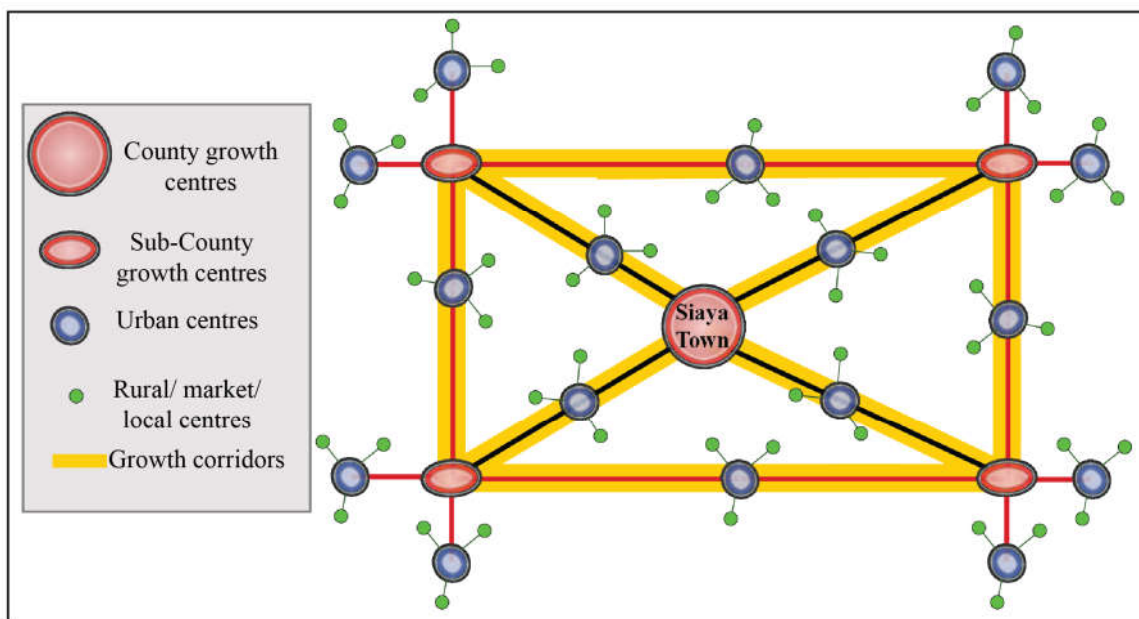


Figure 8.9: Proposed Settlement Patterns for Siaya County

8.7 Emerging Issues

The growth and development of settlements in Siaya County like many other settlements in Kenya are faced with various challenges – cutting across urban and rural settlements- that require to be addressed to achieve the much-desired future of the County.

8.7.1 Dispersed (rural) Settlements

I. Poor infrastructure development

With more than 89.2 % of the total population in Siaya County living in rural areas, access to quality infrastructure such as water, roads, electricity, health facilities, water supply, education, housing and related facilities is a challenge.

II Uncontrolled subdivision and conversion of agricultural land

As a result of population growth, there has been excessive subdivision of agricultural land due to inheritance or sale. The increasing investment and infrastructural development have resulted in the change of use from agriculture to commercial, residential or related land uses. Additionally, the Transportation of agricultural produce, goods and services has led to the growth of urban centres along the corridors. This is a threat to arable land as it results in more subdivisions and conversions.

III Encroachment on fragile ecosystems

The ever-increasing population exerts pressure on land which leads to encroachment of fragile ecosystems such as lakes, wetlands, forests, rivers and hills. Most of the affected areas in the County include Yala Swamp, Lake Victoria, Mbaga Hill, River Nzoia and Yala among others.

8.7.2 Nucleated (urban) Settlements

Urban areas of Siaya County are faced with various challenges which include: -

I. Poor infrastructure and services

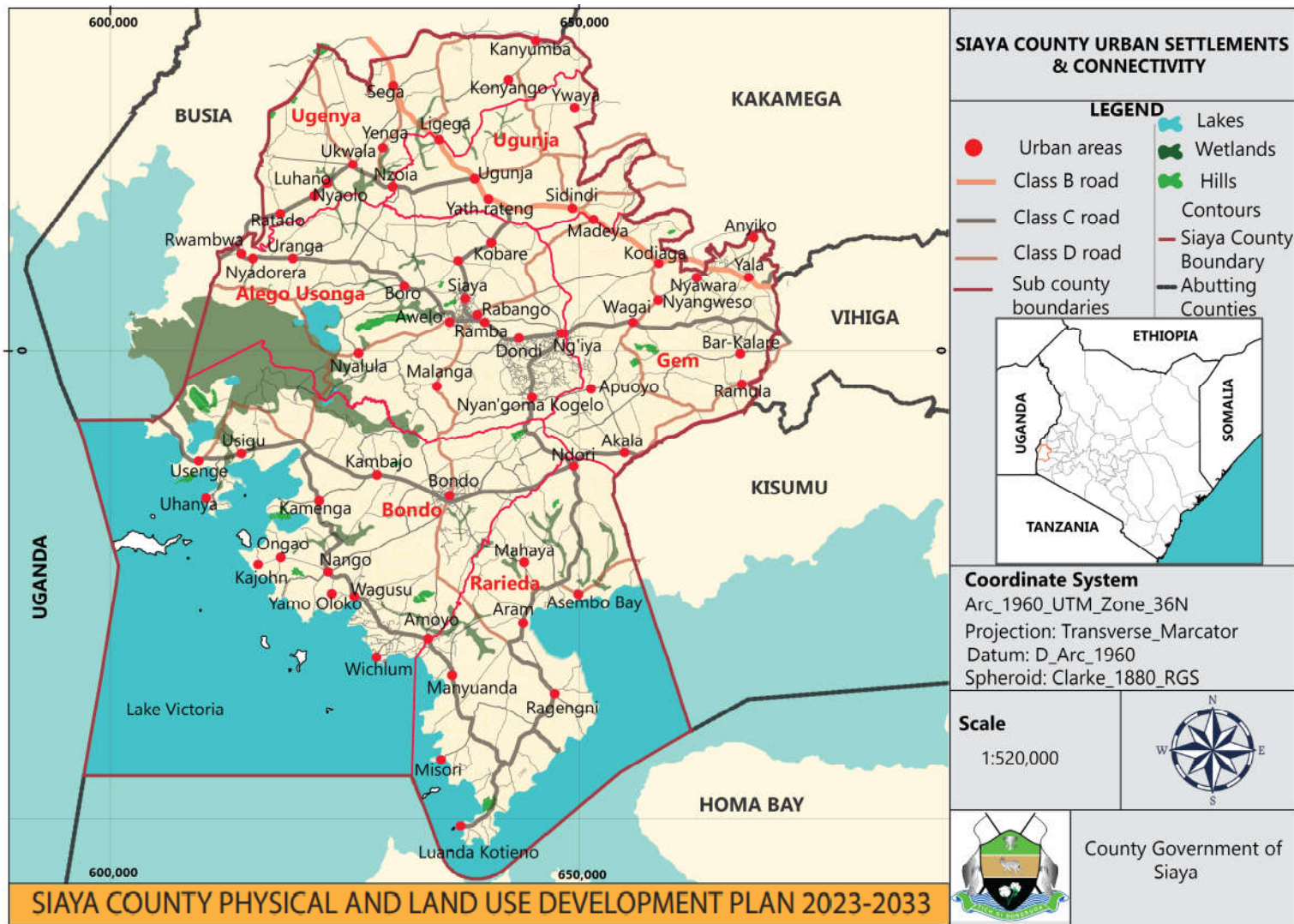
The level and standard of infrastructure and services in all the urban centres are low or completely lacking. Among the most glaring problem are poor conditions of roads, poor sanitation, poor solid waste management, poor transport management, electricity and sub-standard housing.

II. Weak institutional support in planning, implementation and enforcement

This has led to uncoordinated urban development as well as poor delivery of services. Most of the urban centres lack a physical development plan to serve as a guide for infrastructure development.

III. Growth of informal settlements

IV. Environmental degradation



Map 8.2: Siaya County Urban Settlements and Connectivity

CHAPTER 9: TRANSPORT, INFRASTRUCTURE AND SERVICES

9.0 Introduction

Infrastructure services act as a fulcrum to facilitate socio-economic growth, and this situational analysis provides information on existing facilities as opportunities and challenges as well as their access by the people is paramount. In general, infrastructure deals with elements that keep civilization together, such as electric power production and distribution systems; dams and water and irrigation systems; a collection of sewage, pipelines and processing; roads and bridges; airports and public transport systems, things which we greatly depend on. Infrastructure represents the foundations of the basic equipment and instruments, as well as capital apparatus, which are needed to have the economic basis of a country's function. It is a common practice to put infrastructure as a sandwich between governance, which regulates it, and trade (or commerce), which depends on it. Generally, infrastructure in the County has been classified as economic infrastructure (shops, slaughterhouses, industries), Transport and communication (Road transport, water transport, telephone masts, air transport), Environment (Rivers, water points, sewerage systems, dumping sites), Water and sanitation (Water supply, intake, water kiosks, treatment plants), Economic infrastructure (Markets and beaches), Social infrastructure (Correctional unit, social halls, libraries, playgrounds, schools, health facilities), Communication (Power lines, fibre optics, telephone masts), Energy (Wood fuel, electricity, solar and biogas), Security infrastructure (County administrators, police stations, prison) and Human settlement: Urban and rural settlement. Analysis of infrastructure services in Siaya County is two-fold: physical infrastructure and social infrastructure. Physical infrastructure includes roads, railways, airports, water supply, power lines, pipelines and cables. Social Infrastructure includes health, schools, community centre, police stations, post offices and administrative centres.

9.1 Transport Network and Distribution

The government of Kenya recognizes the vital role played by transport in enhancing economic transformation. Transport is seen as an engine that steers faster economic growth and sectoral development. Due to this critical role, the county government must invest heavily in the provision of infrastructure to improve transportation services for both goods and passengers. The national Government has established State Department in charge of Transport to regulate and control transport services in the country.

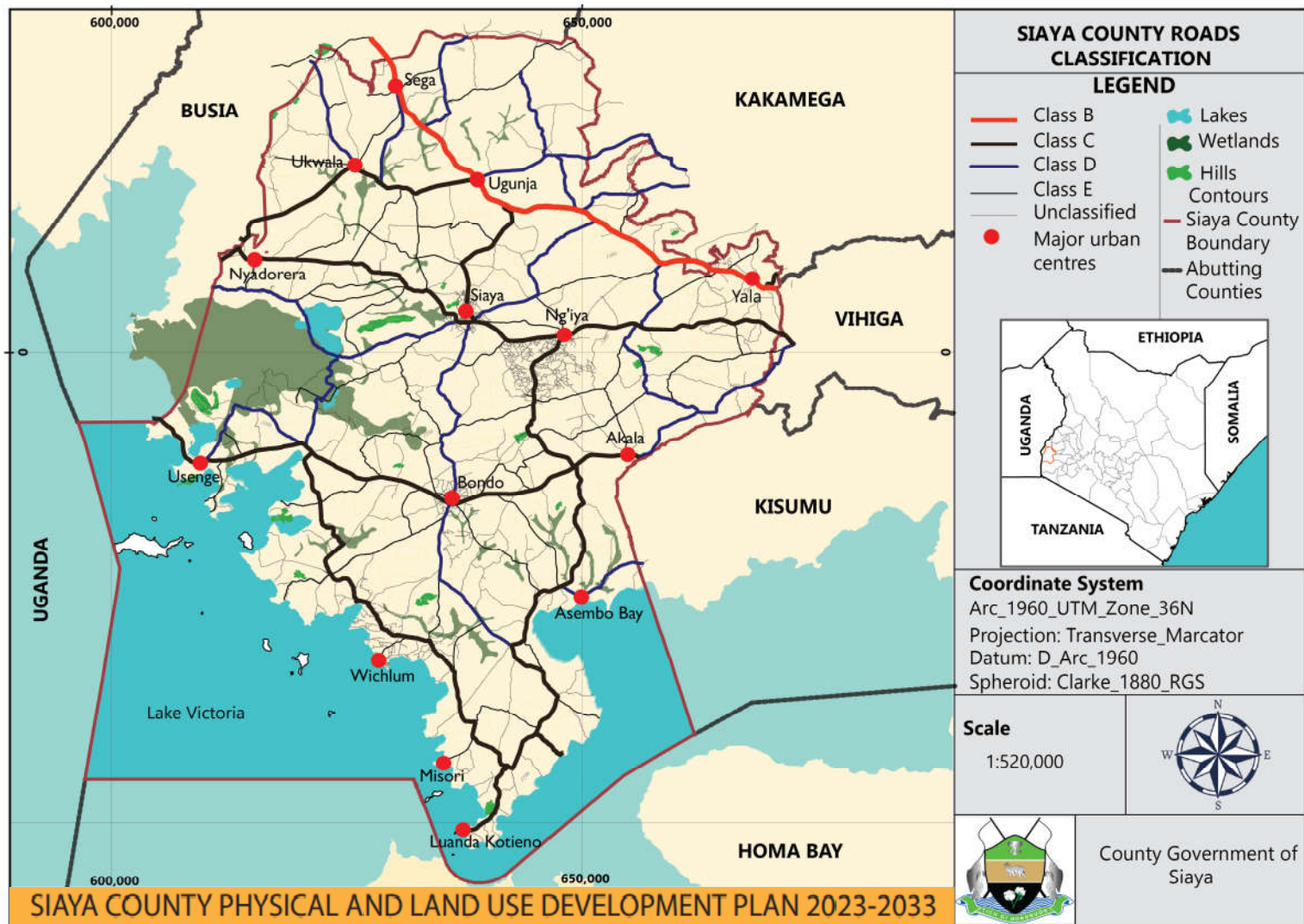
9.1.1 Road Transport

Road transport is the most popular system of transport, providing transport for both goods and passengers. Matatus, boda boda, bicycles and pedestrian movement constitute the bulk of road transport in Siaya County. The County has roads classified as B, C, D and E as highlighted:

- **Class B-** connecting Kisumu from Segla, Ugunja, Sidindi,
- **Class C-** connecting Kisumu from Bondo and then to Lwanda Kotieno where a ferry dock.
- **Class D** – connecting Siaya district and Bondo
- **Class E-** connecting important market centres within the county.
- **Rural access roads** connecting rural centres within the county.

The County had 283.2 Km of bitumen standard roads, 1,903 marram roads, and 1,528.0 earth roads by December 2016. The County has witnessed an improvement in the road network with several roads being tarmacked; these include the Rang'ala-Siaya-Bondo road which is

100% complete, Akala-Luanda Road and Siaya-Nyadorera Road which is 100% complete. Ndori-Owimbi-Luanda Kotieno, Bondo -Misoro –Mituri, Kisian- Bondo and Ngiya- Ndori roads have all been tarmacked. 700 km of roads in the County have also been opened, graded and graveled through the county government initiative. The poor road conditions in some parts of the county hinder the growth of agriculture in the predominantly agricultural county of Siaya. Over 70% of the road network in the county is in a poor state. Proximity to tarmac road analysis indicated that over 50% of the county is still not close to tarmac roads, which is an average 5 Km radius in terms of accessibility.



Map 9.1: Siaya County Roads Classification

9.1.2 Air and Railway Transport

There are three airstrips in the County namely: Gombe, Dominion and Segla. These airstrips are currently not in use, so there is a need for the county government to rehabilitate them. The airstrips should be used to promote tourism activities, enhancing the sanity of local and international tourists and providing space for an emergency landing. The County has a railway line from Nairobi at Yala Township connecting to Uganda though not operational.

9.1.3 Water Transport

The water transport in Siaya County (ferry and boats) is predominant and links people from the mainland to the islands as well as the neighbouring Counties of Migori and Homabay in South Nyanza.

9.2 Information and Communication Technology

This section assesses the means of communication in the area. These are telephone services, postal, cell phone services, courier services, newspaper, radio and television coverage.

9.2.1 Modes of Communication

Telecommunication: Fixed line network covers the mainland but not the islands (Magenta, Ndenda and Oyamo) while the mobile phone network is county wide with some areas having both or either of Safaricom or Airtel networks, 90 per cent mobile phones with main operators being Safaricom and Airtel communication companies, 0.5 per cent landline and 1.2 per cent of the household's computers. It is important to note that most of the government offices have internet connections through modems. Radio coverage is county-wide while the postal network covers the important business/market centres in the county. It is estimated that 75.2 per cent of the households in the County own a radio, 13.7 per cent of television sets

Postal services: The County has a total of 28 Post Offices and 21 sub-post offices spread across the region (Table 9.1). The County is serviced by three private courier services which include G4S, Wells Fargo and EMS. In addition to this, registered Public Service Vehicles also offer courier services.

Table 9.1: Postal Services

Post Offices and Letter Boxes	2013	2014
Post Offices	23	28
Letter boxes Installed	6,350	6,350
Letter Boxes Rented	3,980	4,012
Letter Boxes Vacant	2,370	2,338

Source: Kenya National Bureau of Statistics

9.3 Energy

In Siaya County, currently, there is no power plant for electricity generation. The energy supply is currently derived from the national grid. However, there is potential for harnessing other small-scale hydro-power from available resources such as waterfalls (Ndanu falls), wind power (along the lakeshore high potential) and solar energy (abundant sunshine) to start generating energy for local consumption (Figure 9.2). The energy consumption statistics were as follows: Paraffin lamps - 94% - of this, 73% use tin lamps. Total electricity usage was only at 4.3%. Only 2.4% of rural households had access to electricity. Total urban electricity access was at 20%. In 2014 domestic customer connection represented 84% of the total with 15.9% for small commercial and very limited industrial connections, an indication of low industrialization in the county (Table 9.2). Connection per customer entity indicated most secondary schools are connected to electricity compared to primary schools (Table 9.3). Most

trading centres are now connected to electric power under the rural electrification programme and the establishment of solar panels in most markets.

There are no gas sources in the County, which could be utilized. The County has no oil resources and refineries and therefore relies on its strategic location on Kisumu-Busia Road for the supply through road transport.

Table 9.2: Connection per Customer Category 2014

Category	2014	Percentage (%)
Domestic	22,606	84
Small Commercial	4,279	15.9
Industrial	2	0.0074
Total	26,887	100

Source: Kenya National Bureau of Statistics

Table 9.3: Electricity Connection per Customer Entity 2014

	Without Electricity	Without Electricity	Total
Trading Centres	126	37	163
Primary Schools	563	163	716
Secondary Schools	148	9	157
Health Centres	327	60	387
Category (in Litres)	2013	2014	
Super Petrol	114.2	113.8	
Diesel	106.2	104.4	
Kerosene	85.9	83.5	

Source: Kenya National Bureau of Statistics

Table 9.4: Petrol Consumption

Category (in Litres)	2013	2014
Super Petrol	114.2	113.8
Diesel	106.2	104.4
Kerosene	85.9	83.5

Source: Kenya National Bureau of Statistics

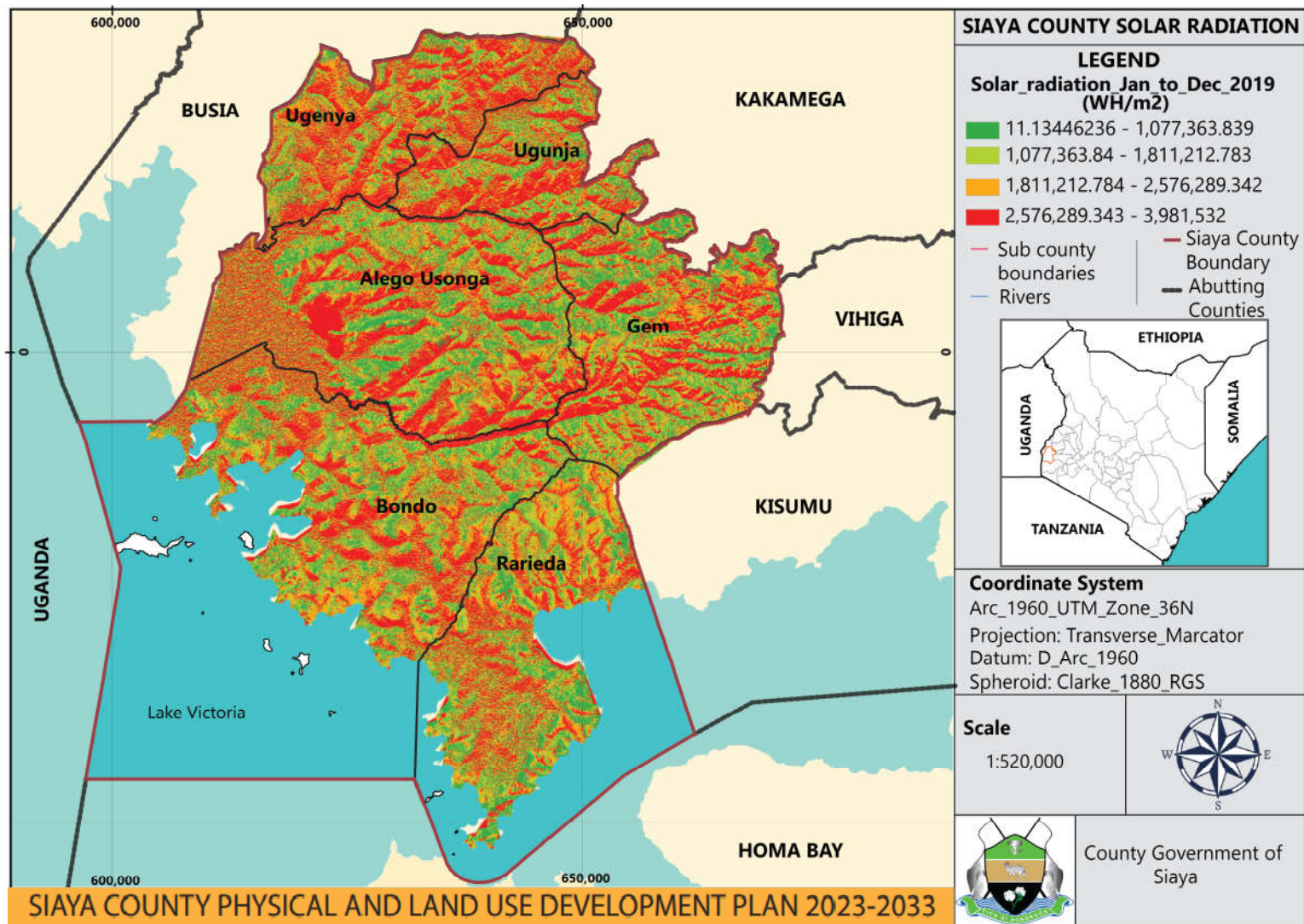
Table 9.5: Average Annual Pump Prices for Fuel by Category

Category (in Litres)	2013	2014
Super Petrol	114.2	113.8
Diesel	106.2	104.4
Kerosene	85.9	83.5

Source: Kenya National Bureau of Statistics

9.3.1 Energy Strategy

Sustainable energy infrastructure is conspicuously missing and untapped in the County, focus on wind power and solar energy needs to be up-scaled towards the achievement of Sustainable Development Goals. Exploring the development of alternative energy potentials such as wind power, solar energy, and biogas among others.



Map 9.2: Siaya County Solar Radiations from January to December 2019

9.4 Water Infrastructure

Adequate quantity and quality of water is a basic requirement for the development of a county because water is life. About 80 per cent of the water provided is disposed of as effluent, meaning that there should be safe disposal of wastewater and environmental protection. There are about twenty-four existing water supply schemes (9 owned by GOK, 5 by institutions, and 10 Community based) in the County that are utilized to provide water services to the people of the County. These schemes range from small community based to large piped water suppliers. The facilities are managed by Community-based management water committees, semi-autonomous water service providers and institutions. These water supply facilities provide water coverage of 42% serving about 396,000 people in the County. The water facilities are dilapidated and pose operational challenges thereby not sustainable and will require rehabilitation and expansion to bring them to operational status and cover the ever-increasing water demand. It is important to note that all the water facilities are pump-based systems consuming high power for their operations, this calls for project re-design to make the schemes gravity-based systems to reduce the high energy cost incurred by the facilities. One step the Government has taken is to undertake the upgrading of the Sidindi-Malanga water Supply to serve Siaya and Bondo Towns through gravity. Major water sources are Lake Victoria, Rivers, Boreholes, kiosks, springs, streams, tap stands, pans dams and wells. About 35% of the total population have access to portable and clean water, the rest depend on water from pans, dams or from the lake.

9.4.1 Water Sources

A total of 292 water points were located and mapped. They include Boreholes, Dams/Water pans, Water Kiosks, Lake Shores, River Points, Springs, Stream Points, Tap stands and well. The majority, at 43.5%, accessed water from Borehole that harnesses groundwater resources. The boreholes are mainly located in the Northern half of the County due to its richness in ground and sub-surface waters as well as traversed by two major rivers.

Table 9.6 Siaya County Water Sources

S/N	Category	Number	Percentage
1	Boreholes	127	43.5%
2	Dams	30	10.3%
3	Water Kiosks	56	19.2%
4	Lake Shores	12	4.1%
5	River Points	7	2.4%
6	Springs	7	2.4%
7	Stream Points	12	4.1%
8	Tap stand	33	11.3%
9	Wells	8	2.7%
Total		292	100.0%

9.4.2 Distribution and Access

Analysis of access and distribution of water services revealed that: Majority of Siaya County access water points between 2 and 3 km away; Water access is generally beyond recommended 200m in the entire Siaya County; About 50% access water sources within 2km; Mostly 2-3 kilometres to water point; West Alego to the North, central Sakwa, North Gem, West Alego, Central Gem, North Sakwa, are most affected Wards as they access water as far as 5km away.

This reaffirms CIDP 2023-2027 assertion that: The distribution of water sources, surface and underground in the County are naturally widely spaced and make people walk long distances to fetch water; In some parts of the county, especially Southern parts of Bondo and Rarieda, have water point density of less than one per 2.5km²; Whereas while the north and north-eastern parts have a water point density of more than 3 per km².

Time spent to access water, especially in the rural areas is about one hour and this had the greatest impact on the girl-child who is charged with such duties. It even gets worse during droughts since most of the pans run dry.

The distribution of water sources, surface and underground in the County are naturally widely spaced and make people walk long distances to fetch water. The Government interventions were intended to reduce the long-distance coverage to about 500m distance. The intervention measures the Ministry of Water has put in place so far in terms of piped schemes, point water sources like boreholes, shallow wells and spring protection have not met the target. The rural population of the County depends on various types of water sources for their domestic needs. The southern part (Bondo and Rarieda) has less than one water point per 2.5km², while the north and northeastern parts have a water point density of more than 3 per km². Streams are the widest spread type of water point but occur mainly in the northeastern part of the County. Other sources of water in the County include; wells, boreholes, roof catchment, rivers, Lake Victoria, water holes, dams, ground catchments and piped supplies. A large number of water points cannot be used during the dry season because they are seasonal. There will be a need for the expansion of water supply systems in addition to de-silting the existing dams like Ouya, Anyuongi and Gologolo to reduce the distance to a water source to less than 3 km.

9.4.3 Water Demand in Siaya County

Water utilization in Siaya County includes Domestic use, Commercial use, public purpose use, Industrial use, Recreational use- water sports, hotels/lodges and golf courses and Agriculture- irrigation and animal watering. Water demand projections help planners, and policymakers establish the amount of water that will be required in future for a community, a settlement or a region, with population main parameter. Population growth for Siaya County is estimated at 1.7%, between 2016 and 2046 at the interval of 10 years will be as shown: 2016 (947,797), 2026 (1,121,824), 2036 (1,327,805) and 2046 (1,571,607) respectively. The water demand for the year 2046 assuming *per capita* water consumption of 80 litres per person per day on average in Siaya County, Total Water Demand, Q, by year will be $Q = 365 \times 80 \times \text{population}$ litres per year. The total water demanded will be 458,890,942 M³ per year by 2046.

Table 9.7: Siaya County Water Demand Projection

Year	Growth rate	Projected population	Per capita water consumption	Total water demand per capita per year (Q=365*80)	Projected water demand (M ³)
2016	1.7 %	947,797	80Litres	29,200 Litres	27,675,672
2026		1,121,824			32,757,261
2036		1,327,805			38,771,906
2046		1,571,607			45,890,924

9.5 Solid Waste Management

The county currently lacks a proper solid waste disposal system and there is a need to improve waste management in urban centres. There are no designated dumping sites in the county, while in other places solid waste is managed through burning. These methods of solid

waste management may lead to groundwater pollution as the soils are previous. There is a need for properly designated solid waste management to safeguard environmental degradation.

9.6 Sanitation and Sewerage

To safeguard against environmental degradation in the county, more so the urban settlement, sanitation facility development is important. All the towns in the region lack sanitation facilities. The main sources of water pollution include agrochemicals, defecation in bushes due to lack of pit latrines and wastewater that ends in water points during surface runoff. Sanitation continues to be a serious problem in the County with only 5.9 per cent of the households with access to piped water while the latrine coverage stands at 75.3 per cent.

There are no planned sewerage systems in all urban centres in the County and this calls for concerted efforts from all the stakeholders especially the County government to invest in planned sewerage systems for improved liquid and solid waste disposal. Currently, a major water and sewerage system is underway developed in Bondo and Siaya Towns through a joint venture between the Government of Kenya and the African Development Bank.

9.7 Social Infrastructure

9.7.1 Education Facilities

Education plays an important role in the development of people by empowering them to improve their well-being and participate in nation-building. At the national level, the broad objective is to achieve a 100% net primary school enrolment rate and reduce the disparity in access and quality of education. The Government also now proposes to achieve a 100% transition from primary to secondary schools as well as promote a competency-based curriculum that includes the integration of Information, Communication and Technology (ICT) learning processes, as some of the radical proposals in the Education Sessional Paper no.1, Reforming Education and Training for Sustainable Development in Kenya, 2019 (GOK, 2019).

Education is a crucial predictor of professional success and future income levels. But children who have completed primary education can only have a shot at higher education if they get to join secondary education, stay and complete their studies. Quality education is paramount in steering development, and thus education is a top priority in Siaya County. In the 2009 census report the population of the age group (3-5 years) was 82,446 of whom 41,414 were boys and 41,032 were girls which represent 9.8% of the County's total population.

In the education sector, the county has one university; Jaramogi Oginga Odinga University of Science and Technology and three colleges affiliated with other universities (Odera Akango, Barrack Obama Memorial University College, and University of Nairobi Learning Centre, Siaya. There are also emerging commercial colleges and branches of other established ones. According to Siaya County Scorecard 2014, the sector had the following further statistics: only 70% of children aged between 3 and 5 were attending pre-primary education in the county at the time of inception of the county government. The net enrolment in primary schools stood at 84.7%; with males standing at 84% and female at 85.7%. In secondary, only 43% of the population aged 14 - 17 years was joining secondary schools. The net enrolment rate stood at 19.8% with males at 19.1% and females at 20.5%. Only 6.1% of those aged 18 - 24 were enrolled in universities. And of the students enrolled in secondary schools, 19.6 were persons with disabilities.

9.7.1.1 Basic Education Services

The County has **744** public Early Childhood Development (ECD) schools and **293** private totaling **989** centres with an enrolment of 61,118. The ECD teachers are employed by both the County Government and the Parents, a factor that has led to the high turnover of the Teachers employed by parents which has comprised the quality of services in the Sector. County Government, Communities and parents have been responsible for the investment in ECD infrastructure. The number of primary schools in the County currently is 700, with a total enrolment of 202,658 pupils of which 96,409 are males and 106,549 females and 4,949 teachers. Teacher to student ratio is 1:49. The total enrolment stands at 202,658 pupils with a gross enrollment of 110 per cent. The average years of attendance stand at 6.4. Understaffing remains a major challenge with most of the schools being understaffed. The county had a total of 217 secondary schools with a total enrolment of 58,302 pupils by the end of 2012 (Table 9.8.3 and Figure 9.8.3). The enrolment consisted of 31,359 boys and 26,943 girls. There were a total of 1290 teachers in 2012 giving a teacher-pupil ratio that stood at 1:27 indicating the need for hiring more teachers. The gross enrolment rate was 53.4 per cent while the net enrolment rate was 52.7 per cent. The average year of attendance in secondary schools is 3.6 years.

Table 9.8: Early Childhood Development Education

Sub-County	Public	Private	Total
Gem	126	19	145
Siaya	144	58	202
Ugunja	70	10	81
Ugenya	89	7	96
Bondo	191	32	223
Rarieda	124	24	148
Total	744	150	894

Source: Kenya National Bureau of Statistics 2014

Table 9.9: Pupil Enrolments in ECD Centers by Sex and Sub-County

Sub-County	2013			2014		
	Boys	Girls	Total	Boys	Girls	Total
Ugenya	5,265	5,294	10,559	5,906	6,390	12,296
Siaya	7,663	6,998	14,661	8,307	8,340	16,647
Ugunja	2,872	2,694	5,566	2,753	2,914	5,667
Ugenya	2,499	2,295	4,794	2,673	2,698	5,371
Bondo	6,473	6,463	12,936	4,972	5,167	10,139
Rarieda	6,919	6,999	13,918	7,202	7,630	14,832
Total	31,691	30,743	62,434	31,813	33,139	64,952

Source: Department of Education, County Government of Siaya

Table 9.10: Primary School by Category and Sub-County

Sub-County	2013		2014	
	Public	Private	Public	Private
Gem	112	4	119	5
Siaya	132	4	136	5
Ugunja	67	20	67	23
Ugenya	84	6	85	7
Bondo	128	17	127	19
Rarieda	116	10	117	11
Total	639	61	652	69

Source: Kenya National Bureau of Statistics 2014

Table 9.11: Primary School by Category and Sub-County

Sub-County	2013		2014	
	Public	Private	Public	Private
Gem	42	0	43	--
Siaya	39	3	42	2
Ugunja	19	1	24	1
Ugenya	27	0	31	--
Bondo	36	2	37	1
Rarieda	34	0	39	-
Total	197	6	217	4

Source: Kenya National Bureau of Statistics 2014

Table 9.12: Primary School Enrolments by Sex and Sub-County

Class	Sex	Bondo	Gem	Rarieda	Siaya	Ugenya	Ugunja	Total
Standard 1	Boys	3,094	3,385	3,070	4,140	2,736	1,812	18,237
	Girls	3,221	3,334	3,088	4,014	2,224	1,837	17,718
Standard 2	Boys	3,076	3,285	3,031	3,867	2,304	1,826	17,389
	Girls	3,030	3,219	2,938	3,907	2,223	1,794	17,111
Standard 3	Boys	3,112	3,301	2,968	3,784	2,245	1,779	17,189
	Girls	2,980	3,197	2,869	3,732	2,164	1,717	16,659
Standard 4	Boys	3,117	3,282	2,972	3,805	2,363	1,758	17,297
	Girls	3,092	3,405	2,882	3,859	2,334	1,698	17,270
Standard 5	Boys	2,902	3,290	2,822	3,656	2,308	1,658	16,636
	Girls	2,983	3,177	2,949	3,799	2,260	1,598	16,766
Standard 6	Boys	2,829	3,143	2,713	3,638	2,097	1,593	16,0131
	Girls	2,854	3,238	2,788	3,250	2,232	1,662	16,456
Standard 7	Boys	2,622	2,893	2,581	3,433	2,084	1,589	15,019
	Girls	2,686	2,972	2,780	2,383	2,145	1,685	15,701
Standard 8	Boys	2,044	2,010	1,842	2,305	1,333	1,279	10,813
	Girls	1,919	2,086	1,877	2,383	1,372	1,230	10,867
Grand Total	Boys	22,796	24,589	21,999	28,445	17,470	13,294	128,593
	Girls	22,765	24,628	22,171	28,809	16,954	13,221	128,548
	Total	45,561	49,217	44,170	57,254	34,424	26,515	257,141

Source: Department of Education, County Government of Siaya

Table 9. 13: Secondary School Enrolments by Sex and Sub-County

Class	Gender	Sub-County						
		Bondo	Gem	Rarieda	Siaya	Ugenya	Ugunja	Total
Form 1	Boys	1,896	2,139	1,960	1,711	1,255	1,055	10,016
	Girls	1,563	1,607	1,532	1,830	1,087	1,193	8,812
Form 2	Boys	1,905	1,945	1,748	1,563	1,083	1,111	9,355
	Girls	1,517	1,456	1,512	1,852	928	1,108	8,373
Form 3	Boys	1,622	1,829	1,568	1,332	977	1,002	8,330
	Girls	1,194	1,215	1,264	1,422	750	866	6,711
Form 4	Boys	1,493	1,611	1,300	1,095	792	815	7,106
	Girls	1,031	973	1,013	1,280	589	667	5,553
Grand	Boys	6,916	7,524	6,576	5,701	4,107	3,983	34,807
	Girls	5,305	5,251	5,321	12,085	7,461	7,817	29,449
Total		12,221	12,775	11,897	12,085	7,461	7,817	64,256

Source Ministry of Education Science and Technology

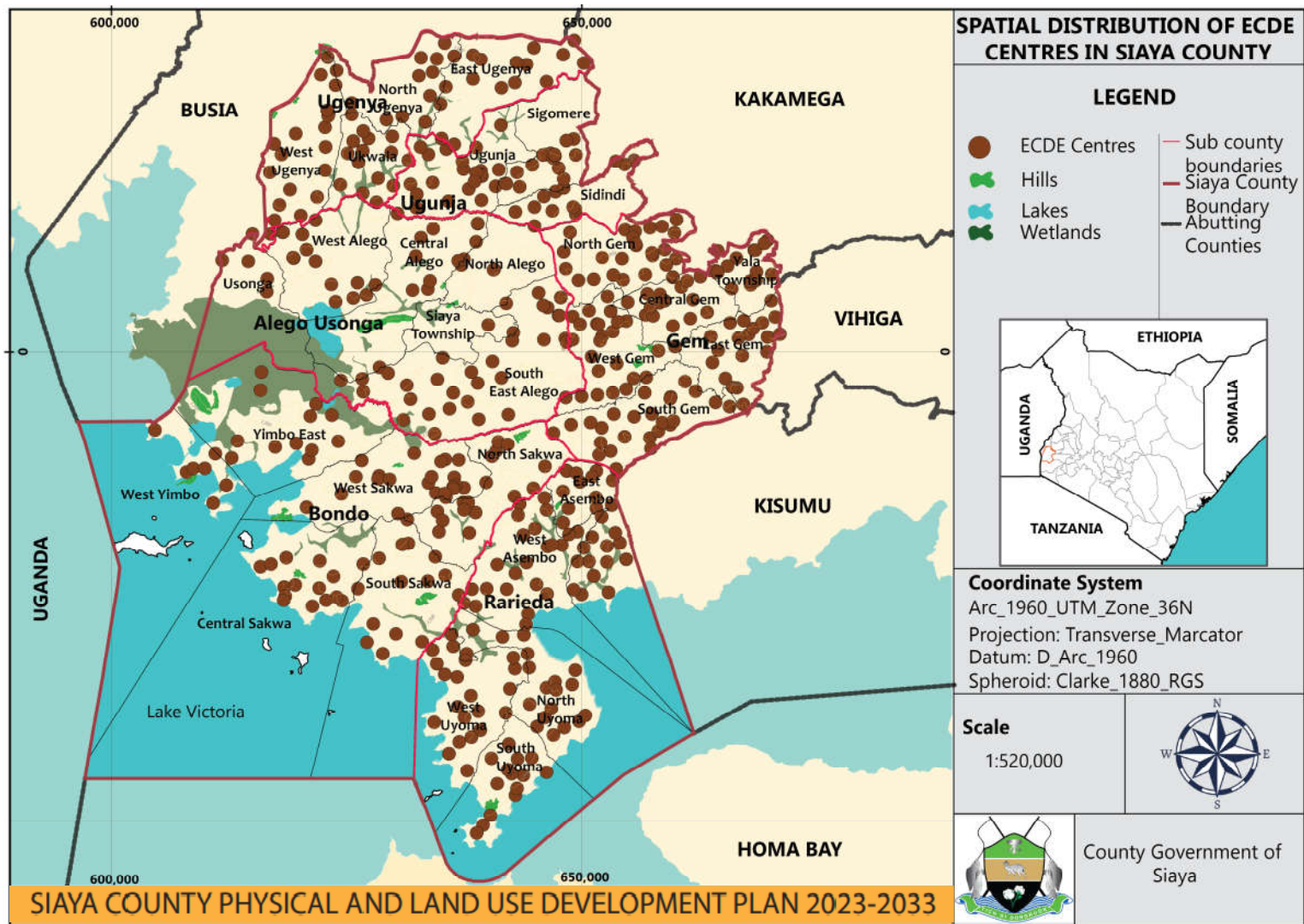
Table 9. 14: Adult Education Centres by Sub-County

Sub-County	2013	2014
Rarieda	16	15
Bondo	28	28

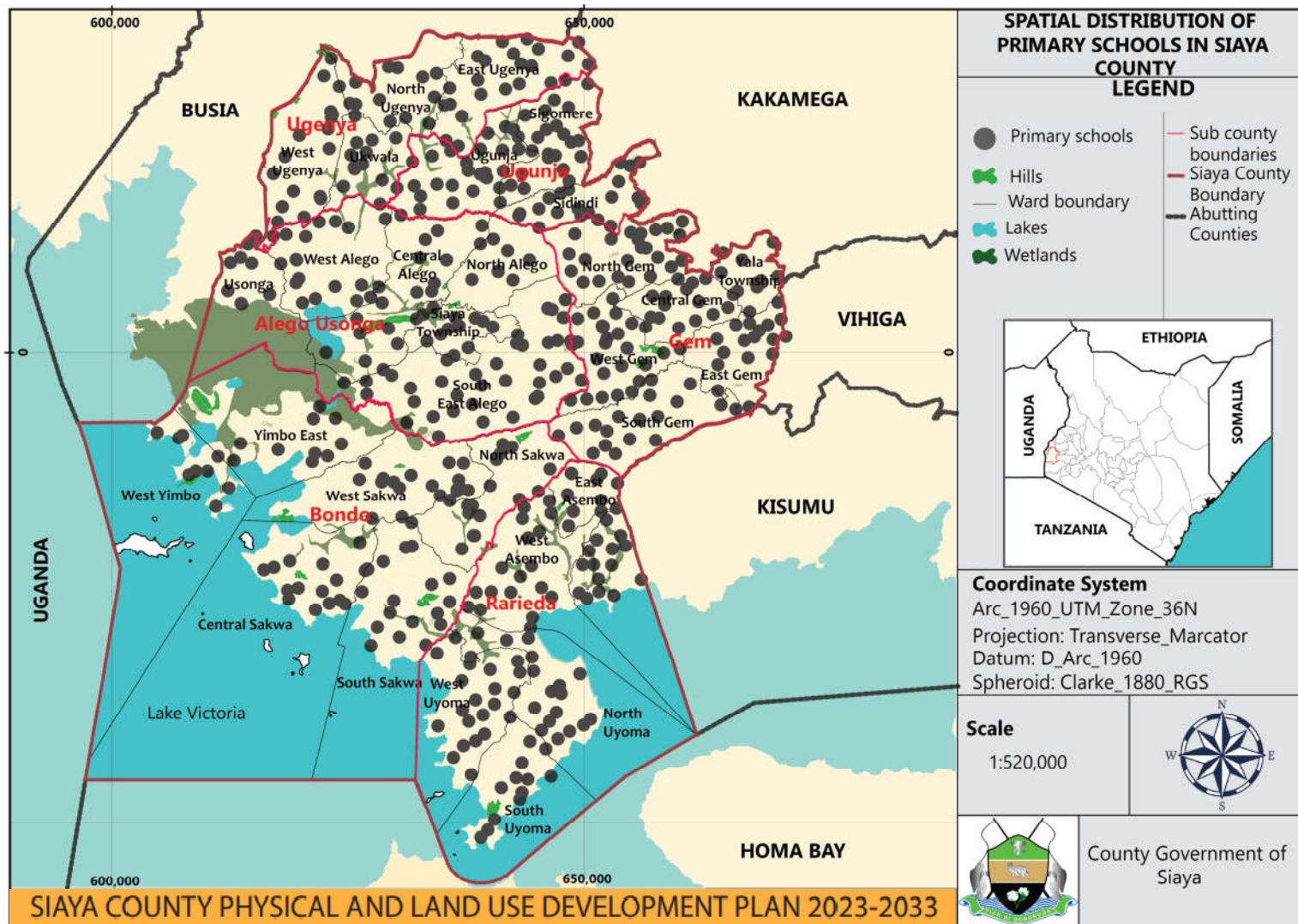
Siaya	23	24
Ugunja	17	12
Ugenya	11	15
Gem	9	9
Total	184	183

Source: Department of Education, County Government of Siaya

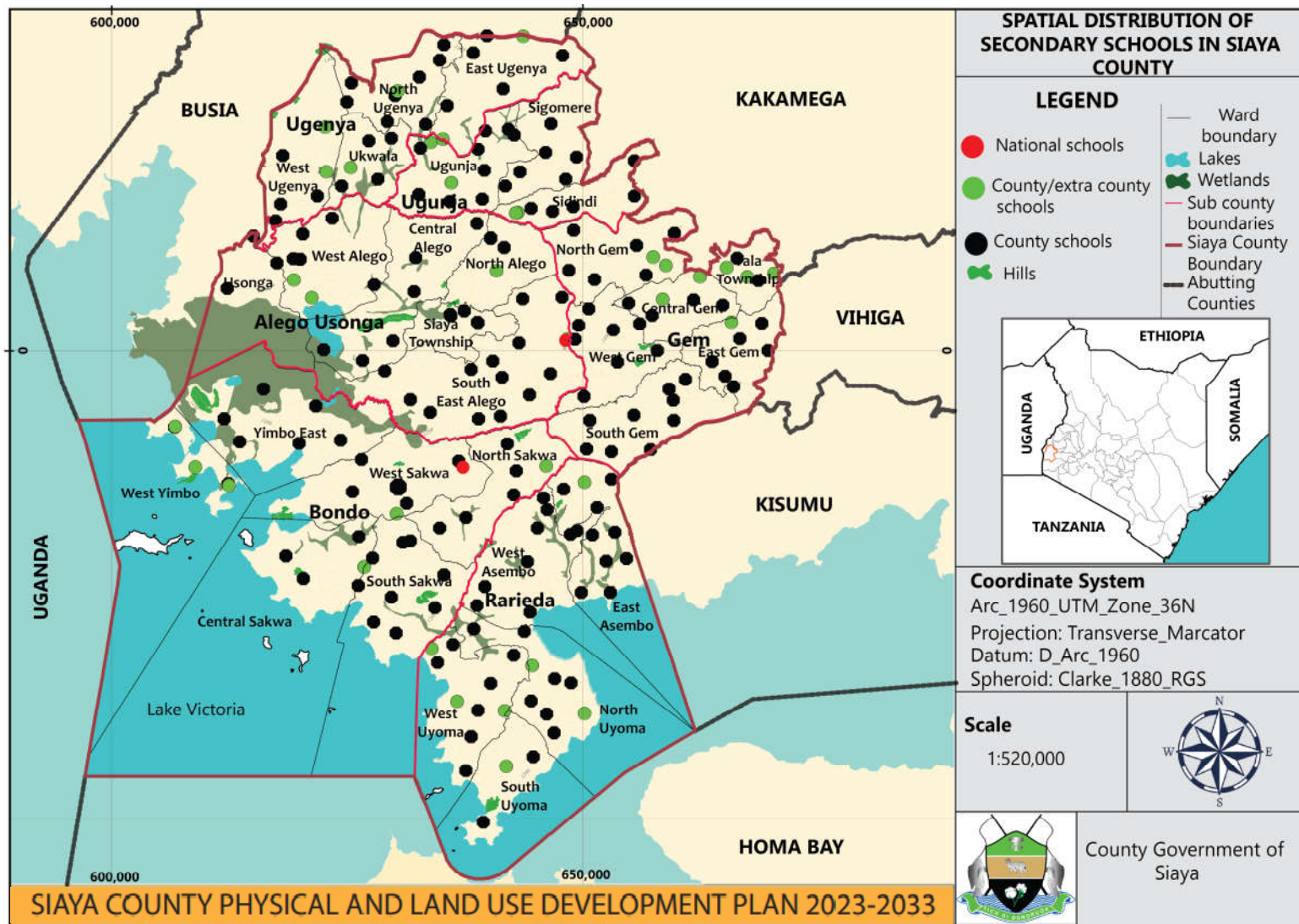
The population aged over 15 years that can read and write is 79.75 per cent, while those who cannot read and write is 18.25 per cent. Efforts will be made to ensure that more formal as well as informal institutions are established to further improve the county's literacy level. The county government plans to equip and staff the adult learning centres and establish resource centres in all sub-locations in the county.



Map 9.3: Spatial Distribution of ECDE Centres in Siaya County



Map 9.4: Spatial Distribution of Primary Schools in Siaya County



Map 9.5: Spatial Distribution of Secondary Schools in Siaya County

9.7.1.2 Tertiary Institutions

The higher learning institutions in the county include Siaya Medical College, Siaya Institute of Technology, Jaramogi Oginga Odinga University of Science and Technology situated in Bondo town, Moi University Odera Akang'o Campus in Yala, Bondo Teachers College, Bondo Technical Institute, and Bondo Medical College and 14 youth polytechnics spread across the County. In general, the county has one fully-fledged university, three university campuses, one institute of science and technology, one teacher training college, two medical training colleges and 15 youth polytechnics. According to the 2009 population and housing census, the youth population accounted for 27% of the County population which was 226,568 persons consisting of 119,234 females and 107,334 males. The youthful population requires well-developed tertiary institutions for technical skill enhancement as well as entrepreneurship and managerial skills to promote profitable employment and guarantee future investments.

Table 9.15: Teacher Training Colleges by Category

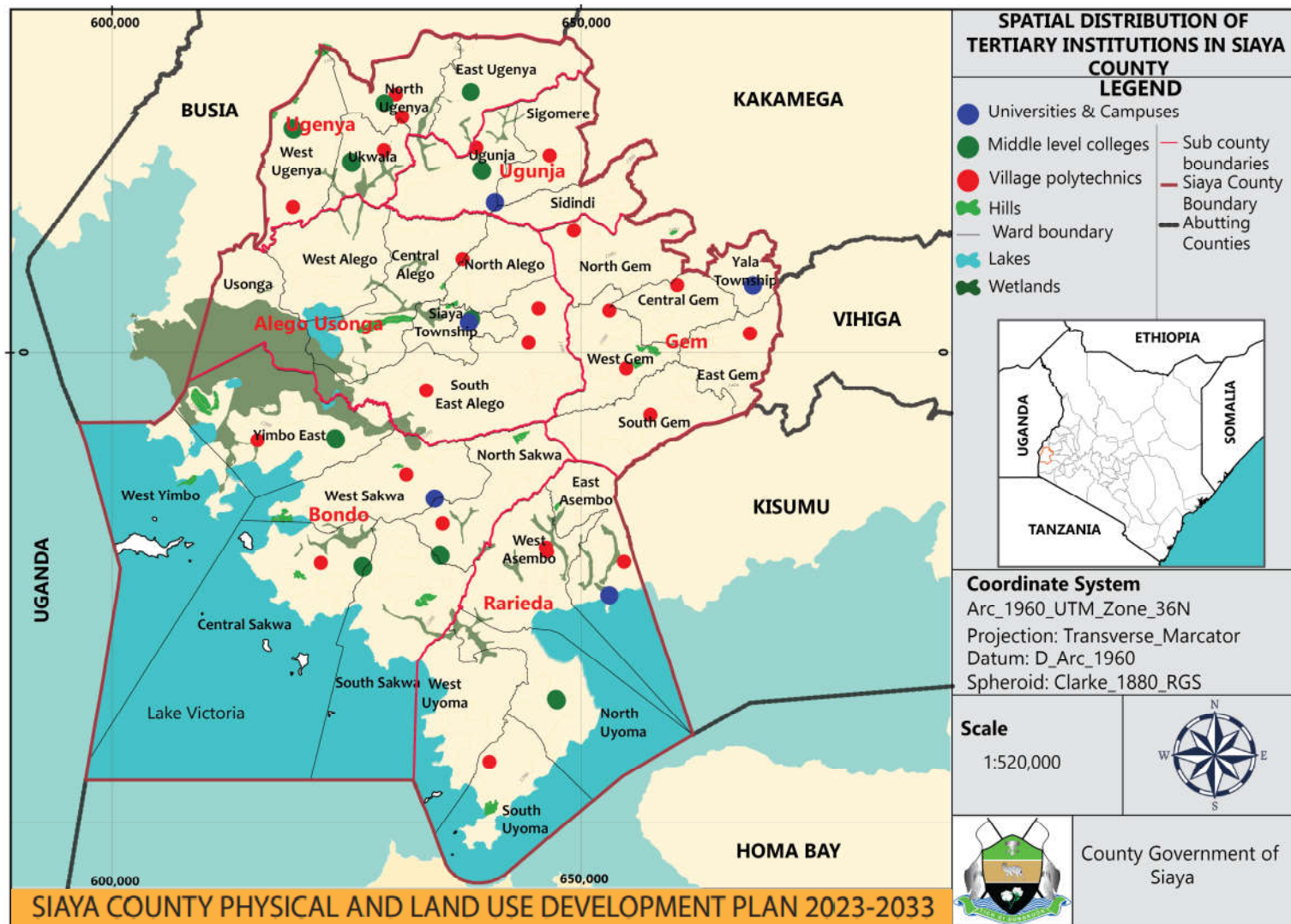
Category	2013		2014	
	Public	Private	Public	Private
Pre-Primary	-	3	-	3
Primary	1	-	2	-
Secondary	-	-	-	-
Sub-Total	1	3	2	3
Total	4		5	

Source: Department of Education, County Government of Siaya

Table 9.16: Universities and Technical Institutions by Category

Category	2013		2014	
	Public	Private	Public	Private
Universities	1	-	1	-
University Campuses	3	-	3	-
Institute of Technology	-	-	3	-
Technical Training Institutes	1	1	-	-
Total	5	1	7	-

Source: Department of Education, County Government of Siaya



Map 9.6: Spatial Distribution of Tertiary Institutions in Siaya County

9.7.1.3 Hexagonal Analysis in Education Sector

The application of the Central Place Model was used to assess the adequacy of schools in terms of location, accessibility, and equity. The 5 Km radius was used as an equidistant standard to create polygons and/or hexagons distributed in the entire county. The wards were therefore used as the basic unit of resource allocation while respecting the catchment population. The deficient and/or underserved areas with public schools per ward were therefore projected for 10 years and 20 years assuming everything is held constant. Tables 9.8.10, 9.8.11 and 9.8.12 illustrate the same for ECDE, Primary and Secondary Schools respectively.

Table 9.17: Results of Hexagonal Analysis for Early Childhood Education Centres

ALEGO USONGA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
Central Alego	275.10	122	19	19	19
North Alego	383.47	59	07	09	09
Siaya Township	872.03	39	18	08	08
South East Alego	357.40	196	44	31	31
Usonga	178.24	91	11	12	12
West Alego	324.18	100	17	10	20
BONDO	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
Central Sakwa	653.79	84	18	13	13
North Sakwa	331.55	94	16	15	14
South Sakwa	174.71	105	16	16	16
West Sakwa	204.80	112	18	16	16
West Yimbo	938.33	38	09	06	06
East Yimbo	170.30	155	10	20	20
GEM	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
Central Gem	484.57	52	14	08	08
East Gem	407.15	61	17	10	09
North Gem	420.16	85	24	12	12
South Gem	317.04	96	18	15	15
West Gem	347.55	75	26	12	12
Yala Township	679.03	34	10	05	05
RARIEDA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
East Asembo	416.32	77	26	12	12
North Uyoma	297.49	78	19	12	12
South Uyoma	351.22	54	12	12	12
West Asembo	325.50	100	18	16	16
West Uyoma	325.50	89	20	16	16
GEM	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
East Ugenya	653.79	84	18	13	13
North Ugenya	331.55	94	16	15	14
Ukwala	174.71	105	16	16	16
West Ugenya	204.80	112	18	16	16

UGUNJA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
Sidindi	476.93	55	21	10	07
Sigomere	417.15	72	21	11	11
Ugunja	465.25	83	21	13	13
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
East Ugenya	340.75	94	19	16	16
North Ugenya	406.73	69	14	08	08
Ukwala	401.74	52	15	08	08
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency (10 years)	Deficiency (20 Years)
West Ugenya	342.73	93	19	16	16

Table 9.18: Results of Hexagonal Analysis for Primary Schools

ALEGO USONGA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Alego	275.10	122	19	19	19
North Alego	383.47	59	07	09	09
Siaya Township	872.03	39	18	08	08
South East Alego	357.40	196	44	31	31
Usonga	178.24	91	11	12	12
West Alego	324.18	100	17	10	20
BONDO	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Sakwa	653.79	84	18	13	13
North Sakwa	331.55	94	16	15	14
South Sakwa	174.71	105	16	16	16
West Sakwa	204.80	112	18	16	16
West Yimbo	938.33	38	09	06	06
East Yimbo	170.30	155	10	20	20
GEM	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Gem	484.57	52	14	08	08
East Gem	407.15	61	17	10	09
North Gem	420.16	85	24	12	12
South Gem	317.04	96	18	15	15
West Gem	347.55	75	26	12	12
Yala Township	679.03	34	10	05	05
RARIEDA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Asembo	416.32	77	26	12	12
North Uyoma	297.49	78	19	12	12
South Uyoma	351.22	54	12	12	12
West Asembo	325.50	100	18	16	16
West Uyoma	325.50	89	20	16	16
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Ugenya	653.79	84	18	13	13
North Ugenya	331.55	94	16	15	14
Ukwala	174.71	105	16	16	16
West Ugenya	204.80	112	18	16	16

UGUNJA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Sidindi	476.93	55	21	10	07
Sigomere	417.15	72	21	11	11
Ugunja	465.25	83	21	13	13
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Ugenya	340.75	94	19	16	16
North Ugenya	406.73	69	14	08	08
Ukwala	401.74	52	15	08	08
West Ugenya	342.73	93	19	16	16

Table 9.19: Results of Hexagonal Analysis for Secondary Schools

SIAYA COUNTY SCHOOLS DATA BY WARDS IN SECONDARY SCHOOLS BY CATEGORY						
Ward	Pop Density	Area Km2	National	Extra County	County Sub-county	Deficiency 10yrs
ALEGO USONGA SUB-COUNTY						
Central Alego	275.10	122	0	0	6	2 Extra County 2 County /Ward
North Alego	383.47	59	0	1	3	
Siaya Township	872.03	39	0	0	7	
South E. Alego	357.40	196	1	1	14	
Usonga	178.24	91	0	0	4	
West Alego	324.18	100	0	2	7	
BONDO SUB-COUNTY						
Central Sakwa	653.79	84	0	1	3	2 Extra County 2 County /Ward
North Sakwa	331.55	94	0	1	5	
South Sakwa	174.21	105	0	0	9	
West Sakwa	204.80	112	1	1	4	
West Yimbo	938.33	38	0	4	2	
East Yimbo	170.30	155	0	0	6	
GEM SUB-COUNTY						
Central Gem	484.57	52	0	2	4	2 Extra County 2 County /Ward
East Gem	407.15	61	0	1	7	
North Gem	420.16	85	0	2	6	
South Gem	317.04	96	0	0	9	
West Gem	347.55	75	0	0	8	
Yala Township	679.03	34	0	3	2	
RARIEDA SUB-COUNTY						
East Asembo	416.32	77	0	1	9	2 Extra County 2 County /Ward
North Uyoma	297.49	78	0	2	7	
South Uyoma	351.22	54	0	1	2	
West Asembo	325.50	100	0	0	9	
West Uyoma	325.88	89	0	3	8	
UGENYA SUB-COUNTY						
East Ugenya	340.75	94		2	4	2 Extra County 2 County /Ward
North Ugenya	406.73	69		1	9	
Ukwala	401.74	52		1	4	
West Ugenya	342.73	93		0	8	
UGUNJA SUB-COUNTY						
Sidindi	476.93	55		2	5	2 Extra County 2 County /Ward

Table 9.20: Results of Hexagonal Analysis for Universities (Campuses, Learning Centres)

SIAYA COUNTY UNIVERSITY CENTRES BY WARDS/SUB-COUNTIES					
No.	WARD	POP DENSITY	AREA IN KM2	CURRENT NO.	10YRS
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	0	Create A University at Siaya County Headquarters
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	0	
4	South East Alego	357.40	196	0	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	0	Improvement of Existing University - JOOUST
8	North Sakwa	331.55	94	0	
9	South Sakwa	174.21	105	0	
10	West Sakwa	204.80	112	1	
11	West Yimbo	938.33	38	0	
12	East Yimbo	170.30	155	0	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	0	Improvement of Existing University & Middle-Level Colleges
14	East Gem	407.15	61	0	
15	North Gem	420.16	85	0	
16	South Gem	317.04	96	0	
17	West Gem	347.55	75	0	
18	Yala Township	679.03	34	1	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	Improvement of Existing University & Middle-Level Colleges
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	0	
22	West Asembo	325.50	100	0	
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	East Ugenya	340.75	94	0	Improvement of Existing University & Middle-Level Colleges
25	North Ugenya	406.73	69	0	
26	Ukwala	401.74	52	0	
27	West Ugenya	342.73	93	0	
UGUNJA SUB-COUNTY					
29	Sidindi	476.93	55	0	Improvement Middle-Level Colleges
29	Sigomere	417.15	72	0	
30	Ugunia	465.25	83	0	

Table 9.21: Results of Hexagonal Analysis for Tertiary Institutions

SIAYA COUNTY SCHOOLS DATA BY WARDS IN TERTIARY COLLEGES/ NATIONAL POLYTECHNICS/TTC/ KMTC					
No.	WARD	POP DENSITY	AREA	NO.	10 YRS
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	0	A Tertiary Institution in each Sub-County (TTI, TTC, University College, KMTC)
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	2	
4	Southeast Alego	357.40	196	0	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	0	A Tertiary Institution in each Sub-County (TTI,
8	North Sakwa	331.55	94	0	
9	South Sakwa	174.21	105	1	
10	West Sakwa	204.80	112	1	

11	West Yimbo	938.33	38	0	TTC, University College, KMTC)
12	East Yimbo	170.30	155	1	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	0	A Tertiary Institution in each Sub-County (TTI, TTC, University College, KMTC)
14	East Gem	407.15	61	0	
15	North Gem	420.16	85	0	
16	South Gem	317.04	96	0	
17	West Gem	347.55	75	0	
18	Yala Township	679.03	34	1	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	A Tertiary Institution in each Sub-County (TTI, TTC, University College, KMTC)
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	0	
22	West Asembo	325.50	100	0	
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	EAST UGENYA	340.75	94	1	A Tertiary Institution in each Sub-County (TTI, TTC, University College, KMTC)
25	NORTH UGENYA	406.73	69	1	
26	UKWALA	401.74	52	0	
27	WEST UGENYA	342.73	93	1	
UGUNJA SUB-COUNTY					
29	SIDINDI	476.93	55	0	A Tertiary Institution in each Sub-County
29	SIGOMERE	417.15	72	0	
30	UGUNJA	465.25	83	1	

Table 9.22: Results of Hexagonal Analysis for Village Polytechnics

SIAYA COUNTY SCHOOLS DATA BY WARDS IN VILLAGE POLYTECHNICS					
No.	WARD	POP DENSITY	AREA	CURRENT NO.	10 YRS
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	1	Create a Village Polytechnic in each ward
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	0	
4	South East Alego	357.40	196	5	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	1	Create a Village Polytechnic in each ward
8	North Sakwa	331.55	94	1	
9	South Sakwa	174.21	105	0	
10	West Sakwa	204.80	112	1	
11	West Yimbo	938.33	38	0	
12	East Yimbo	170.30	155	1	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	1	Create a Village Polytechnic in each ward
14	East Gem	407.15	61	1	
15	North Gem	420.16	85	1	
16	South Gem	317.04	96	1	
17	West Gem	347.55	75	2	
18	Yala Township	679.03	34	0	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	Create a Village Polytechnic in each ward
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	1	

22	West Asembo	325.50	100	2	
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	East Ugenya	340.75	94	0	Create a Village Polytechnic in each ward
25	North Ugenya	406.73	69	2	
26	Ukwala	401.74	52	1	
27	West Ugenya	342.73	93	1	
UGUNJA SUB-COUNTY					
29	Sidindi	476.93	55	0	Create a Village Polytechnic in each ward
29	Sigomere	417.15	72	1	
30	Ugunja	465.25	83	1	

ALEGO USONGA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Alego	275.10	122	19	19	19
North Alego	383.47	59	07	09	09
Siaya Township	872.03	39	18	08	08
South East Alego	357.40	196	44	31	31
Usonga	178.24	91	11	12	12
West Alego	324.18	100	17	10	20
BONDO	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Sakwa	653.79	84	18	13	13
North Sakwa	331.55	94	16	15	14
South Sakwa	174.71	105	16	16	16
West Sakwa	204.80	112	18	16	16
West Yimbo	938.33	38	09	06	06
East Yimbo	170.30	155	10	20	20
GEM	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
Central Gem	484.57	52	14	08	08
East Gem	407.15	61	17	10	09
North Gem	420.16	85	24	12	12
South Gem	317.04	96	18	15	15
West Gem	347.55	75	26	12	12
Yala Township	679.03	34	10	05	05
RARIEDA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Asembo	416.32	77	26	12	12
North Uyoma	297.49	78	19	12	12
South Uyoma	351.22	54	12	12	12
West Asembo	325.50	100	18	16	16
West Uyoma	325.50	89	20	16	16
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Ugenya	653.79	84	18	13	13
North Ugenya	331.55	94	16	15	14
Ukwala	174.71	105	16	16	16
West Ugenya	204.80	112	18	16	16
UGUNJA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years

Sidindi	476.93	55	21	10	07
Sigomere	417.15	72	21	11	11
Ugunja	465.25	83	21	13	13
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years	Deficiency 20 Years
East Ugenya	340.75	94	19	16	16
North Ugenya	406.73	69	14	08	08
Ukwala	401.74	52	15	08	08
West Ugenya	342.73	93	19	16	16

Table 9.23: Results of Hexagonal Analysis for Secondary Schools

SIAYA COUNTY SCHOOLS DATA BY WARDS IN SECONDARY SCHOOLS BY CATEGORY						
Ward	Pop Density	Area Km2	National	Extra County	County Sub-county	Deficiency 10yrs
ALEGO USONGA SUB-COUNTY						
Central Alego	275.10	122	0	0	6	2 Extra County 2 County /Ward
North Alego	383.47	59	0	1	3	
Siaya Township	872.03	39	0	0	7	
South E. Alego	357.40	196	1	1	14	
Usonga	178..24	91	0	0	4	
West Alego	324.18	100	0	2	7	
BONDO SUB-COUNTY						
Central Sakwa	653.79	84	0	1	3	2 Extra County 2 County /Ward
North Sakwa	331.55	94	0	1	5	
South Sakwa	174.21	105	0	0	9	
West Sakwa	204.80	112	1	1	4	
West Yimbo	938.33	38	0	4	2	
East Yimbo	170.30	155	0	0	6	
GEM SUB-COUNTY						
Central Gem	484.57	52	0	2	4	2 Extra County 2 County /Ward
East Gem	407.15	61	0	1	7	
North Gem	420.16	85	0	2	6	
South Gem	317.04	96	0	0	9	
West Gem	347.55	75	0	0	8	
Yala Township	679.03	34	0	3	2	
RARIEDA SUB-COUNTY						
East Asembo	416.32	77	0	1	9	2 Extra County 2 County /Ward
North Uyoma	297.49	78	0	2	7	
South Uyoma	351.22	54	0	1	2	
West Asembo	325.50	100	0	0	9	
West Uyoma	325.88	89	0	3	8	
UGENYA SUB-COUNTY						
East Ugenya	340.75	94		2	4	2 Extra County 2 County /Ward
North Ugenya	406.73	69		1	9	
Ukwala	401.74	52		1	4	
West Ugenya	342.73	93		0	8	
UGUNJA SUB-COUNTY						
Sidindi	476.93	55		2	5	2 Extra County 2 County /Ward

Table 9.24: Results of Hexagonal Analysis for Universities (Campuses, Learning Centres)

SIAYA COUNTY UNIVERSITY CENTRES BY WARDS/SUB-COUNTIES					
No.	WARD	POP DENSITY	AREA IN KM2	CURRENT NO.	10YRS
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	0	Create A University at Siaya County Headquarters
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	0	
4	South East Alego	357.40	196	0	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	0	Improvement of Existing University - JOOUST
8	North Sakwa	331.55	94	0	
9	South Sakwa	174.21	105	0	
10	West Sakwa	204.80	112	1	
11	West Yimbo	938.33	38	0	
12	East Yimbo	170.30	155	0	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	0	Improvement of Existing University & Middle-Level Colleges
14	East Gem	407.15	61	0	
15	North Gem	420.16	85	0	
16	South Gem	317.04	96	0	
17	West Gem	347.55	75	0	
18	Yala Township	679.03	34	1	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	Improvement of Existing University & Middle-Level Colleges
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	0	
22	West Asembo	325.50	100	0	
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	East Ugenya	340.75	94	0	Improvement of Existing University & Middle-Level Colleges
25	North Ugenya	406.73	69	0	
26	Ukwala	401.74	52	0	
27	West Ugenya	342.73	93	0	
UGUNJA SUB-COUNTY					
29	Sidindi	476.93	55	0	Improvement Middle-Level Colleges
29	Sigomere	417.15	72	0	
30	Ugunja	465.25	83	0	

Table 9.25: Results of Hexagonal Analysis for Tertiary Institutions

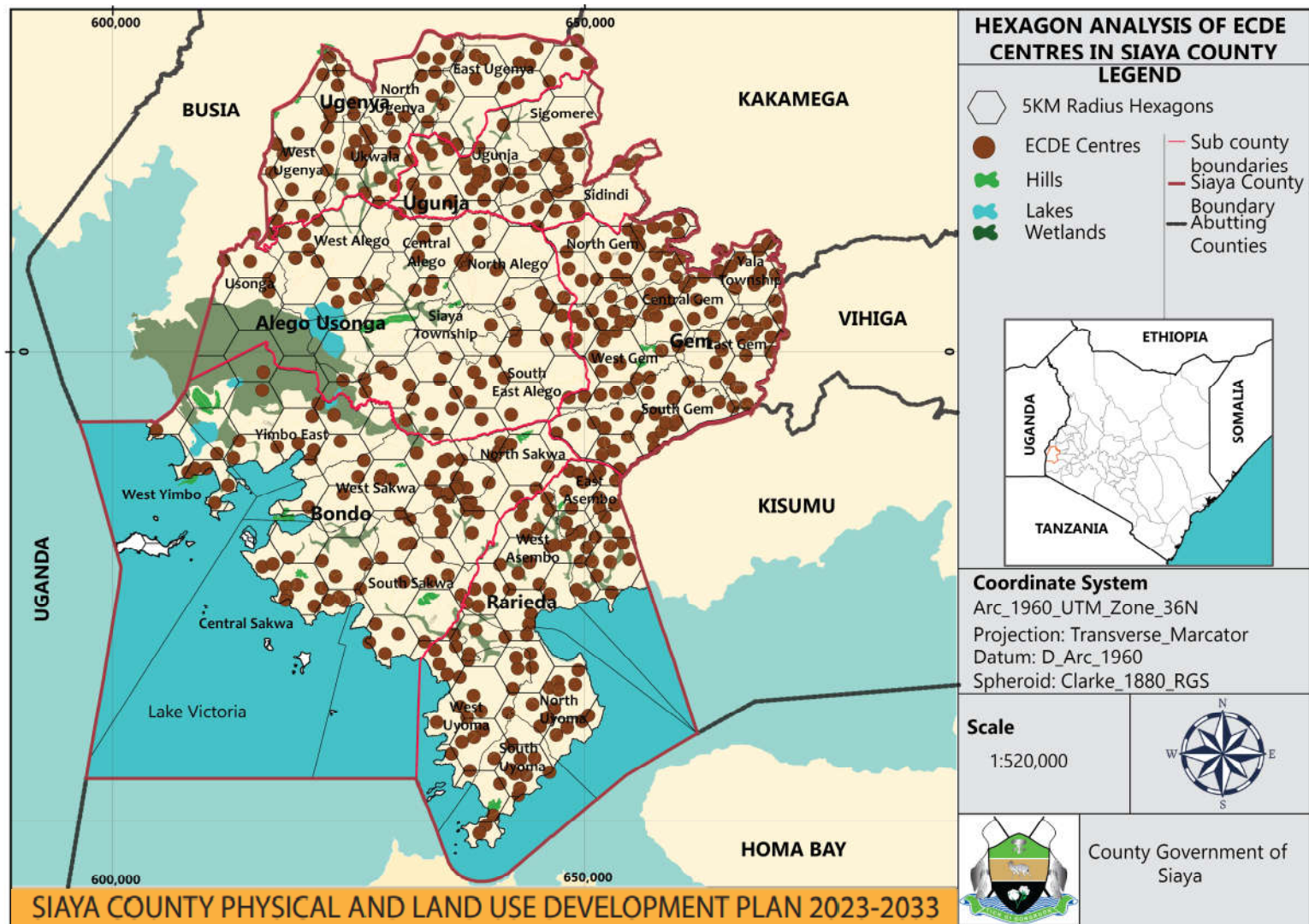
SIAYA COUNTY SCHOOLS DATA BY WARDS IN TERTIARY COLLEGES/ NATIONAL POLYTECHNICS/TTC/ KMTC					
No.	WARD	POP DENSITY	AREA	NO.	10 YRS
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	0	A Tertiary Institution in each Sub- County (TTI, TTC, University College, KMTC)
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	2	
4	Southeast Alego	357.40	196	0	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	0	A Tertiary Institution in each Sub- County
8	North Sakwa	331.55	94	0	

9	South Sakwa	174.21	105	1	(TTI, TTC, University College, KMTC)
10	West Sakwa	204.80	112	1	
11	West Yimbo	938.33	38	0	
12	East Yimbo	170.30	155	1	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	0	A Tertiary Institution in each Sub- County (TTI, TTC, University College, KMTC)
14	East Gem	407.15	61	0	
15	North Gem	420.16	85	0	
16	South Gem	317.04	96	0	
17	West Gem	347.55	75	0	
18	Yala Township	679.03	34	1	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	A Tertiary Institution in each Sub- County (TTI, TTC, University College, KMTC)
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	0	
22	West Asembo	325.50	100	0	
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	EAST UGENYA	340.75	94	1	A Tertiary Institution in each Sub- County (TTI, TTC, University College, KMTC)
25	NORTH UGENYA	406.73	69	1	
26	UKWALA	401.74	52	0	
27	WEST UGENYA	342.73	93	1	
UGUNJA SUB-COUNTY					
29	SIDINDI	476.93	55	0	A Tertiary Institution in each Sub- County
29	SIGOMERE	417.15	72	0	
30	UGUNJA	465.25	83	1	

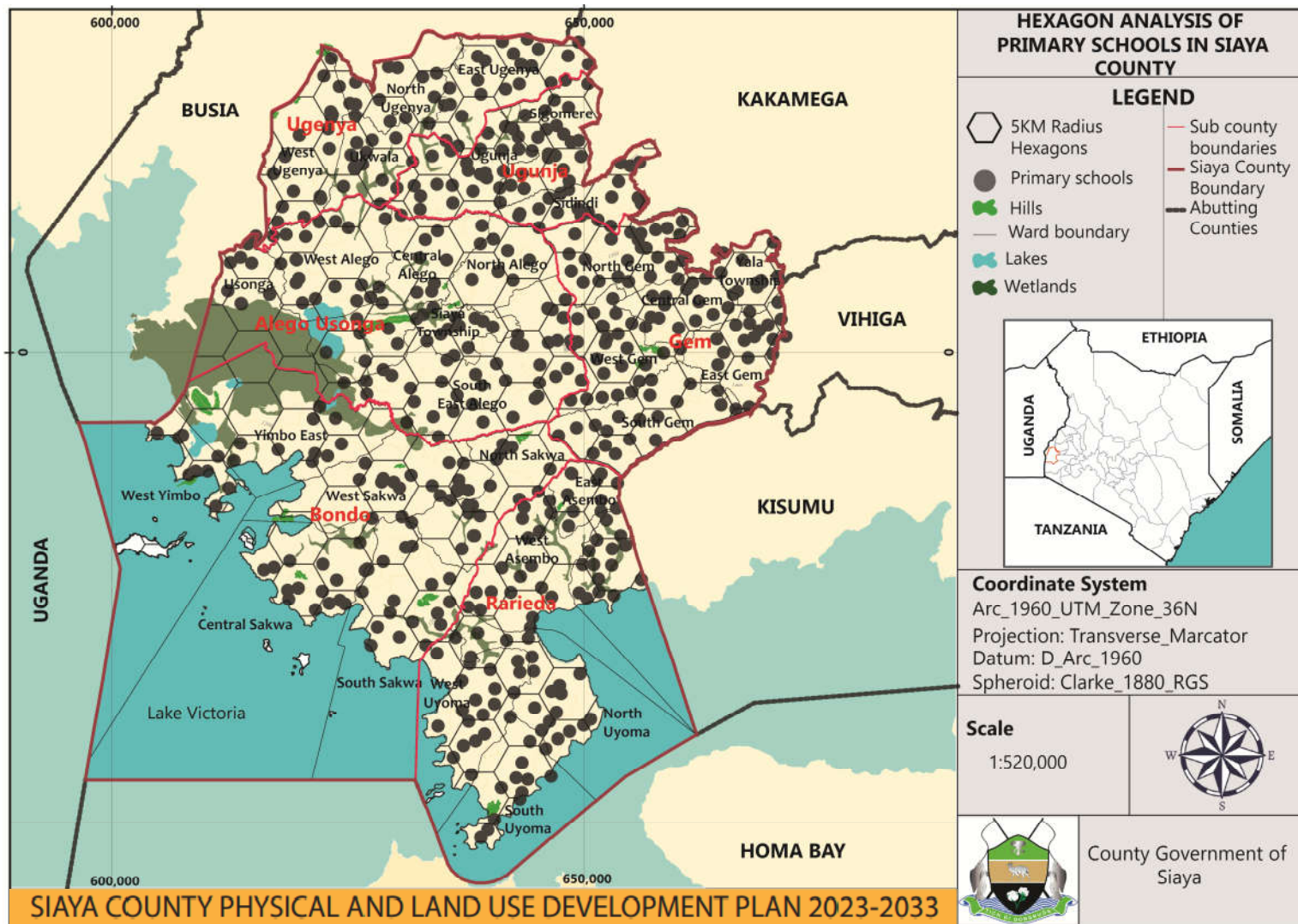
Table 9.26: Results of Hexagonal Analysis for Village Polytechnics

SIAYA COUNTY SCHOOLS DATA BY WARDS IN VILLAGE POLYTECHNICS					
No.	Ward	Pop Density	Area	Current No.	10 Yrs.
ALEGO USONGA SUB-COUNTY					
1	Central Alego	275.10	122	1	Create a Village Polytechnic in each ward
2	North Alego	383.47	59	0	
3	Siaya Township	872.03	39	0	
4	South East Alego	357.40	196	5	
5	Usonga	178..24	91	0	
6	West Alego	324.18	100	0	
BONDO SUB-COUNTY					
7	Central Sakwa	653.79	84	1	Create a Village Polytechnic in each ward
8	North Sakwa	331.55	94	1	
9	South Sakwa	174.21	105	0	
10	West Sakwa	204.80	112	1	
11	West Yimbo	938.33	38	0	
12	East Yimbo	170.30	155	1	
GEM SUB-COUNTY					
13	Central Gem	484.57	52	1	Create a Village Polytechnic in each ward
14	East Gem	407.15	61	1	
15	North Gem	420.16	85	1	
16	South Gem	317.04	96	1	
17	West Gem	347.55	75	2	
18	Yala Township	679.03	34	0	
RARIEDA SUB-COUNTY					
19	East Asembo	416.32	77	1	Create a Village Polytechnic in each ward
20	North Uyoma	297.49	78	0	
21	South Uyoma	351.22	54	1	
22	West Asembo	325.50	100	2	

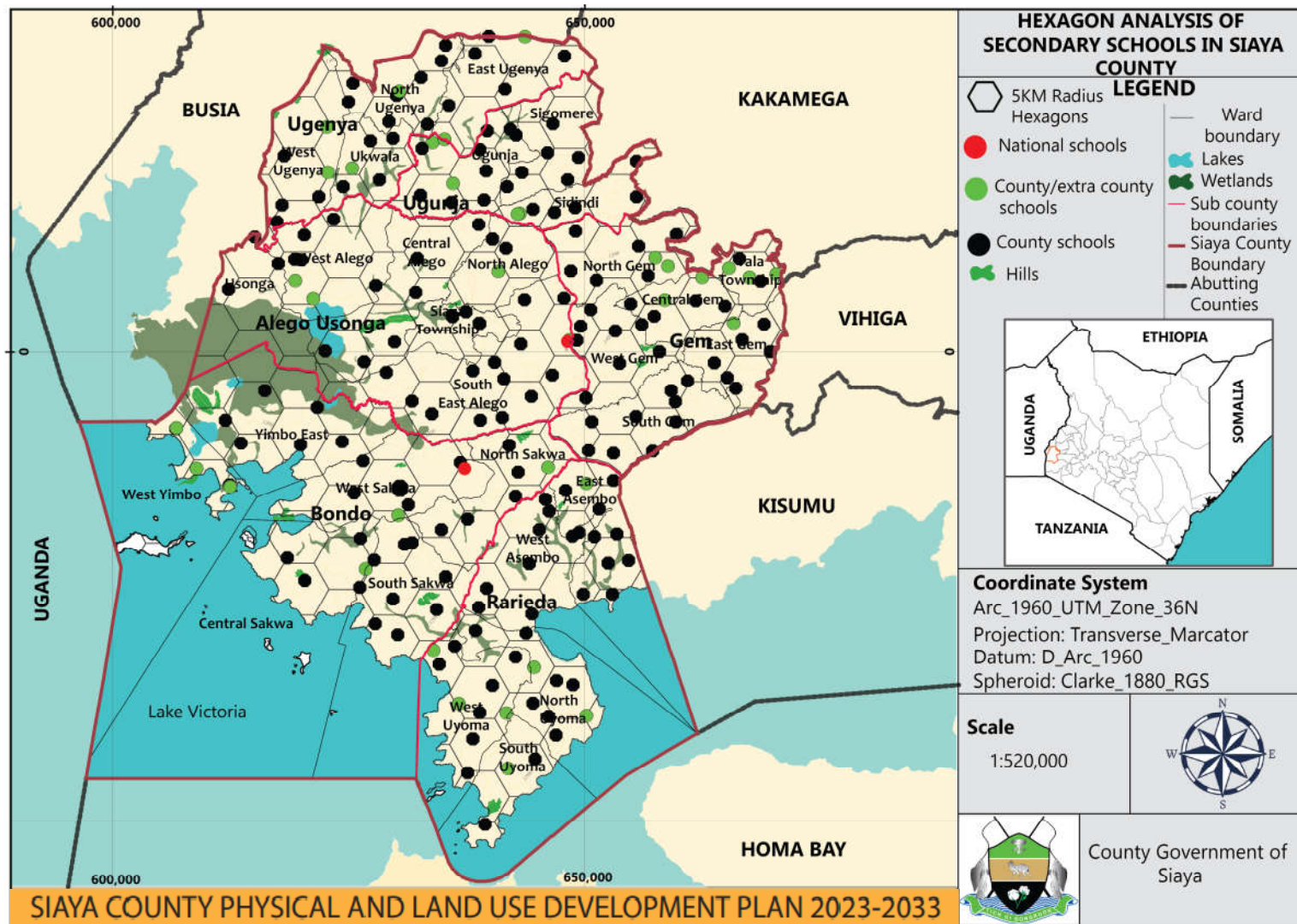
23	West Uyoma	325.88	89	0	
UGENYA SUB-COUNTY					
24	East Ugenya	340.75	94	0	Create a Village Polytechnic in each ward
25	North Ugenya	406.73	69	2	
26	Ukwala	401.74	52	1	
27	West Ugenya	342.73	93	1	
UGUNJA SUB-COUNTY					
29	Sidindi	476.93	55	0	Create a Village Polytechnic in each ward
29	Sigomere	417.15	72	1	
30	Ugunja	465.25	83	1	



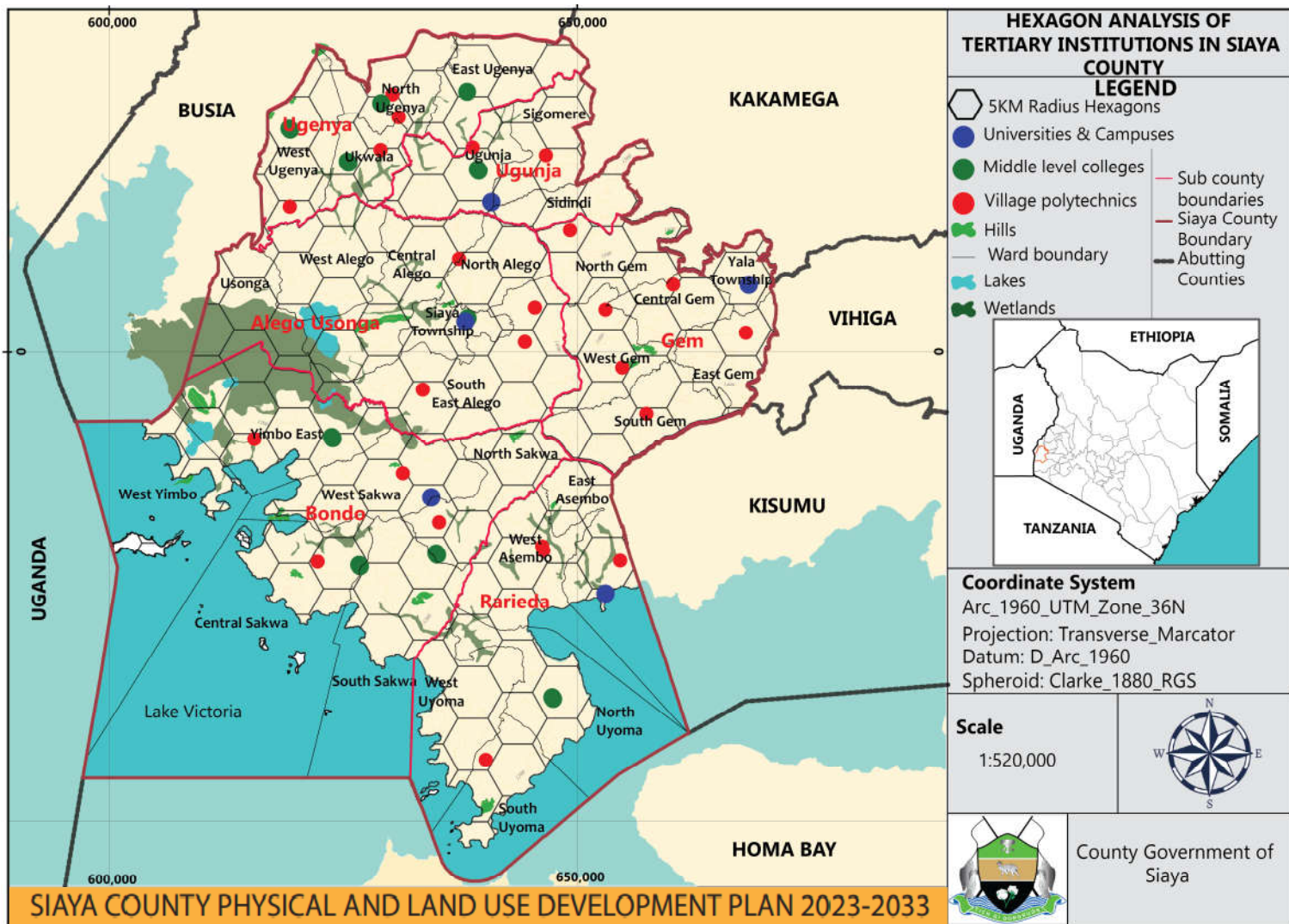
Map 9. 7: Hexagon Analysis for ECDE Centres in Siaya County



Map 9.8: Hexagon Analysis of Primary Schools in Siaya County



Map 9.9: Hexagon Analysis for Secondary Schools in Siaya County



Map 9.10: Hexagon Analysis of Tertiary Institutions in Siaya County

9.7.2 Health Facilities

Health is a very crucial component in any development process and its importance, therefore, cannot be underestimated. Health determines among other things, the level of productivity of the population, living standards and, consequently, the level of development. The County has 174 health facilities, with 123 public facilities, 28 private facilities, 16 Faith-based and 7 Nongovernmental Organizations (Figure 9.8.1 and 9.8.2). The general number of health staff employed in the County is inadequate. The number of physicians employed per 100,000 people is 2¹⁴, nurses 33¹⁴ and clinical officers 25¹⁴. The ratio of physician and inhabitants are below the average and smaller than the recommended World Health Organization (WHO) standards of 35 medical doctors per 10,000 inhabitants. The average distance to the nearest health facility is 5km which is the same as the national standard of 5km. Figure 9.9.2 illustrates that only 14.63% of area coverage has 1 Km distance access, 50% of area coverage of 2 Km distance access and 70% of 5 km distance access. Most areas in the County fall under high-distance access, therefore most health facilities services should be availed in these areas.

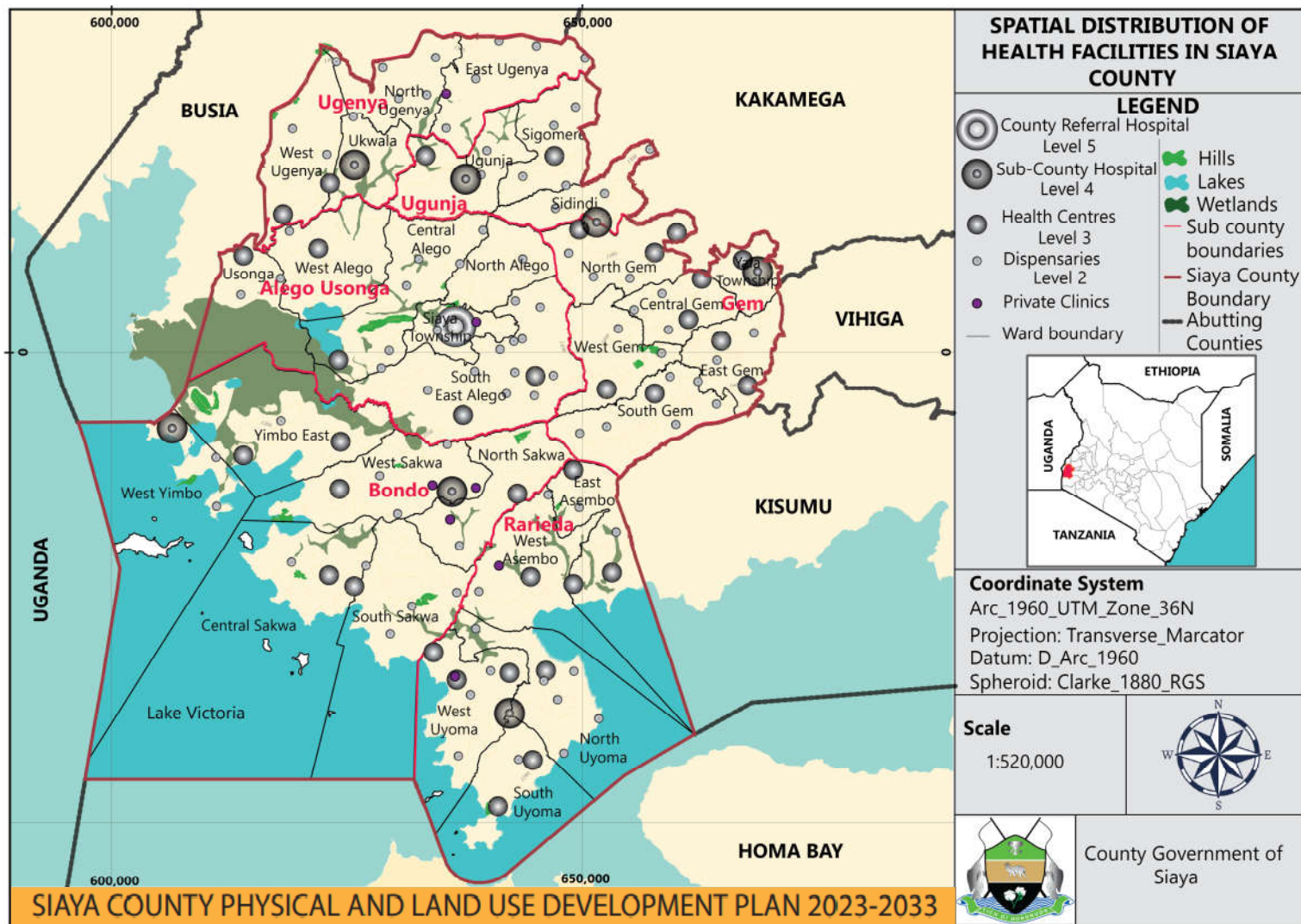
The HIV prevalence among the general population in Siaya is 24.8% for people aged 15 years and above. It is, however, higher among women at 26.4% compared to that of men at 22.8%. The total number of PLHIV is 126,411 (Kenya HIV Estimates, 2015). The HIV epidemic trend has generally been stable at a rate of 21.4% in 2013, 23.7% in 2014 and 24.8% in 2015 (Kenya HIV estimates).

9.7.2.1 Category and Functionalities of Health Facilities

County Referral Hospital (Level 5). Serve as an intermediary between National Referral Hospitals & County level hospitals; they oversee the implementation of health policy at the county level; Coordinate County health activities; and provide some form of specialized care. They offer services such as surgical, internal medicine, and specialty services such as emergency, EmOC and anesthesiology but are less extensive than the National Referral Hospitals. This category of the hospital in Siaya is Siaya County Referral Hospital (Figure 9.11). The physical planning handbook proposes an acreage of 8 hectares for this category of health facility.

Sub-County Hospitals (Level 4). These are primary hospitals and serve as the main referral centres for health centres and offer different services such as outpatient care, emergency surgery, blood transfusion, laboratory and consultative services about community-based programs. They offer services such as Antenatal care (ANC) and routine birthing services, immunization programs, HIV/AIDS care, pediatric services, and EmOC. In the County, these facilities include Yala, Madiany, Bondo, Got Agulu, Ambira, Ukwala, and Inuka Sub-County hospitals (Figure 9.4). The proposed acreage of these facilities is 4 hectares.

Health Centres (Level 3): They perform all community-based demand creation activities, that is, the identification of cases that need to be managed at higher levels of care, as defined by the health sector. They offer a range of preventive and curative services with a focus on primary care services (Figure 9.11).



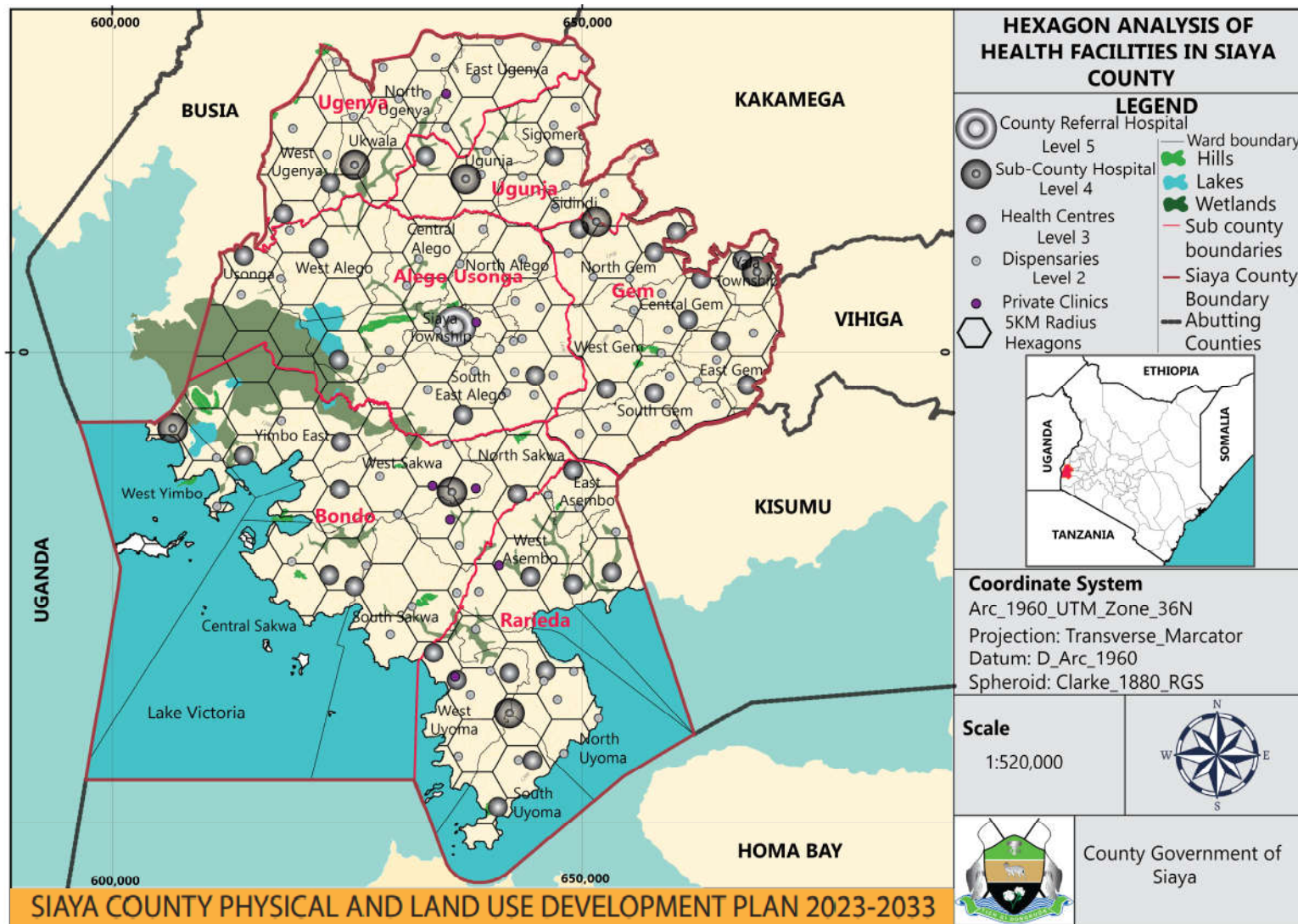
Map 9.11: Spatial Distribution of Health Facilities in Siaya County

9.7.2.2 Hexagonal Analysis for Health Facilities

The application of the Central Place Model was used to assess the adequacy of health facilities in terms of location, accessibility, and equity. The 5 Km radius was used as an equidistant standard to create polygons and/or hexagons distributed in the entire county. The wards were therefore used as the basic unit of resource allocation while respecting the catchment population. The deficient and/or underserved areas with public health facilities per ward were therefore projected for 10 years assuming all other factors are held constant. Table 9.22 illustrates the same for public health facilities.

Table 9.27: Hexagonal Analysis for Health Facilities in Siaya County

ALEGO USONGA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Yrs.
Central Alego	275.10	122	6	5
North Alego	383.47	59	1	2
Siaya Township	872.03	39	3	4
South East Alego	357.40	196	14	3
Usonga	178.24	91	3	2
West Alego	324.18	100	2	3
BONDO	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Yrs.
Central Sakwa	653.79	84	4	4
North Sakwa	331.55	94	2	4
South Sakwa	174.71	105	3	3
West Sakwa	204.80	112	4	4
West Yimbo	938.33	38	3	1
East Yimbo	170.30	155	3	5
GEM	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Yrs.
Central Gem	484.57	52	5	1
East Gem	407.15	61	4	1
North Gem	420.16	85	7	1
South Gem	317.04	96	7	0
West Gem	347.55	75	3	1
Yala Township	679.03	34	2	0
RARIEDA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Years
East Asembo	416.32	77	5	1
North Uyoma	297.49	78	7	0
South Uyoma	351.22	54	4	1
West Asembo	325.50	100	4	2
West Uyoma	325.50	89	7	1
UGENYA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Yrs.
East Ugenya	653.79	84	6	2
North Ugenya	331.55	94	5	1
Ukwala	174.71	105	2	1
West Ugenya	204.80	112	4	2
UGUNJA	Population Density	Area in Sq. Km	Existing Number	Deficiency 10 Yrs.
Sidindi	476.93	55	3	2
Sigomere	417.15	72	5	1
Ugunja	465.25	83	5	1



Map 9.12: Hexagon Analysis of Health Facilities in Siaya County

9.7.3 Emerging Planning Issues, Opportunities and Challenges

9.7.3.1 Opportunities

- a) Road Transport:** Suitable terrain for road development; Various funds for example., CDF, fuel levy, rural access road, County Government Budget; Available labour for road construction; Availability of building materials
- b) Railway:** Mombasa-Uganda Railways through the county; and the possibility of alternative means of transport
- c) Water Transport:** Ferry transport between the county and other regions; Kisumu, Homabay, and Migori; and water sports for tourism
- d) Air Transport:** potential for the tourism industry in the region; existing potential for horticulture and other agro-based products; and land available to establish more airstrips
- e) Energy:** Existing potential for solar energy; Existing potential for wind energy; and potential for biogas exploration
- f) Water and Sanitation:** Unexploited water resources for example groundwater, dams and boreholes; Establishment of Water and Sewerage Company to provide water and sanitation services; Availability of funds at the county level; Existence of urban centres that require water and sanitation services like Bondo, Siaya, Ugunja, Usenge, Yala and Ukwala; Recycling of wastes
- g) Health:** Health facilities evenly spread across the county (average of 5 km radius); NGOs doing capacity building in preventive Health for example hygiene, counselling and VCT; Community Health Programmes
- h) Recreation:** Presence of sites of historical significance, and beaches; untapped indigenous forms of recreation like traditional dances and acrobats, wrestling, *Tero buru* (rich cultural heritage); Lakefront recreational sites (good sandy beaches), wetland ecosystems
- i) Education:** Availability of funding, NGOs, CDF, County Government Budget, Infrastructure Fund; Unemployed graduates from Teacher Training Colleges and Universities; and development funding from National Government

9.7.3.2 Challenges

- a) Road Transport:** Poor Road condition -the majority of rural access roads are in bad condition; lack of tarmac coverage in northern Side-Gem, Ugunja, Ugenya and parts of Alego sub-counties; blocked access to beaches; and encroachment on road reserves.
- b) Water Transport:** lack of commercial sustainability in Ferry services
- c) Energy:** Unreliable power supply; Destruction of vegetation; Loss of biodiversity; and Undeveloped use of alternative energy sources
- d) Water and sanitation:** Inadequate water supply in all the urban centres; urban centres and markets are not connected to sewerage lines; and use of septic tanks and latrines poses a danger to the quality of ground and surface water
- e) Solid Waste disposal:** Lack of designated dumping sites; and Lack of proper solid waste management
- f) Health Care:** Physical facilities are inadequate; and inaccessibility because of the poor road network
- g) Recreation:** Undeveloped beaches to promote tourism; Lack of adequate stadia and play fields; and inadequate social halls for example Ndori, Ugunja, Usenge, Yala
- h) Education:** Shortage of facilities for example classrooms, laboratories, libraries, toilets, playing fields; low staffing levels; and land requirements for expansion of schools not met
- i) Markets:** Open air markets without sheds, public toilets or sanitation facilities; Insecurity: goods are often lost; and poor road network

CHAPTER 10: ECONOMIC BASE

10.1 Introduction

Siaya County has posted the fastest growth over the last 5 years according to a World Bank Report Gross Domestic Product (GDP) grew by 10 per cent per annum. This accelerated growth is attributed to the extended construction of roads, hospitals and sports facilities as well as improvement in the management of fish resources in Lake Victoria. There has been an increased stock of drugs at various hospitals, increased admission in local primary and secondary schools, agricultural expansion through irrigation, and expansion of trading activities. The GDP was recorded at \$287 million with a wealth per capita of \$340, about half the Kenyan average. Accelerated growth is manifested in the opening of over 592 Kilometers of rural roads with another 40 kilometres tarmacked from Siaya Town to Nyadorera and on-going is Musanda-Ugunja-Ruambwa Road being tarmacked. The same scenario has been replicated in Siaya and Bondo Township which have gone through a transformation with most strategic urban roads being tarmacked as well as developing the street lighting. Most trading markets now have solar lighting to enhance trading beyond daytime. Expansion in agricultural productivity followed interventions where at least 10,000 acres of smallholder farms have been ploughed through subsidies in a tractor program, where farmers pay KShs 1,850 per acre lower the commercial rate of Kshs3500. Maize productivity has increased from 130,683 metric tons in 2012 to 160,638 metric tons in 2014. Over 200 solar-powered street lights were installed in trading centres as these increased security and business hours. Jaramogi Oginga Odinga University of Science and Technology (JOUST) has provided the impetus for the growth of Bondo Town, an opportunity in real estate development. The county has seen the growth of the hotel industry as a re-birth of a destination of tourism business. Lastly, education experienced growth through bursary scheme disbursement of over KShs. 80 million as more than 12,700 secondary and college students have benefited.

10.2 Poverty

This section focuses on poverty estimates based on three poverty lines; food poverty line, overall poverty line, and hardcore or extreme poverty line defined as follows:

Food Poverty: households and individuals whose monthly adult equivalent food consumption expenditure per person is less than Ksh 1,954 in rural and peri-urban areas and less than Ksh 2,551 in core-urban areas respectively are considered to be food poor or live in “food poverty”.

Overall Poverty: households and individuals whose monthly adult equivalent total consumption expenditure per person is less than Ksh 3,252 in rural and peri-urban areas and less than Ksh 5,995 in core-urban areas are considered to be overall poor or live in “overall poverty”.

Hardcore or Extreme Poverty: households and individuals whose monthly adult equivalent total consumption expenditure per person is less than Ksh 1,954 in rural and peri-urban areas and less than Ksh 2,551 in core-urban areas respectively are considered to be hardcore poor or live in “hardcore or extreme poverty”.

10.2.1 Food Poverty

Table 10.1 summarizes food poverty measures for Siaya County and at the National level. Looking beyond the County and national average food poverty headcount rate for individuals of 27% and 32% respectively reveals a gloomy status of food poverty in the County. In terms of the number of individuals living in food poverty, Siaya County has a population of 17,730 accounting for 1.8% of the County's total population.

Table 10.1: Food Poverty Estimates (individual)

Residence/County	Headcount rate %	Distribution of the poor%	Poverty Gap%	Severity of Poverty%	Population ('000)	Number of poor ('000)
Siaya County	27.3	1.8	7.2	3.1	985	269

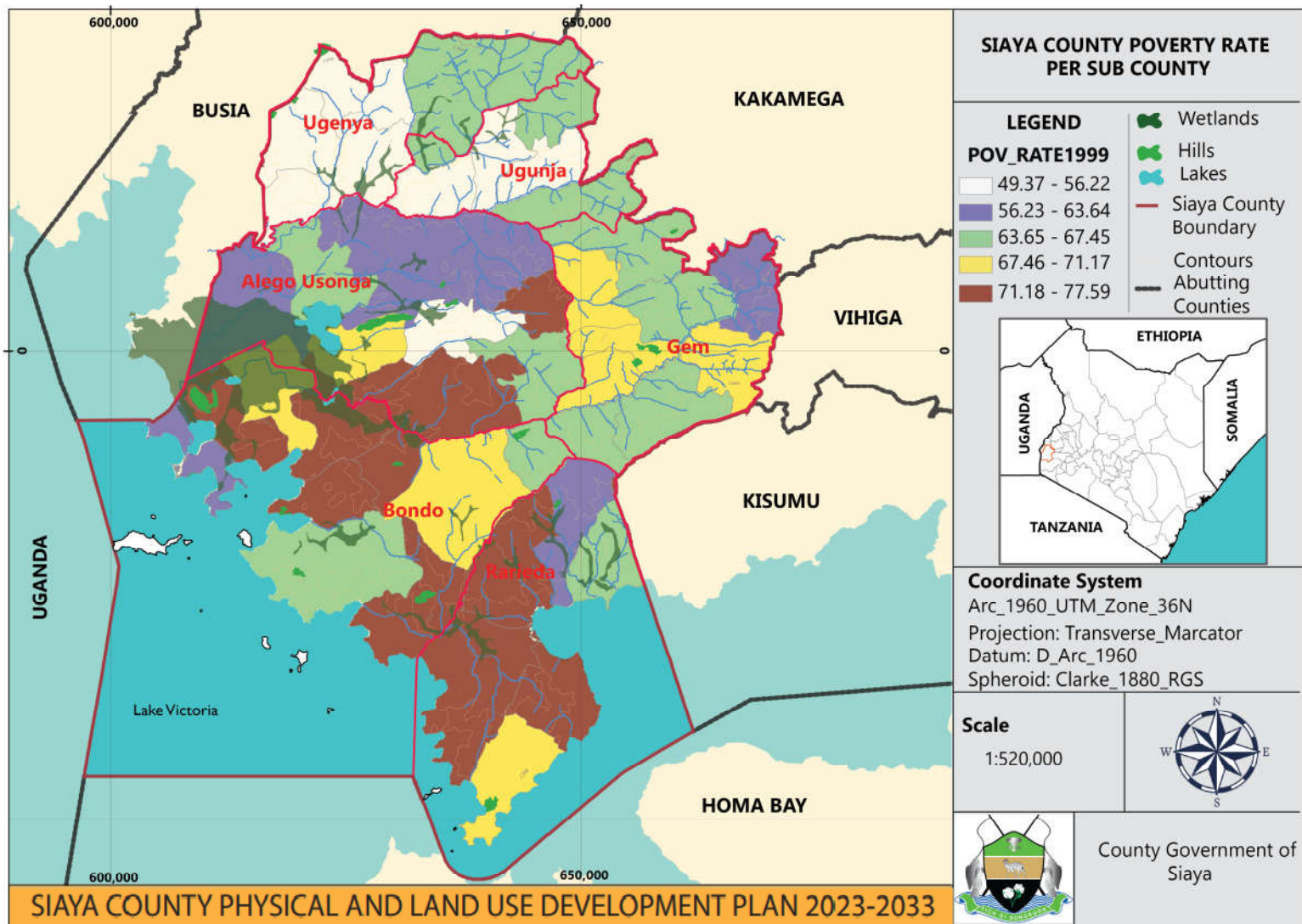
10.2.2 Overall Poverty

Table 10.2 summarizes the overall poverty measures for individuals in Siaya County and at the national level. The results reveal significant overall poverty incidence at the county level with approximately 332,930 accounting for 33.8% of residents out of a total population of 985,000 people (KIHBS 2015/2016).

Table 10.2: Overall Poverty Measures

Residence/County	Headcount rate %	Distribution of the poor%	Poverty Gap%	Severity of Poverty%	Population ('000)	Number of poor ('000)
Siaya County	33.8	2.0	8.7	3.5	985	333

Most of the affected people are Persons living with Disabilities (PWDS), People Living with HIV and AIDS (PLWHA) and the youth who have negative attitudes towards non-formal employment. While the overall poverty level has reduced significantly, there are still many locations in the county with high poverty ratings. Household poverty rates vary significantly per ward with Siaya Township recording the least percentage of poor households (13-25% against North Uyoma (25-50%). The causes of poverty in these areas are diverse and include poor soil fertility leading to low yields, low income among households to afford farm inputs, over-reliance on traditional methods of farming and lack of alternative sources of income. To be able to address poverty there is a need to enhance development efforts targeting food production. This will ensure food security and provide income through the sale of surplus farm produce. In 1999 Poverty index indicated most population were below the poverty line (Map 10.1) earning a dollar a day. Over half of the wards were below poverty (70-79%) in Alego-Usonga, Bondo and Gem. Few wards had an average population of less than 50% below the poverty line. The County must put concerted efforts to develop the local economy as well as reduce poverty through: the revitalization of agriculture, tapping the fishing resources and promoting industrial production, tourism, and trade and commercial activities.



Map 10.1: Poverty Rate by Sub Counties as at 1999

10.3 Agriculture Sector

Agriculture is considered a critical sector in the world economy. It contributes 24% of the Gross Domestic Product (GDP) and employs 1.3 billion people or 22% of the world's population. According to the Government of Kenya (2010), agriculture is the mainstay of the Kenyan economy directly contributing 26 per cent of the Gross Domestic Product annually, and another 25 per cent indirectly. The sector accounts for 65 per cent of Kenya's total exports and provides more than 70 per cent of informal employment in the rural areas and 18 per cent of formal employment. Over the years, agriculture production in Kenya has been facing challenges that have contributed to reduced productivity.

The main food crops in Siaya County include; maize, sorghum, millet, beans, cowpeas, cassava, sweet potatoes, groundnuts and finger millets while the main cash crops include cotton, rice, sugar cane and groundnuts (Figures 10.2, 10.3 and 10.4). There is a mark in crop production in terms of area under crop, production in tonnes and value in Kenya Shillings (Table 10.1, 10.2, 10.3 and 10.4). Some of the emerging crops in the county include irrigated rice, palm oil, chilli, passion fruits and grain amaranth. Vegetables produced in the county are tomatoes, onions and kale while fruits grown in the region are; mangoes, pawpaw, bananas, oranges and watermelon.

Table 10.3: Cereal Crop Production (Area, Production, Value) 2013-2016 in Siaya County

	Area Cropped (Ha)			Production (Tonnes)				
Cereals	2013	2014	2015	2016	2013	2014	2015	2016
Maize	89760	93732	84024	74160	81814.3	102385	137289.6	54429.3
Paddy Rice	15912	15720	15900	15096	42972	48576	48960	437223.2
Sorghum	36348	37434	34440	35034	36029	32006	36747	342223.0
Beans	70716	63870	63630	52128	596100	643809	584190	347544
Green Gram	2490	558	804	510	1008.5	305.64	274.64	322.11
Value (KES Million)								
Cereals	2013		2014		2015		2016	
Maize	2908.98		3299.1		3661.08		1814.3	
Paddy Rice	1289.16		1943.0		1958.4		1748.9	
Sorghum	1121		1066.8		898.26		1064.7	
Beans	2384.4		3669.6		3505		2224.2	
Green Gram	65.54		15.81		20.7		22.54	

Source: Department of Agriculture, County Government of Siaya (2016)

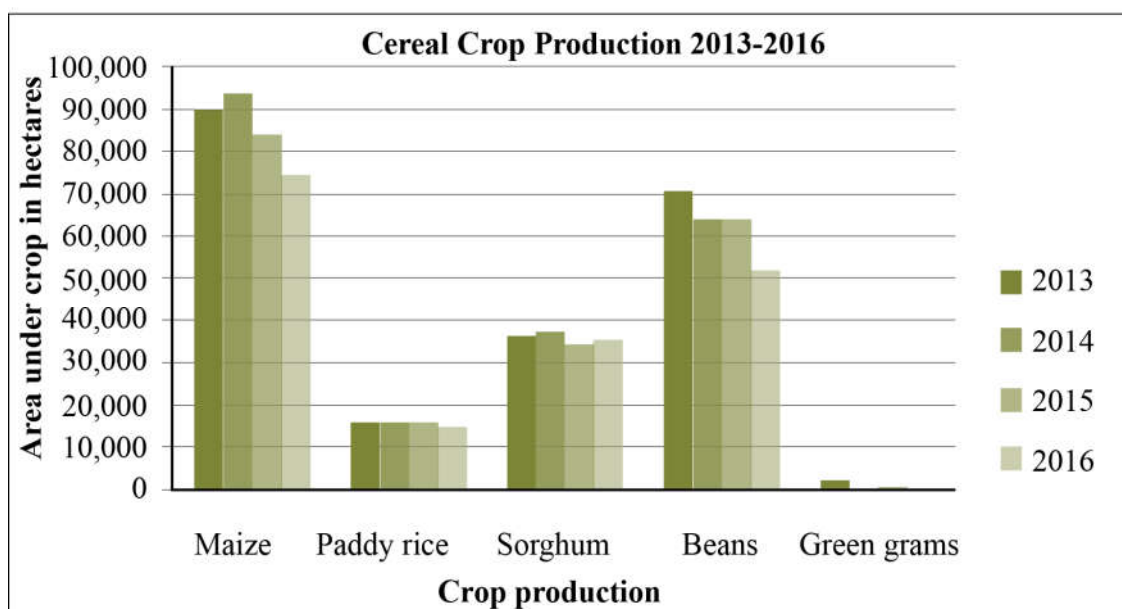


Figure 10.1: Trend of Cereal Crop Production (area under crop) 2013-2016

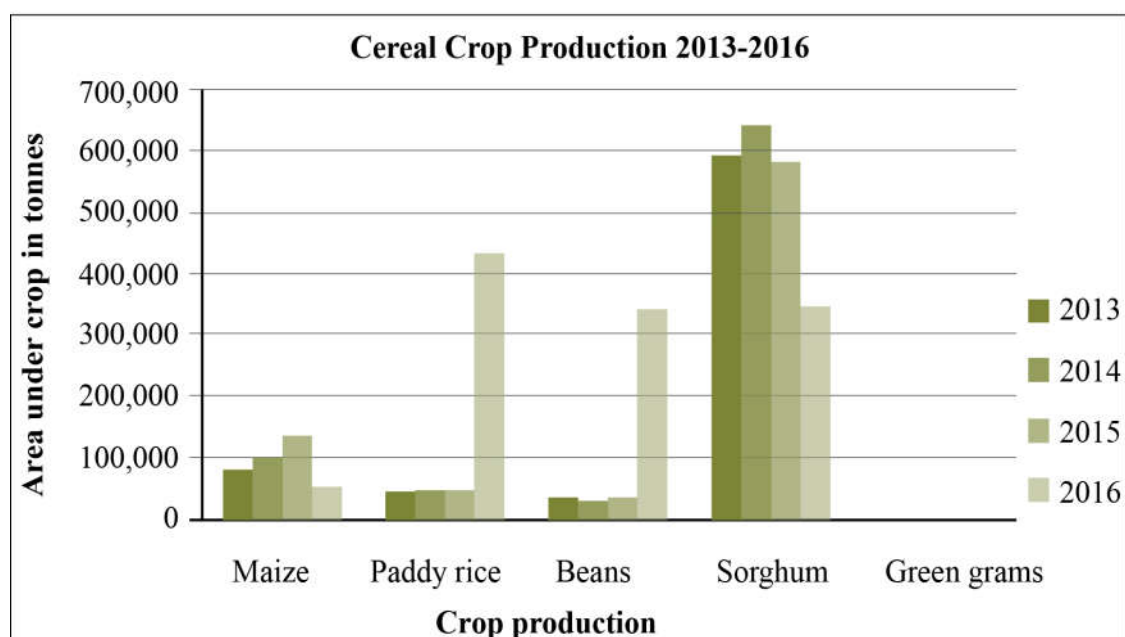


Figure 10.2: Trend of Cereal Crop Production (Tonnes) 2013-2016

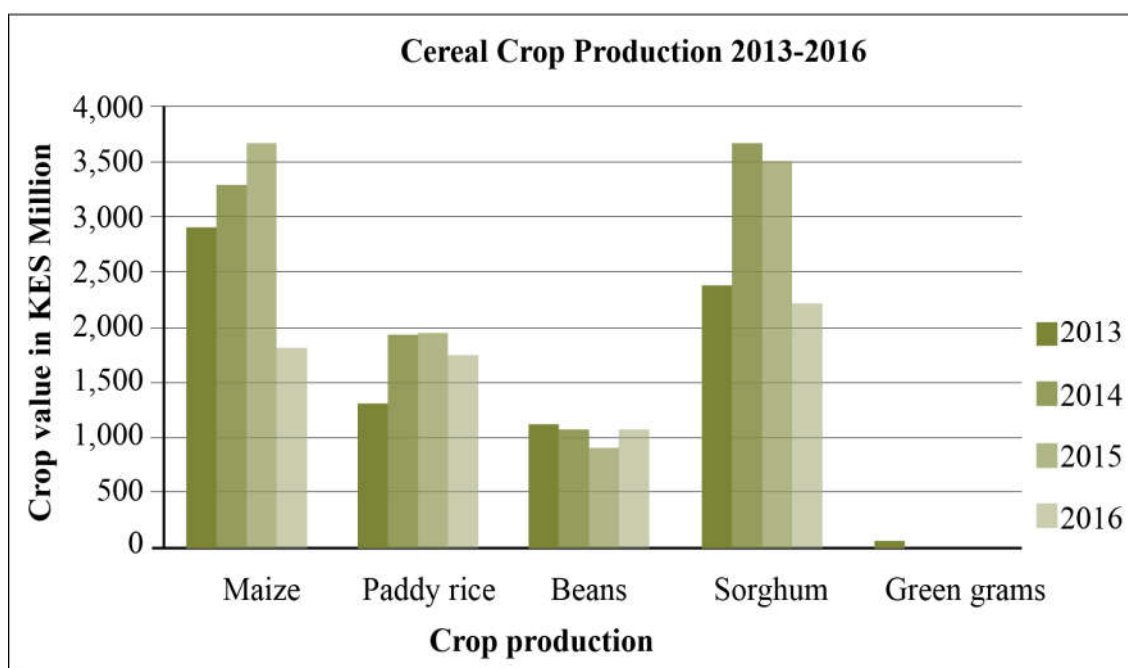


Figure 10.3: Trend of Cereal Production (Value in KES) 2013-2016

Table 10.4: Roots and Tuber Crop Production 2013-2016

	Area Cropped (Ha)				Production (Tonnes)				Value (KES in Million)			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Sweet Potato	7686	7500	5490	3606	83610	76386	60390	23820	1672	1528	1209	603.9
Cassava	6900	5572	8328	6774	100140	696600	104100	59766	1502	1393	2082	1195.3

Source: Department of Agriculture, County Government of Siaya

Table 10.5: Fruit Crop Production 2013-2016

Fruits	Area Cropped (Ha)				Production (Tonnes)				Value (KES in Million)			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Avocado	270	300	228	300	1800	2394	1944	2868	27	14.364	12.636	21.51
Banana	1380	1632	1668	1680	8970	19260	19682.4	8532	180	337.008	393.648	213.3
Mango	990	2106	2160	2208	5400	10080	12960	39042	21.4	80.64	129.6	585.63
Passion	60	48	48	48	600	504	528	408	48	30.6	39.6	32.4
Oranges	30	30	30	24	150	150	150	120	3	3.75	3	3.6
Water Melons	180	264	336	252	2700	3960	5040	2520	45	79.2	11.088	63

Source: Department of Agriculture, County Government of Siaya

Table 10.6: Vegetable and Nut Crop Production 2013-2016

Vegetables	Area Cropped (Ha)				Production (Tonnes)				Value (KES in Million)			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Tomato	1080	1410	1260	1296	10800	15510	13860	12762	279	387.75	346.5	382.86
Kales	2100	2490	2970	5298	10500	14964	17820	26358	105	149.69	178.2	395.37
Cabbage	60	132	216	126	300	1254	2700	558	3	18.81	54	11.16
Onions Springs	90	90	108	60	270	252	486	324	5.64	5.04	8.7	8.1
Bulb Onion	720	780	930	216	10800	11700	14415	2184	702	760.5	432.3	76.4

	Area Cropped (Ha)				Production (Tonnes)				Value (KES in Million)			
Carrots	0	0	0	0	0	0	0	0	0	0	0	0
African Nightshade	180	414	228	162		1863	1368	420	5.04	18.63	14.364	11.04
Nuts	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Groundnuts	15961	1950	1750	1530	494.1	1323	1628.1	613.98	39.54	105.84	130.248	67.32

Source: Department of Agriculture, County Government of Siaya (2016)

The 2009 Kenya Population and household census (KPHC) estimated that 90.5% of farmers are engaged in crop farming compared to 68.8% for the entire country while at the same time, 78.9% of the household livestock compared to 66% for the entire country. Table 10.5 shows the quantities and estimated value of outputs from livestock in the county. Several livestock breed in the county include zebu cattle, crossbred dairy cows, dairy goats, local goats, sheep, pigs, rabbits, donkeys and poultry. In terms of production and earnings milk and beef contributes significantly to the local economy (Table 10.7 and Figure 10.8). The county has great potential for the development of processing industries for both livestock products and by-products.

Table 10.7: Livestock Production in Each Sub-county

		Alego Usonga	Bondo	Gem	Ugunja	Ugenya	Rarieda	Total
Milk	Quantity (Kg)	10,994	1,147	6,681	3,995	1,793	3,345	27,956
	Value (KES)	549,724	57,353	334,065	199,743	89,649	167,261	1,397,795
Beef	Quantity (Kg)	461	844	988	426	317	651	3,686
	Value (KES)	156,721	286,885	335,953	144,755	107,624	221,234	1,253,172
Mutton	Quantity (Kg)	118	178	68	74	23	78	539
	Value (KES)	44,879	67,640	26,000	27,949	8,889	29,522	204,861
Chevon	Quantity (Kg)	40	48	82	52	13	17	251
	Value (KES)	15,215	18,088	31,067	19,646	4,894	6,624	95,534
Pork	Quantity (Kg)	81	23	30	37	11	28	211
	Value (KES)	24,342	7,023	8,964	11,172	3,432	8,390	63,323
Rabbit Meat	Quantity (Kg)	12	12	65	14	14	8	125
	Value (KES)	3,734	19,568	4,116	4,060	2,426	37,502	37,502
Poultry	Quantity (Kg)	100	1,403	269	54	80	90	1,996
	Value (KES)	39,767	561,280	107,468	21,718	31,960	36,156	798,350
Eggs	Quantity (Kg)	3,798	6,324	4,104	2,497	2,809	1,196	20,728
	Value (KES)	37,975	63,240	41,042	24,970	28,092	11,957	207,276
Honey	Quantity (Kg)	7,428	342	60	6	48	18	482
	Value (KES)	3,343	153,743	26,982	2,658	21,583	8,032	216,539
Wax	Quantity (Kg)	0.935	1.22	0.597	1.88	1.62	7.5	14
	Value (KES)	281	366	180	564	486	2,245	4,121

Source: Department Livestock, County Government of Siaya

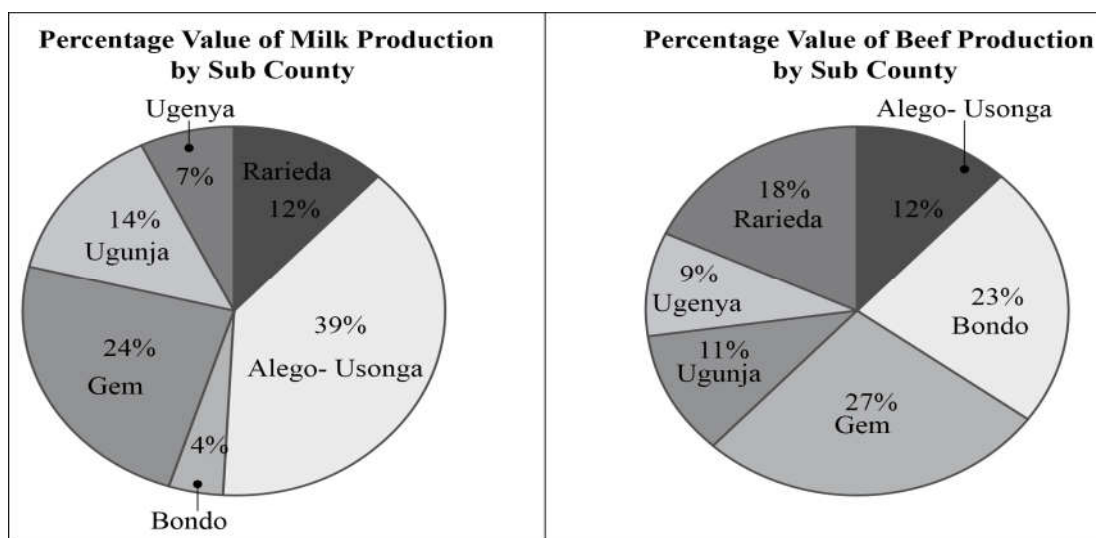


Figure 10.4: Percentage Value of Milk and Beef Production by Sub-county

The County received a total of KES 1.6 billion from major livestock products with beef production contributing the largest share amounting to KES 962 billion followed by eggs at KES 159 million. Milk and poultry meat accounted for KES 157 million and KES 148.7 million respectively, while pork contributed KES 38 million. There was an increase in livestock numbers from 2009 to 2017, there were 293,633 to 359,323 cattle; 94,566 to 159,608 sheep, 176,547 to 281,280 goats, 7,531 to 8,133 donkeys, 11,419 to 14,509 pigs and 1,047,015 to 1,054,494 chickens in addition to 9,828 to 11,315 bee hives complemented by 36 apiaries (Table 10.8). The information available in the county showed that the average farm size for small-scale farms was 0.6 Ha. and 7.0 Ha. for large-scale farms. The average farm size in the county varied between the sub-counties, for instance, the average farm size for small-scale farmers in Bondo Sub- County was approximately 3.0 Ha. while in Siaya Sub- County it was 1.02 Ha. Food crops covered a total land area of 150,300 Ha. while the cash crops occupied 2,500 Ha.

Table 10.8: Livestock Production

	Types	2013	2014	2015	2016	2017
Cattle	Dairy	5,285	5,698	5,771	6071	7024
	Beef Cattle	323,287	492,591	495,061	509,913	352,299
Poultry	Broilers	64,498	63,688	71,500	87,063	98,469
	Exotic layers	39,097	40,394	55,800	66,005	75,154
	Quails	20,000	-	-	-	-
	Local/Indigenous Chicken	797,651	804,161	820,150	829,821	
Goats	Local	257,221	260,252	265,436	269,177	280,726
	Dairy	3,630	4,656	4,717	5421	5,954
Sheep	Local breeds	139,456	143,752	146,624	150,445	157,608
	Wool/hair	0	0	0	0	0
Pigs	Pigs breed (All)	14,186	13,453	13,650	13,227	14,509
Bee	KTBH	2,281	2,148	2,148	2,155	2,212
Hives	Langstroth	7,282	8,310	8,316	8,310	8,864
	Log Beehives	214	208	202	196	239
Rabbits	Exotic breeds	12,170	12,324	12,470	13,111	13,351
	Local breeds					
Donkeys	Donkeys breeds	7,577	7,719	7,754	7,861	8,133

Source: Department of Livestock, County Government of Siaya

Table 10.9: Feeding and Livestock Nutrition

Pasture/Fodder	2015	2016	2017
Napier grass	875	895	900
Sweet potato vines	63	60	83
Fodder Trees			
Caliandra	23700	25576	26500
Sesbania	7500	7833	7846
Leucaena	53650	57000	58500
Pastures			
Rhodes grass	120	120	133
Columbus grass	0.05	1.5	1.5
Kikuyu grass	0	0	0
Natural pastures	88,800	82,314	81,200
Browse material	48,250	47,680	45,600
Legumes			
Lucerne	9.8	9.9	11.2
Desmodium	26	29	35
Brachiaria	2.5	3.1	34

Source: Department of Livestock, County Government of Siaya

Table 10.10: Animal Slaughtered in Number and Value (KES Million)

Animal	Animal Carcasses		KES (Million)	
	2013	2014	2013	2014
Cattle and Calves	19,154	19,450	134,078	1361.5
Goats	1,250	1,378	5	5,512
Sheep	1,120	1,233	4.48	4.932
Pigs	2700	5360	64.8	144.45

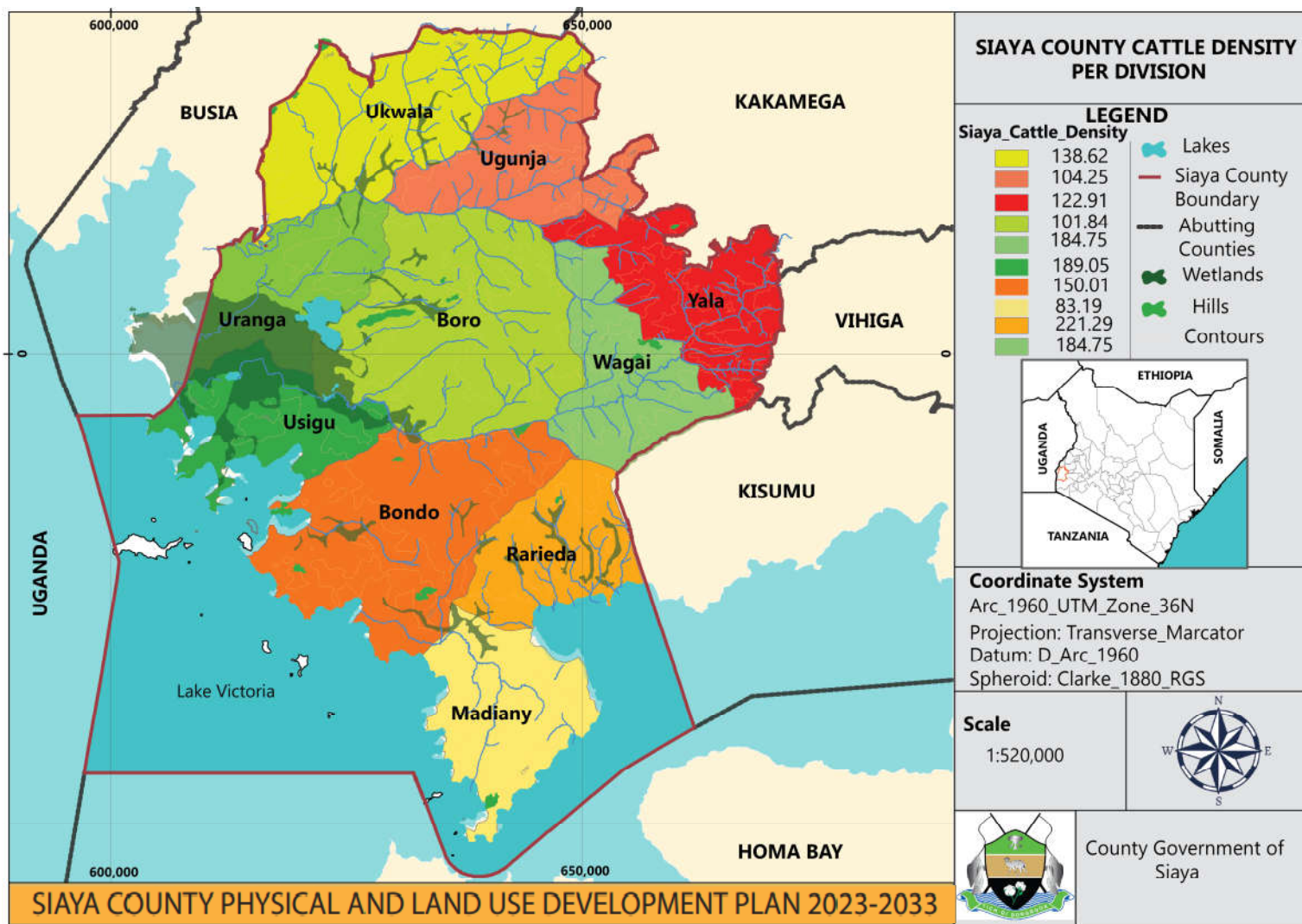
Source: Department of Livestock, County Government of Siaya

Table 10.11: Quantity and Value of Hides and Skins Produced in 2014

Animal	Kg/Pcs	Value (KES Million)
Cattle and Calves	69,164	38,075
Goats	96,803	9,594
Sheep	25,132	3,477

Source: Department of Livestock, County Government of Siaya

Cattle Density in the County changes according to Agro-Ecological subzones indicating higher density in regions bordering Kakamega County due to increased rainfall reliability (Figures 10.6).



Map 10.2: Siaya County Cattle Density

10.3.1 Food Expenditure by Source

For each food item, the information is provided on four sources of consumption, namely, purchases, own production, own stock, and gifts. The expenditure on household purchases made during the reference period utilized the actual quantity consumed from purchases, rather than the entire purchases made during the period.

Table 10.12 presents the percentage share of total food consumed disaggregated by source. At the county, food consumed from purchases accounted for 57.4% while own production accounts for only 28.5 % (KIHBS 2015/16). Consumption from gifts and other sources accounts for only 9% in Siaya County.

Table 10.12: Percentage Distribution of Household Food Consumption by Source

Residence / County	Purchases	Stock	Own production	Gifts	Total
Siaya County	57.4	5.2	28.5	9.0	100

The mean monthly food and non-food expenditure per adult equivalent are presented in Table 10.13. The Siaya County food expenditure per month per adult equivalent was Ksh5959 (KIHBS 2015/16).

Table 10.13: Mean Monthly Food and Non-Food Expenditure per Adult Equivalent

residence / County	Expenditure			Percentage share	
	Food	Non-food	Total	Food	Nonfood
Siaya County	4,106	1,853	5,959	68.9	31.1

10.3.2 Percentage Distribution of Households by Point of Purchased Food Items

Information on household food purchases by point of purchase in Siaya County is presented in Table 10.14. In the County, Open markets (49.1%), General shops (28.1%), and Kiosks (8.2%) were the preferred outlets, jointly accounting for more than 3/4 of all food purchases made.

Table 10.14: Percentage Distribution of Households by Point of Purchased Food Items

Residence/ County	Supermarkets	Open Markets	Kiosk	General shops	Specialized shops	Informal sources	Other formal points	Number of observations
Siaya	1.7	49.1	8.2	28.1	5.4	7.4	0.1	6,951

10.3.4 Agriculture Emerging Planning Issues

a) Challenges

Crops

1. Poor market accessibility due to bad roads
2. Unreliable rainfall
3. Sentimental attachment to maize which does not do well in some areas of the county
4. The collapse of the cotton and sugarcane industries
5. Poor marketing systems
6. Poor extension services
7. Low management skills for commercial farming
8. Lack of Mechanization only small-scale rain-fed agriculture
9. Inadequate irrigation services during the season

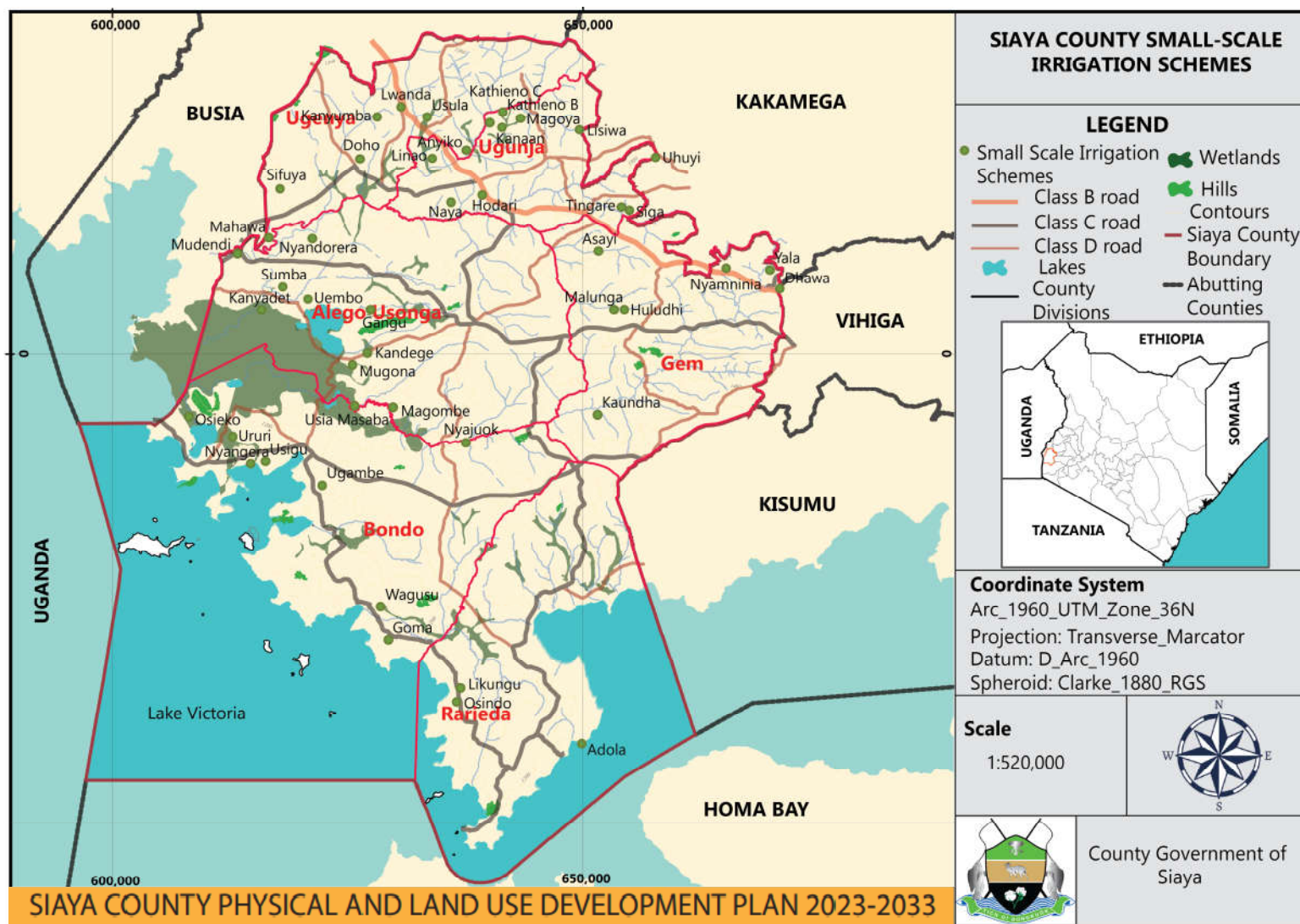
10. High-cost agricultural input: seeds, fertilizer, animal feeds
11. Inadequate value addition in agricultural products

Livestock

1. High incidence of tick-borne diseases
2. Collapsed dips
3. Poor animal husbandry
4. Harsh weather conditions in some parts of the county
5. High cost of good quality dairy cattle not affordable to farmers

b) Opportunities

- Food crop farming (maize, sorghum, millet, beans, cowpeas, cassava, sweet potatoes, groundnuts and finger millet)
- Cash crop farming (cotton, rice, sugar cane and groundnuts)
- Emerging crops (irrigated rice, palm oil, chilly, passion fruits and grain amaranth)
- Livestock farming (zebu cattle, up-grade and pure dairy cows, dairy goats, poultry, local goats, sheep, pigs, rabbits, donkeys)
- Beekeeping
- Fish farming in Lake Victoria, Lake Kanyaboli, dams and fish ponds
- Agroforestry: Tree nurseries, fruit trees and establishment of woodlots
- Rice production in Yala swamp



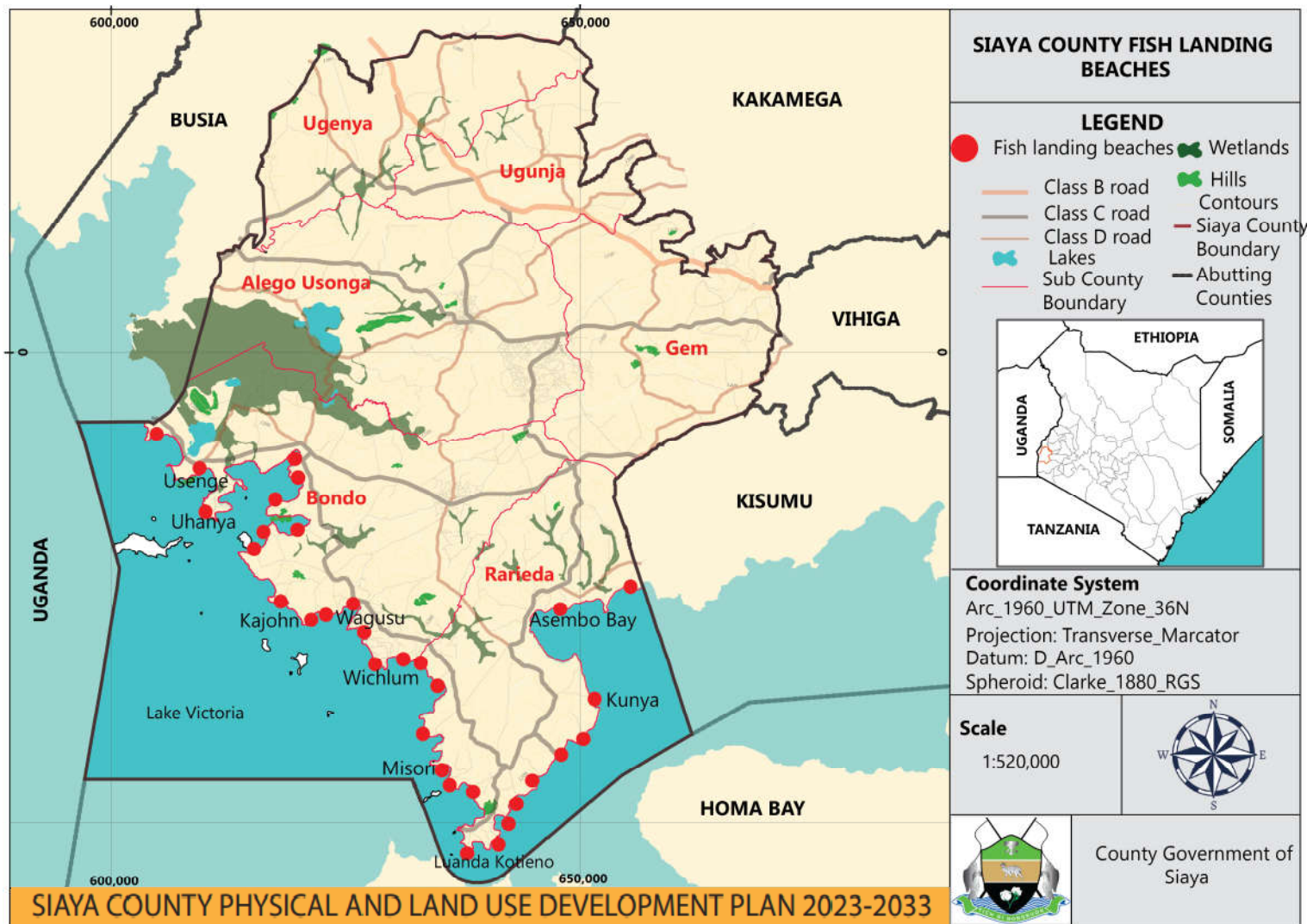
Map 10.3: Siaya County Small-Scale Irrigation Schemes

10.4 Fisheries Sector

Kenya's fisheries resources are an important source of food, employment and foreign exchange earnings in Kenya. It is estimated that the fishing industry employs over 48,400 artisan fishermen and that 5,000,000 persons are engaged directly or indirectly in fish processing and trade. Siaya County is endowed with an estimated 1000 km² of water mass making fishing to be one of the major economic activities in the County. However, it's imperative to note that Over-fishing in breeding grounds in bays along the lakeshore and trawler fishing has negatively impacted sustainable exploitation in the industry. Lake Victoria is the most important source of fish in East Africa and the largest source of freshwater fish on the African continent. The Lake is significant for the biological diversity of fish species as well as its contribution to the blue economy. Lake Victoria, Lake Kanyaboli, Rivers Yala and Nzoia and other surface water bodies in the County provide necessary grounds for fishing activity (Figure 10.8). Landing beaches under the authority of Beach Management Units (BM(U) in coordination with the Fisheries Department promotes sustainable utilization of fishing resources. Fisheries in the County are two folds: *capture fisheries* from Lake Victoria and Kanyaboli, and *culture fisheries* (aquaculture).

10.4.1 Capture Fisheries

The County has several species of fish, but the most popular ones are Nile Tilapia (*Oreochromis Niloticus* (Ngege), Nile Perch (*Mbuta*) *Lates Niloticus*, Lung Fish (Monye-Kamongo) (*Protopterus annectens*), and *Dagaa* (Omena), *Hatlochromines* (Fulu). Tilapia and Perch have very high commercial value as most of these catches are exported. There are 86 fish landing beaches in Lakes Victoria and Kanyaboli, the main ones being Kadenge, Kombo, Ndayi, Kamariga, Usenge, WichLum, Misor, Uyawi, Liunda, Lwanda Kotieno, Nyamnwa, Gul Min Ougo, Goye, Kowange, Magarem Nyabera, Saga, Sifu, Oyamo, Port South Banga (Miyandhe), Wakawaka, Warianda, Ulanda, Uhanya, Uhoma, Mahanga, Ndeda, Obenge, Kasiri among others (Figure 10.8). In 2010 data collected from 69 beaches shows that Siaya County had a total catch of 9,000 tons valued at Kshs 836 million. Tables 10.3 and 10.4 indicate that there has been tremendous growth in fish catch and by 2015 about Kshs. 3.7 Billion to the County economy (Map 10.4). Due to the proximity to the Kisumu International Airport, the County need to export its fish products to international markets. To facilitate this, access roads to beaches have been constructed and the County should improve the support infrastructure of the beaches and landing sites to enable faster product delivery to the market. Bondo Sub- County had the highest number with 56 active fishing crafts per landing site followed by Rarieda at 38 (GoK, 2015). During the 2014 Frame Survey, 1,432 monofilament gillnets were enumerated in the Lake region with Siaya County accounting for 987 monofilament gillnets or 69%, Homa Bay 238 or 17%, Busia 121 or 8%, Migori 68 or 5% and Kisumu County 18 or 1%. Hand lines were 3,161 while traps/baskets were 1,083.



Map 10.4: Siaya County Fishing Areas (Landing Beaches)

Table 10.15: Type, Quantity and Quality of Fish Catch in Lake Victoria Siaya County the Period 2014-2015

2014			2015	
Species	Wt. (Kgs)	Value (Kshs)	Wt. (Kgs)	Value (Kshs)
Cat Fish	417,993	37,162,191	617,316	51,749,258
(Omena)	11,725,910	354,574,684	10,692,327	451,592,471
Nile Perch	9,128,589	2,086,036,655	10,000,208	2,560,876,840
Tilapia	1,663,051	305,231,696	1,711,676	305,763,145
Other fish species	3,135,424	1,048,584,774	6,074,505	254,926,101
TOTAL	26,070,967	3,831,590,000	29,996,032	3,624,907,817

Source: Department of Agriculture, Livestock and Fisheries Siaya County (2016)

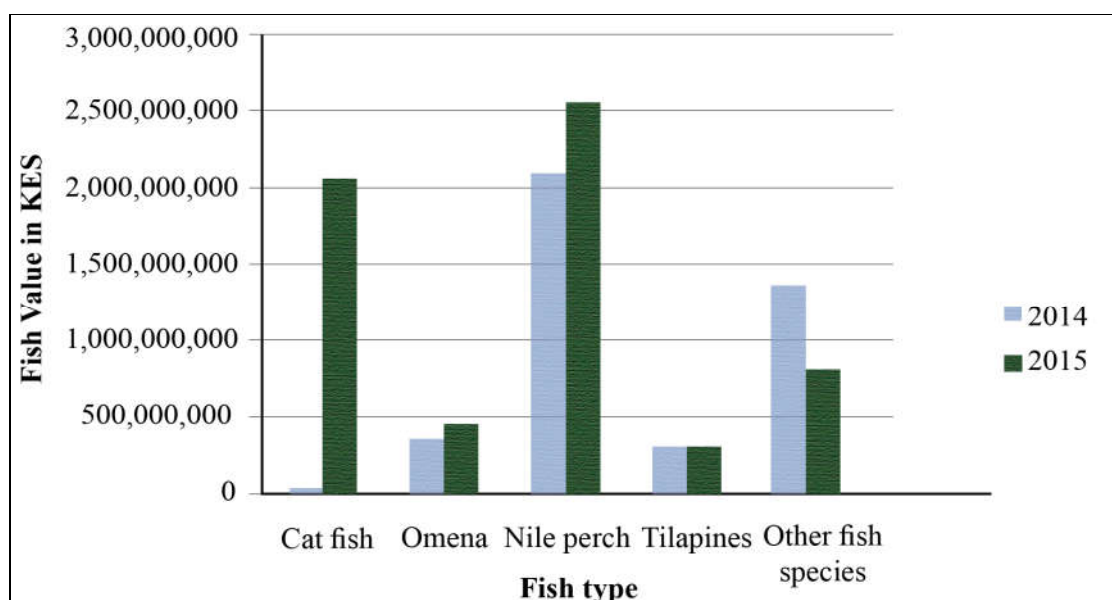


Figure 10.5: Fish Value in Kenya Shillings (KES) 2014-2015

Table 10.16: Quantity and Value of Fish for Siaya County for the Period 2010-2015

Year	Quantity (Metric Tons)	Value of Fish (Million Kshs)
2010	39154.00	3837.07
2011	33450.00	3679.50
2012	25582.00	2655.32
2013	28034.00	3540.00
2014	26070.00	3831.59
2015	29996.00	3624.91
Total	182287.60	21168.39

Source: Department of Agriculture, Livestock and Fisheries Siaya County (2016)

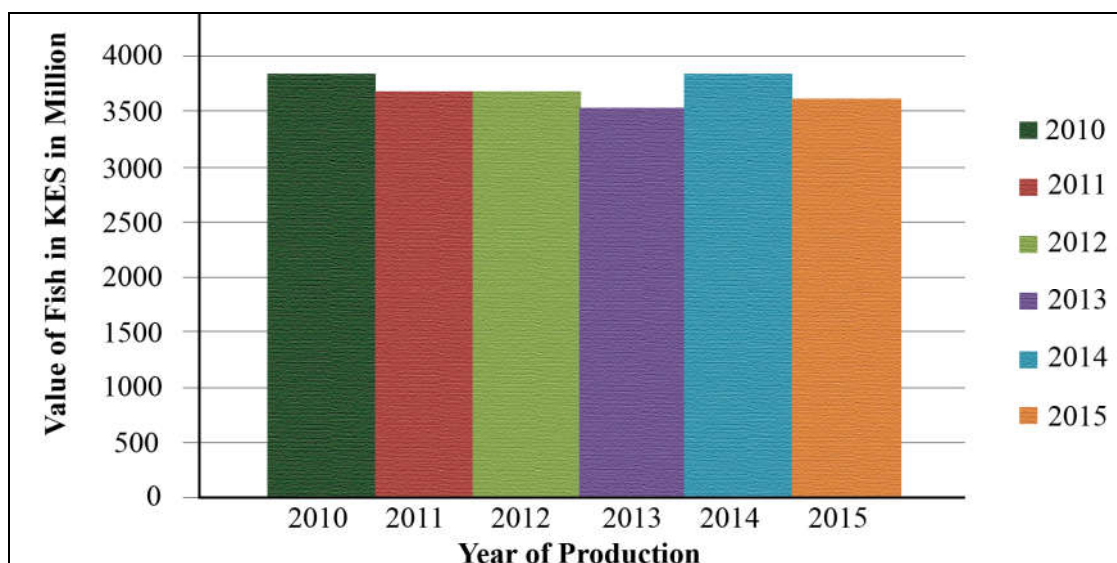


Figure 10.6: Value of Fish in Kenya Shillings in Million 2010-2015

Siaya Waters of Lake Victoria directly employs 12,140 fishing crews operating 4,007 boats accounting for about 30% of the number's crews and 28% of fishing boats on the Kenyan side of Lake Victoria (Frame Survey, 2016). The fishing crews and crafts operating in Lake Kanyaboli stand at 834 and 398 respectively.

In 2016, County produced about 28.3 thousand metric tons of fish from Lakes Victoria and Kanyaboli valued at about 5.6 billion Kenya Shillings on ex-vessel prices. The catch was dominated by *Rastrineobolaargentea* (Omena 38%) and Nile perch (36%) with Tilapia and catfish contributing 6% and 2% of total fish landings by volume respectively. Other species also landed but in relatively smaller quantities. Over 80 % of *Omena* and Nile perch fish landed is traded outside the County. Nile perch leads as an export and a foreign exchange earner among the locally landed fish. Fish catches from lakes have been declining (2010 to 2016) from 39 to 28 thousand metric tons respectively. Sustainable utilization of fisheries resources is therefore a priority.

10.4.2 Culture Fisheries (Aquaculture)

Fish farming in the County is predominantly practised in earthen ponds. However, there are small-scale fish cages in Bondo and Rarieda. Under the Economic Stimulus Programme, 300 fish ponds each measuring 300 sq. metres were constructed in each constituency to boost aquaculture. There were 467 fish farm families and 11,759 fishermen. Gem Sub- County has the highest number of fish ponds (24%) due to existing streams and soil types that support earthen ponds. Two species are dominant in fish farming, namely, Tilapia (*Oreochromis Niloticus*) and African catfish (*Clarius Gariepinus*). In 2016, the County produced 137.3 metric tons from earthen ponds worth KES 24.1 million (Table 10.17). More potentials remain un-tapped both in the lakes Victoria and Kanyaboli as well as in earthen ponds.

Table 10.17: Aquaculture Units and Production by Sub-Counties

	Rarieda	Bondo	Alego Usonga	Gem	Ugenya	Ugunja	Total
Metric Tonnes	22.0	15.4	21.0	32.5	19.8	26.6	137.3
% Contribution	16.0	11.2	15.3	23.7	14.4	19.4	100.0
Million KES	3.6	2.7	3.5	6.5	3.3	4/5	24.1
The area under Ponds (Ha)	75.3	38.1	96.2	106.9	45.1	52.4	413.9
Fish cages	53	1873	0	0	0	0	0

Overreliance on Lake Victoria for fishing is proving unsustainable. The County is encouraging locals to undertake aquaculture since fish levels in Lake Victoria are dwindling. Farmers have been given improved fish farming techniques through the training of fisheries extension officers. In 2014, the County purchased and distributed about 1.7 metric tonnes of feeds as an incentive to keep fish in ponds. This has increased the production of fish from 65.9 metric tonnes in 2012 to 1,070 metric tons by 2014.

10.4.3 Cotton Sector

Siaya County spreads across agroecological zones from LM1 to LM 5. According to the Kenya Soil Survey and Integrated Regional Development Plan for the Lake Basin Development Authority, the lower part of the County and especially the shores of Lake Victoria can be categorized into semi-humid, semi-dry Lower Midland zones (LM4 and LM5), (**Marginal cotton zone**). These zones cover the whole of Uyoma in Rarieda Sub-County and Yimbo in Bondo Sub-County. The lower central parts of the County, covering the whole of Sakwa and Asembo in Bondo and Rarieda Sub-counties respectively and parts of Central and West Alego Wards in Alego Usonga Sub-County are classified as the lower midland zone (LM3), **Cotton/ cassava/sorghum zone**. These two zones cover more than 50% of the county area. Given that the zones have a bi-modal rainfall pattern, makes them ideal cotton production areas. The main variety grown in the county is **KSM81M**, which has been grown in many parts of the county (Rarieda, Bondo, Alego Usonga, Gem, and Ugenya sub-counties) as a major cash crop since 1960. This variety has a potential of 2000-5000Kgs per hectare but only yields 700 kilograms per hectare in the county. Production of KSM81M is on 6,140 acres within the county in the current season. Hybrid varieties were introduced into the county during the year (2020) and occupy approximately 1,500 acres with about 120 farmers engaged in its production. There exists basic infrastructure for cotton enterprise development such as buying centres or collection stores and ginneries (Ndere and Madiany) in areas that were major cotton growers in the past, and may just require rehabilitation to support the enterprise development.

10.4.4 Activities/Achievements

The 2019/20 crop season was favourable for cotton growing at the beginning of the season up to September when harvesting started. Siaya County had about 2,500Ha under cotton in the year 2019 which produced 147MT that fetched 7.4 million (AFA 2019). The enhanced short rains resulted to delay in harvesting, poor quality seed cotton and reduced formation of new bolls. Cotton production in this period was concentrated in Rarieda and Bondo sub-counties.

Ndere and Madiany ginneries were not operational over the said period due to obsolete machinery (Ndere) and low operational capacity (Madiany ginnery). Cotton marketing was done through the Uyoma Cooperative Society. Ndere, Sakwa Yimbo and Uyoma Farmers' Cooperative Societies could not market over the period under review. Cotton price stood at Kes 52 per kilogramme. These cooperatives have a myriad of challenges, key among them being organizational. The major buyer of cotton in 2019 was Sagawa ginneries.

During the 2020/21 production period, 37 metric tons of KSA81M seed cotton has been distributed to farmers in the county. This is expected to plant approximately 6140 acres and yield about 400 metric tons. Over the same period, 3.2MT (Appendix III) of hybrid seed has been distributed and it's expected to plant 1515 acres. Yield from the hybrids is approximated to be 1000 MT.

Detailed achievements per output are as outlined: -

Table 10.18: Seed Cotton Production Data for the 2019/2020 Crop Season

Sub-County	Cotton seed Distributed (kg)	Expected production (kgs)	Achieved production	Value (KSHS)	Remarks
Rarieda	32,000	900,000	145,000	7,540,000	AR Rate @ 52 and BR @ 26
Bondo	3,000	75,000	1500	78,000	”
Alego Usonga	2,000	50,000	500	26,000	”
Ugunja	-	-	0	0	
Ugenya	-	-	0	0	
Gem	-	-	0	0	
	37,000	1,025,500	147,000	7,644,000	”

Table 10.19: Cotton Production Statistics for the 2020/21 Season

Sub-County	Cotton seed Distributed (kg)	Expected Acreage	% cotton seed uptake	Germination %	Remarks
Rarieda	33,000	5,500	70	95	
Bondo	2,500	400	49	90	
Alego Usonga	1000	160	60	85	
Ugunja	200	30	30	90	
Ugenya	300	50	41	90	
Gem	-	-	-	-	
	37,000	6,140		90	

Table 10.20: Cotton Production Statistics for the 2020/21 Season for Hybrid

Sub-County	Cotton seed Distributed (kg)	Expected Acreage	% cotton seed uptake	Germination %	Remarks
Rarieda	2600	1300	70	95	
Bondo	300	150	67	90	
Alego Usonga	260	135	60	85	
Ugunja	20	10	70	90	
Ugenya	20	10	73	90	
Gem	-	-	-	-	
	3,200	1,515	50	90	

10.4.5 Sugarcane Sector

The Siaya sugarcane zone stretches over five sub-counties in Siaya County. These are Alego Usonga, Ugenya, Ugunja Gem, and Bondo sub-counties which fall under Siaya County. The entire zone measures approximately 1370 square kilometres and supports over half a million people who depend on agriculture for their livelihood.

Historically sugarcane ranked among the top competitive enterprises for this community despite the proposed zone's suitability for cane farming, cane acreage has generally reduced over the last two decades as a result of poor roads and market infrastructure as well as low prices for cane delivered to Mumias Sugar Company and surrounding jaggeries. There has not been a functional sugar factory in this zone. This is a strong reason indicating the downward trend of the subsector even though many farmers have grown sugarcane for very little pay.

In recent times there has been observed interest by investors to set up sugar mills in the area. This is likely to restore cane to its position as the major cash crop in this zone and improve the livelihoods of over a hundred thousand families. Other positive steps include the availability of improved varieties which mature as early as 16 to 18 months as opposed to 24 months for the old varieties. In addition, the devolvement of government to counties as provided for in the new constitution is a positive move that will prioritize such a development agenda.

10.4.6 Challenges in Sugarcane Sector

Sugarcane production in Siaya County faces numerous challenges which have to be addressed for this potential to be exploited. The lack of a sugar milling factory in this zone tops the list of these challenges. Marketing constraints are the main reasons for cane decline.

Although Ugenya and Ugunja sub counties areas are considered nearer to Mumias Sugar Factory the distance of over 40 km in most places coupled with poorly maintained roads works negatively against the sub-sector performance. During the last two decades, farmers around North East and East Ugenya and Uholo areas have made efforts to plant more cane targeting the Mumias market. This is a genuine sign of the community's readiness to exploit the slightest chance to get into cane farming since it is the most reliable cash crop suitable in the zone. However, the appraisal team established that the cost of cane transportation alone accounts for 40% of the total costs of growing sugarcane in the area. The high cost of fertilizer has limited fertility improvement efforts. The resulting yield of cane currently lies between 40 and 60 tons per Ha compared to an average of 70 tons per Ha in other comparatively developed cane areas in Nyanza province. With good agronomic practices, research yields have recorded over 100 tons per Ha.

Poor planning leads to the problem of poor timing of crucial farm operations like ploughing, planting, delayed supply of farm inputs and harvesting. Delayed supply of seed cane, fertilizer and harvesting also featured as constraints in the zone. This delay can contribute to the reduction in cane yields by over 40%.⁶ Farmers complained of low cane prices. Mumias Sugar Company for example paid farmers as low as Ksh. 2,485 by the year 2011. Jaggery producers paid farmers between Ksh. 500 and 1000 per ton. Low cane prices in the past translated into reduced profit margins for the farmers thus causing progressive abandoning of the crop especially by farmers furthest from the factory.

⁶ Kenya Sugar Research Foundation (KESREF) Technical Bulletin No. 1 (December 2006)

Extension service provision in the sugarcane industry has been the mandate of the sugarcane and out-growers' companies. This extension service is generally weak. Only one extension officer is covering Ugenya, Butula, Matungu and Bunyala which is a very large area for one officer. Farmers do not receive adequate information on various cane varieties and their management. Although the appraisal Team lauded the role of KESREF in promoting new varieties, the sugar/out-growers' companies have to strengthen their extension services if sugarcane production is to be improved.

Other challenges include a lack of diversity of products. Production of diverse products through cogeneration and ethanol production are important avenues of providing alternative sources of revenue to complement the primary production of sugar and reduce the cost of production thus increasing factory efficiency. Cogeneration of energy from bagasse is attractive as it combines low cost, efficiency and social benefits with the provision of clean, renewable energy⁷. This increases the uptake of early maturing, high-yielding varieties and also makes irrigated sugarcane farming viable. This in turn assures the factory of a continuous supply of raw materials necessary for cogeneration⁸. Currently, no factory exploits this immense potential in this area and sugarcane has not been grown under irrigated conditions.

10.4.7 Actual Sugarcane Growing Area in the Zone

Map 2 below shows the agroecological zones of the proposed Siaya Zone. These are climatically marked areas suitable for cultivating specific crops and pastures. The most predominant cash crop or livestock system usually has the advantage of providing the common name of that zone. Sugarcane crop dominates the Lower Midland Zone 1 (LM1) which neighbours a less suitable Lower Midland Zone 2 (LM2). LM1 and LM2 are therefore commonly called Sugarcane and Marginal Sugarcane zones respectively. Lower Midland 3 (LM3) is commonly called Cotton or Tobacco zone and is not suitable for rain-fed sugarcane farming. However, there exists a potential for growing sugarcane under supplementary irrigation in LM3. Other labels in the map such as *p or l/m m/l* provide further details on the number of days the rains reliably fall to support crop growth. Understanding these agroecological zones is critical to decision-making on matters of the potential production of any crop.

⁷ Bagasse Cogeneration – Global Review and Potential, 2004

⁸ Mumias Sugar Co: <http://www.mumias-sugar.com/index.php?page=Future-Products>

A. Land Use Potential for Sugar Cane

1) Food Security and Land Use

Table 10.21: Food (Energy) Requirement versus Sugarcane Area

Sub-County	Population	Arable Land (Ha)	Annual Food Requirements (90Kg bags)	Area required for food security annually (Ha)	The maximum area that can be put under sugarcane annually ($\frac{1}{3}$ rule ⁹) Ha	TOTAL Annual land area for Food Security and Sugarcane (Ha)	Balance Area (Ha)
		A	B	C	d	e = c + d	a - e
Gem	160,675	33,900	174,957	7,953	11,300	19,253	14,647
Ugunja	88,450	16,290	96,312	4,816	5,430	10,246	6,044
Ugenya	113,848	18,320	98,922	3,297	6,105	9,402	8,918
Kisumu West	78,059	10,797	84,998	3,400	3,599	6,999	3,798
Siaya	84,518	84,518	92,031	6,527	28,173	34,700	49,818
Bondo	2,620	4,874	2,853	143	1,625	1,768	1,085
TOTAL	505,169	168,699	550,073	26,136	56,232	82,368	84,310

The table shows the possibility to meet the food requirement for the entire population of the proposed Siaya Sugarcane Zone. A total of farm area 26,136Ha will produce 550,078 bags (90 kg) of maize which is sufficient to meet the energy food requirement for 505,169 persons living in the area. Under the $\frac{1}{3}$ rule, the table also shows that a total farm area of 56,232Ha can be put under cane. Added to the food security area there is a huge balance of 84,310Ha available for a whole array of enterprises undertaken by farmers in the zone.

Potential for Sugarcane Expansion

Table 10.22: Sugarcane Cultivation Potential

	DISTRICT FIGURES (Ha)						ALL DISTRICTS
Item	Siaya	Bondo	Ugenya	Kisumu West	Ugunja	Gem	

⁹ Source: Farm Management Handbook of Kenya Vol. II; *Natural Conditions and Farm Management Information*, 2009

Total Area (LM1 & LM2)	26,800	9,600	32,250	15,340	20,110	40,730	144,830
Arable	18,760	4,874	18,320	10,797	16,290	33,900	107,483
Maximum Achievable Area Sugarcane Assuming the $\frac{1}{3}$ rule ¹⁰ (x)	28,173	1,625	6,105	3,599	5,430	11,300	57,746
The current area under sugarcane (y)	400	0	2,082	0	1,079	100	3,661
Potential for expansion to meet the $\frac{1}{3}$ rule (x-y)	27,773	1,625	4,023	3,599	4,351	11,200	54,085

Table 10.22 indicates the area currently under sugarcane is 3,661Ha (6%) which lies far below the maximum area of 57,746Ha under the $\frac{1}{3}$ rule in this proposed zone. The appraisal indicates there exists a potential of expanding rainfed sugarcane acreage by an additional 54,085. Thus 94% of this sugarcane ecological zone lies underutilized. On average the practical farmer's yield is 70 tons/Ha for the planted crop and two ratoon crops harvested in five years. Assuming a $\frac{1}{3}$ of the farm area is devoted to sugarcane cultivation, the entire proposed Siaya Zone has the potential of achieving 54,085Ha. Three harvests at this rate, therefore, give us an effective yield of 42 tons annually. This means on a practical scenario about 60% of the entire sugarcane area is considered mature and therefore harvestable in a given year. Thus, the maximum allowable cane area of 57,746Ha, therefore, translates to 34,648Ha of harvestable cane per year.

A mature cane area of 34,648Ha would avail 2,425,360 tons of harvested cane per year. Divided by 300 days of milling operations this amount of cane will be crushed at 8,085 tons per day. Ideally speaking the existing potential for cane farming in the zone can support a milling factory of 8,085 TCD. This offers a good opportunity for establishing a strong cane milling factory for sugar production in the proposed zone.

¹⁰ Source: Farm Management Handbook of Kenya Vol. II; *Natural Conditions and Farm Management Information*, 2009

Table10.23: Cane Requirement for Jaggery Production

Division	No. of Jaggery crushing units	Annual Cane Consumed (Tons) by Jaggery Units	Annual Cane Area (Ha) Utilized by Jaggery Units	Current Sugarcane Area (Ha)
Gem	1	5,000	100	100
Ugenya	1	9,000	11	2082
Siaya	1	10950	225	400
Ugunja	3	11,800	148	1079
Bondo	4	0	0	0
TOTAL	10	36,750	484	3,661

Table 10.23 above summarizes the cane requirement by currently operating motorized jaggery production units. There are 10 units producing jaggery in the zone. These utilize a total of 36,750 tons which is grown from an area of 484Ha annually. This area constitutes 13% of the current cane stand in the zone. The presence of an efficient cane-crushing factory would utilize the existing cane while creating an opportunity to expand production in the largely underutilized land in this zone without interfering with food security. The proposed Siaya Sugarcane zone has immense potential of producing 2,425,360 tons of harvested cane per year which translates to 8,085 tons per day. It is necessary to introduce a new factory within the proposed Siaya sugarcane zone. Such a factory will have operation efficiency as well as give adequate support to producers of the raw material. This will serve sugarcane farmers in sub-counties that fall within the proposed Siaya Zone. A potential of 8,085TCD means when the cane area is expanded in this zone it will be possible to establish a second factory.

The establishment of factories with clear catchments within the zone means millers will play the vital role of enhancing the holistic development of the value chain to ensure a steady supply of quality raw materials. The created factory catchments will also lead to the improvement of the sugarcane yields through proper agronomic practices and the adoption of new early maturing and high-yielding cane varieties. The proposed zone neighbours a vast area under agroecological zone LM3 which can adequately support can farm under supplementary irrigation. The zone is traversed by permanent rivers among them being Yala and Nzoia, giving the area a large potential for irrigation (see maps 2a and 2b). To safeguard food security through optimal land use while establishing the potential of cane production, the team established there is adequate land to meet food requirements and still meet the sugarcane production volumes required for new factories in the proposed zone. The creation of the Siaya Sugarcane zone and the successive construction of two factories within the zone will provide a great opportunity to revive cane farming in the area and substantially improve living standards.

Table 10.24: Administrative and Demographic Data for Areas Suitable for Cane Farming

District	CANE CATCHMENT AREA DATA					Agro-ecological Zone (AEZ)
	Divisions	Area (Km ²)	Population	No. of Farm Families	Average Farm Size (Ha)	

Ugenya	Ukwala	241	90,847	21,439	2.5	LM 1, LM2
	SUB-COUNTY	241	90,847	21,439	2.5	
Ugunja	Ugunja	201	88,450	6,228	0.8	LM 1
	SUB-COUNTY	201	88,450	6,228	0.8	
Gem	Yala	214	98,362	22,547	0.6	LM1 and LM 2
	Wagai	193.3	62,313	14,655	1.2	
	SUB-COUNTY	407.3	160,675	37,202	0.9	
Siaya	Uranga	17	4910	809	2.5	LM 2
	Boro	123	31313	6862	1.5	
	Karemo	128	48295	8791	1.4	
	SUB-COUNTY	268	84,518	16,462	1.5	
Bondo	Maranda (Selected areas, North Sakwa Location)	96	2,620	485	1.4	LM 2
	SUB-COUNTY	96	2,620	485	1.4	
Kisumu West	Maseno	93	54,129	11,709	1.01	LM1 and LM 2
	Kombewa	60.4	23,930	5,581	1.31	
	SUB-COUNTY	153.39	78,059	17,290	1.07	
TOTAL		1366.69	505,169	99,106	1.45	

On average a family in the zone has access to the land of about 1.89Ha and 235,800 farm families are depending on sugarcane for their livelihood. Land parcels in Trans Mara are however larger, measuring between 30 and 40 ha. This was therefore not included in working out the average land size in this zone.

Enterprise Ranking

Table 10.25: Major Crops Enterprise Ranking – Based on Return to a Shilling

CROP ENTERPRISE	Siaya	Kisumu West	Ugunja	Gem	Ugenya	Bondo	Average Return to a Shilling	Rank
Kales	2.04	8.62	2.00	4.20			4.22	1
Cassava	2.16	5.70	2.30	2.30			3.12	2
Sweet potatoes	2.22	5.00	2.40	2.50			3.03	3
Beans	0.92	4.80	1.50	2.00			2.31	4
Industrial sugarcane	1.65	3.20	1.70	1.60			2.04	5
Sorghum	1.15	3.38	1.20	1.60			1.83	6
Dry Maize	1.45	2.34	1.20	1.40			1.60	7

Sugarcane ranks position 5 despite the many challenges facing this enterprise. It is envisaged that if limiting factors in the subsector are addressed sugarcane will become competitive and move up the ranks to be among the top two enterprises.

10.5 Mining and Quarrying Sector

Mining and quarrying sector is also generating income for the number of households. This venture is however unregulated and, in most cases, results to land degradation. Gold has been mined in the County for considerable time on a substance basis in shallow excavations in Bondo, Siaya, Rarieda, Ugunja and Gem sub-counties. A study by Lake Basin Development Authority has shown that the whole of the Lake Victoria Basin region of which Siaya County is part, has some minerals, precious stones and rare earth elements. The best-known mineral in the County is gold. Gold mining areas in the County include small-scale artesian mining of Central Sakwa (Wagusu, Dago, Kopolo, Lenya, Luore, Nango, Nyangoma, Odao, Uyawi, Abimbo), South East Alego (Ojalo Rambo-Kogello, Barding), Asembo (Onyata, Magare) and South Gem (Rera) among others. Other minerals include fluorite which occurs as a thin vein near Rata within the larger Asembo; granite and black sand from Yala Valley which has weak radioactive quality, mining in Kogello, and sand harvesting along the beaches and River Nzoia (Plate 10.1).



Plate 10.1: Local Use of Water to Clean Gold at a Mining Site in Bondo, Siaya (Daily Nation, 9th October 2019)

10.6 Tourism Sector

The County has only one gazetted game reserve which is Lake Kanyaboli Game Reserve under the Kenya Wildlife Services (KWS) and yet to be fully developed to attract more tourists, though has high potential. The settlement patterns within the county coupled with the high population density is a major constraint to large-scale wildlife conservation. There have been several investments in cultural heritage sites, hotel development, and attempts to link the County with the Western Kenya Circuit tours and travel investments. Siaya County Tourist Guide (2016) enumerates some of the destination sites with potential for tourist attractions (sightseeing, Bird watching, picnics, camping, educational facilities, Nature

Photography, Fishing, Boat rides, Water sports, Canoeing, Nature walk, Nature drive, Biking, Wildlife safaris, Recreational sailing, cruise tourism, sport fishing, film tourism, hill hiking, cave camping. Kayaking, Beach Volleyball) and cultural activities (traditional dances, Nyatiti players, Orutu players, Dodo dancers, Dirges, Tero buru) in the County to include:

a) **Natural Heritage Sites (Ecotourism):** Got Ramogi Heritage Site (40km from Siaya Town), Lake Victoria (Nam Lolwe), Yala Wetlands as covering 17,500 ha (Important Bird Area: Lakes-Kanyaboli, Sare, Namboyo, Artificial Lake Bob), Dominion Farms Birds Sanctuary, fish caging, Anyiko Wetland, Uwasi/Muluhwa Rice Scheme (agro-tourism), Rawalo Hills, Ndanu Falls (Yala), Mahira Falls (Sidindi), GodHa the Islands of Mageta, Oyamo, Ndeda, Magare, Sifu, Sirigombe, Nyalumba, Sika with spectacular natural sceneries. Several spectacular hills with good viewing: Got Ramogi, Got Rambugu Got Mbaga. Got Obiero, Got Usenge, Got Nyangoe, Got Abom, Got Abuyu, Got Nyagoko, Got Anyango, Got Nyambare, Got Naya and Got Akara.

b) **Archeological, Cultural, Historical and Land of Heroes** significance (Heritage Sites): Got Ramogi, Jaramogi Oginga Odinga Mausoleum (8 km from Bondo Town), the Alego Nyang'oma Kogelo *Village, a place of international attention because it is the birthplace of Barack Obama Senior, the father of the United States' first black President, Barack Obama*). Achieng' Oneko Mausoleum, Justice Hayanga Mausoleum, Argwings Kodhek Mausoleum, Chief Odera Akang'o Office and Cells (Yala), Grace Ogot Mausoleum, Amoth Owira Mausoleum, Mageta Island (Colonial Prisons that include Ndeda and Oyamo), Colonial Courts in Ukwala, Olua Sacred Trees, Bullock of Got Podhe, Nungu Shrines, Prehistoric sites: Iron Stone Age Sites of Got Rambugu, Holy Got Adodi, Gangu-Nyalagi, Earthwalls (Gunda Buche), Cultural Festival & Wrestling Sites (Migwena, Sumba-Nyambala, Karemo, Bar Olengo).

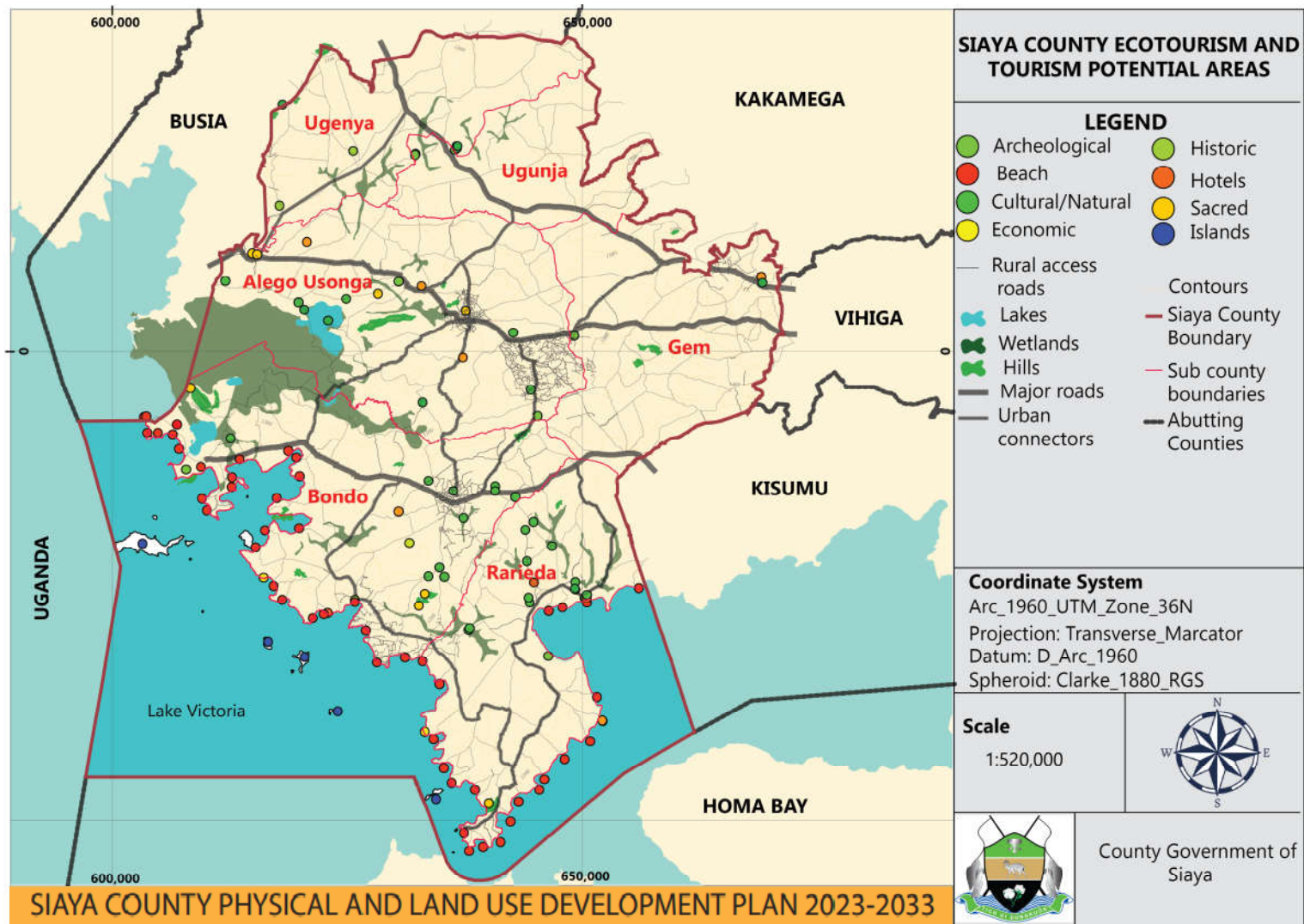
c) **Landing Beaches:** There exists 33 beaches, some of which are good sandy beaches for leisure tourism (Siungu and Goye Beaches in Usenge) and 5 habited islands in the County namely; Oyamo, Mageta, Ndeda, Magare and Sihu. The other beaches that have the potential for waterfront development, and leisure sport tourism include Luanda Kotieno, Madudu, Kamariga, Usenge, WichLum, Misor, Uyawi, Liunda, Lwanda Kotieno, Nyamnwa, Gul Min Ougo, Goye, Kowange, Magarem Nyabera, Saga, Sifu, Oyamo, Port South Banga (Miyandhe), Wakawaka, Warianda, Ulanda, Uhanya, Uhoma, Mahanga, Ndeda, Obenge, Kasiri Asembo bay, Kombo, Gangu, Rabonde, Kadenge, Gudwa, Kunywa, Nambo, Honge, Nyenye, Anyanga, Mitundu, Kabarua, Sika, among others.

d) **Rich Biodiversity:** The varieties of wildlife found in the County include hippopotamus (Lake Victoria, River Yala), crocodiles (Yala Swamp, parts of the Lake Victoria), Sitatunga antelope (Yala Swamp) and monkeys and leopards. The County has several species of fish, but the most popular ones are Nile perch, *Rastrineobola argentea* (Locally known as Omena), Hatlochromines (locally known as Fulu or Wiu) and Nile Tilapia. The first species have a very high commercial value and are responsible for the economic breakthrough which has been experienced along the shore of Lake Victoria. Others are bushpigs (mainly in Yala Swamp), Hyenas (Got Abiero, Utonga), various species of snakes like pythons, cobras and various species of birds (Papyrus Yellow Warbler, Papyrus Gonolek, Quelea, Egrets, Pelicans, Hammer kops, Plovers, Hadada Ibises, African Jacanaamong).

e) **Rich cultural diversity:** 1. Traditional Music/Instruments: *Nyatiti, Orutu, Ohangla, Peke, Tung, Bul* 2. Traditional Weapons: *Orujie, Mbidho, Kuot, Luth, Okumba, Ligangla, Tong, Atheno, Okot, Okol* 3. Traditional Attire/Regalia: *Pien gugru, Pien Nya diel, Akala, Kond Tigo, Chieno, Olemo* 4. Traditional Dishes: *Aliya, Atururu, Atuago, Hariadho, Ogira, Atipa, Riga, Rabuon* 5. Traditional Artifacts: *Da pii, Pand Nyaluo, Mbir, Osero, Koo, Owes, Kom Nyaluo, Oliho, Aguata, Haiga, Tao, Agul, Odheru, Nyiedh, Hamiero, Osieke, Ralung, Pong*

Nyatieng. 6. Cultural festivals: *Got Ramogi Festivals, Siaya County Festivals, Nyambala Wrestling Festivals*

f) **Hotels and Hospitality:** The County currently does not have any classified hotels. However, there are 89 unclassified hotels with a gross bed capacity of 1,780. In addition, there are 619 bars and restaurants. Where international visitors can find accommodation include Siaya County Club, Summit, Distinction Gardens, Namsagali Gardens, White Hotel *within Siaya Town* as well as Pride Hotel, Don Hotel and Annex, Kings Club, Rozella Hotel, Switel Hotel, Bondo County Resort, Green Court Hotel, Care for the Earth *within Bondo Town*, Juliana County Hotel and Tintoler *within Ndori Town*, Ndanu Falls Lodge, Yala Resort Roddy Eco-cover *within Yala Town*, Yimbo Ber Nature Resort, Usenge Sunset Grill, Mombasa Raha, the Place, Dallas. Lake Breeze Resort, Got Ramogi (Camping Site) *within Usenge Town*, Hawi's Paradise Tented Camp, Swila Resort Guest House, Kogelo Village Resort, Edwin Ndayi Village Resort, The Villa International Palace (VIP), ByKay Hotel (Sega), Camunya Hotel (Ugunja), Malo Cottages, Mothers Guest House, Gevaam Hotel (Ukwala), and several Homestays. Other entertainment spots include County Club Annes, Mwisho, Tripple A, Rhumba Zone within Siaya, Kings Club, Niloticus, Burudani, Hummer Lounge, Sponsoe Lounge within Bondo Town, Club Nebraska (Ugunja), and Villa International Palace (Madeya), Manicaland, Summit (Bar Olengo), Kabab Resort, Marias Suites (Siaya Town).



Map 10.5: Siaya County Tourism Sites

Land of Heroes

As a tourist attraction county, Siaya is home to several heroes. This is as depicted below

Name	Birth	Home	Designation	Description
Odera Akang'o	1880-1920	Gem	Chief	In 1915, he became the chief of the Kagola clan of Gem, Siaya County. He strictly encouraged Agriculture, Education and Discipline. As a result, the Gem area has the highest concentration of educated people and heroes
Jaramogi Oginga Odinga	1911-1994	Bondo	Teacher & Politician	He was the first Vice President of Kenya in the year 1964-1966.
Ramogi Achieng Oneko	1920-2007	Uyoma	Freedom fighter & politician	He was among the six freedom fighters arrested by the British colonial government in Kapenguria in 1952.
Raila Amolo Odinga	1945	Bondo	Engineer & Politician	He was the Prime Minister of Kenya from 2008 to 2013. He is among the politicians who struggled for the second political liberation from the 1980s up to 1991 when the restoration of multiparty democracy in Kenya was achieved.
Abednego Matthew Ajuoga		Gem	Archbishop	He founded the Church of Christ in Africa, known popularly as "Hera", a prominent independent African Christian denomination in Kenya.
Argwings C.M.G Kodhek	1923-1969	Gem	Lawyer and Politician	In 1956 he launched the National District African Congress. In 1961-1963 he was in the Legislative Council (LEGICO), and after independence, he became the KANU representative for Gem Constituency.
Grace Aketch Onyango	1927	Gem	Politician	She became the first woman to be elected mayor of Kisumu Town in 1967 and MP in 1969.
Bethwell Allan Ogot	1929	Gem	Scholar	Served as a dean at the University of Nairobi, first director of the Louis Leakey Memorial Institute as a Professor of Kenyatta University, and director of research at Maseno University College and the Vice Chancellor of Moi University in 2003.
Barack Hussein Obama	1961	America-Nyang'oma	Lawyer & Politician	Born to a Kenyan father, he was the president of the United States of America from 2009-2017.
Hussein	1936-	Nyang'oma	Economist	The father to Barack Hussein Obama,

Obama	1982			the president of the United States of America from 2009-2017.
SM Otieno	1931-1986	Nyamila	Lawyer	He ruled that the justification of judicial interference in tribal burial disputes “only if they are repugnant to justice and morality”.
Thomas Odhiambo	1931-2003	Gem	Entomologist	Founded an international insect research centre called International Centre for Insect Physiology and Ecology (ICIPE)
Grace Emily Akinyi Ogot	1930-2015	Gem	Nurse	She was a Kenyan author of widely anthologized short stories and novels who also held a ministerial position in Kenya’s government.
John Henry Okullu	1929-1999	Ramba	Bishop	He was an outspoken critic of the Kenyan government in his sermons and publications on issues of human rights and justice, advocating a multiparty system of governance.
David Peter Simon Wasawo	1923-2014	Gem	Zoologist and Conservationist	He was a scientific advisor of UNESCO in Tanzania from 1971 to 1973. Served as the Vice president of the International Union for Conservation of Nature from 1972 to 1974. A professor at the University of Nairobi
Margret Ogola	1958-2011	Asembo	Medicine and Surgery	The Kenyan author of <i>the river and the Source</i> , and its sequel, <i>I Swear by Apollo</i> .
Apolo Ohanga	1913-1992	Gem	Politician	He was the first black Kenyan cabinet minister in the colonial period.
Cornel Rasanga Amoth	1957	Segere	Lawyer and Politician	He is the first Governor of Siaya County.

Source: County Government of Siaya, 2016

LAND OF HEROES



Jaramogi Oginga
Odinga



Raila Amolo
Odinga



Barack Obama



Odera Akang'o



Cornel Rasanga



Apollo Ohanga



SM Otieno



Grace Aketch Onyango



Abednego Matthew
Ajuoga



John Henry Okullu



Argwings C.M.G Kodhek



David Peter Simon Wasawo



Ramogi Achieng
Oneko



Margaret Ogola



Thomas Odhiambo



Grace Emily Akinyi Ogot



Bethwell Allan Ogot



Hussein Obama

10.6.1 Tourism Emerging Planning Issues

a) Opportunities for Tourism in Siaya County

- Natural Heritage Sites (Ecotourism): Nature and Wildlife
- Archaeological, Cultural, Historical and Land of Heroes
- Cultural Heritage, Community
- Landing Beaches, The varieties of wildlife, rich cultural diversity
- Hotels and Hospitality
- Establishment of cultural sites
- Establishment of Adventure tourism
- Development of World Class Hospitality
- Conference Tourism
- Agro-tourism and Ecotourism
- Entertainment Sector
- Health and Wellness
- Lake Victoria Islands Golf Resorts
- Water Sports

b) Challenges in Tourism in Siaya County

- Cultural erosion
- Undeveloped tourist sites
- Infrastructure development (roads, electricity, communication channels)
- Access to site destination
- Human capital
- Quality hotels (hospitality)
- Marketing and Branding
- Climate change (nature-based)
- Environmental degradation
- Destruction of heritage sites (archaeological and historical)

10.7 Industrial Production

Industrial production in the County is still low compared to other established counties with raw materials, hence no major processing and/or manufacturing industries. There are a few firms that use local raw materials for industrial processing such as rice milling, sugar juggling, bakeries and jua kali industries. In terms of industrial potential, the County has available raw materials that include fish, mangoes, hides and skins, cotton, sand and underlying rocks. These industrial potentials can be harnessed with requisite human resources, available land, a ready market, infrastructural development, credit finance, and political goodwill. Revival of growing cotton and ginneries can boost the future textile industry in the County. *Jua Kali* Industry can be credited to be the main driver of industrial development in the County as it provides an avenue for industrial incubation and employment, especially in *Jua Kali* garages (mechanics), metal fabrications, and carpentry (wood joinery).

The County hosts the Kenya Industrial Estate site in Siaya Town, formerly established to act as an industrial incubation centre, though not actively busy as was expected. It is expected to establish industrial incubation centres in each of the 30 wards and the same time revive the *Jua Kali* Sheds. The latest proposal for industrialization in Siaya County includes a 940 million Sugar Factory (South Gem Sugar Factory) at Kanyilaji Village. It is expected to crush 1,000 metric tonnes of cane per day and use about 8,000 Ha. of land area under sugar cane

and create about 300 jobs. There is a proposal for Mango Fruit Processing in Ndori and Bondo Fishmeal factory whose establishment is ongoing. Other related projects proposed to fastrack manufacturing processing in the County include the establishment of rice mills, the development of fish cold storage facilities in landing beaches (Luanda Kotieno, Usenge, Wichlun among others), dairy processing (Mur Malanga), fruit processing, animal feeds (in major Sub- County headquarters). The County is partnering with USAID under the Kenya Agricultural Value Chains Enterprise to revive the fruit processing industry and will provide a market for farmers of passion, mangoes and bananas.

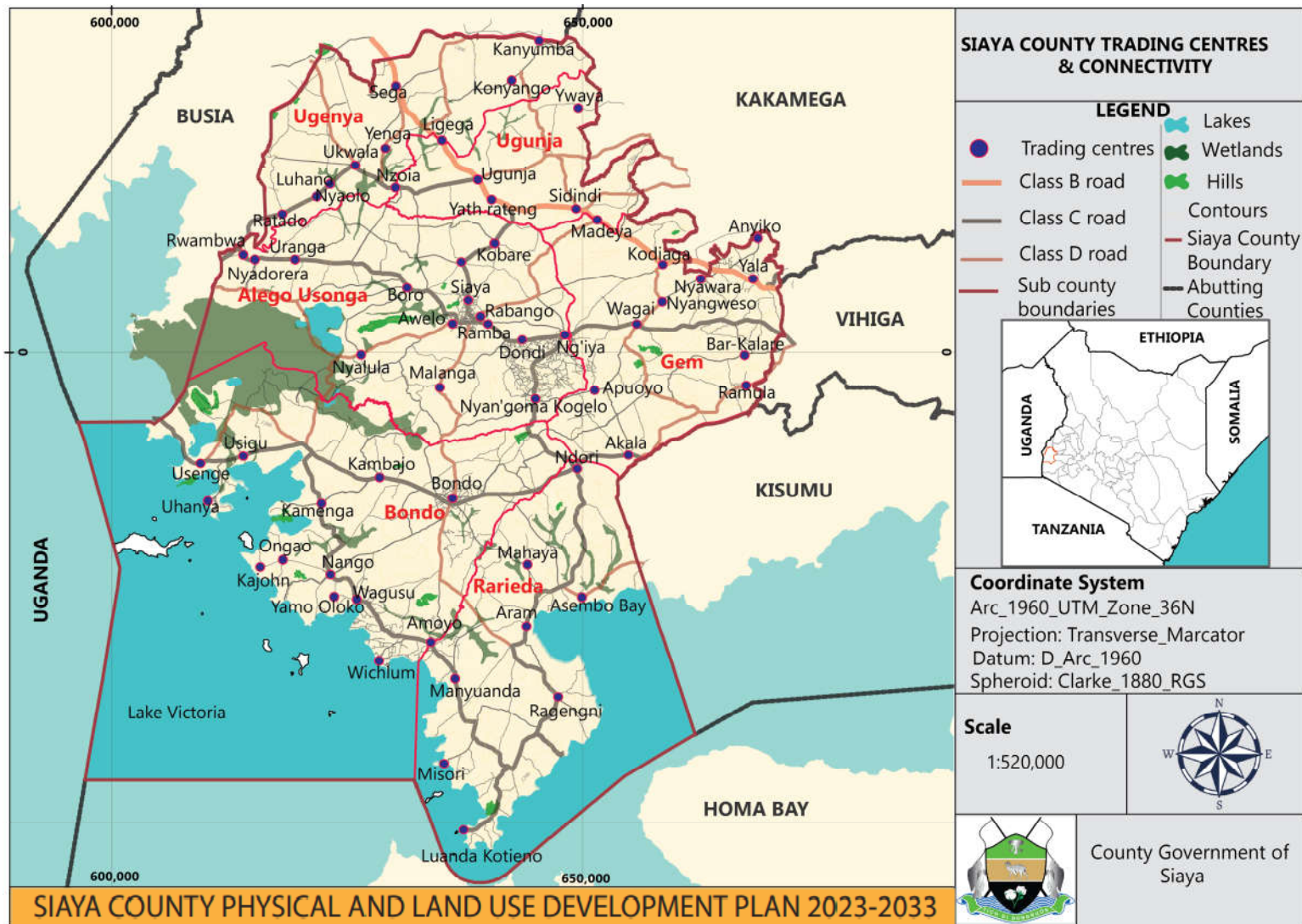
10.8 Trade and Commerce

The following factors influence trade patterns in Siaya County: Proximity to Kisumu and Busia, quality of service roads serving the market centres (accessibility), security, economic viability, availability of auxiliary services such as banking, credit facilities, and general infrastructure in the trading centres.

10.8.1 Major Trading Centres

Business activities in Siaya County are conducted within the fourteen major market centres. These centres are Siaya, Bondo, Yala, Usenge, Ugunja, Nyadorera, Aram, Akala, Luanda Kotieno, Sigomere, Sidindi, Aboke, Ndori and other trading centres as well as periodic markets. Bondo and Siaya enjoy functional influence and are seen to be growing faster than other centres. (Figure 10.6). Ugunja has a strategic advantage due to its location along the busy Kisumu -Busia-Kampala Highway which has influenced its vibrancy, attracting more business and hence faster growth. Wholesale, Retail, kiosks and transport are the most dominant and popular business types. This indicates that almost all higher-order goods and services are sourced from Kisumu, Nairobi and Busia. The scenario further shows a weak financial base for the County Government in terms of revenues generated from the business entities in the County.

Supply centres are evenly distributed, poor road network, however, inhibits effective utilization of the centres, business is confined along Luanda-Kotieno-Ndori- Ngiya, Bondo-Siaya-Rangala, -Ugunja, and Siaya-Nyadorera transport corridors.



Map 10.6: Siaya County Location of Major Trading Centers

10.8.2 Small and Medium Enterprises (SME) and Medium Sector Enterprises (MSE)

On average 9 out of 10 new jobs are created in the informal sector. The majority MSEs are in agriculture at 46. % followed by Trade at 41% and Small Manufacturing at 9%. Services and Transport form the 4%. Half of the MSEs collapse within the first three years of their establishment; 65% of their businesses are not registered and the majority operate on temporary structures/market stalls. There are 17 registered MSE associations in the County each with an average of 300 members and 6 MSE SACCOs. Most of the products are made for local markets since most operators lack creativity and innovation; they copy and replicate similar products from their business colleagues with the resultant effect of market saturation.

The MSE Sector plays an important role towards the County's economic growth, employment creation, 'poverty reduction and development of an industrial base and therefore must be prioritized. To effectively address these challenges, there is a need to come up with a disaggregated MSME Data Profile, Construct and Equip industrial development Centers, promote creativity and innovation, Development of Business Information Center and creation of a County Revolving Fund which all these do not exist in the County. There is also a need to develop a County Industrial Development Policy to facilitate the investment of industries with much focus on the provision of incentives.

10.9 Employment

The informal sector is one of the biggest employers of the majority of the County population. Welding, furniture wares, vehicle mechanics, boda boda transport, and footwear are common undertakings in the market centres. The location of the activities within the trading centres is an area of conflict that require planning intervention. The majority of the informal economic activities are domiciled in key trading centres that include: Bondo, Siaya, Usenge and Ugunja centres. In Siaya County, 11% of the residents with no formal education are working for pay, 13% of those with a primary education and 22% of those with a secondary or above level of education. Work for pay for those with a secondary or above level of education is highest in Nairobi at 49% and this is twice the level in Siaya (Table 10.18).

Table 10.26: Overall Employment by Education and levels in Siaya County

Edu. Level	Work for pay	Family Business	Family Agric. Holding	Interns Volunteer	Retired Homemakers	Fulltime student	Incapacitated	No work	Number of Individuals
Total	15.4	13.5	44.1	1.2	0.7	13.1	0.9	5.2	413,673
None	10.5	10.1	62.5	2.0	0.4	0.5	3.3	4.7	38,443
Primary	13.2	14.4	47.1	1.0	7.0	11.6	0.7	5.0	263,720
Secondary	22.4	12.8	30.5	1.3	5.9	20.7	0.5	0.5	111,510

Source: Kenya National Bureau of Statistics and Society for International Development (2013)

10.9.1 Employment Typology

Formal Employment: People engaged under formal employment in County are approximately 17% in various sectors including Agriculture, Non-Governmental Organizations, Government, Transport industry. Where agriculture forms approximately 61% of total employment opportunities.

Informal Employment: Self-employment which is classified as informal business comprises 14% of urban areas and 8% (per cent) of rural areas' total labour force in the County. In rural areas, small-scale businesses include operating kiosks selling groceries, foodstuffs, small

hotels and ‘boda boda services and undertaking small-scale farming. In urban areas, these businesses include shop keeping, hotels, chemists, hairdressing foodstuff trade, and cottage industry among others.

Labour Force: In 2012 the County’s labour force was projected to be 430,300 comprising 189,181 and 241,119 men and women respectively. The labour force was to increase to 452,815 in 2015 and 468,497 in 2017. The number of populations to drive the economy is gradually increasing and strategic interventions are required to provide gainful employment in the key sectors of the economy.

Unemployment Levels: The CIDP (2015) reports that approximately 40% (172,120) of people are unemployed in the county. Unemployment in the County is due to low access to affordable credits, lack of collateral, preference for white-collar jobs, and fear of risk-taking in self-employment. In this regard, more opportunities need to be created to address the unemployment problem. The county government has put in place various programmes that will expand opportunities for the youth and women. Nonetheless, there is a need for more interventions by all stakeholders to complement the government’s initiatives.

10.10 Financial Institutions

The County has a few banks. Most of the banking services are located in Bondo, Siaya and Ugunja, which have Kenya Commercial Bank, Equity Bank, Co-operative Bank, Post Bank, and Kenya Women Finance Trust. Their location and bias deny banking services to the majority of small-scale traders in the county. All trading centres host Bank Agents, M-pesa and M-shwari as important financial services that have supported small-scale traders in financing their businesses. Financial services from mainstream banks are limited and restricted to biased lending terms. However, the prevalence of informal banking merry-go-rounds, Kenya Women Finance Trust, and Mshwari services is helping alleviate this problem.

10.11 Strategies to Revitalize Agricultural Production in the County

i) Mechanization strategy: The County has purchased 15 tractors with assorted accessories for Sh66 million and hired eight others. This has improved locals’ access to mechanized services and expanded the hectares of land under production by 15 per cent. This has improved crop productivity as about 4,800 acres were ploughed at a subsidized rate of Sh1,850 per acre, down from the commercial rate of Sh3,500.

ii) Irrigation Expansion Strategy: The county has increased land under irrigation, where development of irrigation infrastructure in all sub-counties has been accelerated, some of the areas covered include Bunyala-Usonga Irrigation Scheme, funded by the World Bank Lower River Nzoia Project. Irrigation demonstration sites have also been established at the Siaya Agricultural Training Centre to ensure the continuity of the projects. 132 acres are now under irrigation.

iii) Farm input subsidies: To boost farming, in 2014, the County purchased 26.8 metric tonnes of assorted seeds and 3,000 bags of subsidized fertilizer directly from producers and distributed them across the sub-counties.

iv) Strategic grain reserves: Has been established as a post-harvest losses management initiative as well as a marketing strategy. The county buys maize from farmers at a market price and stores it so that when prices stabilize during a shortage they are released to the market. This is done during bumper harvest.

10.12 Trade and Commerce Emerging Planning Issues

- Poor Roads in most parts of the county, Ugenya, Ugunja, Gem and Alego Sub-counties
- Limited access to credit
- Unplanned locations for informal economic activities

- Limited capacity to diversify and keep trends with changes in times and opportunities
- Lack of planning interventions for trading centres
- Limited banking services in most trading centres
- Inadequate creativity and innovation in business enterprises
- Most employment is in the informal sector (lack of formal employment)
- Low agricultural and industrial productivity results in low-traded goods and services

Opportunities

- Develop a disaggregated MSME Data Profile
- Construct and Equip industrial development Centers (Industrial incubation hubs and parks) in each sub-county headquarter and subsequently in ward centres.
- Promote creativity and innovation in trade, business and industrial development through capacity building
- Establish Business Information Centers and/or Business Outsourcing Centres
- Creation of a County Revolving Fund to facilitate credit facilities to SMEs and MSE
- Formulate a robust County Industrial Development Policy to facilitate the investment of industries focusing on the provision of incentives.
- Strengthen the role County Chamber of Commerce and Kenya Manufacturing
- Development of potential manufacturing and agro-processing industries based on available raw materials (sugar, rice, fish, mangoes, dairy, hides & skins, cotton)
- Facilitate County Physical and Land Use Development Planning for informal activities, SME and MSE and subsequent trading centres and landing beaches
- Development of stall markets and auxiliary services to accommodate many small-scale traders

10.13 Economic Sector Challenges

Some of the common economic base sector challenges that require interventions include (Lake Basin Economic Blue Print, 2019):

- Low domestic savings and investments
- Low per capita income growth
- High Levels of unemployment and poverty
- High energy cost
- Inefficiencies in rail and port (water and air) operations (including ferry services)
- Poor business environment: inadequate entrepreneurial skills
- Major economic and social disparities
- Rapid population growth (rural-urban migration and urbanization)
- High dependence on rain-fed agriculture (in arable land)
- Declining fish resources (Lake)
- Un-tapped tourism (ecotourism) potential
- Slow structural transformation (agriculture to industry)
- The narrow range of export products
- Health services affect the population's well-being and perform productive services
- Governance in the economic sector: transparency and accountability
- Environment: quality, impact of climate change

CHAPTER 11: GOVERNANCE

11.1 Administrative Structure

Projects and programmes in the County, including those by the National government, will be implemented by the County government through the respective Ministries, Departments and Agencies. Projects by the County government are implemented by the County Executive and its decentralized structures up to the village level. For the implementation of projects, various departments are expected to prepare budgets and thereafter develop work plans based on the approved budgets. The CPLUDP will form the basis for budgeting County projects. Figure 11.1 illustrates the structure within the County Government of Siaya.

11.1.1 County Coordination Framework

The Sub-County Administrative units coordinate the implementation of government projects/programmes/policies at the sub-county level while at the Ward level, the function is performed by the ward administrative units.

11.1.2 Project Implementation Framework

Projects and programmes are coordinated, implemented and monitored through various development forums at the County, Sub-County and Ward levels from which new project proposals and ongoing projects are reviewed and final recommendations on the same are submitted to the County Executive Committee member in charge of Finance and Planning for implementation.

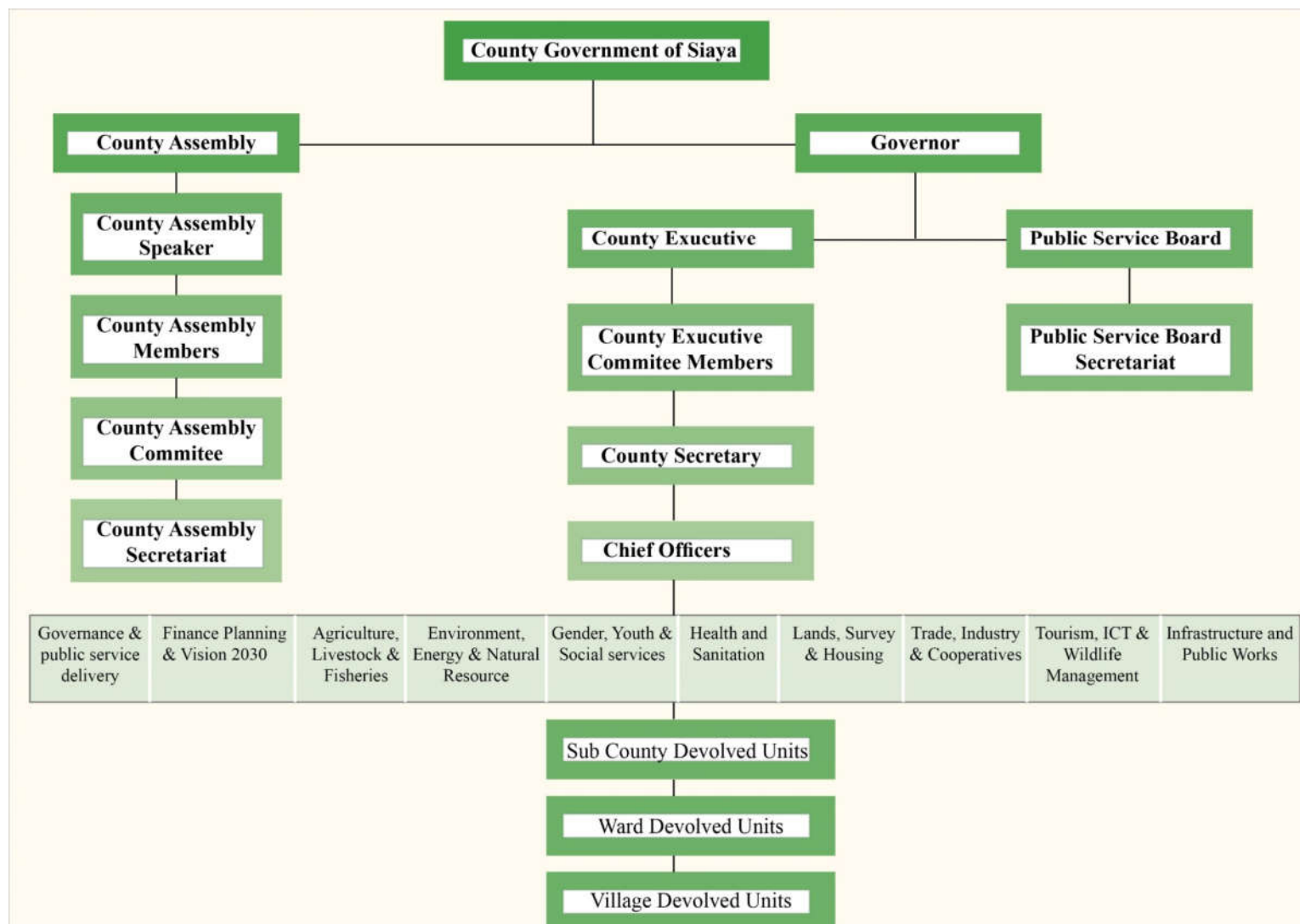


Figure 11.1: Siaya County Administrative Structure

Figure 11.2 below illustrates the structure within the county government of Siaya that will be used to implement the County Physical and Land Use Development Plan.



Figure 11.2: Siaya County Projects Implementation Structure

- a) **County and Sub-County Development Forum:** overall authority in policy implementation, coordination and supervision of projects is vested in these forums. The membership of the forum shall include among others: the national and county departmental heads, non-governmental organizations, faith-based organizations, NG-constituency development fund, Members of the National Assembly, Women Representative (MYW), Youth Representative, and PLWD.
- b) **County and Sub-County Executive forums:** the membership of the forum includes the National and County Heads of Departments. The committee is mandated to report and provide technical support to the county and sub-county development forums.
- c) **County and Sub-County Monitoring and Evaluation Forum:** These forums are mandated to undertake all monitoring and evaluation activities aimed at improving the effectiveness and quality of tracking implementation of various development policies, strategies, programmes and projects. The forum is all-inclusive as it draws its membership from within government and civil society organizations and other interest groups
- d) **County and Sub-County Special/Sectoral forums:** These are mandated to undertake implementation, supervisory and overall review of projects in their sectors at all levels. The committees nominate a Chairperson to steer the management and coordinate various meetings with the technical person in charge of the sector being the convener

11.2 Public Participation in Decision Making

Development partners and other stakeholders are essential in the implementation of programmes and projects within the set framework of the sector of interest and within other county structures. These stakeholders will therefore provide support to the County government in achieving the objectives of the County Physical and Land Use Development

Plan. Support from these stakeholders will be in the form of both financial and technical support. The County will legislate or formulate appropriate policies to guide the operations of these stakeholders at all administrative levels given streamlining their operations to avoid duplication of interventions.

a. Role of Stakeholders in Lands, Physical Planning, Housing and Urban Development

Table 11.1: Role of Stakeholders in Lands, Physical Planning, Housing and Urban Development

Stakeholder	Role
World bank	To establish and strengthen urban institutions to deliver improved infrastructure and services
National Government (Department of Housing)	Provide adequate, affordable and decent housing units
National Government (Department of Lands and Physical Planning)	Ensuring efficient administration and sustainable management of land resources in the country
National Housing Corporation	Implementation of government housing policies and programmes
Land Control board	To have jurisdiction over land control area

b. Role of Stakeholders in Agriculture, Livestock and Fisheries: Their role in this sector is to establish a County stakeholder forum in addition to the existing quarterly ones at the sub-County level. They sensitize farmers to the existence of other stakeholders within the County and beyond. The major stakeholders in this sector are shown in Table 11.2 below:

Table 11.2: Role of Stakeholders in Agriculture, Livestock and Fisheries

Stakeholders	Role
ICIPE	Technology Development, capacity building
USAID	Capacity building
Farmer/Processor Associations (KLPA, KFA, KENAF, AKEFEEMA, AFIPK, BMUs)	Farmer mobilization; Advocacy and lobbying on agricultural issues; Resource mobilization.
GIZ AND GIZ PARTNERS	Food security interventions, Soil Protection & Rehabilitation, Green Innovation
USAID KAVES	Supports fruit, cereals and dairy value chains
ICRISAT (International Crops Research Institute for Semi-Arid and Tropics)	Research for the development of sorghum, F/millet, groundnuts
World Health Organization (WHO)/ OIE-International Office for Animal Diseases	Vaccines provision Disease surveillance The export market for livestock products
Regulatory bodies (KVB, KDB, NACADA, KEBS, KEPHIS, PPBK, WHO, NEMA, HCDA)	Capacity building, regulations, quality assurance
Farmers/ Producers	Adopt and implement technologies, Provide feedback
Faith-based Organizations	Community mobilization, Counseling,
Input Suppliers and manufacturers (Pharmaceuticals, Seed Companies, Agrovets, Farm machinery and equipment suppliers, Feed Millers)	Research, manufacture, supply of farm inputs and training
AHADI	Financial and Technical support in policy development
NGOS/CBOS (Heifer International, send a Cow, World Vision, Red Cross, Plan International, Care Kenya, Vi-Agroforestry, Farm Africa, Pathfinder International, GOPA)	Capacity building, Provision of farm inputs

Stakeholders	Role
Financial & Insurance Institutions (Banks, Micro Finances Government Cooperation's, insurance Cos.)	Financial services (Loans, credit, insurance)
Private Sector (Dominion farms, Macro Fish Farm, Jewlet fish farm, Investors in Fish Processing, Agricultural Commodity processors)	Investments, product value-addition and marketing
Professional Bodies (KVA, APSK, KASPA, KVPA, KALT, KMA, KESAP, EIK, AAE)	Capacity building, staff welfare, lobbying, professional discipline
MEDIA	Education, Publicity, Dissemination
Research Organizations (KALRO, ICRAF, KEMFRI)	
Educational Institutions (JOUST, Maseno Egerton Universities, Siaya Technical Training Institute)	Partnership and collaboration in training

c. Role of Stakeholders in Education, Youth, Gender, Children, Sports and Culture:

Major stakeholders in this sector include the Ministry of Education, National Youth Forum, Constituency Development Fund, National Funds for People Living with Disabilities (NFPLWD), Plan International, Child Fund, UNICEF, UNESCO World Bank, National Gender and Equality Commission, National Youth Council, Athletics Kenya, National Fund for the Disabled to replace National Funds for People Living with Disabilities, Department of Culture, Children Services, Ministry of Devolution and Planning (Uwezo Fund), Disability Council, Help Age Kenya, Faith Based Organizations.

Table 11.3: Roles of Stakeholders in Education, Youth, Culture and Sports

Stakeholder	Role
Community	Provision of resources: land, capital and labour Programme beneficiaries at as M&E agents
The county government of Siaya	Provision of technical human capacity and financial support. Establishment of legal and policy framework for service delivery M&E of sector development programmes
NGOs, CBOs, FBOs, CSOs	Provision of human technical and financial support in the implementation of sector policies projects and programmes
National government	Formulation of national policies that govern the sector. Provision of Security M& E of sector programmes Technical support for County government

d. Role of Stakeholders in Roads and Public Works: The major stakeholders in this sector include the Constituency Development Fund, Kenya Roads Board, KERRA, KURA, KENHA, Ministry of Roads and Infrastructure, IEK, ERB, NCA, KABCSEC, AAK and IQSK.

Table 11.4: Role of Stakeholders in Roads and Infrastructure

Stakeholder	Role
KeRRA	To construct and maintain rural roads
KeNHA	To construct and maintain national trunk roads
KuRA	To construct and maintain urban roads
County Government	To construct and maintain County roads
Kenya Wildlife Service	To construct and maintain roads within game parks and reserves
African Development Bank	Major financier for road construction
World Bank	Major financier for road construction
IEK, ERB, NCA, KABCSEC, AAK and IQSK	Professional regulatory bodies in the sector

e. Role of Stakeholders in Finance, Planning and Vision 2013

Table 11.5: Role of Stakeholders in Finance, Planning and Vision 2013

Stakeholders	Role
Office of the Controller of Budget	To approve withdrawal from the exchequer To oversee the implementation of the budget
The public	To participate in the budget preparation To oversee the implementation of the budget
Suppliers/creditors	Interested in the debt repayment plans in the budget
Debtor	Interested in financial bills and related financial legislation
National government	Linkage of County government policies to national government policies Capacity Building, intergovernmental relations act
Kenya National Bureau of Statistics	To provide policy guidelines on data collection, compilation, dissemination and maintenance of the national statistical system
NCPD	Provides policies on population and development
UNFPA	Provides technical expertise and setting of international standards on population
UNDP	Provides technical and financial support on socio-economic development
UNICEF	Provides technical and financial support on social intelligence reporting (SIR) and electronic project management information system (E-promise)
IFAD	Provides technical and financial support in various sectors
AfDB	Community Empowerment and institutional support Programme (CEISP)
UNPF	Promote and appreciate involvement in development activities
CRA	Determine the proportion of revenue to be shared between the National and County governments
SRC	Review and determine salaries and remuneration to be paid out to state officers and other public officers
KRA	Collect taxes
KENAO	To determine if proper books of accounts are being kept and reflect the true picture of finances in the county

f. Role of Stakeholders in Trade, Industry, Cooperatives and Labour

Table 11.6: Role of stakeholders in Trade, Industry, Cooperatives & Labour

Stakeholders	Role
Ministry of EAC Affairs, Commerce and Tourism	Technical Support
Ministry of Roads and Infrastructure	Technical Support, formulating national policies on transport. construction of national trunk roads
Saccos	Technical Support
Ministry of Industry and Enterprise Development	Technical Support. Formulating national policies on trade and enterprise development.
Donors	Financial and Technical Support
Parastatals (EPC, KENINVEST, KIRDI, KEBS, MSEA, KIPRI, Consumer Protection Board and Anti-Counterfeit Agency)	Technical Support
Saccos	Technical Support
Universities	Technical Support
Siaya County Government	Undertaking implementation of programmes/policies/projects in the sector

g. Role of Stakeholders in Water, Irrigation and Environment

Table 11.7: Roles of Stakeholders in Water, Irrigation and Environment

Stakeholder	Role
Water Resources Management Authority	
Ministry of Agriculture	Capacity building on appropriate agricultural

	practices
KFS	Capacity building on type of trees and planting spacing, and sourcing of seeds
NEMA	Capacity building on the protection of the environment and enforcement of Law.
Provincial administration	Mobilization and enforcement of Law.
Meteorology	
All government Departments whose activities are sensitive to weather and climate.	First track climate and weather information in their plans and activities
All NGO CBO With Climate and Weather programs.	First track climate and weather information in their plans and activities
All users of climate and weather information.	First track climate and weather information in their plans and activities
Traditional Rain forecasters	In-cooperated in the identification of impacts and enhancement of weather dissemination

h. Roles of Stakeholders in Governance and Administration

Table 11.8: Role of Stakeholders in Governance and Administration

Stakeholder	Role
Kenya Police Service	Maintaining Law and Order
Kenya Wildlife Service	To secure Wildlife Resources
Ministry of Interior and Coordination of National Government	To provide backstopping on National Government Issues
The Judiciary	Agent of dispute resolution
The General Public	Consumers of government goods and services.
Council of governors	Interpretation of external policies
Other county governments	Intergovernmental engagements
Civil society players	Facilitate citizen engagement in good governance
Donor community	Are partners to augment county programmes
Media	To provide a communication platform

i. Role of Stakeholders in Tourism, Culture, Sports and Arts

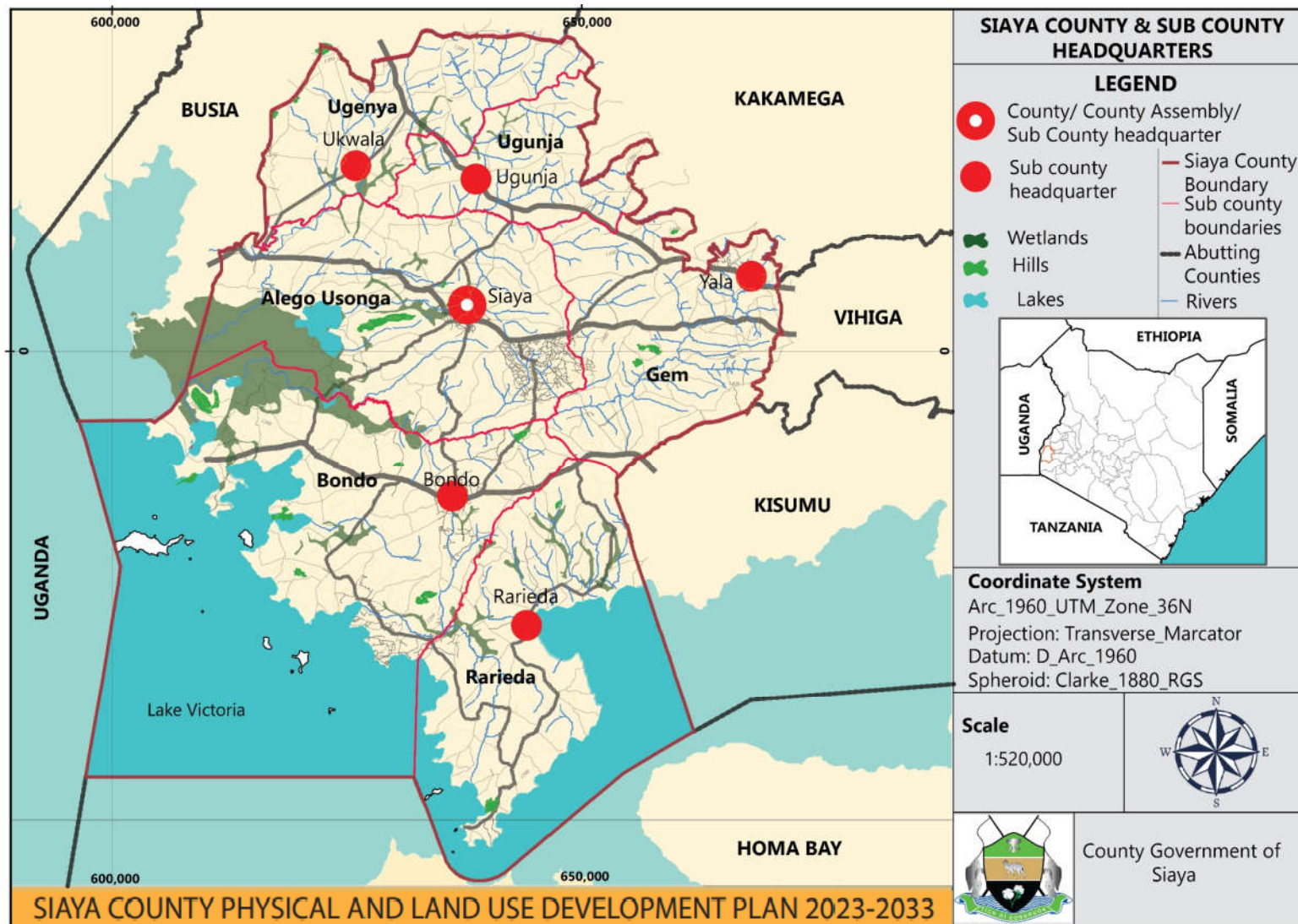
Table 11.9: Role of Stakeholders in Tourism, Culture, Sports and Arts

Stakeholder	Role
Kenya Tourism Board	To promote and market Kenya as a tourist destination internationally and locally
Ministry of Tourism-National Government	To promote the development of the tourism industry in Kenya
Kenya Association of Hotelkeepers and Caterers	To protect and represent the interest of hotels, lodges, restaurants and membership clubs
Kenya Association of travel agency	To champion and represent the interest of the travel agent industry
The Football Kenya Federation	To run and manage football in Kenya
Schools	Provide facilities for sporting activities
Betting companies	They sponsor sporting tournaments and clubs

j) Role of Stakeholders in the Health Sector: The major stakeholders in the health sector are the County government, the National government, the people of Siaya County and development partners. The sector coordinates the stakeholders through quarterly forums at the sub-County and county levels, and stakeholder participation in the preparation of the Annual Work Plans for implementation of the County spatial projects related to health in the county. The key development partners in the health sector are indicated in the table below.

Table 11.10: Role of Stakeholders in Health

S/no	Partner	Support
1	CHS	HIV/TB, Nutrition, Staffing,
2	ICAP	Quality Assurance in HIV Program
3	UNICEF	MSE, Child Health, Immunization, Vitamin A supplementation, Community Health Strategy, WASH
4	AMREF	Maternal, reproductive and child health, nutrition Program
5	CARE KENYA	Maternal, reproductive and child health, nutrition Program, Wash
6	FRED HOLLOWS	Eye Care Support, Capacity Building and Equipment Support.
7	Red Cross	Reproductive Health, Nutrition, Community Health Services, Waste Management/WASH, Disaster management
8	Mild May	HIV/AIDS care, community strategy
9	PATH(ECD), MACEPA	Early Childhood Development, Malaria Prevention, Control and Management, Nutrition
10	IRDO	HIV Testing, Malaria, Community TB
11	CMMB	HIV Program,
12	Sane Landin (SLCC)	HIV Program,
13	ACE AFRICA	HIV Program, Reproductive health intervention, WASH/Jiggers Control
14	WORLD VISION	Reproductive Health, Community Health Strategy, OVC/ WASH, HIV
15	KARP	HIV Program,
16	MATIBABU	Reproductive Health, Community Health Strategy, HIV/AIDS care
17	PLAN INT.	Maternal, Reproductive and Child Health, WASH, Advocacy
18	MAP	nutrition Program
19	GAP	TB Program
20	GIS	TB Program
21	FHOK	Reproductive Health/ Maternal and Adolescent Health Interventions, PAC, Nutrition
22	KEMRI/CDC	HIV/AIDs care, Malaria research and control, TB
23	KMET	Family Planning/RH, Nutrition Program, Advocacy
24	PS Kenya	HIV prevention, Malaria prevention, social mobilization
25	Palladium Group	HMIS
26	KSCSS	Strengthening Supply Chain Management
27	IPAS	Reproductive Health
28	OMEGA	Family Planning
29	ESHE	Family Planning
30	Network for Adolescent and Youth in Africa (NAYA)	Advocacy: Adolescents Care, Reproductive Health, HIV Care



Map 11.: Siaya County and Sub-County Headquarters

PART III - SYNTHESIS

CHAPTER 12: SUMMARY OF PLANNING ISSUES

The Siaya County Physical and Land Use Development Plan, through a comprehensive and transparent process, is aimed at creating conditions of providing the locations for capital investments in economic development, improving infrastructure services, and protecting natural and cultural heritage. The framework of the County Physical and Land Use Development Planning process is provided in the Kenya Constitution 2010, and County Government Act 2012. These documents provide a broad process of participation of different stakeholders during the preparation of the County Physical and Land Use Development Plan. Under this framework, the process of analyzing the situation is divided into two namely challenges and opportunities of spatial development and the potentials which are viewed along the thematic areas. The following planning issues from all sectors emerged from the situational analysis.

Sector	Planning Issue	Description of issues	Where
Environment	High rate of environmental pollution and degradation.	Poor solid and liquid management. Wetland encroachment due to human settlement. Environmental pollution like River and Lake pollution, especially car washing, bathing and oil spills. Environmental hazards such as floods due to lack of disaster preparedness Depletion of forest cover and extinction of rare plant species Loss of biodiversity in ecologically fragile areas like wetlands Unprotected wildlife corridors	County-wide, Major towns, Market centres, River beds Forests, Hills, Wetlands, Wildlife corridors, Industrial areas, Beaches
	Air and land	Increasing water, air and land pollution. Forest encroachment. Poor environmental quality Reducing forest cover. Land degradation. Unsustainable utilization of natural resources.	Countywide Sand mines Stone mines, Forests Agricultural lands Rivers
Flood	Sporadic flooding causes threats to life and property.	Homes and villages swept by floods. Increased waterborne diseases. Submerged farmlands and crops. Hampered movement of goods, services and people. School programmes affected. Loss of human and animal lives.	Countywide River banks Beaches Downhills Plains Market centres
Erosion	Causing hazardous consequences to water flows, land, forests, objects and other immovable properties.	Threat to life and property. Hampered agricultural activities. Increased river siltation. Degraded land.	Countywide, Market centres, Riverbanks, Downhills, Agricultural lands, Villages
Natural Resources	Insufficient preservation, protection and rational exploitation of natural resources	Illegal cutting of trees. Indiscriminate waste disposal. Increased water pollution. Poor inventory and Mapping of cultural and natural heritage sites.	Countywide Forests Degraded areas Cultural heritage areas Schools Public institutions
Agriculture	Declining soil fertility	Reduced productivity	All agro-ecological zones
	Declined cotton	Collapsed cotton and textile industry	Aboke, Alego Usonga,

Sector	Planning Issue	Description of issues	Where
	production		Siranga
	Decrease in food security	Over-reliance on rain-fed agriculture Unreliable rainfall Poor crop husbandry Use of local seeds and low usage of fertilizer and manure Use of traditional livestock breeds High crop and livestock diseases	Whole county
	Small farm holdings and the resulting limited benefits of economies of scale	Low management skills for commercial farming	Whole county
	Inadequate extension services	High farmer-to-staff ratio Extension personnel lack access to emerging knowledge on modern farming practices	All sub-counties
	Poor market access	Poor infrastructure Low productivity Poor access to accurate and timely market information	Whole county
	Poor quality of livestock	Poor animal husbandry High cost of good quality dairy cattle not affordable to farmers	Whole county
	High incidence of tick-borne diseases	Collapsed dips	Whole county
	Utilization of fishing resources	Overfishing Trawler fishing	Lake Victoria, Lake Kanyaboli, Key Rivers (Yala and Nzoia), Breeding grounds in bays along the lakeshore
Industry	Inadequate land for industrial use	Inadequate industries Hindrance in the growth of industries	Siaya, Aram, Bondo, Ugunja, Yala, Ukwala, Usenge
	Small farm holdings	Constrained mechanized agriculture	All county
	The collapse of cotton industries	Inadequate incentives for cotton farmers Importation of second-hand clothes	Alego Usonga
	The collapse of sugarcane industries	Inadequate incentives for sugarcane farmers	
	Unregulated sand mining	Haphazard location of sand mining sites	Along the beaches and river Nzoia
	Crude methods of mining	Unsustainable exploitation of mineral resources	Gold (Wagusu) and Kogela Fluorite (Rata) Granite and black sand from Yala Valley
	Poor access to mining sites	Poor road conditions	Wagusu, Kogelo, Rata, Yala valley
	Lack of an industrial park	Low investments in the county	All sub-counties
Tourism	Unmapped boundaries	Encroachment by other human activities	Olua Sacred Trees, Holy Got Adodi, Bullock of Got, Podhe, Rambugu hills, Got Ramogi,

Sector	Planning Issue	Description of issues	Where
			Jaramogi Oginga Odinga Mausoleum, Achieng' Ouko Mausoleum, Mageta Island, Odera Akang'o office and cells in Yala, Sare, Nyamboyo, Oyamo, Mageta. Ndeda, Magare and Sihuh.
	The untapped potential of tourist attraction sites	Underutilized sites	Olua Sacred Trees, Holy Got Adodi, Bullock of Got, Podhe, Rambugu Hills, Got Ramogi. Jaramogi Oginga Odinga Mausoleum, Achieng' Ouko Mausoleum, Mageta Island. Odera Akang'o office and cells in Yala, Sare, Nyamboyo, Oyamo, Mageta, Ndeda, Magare and Sihuh.
Poor accessibility of sites		Poor road conditions	Olua Sacred Trees, Holy Got Adodi, Bullock of Got, Podhe, Rambugu hills, Got Ramogi, Jaramogi Oginga Odinga Mausoleum, Achieng' Ouko Mausoleum, Mageta Island, Odera Akang'o office and cells in Yala, Sare, Nyamboyo, Oyamo, Mageta, Ndeda, Magare and Sihuh.
	Unattractive sites	Few tourists visit the sites	All sites
	Unclassified hotels	Few visitors	All hotels
Water	Poor access to potable water	Unreliable, inadequate, unaffordable water supply. Unprotected water sources. Long walking distances to access water Polluted water sources	Countywide. Major towns such as Bondo, Siaya, Ugunja, Yalla, Usenge, Akala, Aram, Luanda K'otieno, water-scarce rural areas, health & educational facilities & abattoirs
Sanitation	Poor sanitation	No operational sewerage systems Poor solid and liquid waste management Widespread use of ordinary pit latrines in urban and peri-urban areas Poor maintenance of sanitation infrastructure	Countywide including Bondo, Siaya, Ugunja, Ukwala, Sega Usenge, Ndori, Akala, Luanda-Kotieno, Yala, Nyandorera, Sigomere, Nyangueso
Transport	Unclassified priority county roads	Roads serving key facilities including industrial and commercial areas and government institutions such as schools, hospitals, prisons and government housing.	Countywide

Sector	Planning Issue	Description of issues	Where
	Road safety	Unsafe roads characterised by frequent accidents and insecurity	Countywide
	Marine safety	Unsafe water transport for fisher folks and passengers	Lake Victoria, Lake Kanyaboli, River Yala, River Nzoia
	Poor accessibility to waterfronts	Limited access to beaches, landing sites and visual disconnection to water scenery	Beaches like Osieko, Usenge, Nyenye, Usigu, Miyadhe, Sirongo, Wagusu, Orengo, Luanda-Kotieno
	Encroachment of road reserves	Informal structures, vending and other activities within the road reserves	Countywide
	Poor road conditions	Potholes, poor /inadequate bridges, impassable roads during rainy seasons	Countywide
	Poor drainage infrastructure	Inadequate/ poor maintenance of storm drains leading to flooding and erosion of road surface	Countywide
	Undocumented/ unmapped waterways	Connecting to islands, fishing grounds, and mainland	Lake Victoria
	Undeveloped airstrips	The existing airstrips are in a state of neglect, unused, encroached and underdeveloped No security of tenure	All Airstrips (Sega, Gombe, Dominion, Migwena)
Energy	Poor electricity service Poor Electricity connectivity in the county	Untapped alternative sources of energy	Urban Centres Beaches Schools Health Centres Rural areas
Health	Basic facilities	Some are not connected to electricity and Water Lack of specialised equipment (MRI machines, Cancer screening, dialysis machines) Low bed capacity Lack of specialised laboratories Lack of mental health facility Lack of elderly care homes	All health facilities (every sub-county to have a level 4 hospital, elderly care home)
	Access to health services	Distance Inadequate drugs/medicine Low staffing of different cadres of health personnel Poor disposal of medical waste Poor access to medical facilities by residents at the Islands	All health facilities
Education	Basic facilities	Shortage of well-equipped laboratories in secondary school Poor drainage and waste disposal system Lack of water in some schools Inadequate green infrastructure No defined footpaths. Inadequate/poor play areas for students due to inadequate land Inadequate floor area for classrooms Inadequate educational institutions in some wards Haphazard planning leads to poor location of developments	All schools in the county

Sector	Planning Issue	Description of issues	Where
	Access to schools	Longer walking distance for students to schools Poor road conditions Poor access to education by persons with disabilities about specialised equipment, access roads	All Schools
	Transition to tertiary education and training	Declining interest in village youth polytechnics Poor equipment Inadequate personnel Inability to afford education students especially those from humble backgrounds	All village polytechnics

Table 12.1: Summary of Planning Issues

12.1 Situational Analysis

This analysis was done to make it possible to understand and appreciate the opportunities to be maximized as well as the challenges to be addressed by strategies and policies. The analysis identified the rich and natural resource endowment due to the unique topography, climate, geology and drainage. This makes Siaya County have a diversity of social and economic activities such as farming, pastoralism, mining, tourism, fishing and water transport. Population analysis defined the population projections, distribution, structure, densities and demographic trends which indicated the current and future needs. The economic base was analysed and it provided indications of patterns and trends of economic growth and development. This calls for diversification of the county's economic base and harnessing of the largely unexploited potential which will in turn lead to stability and improvement of the general economic performance of Kenya in general and Siaya county in particular. The Siaya County Physical and Land Use Development Plan development policies are aimed towards developing functional human settlements, efficient and integrated transport and communication networks and appropriate infrastructure to spur economic growth and improvement of livelihoods. Land use was also analyzed and it indicated that land is owned inequitably. It also has low productivity and is used inefficiently and unsustainably. The Siaya County Physical and Land Use Development Plan advocates for the optimal utilization of land by reorganizing and adjusting how land is utilized to achieve overall efficiency and sustainability. Concerning transport and infrastructure systems, there is an indication of uneven distribution, inadequacy in provision, poor accessibility, unreliability and inefficiency. The County Physical and Land Use Development Plan is aimed at promoting investments in the expansion, improvement and diversification of transport and infrastructure systems to support the performance of the country's economy.

12.2 Opportunities

i. Availability of raw materials: The county is endowed with several resources which can be exploited. These are resources distributed across the county. They include livestock, fruits and sand among others. The exploitation of these resources shall improve income levels, and spur industrial investment and revenue generation for the county.

ii. Readily available labour: Siaya County has a large skilled and unskilled labour force. This is attributed to the high population and improved education levels.

iii. Good working relations between the county and national government: The good working relationship between the county government and the national government institutions provides an opportunity to secure land tenure through the titling of urban land.

iv. Peace and tranquility: The county enjoys political stability and a peaceful environment which can spur the growth of businesses and attract investors.

v. Existing institutions: There are several institutions in the county which can come in handy to help in development. They include both governmental and non-governmental institutions. Some of these institutions like Agricultural Training College (ATC) offer agricultural education to farmers in the county.

vi. Tourism attraction sites: The county has several tourist attraction sites which can be developed, Mapped and branded to attract both local and international tourists. Beaches along Lake Victoria can also be developed as tourist attraction sites apart from fishing.

12.3 Challenges/Gaps

Urbanization: The county faces the challenges of an increasing population moving from predominantly rural areas to urban areas from rural areas. This is attributed to the devolution and the opening up of urban areas. The increasing population consequently exerts pressure on the existing social facilities and infrastructure due to the high demand. The county has inadequate guiding policies and legal framework guiding urbanization in the county. Further, inadequate infrastructural facilities in the county's urban areas limit the growth and development prospects of the urban areas. The infrastructural facilities include clean water, energy, an efficient transport system and a network linking the major town and the agriculturally rich rural areas. Most of the urban areas have scattered development/housing attributed to weak enforcement of the development plan and development control policies in place.

Industrialization: The sector faces several challenges including; inadequate infrastructural facilities, high cost of credit and limited access to credit. The rural-based cottage industries face low adoption of technology for value addition, price fluctuations, poor transport infrastructure development and poor linkages to markets for agricultural products

Agricultural production: The sector faces several challenges including; low agricultural and livestock productivity attributed to low adoption of technology and limited access to inputs; inadequate extension services; high incidences of crop and livestock pests and diseases; low-value addition; land fragmentation into uneconomical sizes; weak and inappropriate land use policies and erratic rainfall/frequent droughts and shortage of water to sustain agricultural development. The sector however has a huge potential and opportunity to increase productivity through irrigation, leveraging modern technology in farming and intensifying extension services.

Infrastructure: The county has a fair coverage of the road network estimated which is distributed across the administrative units. The road is majorly earthen and mostly becomes impassable during the rainy season thus hindering the provision of essential services to many citizens and the access to market and other social amenities. The sector is equally faced with inadequate governance and legislation framework on the water resources which greatly affects the sustainability of the water developments. Degradation of the environment and the destruction of the water catchment areas has affected the water supply in the county. Information, Communication Technology (ICT) has a huge potential to drive growth in several sectors of the county economy. These include; agribusiness, commerce and industry, revenue generation and procurement process. The penetration of ICT in the county remains low due to inadequate infrastructural facilities to support ICT development.

CHAPTER 13: SCENARIO BUILDING

Scenarios are assumptions of potential situations in future development. The key principle in working with scenarios is the question "What If?".

13.1 Development of Alternative Scenarios

The strategy for the development of the Siaya County Physical and Land Use Development Plan is based on three scenarios. These are the No Action Alternative, Mid Way Plan Alternative and Full Plan Implementation Alternative.

13.1.1 No Action Alternative

The selection of the "No Action" alternative means the discontinuation of the Siaya County Physical and Land Use Development Plan Proposal and results in the county being retained in its existing form. There are structural, environmental, infrastructural, socio-cultural, economic, political, institutional and governance implications of this alternative. Structurally, the county is unlikely to undergo any major changes from its condition at present. Economically, the county is likely to have a very poor economic base as a result of poor livestock productivity, outdated agricultural practices and lack of incentives and resources such as adequate land set apart for industrial use to attract investors. Natural resources such as lakes and forests or hills will also be affected because there will be no measures put in place to conserve and manage them thus hurting the environment and the social and economic well-being of the county residents. The health, nutrition and food security of the area residents will greatly be affected hence it is likely to have the greatest implication on the socio-economic environment of the county, the other neighbouring counties and the whole nation at large. The county will also face challenges in the maintenance and development of infrastructure such as roads which are drivers of economic growth and development. This will in turn affect the marketing of agricultural products as well as linking Siaya County to other regions. All the issues which have been highlighted will in the end affect the budgeting of projects as well as the governance system. If this alternative was adopted, then the status quo will be maintained and the county will face major development challenges.

13.1.2 Mid-Way Plan Action Alternative

There are so many reasons why a plan might end up not being implemented fully. These could be a result of setting up unrealistic expectations, poor methodology and requirements, inadequate resources and so on. However, these can be avoided by adopting effective practices which will help to establish a clear understanding of expectations and processes among all the stakeholders on board. This alternative means that only mid-term projects will be implemented thus leaving out major projects such as infrastructure development which are key in spurring development.

13.1.3 Full Plan Implementation Alternative

Siaya County Physical and Land Use Development Plan Implementation is the phase where visions and plans become a reality. This is the logical conclusion, after evaluating, deciding, visioning, planning, applying for funds and finding the financial resources for the County Physical and Land Use Development Plan. With the right planning, implementation and monitoring there is the opportunity to implement the Siaya County Physical and Land Use Development Plan on time, on budget and with high-quality results, and fully meeting the key performance indicators as highlighted in the plan implementation matrix. In case a clear idea of what is to be achieved and what is required to be done to ensure that the plan is implemented fully, there is a need to put in place all the tasks on a timeline and make sure

that all stakeholders are put on board with the County Physical and Land Use Development Plan. A visual timeline will give a bird's eye view of the entire project and resources. On top of that, having a visual understanding of all the steps and tasks needed to be completed can help in figuring out if overly optimistic deployment dates have been set. This can keep the Siaya County Government which is in charge of the County Physical and Land Use Development Plan implementation grounded and focused on delivering results by realistic schedules. To achieve the objectives of the County Physical and Land Use Development Plan, several strategies need to be adopted as discussed below.

13.1.3.1 Corridor Development Strategy

This is a planning strategy that concentrates on spatial developments along transportation routes. From a national corridor perspective, corridors throughout the world are developed for development promotion purposes, to expand the development opportunities for a specific economic sector and/or industry and to increase access to public amenities and private investments within the corridor area, as well as between the corridor and surrounding areas, markets or economic activity nodes. This strategy is characterized by the application of a strategic integrated development planning process, whereby several issues are incorporated, viz that of land use, transportation, economic development and social development. Through this planning process, a development framework and development concept framework are generated. This is an integrated development framework which should be robust and dynamic to accommodate human choices as when necessary. Several benefits can be identified through a formulated theoretical framework development corridor framework, which can be summarized as follows: -

- corridor development creates an opportunity for innovative and creative designs and problem-solving opportunities
- it necessitates the integration of land use and transport planning
- it has a strong focus on attracting and promoting private-sector investment and ventures
- it establishes the opportunity for greater levels of economic efficiency and productivity due to shorter travel distances and reduced travel time
- sustainable environmental development and environmental protection are enhanced
- it allows local and regional planning and development approach
- it creates an opportunity to integrate fragmented spatial forms
- it creates the opportunity for the more efficient use and allocation of urban and regional facilities

13.1.3.2 Nodal-Oriented Development Strategy

Nodal Development involves concentrating development in existing or new centres and around planned roadway and intersection improvements at a higher density than the surrounding area. This allows the land between nodes to be used for lower-density, lower-traffic land uses. Nodal development is generally found in more suburban/urban locations and provides a mix of residential, commercial, and service opportunities in a compact walkable area. Nodes are often located at existing intersections or community centres. The land between the nodes remains relatively rural with limited commercial sites and access points. One of the key benefits of nodal development is reduced automobile trips by providing bicycle and pedestrian amenities such as sidewalks, visible crosswalks, streetscape improvements, and street furniture. Nodal development can enhance community character and sense of place by minimizing the spread of generic sprawl and unifying development, making it easier to achieve consistent design themes. Safety is also improved by concentrating access points within the nodes and limiting them along major corridors to minimize potential conflict points. These major urban centres act as nodes or hubs for both

the residents living in the centre itself and for people in nearby communities. Service delivery in the nodal development concept is economical since it promotes quality of life by concentrating infrastructural and service investments where they are most required. This concept has the advantage of helping to preserve rural land for agricultural investment.

13.1.3.3 Balanced Regional Development Strategy

Balanced regional development is an important condition for the harmonious and smooth development of Siaya County. It does not imply equal development of all the six sub-counties, rather it indicates utilization of the development potential of all areas as per its capacity so that the benefit of overall economic growth is shared by the inhabitants of all the different sub-counties. Thus, the regional balance implies a uniform distribution pattern of the planned investment among the six sub-counties. This is done up to the lowest location which is the village level for equal distribution. It also ensures that no area is left lagging in development. Alternatively, regional balance demands the distribution of investment in such a way so that the regional rates of growth in different parts of the county be equally attained, eliminating the regional disparities prevailing in the county. To attain regional balance, the sub-counties which are lagging must try to attain a higher rate of growth than that of developed areas. Balanced regional development does not also indicate attainment of self-sufficiency of level of industrialization or uniform economic pattern for each sub-county rather it simply indicates widespread diffusion of industry in sub-counties which are lagging in development. Balanced regional development is broadly guided by the people in these areas which can be attained simply through its development of agriculture, industry, infrastructure, trade and commerce. Thus, by the term regional development, we mean the economic development of all sub-counties simultaneously, raising their per capita income and living standards by exploiting their natural and human resources fully.

13.2 Evaluation of the Alternative Scenarios

To come up with a well-informed Siaya County Physical and Land Use Development Plan, three alternatives have been discussed. The preferred alternative is the Full Plan Implementation Alternative because it is an integrated option taking into account the three strategies namely nodal, corridor and concentrated development. Integrating the three strategies will guide development across the county for the entire plan period i.e. 2019 - 2028. This preferred strategy can also be implemented in phases (short-term, mid-term and long-term) according to pre-formulated development programmes and as budgets permit implementation.

PART IV – PLAN PROPOSAL

CHAPTER 14: POLICIES, STRATEGIES AND ACTIONS

This chapter comprises policies, strategies, actions and spatial structures necessary to achieve the objectives of this plan for the next 10 years. The plan comprises development proposals to serve as a road map for integrated and sustainable development of Siaya County through five interlinked strategies namely: social development strategy; economic development strategy; human settlements strategy; transport, communication and infrastructure strategy; and governance strategy.

14.1 SOCIAL DEVELOPMENT STRATEGY

Actions, and activities for achieving social development goals are given achieving objectives mainly related to population and demographics, HIV/AIDS, culture as well as improving the quality of housing.

14.1.1 Background to Social Development Strategy

Like many other counties in Kenya, Siaya County faces high rates of poverty, inequality and other social ills, such as substance abuse and crime. These problems affect the growth and development of the County as a whole and restrict access to opportunities, preventing people from realizing their potential. Both social and economic development interventions are necessary to address the scale and impact of these social problems. Social development is the overall improvement and enhancement in the quality of life of all people, especially people who are poor, vulnerable or marginalized. At its core is a focus on addressing poverty, inequality and social ills while providing for the participation of people in their development.

Yet, Kenya's Constitution mandates the County Government to 'promote social and economic development'. This is reiterated in the Country and Siaya County Integrated Development Plan 2023-2027. The County has interpreted its mandate to mean that all service delivery, planning and government activity is not an end in itself but rather *strategic enablers* for social and economic development. In other words, all of the County's work is designed to improve the quality of life for all people living in the County as well as address poverty, inequality and social ills. However, there is a lack of integration in social development activity within the County. Departments and directorates often view the challenges faced through the lens of their sphere of activity, providing isolated, sector-specific responses to broader social issues. This results in a piecemeal approach that rarely adequately addresses the scale of social problems. Furthermore, social development is often viewed as the domain of a specific directorate concerned with relatively small, discrete projects, rather than viewed broadly as encompassing all of the County's work.

14.1.2 Desired Outcomes of the Social Development Strategy

The Social Development Strategy (SDS) articulates the role of the County Government of Siaya in promoting and maximizing social development. This strategy sets out what the County is doing, and plans to do and articulates where external stakeholders, such as contracted service providers and organizations receiving grants, shall contribute. The SDS recognizes that certain groups within communities may require different levels of assistance in achieving their potential and hence it is decidedly pro-poor and based on promoting an inclusive County. To maintain an outcomes-driven approach, the SDS is structured around five broad high-level objectives. These are:

- i) Promote and foster social integration
- ii) Support the most vulnerable through enhancing access to infrastructure and services.

- iii) Maximize income-generating opportunities for people who are excluded or at risk of exclusion
- iv) Build and promote safe households and communities
- v) Mobilize resources for social development

The Social Development Strategy puts forward the actions needed to strengthen and improve these levers so that they can best facilitate social development. The SDS is closely connected to the Economic Growth Strategy (EGS) as social development interventions promote people's ability to engage in economically productive activity, while economic growth is essential for facilitating social development.

14.1.3 Approach to Social Development

The County Physical and Land Use Development Plan adopts a transversal approach to social development, viewing the County as an integrated whole, where each department and directorate has an important role to play in facilitating social development. The plan considers all of the County's work as geared towards improving the well-being of all people in Siaya County. If the work of the County government is considered a strategic enabler for social development, the various roles that the County plays are opportunities to promote social development. These roles are summarized in Table 14.1 below. Departments might fill several of these roles at one time.

Table 14.1: Role of County Government in Social Development

County Government of Siaya	Role
Facilitates engagement through democratic structures	Service provider
Regulates and plans for public organization	Regulator
Manages its corporate affairs	Corporate employer
Fills the gaps or meets local, specific needs through interventions which are provided by the County or by county-funded organizations	Government of last resort
Delivers services and maintains public infrastructure	Service provider

At the heart of the SDS, is an approach to the City's work. The way that departments provide services, plan, regulate, employ people or directly intervene in communities shall be done in a manner that promotes the social development of communities. the central principles of the Social Development Strategy approach are to:

- Facilitate partnership and community collaboration, which encourages initiative, self-help, and mutual help.
- Focus especially on individuals and groups that are vulnerable, marginalized or excluded, such as women, people with disabilities, unemployed youth, elderly and very poor people
- Use the County's efforts, resources and assets as strategic enablers for creating environments, which foster social development, where individuals are supported in improving the quality of life for themselves and their communities.
- Emphasize the sustainability of interventions by considering the environmental consequences and promoting self-reliance.
- Be priority-driven, so that the County's activity and resources are directed by relevant evidence emphasizing the areas of greatest need.

Using these key principles of the County's social development approach and the broad county government roles indicated above, the following Table 4.2 provides some guidance on

the SDS approach. These questions shall be used by County officials to guide their work and to aid in the implementation of a social developmental approach to the County's work.

Table 14.2: Guidance on Social Development Strategy Approach

County Government Work	Guiding Questions (Application SDS principles)
Facilitates engagement through democratic structures (Public Engager)	<ul style="list-style-type: none"> • Are opportunities for participation treated as a key aspect of a democratic and accountable government? • Are democratic structures set up in a way to recognize the important contribution of individuals, respect their views and facilitate a dialogue? • Are public engagement processes aware of the divisions within local communities and seek to promote the participation of marginalized and excluded groups in community and government processes through specially designed plans? • Are leadership, encouragement and practical support provided to organizations created by communities that build on the democratic structures of the County?
Regulates and plans for the public organization (Regulator)	<ul style="list-style-type: none"> • Does the regulation and policing of bylaws respect the inherent human rights of each person? • Does regulation act to promote and support the livelihood strategies of people who are poor or vulnerable? • Does the planning function take into consideration the needs of people who are poor and vulnerable? • Is planning environmentally sustainable and informed by Local Agenda 21 aimed at creating and maintaining sustainable cities? • Does regulation engage communities and promote individual responsibility? Are new areas of development designed using urban and spatial design principles aimed at integrating economic and social infrastructure and addressing or preventing the spatial and economic divides of the past?
Manages its corporate affairs (Corporate Employer)	<ul style="list-style-type: none"> • Is the County's status as an employer used to develop the skills, knowledge and potential of employees? • Are vulnerable people/groups supported in the corporate workplace? • Are diversity and mutual respect fostered in all interactions? • Is the County open to the views and opinions of employees and employee representatives? • Are activities conducted in a way that promotes environmental sustainability?
Fills the gaps or meets local, specific needs through interventions which are provided by the County or by County-funded organizations (Government of last resort)	<ul style="list-style-type: none"> • Are the services/programmes or interventions provided because of a lack of such services in an area or a special need and thus avoid the duplication of effort? • Do these quality interventions provide specifically further the social development of an area? • Are these special provisions of programmes targeting vulnerable or excluded groups? • Do these efforts build on the services, resources and assets of the County? • Are these interventions based on community engagement and collaboration? • Are these efforts sustainable?
Delivers services and maintains public infrastructure ("service provider")	<ul style="list-style-type: none"> • Are services delivered in a manner that provides for the basic needs of communities or possibly defined by service levels and standards? • Are services delivered in a manner that meets the different needs of communities? • Are services accessible, safe, culturally appropriate and affordable? • Are community facilities utilized to their maximum capacity to provide opportunities for communities?

County Government Work	Guiding Questions (Application SDS principles)
	<ul style="list-style-type: none"> • Does service delivery engage the community and promote participation, initiative and collaboration? • Are services provided in a manner that recognizes the inherent dignity and human rights of each person and facilitates the progressive realization of all socioeconomic rights? • Is service provision sustainable in terms of the environment and promoting self-reliance? • Is service provision guided by relevant statistics and provided in areas with the most need? • Is the priority setting informed by analysis of services and infrastructure and balanced by need and

14.1.4 Development Proposals on Social Development

14.1.4.1 HIV/AIDS

The plan recognizes the impact of HIV/AIDs on the development of Siaya County. The National government in collaboration with other agencies have worked to reduce its spread through the voluntary counseling and testing centres (VCTs). The plan proposes that these centres should be set up in all urban centres including local centres at the village level.

14.1.4.2 Housing

The Siaya County Physical and Land Use Development Plan aims for all residents to have the possibility of ensuring an adequate housing area, offering and providing a larger choice in housing and reducing social inequality. The provision of housing should therefore be accompanied by adequate infrastructure and optimal utilization of land. New housing design must be modern and enable the regeneration of degraded settlements. A legal framework must be established to provide different housing schemes in Siaya County. Below are the proposed actions:

Institutional: Needs assessment and urban capacity for housing; Identification of areas and locations; Allocation and clearance on land for housing development; and use of negotiated purchase approach of land for consolidation

Social: Creation of mixed communities – impact on type and size of housing; provision of affordable housing; and monitoring of affordable housing

Financial: Establishment of a constructive partnership between public and private sectors; establishment of housing development funds; establishment of a housing fund at the Government level; and promotion and provision of housing on subsidized and non-profit rents

Spatial: Creation of sustainable housing environments; sustainable land use; linking development with public transport; re-designation of business and other functions onto housing; promotion of mixed-use development; greenery in housing areas; and quality design.

14.1.4.3 Culture and Heritage

The county government should invest in the culture and heritage as a strategy by: -

- Identifying avenues for turning culture and heritage into sought for ecotourism
- Taking advantage of the country's unique culture, history and heritage by generating local, regional, national and international awareness (branding)
- Ensuring a coordinated and systemized approach to promote cultural and heritage assets
- Ensuring the protection and conservation of cultural heritage sites

Table 14.3 further indicates proposals for the social development strategy of Siaya County.

Table 14.3: Social Development Strategy

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
Lack of opportunities for unskilled/low-skilled/unemployed people	To create job opportunities through public work programmes	Poor families receive business training some monetary grants to start businesses, work experience & some skills training for job seekers	County Government	Development partners, National Government, NGOs	Training, facilitating further employment, utilizing county administrators' and focus on jobs for women
Many poor people lack the skills to be able to access income-generating activities	To develop the skills of people excluded or at risk of exclusion	Poor young people receive skills development opportunities in the County's structure	County Government	Development partners, National Government, NGOs	Increased number of beneficiaries who were previously disadvantaged who receive training
		Provide people who are poor with relevant skills that they can use to access job opportunities	All directorates/ departments that provide funding/ skills development opportunities for outside population in the county	Development partners, National Government, NGOs	Meet community and private sector demands, focus on youth, combine hard & soft skills, follow-up support, standardize and accredit courses, workshops provided as part of a set of interventions
Poor people often engage in entrepreneurial activities to support themselves and their families. These are often not recognised / inadvertently affected by government regulatory functions	To support entrepreneurial activity in the formal and informal sector	Provide people who are poor with support services to create a viable business in the formal sector	All departments/ Directorates in the county government	NGOs, National Government, Development partners	Move toward incubator projects and one-stop-shops, maintain and expand library support services for entrepreneurs
		Enable and support poor people to utilize informal trading as a	All departments/Directorate	NGOs, National Government,	Innovative support services: Health

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
		livelihood strategy to support themselves and their families	s in the county government	Development partners	and Safety information& education, strengthen the participation of informal traders in governance, intermediaries
Poor people live in high densities on leftover land, vulnerable to flooding, fire and disease	To reorient services to create & maintain a safe, healthy environment	Balance resources so all residents receive necessary services but vulnerable people receive the services that enable them to live in a clean & safe environment	Health, Physical Planning Public works, Environment and all relevant departments	Community members, businesses contracted to provide services, NGOs contracted for animal sterilization/ impoundment, education campaigns	Balancing services and regulation so that adequate services are provided in poor areas
People who are poor face high levels of crime. The causes of crime are multi-faceted and complex	To Reduce levels of crime through social & situational crime prevention and community participation	Situational Crime Prevention (“Designing-out crime”)	National security agencies, County Government, communities, individuals, NGOs	National security agencies, communities, individuals, NGOs	Mainstreaming situational crime prevention initiatives and thinking for planning, cleansing, community services and surveillance of streets
		Social Crime Prevention	National security agencies, County Government, communities, individuals, NGOs	National security agencies, communities, individuals, NGOs	Social Crime Prevention strategy, victim support services
		Community participation in safety measures	National security agencies, County Government, communities, individuals, NGOs	National security agencies, communities, individuals, NGOs	Utilize democratic county-supported structures for safety initiatives, support

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
					community safety projects
Disadvantaged areas especially in urban centres are more affected by gang activity, crime and substance abuse	To develop holistic strategies to address gangs, substance abuse & youth development	Gang strategy: suppression, mobilization & social interventions to deal with gang activity	Urban development, housing, Health, Public Health, Governance and all relevant county departments/directorates	The national government, security agencies, NGOs, and communities. NACADA	Develop a comprehensive strategy for gang suppression and community mobilization.
		Substance Abuse strategy: address supply, prevention, early intervention and treatment	Urban development, housing, Health, Public Health, Governance and all relevant county departments/directorates	The national government, security agencies, NGOs, communities, NACADA	Develop & expand current activity, develop a comprehensive plan and fast-track through the workgroup, monitor effectiveness and capacity of treatment, build an alternative youth culture
		Youth Development Strategy: coordinate activities of directorates in specific disadvantaged areas	Urban development, housing, Health, Public Health, Governance and all relevant county departments/directorates	The national government, security agencies, NGOs, communities, NACADA	County Government Agencies become youth champions, area-based interventions as part of a set of services
Poor people are not able to access services that improve their quality of life	To reorient service delivery for pro-poor	Targeted expenditure, free basic services for people on the indigent list and in informal settlements, rate rebates for poor households, pro-poor NGOs, old age homes	Finance, Housing & Urban Development, legislature, social services, all relevant county departments	Development partners, National Government, NGOs, communities	Focus on the needs of women, youth, disabled indigent relief and innovative ways to engage citizens in service delivery

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
Poor health limits people's abilities to access opportunities and affects their quality of life. HIV/AIDS & TB disproportionately affect poor people	To Provide free primary healthcare incl. HIV & TB care	Prevention, care and treatment services for all people in the County ensure that illness or disability does not plunge poor households into destitution	County Health, Corporate Services	Private health service providers, NHIF, Medical insurance providers	Improve the quality of healthcare, continued focus on HIV and AIDS,
People who are poor lack access to physical assets such as housing and land which they can use as collateral for income generation	To facilitate access to housing opportunities	Provide various housing options to poor people, transfer rental units to identified beneficiaries and informal settlement upgrades	Housing and urban development, Physical planning, health, public works and all relevant departments in the county	The national government, National Housing Corporation, Finance, Private sector, NGOs, Development partners	Focus on urbanization, continue to recognize & upgrade informal settlements, education of new homeowners
Children who grow up in poverty are at risk of a wide range of adverse experiences and disadvantages that persist later in life	To focus on Early Childhood Development	Provide poor children with access to ECD services that meet their developmental needs. The aim is to increase the headcount of learners in registered ECD facilities.	Department of Education, Finance, Governance and Administration, all relevant county directorates	The national government, Education Ministry, NGOs, Development partners	Integrate services for ECD (health, education, social) within the County and other sectors, use grants and mentorship to help unregistered centres, ECD provision in informal settlement projects, nutritional programmes
Women, children, the elderly and people with disabilities are most affected by poverty. There is a preponderance of vulnerable groups in the poor population	To champion the issues of vulnerable people across the County	Ensure that vulnerable peoples' issues are included in all departments' planning and services	All departments of county government	Civil society, Vulnerable groups organizations, Churches, Mosques, National government	Strengthened role for county government agencies as a champion and coordinator of vulnerable groups

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
		Provide special interventions targeted at vulnerable groups like Street people	All departments of county government	Civil society, Vulnerable groups organizations, Churches, Mosques, National government	Strengthened role for county government agencies as a champion and coordinator of vulnerable groups
Poor social interaction between economic classes prevents the development of networks that promotes access to opportunities	To promote social interaction through recreational and active citizenship opportunities	Enables interaction across race/class barriers to building social capital, networks and cohesion that facilitate access to opportunity and address stereotypes and discrimination	Public participation arenas, ward committees, Bunge la wanainchi, County Government	Civil Society, National Government, community groups, NGOs	Community centres become centres of community development, focusing on building social capital & cohesion, events and arts bring people together to examine social norms,
	To foster diversity and inclusivity in the County's governance structure	Promote constructive engagement between groups and engage employees as agents in building an inclusive county	HR department, all relevant county departments	Civil Society, National Government, community groups, NGOs	Utilizing the County workspace as a space for interface/culture interaction, maintaining a culture of respect and valuing diversity
Poor people often lack the voice to be able to participate in planning processes for their development	To facilitate public participation and ensure that marginalized voices are heard	Provide access to information, opportunities to report problems or provide feedback, special mechanisms to improve access of vulnerable groups to participation opportunities, civic education	County government, public participation arenas, ward committees, county assembly	Civil society groups, NGOs, National government agencies	Partnering with county and national government agencies., promoting active citizenship,

Problem	Objective	Action	Internal Role-Players	External Role-Players	Gaps/Way Forward
					facilitating marginalized people's access to public participation, utilizing points of contact with communities, citizenship education initiatives

14.2 ENVIRONMENTAL AND NATURAL RESOURCES MANAGEMENT AND CONSERVATION STRATEGY

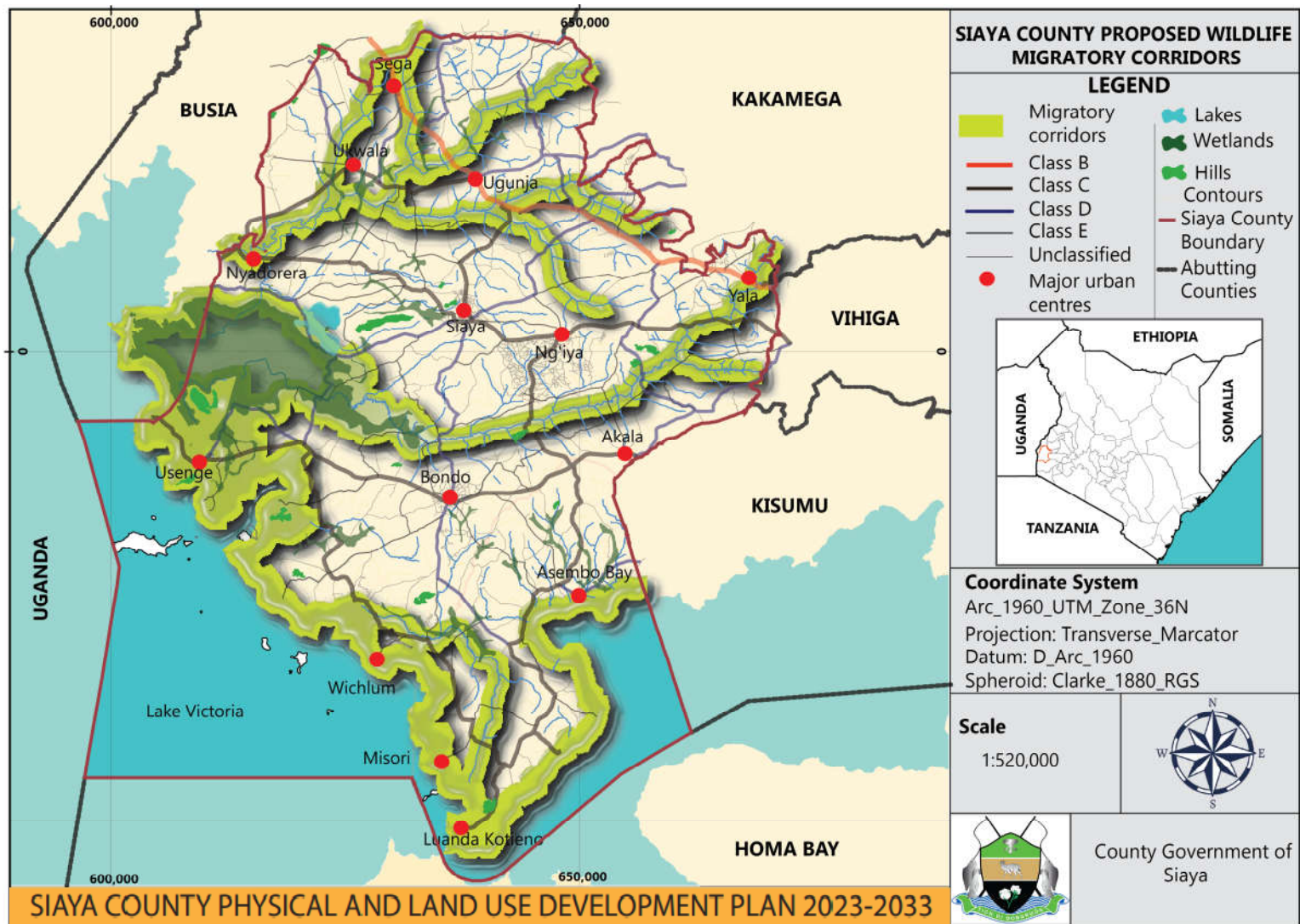
The plan comprises a strategy for sustainable natural resources management of the County. The strategy covers the reforestation of gazetted forest areas; the provision and protection of wildlife migratory corridors; and the protection of water catchment and environmentally fragile ecosystems. Therefore, the plan proposes actions for the protection and conservation of environmental resources for sustainable development. The plan proposes partnerships and engagement with local communities in the ownership and management of environmentally sensitive areas. Additionally, an environmental management plan and policy guidelines mandating a 10% increment of tree cover should be enforced on individual and public land holdings in urban and rural areas.

14.2.1 Wildlife Migratory Corridors

Siaya County migratory corridors are areas connecting of habitat connecting wildlife populations separated by human activities or structures such as road development or logging. It allows an individual between populations which may prevent the negative effect of inbreeding and reduced genetic diversity that often occur within isolated populations. The proposed corridors within the county should help to facilitate the re-establishment of populations that have been reduced or eliminated due to random events such as fires or diseases.

The proposed migratory corridors are intended to moderate some of the worst effects of habitat fragmentation wherein urbanization can split up habitat areas, causing the animals to lose both their natural habitats and the ability to move between regions to use all resources they need to survive. Habitat fragmentation due to human development is an ever-increasing threat to biodiversity in Siaya County and the proposed corridors are possible mitigations.

In Siaya County, wetlands along the Lake Victoria, Lake Kanyaboli and all the county rivers have been identified and proposed as strategic migratory corridors for the wildlife in the County. Common wildlife in Siaya County includes Crocodiles, Warthogs, Monkeys, Birds, Antelopes, Leopards, Hyenas, squirrels, and snakes. The proposed riparian areas along the rivers, lakes and other water bodies have been identified and further proposed for utilization as migratory corridors in Siaya County (Map 14.1).



Map 14.1: Proposed Wildlife Migratory Corridors

14.2.2 Water Resources Development Strategy

Water resources being limited, exploitation management of available resources against various heads of consumption must be worked out with due care taking into consideration and after analysis of various relevant factors such as expenses, sustainability and optimum utilization of current provisions. In Siaya County, both surface water and groundwater resources are currently exploited to meet the diverse nature of the demand scenario.

Water resources in the county are typically comprised of rivers (Yala, Nzoia and other small rivers) and their tributaries, water pans, boreholes, lakes (Lake Victoria, Lake Kanyaboli), wetlands (Yala Swamp), and dams. These resources should however be planned to ensure: an adequate quantity of water available to consumers and aesthetics and environmental safety. All plans must therefore be developed to cater to the goals of Vision 2030. A judicious assessment of demand for water through various phases within the planning horizon is one of the key basics which in turn is related to population size.

14.2.2.1 Development Proposals for Water Resources Development

Protection of water Intake/Sources: A protection belt (buffer) should be provided for underground water intakes comprising both direct and indirect protection. In areas of direct protection, a buffer of 10m wide should be provided surrounding well(s), boreholes, rivers, wetlands, lakes, water pans and dams. The physical planning standards recommend the following protection belts as indicated (Table 14.4):

Table 14.4: Recommended Protection Belts for Water Sources

Protection belt	Direct (Radius) protection	Indirect (Radius) protection
Borehole	10m	50m
Well	10m	50m
River	10-50m	50m

Boreholes and wells: should be located 800m apart to avoid drawdown

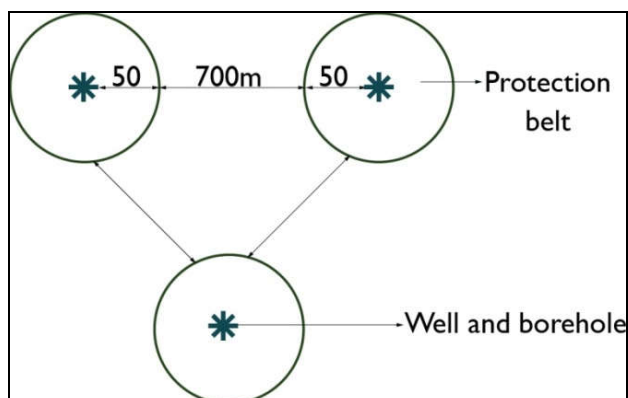


Figure 14.1: Standard Buffer Radius for Boreholes and Wells

Wetlands: Wetlands are areas where water covers soil all or part of the time. Wetlands are important because they protect and improve water quality, provide fish and wildlife habitats, store floodwaters and maintain surface water flow during dry periods.

To conserve such ecosystems as the Yala swamp, a riparian reserve of 50m is proposed. These ecosystems shall be preserved for recreation and ecotourism development.



Figure 14.2: Standard Buffer Distance for Wetlands

Rivers: Rivers should be protected as they help people and nature in many ways. These rivers are home to some of the best fishing, boating, hiking and scenery anywhere. They naturally filter and store clean water and reduce the impacts of floods, reserve some of the most important ecosystems on the planet, noble native plants and animals to thrive, preserve the cultures of communities who once lived by the river, provide amazing adventures, recreation and wildlife viewing and contain fabulous rock and geologic formations that help in understanding the evolution of our planet.

A protection buffer of 50m should be provided to ensure maximum conservation and protection of the rivers and their riparian reserves. The riparian reserves can be developed further for ecotourism and recreational purposes. These would include the provision of greenway parks and nature trails.

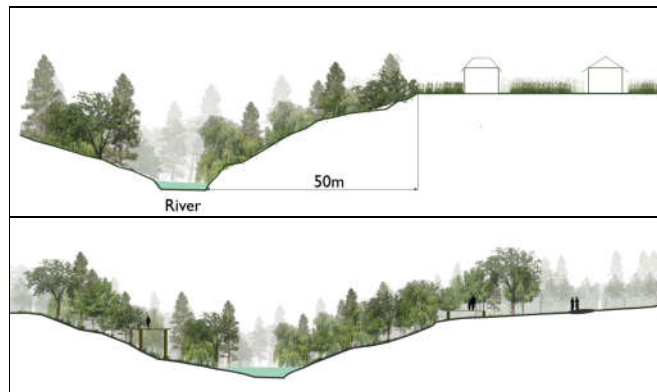


Figure 14.3: Buffer Radius for the Protection of Rivers

Lakes: A lake is an ecosystem, a community of interaction among animals, plants, microorganisms, and the physical and chemical environment in which they live. Critical to any lake ecosystem is the lake's watershed, the surrounding land area that drains into that particular lake. A complex interdependence has evolved among the organisms in a lake community. If one part of the ecosystem is disturbed, it affects the other parts. Human developments or other changes in the watershed can alter the delicate balance of the lake ecosystem. Therefore, these obstructive activities should be regulated. A protection buffer of 50m is therefore proposed for any developments taking place in Lake Victoria and Lake Kanyaboli.

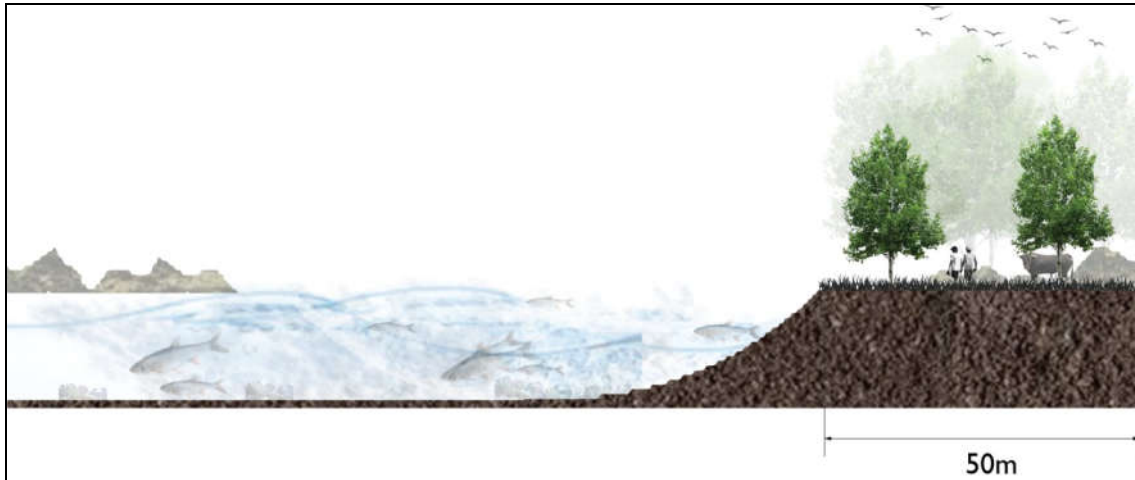


Figure 14.4: Buffer Radius for the Protection of Lakes

Similarly, as rivers, lake riparian's can be utilized for recreation purposes such as parks and nature trails.

Water pans and ponds: Ponds and pans are small reservoirs, about 1 m to 3 m deep, usually dug off-stream with raised and compacted banks all around. They are constructed to collect and store runoff water from various surfaces including hillsides, roads, rocky areas and open rangelands. The difference is that pans receive their water wholly from surface runoff while ponds are constructed where there is some groundwater contribution or a high-water table. The capacity of pans and ponds can range from 500 to 5,000 m³. These water resources provide water for domestic/livestock use and crop irrigation as well as control seepage. However, they are threatened by pollution and contamination due to unprotected catchments and human encroachment. Therefore, a protection belt of 50m with vegetation should be provided.

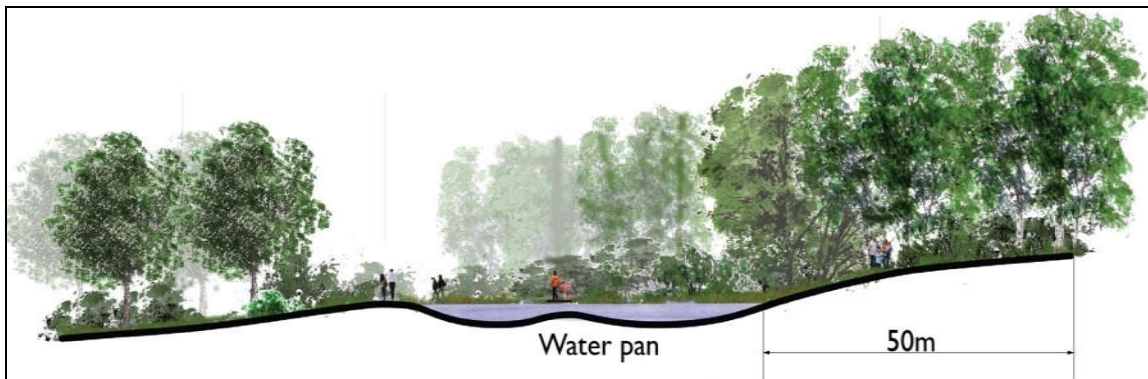


Figure 14.5: Recommended Protection for Water Pans and Ponds

Service reservoirs: The provision of service reservoirs and where necessary, elevated storage tanks are recommended for all water supply utilities. In particular, hospitals, institutions and industrial plants should be provided with separate elevated storage tanks. The minimum space requirements are 0.1 hectares. Table 14.5 further indicates proposals for the development of the environmental and natural resources of the county.

Table 14.5: Environmental and Natural Resources Management and Conservation Strategy

Sector	Planning Issue	Description of issues	Objective	Where	Activities/Strategies
Environment	Inadequacy of existing legislation	<ul style="list-style-type: none"> • Environmental degradation 	To legislate additional Acts of Parliament	<ul style="list-style-type: none"> • National 	<ul style="list-style-type: none"> • Additional legislation is required to adequately effect provisions of the Constitution.
	High rate of environmental pollution and degradation.	<ul style="list-style-type: none"> • Poor solid and liquid management. • Wetland encroachment due to human settlement. • Environmental pollution like River and Lake pollution, especially car washing, bathing and oil spills. • Environmental hazards such as floods due to lack of disaster preparedness • Depletion of forest cover and extinction of rare plant species • Loss of biodiversity in ecologically fragile areas for example wetlands • Unprotected wildlife corridors 	To reduce environmental pollution and degradation.	<ul style="list-style-type: none"> • Countywide • Major towns • Market centres • River beds • Forests • Hills, • Wetlands • Wildlife corridors • Industrial areas • Beaches 	<ul style="list-style-type: none"> • Creating buffers and prohibition by law of inert matter exploitation on river beds by unlicensed operators. • Prohibition of waste discharges into river beds. • Landfill creation standardization. • Ensure more efficient locations and protection in hazardous waste landfills which may cause disasters in subterranean and superficial waters. • Each industrial facility or activity, mine, open-cut mine, must construct industrial implants based on economic activity, undertake chemical and biological cleaning of waters, and discharge clean water into streams. • Construction of wastewater treatment plants to clean up waters by settlement sewage systems. • Reparation, and also the construction of agile layers and drainage channels of landfills, to avoid pollution of subterranean and superficial waters.
	Air and land	<ul style="list-style-type: none"> • Increasing water, air and land pollution. • Forest encroachment. • Poor environmental quality • Reducing forest cover. • Land degradation. • Unsustainable utilization of natural 	To develop, protect and conserve natural resources	<ul style="list-style-type: none"> • Countywide • Sand mines • Stone mines, • Forests • Agricultural lands • Rivers 	<ul style="list-style-type: none"> • Abeyance of the law on environmental protection. • Definition of allowed values of pollution in water, air, and land by international standards. • Addressing the hazardous waste landfills. • Protection of environmental quality. • Protection against degradation. • Identification of erosion-prone areas.

		resources.			<ul style="list-style-type: none"> • Recultivation of land after the exploitation of natural resources. • Protection of quality agricultural land. • Rational utilization of natural resources, protection of biodiversity and natural values. • All investment projects should follow an Environmental Impact Assessment. • Profiling, protection and preservation of forests and forestry assets' integrity. • Prevention of illegal cutting and destruction of forests. • Avoidance of economic activities harming the environment. • Location and placement of waste into landfills and recycling. • Mapping and afforestation of treeless areas • Determination of virgin forest areas, forest reserves and hunting reserves. • Protection of relict and endemic species of flora and fauna. • Creation of green belts around areas with environmental negative impacts.
Water	Poor access to potable water	<ul style="list-style-type: none"> • Unreliable, inadequate, unaffordable water supply. • Unprotected water sources. • Long walking distances to access water • Polluted water sources 	To ensure access to potable water by all	<ul style="list-style-type: none"> • Countywide. • Major towns such as Bondo, Siaya, Ugunja, Yala, Usenge, Akala, Aram, Luanda K'Otieno, water-scarce rural areas, health & educational facilities & abattoirs 	<ul style="list-style-type: none"> • Improve water supply and coverage to ensure adequate access to potable water. • Water supply to all urban areas. • Harness rainwater. • Enhance domestic water treatment before consumption. • Intensify public education on water safety. • Protection of water sources
Flood	Sporadic flooding	•Homes and villages	To place control over	•Countywide	•Establishment of a database of river flow

	causes a threat to life and property.	<p>swept by floods.</p> <ul style="list-style-type: none"> • Increased waterborne diseases. • Submerged farmlands and crops. • Hampered movement of goods, services and people. • School programmes affected. • Loss of human and animal lives. 	flood-endangered areas to ensure the protection of lives and property.	<ul style="list-style-type: none"> • River banks • Beaches • Downhills • Plains • Market centres 	<p>volumes.</p> <ul style="list-style-type: none"> • Mapping overview of endangered areas along riverbanks and the flooding wave of rivers, with the aim of permanent monitoring. • Establishment of a central level staff on forewarning, monitoring and alarming. • Drafting of emergency plans on flooding by respective institutions for crisis management. • Prevention of negative effects from flooding by preliminary technical measures. These measures are to be undertaken on riverbanks, or even riverbeds, to avoid natural barriers and man-made barriers. • Construction of protection walls at areas where riverbeds may not contain all flow, by technical interventions (embankment by natural materials and solid materials as well). • Maintenance of estuaries through natural interventions. • Prohibition by the law of agricultural land use along riverbanks, which may affect flooding risks. • Prohibition of all construction activities in proximity to river banks, apart from objects of an economic character (bridges, dams and drainage channels) which do not endanger water streams with flooding. • Prevention of flora destruction along river banks, apart from those that negatively impact them. • Prevention of flora destruction along river
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					<p>banks.</p> <ul style="list-style-type: none"> • Planting of wood plants along river banks, with the aim of erosion prevention and flooding. • Providing natural landscapes, according to preliminary studies. • Prevention of inert matter exploitation on riverbeds. • Restoration of the riverbanks to previous situations. • Prevention of flow change to the riverbed.
Erosion	Causing hazardous consequences to water flows, land, forests, objects and other immovable properties.	<ul style="list-style-type: none"> • Threat to life and property. • Hampered agricultural activities. • Increased river siltation. • Degraded land. 	To determine, establish and Map erosion-prone areas and propose mitigation measures.	<ul style="list-style-type: none"> • Countywide • Market centres • Riverbanks • Downhills • Agricultural lands • Villages 	<ul style="list-style-type: none"> • Prevention of forest cutting and degradation. • Prevention of overgrazing • Prevention of activities/materials causing erosion. • Construction of embankments along river banks. • Planting of forest plants along riverbanks. • Prevention of inert exploitation in a riverbed. • Agricultural land maintenance • Agricultural practices be applied fairly. • Utilization of irrigation and drainage systems be made by expert instructions • Increased investment for land protection along riverbanks. • Protection of existing forests against uncontrolled cutting and fire. • Prevention of grazing in bare massive and flora-deficient areas. • Forestation of bare and degraded areas. • Creation of green belts in regions where erosion incidence is higher. • Planting along riverbeds, streams and flows

					where erosion is active.
Natural Resources	Insufficient preservation, protection and rational exploitation of natural resources	<ul style="list-style-type: none"> • Illegal cutting of trees. • Indiscriminate waste disposal. • Increased water pollution. • Poor inventory and Mapping of cultural and natural heritage sites. 	To preserve, protect and rationally exploit natural resources	<ul style="list-style-type: none"> • Countywide • Forests • Degraded areas • Cultural heritage areas • Schools • Public institutions 	<ul style="list-style-type: none"> • To stop the illegal cutting of forests by introducing under-controlled and systematic cutting. • Application of clause: "A tree felled to be replaced with two other plants" • Zoning and classification of areas which are considered endangered. • Drawing and implementation of renewal of the old mining surface. • Renewal is to be conditioned upon the use of land for new purposes. • The drafted plans for rational exploitation of space should be promulgated as areas with natural heritage values. • To formulate the rehabilitation plan for the dumping of waste and surface mining

14.3 SEWERAGE AND SANITATION DEVELOPMENT STRATEGY

Organized sewerage and sanitation facilities are available only in the selected urban centres such as Bondo and Siaya but they aren't working. Other areas have no access to sewerage systems which requires installation and operationalization. Predominant dependence is on pit latrine followed by septic tank. Open defecation is also in practice. Therefore, there is a serious deficiency in the sewerage system in the county.

14.3.1 Development Proposals on Sewerage and Sanitation

Given undulating topography and scattered urban centres, it is not considered economically feasible to provide a centralized sewage treatment facility, which will involve sewage pumping and sewerage system at larger depth involving huge cost and likely large length of idle sewers may make the system uneconomical. On techno-economical consideration, decentralized treatment facilities at an urban centre level as in the current practice are proposed.

Notably, the installation of sewerage systems is land-dependent, which is not a serious constraint in Siaya County (especially in rural areas). However, in the case of urban centres with land constraints, the treatment process shall be selected based on the availability of land and associated techno-economic considerations. For rural areas, septic tanks or ponds or low-cost sanitation facilities may be provided as per local conditions as an economical option. Some innovative low-cost options may also be explored.

14.3.2 Sewerage and Sanitation Recommendations

- Operationalization of the existing sewerage system and treatment plant in Siaya and Bondo town as well as installation in other towns of the county. It will cover deploying the sewer network, pumping station and treatment facilities.
- Decentralized sewerage treatment facilities are to be provided for each urban centre. Urban areas will be provided with a properly designed sewerage network and waste stabilization pond technology, where the availability of land is not a constraint.
- Rural areas will be provided with small bore sewerage systems and on-site sanitation schemes like septic tanks.
- The treatment plants shall be sited as far as is practicable from the boundaries of the urban area, downwind of the prevailing wind direction. A surrounding tree buffer is desirable both as protection against blows and for environmental purposes. The land requirement for buffer zones for sewer areas is 75m² whereas for unsewered areas is 110 m².
- Each urban area shall have a garbage collection site located on the leeward side of the urban area and have a 100m protection belt.
- Provide toilet facilities at convenient sites in all types of centres, schools, hospitals and parks.
- Sensitize the public on the installation and use of pit latrines in rural areas.

14.3.3 The Reuse of Sewage

A large quantity of sewage will be generated within the urban centres and development corridors and the same can be utilized for various other purposes after providing the required treatment to effluent to bring down its quality within the prescribed standards of the National Environmental Management Authority (NEMA). The exploitation of treated effluent for uses as mentioned below could result in financial savings or even the creation of revenue for Siaya County. The reuse of sewage or treated sewage will help in conserving natural water resources and reduce raw water demand which is already scarce. Probable uses of the treated sewage as considered appropriate are:

- **Irrigation of crops or forests:** This form of reuse has been widely recognized and used internationally. Treated wastewater has fertilizer values as it contains nitrogen and other trace elements such as phosphorous and potassium. However, a disadvantage of this form of reuse is that water for irrigation purposes is not normally required during the rainy season. As an alternative, a bypass arrangement for discharging treated effluent should be made in every treatment facility. Aesthetic elements should also be given due consideration.
- **Groundwater Recharge:** This may be used to supplement underground water by recharging. However, to prevent the clogging of the aquifer, only good quality sewage effluent may be utilized for recharging as many existing water supply schemes are based on groundwater.
- **Fish Farming:** Sewage ponds are used internationally for breeding fish for food. Maturation ponds considered secondary waste stabilization ponds (following primary ponds) can be utilized for farming. However, aesthetic objections from the public to consuming such a form of food production may have to be overcome.
- **Industrial Reuse:** Industrial demand can be met from the treated effluent. However, additional treatment requires to be provided for making the effluent suitable to the need of the water quality requirement of industries. This will lead to a reduction in load on groundwater and surface water sources.

Table 14.6: Sewerage and Sanitation Development Strategy

Issue	Challenge	Strategic objectives	Location/Space	Strategy
Poor sanitation	<ul style="list-style-type: none"> • No operational sewerage systems • Poor solid and liquid waste management • Widespread use of ordinary pit latrines in urban and peri-urban areas <ul style="list-style-type: none"> • Poor maintenance of sanitation infrastructure 	To enhance access to improved sanitation	Countywide Bondo, Siaya, Ugunja, Ukwala, Sega, Usenge, Ndori, Akala, Luanda-Kotieno, Yala, Nyandorera, Sigomere, Nyangueso	<ul style="list-style-type: none"> • To operationalize Bondo and Siaya sewerage systems. • To plan and provide sewerage infrastructure in major urban areas. • Adopt septic tank technology in peri-urban areas not served by conventional sewerage systems. • Adopt Ventilated Improved Pit (VIP) latrines for rural areas. • Public education and sensitization on sanitation. • Enforce public health and planning regulations. • Ensure proper waste management by adopting the 7Rs (Recycle, reuse, reduce, rethink, respect/Recover, refuse and repair). • Provide resource recovery estates/sites • Commercialize waste management in urban areas. • Propose disposal sites per every two sub-counties. • Designate waste disposal sites/landfills. • Generate biogas out of human and other organic waste (pilot in markets and schools).

14.4 ECONOMIC DEVELOPMENT STRATEGY

The National and County Governments have put in place several interventions to promote economic growth in the whole country. These include:

- Formulation of the Strategy for Revitalization of Agriculture (SRA) 2004-2014 that is expected to contribute significantly towards attaining economic recovery strategies.
- The National Food Policy addresses the basic causes of malnutrition and improves food security at the household and national levels.
- Proposed increment in total government expenditure in the agricultural sector (strengthening agricultural research and extension, credit to farmers, the revival of farmers' institutions and control of crop and animal diseases) from 5.6% to almost 7% from 2005-2008.
- Industrial development strategy: industrial incubation centres, agro-processing value addition
- Tapping of mining resources to increase revenue generation
- Blue economy revitalization: fishing resources, sustainable tourism (and ecotourism)
- Expand the role of SME and MSE contribution to the local economy
- Infrastructure development in trading centres (markets): electricity (street lighting, solar powered), water and sanitation, the establishment of stall markets
- Financial enhancement to local traders: credit facilities, revolving funds, banking facilities
- Human resource development in the economic sector: develop entrepreneurial skills, education and health services to enhance participation productive sector
- Resource mobilization strategy: public financing, private financing, and public-private financing
- Focusing on Foreign Direct Investments (FDI) as a driver of investment

14.4.1 Tourism

Tourism planning within a region provides for socioeconomic development, environmental protection and conservation. i) Tourist and Public Recreation: Beach tourism development is contributing to the overall growth of the tourism industry in Kenya. Development on the beach requires careful planning and supervision to ameliorate pressure on the natural environment. The following are planning considerations: The condition of the beach development of harbour should focus on pollution control. No building is permitted within 30 metres (100 feet) of the high-water mark. The foreshore should support fairly dense vegetation to give a natural appearance. Public access: there should be unlimited access to the beach by the general public. The placement of signposts is recommended to guide access points.

i) Encourage the attraction of various classes of resident tourists; medium-cost tourists based on beach cottages or cheaper beach hotels with family cars. Economy tourists: that do have their transport usually accommodated in low-cost hotels. High-cost tourists: they use private jets and planes, cruise ships, and stay longer.

ii) Identify and Map out public recreation spots as potential areas for development. Map out oceans or lakefront beaches or shorelines that have the potential for tourism development. Map out cultural sites: like Rampon'go, Gunda Yiro, Gunda Buche, Got Romogi, Owiny Sigoma).

iii) Game reserves and areas of significant biodiversity should be included while identifying other areas of endangered species, for purposes of protection (preservation) and conservation.

iv) Take cognizance of environmentally fragile/hazardous areas. These are areas with significant biodiversity in flora and fauna. They are of importance to life and development and are under pressure from human activities. Environmentally hazard/risk areas where there

is a danger to humans due to geological instability, hydrological phenomena and sometimes environmental pollution (air, water, land).

v) Promote sustainable county development of these areas, require identification, Mapping and delineation: flood-prone areas are delineated using a high-water mark and creating a buffer zone of a minimum of 10m from the edge. Mass wasteland (landslide areas) with management strategies of soil-water conservation, afforestation and control settlement.

vi) Wetland conservation: areas that are permanently or seasonally flooded by water where plants and animals have adapted for example swamps, areas of marsh, peat land, mountain bogs, banks of impeded drainage or brackish, salt or alkaline.

vii) Tourism planning which is nature-based and referred to as ecotourism is emerging as a strategy to integrate ecological concerns in development for purposes of sustainable development within the County. Counties' diverse natural resources and ecological diversity should therefore prioritize tourism as the key driver for economic development.

Proposed and ongoing projects to revamp tourism in Siaya County

- Construction and equipping of cultural centres.
- Undertake and develop a business and conference tourism initiative.
- Fence Lake Kanyaboli conservation area.
- Develop sports tourism (boat, racing, water skiing, swimming competitions and a floating restaurant

Flagship projects: Development of a Lake Region Tourism Circuit within Siaya County

- Development of high-end hotel and Conference facilities in Siaya County
- Development of Community-Based Tourism activities and attractions at selected sites
- Marketing Initiatives to enhance the visibility of the Lake Region Tourism Circuit;
- Development of Wildlife Conservancies to promote tourism and solve the wildlife-human conflict;
- Establishment of standards for tourism products and services in the Lake Region Tourist Circuit; and
- Development of a road network within Siaya **County** for rural and urban areas targeting unique heritage facilities and sceneries around and within the County.

Potential Impact on Investment in the Tourism Sector

The following are the potential impacts of investment in the tourism sector (Lake Region Economic Block, 2019):

- A 20% increase in tourism demand results in an increase in real GDP of 0.1%;
- A 10% increase in tourist expenditure can lead to a 0.3% increase in rural household consumption and a 0.02% increase in welfare;
- 10% increase in tourism results in an increase in the domestic consumption of agricultural commodities; tourism growth in Kenya is pro-agriculture;
- Economic activity created by tourism expansion increases real wage rates by 0.8%;
- Inbound tourism increases the output of agricultural products, decreases its prices and increases employment. (Njoya);
- Tourism can serve as a powerful incentive to protect natural resources (UNEP, 2011);
- Tourism generates revenue to support the conservation and management of natural environments (UNEP, 2011); and
- Tourism has larger multiplier effects, with revenue spreading from hotel accommodation, food and beverages, shopping, entertainment and transport to the income of hotel staff, taxi operators, shopkeepers and suppliers of goods and services (UNEP, 2011).

Table 14.7: Key Issues in Tourism Development Sector and Strategies for Intervention

Planning Issue	Description of Issue	Objective	Where	Strategies
Poor access to tourist attraction sites	Poor road network	To enhance accessibility to tourist attraction sites	Olua Sacred Trees, Holy Got Adodi, Bullock of Got, Podhe, Rambugu hills, Got Ramogi, Jaramogi Oginga Odinga Mausoleum, Achieng' Onoko Mausoleum, Mageta Island, Odera Akang'o office and cells in Yala, Sare, Nyamboyo, Oyamo, Mageta. Ndeda, Magare and Sihuh.	Make all sites accessible to weather roads.
Untapped potential for tourism	Unattractive tourist circuit	To establish an attractive tourist circuit that makes Siaya County a destination of choice	As above	Ensure that proper planning is undertaken
	Revamping the tourism sector	To develop and improve products, mini-circuits and source markets within a sustainability framework and ensure the maintenance of standards	As above	Create awareness of the benefits of tourism
	Unattractive tourist facilities	To refurbish hotels and other accommodation facilities	As above	Active involvement of members of the community in developments
	Poor marketing to attract domestic tourists	To promote domestic tourism	As above	Provide incentives and establish an information dissemination system to alert domestic tourists of attractions, promotions and deals
	Poor service provision	To provide skilled labour to establish excellent service delivery dependent on informed policies, clear tourism development plans, supportive legislation and regulatory framework.	As above	Training of personnel
Unmapped tourist attraction sites	Poor planning and management as a result of encroachment	To Map out cultural sites	As above	Mapping of sites
		To identify and map out public recreation spots as potential areas for development.	All formal public recreation sites	Mapping of sites

Planning Issue	Description of Issue	Objective	Where	Strategies
		Map out lakefront beaches or shorelines that have the potential for tourism development.	All beaches and shorelines along Lake Victoria	Mapping of sites

14.4.2 Fishing

The policy objective to increase fish production, marketing and processing focuses on improving and strengthening fishing research, seed and feed production and extension services. Fish farming needs to be enhanced and fisheries infrastructure needs to be developed. The policy concerns are management, conservation, control, utilization of fishery resources, promotion of aquaculture development to supplement fish marketing systems and sustainable management of fishery resources.

Table 14.8: Key Issues in Fishing Sector and Strategies for Intervention

Planning Issue	Description of Issue	Objective	Where	Strategies
Declining fish stock	Overfishing	To increase fish production	Whole county	Strengthen fishing research Encourage the use of fish cages through education to farmers
Utilization of fishing resources	Underutilization of fishing resources	To identify, manage and conserve fish breeding grounds and resources	Whole county	Identify suitable sites for fish breeding

14.4.3 Agriculture and Rural Development

Table 14.9: Key Issues in Agriculture and Rural Development Sector and Strategies for Intervention

Planning Issue	Description of Issue	Objective	Where	Strategies
Small farm holdings and the resulting limited benefits of economies of scale	<ul style="list-style-type: none"> Constrained mechanized agriculture Low management skills for commercial matters 	To increase food security	Whole county	Set minimum farm holdings for mechanized agriculture
Declining soil fertility	<ul style="list-style-type: none"> Reduced productivity 	To increase food production	All agro-ecological zones	<ul style="list-style-type: none"> Encourage the use of farm yard manure and fertilizers Erect gabions to arrest soil erosion
Declined cotton production	<ul style="list-style-type: none"> Collapsed cotton and textile industry 	To revamp the cotton industries	Aboke, Alego Usonga, Siranga	<ul style="list-style-type: none"> Revamp the cotton industries Sensitize farmers on cotton production
Decrease in food security	<ul style="list-style-type: none"> Over-reliance on rain-fed agriculture Unreliable rainfall Poor crop husbandry Use of local seeds and low usage of fertilizer and manure Use of traditional 	To increase food security	Whole county	<ul style="list-style-type: none"> Encourage the use of irrigation Training on modern farming and livestock-keeping practices

Planning Issue	Description of Issue	Objective	Where	Strategies
	livestock breeds <ul style="list-style-type: none"> • High crop and livestock diseases 			
Inadequate extension services	<ul style="list-style-type: none"> • High farmer-to-staff ratio • Extension personnel lack access to emerging knowledge on modern farming practices 	To educate extension workers on modern farming practices	Whole county	<ul style="list-style-type: none"> • Train farmers on emerging knowledge of modern farming practices
Poor market access	<ul style="list-style-type: none"> • Poor infrastructure • Low productivity 	To ensure access to accurate and timely market information	Whole county	<ul style="list-style-type: none"> • Make all production and marketing areas accessible to weather roads.
Poor quality of livestock and high incidence of tick-borne disease	<ul style="list-style-type: none"> • Poor animal husbandry • High cost of good quality dairy cattle not affordable to farmers 	To educate farmers on modern dairy farming practices	Whole county	<ul style="list-style-type: none"> • Train farmers on emerging knowledge of modern livestock practices
Declined sugarcane production	<ul style="list-style-type: none"> • Lack of extension services • poor road infrastructure • high cost of fertilizers and quality seed cane • long distance to sugar factories. high transportation costs • low productivity 	To ensure a conducive environment for sugarcane production	Proposed sugar zones in the County	<ul style="list-style-type: none"> • establish sugar factory • train farmers on modern knowledge of cane farming • improve road infrastructure • agricultural incentives to farmers

14.4.4 Mining

This activity also generates income for several households. This venture is however unregulated and, in most cases, results in land degradation. Gold has been mined in the county for considerable time on a substance basis in shallow excavations in Bondo, Siaya, Rarieda, Ugunja and Gem sub-counties. A study by Lake Basin Development Authority has shown that the whole of the Lake Victoria Basin region of which Siaya County is included, has some minerals, precious stones and rare earth elements. The best-known mineral in the county is gold. Other minerals include fluorite which occurs as a thin vein near Rata within the larger Asembo, granite and black sand from Yala Valley which has weak radioactive quality, mining in Kogelo, and sand harvesting along the beaches and river Nzoia.

Table 14.10: Key Issues in Mining Sector and Strategies for Intervention

Planning Issue	Description of Issue	Objective	Where	Strategies
Unregulated sand mining	Haphazard location of sand mining sites	To ensure sustainable sand mining in the county	Along the beaches and river Nzoia	Ensure EIA is carried out at all mining sites and licenses issued

Planning Issue	Description of Issue	Objective	Where	Strategies
Crude methods of mining	Unsustainable exploitation of mineral resources	To devise sustainable mining methods	Gold (Wagusu) and Kogelo Fluorite (Rata) Granite and black and from Yala Valley	Experts (Geologists) to be invited to train the community on current mining technology
Poor access to mining sites	Poor road conditions	To enhance accessibility to mining sites	Wagusu, Kogelo, Rata, Yala valley	Make all sites accessible to weather roads.

14.4.5 Industrialization

There is a need to develop cottage industries at various locations in Siaya County. Some of the available opportunities for industrial development include fish processing industries at Wagusu, Usigu, Usenge, Luanda Kotieno, Misoro and Asembo Bay. All these are beach landing points that should be supported with fish processing infrastructure/plants. Many of the available opportunities are accessible at Bondo and Rarieda sub-counties.

Other parts of the sub-county like Ugenya are best placed to undertake Agro based enterprises in honey, grain, groundnut and peanut butter processing. Value chain addition in agriculturally based products would complement earnings for the residents. Areas on target extend to East Ugenya, West Ugenya, North Ugenya and Ukwala wards which are potential for Agro-based industrial development. Brewery industrial plants are suited in Ugenya at Ukwala or Sihay. Sunflower oil production in Gen Sub County should also be intensified.

There is an opportunity for sugarcane industries at Yala Wetland in Alego Usonga Sub County. There is also potential for sugarcane production at Yala in Gem Sub County. Other potential areas include Uholo in East Ugenya. Ginnery and textile have potential at Ndere in Alego Usonga.

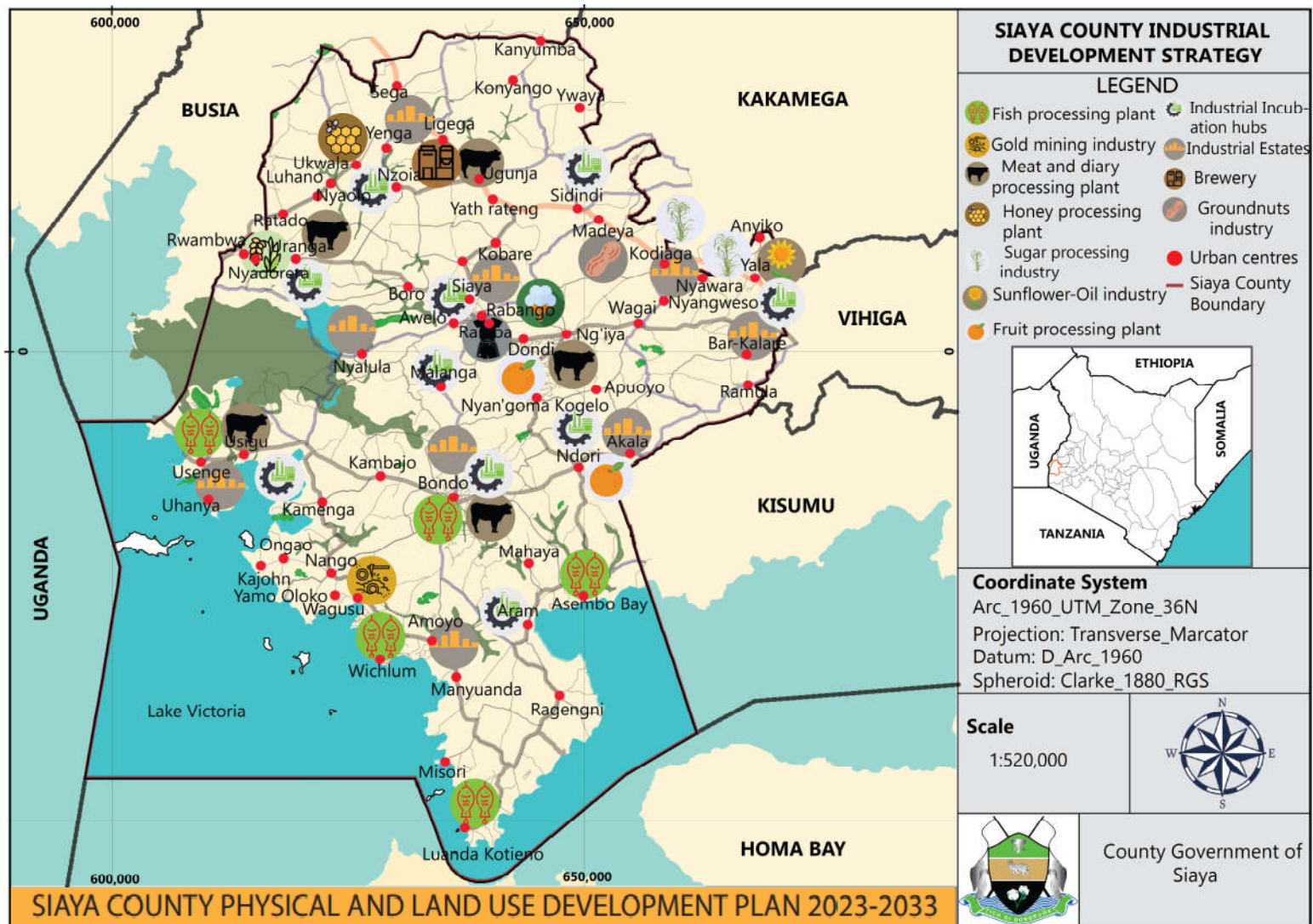
14.4.5.1 Industrial Development Strategy

To promote and accelerate sustainable industrial development in Siaya County, the vision is to “establish a modern industrialized county.” The following objectives are recommended to promote “Sustainable Industrial Development” in Siaya County:

- Successful industrial diversification and upgrading based on both agriculture modernization and higher value-addition and introduction of new technology in industries
- Promotion of gradual integration into regional production network and global value-chain
- Development of high-skilled human resources and creation of more employment opportunities with quality jobs through industrialization
- Reduction of rural poverty and disparities between rural and urban areas by promoting industrial production with value-addition by rural areas

To achieve the above strategies, the county shall establish industries such as the fishing processing industry (Bondo, Usenge, Wichlum, and Luanda K’Otieno), Sugar

processing industry (Uholo, Yala), mining industry (Gold- Wagusu), groundnut industry (Diego), fruit/ juice processing Industries (Akala and Ting'wang'i), honey processing plant (Ukwala), meat processing industry (Usenge, Bondo, Siaya, and Ugunja), rice milling plant (Nyadorera), oil processing plant (Sunflower-Gem), cotton and textile industry (Siaya) and a brewery in Ugunja



Map 14.2: Proposed Industrial Development Strategy

Table 14. 7: Key Issues in Industrial Development Sector and Strategies for Intervention

Planning Issue	Description of Issue	Objective	Where	Strategies
Inadequate land for industrial use	<ul style="list-style-type: none"> • Inadequate industries • Hindrance in the growth of industries 	<ul style="list-style-type: none"> • To revamp industrial activities 	Siaya, Aram, Bondo, Ugunja, Yala, Ukwala, Usenge	<ul style="list-style-type: none"> • Demarcate more land for industrial use in all core urban centres • To develop processing industries for both livestock products and by-products
Small farm holdings	<ul style="list-style-type: none"> • Constrained mechanized agriculture 	<ul style="list-style-type: none"> • Increase food security 	All county	<ul style="list-style-type: none"> • Set minimum farm holdings for mechanized agriculture
The collapse of cotton industries	<ul style="list-style-type: none"> • Inadequate incentives for cotton farmers • Importation of second-hand clothes 	<ul style="list-style-type: none"> • To revamp the collapsed cotton industries 	Alego Usonga	<ul style="list-style-type: none"> • Provide incentives to farmers
Collapse of sugarcane industries	<ul style="list-style-type: none"> • Inadequate incentives for sugarcane farmers 	<ul style="list-style-type: none"> • To revamp the collapsed sugarcane industries 		<ul style="list-style-type: none"> • Provide incentives to farmers
Unregulated sand mining	<ul style="list-style-type: none"> • Haphazard location of sand mining sites 	<ul style="list-style-type: none"> • To ensure sustainable sand mining in the county 	Along the beaches and river Nzoia	<ul style="list-style-type: none"> • Ensure EIA is carried out at all mining sites and licenses issued
Crude methods of mining	<ul style="list-style-type: none"> • Unsustainable exploitation of mineral resources 	<ul style="list-style-type: none"> • To devise sustainable mining methods 	<ul style="list-style-type: none"> • Gold (Wagusu) and Kogelo • Fluorite (Rata) • Granite and black sand from Yala Valley 	<ul style="list-style-type: none"> • Experts (Geologists) to be invited to train the community on current mining technology
Poor access to mining sites	<ul style="list-style-type: none"> • Poor road conditions 	<ul style="list-style-type: none"> • To enhance accessibility to mining sites 	<ul style="list-style-type: none"> • Wagusu, Kogelo, Rata, Yala Valley 	<ul style="list-style-type: none"> • Make all sites accessible to weather roads.
Lack of an industrial park	<ul style="list-style-type: none"> • Low investments in the county 	<ul style="list-style-type: none"> • To acquire land for industrial parks 	<ul style="list-style-type: none"> • All sub-counties 	<ul style="list-style-type: none"> • Prepare urban plans for citing industrial parks

14.5 HUMAN SETTLEMENTS DEVELOPMENT STRATEGY

Siaya County continues to grow as more people make the urban areas their home, attracted by proximity to work opportunities, lifestyle, culture, and high-quality services. Currently, the county is accommodating approximately 950,000 inhabitants, of which the majority (80%) live in rural areas, while the rest (20%) live in urban and peri-urban areas. 1/5 of the total population lives in Siaya, Bondo, Usenge, Yala, Ugunja and other small urban centres in Siaya County, most of which are not responding to demands for expansion of housing, education, employment, causing a general devolvement of the services' quality. In this direction, the drafting of the county and urban development policies must rationally and functionally plan for these towns by assigning them functionalities, while establishing a sustainable growth strategy for the next 10 years. This implies the need for:

- Maximum protection of land by densifying existing housing areas in the urban areas, and new housing spaces should be assigned only when this is impossible.
- Protection of agricultural land by concentrating human settlements in the specified growth corridors and urban areas.
- Provision of technical and social infrastructure, and sufficient services depending on the specific urban functionality and growth corridor.
- Promoting equitable distribution, providing unique living conditions for the urban growth centres and corridors, offering subsidies for an accelerated economic development in under-developed areas, and thus creating an attractive and sufficing environment.
- Ensuring access to quality infrastructure and services to the inhabitants.

14.5.1 Purpose of Human Settlement Development Framework

The overall objective of the human settlement strategy is to improve the social, economic and environmental quality of settlements and the living and working environments of all people in the urban and rural areas of Siaya County. This is meant to achieve sustainable urban and rural development by achieving a balanced growth in all spatial units namely Sub-counties and Wards as well as enhance County Physical and Land Use Development Planning decisions that relate to urban growth, land use, housing, and transport, guarantee equitable distribution of infrastructure and services, and ensure optimal utilization of land as a scarce resource in the county. The specific objectives are to:

- Direct new growth to suitable areas to maintain sustainable growth of the county.
- Ensure development occurs close to employment, services, and transport links. This is to encourage active modes and accessibility and reduce pressure on resources and infrastructure. The expectation is that the newest developments will occur along the proposed growth poles and corridors of the county.
- Ensure county growth contributes to the urban and rural areas' economic, social and environmental success.

14.5.2 Policies for Human Development Framework

The human settlement strategy is anchored on the following global and national legal frameworks:

Sustainable Development Goals 2015: Goal eleven (11): Make cities and human settlements inclusive, safe, resilient and sustainable. The target for 2030 is to ensure access to safe and affordable housing. The indicator that aims to measure progress toward this target is the proportion of the urban population living in slums or informal settlements. Movement from rural to urban areas has accelerated as the population has grown and better housing alternatives are available.

The Urban Areas and Cities Act 2011: The Act classifies urban areas as cities, municipalities and towns. These urban areas are differentiated largely in terms of population and minimally in terms of capacity. The majority of the Act is dedicated to providing criteria for distinguishing the classifications of urban areas and cities and establishing the principles and structures for governance and management of urban areas.

The Physical and Land Use Planning Act No. 13 of 2019: Analysis of human settlements should include distribution of services, growth and pattern of urbanization, cause of primary, and rural-urban migration; provide for alternative development patterns including rural development, urban development, and interrelations between urbanization, between urban and rural development Strategies for human settlement in the area including development of service centres, growth centres, transport and communication network and rural development; and implementation to be based on a sectoral approach to development and measures for implementation and coordination in these sectors, namely industrial development, housing, transportation, health services, education, water supply, sewerage and electricity.

Sessional Paper No. 1 of 2017 on National Land Use Policy: The overall goal of the national land use policy is to provide legal, administrative, institutional and technological framework for optimal utilization and productivity of land and land-related resources in a the sustainable and desirable manner at the National, County and local level. Specifically, the policy offers a framework of recommendations and principles designed to ensure the maintenance of a land use system that will provide for: Land-use planning, resource allocation and resource management for sustainable development to promote public good and general welfare; environmental management and sustainable production initiatives in the utilization of land resources; coordination and integration of institutional linkages in planning at sectoral and cross sectoral levels to foster collaboration and decision making among different land users; optimum utilization of land resources to meet governance, social economic, political and cultural obligations of the people of Kenya; anchoring land development initiatives that will respond positively to the market demands; Integrated framework for the preparation of a National County Physical and Land Use Development Plan and review of various land use plans; mainstreaming of gender and special interest groups in land use planning and management; a comprehensive, efficient and affordable computer based land use information management system; an appropriate, accountable and democratic institution for land use conflicts resolution; and mitigating problems associated with poor land use.

14.5.3 What the Framework Covers

This framework provides a series of methods and actions to achieve the objectives discussed above and proactively manage growth. Growth creates a demand for appropriately located and available land to provide for the expansion of infrastructure and services. Assigning functionalities to growth areas creates an increase in demand for services. Planning for this growth, and associated infrastructure, ultimately provides the County Government of Siaya with the opportunity to direct how and where growth is accommodated and provided for, and manage the effects and costs of it.

14.5.4 Principles for Human Development

These principles underpin this framework and outline the qualities to be achieved in Siaya County. They are the key objectives for achieving this strategy and represent areas the map community may not wish to compromise on. These principles, and the implications of applying them, are provided in the table below.

Table 14.8: Principles and Implications for Human Settlement Development

Principles	Implications of application
Plan for high-quality urban growth and consolidated developments.	This implies that future growth and development will have higher densities to stimulate the relationships of workforce density, economic productivity and public transport. It also means that within the higher density-built fabric, there are more housing options like townhouses, attached housing and apartments. Urban consolidation on the other hand implies setting urban edges to control human development.
Focus growth in existing communities that have the capacity for expansion.	Encourage infill development in the urban areas and transportation routes of the county. Ideally, growth will be focused on existing social infrastructure to increase the thresholds of the existing and other facilities.
Plan for quality amenities in the growth centres and corridors	Structure planning for new areas will have to meet specific criteria set out in the Urban Areas and Cities Act of 2011 and physical planning regulations. New development areas will need to fit in with the rest of the urban areas rather than being isolated on their own. Good connectivity implies a high-quality urban environment with increased densities along transport corridors.
Achieve quality environments, places and spaces.	Growth and development within the urban growth areas and corridors will ensure that indigenous biodiversity is maintained and enhanced. Public spaces and recreational facilities will respond to the community's needs.
Plan for mixed-use development in suitable locations.	Mixed land uses and higher development intensity can increase land value without a corresponding increase in the cost of infrastructure and services. Mixed uses can also provide greater choice, in terms of access to destinations for residents and create conditions for clusters of different economic activities to be located close together.
Encourage economic and ecotourism development.	The County government must support a proactive role in the economic development of the county. This may mean that the CoG facilitates groups to work together on different issues or sets up public-private partnerships. The CoG proactively create urban environments which attract economic and ecotourism development.
Encourage community collaboration in urban growth decisions.	The CoG should always collaboratively consult with different stakeholders before making final decisions. Development decisions will be based on the stipulated growth strategies of this plan.
Protect and enhance green open space, outstanding landscapes and areas of cultural, ecological, historic and environmental significance.	In expanding some areas, the CoG may need to weigh up the need to protect high-quality versatile soils, and sites of ecological value or other environmentally significant areas. In expanding some areas, the CoG will need to consider how a larger population will impact the natural resources, like access to Lake Victoria, the beaches, Rivers, Wetlands, and Got Ramogi hills among other valuable sites of the County.
Implement best practices and integrated planning.	The CoG will need to work in a more collaborative way to establish effective partnerships.
Consider natural hazards.	Natural hazards and flood risk areas pose a significant constraint to growth for the growth areas and corridors. In the long term, the CoG may need to consider actively encouraging population growth away from natural hazard environments in the County. Flood risk areas will have to be managed and re-mediated before infrastructural development occurs.

14.5.5 Proposed Growth Areas and Functionalities

Following the determination of responsibility and importance of each settlement, and its position within Siaya County, spatial development proposals are hereby provided to fulfil the criteria which characterize all settlements as such.

14.5.5.1 County Growth Centres

These are centres with potential for urban and industrial growth as well as have the capability to induce growth in larger centres that offer one or more specialized growth functions and

which can accommodate major redistribution of the population. The proposed centres include Siaya, Bondo and Usenge towns. These are the largest centres of the county in which 20-40,000 inhabitants or 5% of the whole population of Siaya live. The selection of these towns was based on the following characteristics: Core administrative functions; Higher level infrastructure; Secondary and tertiary activities; Strong industrial base; and the existence of Specialized facilities.

a. Core functions of selected urban area

- ***Siaya Municipality:*** Shall be developed as a hub for Governance, Commerce, Education, Medicine, Sports, Transportation, and Eco-tourism. This strengthens the position of Siaya town, as a County headquarter, and is of functional service to all other centres in the County, as well as strengthens its position as a key administrative centre, in which all county governance institutions reside.
- ***Bondo Municipality:*** Shall be developed as a hub for Education, Fishing Industries, Commerce, Governance, Medicine and Eco-tourism. This will enhance the development of Bondo town in the region, tending to achieve the level of national and regional towns, creating a functional and efficient transport system; improved infrastructure for educational, industry and ecotourism development.
- ***Usenge town:*** Shall be developed as a Fishing zone in its Beaches, Eco-tourism, Commercial, Governance, and Medicine. This will promote ecotourism and the fishing industry development of the town.

b. Strategic Issues in developing growth centres

- Urban regeneration must be considered as a means for solving economic and social problems, and for the improvement of built spaces in unplanned areas.
- Define precise boundaries (urban edges) of the centres.
- Superior functions in health care and education must not be exclusive to urban centres, it is recommended that several units – faculties and clinics must be given space in other centres, in the manner of helping migration and commuting fluxes, and also concentration in major urban centres.

c. Spatial Requirements for growth centres

Proposed growth centres shall be entitled to the following spatial requirements: Planning and development control, traffic control and parking, water and sanitation, street lighting, outdoor advertising, cemeteries & crematoria, public transport, libraries, storm drainage, ambulance services, health facilities, firefighting and disaster management, control of drugs, sports and cultural activities, electricity and gas reticulation, abattoirs, refuse collection, solid waste management, child care facilities, pre-primary education, local distributor roads, conference facilities, community centres, five star hotel, guest houses, referral hospital, county hospital, university, constituent university campuses, polytechnic, training institution, national school or a county school, stadium, airport, airstrip, theatre, library service administrative seat, financial hub, museum, historical monument, fire station, emergency 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, and religious institutions.

14.5.5.2 Sub-County Growth Centres

These centres shall serve the administrative functions of the sub-counties. The selection of these towns was based on the increasing socio-economic activities, designed with specialized facilities and higher-level infrastructure. Towns under this category include Bondo, Siaya, Yala, Ugunja, Ukwala, and Rarieda.

Spatial requirements: 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, health facilities, firefighting 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.

14.5.5.3 Urban Centres

First-tier urban centres: These towns are planned to decongest the sub-county centres and developments in the surrounding regions. They shall be designed with specialized facilities and planned as special packages with a focus on development. The towns and their functionalities are shown below (Table 14.2).

Table 14.9: Proposed First Tier Urban Centres and their Functionalities

Urban Centre	Functionality
Usenge town	Fishing, Transport, Ecotourism, Commercial
Ugunja Municipality	Fishing, Transport, Commercial
Yala Town	Transport, Education, Governance, Industrial, Communications
Ukwala Town	Commercial
Nyadorera Market	Commercial, Transport
Luanda K'Otieno	Commercial, Fishing
Ndori, Akala, Sega Towns	Commercial, Transport

Spatial requirements: Street lighting, cemeteries and crematoria, libraries, health 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 monument, postal services, regional radio station, community radio, funeral Parlour, cemetery, recreational parks, management of markets, marine waterfront, animal control and welfare, religious institution.

Second-tier urban centres: They serve as intermediary towns which shall play the role of promoting rural development to achieve a balanced distribution of growth and development. This shall provide functional linkages between the first-tier urban centres and the growth centres. To promote an equitable share of resources and development, each ward shall have a growth centre.

These centres shall include Sidundo, Boro, Kobare, Mwer, Nyangoma, Aboke, Sihayi, Sega, Sigomere, Sididi, Kodiaga, Nyangueso, Apuoyo, Bar-Kalare, Nango, Bar-Chando, Wich Lum, Kapuoyo, Usigu, Uhanya, Asembo Bay, Mahaya, Ragegni, Ndigwa, and Misori. Therefore, these towns shall be provided with basic infrastructure and services such as street lighting, health facility, abattoirs, sports/cultural centres, refuse collection, solid waste management, child care facilities, pre-primary education, community centre, homestays, unclassified roads, postal services, cemetery, recreational parks, management markets, marine water, marine waterfront, animal control and welfare.

14.5.5.4 Market Centres

This includes small towns having linkages with immediate rural hinterlands. They serve as higher-order villages having central locations and potential for development within their catchment area, with relatively better services, and facilities in terms of education, health, communication, accessibility, growing socio-economic activities, and having the capacity to serve a group of basic villages. These towns include Nyadorera, Sega, Yala, Aram, Akala, Luanda Kotieno, Sigomere, Sidindi, Aboke, Usenge, Ndori, Ngiya, Kogelo, Ragegni, Wich Lum, Wagusu, Yenga, Misori, Aram, Usigu, Ngiya, Boro, and Mandiany. Facilities and services to be provided in these towns shall include: Street lighting, health facility, abattoirs, sports/cultural centres, refuse collection, solid waste management, child care facilities, pre-primary education, community centre, homestays, unclassified roads, postal services, cemetery, recreational parks, management markets, marine water, marine waterfront, animal control and welfare

14.5.5.5 Rural Centres

These centres shall cater for the rural hinterland as agro-service centres in the collection and distribution of agricultural goods and services with processing, marketing, warehousing and storage facilities. They shall be the lowest settlements for housing development as village hamlets with the core function of household shopping and shall have facilities such as street lighting, community/village health centres, sports/cultural centres, child care facility, pre-primary education, community centre, homestays, unclassified roads, cemetery, religious. Centres under this category include Sidundo, Bar Okwako, Lukhano, Nyaola, Rabango, Obet, Awelo, Ngiya, Sidindi, Rwabwa, Nango, Nyalula, Manyuanda, Mahaya, Ratado, Ligega, Kabare, Amoyo, Liganwa, Ndigwa, Wagai, and Sikalame.

14.5.5.6 Local Centres

This comprises of main village settlements which are predominantly agricultural with a lowest threshold shopping centre. These centres shall be provided with services such as nursery schools, community cemeteries, religious institutions, stall markets, floodlights, access roads, and electricity.

Table 14.10: Proposed Hierarchy and Size of Human Settlements

Settlement Hierarchy	Settlements/ Town	Selection criteria	Proposed Land size
Growth Centres	Siaya, Bondo, Usenge	<ul style="list-style-type: none"> • Administrative functions / County headquarters • Higher level infrastructure • Secondary and tertiary activities • Strong industrial base • Specialized facilities 	Maximum Radius 7Km Radius, and 44 sq. km (4400 ha)
Sub-County centres	Bondo, Siaya, Yala, Ukwala, Ugunja, Rarieda	<ul style="list-style-type: none"> • Host sub-county headquarters. • Increasing socio-economic activities designed with specialized facilities • Planned to decongest growth centres • Higher level infrastructure 	Maximum Radius 5Km Radius; 31.43 sq. km (3143 ha)
Urban Centres: <i>First tier</i>	Nyadorera, Luanda Kotieno, Akala, Sega	<ul style="list-style-type: none"> • Planned to decongest sub-county centres and developments in the surrounding regions, designed with specialized facilities. • To be planned as special packages 	Maximum Radius 3Km Radius; 18.86 sq.

		and special focus for development.	km (1866 ha)
Urban Centres: <i>Second tier</i>	Boro, Kobare, Nyangoma, Aboke, Sihayi, Ndori, Sigomere, Sididi, Kodiaga, Nyangueso, Apuoyo, Kabare, Bar-Kalare, Nango, Bar-Chando, Wich Lum, Kapuoyo, Usigu, Uhanya, Asembo Bay, Mahaya, Ragegni, Ndigwa, Misori	<ul style="list-style-type: none"> • Intermediary towns planned to decongest first-tier urban centres • An important role in promoting rural development and in achieving a balanced distribution of urban population. • Provide functional linkages between the smaller towns and the County Core Centres: Location advantage; centrality. 	Maximum 1 (One) Km Radius, 6.29 sq. km (629 hectares)
Market Centres	Aram, Aboke, Ragegni, Wich Lumu, Wagusu, Yenga, Misori, Aram, Usigu, Ngiya, Boro, Mandiany	<ul style="list-style-type: none"> • The small town has linkages with immediate rural hinterlands. • Is the higher-order village have a central location and potential for development within its catchment area, with relatively better services and facilities in terms of education, health, communication, accessibility and the capacity to serve a group of Basic villages? • Has increasing socio-economic activities 	Maximum Radius 0.5 KM; 3.14sq.km (314 ha)
Rural and Local Centres	Sidundo, Bar Okwako, Lukhano, Nyaola, Rabango, Obet, Awelo, Rwabwa, Nango, Nyalula, Manyuanda, Mahaya, Ratado, Ligega, Kabare, Amoyo, Liganwa, Ndigwa, Wagai, Sigalame, Bar-Kalare, Yamo Oloko, Ramba, Ongao, Nyawara, Malanga, Kambajo, Kajohn, Yath Rateng, Rwamba, Kamenga,	<ul style="list-style-type: none"> • Would cater to the rural hinterland as an agro-service centre in the collection and distribution of agricultural goods and services with processing, marketing, warehousing and storage facilities. • Main Settlement • Agricultural areas 	

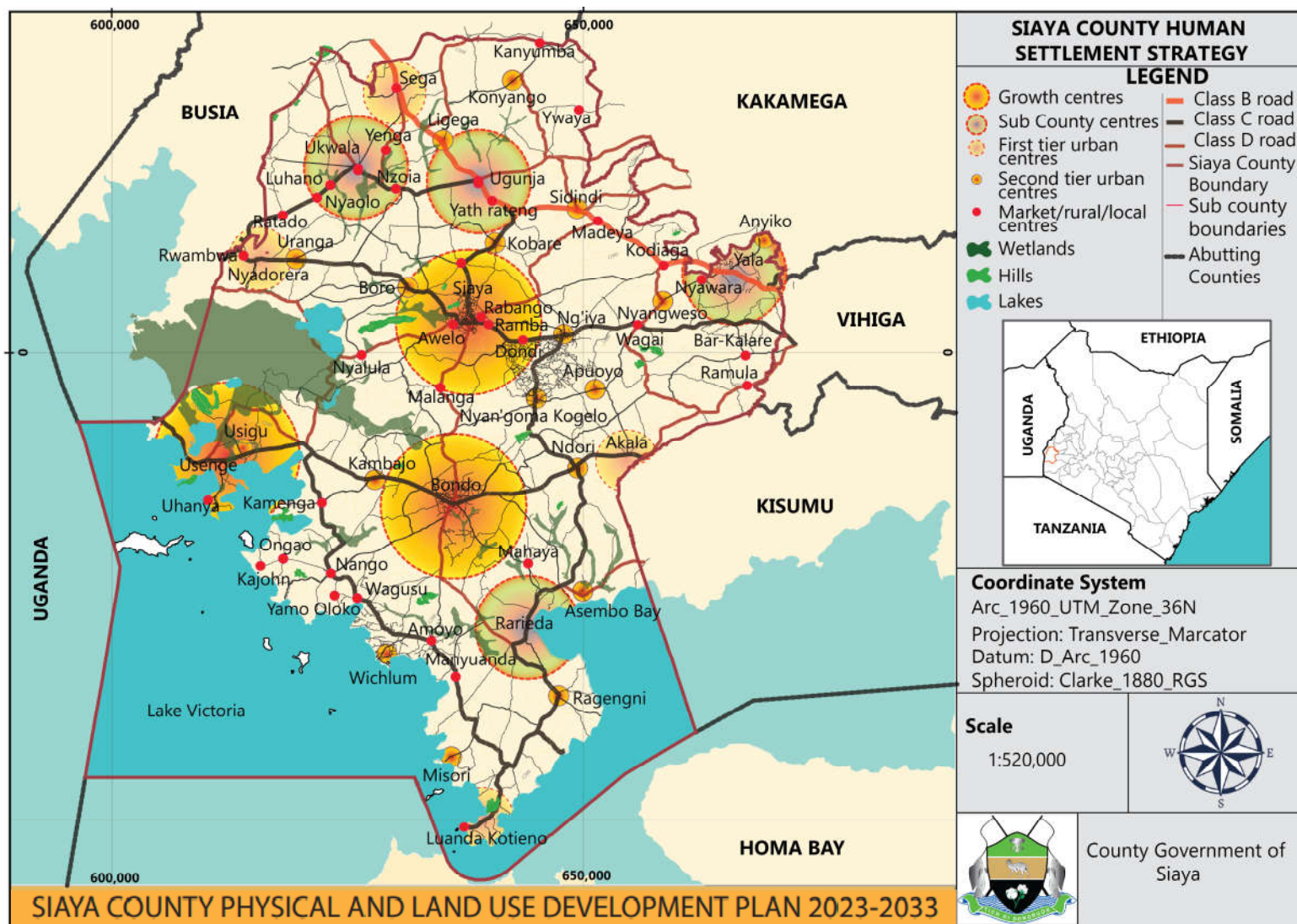
14.5.6 Criteria for Delineating Urban Edges

An urban edge is defined as the line around an urban area which serves as a growth boundary. The urban edge marks the transition between rural and urban land uses other than agriculture and the rural, predominantly agricultural, conservation and nature areas. They are intended to include an adequate supply of land that can be efficiently provided with urban services such as roads, sewers, water, stormwater systems, streetlights and other related infrastructure to accommodate the expected growth of the urban area for a defined period. By providing land for urban uses within the urban edge (growth boundary), the rural area can be protected for urban growth. The process for drafting guidelines about the establishment and management of urban edges should observe key elements such as:

- i) The assessment of the impact of urban growth on the town's physical, biophysical and socio-economic environment
- ii) An analysis of the grounds of urban expansion and direction of growth
- iii) Formulation of strategies to mitigate urban growth impacts through the establishment and management of urban edges or growth boundaries.
- iv) Delineation of Urban edges in the County's towns would help in attaining a balanced and mutually reinforcing system of central places and bringing a series of necessary functions

to the actual reach of the urban and rural population. To achieve this, the following guidelines are proposed: -

- a. Develop a settlement pattern for Siaya and other towns of the County to promote growth within their carrying capacity
- b. Assign dominant functionalities for the towns within the County and determine their sizes based on urban population share. Development of sub-regional centres (small and medium towns) to support socioeconomic development in their rural hinterland by providing access services.



Map 14.3: Human Settlements Development Strategy

14.5.7 Proposed Growth Corridors

The Growth Corridor provides a strategy for the development of Siaya County's growth human settlements for the next 10 years. This will guide the delivery of key housing, employment and transport infrastructure and provide a clear strategy for the development of the growth corridors. The plans also identify broad transport networks, industrial and employment zones, residential areas and recreation precincts. These corridors are: -

14.5.6.1 Regional Corridors

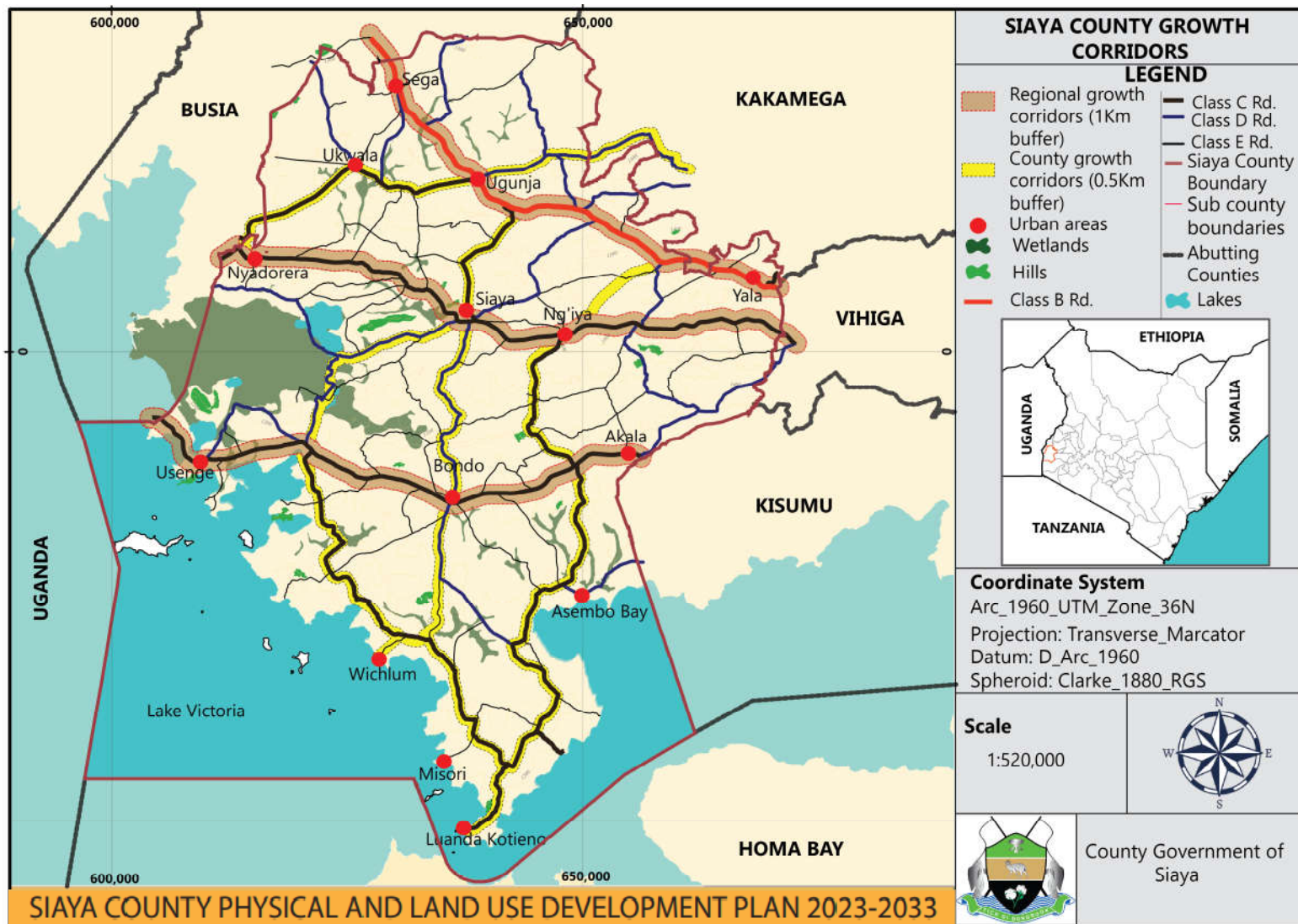
These corridors will play a significant role in enhancing regional connection and economic development. A buffer radius of 1KM is proposed for the regional growth corridors. These corridors include:

- i) **Usenge-Bondo- Kisumu corridor:** Growth drivers in this corridor includes education facilities (JOUST, KMTC, Technical colleges, National Schools) fishing and ecotourism, direct connection to Kisumu city and the administrative functions of Bondo and Usenge town.
- ii) **Nyadorera-Siaya-Kisumu Corridor:** Regional connection-direct connection to Kisumu County, strong governance (County Headquarters in Siaya town) and ecotourism activities.
- iii) **Busia-Ugunja-Yala-Kisumu corridor:** Regional connection to Kisumu County, Busia County and Uganda, governance and ecotourism.

14.5.6.2 County Growth Corridors

The corridors will play a significant role in enhancing County, Sub County, and Ward to village connections to promote economic growth and development in respective areas. A buffer radius of 500m is proposed along the County growth corridors

- i) **Luanda Kotieno-Bondo-Siaya corridor:** The drivers of growth and development in this corridor include: educational facilities - JOUST, proposed Barack Obama University, KMTCs, technical colleges, national schools, fishing and ecotourism, strong governance, and a strong political history (Jaramogi, Obama).
- ii) **Nyandorera-Ukwala-Ugunja Corridor:** This corridor shall develop as a result of ecotourism activities and the influence of the Busia-Ugunja- Kisumu corridor.
- iii) **Siaya-Kamenga-Luanda K'otieno Corridor:** Development and growth of this corridor shall be influenced by ecotourism and fishing in Lake Victoria, the influence from Usenge-Bondo- Kisumu corridor, and the influence of the proposed ring road along Lake Victoria.
- iv) **Bondo-Amoyo-Wichlum Corridor:** Growth stimulus in this corridor shall be as a result of ecotourism and fishing in Lake Victoria, influence from Usenge-Bondo-- Kisumu corridor and tertiary education institutions.
- v) **Kodiaga- Ng'iya-Ndori-Asembo-Luanda Kotieno corridor:** Growth in this corridor is stimulated by ecotourism and fishing activities in Lake Victoria and influence from Usenge-Bondo- Kisumu corridor.



Map 14.4: Siaya County Proposed Growth Corridors

14.5.8 Proposed Developmental Guidelines for Rural Settlements

Transformation of the rural sector requires policy reforms in several key areas including agriculture and food security, access to input and commodity markets, industrialization, small and microenterprises, and regional and global markets. Discussed below are strategies for the development of rural areas of Siaya County.

Rural Connectivity: Rural Roads accelerate economic growth and poverty alleviation in the villages. Therefore, Rural Road connectivity programmes should be taken to provide connectivity using properly laid all-weather surfaced roads.

Access to Market: Markets are important in the livelihood strategy and serve as engines for the growth of rural areas. This plan proposes the following strategies to enhance access to markets: Establishment of commercially oriented producer organizations (groups, associations, cooperatives); Helping and training producers to identify new markets; Linking farmers with traders and processors; constructing and improving rural roads; Building market information systems

Housing: The lack of affordable housing is one of the most critical issues facing rural communities in Siaya County, in Kenya and the entire world. This plan proposes an integrated approach to rural housing and improvement. Some of the approaches include A scheme to provide shelter for the rural poor living below the poverty line (BPL); and a scheme for the provision of basic minimum services i.e., primary health, primary education, rural shelter, rural drinking water, rural electrification and nutrition.

Employment: The provision of employment opportunities in rural areas slows rural-urban migrations. The following strategies are proposed to strengthen rural economies: Establishment of Micro-Enterprises in Rural Areas; and promotion of the formation of Co-operatives of Agriculture and Allied Workers for Organized Processing and Value Addition.

14.6 TRANSPORT, COMMUNICATION AND INFRASTRUCTURE DEVELOPMENT STRATEGY

14.6.1 Transport

With the targeted strong growth in the economy and population of Siaya County, rapid growth in intra and inter-regional freight and passenger transportation demand is inevitable. The efficient transport system will play a major role in improving the quality of life in the county. Unregulated public transportation services represent a challenge that needs to be overcome as their inefficiencies may lead to continuing dependency on private cars. Therefore, optimization of mobility and accessibility through sustainable transportation systems is needed to increase mode shares in public transport.

14.6.1.1 Road Transport

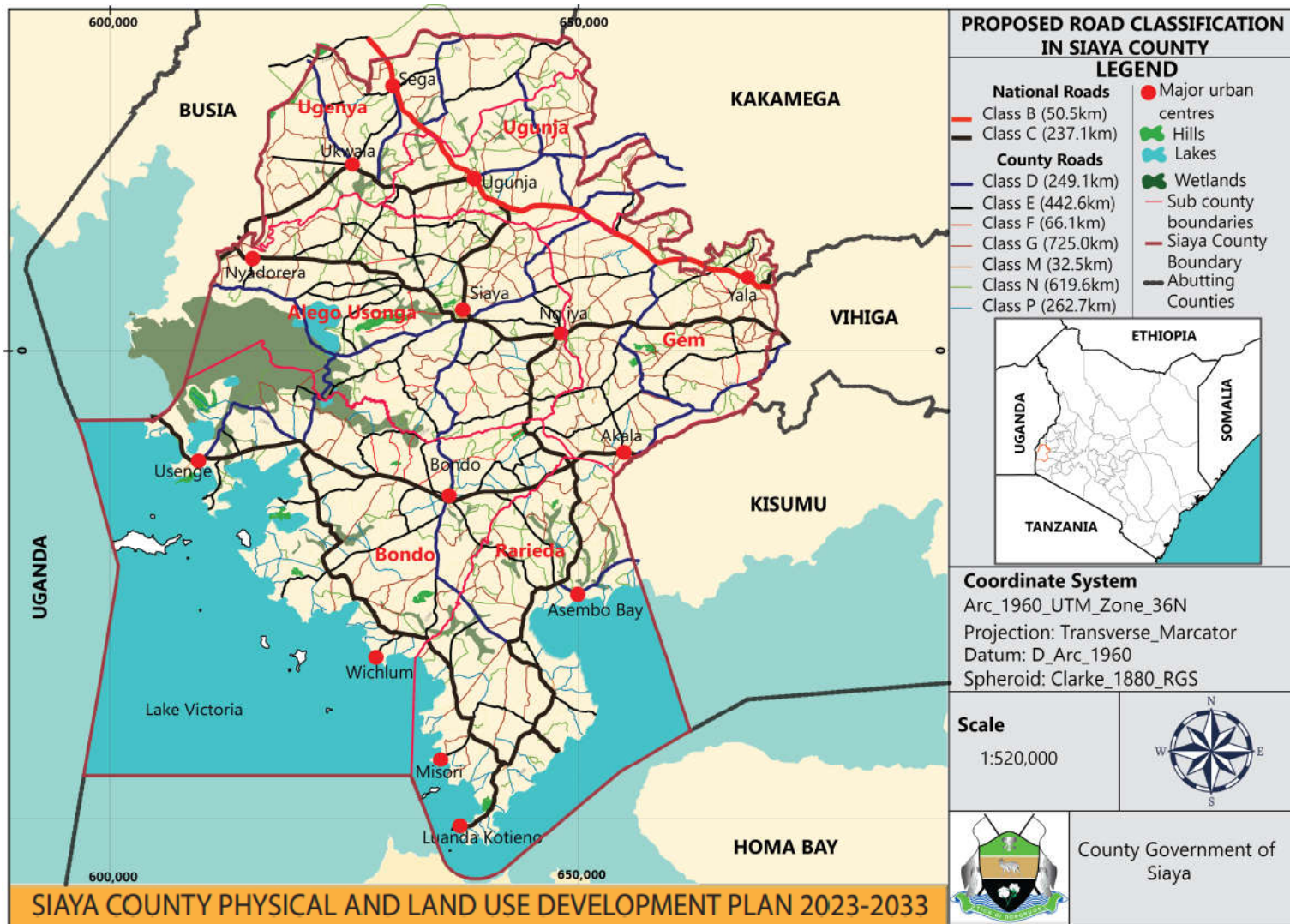
The development of road transport relies on overall system improvement to make it successful. The improvement of network coverage and connectivity through route network planning and expansion will encourage people to use public transport. In rural areas, many communities should be served with public transport services to improve social and economic connections. The Siaya County Physical and Land Use Development Plan sets out the strategy and policy framework for transport for the next 10 years. This will be used as a guide for transport investment in Siaya County when determining planning or delivery decisions. The strategy is accompanied by an implementation plan, setting out the measures to be delivered over this period. The vision of this plan is to ensure an available, accessible and reliable infrastructure for sustainable socio-economic development and investment in Siaya County

Road classification: The plan proposes the classification of County roads as per the recommendations by the Kenya Roads Act, 2007 and Amendment Bill, 2017 as indicated in (Table 14.11).

Table 14.11: Recommended Road Classification by the Kenya Roads Act, 2007 and Amendment Bill, 2017

Roads	Class	Description
National roads	A	International trunk roads linking centres of international importance and crossing international boundaries or terminating at international ports.
	B	National trunk roads linking nationally important centres.
	C	Primary roads linking provincially important centres to each other or two higher class roads.
Urban roads	UA	Arterial roads
	UC	Urban collectors including primary distributors
	UL	Urban local roads including minor distributors, local streets, residential stand accesses, commercial and industrial stand accesses, shopping streets
	H	Urban major arterials: highways meant to carry through traffic and relatively long-distance traffic between widely separated parts of the city or municipality. They are required to provide mobility within an urban area as opposed to access.
	J	Minor arterials are meant to carry traffic between different zones of the urban area and include the principal urban bus routes. They shall include, roads within economic zones that are planned by the National Government and roads within State Houses and Lodges including their access roads. They are required to provide mobility as opposed to access.
County Roads	D	Secondary Roads link locally important centres to each other, to more important centres or higher-class roads.
	E	Major Feeder Roads link important constituency centres to each other and are

Roads	Class	Description
		meant to carry local traffic and channel it to class D roads.
	F	Minor Feeder Roads linking Market Centres to each other. Meant to carry and channel it to class E roads.
	G	Roads linking farms to markets and meant to carry farm produce and farm inputs traffic to and from the markets.
	R	Roads accessing rural areas.
	S	Roads accessing sugar-growing areas.
	K	Urban major collector roads are meant to collect traffic from the local roads and channel it to the major and minor arterial roads. The roads are meant to provide for both mobility and access.
	L	Urban minor collector roads are meant to perform a similar function as the class K roads i.e., to collect traffic from the local roads and channel it to the arterial roads, but in a smaller catchment area meant to collect traffic from the local roads and channel it to class K roads. The roads are meant to provide both mobility and access.
	M	Main business and shopping streets in the urban areas are meant to provide access to commercial properties and residential areas and also cater for a high level of pedestrian traffic.
	N	Provide direct access to individual or group of properties, and residential areas, or to places of specific social or economic activity, including industrial and commercial areas and government institutions such as schools, hospitals, prisons and government housing.
	P	Provide direct access to groups of residential properties. This is the lowest class of public roads and therefore Class P roads will provide all other public access (for example access to social amenities such as schools and hospitals) not provided by higher-class roads.



Map 14.5: Proposed Road Classifications in Siaya County

14.6.1.2 Air Transport

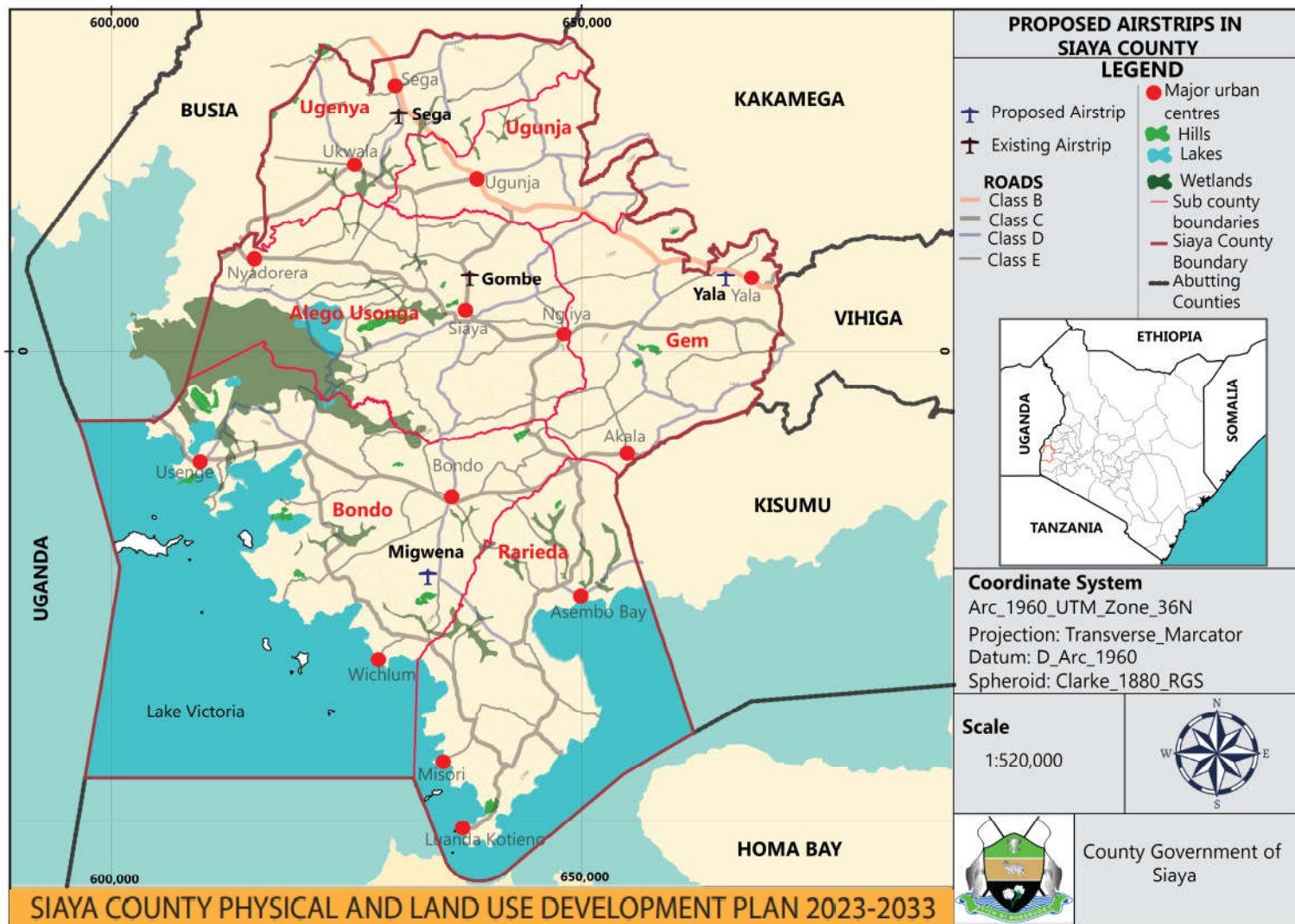
The County has 2 designated airstrips (Gombe and Sega) which are in the poor status of operation. These airstrips are intended to handle small aircraft operating on national and regional routes. To promote international, national and regional growth, there is a need to operationalize and renovate these designated airstrips. More airstrips are proposed at Migwena in the Bondo sub-county and Yala in the Gem sub-county.

Gombe Airstrip (Existing): Gombe Airstrip is located within Siaya Municipality to the North and occupies a land area of 31.8 acres. The airstrip should be paved, fenced, and equipped with a lounge and weather-monitoring equipment. Essential airport personnel should be employed and the facility maintained regularly.

Sega Airstrip (Existing): The Airstrip is located about 2 kilometres to the South of Sega town and occupies a land area of 48.3 Acres. The same improvements as proposed for Gombe Airstrip should be implemented.

Migwena (Proposed Airstrip): This site is proposed 7.5 kilometres South of Bondo town and has a land area of 80 Acres.

Yala (Proposed Airstrip): This site is proposed in Yala town and should have a land area of 50 Acres.

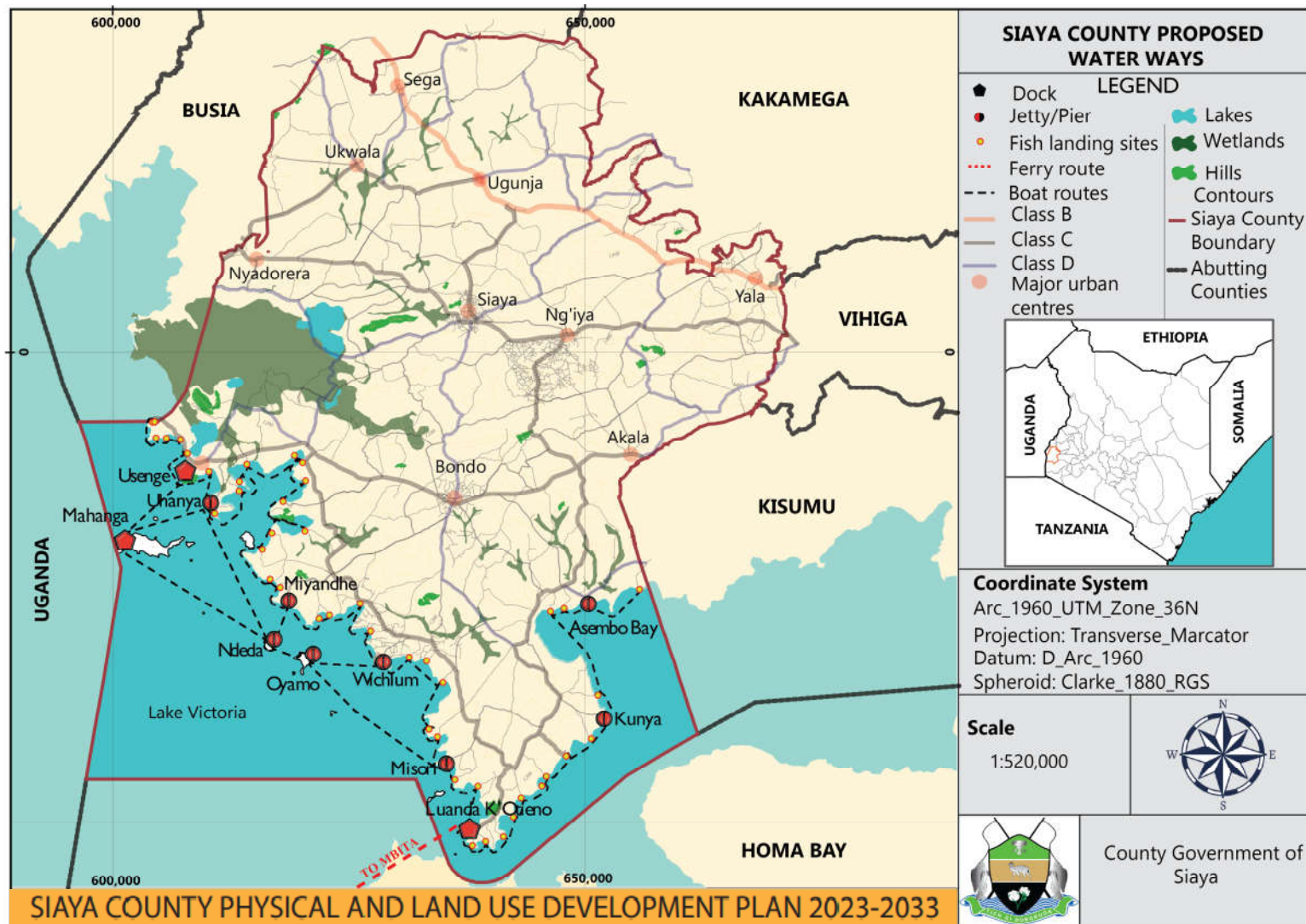


Map 14.6: Proposed Airstrips in Siaya County

14.6.1.3 Water Transport

Water transport (ferry and boats) is predominant and links people from the mainland of Siaya County to the islands as well as the neighbouring counties of Migori and Homabay and nations of Tanzania and Uganda that share Lake Victoria with Kenya. There is therefore great potential in this type of transport that if developed can immensely benefit the region and Kenya. To enhance transportation, spatial interactions between the mainland and the islands, ecotourism and socio-economic development, the plan proposes the following:

- i) Identify and develop landing bays.
- ii) Linking the mainland to the islands.
- iii) Public-private partnerships to provide for more ferries.
- iv) Security patrols and rescue services.



Map 14.7: Proposed Waterways in Lake Victoria

14.6.1.4 Non-Motorized Transport

With increasing attention towards low-carbon societies, designing walkable and livable counties is therefore an important facet of a low-carbon society. Its main purpose in Siaya County is to induce a voluntary modal shift from motorized means to walking and cycling for short-to medium-distance trips while creating world-class environments to live, work, learn and play. To achieve this, the following interrelated sub-actions and measures should be implemented:

1. Providing comfortable walkways: The implementation of comfortable pedestrian walkways should be emphasized in Siaya County. These include intensive efforts to plan and design pedestrian walkways in the urban areas and other iconic places of the county.

Street tree planting for shades: In a tropical climate such as Siaya County, the weather is often cited as the main reason people refuse to walk. Thus, providing shade along walkways is an important element to encourage residents to walk. Trees provide natural shades while at the same time increasing the aesthetic value of the surrounding. Although continuous maintenance is required at the initial stage, mature trees require very minimal care other than pruning. To achieve the proper shading effect, the correct selection of trees must be emphasized. Trees providing good shade are trees with a large canopy that hangs relatively low but high enough not to endanger the safety of pedestrians (Figure 14.6).

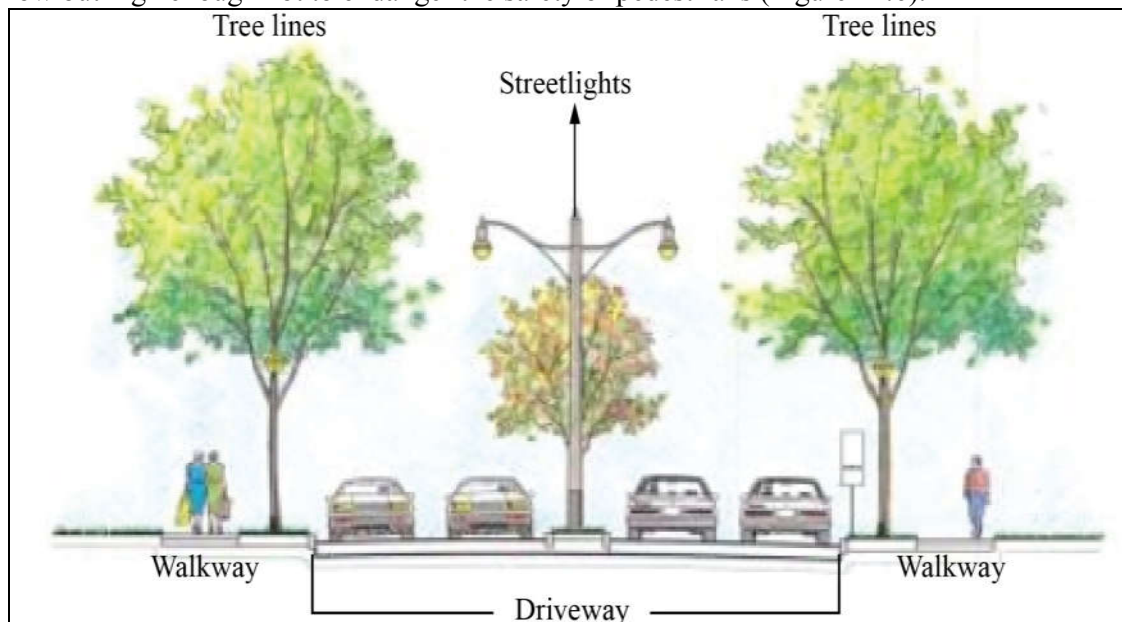


Figure 14.6: Provision of Shade by Trees along Walkways and Driveways

Appropriate street furniture: Pedestrians often require guidance to reach their destinations. Guidance in the form of street names and signs helps pedestrians identify locations. The ability to correctly determine locations and streets is beneficial for locals and visitors as well as emergency workers. Street name signs are just one example of street furniture that benefits pedestrians and increase their utility for walking. Siaya County aims to attract more visitors and tourists to the region, and the importance of providing adequate and properly placed street name signs must not be overlooked. Other important street furniture that can increase pedestrians' comfort and safety are listed below.

- Benches along walkways serve as a place for people to rest and admire the surrounding view.

- Bollards at crossings prevent illegal entrance into or movement along the walkways by motorized vehicles, especially motorcycles.
- Street lamps provide illumination to the surrounding area at night. The illumination creates a sense of safety for pedestrians and discourages criminal activities.
- Waste containers or litter bins in properly placed locations help to promote street cleanliness as well as recycling activities.

Create Permeable Street layouts: Streets should be planned and designed in a manner that provides a selectively high degree of pedestrian network connectivity and permeability but is decreasingly permeable for motorized means. Achieving this will force some streets to be only accessible by walking and not driving. Permeability and connectivity must be designed with walking comfort in mind. Thus, maximum street block dimensions of 70m90m are encouraged to achieve both permeability and comfort.

Identify gaps/disconnections of the street networks: When there are disconnected pedestrian networks, permeability and connectivity can't be achieved. Pedestrian network analysis must be performed to identify gaps in the pedestrian network. Any gaps identified indicate a discontinuity in the pedestrian network. Therefore, based on any identified gaps, mitigation measures must be planned to improve the permeability of the network. Once permeability is improved, the walking experience will also be improved, thus encouraging more people to walk to their destinations.

Create continuous active street frontages: Business and retail outlets that face walkways shall create street frontage that encourages active participation from the people. Active street frontages encourage economic/business activities as well as provide a sense of life, security and safety. Therefore, all proposed growth corridors and centres shall ensure active street frontages as a strategy for enhanced pedestrian movements.

Provide safe walking routes to schools: Schoolchildren are the future of the county. The success of the county depends on children's access to quality education. Yet, school children are among the most vulnerable group of pedestrians. A lack of understanding and appreciation of road safety may lead to accidents. Therefore, the following strategies are necessary: Segregation between pedestrian walkways and roads; Fences along the pedestrian walkways; and Shelter for pedestrians to protect the children.

2. Providing a safe and comfortable cycling network: Cycling promotes a healthy way of travelling compared to driving. Cycling can be promoted in Siaya County by giving some priorities in terms of the development of infrastructure and facilities to encourage people to use bicycles and replace cars or motorbikes as transportation modes

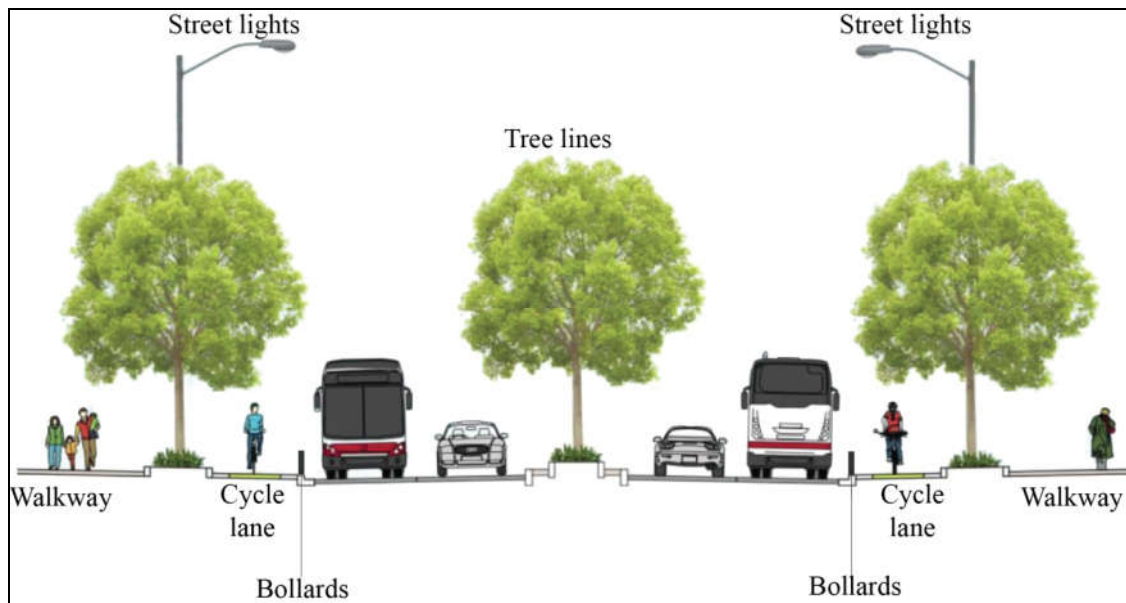


Figure 14.7: Provision of Cycle Lanes and Walkways

Provide dedicated cycle tracks along major roads: The County Government shall provide cycle tracks to encourage the use of bicycles in the county. This shall only be reserved only for bicyclists, combined with a pedestrian walkway.

Provide sufficient and secure bicycle parking facilities: To encourage cycling and to improve the management of bicycles, a proper parking facility should be provided at major destination points such as transit stations, educational institutions, retail outlets, government offices and so on.

Provide safe cycling routes to school: When schools are located slightly further away from home, cycling is a better choice than walking. In such a situation, if cycling routes are not provided, school children who cycle will have to compete for the same road space with other road users, particularly motorized modes. The competition for the same road space plus different handling characteristics between motorized modes will often result in conflicts leading to accidents. Thus, to prevent this, dedicated cycling routes to schools should be provided. The provision of dedicated cycling routes will undoubtedly increase the safety and confidence of parents to allow their children to cycle to school.

Table 14.12: Key Issues in Transport Sector and Strategies for Intervention

Sector	Planning Issue	Description	Objective	Where	Strategies
Transport	Unclassified priority county roads	Roads serving key facilities including industrial and commercial areas and government institutions such as schools, hospitals, prisons and government housing.	To classify priority County roads	Countywide	<ul style="list-style-type: none"> Identify and classify prioritized county roads according to Kenya Roads Bill 2017. Impose a policy to classify prioritized rural access roads Priorities certain rural access roads
	Road safety	Unsafe roads characterized by frequent accidents and insecurity	To improve road safety	Countywide	<ul style="list-style-type: none"> Improve safety by introducing bumps. Discourage illegal bumps. Enforcement of stringent traffic rules. Segregate roads for different users. Installation/ maintenance of more solar-powered streetlights. Road safety education. Ensure and maintain a clear line of sight along the roads.
	Marine safety	Unsafe water transport for fisher folks and passengers	To improve safety in water transport	<ul style="list-style-type: none"> Lake Victoria Lake Kanyaboli River Yala River Nzoia 	<ul style="list-style-type: none"> Establish a disaster response unit for Fishing. Enforcement of marine safety policy (Safety jackets) Capacity maintenance
	Poor accessibility to waterfronts	Limited access to beaches, landing sites and visual disconnection to water scenery	To enhance physical and visual access to water fronts	Beaches like Osieko, Usenge, Nyenye, Usigu, Miyadhe, Sirongo, Wagusu, Orengo, Luanda-Kotieno	<ul style="list-style-type: none"> Provide access to beaches Plan and provide basic services to beaches Plan prioritized beaches. Identify and develop key viewing points towards the lake,
	Encroachment of road reserves	Informal structures, vending and other activities within the road reserves	To protect road reserves from encroachment	Countywide	<ul style="list-style-type: none"> □ Enforce development control.

Sector	Planning Issue	Description	Objective	Where	Strategies
					<ul style="list-style-type: none"> • Ensure proactive enforcement to address the encroachment of road reserves (warn by marking illegal structures). • County departments to work in a harmonized manner
	Poor road conditions	Potholes, poor /inadequate bridges, impassable roads during rainy seasons	To improve road conditions	Countywide	<ul style="list-style-type: none"> • Ensure routine maintenance of roads. • Installation of bridges where necessary. • Road improvement strategy: tarmacked road, ongoing tarmacking, Priority 1 (immediate short-term), Priority 2 (Medium term), Priority 3 (long-term) (Road infrastructure model)
	Poor drainage infrastructure	Inadequate/ poor maintenance of storm drains leading to flooding and erosion of road surface	To provide for and ensure routine maintenance of drainage infrastructure	Countywide	<ul style="list-style-type: none"> • Ensure proper stormwater management by installing storm drains. • Routine maintenance of existing storm drains. • Address the problem of solid waste disposal on drainage channels. • Address encroachment of drainage areas. • Install culverts
	Undocumented/ unmapped waterways	Connecting to islands, fishing grounds, and mainland	To Map out waterways	Lake Victoria	<ul style="list-style-type: none"> • Map out all boats and ferry routes. • Recommend fish breeding sites
	Undeveloped airstrips	The existing airstrips are in a state of neglect, unused, encroached and underdeveloped No security of tenure	To secure title, fence, develop, and use airstrips	All Airstrips (Sega, Gombe, Dominion, Migwenya)	<ul style="list-style-type: none"> • Know the status of land allocations for the airstrips. • Secure ownership of the existing airstrips by the county. • Develop and operationalize airstrips

14.6.2 Information Communication Technology

The county is planned to attract and support the growth of the ICT sector. Through this sector, the county shall harness human and technological resources to ensure improved productivity, cultural production and human interaction which are often the sites of socio-political growth. Globally, the ICT sector has been recognized as an enabler of growth and development in most countries. This presents an opportunity to develop a more economically, socially and environmentally sustainable county. ICT is central to providing linkages between all levels of government, the private sector and urban communities towards achieving sustainable development. The Government of Kenya realized the role ICT plays in the socioeconomic development of the nation. This is evidenced by the National ICT Policy based on the Economic Recovery Strategy for Wealth and Employment Creation of 2003-2007. The National ICT Sector Master Plan (2008 – 2012) outlines the road map and implementation strategy for making ICTs more accessible and affordable to the entire population. This is to enable the Republic of Kenya to be a fully-fledged knowledge and information society by 2030 (GoK, 2007).

Digital Village Concept is an idea that has been identified by the Government as a solution to internet access problems. A lot of resources are being put in place to bring government services closer proximity to the people through the digital villages concept (KICTB, 2012). Siaya County is predominantly a rural county with several urban centres proposed for upgrading. The Smart City concept is expected to open up opportunities and facilitate success through a thoughtful environment and intelligent infrastructure with advanced support systems using ICT (GoK, 2007). Marketplaces (meeting places) and Learning Institutions are in dire need of internet hotspots and other affordable computerized services. This area priority for County Physical and Land Use Development Planning for ICT-enabled services. Sharing internet infrastructure remains the only solution for schools and urban centres. The spatial locations of digital village facilities remain the sub-counties and ward headquarters. All sub-county headquarters should be fitted with strong wireless internet links or optic Fibre networks that extend to ward offices in the next 10 years.

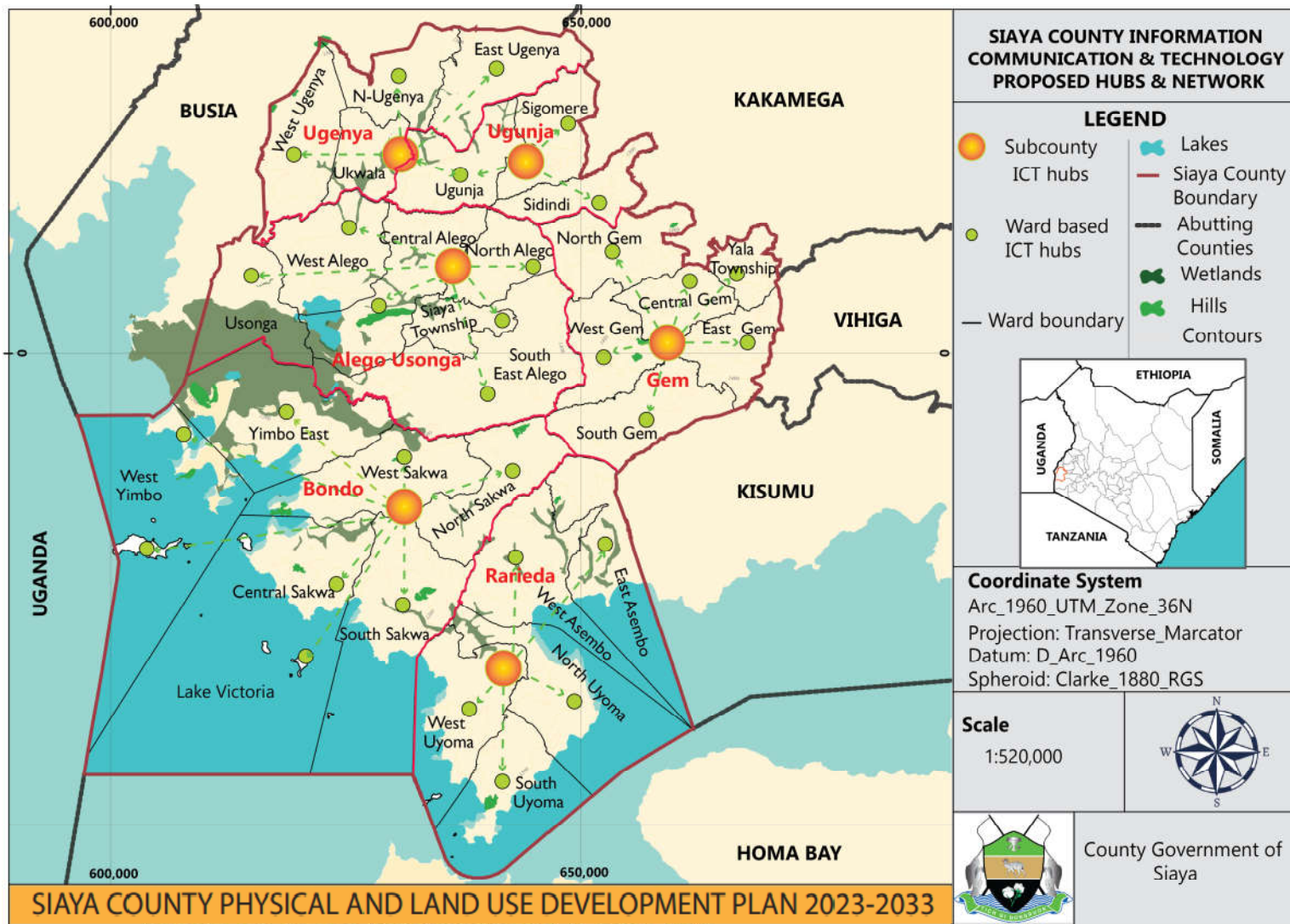
This plan proposes an ICT network plan that would ensure equitable access in most learning institutions and communities through urban centres, shopping centres and meeting places of Siaya County. A wireless network plan is proposed to permeate all corners of the county through broadband technology. Aerial masts erected at different locations by wards or sub-counties would form a triangular set of antennae, especially through a service provider such as Safaricom, or Airtel, among others. This should be fitted with a microwave-enabled point-to-point line of sight access that would ensure efficient and faster signal propagation in the county. The design and spatial location details of the antennas would ensure reliable internet network access by all potential marketplaces and learning institutions in the county. Radio antennae's masts for the internet network could be erected at locations highlighted to ensure maximum signal propagation in all the learning institutions and marketplaces.

At the backyard of the triangular set antennae, would be a set of fully functioning telecommunications infrastructure that would allow for internet service access. In terms of the implementation schedule, consultations with the relevant authorities and design engineers are necessary such that donor funding and support can be secured for the purchase of the necessary internet infrastructure. To effectively and efficiently manage both voice, text and video data services, a team of qualified technical and maintenance staff would be required. Notable design issues involving powering costs and the location of the antennae altitudes

would be put into consideration. Selected locations must allow for maximum signal propagation in the county through the sub-county hubs into the ward offices.

Table 14.13: Key Issues in ICT Sector and Strategies for Intervention

Sector priority	Recommendations	Duration	Implementing agency
ICT infrastructure accessibility in devolved units	A subsidized loaning scheme by the government to interested parties (small groupings/individuals) would help accelerate the rate of ICT penetration in rural areas.	5-10 Years.	<ul style="list-style-type: none"> • County Government of Siaya • National Government • NGOs • Donors
	The County Government of Siaya through the ICT and Education Department needs to create a funding kitty for learning institutions to support ICT infrastructure projects. Learning institutions should be supplied with commercial connection kits containing basic access facilities like a hub or a switch at some subsidized cost that is affordable over time.	10 Years	<ul style="list-style-type: none"> • County Government of Siaya • National Government • NGOs • Donors
	Internet infrastructure in marketplaces, Urban centres of Segwa, Ukwala, Ugunja, Aram, Luanda Kotieno, Siaya, Bondo, Nyadorera, Yala, Ndori, Akala and Usenge. Through digital villages or Government premises/offices	10 Years	<ul style="list-style-type: none"> • County Government of Siaya • National Government • NGOs • Donors
	Develop internet hot spots where community members can log in freely through public Wi-Fi at Sub- County HQs in major public Parks at Bondo, Siaya, Ukwala, Ugunja, Yala and Aram.	5-10Years	<ul style="list-style-type: none"> • County Government of Siaya • National Government • NGOs • Donors
Socio-Cultural Strategy as an opportunity to promote ICT awareness	<ul style="list-style-type: none"> • Formation of ICT Clubs in all wards/schools. • Competitions in ICT to create local content and promote Siaya County • ICT conferences showcasing the Internet revolution 	5-10 years	<ul style="list-style-type: none"> • County Government of Siaya • National Government • NGOs • Donors



Map 14.8: Proposed ICT Network Plan

14.6.3 Energy

Siaya County has immense opportunities for the development of the energy sector to meet the future power demand. The efficient, reliable and sustainable energy services will provide the impulse for the development of various sectors of the economy including agriculture, tourism, communication, industries, trade and commerce among others. An integrated approach has been suggested for power generation and planning in the county.

Rapid population growth and development will lead to an increase in demand for power. The level of energy consumption depends on the economic growth. The basic goal of the development programme in this sector is to decrease, first, the power shortage during normal and peak loads and second increase the power generation capacity up to the level of meeting the total future needs. The efforts shall have to be made for the implementation of an organized and coordinated planning for setting up additional new power plants along with the up-gradation of regional and national grids.

Poor electricity connectivity and service experienced in the county are associated with untapped alternative sources of energy and poverty. Therefore, the objective of this plan is to improve reliability and access to power. To realize this objective, the county should exploit the following strategies:

- Tap on green energy sources: Identify sites suitable for wind and solar energy plants
- Partner with developers of green energy
- Explore the possibility of hydropower generation (R. Nzoia and Yala, Dominion Farm)
- Improve connectivity to power
- Improve the service quality

14.6.3.1 Green Energy System and Renewable Energy

Renewable energy (RE) has been designated as a primary option to overcome the dependence on fossil fuels and also as a solution towards the energy crisis and global warming. Even so, the intermittency of renewable energy systems cannot be achieved without detailed planning and control. For that reason, the green energy system, built on the concept of renewability and efficiency, has been introduced as a key factor in achieving sustainability in the energy sector.

14.6.3.2 Promotion of Renewable/alternative energy

Renewable energy resource availability depends on geographic locations. The potential renewable energy sources in Siaya County include solar, biogas, wind and municipal solid waste. The following strategies can be applied in promoting renewable energy in the county.

- a. Harnessing Solar Energy:** Energy from the sun can be directly harnessed as electricity through a solar photovoltaic (PV) system or as heat through a solar thermal system. Since Siaya County is located in a tropical climate, it becomes a good potential area for solar energy investments. While solar PV system produces electricity directly by converting solar radiation, solar thermal system works by using heat from radiation to produce high pressured steam to operate a turbine to generate electricity (Becker et. al. 2000). Although solar energy appears to be a promising source of energy, exploitation requires vast areas. The identification of suitable location and sites are important to prevent the wastage of useful land space. To improve energy sources and supply, the county should endeavor to install solar farm(s) as well as encourage rooftop catchment.



Plate 14.1: An Example of a Solar Farm

- b. Utilization of energy from waste:** In recent years, waste to wealth has been a hot topic discussed globally. Instead of disposing of waste, it could be utilized for other beneficial purposes, such as energy. In Siaya County, the top potential resources for waste to energy, based on long-term availability and abundance, are agricultural waste, municipal solid waste and sewage sludge.

14.6.3.3 Establishment of the Advanced Energy System

The advanced energy system is a comprehensive system for energy supply which is decentralized and has several key technologies such as distributed energy generation, energy, demand response technology and load management system with IT technologies. In the current energy system, electricity is produced from several centralized power plants and then transmitted and subsequently distributed to the end users. However, due to several pressing issues related to the current system, there is a call for a more advanced system based on renewable energy. The smart grid that contributes to the current scenario includes the constraints on the construction of new transmission lines (for centralized systems), and increased customer demand for highly reliable electricity.

- a. Employing distributed energy system:** This system emphasizes utilizing the local resources to fulfil the energy demand. These systems produce and distribute networks without being injected into the transmission network. Generally, the system consists of a cluster of small to medium size (1-50 MW) power generators (Solar, Biomass and Wind) and energy storage devices which are optional that compliments one another for optimal operation (CIGRE, 2012).
- b. Widespread use of energy storage:** Generally, by storing extra energy at times of light loading and supplying energy at times of heavy loading, energy storage systems can provide the required energy when the generation and loads do not match (Suryanarayanan et. al., 2010). Energy storage can be performed at the power plant, in support of the transmission system, at various points in the distribution system and on particular appliances and equipment on the customer's side of the meter.
- c. Diffusion of demand response initiatives:** Demand response is an initiative that involves electricity consumption change at the demand side in response to the equipment of utility companies during critical periods, i.e., high prices and peak hours. The energy-saving

capacity then served as the virtual power plant that supplies electricity to the peak demand load.

d. Incorporation of the power management system (IT Technologies): A power management system refers to a computer-aided tool for monitoring, controlling and optimization purposes. The advantage of the system is that it allows the plant to keep track of its energy utilization for further analysis. In terms of control and optimization, the system aids the plant through scheduling which will then shave energy peaks leading to a lower cost of electricity. While in terms of total energy consumption the system does not reduce and in fact might increase the overall electricity consumption, with a constant of flat consumption of electricity, the cost of electricity will generally reduce. In the case of Demand Respond, the power management system acts as an agent to dispatch the demand response event. On the participant side, along with the installed metering device, the power management system shall monitor the energy reduction of participants during such events, which will then determine the payment received by the participants. To ensure reliability and access to power, all urban centres, beaches, schools, health facilities and households of rural areas shall be connected and serviced with energy supply. The table below indicates the implementation strategies.

Table 14.14: Key Issues in Energy Sector and Strategies for Intervention

Sector	Planning issue	Description	Objective	Where	Strategies
Energy	<ul style="list-style-type: none"> • Poor electricity service • Poor Electricity connectivity in the county 	Untapped alternative sources of energy	To improve reliability and access to power	<ul style="list-style-type: none"> • Urban Centres • Beaches • Schools • Health Centres • Rural areas 	<ul style="list-style-type: none"> • Tap on Green energy sources • Identify sites suitable for wind and solar energy farms • Partner with developers of green energy • Explore the possibility of hydropower generation (R. Nzoia and Yala, Dominion Farm) • Improve connectivity to power • Improve the service quality • Provide incentives for the installation of renewable sources of energy

14.6.4 Storm Drainage

The natural undulating terrains with a large network of natural streams form an excellent combination, which assists drainage evacuation immensely. Rainwater harvesting should be practised extensively and storm sewers installed to provide relief. In the county, there is no serious drainage problem identified, though no organized system of drainage exists. Large-scale development activities as likely to be taken up through the plan period may cause problems with water logging, especially in low-lying areas. A planned approach, therefore, is required to be initiated in this regard.

14.6.4.1 County Storm Water Drainage

The County Government of Siaya should initiate a legislative process towards a structured policy or strategy on stormwater drainage. Stagnated stormwater drainage in any locality has

negative environmental and health impacts and causes inconveniences to the community. Undulating topography with a large network of natural channels, one of the characteristic features of Siaya County, eases out storm runoff and no significant problems due to the storm water are reported except in Alego-Usonga Sub- County. However, with the anticipated increase in developmental activities, problems of storm water drainage are likely to increase, specifically in the urban areas and development corridors. Therefore, adequate provision for storm water drainage has to be implemented. Necessary policies, guidelines and by-laws may be formulated, enacted and implemented covering all aspects of county storm water drainage. The following actions need to be undertaken: -

- Comprehensive rainfall-runoff analysis to be carried out.
- Drainage plans for urban areas and future developments need to be developed in consideration of the existing natural drainage channels, retaining, rehabilitating and improving existing ones.
- A comprehensive catchment treatment programme comprising primarily afforestation and silt prevention device is to be developed and executed.
- Install storm sewers and drainage channels in strategic areas of the county.

14.6.5 Solid Waste Management

All urban areas within Siaya County do not have any proper plans for solid waste management. The county does not have any designated dumping. In Alego Usonga Sub County, solid waste dumping is done in Awelo next to the designated cemetery. Solid waste is managed through burning in other sub-counties or dumping in undesignated sites. These types of solid waste management are likely to lead to groundwater pollution as the soils are previous. There is, therefore, a need for properly designated solid waste disposal sites to safeguard against environmental degradation. There is, therefore, a need to zone specific areas in all the major towns for solid waste management and sanitation. Adoption of new and appropriate technology such as land filling other than open dumping is essential.

14.6.6 Social Infrastructure

14.6.6.1 Health

Kenya Vision 2030 aims to provide an efficient and high-quality healthcare system with the best standards. Additionally, Kenya aims to become the regional provider of choice for highly specialized healthcare, thus opening the country to “health tourism” as an income-generating activity. To achieve this, specific strategies were formulated as follows: -

- Provision of robust health infrastructure network
- Improve the quality of health service delivery to the highest standards and promote partnerships with the private sector
- Provide access to those excluded from healthcare due to financial reasons

The Kenya Constitution 2010 Article 43 (1a) provides for the right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care. Additionally, Article 56 (1e) states that the government shall put in place affirmative action programmes designed to ensure that minorities and marginalized groups have reasonable access to water, health services and infrastructure. In its Fourth Schedule, the Constitution highlights the devolved health functions which include county health facilities and pharmacies; ambulance services; promotion of primary health care; licensing and control of undertakings that sell food to the public; veterinary services (excluding regulation of the profession); cemeteries, funeral parlours and crematoria; and refuse removal, refuse dumps and solid waste disposal.

Sustainable Development Goal No. 3 of 2015 aims to ensure health and well-being for all ages by improving reproductive, maternal and child health, ending the epidemics of major communicable diseases, reducing non-communicable and environmental diseases; achieving universal health coverage; and ensuring access to safe, affordable and effective medicines and vaccines for all.

14.6.6.1.1 Location and Land Requirements for Health Facilities

The preferred location for health services 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. It is recommended that applications for health facilities be accompanied by details of site requirements to facilitate the reservation of adequate land.

Table 14.15: Key Issues in Health Sector and Strategies for Intervention

Sector	Planning issue	Description of issue	Objective	Where	Strategies
Health	Basic facilities	<ul style="list-style-type: none"> • Some are not connected to electricity and Water • Lack of specialised equipment (MRI machines, Cancer screening, dialysis machines) • Low bed capacity • Lack of specialised laboratories • Lack of mental health facility • Lack of elderly care homes 	To ensure adequate access to basic health facilities and services	All health facilities (every sub-county to have a level 4 hospital, elderly care home)	<ul style="list-style-type: none"> • Provide all basic facilities in hospitals • Upgrade some health facilities • Land Ownership- Acquire title deeds for all public health facilities • Ensure each class of health facility meets the recommended standards • Establish a mental health facility at the county headquarters • Establish elderly care centres by sub-county
	Access to health services	<ul style="list-style-type: none"> • Distance • Inadequate drugs/medicine • Low staffing of different cadres of health personnel • Poor disposal of medical waste • Poor access to medical facilities by residents at the Islands 	To enhance accessibility to quality health services	All health facilities	<ul style="list-style-type: none"> • Make all hospitals accessible to weather roads. • Improve health personnel-to-patient ratio • Provide health facilities in areas not served currently • Safe disposal of medical waste • Have an emergency motorboat to service the islands

14.6.6.2 Education

Education is an important inducer of economic growth and development of any society. The most important element for future economic and social success is the development of inclusive and quality education. This would have to be understood as an important part of the spatial development strategy, aiming to support enhancing qualities of education for the whole county, and all. Findings indicated a strong link between poverty with reduced achievement in education. Efforts to ensure education for all are of special importance.

Although the rate of inclusion in binding education is almost universal, there are inequalities related to income levels. In this aspect, secondary and higher education faces large inequalities. The trend of population increases and the government policy on 100% transition has caused pressure on the available education facilities which for a long time has been insufficient with the enormous shortage of teaching personnel.

The specific strategies towards quality education as stipulated in the Kenya Vision 2030 include: -

- Integration of early childhood into primary education
- Reforming secondary curricula
- Modernizing teacher training
- Strengthening partnerships with the private sector

The flagship education and training projects for 2012 identified included:

- Build and fully equip 560 new secondary schools to accommodate the increasing number of students graduating from primary schools
- Establish a computer supply programme that will equip students with modern information technology skills
- Create centres of specialization for each vision of 2030's economic growth sectors.

14.6.6.2.1 Principles for Provision of Schools

To achieve access to quality education for all, the county ought to focus on the distribution of schools, their accessibility and the quality of infrastructure. Therefore, Location and access to education facilities are important principles in planning. The goal is to ensure access to services in areas underserved (administrative principle) through a hexagonal lattice analysis. On the other hand, the location serves as an important factor leading to the success of any educational facility (Location-allocation principle). A strategic location provides high-quality service to the community at a low cost.

14.6.6.2.2 Location and Land Requirements for the Provision of Schools

The Physical Planning Handbook (2008), provides the guidelines and minimum standards to be used while planning for education services and facilities. The handbook cites the need for educational institutions to have site layout plans prepared and submitted for approval to relevant authorities to avoid haphazard developments. In its discussion, it also highlights standards about demand and distribution, Location, land, and space requirements for various levels of education facilities as tabulated.

Table 14.16: Key Issues in the Education Sector and Strategies for Intervention

Planning issue	Description of issue	Objective	Where	Strategies/Actions
Basic facilities	<ul style="list-style-type: none"> • Shortage of well-equipped laboratories in secondary school • Poor drainage and waste disposal system • Lack of water in some schools • Inadequate green infrastructure • No defined footpaths. 	To ensure access to basic facilities and services	All schools in the county	<ul style="list-style-type: none"> • Provide well-equipped laboratories for all secondary schools • All schools are to be provided with sanitation facilities • Schools to be connected to SIBOWASCO. • Roof catchment to be encouraged • Water and electricity • Ensure adequate green infrastructure coverage in

Planning issue	Description of issue	Objective	Where	Strategies/Actions
	<ul style="list-style-type: none"> • Inadequate/poor play areas for students due to inadequate land • Inadequate floor area for classrooms • Inadequate educational institutions in some wards • Haphazard planning leads to poor location of developments 			schools (Landscaping) <ul style="list-style-type: none"> • Ensure adequate land for expansion as per the County's Physical and Land Use Development Planning standards. • Analyze the demand for educational institutions • Increase educational institutions in areas of inadequacy as indicated in the polygon analysis • Each school should have a site layout plan
Access to schools	<ul style="list-style-type: none"> • Longer walking distance for students to schools • Poor road conditions • Poor access to education by persons with disabilities about specialised equipment, access roads 	To ensure inclusive and adequate access to schools for all	All Schools	<ul style="list-style-type: none"> • Provide an average of 1km for primary schools • Provide an average of 2.5km for secondary schools • Provide an average of 500m for ECD • Make all schools accessible through all-weather roads. • Ensure inclusive disability-friendly learning environment like ramps, toilets for persons with disability, specialised equipment, teachers
Transition to tertiary education and training	<ul style="list-style-type: none"> • Declining interest in village youth polytechnics • Poor equipment • Inadequate personnel • Inability to afford education students especially those from humble backgrounds 	To promote the transition of tertiary education and training	All village polytechnics	<ul style="list-style-type: none"> • Branding and upgrading of village youth polytechnics to County Vocational training centres • Provide adequate equipment for training of students • Increase personnel to the required student-teacher ratio • Improve allocation of bursaries to students

14.7 GOVERNANCE STRATEGY

The devolved government structure and resources of Siaya County create an opportunity for the development of thirty (30) strong administrative centres. These centres will act as poles of growth and offer an opportunity for the implementation of a new hierarchy in each county. These centres will be critical in servicing rural areas and absorbing the population once employment opportunities are created.

14.7.1 Open and Collaborative Leadership

Open and Collaborative Leadership is one of the key strategic directions for Siaya County and the basis of the strategy are:

- Integrated sustainable long-term planning for Siaya County and the region
- Considered decision-making based on collaborative, transparent, open and accountable leadership

- Active public engagement in local planning and decision-making processes and shared responsibility for achieving the goal
- County Government as the organization of excellence

14.7.2 Governance Framework

This framework is intended for the high-level processes and behaviour that ensure Siaya County performs by achieving its purpose and conforms by complying with all relevant laws, and codes of ethics while meeting community expectations probity, accountability and transparency. Ensuring County has a sound governance framework in place underpins open and collaborative leadership and is essential to provide the community with confidence that:

- The county is legally compliant and acts on ethical issues
- County decision-making processes are open and transparent and made in the best interest of all stakeholders
- The county is and is seen to be a good corporate citizen

14.7.3 Purpose of the Governance Strategy

The purpose of this strategy is to inform action through Open and Collaborative Leadership through a governance framework in which: members of the County Assembly (MCAs) and county staff ensure that citizens have trust and confidence in the decisions made by the county, and ensure all processes and decisions are made openly and transparently

14.7.4 Principles of Governance

The county commits itself to the following principles:

Equity: The County Government shall ensure fairness in decision-making, prioritizing and allocation of resources, particularly for those in need. Everybody should have a fair opportunity to participate in the future of the community. The planning process should ensure to involve and protect the interest of people in vulnerable circumstances.

Transparency: People should have access to the information they need to understand government planning and decision-making processes to participate in an informed way.

Participation: Maximum opportunity to genuinely participate in decisions affecting people's lives.

Active Citizenship: People can exercise their rights and responsibilities in a balanced way within our democratic society. Individuals and groups are encouraged to take a role in the community and are empowered with the skills, support and opportunity to shape and influence decisions that affect the community now and in the future.

14.7.5 Objectives of the Governance Strategy

- To develop an Integrated, sustainable long-term governance plan for Siaya County
- To achieve a considered Decision-making based on collaborative, transparent and accountable leadership
- To establish active public engagement in local planning and decision-making processes and shared responsibility for achieving goals
- To build a County Government Organization of Excellence

Table 14.17: Governance and Policy Implementation Framework

Objective 1	Strategy	Action
Developing an Integrated, sustainable long-term plan for Siaya County	Identify and document the main priorities and aspirations of the county	<p>Develop and deliver a County Physical and Land Use Development Plan in partnership with county and state agencies, community groups and individuals</p> <p>The county must ensure social justice is achieved by:</p> <ul style="list-style-type: none"> • Ensuring that a broad range of community members have input into the development of the CPLUDP • specifically, consult with those groups whose voice is not often heard in community decision; • ensuring that CPLUDP is adequately informed by sound social research and needs analysis <p>In communicating the CPLUDP, the county needs to show how community engagement informed the goals, priorities and strategies while demonstrating that CPLUDP shared a long-term plan for the community and the county</p>
	Develop a resourcing strategy which must include provision for long-term financial planning, workforce management planning and asset management planning	<p>CPLUDP provides a vehicle for each stakeholder to express their long-term aspirations. However, these aspirations will not be achieved without resources- time, money, assets and people- to carry them out. Resourcing strategy is critical in linking CPLUDP objectives to actions.</p> <p>The integrated nature of the County Physical and Land Use Development Plan means that various projects will be implemented concurrently with cross-referencing and adjustments as the development of each plan progresses</p> <p>The plan will identify that the county does not have full responsibility for implementing or resourcing for all stakeholders' aspirations identified in the County Physical and Land Use Development Plan</p>
	Maintaining long-term financial sustainability	<p>Develop and adopt a long-term financial plan incorporating the county's current financial position, strategies and assumptions that analyze the potential financial impact of several alternate future planning scenarios to assist in determining the most appropriate course of action</p> <p>This course of action will support the service delivery level required by the county residents while ensuring the long-term financial sustainability of the county</p>
	Ensure Asset Management strategy and Plans capture residents' expectations for both service and value and support inter-generational principles	<p>As the custodian, the County authority is responsible for effectively accounting for and managing these assets and having regard for the long-term and cumulative effect of the decisions.</p> <p>The county should establish goals and objectives for assets management in terms of providing platforms for service delivery, integrating asset management with County Physical and Land Use Development Planning and Integrated Development Plans, maximizing value for money by the adoption of lifecycle costing, combined with performance measurement, and promote sustainability to protect the needs of the future generation</p> <p>The county should ensure that its asset management planning has a service delivery focus. The assets that are provided are necessary to meet the needs of the county residents as identified by the stakeholders</p> <p>Asset management decisions should be informed by the evaluation of alternative means of service provision, full lifecycle costing and performance measurement and monitoring</p>

		Informed decision-making recognizes the long-lived character of the infrastructure asset and the need to plan and budget for them on a full lifecycle basis beginning with the identification of a service need.
	Identify and predict workforce issues to ensure resources meet the objectives of the County's Physical and Land Use Development Plan	<p>Develop and adopt a workforce Management Plan to ensure County has planned for the unforeseeable future (next 10 years) and can meet the objectives of the CPLUDP</p> <p>The Workforce Management Plan is a continuous process of matching workforce requirements to county objectives in delivering the CPLUDP, as well as analyzing and focusing on the human resource implication when undertaking strategic plan activities</p> <p>In developing and maintaining the workforce Management plan, consideration has been given to both internal and external factors that may affect the county's ability to meet its current and future workforce needs. These factors include an ageing population, identified skills shortage, past recruiting experience, the county's financial position and stakeholder expectations.</p>
	Detail and be accountable for the actions taken to achieve the objectives of the CPLUDP	<p>The County authority uses the CPLUDP and resourcing options to prepare a 5-year delivery programme for its term in Office</p> <p>Develop and deliver a 5-year delivery programme detailing the actions the county government will prioritize in a 5-year period which are aligned with achieving the objectives of the County Physical and Land Use Development Plan</p> <p>Each year, adopt an Operational Plan including a detailed annual budget and a statement on the County Revenue Policy</p> <p>The adoption of the above documents guides the Members of the County Assembly and staff to ensure that the decisions of the county are open, transparent and consistent with stakeholders' aspirations during the consultative forums in the CPLUDP development process</p> <p>To demonstrate accountability to the people, MCAs and county staff should at all times ensure that their decisions are consistent with Delivery Plan and Operations Plan. The decision-making process should include appropriate analysis and documentation of all risks and financial implication</p>
	Account to the Public for the expenditure of public monies and efficient and effective operations of the county	<p>Develop an annual report detailing:</p> <ul style="list-style-type: none"> • Progress on delivery of programmes • Financial Performance • Asset reporting • Legal proceedings • Contracts awarded • Private work and financial assistance • Details of external bodies, companies and partnerships • Details of overseas trips by MCAs and County staff • Details of County executive members, MCAs expenses and facilities • The total remuneration of the County Governor, Deputy Governor, Assembly speaker, and MCAs • Equal Employment Opportunity Management Plan

Objective 2	Strategy	Action
Considered Decision-making based on collaborative, transparent and accountable leadership	Maintain a strong ethical culture and high standard of conduct	<p>The county adopts a code of conduct based on a model code of conduct developed by other devolved units and organization</p> <p>The code of conduct sets out ethical and behavioral standards to be complied with by MCAs, County staff, administrators and conduct reviewers.</p> <p>The County Governor, MCAs. all senior staff are expected to demonstrate through their words and actions, commitment to the code of conduct. All staff are expected to comply with the code of conduct</p> <p>To improve workplace and organizational culture, the county government is to introduce a training programme which is designed to build awareness and understanding of how attitudes, behaviour and mindsets impact the way people work together. The training programme should aim to provide a common language through open communication across the county so that county officials to recognize, talk about and work towards a more constructive culture</p>
	Clearly defined roles and responsibilities with independence as well as cooperation between all parties	<p>County Government Act 2012, clearly defines the role of the County Executive and County Assemblies. Effective governance relies on acceptance and independence of the different roles of the County Executive and Assembly</p> <p>The county adopts an interaction between MCAs and county staff Policy to support the Code of Conduct and ensure the appropriate level of independence for MCAs and County staff</p> <p>An effective relationship between the County Governor and Members of the County Assembly promotes the successful delivery of the County Physical and Land Use Development Plan as well as the reputation of the County</p>
	Support and Commitment to Education and Training	<p>Education and training for both the MCAs and County staff to ensure they appropriately understand their governance obligation is important for the county</p> <p>All MCAs should be required to complete an education and induction programme upon election, usually after every 4 years regardless of whether you are new or re-elected, and ongoing professional training. This is to ensure MCAs have the appropriate level of skills and experience required to properly fulfil their responsibilities according to regulation.</p> <p>The county supports continuing education and professional development programmes for MCAs. A budget to allow MCAs to attend ongoing professional development training is provided for in the County's Payment of Expenses and Provision of Facilities for MCAs Policy for the County</p> <p>The county is committed to educating all levels of staff through established formal</p>

		<p>training programmes, including:</p> <ul style="list-style-type: none"> • Senior management induction programmes covering governance matters that all senior managers are required to attend on commencement of employment in the County • staff induction programmes covering governance issues that all staff are required to attend upon commencement of employment in the county • provision of a training budget per staff to support them in ongoing training and education relevant to their roles <p>The county should have an established governance training programme at all levels endorsed by the County executive management team. The adopted programme should include all relevant aspects. The adopted governance programme includes all relevant aspects of governance depending on the level within the organization</p>
	<p>Clear and considered decision-making processes made by the county are in the best interest of the county residents and inconsistent with the objectives of the CPLUDP</p>	<p>Elected County Officials (Governor and MCAs) delegate to the senior management (County secretary, CECMs, Chief Officers) functions of the County except those precluded from delegation under County Government Act, 2012 or those functions the elected officials consider should be done by themselves</p> <p>The senior management in turn delegates the functions to staff at appropriate levels of the county structure to ensure day to day work of the county can be carried out. This includes financial delegation to ensure financial decisions are appropriately made and there is a system of accountability</p> <p>The delegation framework demonstrates the trust the county elected officials place in the senior management and staff in decision-making. The county senior management is responsible to ensure that delegation is done in line with appropriate policies. County policies guide staff to enable appropriate decisions to be made.</p> <p>MCAs should be entitled to put forward alternatives to the recommendations provided by the county staff through the executive. All decisions must be supported by reason and align with the objectives of the County Physical and Land Use Development Plan</p> <p>All decisions are made at appropriate levels and are supported by sound financial and risk analysis, as well as being consistent with CPLUDP.</p> <p>Clear and considered decision-making processes to ensure the decisions made by the county are in the best interest of the county residents and consistent with the objectives of the CPLUDP</p>
Objective 3	Strategy	Action
Active Public Engagement in local planning and decision-	Being open and transparent about the county's public engagement activities	The county ensures significant public consultation and adoption of the County Physical and Land Use Development Plan. The CPLUDP is supported by a specific public

<p>making processes and shared responsibility for achieving goals</p>		<p>engagement strategy. Public engagement for the CPLUDP is the key way the citizens can become involved in setting the strategic direction for the county.</p> <p>Once the CPLUDP is adopted, the MCAs and the county staff are empowered to implement the strategies and goals established in consultation with the stakeholders.</p> <p>The county adopts the public engagement framework and public engagement policy to provide for openness and transparency with the county's public engagement activities as well as being accessible, inclusive and actively seeking input in decision-making. MCAs and county staff recognize that decisions are improved by engaging the residents and other stakeholder groups. Within the county's ability to finance and resource, the county commits to conduct a transparent and inclusive engagement process that is responsive and accountable.</p> <p>The county assigns high priority to appropriately involving residents and other stakeholders early on and throughout the process, especially when decisions impact their lives. The county recognizes and complies with practices developed by the International Association for Public Participation, Agenda 21, Constitution of Kenya 2010, Article 1(2), Article 10(2), Article 27, Article 33, Article 35, Article 61, Article 69(1) and other related legislations.</p> <p>Public participation is defined in many ways depending on context. For Siaya County, it's the primary way we build public awareness and understanding, and gain better insights into public opinion. The information shared with the county residents is used to ensure services and facilities meet the needs of the people.</p> <p>The county should expand its stakeholder engagement program to empower residents to be further involved in the decision-making process. Methods to employ when engaging stakeholders include:</p> <ul style="list-style-type: none"> • Facilitated workshops • Focus Group Discussions • Online Surveys • Geo Mapping tool surveys • Intercept surveys • Information sessions <p>There are constantly evolving tools being developed in the stakeholder engagement space to better target the hard-to-reach sections of stakeholder groups as well as make the engagement experience as attractive and accessible as possible. The County staff will continue to review from time to time these tools for potential use across the</p>
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		<p>county's planning and service provision initiatives.</p> <p>Diverse stakeholder engagement with a broad section of county residents and other stakeholders is important as MCAs and county Executives and staff have a responsibility to act in the best interest of the people of siaya county.</p>
	Provision of public access to County meetings and business papers	<p>All the ordinary assembly meetings, including assembly sub-committee meetings, be open to the public unless required to be closed according to the relevant Act.</p> <p>The county makes its business papers available on the County website in advance of County Assembly meetings as well as hard copies from the Assembly administration office</p> <p>Minutes of all open county meetings be made available to the public</p>
	A clear line of communication between the MCAs and the members of the public	<p>MCAs' contact details including email contacts and telephone numbers are listed on the County website to allow members of the public to directly communicate with the leaders.</p> <p>Senior County staff contact details including email contacts and telephone numbers listed on the county website to allow members of the public to directly communicate with them</p> <p>Members of the public can raise issues with their leaders at any time. As business papers are released to the public in advance of the assembly deliberations, the public can email or speak with MCAs on issues scheduled for deliberations at the Assembly.</p>
	Open and accessible government information as well as a commitment to the protection of privacy	<p>Under Article 35 of the Constitution of Kenya 2010 and Section 96 of the County Government Act of 2012, there is a provision for the right to access information. Article 35 particularly guarantees all Kenyan citizens the right to access any information held by the state or county or information held by another person and required for the exercise or protection of right or fundamental freedom. For the County this includes</p> <ul style="list-style-type: none"> • Making open access information that is required under Article 35 of the Constitution of Kenya 2010 and Section 96 of the County Government Act of 2012 • Proactively publishing information on the county website than is legally required and improves the efficient release of information • processing all the formal and informal requests for information efficiently and effectively, and • processing all formal access applications within the statutory timeframes and in compliance with the legal requirements <p>The County executive ensures the provision of timely and detailed information to MCAs relevant to the discharge of civic duty while still maintaining an appropriate level of independence for the elected leaders and the county staff.</p>

		<p>The county will ensure it meets the highest level of disclosure regarding all dealings with county officials while also meeting its obligation under the relevant privacy regulations and County Privacy Management Plan</p> <p>The county will ensure that its procedures meet the highest level of transparency, accountability and probity while complying with current legislative requirements</p> <p>Whilst County is committed to releasing information, such disclosure will be done where there is a public interest to do so. This means that there is some personal or commercial confidence business information that may not be disclosed if there is no public interest to do so.</p>
	Open and transparent disclosure	<p>A standing item in every Assembly and other counties' strategic meeting's agenda should be a disclosure of conflict of interest requiring MCAs and All county staff to make disclosures in the meetings about any conflict of interest they have to any item in the agenda of discussion. The official's conflict of interest is recorded in the minutes of the meeting.</p> <p>County staff are also required to declare in writing to their managers any conflict of interest that arise in the course of conducting their duties</p> <p>When MCAs and County Officials declare a pecuniary or significant nonpecuniary interest, they must remove themselves from the decision-making process.</p> <p>MCAs, senior staff and other staff members with decision-making functions are required to complete an annual pecuniary interest return disclosing to the County Secretary:</p> <ul style="list-style-type: none"> • Property • Income • Significant gifts • Significant contributions to travel • Shares and positions held in companies • Positions in trade unions or professional associations • Debts; and • Discretionary disclosures
	Consideration of citizens' advice on County issues	<p>The County may establish advisory committees by a resolution of the County Assembly. The purpose of these committees is to provide guidance and make recommendations to elected and other county officials within a particular area of expertise. The committees may have members from key stakeholder groups and MCAs as members</p> <p>The committees meet to discuss issues within their areas of expertise and make recommendations back to the County Executive and County Assembly.</p> <p>The assembly adopts a constituting document for each of the committees, setting out,</p>

		<p>including and not limited to:</p> <ul style="list-style-type: none"> • Responsibilities/terms of reference • membership • meeting frequencies and agenda items • committee authority, and • reporting obligation
	Effective Complaints handling focused on customer service improvement	<p>The county adopts Customer complaints handling Policy to ensure:</p> <ul style="list-style-type: none"> • The county responds to complaints in a timely, consistent and cost-effective way; • The boosting of public confidence and perception of the quality of services provided by the county • Complaints information and statistics are used to deliver quality improvement in services and how it handles complaints
Objective 4	Strategy	Action
County Government Organization of Excellence	Accountable to actors and supporting a strong governance framework	<p>County to establish a governance committee made up of County executive members and MCAs. The purpose of the governance committee will be to:</p> <ul style="list-style-type: none"> • Oversee the development of County governance policies and Policy Framework • review the county's code of conduct at regular intervals • review and endorse staff awareness programmes on Code of Conduct, fraud and corruption prevention and public interest disclosure; • review and monitor the county's effectiveness in handling customer complaints • review and monitor the county's fraud and corruption management plan • review and monitor CPLUDP and reporting framework <p>The governance committee will report periodically to the County Assembly and the County Executive</p>
	Improve fraud and corruption control	<p>The County to adopt a Fraud and Corruption strategy that provides:</p> <ul style="list-style-type: none"> • An integrated and overarching strategy to control fraud and corruption risks in the county • Guidance on all fraud and corruption management activities and regularly updated tracking actions taken by the county to prevent fraud and corruption, and • A mechanism for evaluation and continuous improvement of fraud and corruption management activities at the county through a fraud and corruption management plan
	The county takes steps to ensure it appropriately identifies and manages serious wrong-doing	<p>The county adopts an internal reporting policy from time to time. It should provide:</p> <ul style="list-style-type: none"> • Procedures for reporting serious wrong-doing to appropriate levels of

		<p>management or legal department and governance team</p> <ul style="list-style-type: none"> • The reporting of systemic and recurring governance problems to those with sufficient authority to correct them
	Promotes an organization that eliminates or minimizes risks	<p>The county supports and is committed to risk management. The county adopts and maintains a risk management framework and risk management committee to appropriately identify and manage:</p> <ul style="list-style-type: none"> • Business and financial risks including fraud and corruption • Risk management plans for projects and undertakings • Project continuity planning, and • Emerging risks <p>The risk management committee reviews the risks and insurance-related initiatives which provide for risk awareness and mitigation strategies to be implemented where appropriate</p>
	Ensure accountability for public money, and high level of services, governance, quality, professional conduct and compliant with professional standards and other legislative requirements	<p>The county is required to ensure that external audits of its financial reports are carried out by accounting standards.</p> <p>The county adopts and maintains an audit committee by regulation and based on the best practice. The audit committee reports periodically to the County Executive and County Assembly</p> <p>The objective of the audit committee is to provide independent assurance and assistance to the county on risk management, fraud and corruption control, governance, and financial and legal and regulatory obligations.</p>

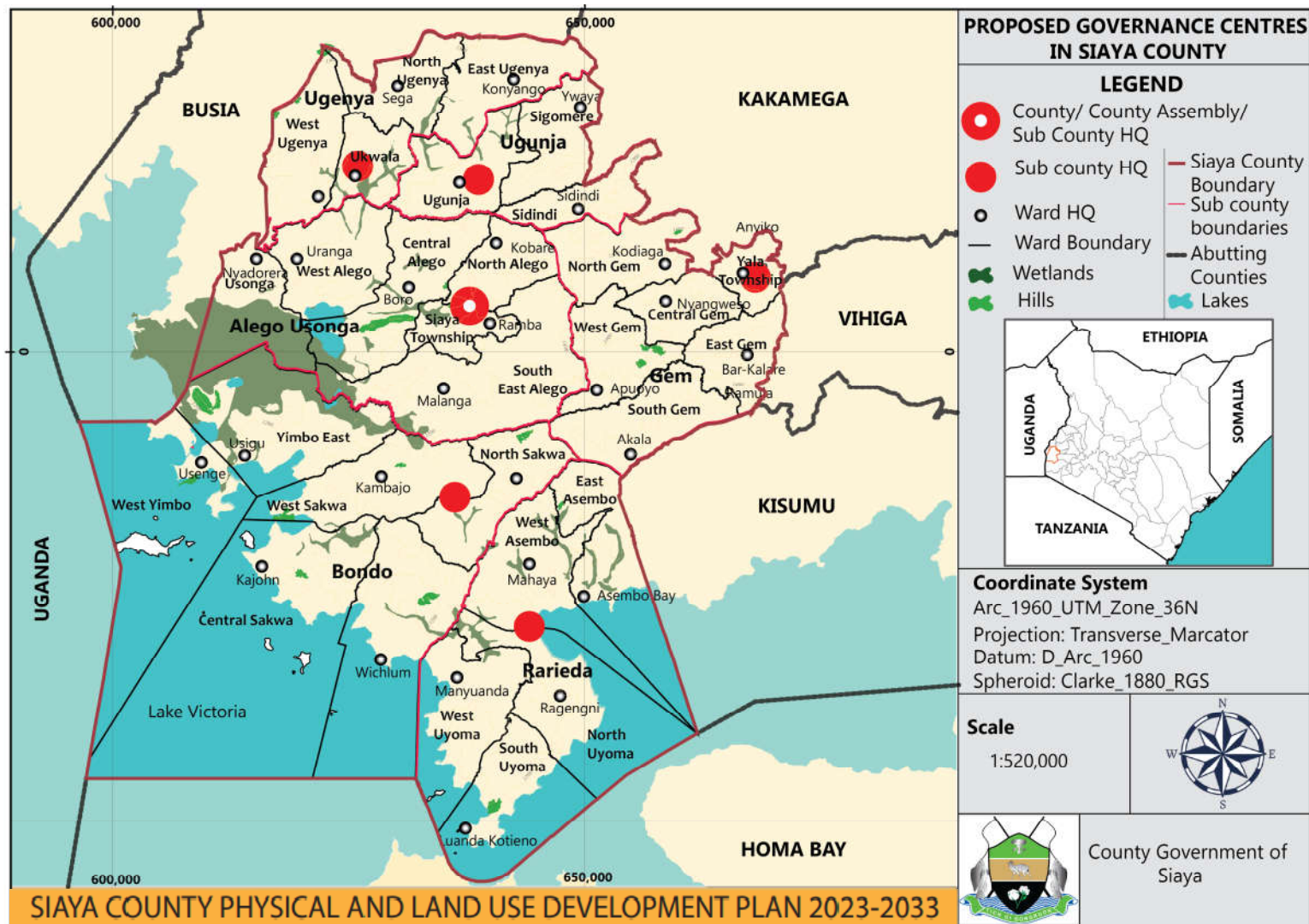
Table 14.18: Key Strategies in Governance and Security Infrastructure

Proposal	Number	Location requirements	Land requirements	Space requirements
Sub-county HQs	6	<ul style="list-style-type: none"> • Centrally located Police Division • Sub County Administrator Office 	<ul style="list-style-type: none"> • Library/Resource Centre • Social hall • VCT centre • Public telephone • Amphitheatre (Cultural dances and cinema) <p><i>At least 1Ha of the land is required</i></p>	<ul style="list-style-type: none"> • Recreation facilities i.e., park • Space for security offices

Ward HQs	30	<ul style="list-style-type: none"> Centrally located Police Station in each ward headquarters Office of the Member of the County Assembly Ward Administrators offices 	<ul style="list-style-type: none"> Library/Resource Centre Social hall VCT centre Public telephone Amphitheatre (Cultural dances and cinema) <i>A police station requires at least 2 Ha of land</i>	<ul style="list-style-type: none"> Recreation facilities i.e., park Space for security offices
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Table 14.19: Proposed Ward Headquarters

S/N	Ward	Proposed Headquarter	S/N	Ward	Proposed Headquarter
1	West Yimbo	Usenge	16	Yala Township	Yala
2	Yimbo East	Usigu	17	North Gem	Kodiaga
3	Central Sakwa	Nango	18	Sidindi	Sidindi
4	West Sakwa	Kambajo	19	Sigomere	Sigomere
5	North Sakwa	Bar Opuk	20	Ugunja	Ugunja
6	South Sakwa	Migwena	21	East Ugenya	Uring
7	West Uyoma	Manyuanda	22	North Ugenya	Sega
8	South Uyoma	Ndigwa	23	Ukwala	Ukwala
9	North Uyoma	Ragengni	24	West Ugenya	Bar Owengo
10	West Asembo	Mahaya	25	Usonga	Nyadorera
11	East Asembo	Nyilima	26	West Alego	Uranga
12	South Gem	Ndori Chief's Camp	27	Central Alego	Boro
13	East Gem	Bar Kalare	28	North Alego	Nyalgunga
14	West Gem	Wagai	29	Siaya Township	Awelo
15	Central Gem	Nyangweso	30	South East Alego	Bar Ogongo



Map 14.9: Proposed Governance Centres in Siaya County

PART V- SPATIAL DEVELOPMENT FRAMEWORK

CHAPTER 15: SPATIAL DEVELOPMENT FRAMEWORK

15.0 Introduction

The County Physical and Land Use Development Plan as per the provision of the Physical Planning Bill 2017 and Physical Planning Hand Book 2019 is supposed to detail guidelines and planning standards for zoning provisions as well as permitted functionality of the plan. This County Physical and Land Use Development Plan, therefore, synthesis and scenario building and clear focus while embracing Sustainable Development Principle recommend a balanced Spatial Framework in development activities embedded into three (3) broad spatial development structures or framework, namely the Green Spatial Development Framework, the Brown Spatial Development Framework, and Blue Spatial Development Framework herein referred as zones I, II, and III respectively.

15.1 Land Use/ Zoning Plan

15.1.1 The Green Spatial Development Zone I

The Green Spatial Development Zone I is created in recognition of the fact that Natural Capital is the backbone of any socioeconomic development. Natural resources as well as environmental well-being are given prominence in this zone:

- To ensure that ecological goods and services as well as natural capital are available and guaranteed for the present and future generations through the allocation of space for conservation, preservation and protection of all environmentally significant areas in the County.
- To ensure that areas for productive engagement in agriculture for food production and raw material through the allocation of space at all times to realize food security and value addition in manufacturing

There shall be a Green Spatial Development Zone 1: This zone, therefore, comprises all environmentally significant areas and habitat conservation areas as detailed in the Environmental Management and Coordination Act of 1999 (amendment 2016) and the Agriculture Act (2003) (Figure 15.1).

15.1.1.1 Zone 1A (Ecological Integrity Zone)

These areas first include forests (gazetted and community forests, hilltops, and migratory corridors). The plan recommends the establishment of buffer zones in these areas to reduce encroachment to these important biological diversity areas. Minimal human activities are allowed in these Zone 1A, and to extend human settlement shall be restricted and/or not permitted in some extreme spaces that are susceptible to severe environmental degradation and/or loss of significant biological habitat due to human encroachment (steep slopes, unique biodiversity areas, water catchment area, groundwater reserve).

15.1.1.1.1 Strategies for Ecological Integrity Zone (Zone 1A)

- There shall be concerted efforts in collaboration between the National and County Governments to gazette these areas of ecological integrity (environmental quality).
- There shall be concerted efforts to create buffer zones through the demarcation of these spaces.
- There shall be elaborate efforts geared towards enhancing the preservation, protection, and conservation of these spaces.
- There shall be elaborate efforts to promote ecotourism ventures (recreational) in these areas to realize revenue generation.

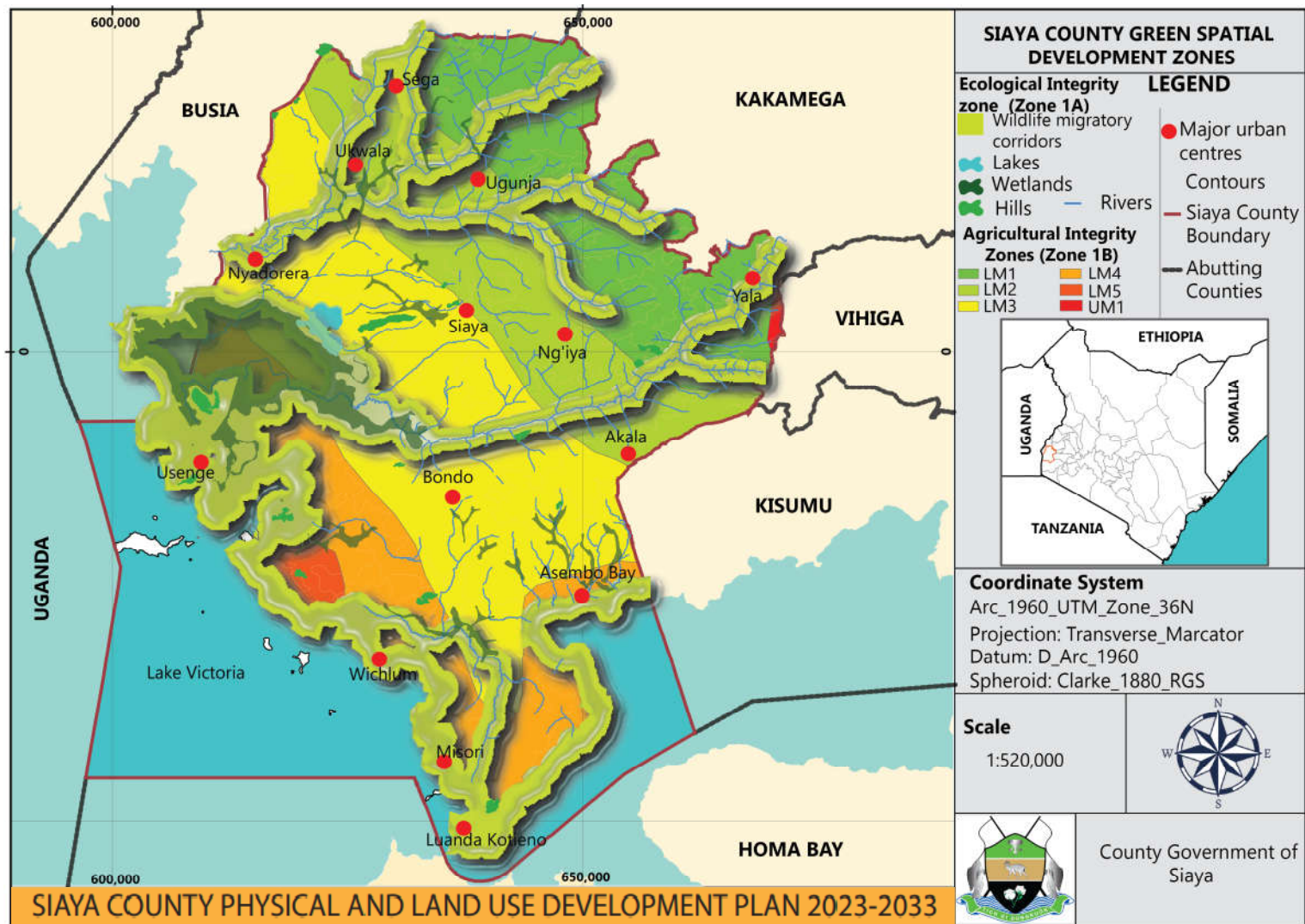
- From time to time the National and County Governments shall progressively pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas for the benefit of humanity and environmental quality.

15.1.1.2 Zone 1B (Agricultural Integrity Zone)

Secondly, all agricultural land for food production (maize, beans, cowpeas, groundnut, sorghum, finger millet, vegetables, fruit crops), cash crops (sugar cane, coffee, cotton) and livestock production (cattle, cows, goats, sheep, poultry) just to mention some as detailed in the Farm Management Hand Book 2011 about Agro-Ecological Zones' guidelines, except the areas, delineated as Urban and Transport Corridors shall be designated as Green Spatial Development Zone 1. Zone 1B, a designated area for agricultural production (crops and livestock), though designated as a Green Spatial Zone I, where human settlement activities shall be permitted and thus designated as rural areas and/or peri-urban, for housing (home) development that is compatible and conforms to the green agenda in housing development. In general, 70% green cover shall be encouraged. Built homes shall maintain at least 10% green cover of the appropriate (mirror natural habitat) biological species of flora (preference to indigenous species).

15.1.1.3 Strategies for Agricultural Integrity (Zone 1B)

- From time to time there shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas to promote agricultural productivity to realize food security and value addition in manufacturing in the County.
- There shall be appropriate, affordable and reliable crop and livestock husbandry methods, and technology applied and transferred to the populace to engage in profitable agriculture and promote local economic growth.
- There shall be concerted efforts made to encourage the local populace to engage in agriculture, especially the youth, to create employment and increase income as well as a multiplier effect in other related economic activities, through backward and forward linkages.
- There shall be concerted efforts to expand land under agriculture, through small-holder farmer participation and increased farmer extension services.
- There shall be concerted efforts to expand land under agriculture through irrigation programmes to cushion farmers from the impact of unreliable rainfall (drought).
- There shall be concerted efforts to increase agricultural productivity through improved technology uptake, and mechanization (tractorization).
- There shall be deliberate efforts in marketing, creativity, innovation, and technology, to enhance value addition in agricultural products to allow the economy to start shifting towards industrialization.



Map 15.1: Siaya County Green Spatial Development Zones

15.1.2 The Brown Spatial Development Zone II

The Brown Spatial Development Zone II is created to allow human settlement and infrastructure development for the well-being of social-economic transformation. This Zone II shall comprise Urban and peri-urban areas as Zone IIA and Transport (growth) Corridors Zone IIB, Nucleated Rural Settlement Zone IIC and Special Economic Zone IIC. Zoning guidelines and planning standards are therefore pronounced to guide development in this zone according to the Physical Planning Act Cap 286 (Amendment Physical Planning Bill 2019) and Urban Areas and Cities Act 2011 (Amendment 2016). The County Physical and Land Use Development Plan pronounces that there shall be a Brown Spatial Development Zone II, where human settlement and infrastructure development activities shall be permitted, however, aspects of green spaces shall be embedded in this zone to allow integration and balanced development to allow enhanced environmental quality. Development in this zone shall embrace 30% green cover. The 70% built environment shall comprise residential, industrial, educational, recreation, public purpose, commercial, public utilities, and transportation land uses while embracing mixed land use for county-wide functionality as per the provision of the Physical Planning Standards 2019. This zone, therefore, comprises human settlement development areas designated as settlement areas of growth centres (7 Kilometre radius), sub-county growth centres (5 Kilometre radius), urban centres (3 Kilometre radius), rural and local centres as well as growth corridors (transport).

15.1.2.1 Objectives of the Brown Spatial Development Zone II

- To enhance harmonious and sustainable urban development for livable towns and rural settlements.
- To promote sustainable human settlements with the growth corridor and special economic zones transform the county's local economy.

15.1.2.2 Strategies to Promote Permitted Development in Zone IIA (Urban Development Zone)

- From time to time there shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage urban development and affordable, sustainable housing within livable urban areas in the County.
- There shall be a concerted effort to promote commercial development areas for sustained local economic development as well as appropriate markets to promote small and medium enterprises (SMEs).
- There shall be elaborate programmes to promote industrialization through creativity, innovation and technology as a working environment for the urban population as well as shift the labour market from agriculture to industrial development
- There shall be a concerted effort to develop affordable housing to enhance social inclusivity, equity and a livable environment for the urban population in the county
- There shall be an elaborate programme to improve social development in the County through the provision of education and health services while embracing and respecting the catchment population and accessibility concepts.
- There shall be concerted efforts to establish public-purpose land uses to promote governance, security, and cultural and spiritual well-being of the population as well as devolved service delivery to the local population.
- There shall be elaborate endeavours to develop public utilities (electricity, energy, water sanitation, sewer line, telephone, Information Communication and Technology (ICT) hubs,

dumping sites, and cemeteries) county-wide to enhance the livability of the urban settlements.

- The County Government in collaboration with the private sector shall ensure development control is exercised in this zone as provided in the Physical Planning Standards 2019

15.1.2.3 Zone IIB Growth Corridors (Transport)

The County Physical and Land Use Development Plan shall pronounce the existence of Growth Corridors in tandem with: with major transport network in the county herein designated as settlement areas as i) Regional Development Corridor of 1 Kilometre radius and ii) County Development of 0.5 Kilometre radius. The permitted development of the Urban Development Zone shall apply (*mutatis mutandis*) as well as the strategies where appropriate and applicable.

15.1.2.4 Zone IIC Rural Settlement Zone

The County Physical and Land Use Development Plan shall pronounce the existence of a Rural Settlement Zone, that acts as a transition between the Green Zone and the Brown Zone. The provision here is to have a nucleated settlement in a rural and local centre of a radius of 0.5 of a Kilometre, well serviced with socio-economic facilities to perform their designated functionality.

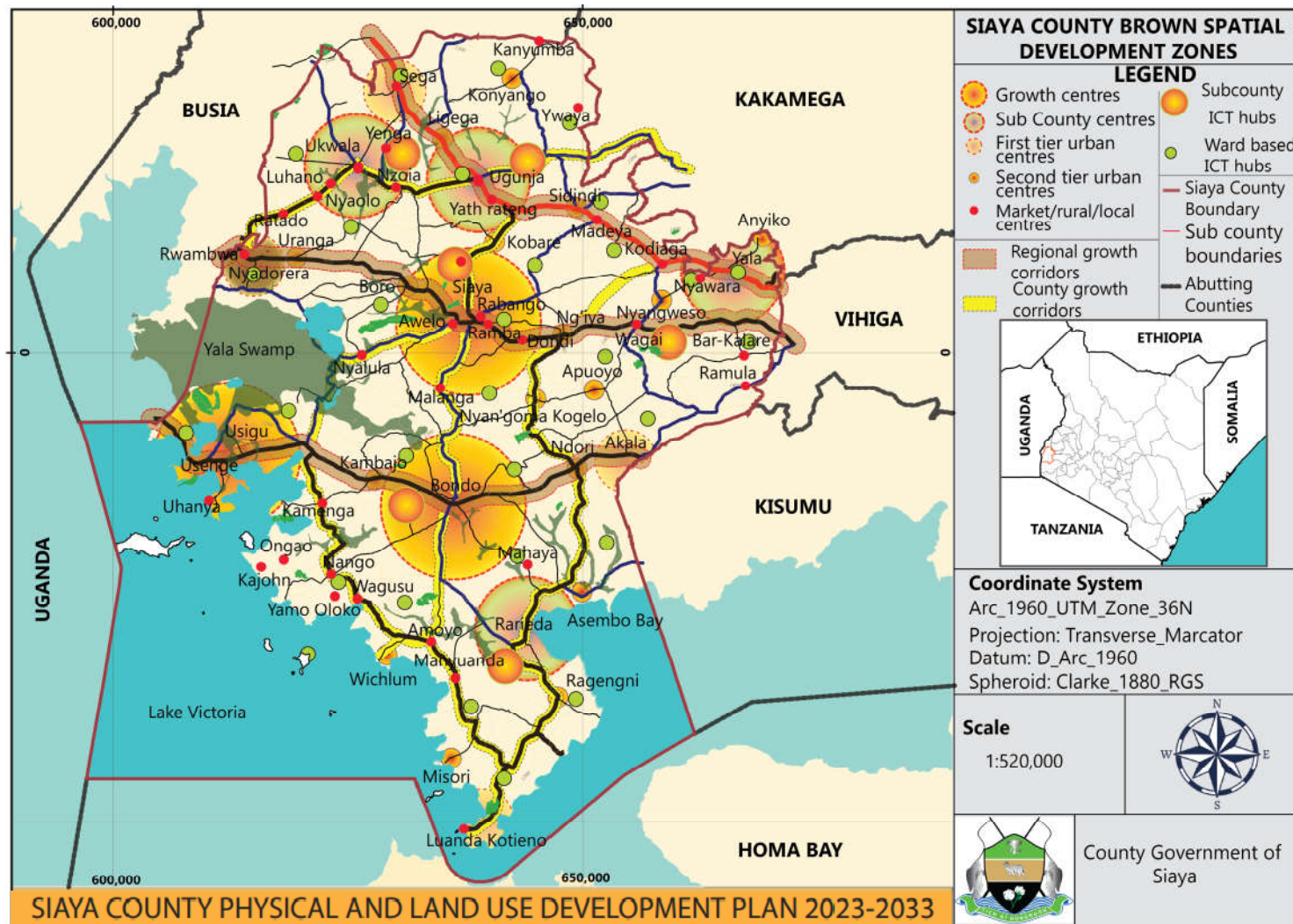
Strategies permitted to promote development in this zone shall include:

- There shall be a resettlement programme to deepen nucleation while releasing land for agricultural productivity.
- There shall be other strategies on Urban Development Zone shall apply (*mutatis mutandis*)

15.1.2.5 Zone IID Special Economic Zone

The County Physical and Land Use Development Plan shall pronounce the existence of a Special Economic Zone to accelerate socio-economic transformation in areas of industrialization, commercial hub, ICT hub and smart city (techno-city).

- There shall be a public-private partnership framework to develop a special economic zone through effective infrastructure development to facilitate these areas as an impetus for growth while embracing the backward and forward linkages concepts.
- There shall be other strategies in Urban Development Zone shall apply (*mutatis mutandis*).



Map 15.2: Siaya County Brown Spatial Development Strategy

15.1.3 The Blue Spatial Development Zone III:

The Blue Economy is an emerging economic space with lacustrine environments, namely: water-related (lakes, rivers and wetlands). The County Physical and Land Use Development Plan pronounces development frameworks within this zone, of significance in terms of activities related to fishing, tourism and marine economy (shipbuilding, boat making), water transport (shipping logistics, Port & harbour), exploration energy (wind and solar power).

15.1.3.1 Objectives of the Blue Spatial Development Zone III

- To explore, establish and promote tourism development in the Zone to shift labour engagement to new areas of economic transformation
- To initiate and formulate policies, strategies, guidelines and standards that promote blue economy development.
- To enhance, and strengthen the development of fisheries both capture and culture fisheries to promote food security and value addition in manufacturing

15.1.3.1.1 Zone IIIA: Tourism Promotion Zone

The County Spatial shall pronounce the Tourism Promotion zone, herein referred to as the Lakefront of: Lake Victoria, Lake Kanyaboli, Lake Nyamboyo and Lake Sare. In addition, the Yala Swamp Ecosystem is included in this zone as an important wetland of international importance (IBA) (Important Bird Area) as per UNESCO and WWF classification. The lake Front 5km inland shall therefore be permitted for the development of the tourist industry in the form of marinas, lodges, resorts, restaurants hotel development, water sport, leisure sport, and marinas as detailed to conform and compatible with the Physical Planning Handbook 2019 as well as in line with Sustainable Tourism Development Strategy.

Strategies to promote tourism development include:

- From time to time the National and County Governments shall pronounce policies, strategies, legislation, and guidelines for sustainable tourism development
- There shall be a designated Lake Front, through legislation, is an exclusive tourism development zone.
- There shall be concerted efforts to mobilize land resources in the Lakefront, through acquisition, purchase, compensation, and land banking to release this land for tourism promotion.
- There shall concerted effort to mobilize funds for capital investment to develop the area as a Lakefront (infrastructure, building lodges, resorts). The Capital Investments shall be through Public-Private Partnerships, National and County Governments, Foreign Direct Investment and local investors.
- There shall be to develop the County-Tourism to link to the regional circuit (Western Kenya) and the national circuit synchronized (Branding, Marketing, and Promote Visibility in various channels).



Plate 15.1: Proposed Lakefront Development for Ecotourism

15.1.3.1.2 Zone IIIB: Fisheries Development Zone

The County Physical and Land Use Development Plan shall pronounce the fish industry development areas to include the Lakes (Lake Victoria, Lake Kanyaboli, Lake Nyamboyo and Lake Sare) as well as the Yala Swamp. The fishing industry is therefore considered a major economic activity in the County. The fish Landing beaches are many (cross reference) that require development space. The Lake and River waters, therefore, are significant for the blue economy in terms of fish capture and culture.

Strategies to promote fishery development in the County shall include:

- From time to time the National and County Governments shall pronounce policies, strategies, legislation, guidelines and standards to promote fishery development.
- The County shall gazette, designated fish landing sites and encourage local ownership and participation
- There shall be elaborate efforts to develop fish landing beaches along the lakes to promote clean, safe, healthy capture of fish resources
- There shall be an elaborate plan and budget for development infrastructure (roads, telephone, electricity, water and sanitation) in the fish landing beaches
- The County shall have concerted efforts to develop spatial development for each fish landing beach (and/or market therein).
- There shall be established programmes to develop and improve fish culture development county-wide.



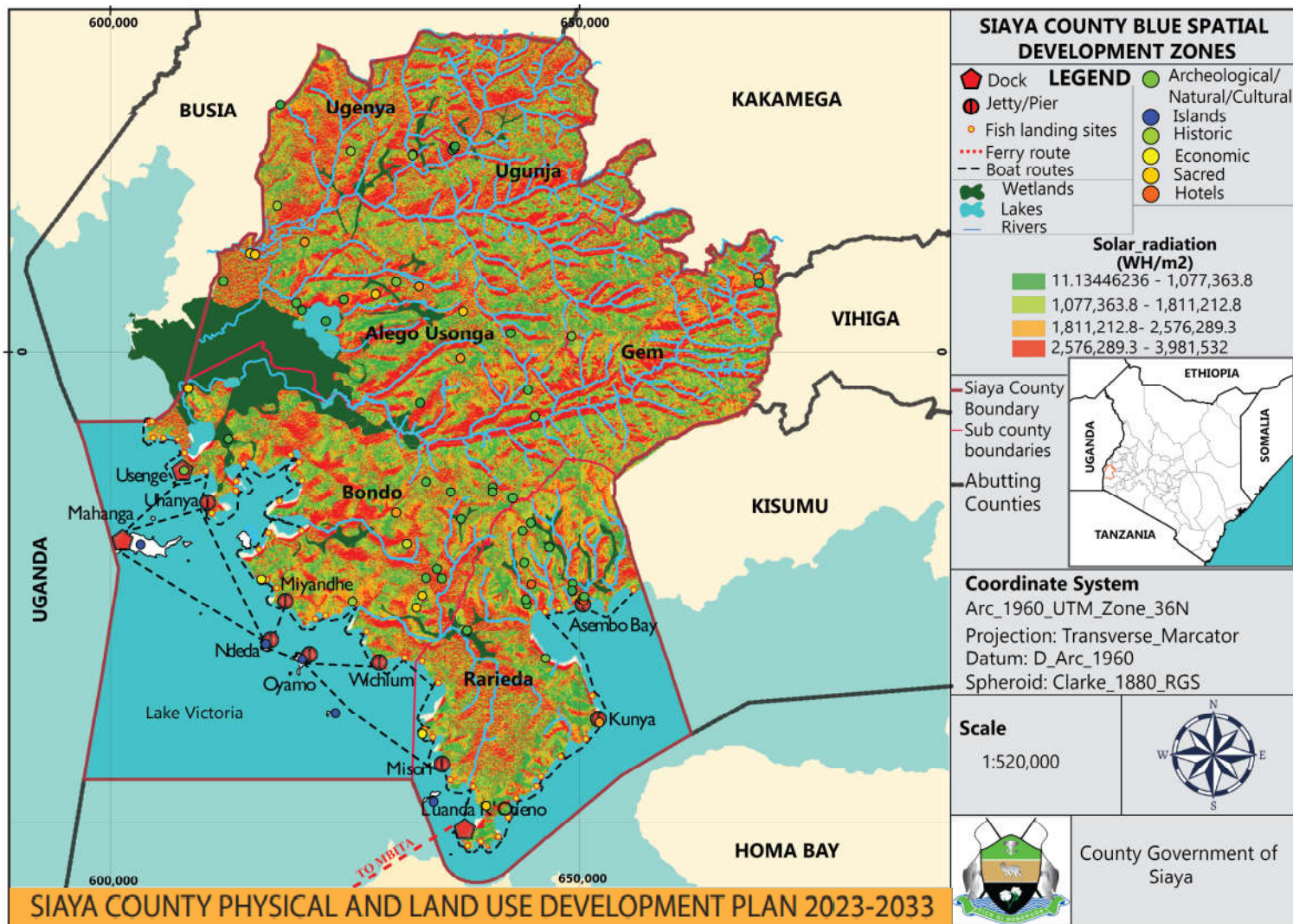
Plate 15.2: Proposed Harbor Development on the Beaches of Lake Victoria

15.1.3.1.3 Zone IIIC: Marine Industry and Commerce Zone

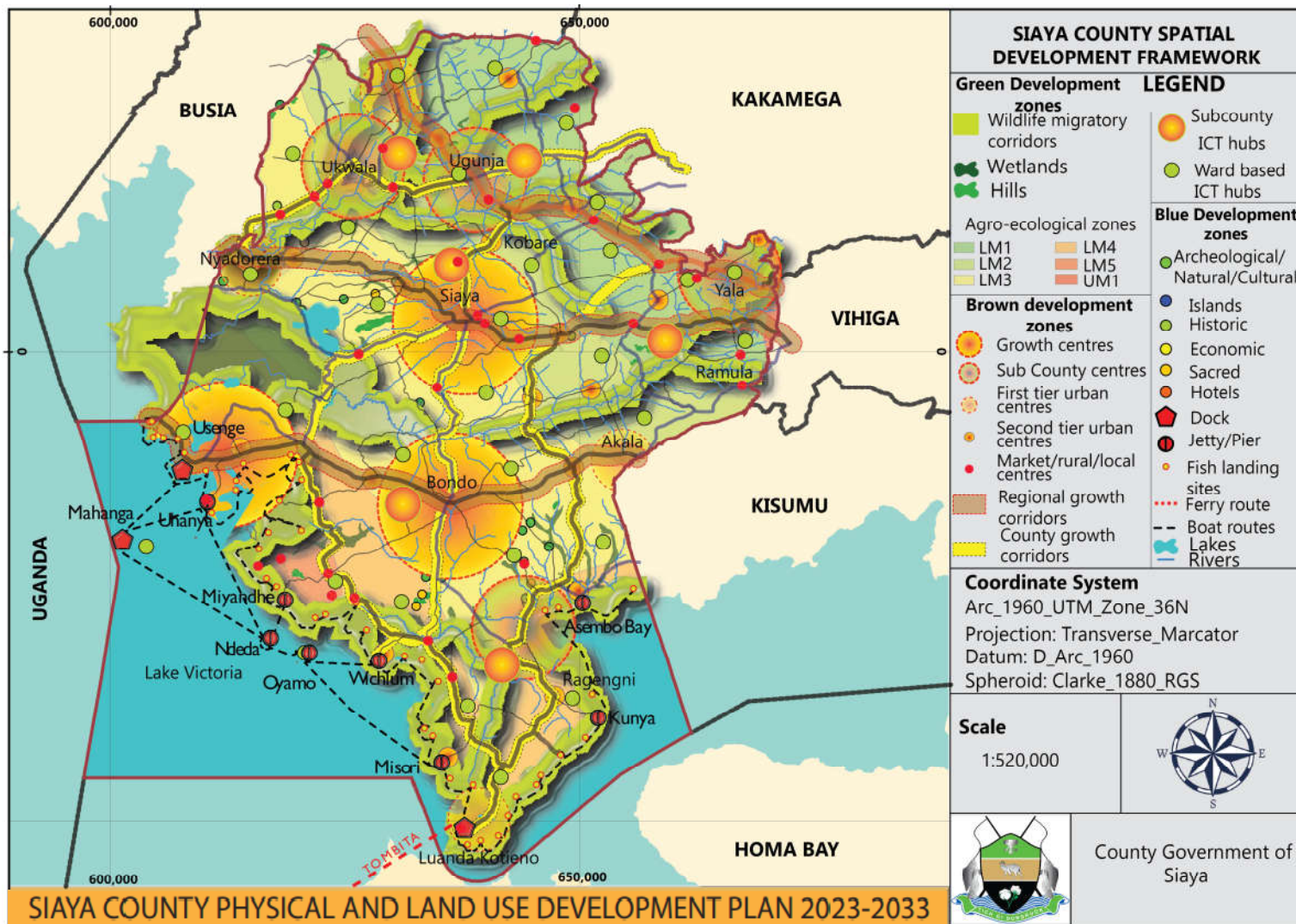
The County Physical and Land Use Development Plan shall pronounce the Marine Industry Zone, which shall provide space to perform functions of Port Development (Various selected beaches for example Asembo Bay, and Port South Bay), Ship Building, ferry services, boat building, boat racing, leisure sport, water transport, hauling of traded goods and services, providing logistical support (clearing and forwarding, warehousing, safety measures, security operations).

Strategies to promote marine industry and commerce shall include:

- From time to time the National and County Governments shall pronounce policies, strategies, legislations, guidelines and standards to promote the development of marine industry and commerce.
- The County Government shall designate and gazette suitable locations for the marine industry and commercial development as well as develop special area plans (spatial) for the development of these selected marine environments that include landing beaches and islands (for example Mageta, Oyamo, Ndeda).
- There shall be elaborate interventions to establish and develop appropriate infrastructure and social amenities in this selected area.



Map 15.3: Siaya County Blue Spatial Development Zones



Map 15.4: Proposed Siaya County Spatial Development Framework

CHAPTER 16: ACTION PLANS

16.1 Introduction

This Chapter details various actions required to actualize the plan for effective implementation. Each Spatial Development zone then is discussed in terms of strategies pronounced in Chapter 15 and various actions required to operationalize the plan in line with Kenya Constitution 2010, the County Devolution Act 2012, the Physical Planning Act Cap 286 (Physical Planning Bill 2019), the Urban Areas and Cities Act 2011 (amendment 2016).

16.2 Green Economy Development Strategy: Action Plan 2023-2033

Table 16.1: Green Economy Development Strategy: Action Plan 2023-2033

Zone 1A: Conservation Zone (Ecological Integrity)			
Objective: To ensure that ecological goods and services as well as natural capital available are guaranteed for the present and future generations through the allocation of space for the conservation, preservation and protection of all environmentally significant areas in the County			
Strategy 1: There shall be concerted efforts in collaboration between the National and County Governments to gazette these areas of ecological integrity (environmental quality).			
ACTIVITY	TIMEFRAME	BUDGET	RESPONSIBLE
1.1: Prepare a County Bill to gazette the conservation zone	2023 - 2024	30M	County Government
1.2: Stakeholders' awareness (public participation)	2023 - 2024	30M	County Government
1.3: Gazette the Conservation in County Gazette	2024	200M	County Government
Strategy 2: There shall be concerted efforts to create buffer zones through the demarcation of these spaces.			
2.1 Stakeholders' Awareness (public participation)	2023 - 2024	20M	County Government
2.2 Survey to establish the buffer zone	2023 - 2024	50M	County Government
2.3 Demarcation of the buffer zone	2024 - 2026		County Government
Strategy 3: There shall be elaborate efforts geared towards enhancing the preservation, protection, and conservation of these spaces.			
3.1 Stakeholder engagement for conservation measures between community and Lead agencies	2023 - 2024	20M	County Government
3.2 Mobilize resources for conservation, preservation and protection,	2024 - 2029	40M	County Government
3.3 Restoration of degraded areas & lost biological habitat	2024 - 2030	100M	County Government
3.4 Afforestation and reforestation programmes	2024 - 2032	80M	County Government
Strategy 4: There shall be elaborate efforts to promote ecotourism ventures, (recreational) in these areas to realize revenue generation.			
4.1 Stakeholder Participation in Eco Ventures	2023 - 2024	30M	
4.2 Establish Local Community Eco-Ventures Institutions	2024 - 2026	100M	
4.3 Capacity Building for Local Community Groups	2024 - 2029	30M	

4.4 Establish Community Management Plans (conservation, Branding & Marketing)	2024 - 2030	200M	
Strategy 5: From time to time the National and County Governments shall progressively pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas for the benefit of humanity and environmental quality.			
5.1 Stakeholder awareness of environmental governance in policy, strategies, legislations, guidelines and standards for conservation Zones	2023 - 2033	30M	County Government
5.2 Drafting of Policies and County Bills	2024 - 2028	50M	County Government
5.3 Presentation of Policies and Bills for Ratification by County Assembly	2026 - 2030	50M	County Government
Zone 1B: Agricultural Productivity Zone Objective 2: To ensure that areas for productive engagement in agriculture for food production and raw material through the allocation of space at all times to realize food security and value addition in manufacturing.			
Strategy 6: From time to time there shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas to promote agricultural productivity to realize food security and value addition in manufacturing in the County.			
6.1 Stakeholder awareness on to formulate policies and legislations on agricultural productivity to realize food security and value addition in manufacturing	2023 - 2026	30M	County Government
6.2 Drafting of Policies and Bills of Policies and Bills for ratification by County Assembly	2024 - 2028	50M	County Government
6.3 Presentation of Policies and Bills for Ratification by County Assembly	2026 - 2030	50M	County Government
Strategy 7: There shall be appropriate, affordable and reliable crop and livestock husbandry methods, and technology applied and transferred to the populace to engage in profitable agriculture and promote local economic growth.			
Transfer of appropriate technology in crop husbandry	2023 - 2024	20M	County Government
Transfer of appropriate technology in livestock husbandry	2023 - 2024	20M	County Government
Provide effective linkages and integration of agriculture productivity (crop and livestock) with the local economy (SME)	2023 - 2033	100M	County Government
Strategy 8: There shall be concerted efforts made to encourage the local populace to engage in agriculture, especially the youth, to create employment and increase income as well as a multiplier effect in other related economic activities, through backward and forward linkages.			
8.1 Capacity building programme for the youth in agronomy, husbandry and agribusiness	2023 - 2033	30M	County Government
8.2 Promote agribusiness enterprises county-wide as part of Small-holder activities	2024 - 2030	50M	County Government
8.3 Mobilize resources to establish youth enterprises (revolving fund)	2022-2028		County Government
Strategy 9: There shall be concerted efforts to expand land under agriculture, through small-holder			

<i>farmer participation and increased farmer extension services.</i>			
9.1 Land suitability analysis irrigation agriculture (crop husbandry)	2023 - 2024	100M	County Government
9.2 Surveying and Mapping of irrigation land	2023 - 2026	80M	County Government
9.3 Feasibility study for various irrigation projects	2024 - 2028	50M	County Government
9.4 Proposal writing for funding	2025-2027	10M	County Government
9.4 Mobilize resources for irrigation development of different projects	2026 - 2030	50M	County Government
9.5 Establish irrigation project after securing funds	2026-2031		County Government

16.3 Brown Economy Development Strategy: Action Plan 2023 - 2033

Table 16.2: Brown Economy Development Strategy: Action Plan 2023 - 2033

Zone 2A: Urban Development Zone			
<i>Objective 1: To enhance harmonious and sustainable urban development for livable towns and rural settlements.</i>			
<i>Strategy 1: There shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage urban development and affordable, sustainable housing within livable urban areas in the County</i>			
ACTIVITY	TIMEFRAME	BUDGET	RESPONSIBLE
1.1 Stakeholder awareness on to formulate policies and legislations on urban management and sustainable housing productivity to realize food security and value addition in manufacturing	2023 - 2026	30M	County Government
1.2 Drafting of Policies and Bills for Ratification by County Assembly	2024 - 2028	50M	County Government
1.3 Presentation of Policies and Bills for Ratification by County Assembly	2026 - 2030	20M	County Government
1.4: Prepare Strategic urban development plans for all urban centres	2023 - 2029	300M	County Government
1.5: Develop new urban areas using principles from livable neighbourhoods and embedded in development control policies designed to achieve sustainable community development	2023 - 2029	300M	County Government
<i>Strategy 2: There shall be a concerted effort to promote commercial development areas for sustained local economic development as well as appropriate markets to promote small and medium enterprises (SMEs).</i>			
2.1: Zone commercial nodes taking into consideration their population and accessibility to the CBDs	2023 - 2024	100M	County Government
2.2: Intensify the use of existing commercial land through better use of existing infrastructure and	2024 - 2029	20M	County Government

planned densification			
2.3 Open up all roads from production and industrial to commercial taking into consideration road connectivity hierarchy	2024 - 2029	200M	County Government
Strategy 3: There shall be elaborate programmes to promote industrialization through creativity, innovation and technology as a working environment for the urban population as well as shift the labour market from agriculture to industrial development.			
3.1: Zone industrial areas taking into consideration accessibility to the CBDs and production areas	2023 - 2024	100M	County Government
3.2: Revamp and establish Small and Medium Enterprises (SMEs) in the county	2024 - 2029	250M	County Government
Strategy 4: There shall be a concerted effort to develop affordable housing to enhance social inclusivity, equity and a livable environment for the urban population in the county			
4.1 Put up housing development in the service centres and use local materials for construction	2023 - 2029	5B	County Government
Strategy 5: There shall be an elaborate programme to improve social development in the County through the provision of education and health services while embracing and respecting the catchment population and accessibility concepts.			
5.1 Upgrade and equip all health facilities	2023 - 2029	600M	County Government
5.2 Improve access to schools and health facilities	2023 - 2029	600M	
Strategy 6: There shall be concerted efforts to establish public-purpose land uses to promote governance, security, and cultural and spiritual well-being of the population as well as devolved service delivery to the local population.			
6.1: Set apart adequate land to plan for the public purpose	2023 - 2027	500M	County Government
Strategy 7: There shall be elaborate endeavors to develop public utilities (electricity, energy, water sanitation, sewer line, telephone, Information Communication and Technology (ICT) hubs, dumping sites, and cemeteries) county-wide to enhance the livability of the urban settlements.			
7.1: Provide Street lights along all major roads and urban centres	2024 - 2029	1B	County Government
7.2: Acquire land for dumping sites in all the major urban centres	2024 - 2029	200M	County Government
7.3 Acquire land for cemeteries in all major urban centres	2024 - 2029	200M	County Government
7.4: Acquire land for liquid waste disposal sites in all the major urban centres	2024 - 2029	200M	County Government
7.5: Improve electricity and telephone connectivity	2024 - 2029	100M	
Strategy 8: The County Government in collaboration with the private sector shall ensure development control is exercised in this zone as provided in the Physical Planning Standards 2019			
8.1 Demolish all structures along road reserves	2023 - 2026	100M	County Government
8.2 Open up all roads taking into consideration road connectivity hierarchy	2023 - 2026	50M	County Government
Zone IIB: Growth Corridors (Transport)			
Objective 2: To promote sustainable human settlements with the growth corridor and special economic zones			

<i>to transform the county's local economy</i>			
Strategy 9: From time to time there shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas to promote agricultural productivity to realize food security and value addition in manufacturing in the County.			
9.1 Stakeholder awareness on to formulate policies and legislations on growth corridors to realize food security and value addition in manufacturing	2023 - 2026	30M	County Government
9.2 Drafting of Policies and Bills for Ratification by County Assembly	2024 - 2028	50M	County Government
9.3 Presentation of Policies and Bills for Ratification by County Assembly	2026 - 2030	20M	County Government
9.4: Prepare Strategic urban development plans for all urban centres	2023 - 2032	600M	County Government
9.5 Develop the public transport network and complementary infrastructure as key elements in supporting urban growth	2023 - 2029	900M	County Government
9.6 Open up all storm water drains along transport channels	2023 - 2025	20M	County Government
9.7 Create parking spaces along roads in the CBD	2023 - 2025	30M	County Government
9.8 Widen narrow road reserves within all CBDs	2023 - 2026	10M	County Government
9.9 To construct walkways and cycle paths on the main roads	2023 - 2029	20M	County Government
Zone IIC: Rural Settlement Zone			
<i>Objective 3: To diversify the rural economy and exploit the potential for economic development in an appropriate scale and manner for the benefit of the rural communities</i>			
Strategy 10: There shall be a resettlement programme to deepen nucleation while releasing land for agricultural productivity.			
10.1 Revamp agro-based industries and collapsing industries like the cotton and sugar industry	2024 - 2029	300M	County Government
10.2 Provide a full range of infrastructure and services in the various service centres	2019-2016	1B	County Government
10.3 Provide entrepreneurial training	2023 - 2029	3M	County Government
10.4 Develop new tourist circuits in the rural areas	2024 - 2029	5M	County Government
10.5 Promote eco-tourism as a tool for achieving rational utilization of environmental and cultural resources	2023 - 2027	2M	County Government
10.6 Promote souvenirs and locally made products	2023 - 2026	1M	County Government
Strategy 11: There shall be other strategies on Urban Development Zone shall apply (mutatis mutandis)			

Zone 11D Special Economic Zone			
<i>Objective: To enhance trade, commerce and industry</i>			
Strategy 9: <i>There shall be a public-private partnership framework to develop a special economic zone through effective infrastructure development to facilitate these areas as the impetus for growth while embracing the backward and forward linkages concepts.</i>			
9.1 Improve key infrastructure in the selected zones	2023 - 2029	1B	County Government
9.2 Strengthen tertiary institutions to provide entrepreneurial training	2023 - 2026	10M	County Government
9.3 Expand small business development support through existing and identified programmes	2023 - 2026	5M	County Government

16.4 Blue Economy Development Strategy: Action Plan 2023 - 2033

The Blue Economy vision is “To develop a blue economy as a means of realizing the County’s development potential through innovation, knowledge-led approach, being mindful of the need to conserve the integrity of Siaya County blue resources for future generations. It is implemented around 4 key pillars

- Economic diversification and resilience- To reduce economic vulnerability and reliance on a small number of sectors and to increase the % GDP derived from the water sector
- Shared prosperity – Creation of high-value jobs and local investment
- The integrity of habitats and ecosystem services, sustainable use, and climate resilience

The blue economy Vision is based on the following blue economy principles:

- Economic Efficiency – Strengthening the role of county government as a regulator and encouraging private sector engagement
- Sustainability – Ensuring sustainable use of lake and wetland resources
- Social equity – Bridging the inequality gap through access to high-quality education, jobs, and local investment opportunities
- Good governance – Transparent, inclusive and accountable decision making
- Resilience – Reducing vulnerability to economic and environmental shocks and resilience planning
- Research and innovation – towards a knowledge of water/marine space for management and technology-based economy, creative business solutions and high-value products
- Partnerships – Government, private sector and civil society, regional and international partners and advocacy

Results sought include: Increased investment in diversification of existing water-based economic sectors (particularly, fisheries, tourism and fishing landing sites) to realize greater value and efficiency from the existing resource base; Exploration and feasibility of new and emerging maritime sectors such as water-based aquaculture, renewable energy and marine biotechnology; and reduced vulnerability to economic and environmental shocks; Effective protection of Siaya County water space and resource through better coordination across different sectors, application of protective measures and greater use of surveillance and enforcement tools; New research, innovation and generation of knowledge about the Lake Victoria space, resources and management needs; Capacity building for effective lake management and for taking advantage of the opportunities the Blue Economy offers today and in future; and Improved prevention of lake/blue economy risks including illegal,

unreported and unregulated fishing, water pollution and climate change through integrated approaches to effective regional cooperation on maritime security.

Table 16.3: Blue Economy Development Strategy: Action Plan 2023 - 2033

STRATEGY	OBJECTIVE	ACTIVITY	TIMEFRAME	BUDGET	RESPONSIBILITY
Strategic Priority 1	Creating sustainable wealth	<p>Diversification of existing water-based sectors (fisheries, ecotourism, Ports) focusing on value addition, value chains, quality, sustainability and good practice</p> <p>Exploring new and emerging sectors such as mariculture, renewable energy, and biotechnology, while focusing on establishing policy setting, feasibility and pilot projects</p>	2023 - 2024	300 M	County Government, National Government, Private sector, development partners
Strategic Priority 2	Sharing prosperity	<p>Ensuring food security and well-being by focusing on improving local production systems and markets, and promoting healthy lifestyles</p> <p>Ensuring high-quality education and professional training, new jobs and employment opportunities</p> <p>Improving the business environment, encouraging local, regional and international investments, innovation, small and medium enterprises and a culture of entrepreneurship</p>	2024 - 2027	300 million	County Government, National Government, Private sector, development partners
Strategic Priority 3	Strengthening the enabling environment	<p>Finalizing the Blue Economy zoning plan of Siaya County by 2020 which will help set the rules to apply for water-based development across maritime sectors</p> <p>Developing research and development and innovation capabilities to inform responsible management of lake and water resources and to transform knowledge into development opportunities and productive activities</p>	2024 - 2030	100 M	County Government, National Government, Private sector, development partners

		<p>As a high-income county, financing blue economy through diversification of funding opportunities, taking advantage of local and international private sector investors' appetite to invest in sustainability; ensuring greater efficiency of revenue raising mechanism</p> <p>Incorporating blue economy risks in county marine security strategies and regional cooperation to address the impact of illegal activities, resource degradation and improved capacity for monitoring, control and surveillance</p> <p>International advocacy and partnerships to attract technical and financial resources and keep blue economy issues at the forefront of county development and climate change agendas</p>			
Strategic Priority 4	Securing a healthy and productive Lake	<p>Ensuring ecosystem service accounting is built into economic measures such as GDP</p> <p>Protecting marine and water assets and addressing lake risks such as water pollution and climate change</p> <p>Implementing blue economy climate resilience through mitigation and adaptation strategies consistent with the obligation under the United Nations Framework Convention on Climate Change (UNFCCC)</p>	2026 - 2030	200 million	County Government, National Government, Private sector, development partners

CHAPTER 17: COUNTY PHYSICAL AND LAND USE DEVELOPMENT PLAN IMPLEMENTATION STRATEGY

17.0 Introduction

The implementation Matrix of Siaya County Spatial is expected to cover 10 years of concrete development frameworks geared towards revitalizing the County's social-economic transformation as well as guaranteeing social inclusivity, economic equity, ecological integrity and heritage posterity. This implementation plan is envisaged to break ground in innovative and transformative actions and strategies that will make the County contribute its share in making Kenya a Middle-Level Industrialized Country and prosperous. The Plan, therefore, is a two-pronged approach to utilize the county resources for sustainable development while establishing capital projects to catalyze the process. The two approaches include Land Use Planning, Administration, and Management as one and second the development of capital investment projects as justification for guiding spatial development frameworks.

17.1 Land Use Planning, Administration and Management

Land use planning, administration and management are supposed to bring systematic order and guaranteed ownership of land as a resource to facilitate spatial development. The land is a scarce resource and all proposed development especially capital investment projects will be required an acceptable, agreeable, suitable, and sustainable space for future development. Information about land resources their value, location, and appropriate use sinks well support spatial development for social-economic transformation as well as environmental capability for the future. Various proposals are therefore made in this County Physical and Land Use Development Plan implementation matrix to cushion land as a resource for future development. County Physical and Land Use Development Plan is broad guidelines for the future spatial structure of the county, a framework, however, its implementation must mirror detailed undertakings:

A1: *implementation of the Plan:* This requires wide stakeholder consultation, capacity building, sensitization and awareness creation of the local community, in every village, market, urban, and ward level among others to internalize the plan as a legal document with its ramifications, benefits, impacts, outcomes and constraints for future spatial development as well as social- economic growth and environmental management. Several meetings, barazas (community), public participation and training of champions to spearhead the ideals of the County Physical and Land Use Development Plan. This includes the formation of implementation sector technical and non-technical committees in wards and sub- county's governance structure.

A2: *Preparation of Integrated Urban Development Plans (IUDP):* These are details plans to guide areas of concentrated human settlement activities especially urban centres, which are intensive development enclaves that require systematic consideration of spatial order. Preparation of these plans will deepen the implementation of the County Physical and Land Use Development Plan since some of the principles, guidelines and standards proposed will only be realized if they are part and parcel of these plans (IUDP) as per The Urban Areas and Cities Act 2011 (amendment 2016). Thus, providing detailed urban spatial frameworks to social-economic development, environmental (protection, restoration, conservation) as well guaranteed cultural heritage for future generations. Each urban centre will therefore initiate, conceptualize and prepare an IUDP to guide development therein within the stipulated legal frameworks and in tandem with the county spatial schema. There are six 6 designated Core and Growth Centres with rapid population growth proposed as education hubs, commercial hubs, industrial hubs, and/or smart-techno cities for the future that require immediate

attention while respecting the County Physical and Land Use Development Plan designated functionality. Each urban centre will require about KES 30 million for preparation of the IUDP as bear minimum and a total of about KES 200 million

A3: Prepare Transport/Urban Corridor Zoning Guidelines: The County Physical and Land Use Development Plan as a spatial structure proposes transport-urban corridors as a zone for major human settlements activities. The Zone will attract more socio-economic development and hence requires detailed planning guidelines and standards to bring systematic order. These transit corridors shall have negotiated detailed spatial frameworks with stakeholders through a planning process as advisory, subject area, and zoning plans. There are around six corridors and the Lakefront area that require special attention in planning. Each corridor would require at least KES 30 million to facilitate this process.

A4: Prepare Urban and Peri-Urban Plans (Towns and Markets): There are about 60 smaller urban centres that act as distributary nodes for social and economic services, viewed as hamlets for future human settlements. In addition, major urban centres (the core) have attractions making their surrounding peri-urban area land speculations, and intensive sub-division that require development control and respective plan preparation.

A5: Prepare plans for the fish landing beaches and Islands: Preparation of about 50 plans prepared to express detailed order of land regulations along these important ecosystems embedded in the Lacustrine (Blue) Economy, being the future of Siaya County. These beautiful landing beaches and islands when planned with a resource base in mind to promote tourism (eco-tourism) and the fishing industry to guide future spatial development of the County, are expected to reap from the Lake Front Development framework.

A6: Prepare Cadastral Plans (Urban Centres): Cadastral plans for major core urban centres is paramount to qualify ownership and facilitate the ability of the owner to access credit in financial institutions and develop the land resource to its full extent. To add value for most urban land cadastral referencing becomes a resource to reduce land conflicts, and achieve correct measurement and correct value. Land cadaster for the county is more than needed for each title deed and or deed plan for all land parcels in the county.

A7. County Urban Development Policy: Urbanization in Africa has been described as unprecedented and alarming meaning that we have to focus our plans in urban centres. This focus requires that urban development policy is prepared and implemented in the county, spatial frameworks, infrastructural development and project implementation require a policy to guide the future. The policy will be viewed to create confidence in investors both foreign and local as the impetus for future county growth.

A8: County Physical and Land Use Development Planning Bill/Law: County Physical and Land Use Development Planning is devolved hence effective County Physical and Land Use Development Plan implementation will be significant if a Bill and Law are promulgated for wide dissemination and deepening the enforcement of the plan. The County Spatial enlists specific guidelines which require to be translated into specific legislations for purposes of implementation to ensure conformity to the plan. The 10 years of implementing the plan in terms of guidelines, plans, and budget require legal backing. Drafting this Bill/Law require wide public participation and stakeholder engagement as well as technical consultative meeting to legislation that is unique to Siaya County.

A9: Development Control Enforcement: Development control is the key determinant in realizing plan implementation. The implementation is realized when development control principles are understood and constantly monitored. This process is therefore significant effective realization of the intended plan.

A10: Valuation Roll for Core Towns and Sub-County Centres: Land value is a key component of plan implementation, where planning adds value to existing land resources. The economic benefit of land use planning cannot be gain said. It envisaged that major land

uses assigned in the County Physical and Land Use Development Plan will increase the land prices, rent and rate charged as well as auxiliary service charges. Areas therefore designated as function, peri-urban, transit corridors, and lakefront will acquire a new value. The planning gain is therefore a useful tool, to offset the planning loss in resource mobilization for development for example land rent, rates and taxes. Siaya country's riches are viewed from abundant land resources and an untapped lake environment (blue economy). County-wide valuation roll will therefore act as a catalyst for County Physical and Land Use Development Plan implementation

A11: County Land Information System: The digital revolution has caught up in every aspect of society, and quick response in service delivery has become effective with abundant data converted from analogue to digital. Land Information System, provides that all land records, data, and information is computer-based and can access with a click of a button for ease of prompt service delivery. These facilities, therefore, include a Geographic Information System (GIS)-Based County Physical and Land Use Development Plan, Developing a Land Information County Portal, Public User- Access Portal, Huduma Centre Portal, and Web-based land records, among others. The County Physical and Land Use Development Plan will be at reach everybody for purposes of interacting with the interface, dissemination, awareness creation and capacity building. It envisaged that a county-wide capacity-building process among professionals, practitioners, technical personnel and the general public will help in County's Physical and Land Use Development Plan implementation.

A12: Mapping for Resources and Infrastructure: Detailed Map generation for key resources and embedded infrastructure enhances accountability, transparency, and integrity concerns, of what is where and who owns it (public or private) as a significant determinant of future capital investments. Meaningful infrastructural development and further expansion and/or extension require details of the existing situation as part of the feasibility study and background checks. The County Physical and Land Use Development Plan implementation will further be deepened with more information and or databases of more accurate surveys.

17.2 Capital Investment Projects

It has been assumed that implementing a County Physical and Land Use Development Plan is not through capital investment projects so in most cases, they are proposed in Isolation. The capital investment projects require the space (land) for construction, operation, maintenance and actual functionality. A plan developed without the capital investment framework embedded in County's Physical and Land Use Development Plan, may not be realized. Planning without a budget is like operating a machine without an operator. The Capital Investment Plan when mirrored in a County Physical and Land Use Development Plan provides the budgeting process of a major investment project envisaged to allow the plan actualized. The plan is usually a five-plan details budget (funds) required and possible sources sometimes referred to as the basket and or resource envelope. Most development partners want to view the county plan and budget and therefore pick one or two items in the budget. Just to reflect on the linkage of the County Physical and Land Use Development Plan and Investment Plan, is that one provides the space and one the budget (funds) for implementation to bridge the gap of integration. These County Physical and Land Use Development Plan therefore proposes several capital investment projects geared to help in the implementation of the plan; the main categories being land acquisition (banking), construction of social and physical infrastructures (for example public works of buildings, roads, water), environmental restoration (conservation) among others.

B1: Urban Support Infrastructure in major towns (Growth Centres): The Urban Support Infrastructure in the Core Centres of Siaya, Bondo, Aram, Yala, Ugunja, Usenge and other growth centres will entail the development of the following infrastructures: Storm Water

Drainage, Market, Street lights, Fire Station, Bus Station. This capital investment project has undergone feasibility studies and proposals approved for funding approved by the World Bank under the Kenya Municipal Reform Programme, currently budgeted at about **KES 20 billion**. to offer a facelift to most of the dilapidated infrastructure in these towns. This an ongoing Capital Investment Project that will facilitate and re-engineer the urban functions as envisaged in the County Spatial. The Core centres and growth centres are supposed to play a major role in the socio-economic transformation of the county. Core centres function to service the hinterland, achieve agglomeration economies, and nucleated settlements; they require basic services to propel them to have higher order goods and services as well attract investments (local and foreign).

B2: Housing Development in Major Urban Centres (growth centres, sub-county growth centres, market, rural and local centres): Housing is one of the core pillars of growth in the Republic of Kenya. The BIG FOUR Agenda takes “affordable housing” as a strategy to propel social-economic growth. Though viewed from the lens of social inclusion but also local economic transformation. These Core centres are envisioned to be the future dormitories (shelter) providers for proposed nucleated settlements. Everybody is moving to have an urban space, with pull factors and/or many attractions, it is healthy for most population to become urbanized to free the rural land for food production. However, moving to towns is not to create slums but to achieve better living standards, Africa Cities, Siaya County included must focus on housing as a priority concern, satisfying Sustainable Development Goal SDG 11) 11. The County Physical and Land Use Development Plan, therefore, prioritize housing development in these Core Centres as an implementation strategy. The situation indicates that no housing programme other than Government and local authority houses for employees has been realized in the county since independence in 1963. Construction of these houses will undergo feasibility studies, proposal development and sourcing for funds under Public-Private Sector (PSP) arrangement and Development Partner Support framework. Housing Bonds, Housing Equity, and Housing Mortgages are all geared to mobilize resources for housing development. However, private persons building owner-occupier houses has been significant housing development in the county and calling for housing subsidies to accelerate these efforts. The County Physical and Land Use Development Plan, therefore, proposes deliberate efforts to sensitize the populace to participate in the national framework as well as initiate County-Specific Strategies. The County shall have County Housing Bond through legislation to elicit citizen participation including *Jua Kali* artisans and *Mama Mboga* vendor.

B3: Urban Access Roads in growth centres, sub-county growth centres, market, rural and local centres: Urban access roads in major centres are in pathetic conditions save for the recent County Government intervention under the devolved framework. However, implementing the County Physical and Land Use Development Plan requires increased accessibility, more networks and connectivity enhanced to leverage these towns to perform their designated function in the plan. Over 50 Urban centres in the county require a facelift, and expansion on their urban access road to promote faster growth, livability, and safe and secure neighbourhoods.

B4: Rural Access and Priority Roads County Wide Class G, N, P: The County Physical and Land Use Development Plan provides for rural access and Priority roads totaling about 1700 Km that require gravelling and/or tarmacking as county roads as per the Kenya Road Bill 2017. These rural access roads are to enhance effective networks, and connectivity to facilitate the timely flow of goods, services and labour in every part of the county. It is anticipated that these roads will open up parts of the county to effectively participate in the local and national economy, and reduce the use of motorcycle menace (accidents) as car and/or vehicular penetration is enhanced.

B5: Development of Urban Storm Drains of other Centres, not Core Centres: Most parts of Siaya County receive a lot of rainfall and sometimes in extreme situations these become flash floods. Urbanization, however, brings with it a more concrete and impervious state hence reducing infiltration, it is therefore environmentally significant to channel this excess water to join surface runoff. Most urban centres do not have urban storm drains though limited in Siaya and Bondo Town. Establishing these storm drains is geared to contribute to improving the environmental quality of these urban centres.

B6: Urban Water Supply and B7: Rural Water Supply: Urban water supply to meet increased demand due to high population growth. Urbanization and population growth have increased demand whose management cannot be implemented without a spatial framework, this County Physical and Land Use Development Plan, therefore, delves into water demand projection. This water demand projection will only be met through the protection and conservation of water resources, availability of space for water infrastructure (reticulation system), and piping, bore-hole development, water spring, dam construction for specific urban needs. A robust water supply system that transverses that county such as SIBO (Siaya-Bondo) water project shall be sustained if the network pathways are reserved. Most urban water supply also serves the rural water supply. Human settlement and/or nucleated settlements functionality will be sustained and livable when the water supply system is integrated and is in tandem with the County's Physical and Land Use Development Plan.

B8: Market Infrastructure for Small Towns (market, rural and local centres): One of the core principles of sustainability planning is the improvement of the local economy. Making business environment possible for *Mama Mboga*, Street Vendors, and *Jua Kali* artisans comfortable, secure, safe and profitable investing in small market infrastructures. These market infrastructures include market stalls, street lighting, refrigeration services, market furniture, and shelter for production units (*Jua kali*, specialized commercial entities, saloons, shoe shining, fish market, and livestock markets).

B9: Industrial Development Infrastructure (Knowledge Hub, Innovation Hubs) in Growth Centres and Ward Centres: Industrial development in the county is very low and requires stimulus. It is believed that agro-processing was the sure way of revitalizing industrialization, however, this is said but may not be true. An emerging concern then is developing industrial incubation centres which can be located in every ward headquarters and/or priority towns. The incubation will allow participants to test ideas, innovation, and creativity in product development, while both entrepreneurial skills also delivered. Products which gain prominence are slowly embraced in the market as a commercial process. Collectively, participants generate conceptualization and build on each other strengths. County Physical and Land Use Development Plan has designated each ward to an industrial incubation centre to promote manufacturing ventures.

B 10: Development of a Smart City (Techno-City): Big dreams can create reality through a public-private partnership, Siaya County proposes to develop a smart (techno-city) within the Lakefront Development and Hillside Development. This can be realized if resource mobilization among citizens, professionals, and technical are made to believe this reality and henceforth contribute towards its inception, proposal, design, feasibility study, the source for funding and eventually implement the dream. The location of a smart city then has been provided in the County Physical and Land Use Development Plan, as well as provide its functionality in the overall socio-economic transformation of the county.

B11: Economic Special Zones in each Sub- County: Industrialization growth in the county must be driven by a basic industrial focus where space is provided for the development of an economic zone. The economic special zone is to provide a space for foreign and local investors can come and established their factories or industry. This zone is planned designed, and is provided with basic auxiliary services such as roads, electricity, warehousing, financial

services and other services. In each sub-county, an economic special zone is proposed is a total of six needed.

B12: ICT Infrastructure (hubs, fibre network): Information, Communication and Technology (ICT) infrastructure, cannot be gainsaid as significant as an aspect of the digital revolution. ICT connections county-wide is, therefore, a necessity, where each ward headquarters and or priority urban centre should have an ICT Hub as well as be connected to a fibre network. Youth participation in the local economy can be leveraged through ICT infrastructure in rural villages. The Digital Economy, therefore, requires deepening in rural villages that include participation in business outsourcing. Over 30 ICT hubs will be established and connected to the national network.

B13: Health Facilities (150 Hospitals of various hierarchies' inwards/growth centre. Affordable health for all and health coverage to ensure equity distribution county-wide is a challenge, County Physical and Land Use Development Plan details the deficits per ward through hexagonal analysis. To ensure equity and access by distance and location, the proposed additional health facilities must be established in each ward to meet the deficit and also ensure their equitable distribution county-wide. Establishing these health facilities will be through construction and providing basic equipment in each location in each ward.

B14: Improving Education Facilities and Construction of Educational Infrastructure (400 Schools): Free Education for all in early childhood education development and primary schools and a 100% transition from primary to secondary require increased investment in the education infrastructure, through the establishment of new schools to much the population increase as well rehabilitation and expansion of existing facilities for basic education services. The County Physical and Land Use Development Plan, through hexagonal analysis, has provided the deficit education sector institutions to be provided in as new additional institutions. This education sector investment must receive deliberate effort in resource mobilization from National Government, County Government, Public-Private Sector Partnership (PPP) and development partner support.

B15: Tertiary Educational Institutions (Universities and Colleges Infrastructural Development): Tertiary education to cater for universities, colleges and technical institutes and polytechnics require a large capital outlay for improvement and expansion and setting up of new facilities. The County education sector requires land for expansion as well as funds for infrastructural development. The County has lagged in establishing these institutions to leverage manpower skill development for the youth in terms of technical, entrepreneurial as well as managerial skills.

B16: Tourism and Cultural Heritage Infrastructure: Siaya County fall under the Western Kenya Tourist Circuit, which has great tourism potential, however, there are impediments due to inadequate infrastructure development. These infrastructures include access roads to place destinations of landing beaches, heritage sites, resorts, and lodges. Secondly, restoration and improvement of heritage sites (fencing), development of bandas, campsites, signage and branding are significant for the meaningful exploitation of these tourism potentials. The Lakes (Victoria, Kanyaboli, Nyamboyo and Sare) are massive resources for tourism development, however, Lakefronts are hardly developed for concrete tourism attractions, and facilities such as leisure sports, water sports, and marina are lacking. National and County Government, Public-Private Sector Partnerships as well private investments must be encouraged and fully exploited to transform tourism in the region.

B17: Protection, Conservation and Restoration of Environmentally Significant Areas: Environmental quality is a major component of the County Physical and Land Use Development Plan, under the Green Economy Strategy to ensure the ecological integrity of the natural resource capital and sustainable development: These environmentally significant areas include: Hill Tops, Wetlands, Lake and River Riparian Reserves, Water Catchment &

Ground Water Reserves, Rural and Urban Green Parks that require protection, conservation and restoration. The County must invest heavily in restoring the natural capital (*mother nature*) which is the foundation for economic and social transformation. The environment cushions the economy, provides rain, and cool temperature, reduce drought, and famine, grow food, catch more fish, provide raw materials for industries, reduce health risks and provide safe and quality living human settlements and habitats for animals and plants (man included). The National and County Governments, Public-Private Sector partnerships, Development Partner Support and private initiatives are investments encouraged to secure mother nature in the county.

B 18: Agricultural Productivity: Land use & Irrigation Infrastructure: Mechanization (Tractors): To ensure that the County is food secure (one of the BIG 4), products for trading and able to produce raw materials for agro-processing investment in agricultural infrastructure is paramount by expanding more arable land through irrigation and mechanization (tractors). Land under irrigation schemes must expand, while the use of tractors to till more land promptly cannot be gain said. Smallholder agriculture must embrace technological change in terms of innovations, seed multiplication, farm demonstration, value addition and varieties are prerequisites for growth. Agro-processing such as dairy farming (milk processing), flour and rice milling, honey processing, sugar processing, hides and skins for leather are new investment frontiers for the county, that require huge capital outlay. The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment are highly encouraged.

B 19: Telephone Lines: Communication is key to local economic growth; the County Physical and Land Use Development Plan recognize the fact that some areas in the county are not connected to telephone lines. The detailed County Network systems proposed in all major, distributor and access roads. The expansion of telephone lines becomes an investment area for this plan. The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment, in the communication sector, are highly encouraged.

B 20: Energy Power Networks (Electric Power, Solar Energy and Wind Power): Energy has been also branded to be the engine of economic growth as well as social well-being. The County Spatial in the same vein, applying the Network principle, opines that a county-wide energy power connection is envisaged. The energy connection is from National Grid, however, there are proposals for an energy-secure County, that develops its energy source, that is safe and affordable. These potentials include solar and wind power energy, and therefore investment in this direction is a great desire as well as expansion of the existing National Grid under the Rural Electrification Programme. The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment, in this energy, are highly encouraged.

B21: Land Banking for Future Growth Centres and Growth Corridors including the Lakefront: Land is a resource for revenue generation in terms of rent, rates, taxes, tax rebates, subsidies, collateral to secure funds and others. The County Physical and Land Use Development Plan proposes new boundaries for urban areas (growth centres, sub-county growth centres, market, rural and local centres and/or referred to as the urban edges require space and land. Most of the land is proposed and in private and/or freehold. For the development of the county, it is prudent to acquire land as a land banking strategy. The County Physical and Land Use Development Plan shall guide which areas are critical and strategic for future land banking depending on the proposed functionality. The County Government must set aside funds for land banking: of strategic areas: Lake Front,

Conservation areas, urban and peri-urban areas, areas for establishing Governance structures, and network systems (roads, water, electricity, energy) among others. The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment, in this Land Resource Sector, are highly encouraged.

B22: Land Acquisition and Compensation for Conservation and Infrastructure Development: Land is a resource for revenue generation in terms of rent, rates, taxes, tax rebates, subsidies, collateral to secure funds and others. The County Physical and Land Use Development Plan proposes new areas for infrastructural development, construction facilities, housing and conservation that require space and land. Most of the land is proposed and in private and/or freehold. For the development of the county, it is prudent to acquire land as a land banking strategy. The County Physical and Land Use Development Plan shall guide which areas are critical and strategic for future land banking depending on the proposed functionality. The County Government must set aside funds for land banking: of strategic areas: Lake Front, Conservation areas, urban and peri-urban areas, areas for establishing Governance structures, and network systems (roads, water, electricity, energy) among others. The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment, in this Land Resource Sector, are highly encouraged.

B23: Resettlement Programme: Implementation of the County Physical and Land Use Development Plan require that optimum utilization of land as a resource is guaranteed or achieved, the Green, Blue and Brown economy strategies in a balanced and sustained manner. The Green (environment-agriculture nexus) and Blue (water bodies Lakes, Rivers and Wetlands) areas will be preserved county-wide, while Brown areas (Human Settlements) will be restricted in a proposed resettlement programme. This resettlement programme will permit most human settlements and housing to be concentrated in nucleated settlements in the towns or urban centres to allow most of the land for farming (agriculture): Maximum allowable urban centres land sizes (A: Growth Centres: Maximum Radius 7Km Radius, and 44 sq. km (4400 hectares) B: Sub-County growth Centres (Maximum Radius 5Km Radius, 31.43 sq. km (3143 hectares) C: Urban centres (Maximum Radius 3Km Radius; 18.86 sq. km (1866 hectares) D: Market Centres Maximum 1 (One)Km Radius; 6.29 sq. km (629 hectares) E: rural and local centres (Maximum Radius 0.5 KM; 3.14sq.km (314 hectares). The National and County Governments, Public-Private Sector Partnership, Development Partner Support and private initiatives, both foreign direct investment and domestic investment, in this Land Resettlement Programme, are highly encouraged. The Process of resettlement can be gradual through awareness in particular where irrigation projects are envisaged to take place as pilot capital investment projects.

B24: Preparation of Integrated Sustainable Urban Development Plans (ISUD): The informality problem shall be addressed during the preparation of ISUDPs. Stimulus markets to be re-designed and retrofitted to make them user-friendly, on-site sanitation facilities in marketplaces to be operated by organized and registered youth groups as sources of income. This retrofitting qualifies these projects as capital investment projects.

B25: Plan and Implement Innovative Security Mechanisms: Innovative security mechanisms including community policing would require the installation of street lighting (urban major roads), flood lights (open-air markets) and CCTV (in major urban centres). This installation is geared towards achieving 24 Hour Economy in most urban centres and increasing time for productive work.

B26: Establish Devolved Governance Structures County Wide: Construction of Governors' House, Sub- County and Ward Administrators offices is paramount in re-enforcing the devolved structures at grass root levels. These offices become the symbol for governance and

decentralized service delivery, this will go hand in hand with developing *Huduma* Centres, police posts and other sector departmental offices.

B 27: *Establishment of Sports and Recreational Infrastructure*: Strategies to strengthen Leisure, Recreational and Sports activities is paramount to increasing the job market in these unexploited industries in the county. It is therefore prudent for the Construction of a Stadium, Cultural Festival sites, Various Sports Grounds, Establish Green Parks, Amusement Centres, Beach Recreation, and Marinas as emerging Capital Investment Projects to allow the County to explore new frontiers in socio-economic development.

B28: *Fish Landing Beaches and Ponds Infrastructure*: Fish capture and fish culture are important local economic sectors along the Lakes and fish ponds in the County and therefore establishing these infrastructures is paramount. These structures include Fish Banda, Refrigeration, Fish Processing: value addition, Fish Ponds and Cage Fish. Capital investment projects established in this industry will spur growth, fish being the greatest income and revenue earner in Siaya County.

17.3 Monitoring and Evaluation Matrix

One of the key stages of all development projects is the progress tracking of the implementation of the development projects and the continual feedback run shaped by an elaborate monitoring and evaluation framework. In implementing the Siaya County Physical and Land Use Development Plan, the when and how individual sectorial projects are being executed, together with detailed monitoring indicators contribute to the overall success of the CPLUDP. Monitoring and evaluation provide a basis for adaptive management and continuous improvement of environmental condition and guides the continuous measurement of progress indicators throughout the plan implementation. It guides the measurement of the achievement of various aspects of the proposed projects and the assessment of project viability as projected in the plan.

17.4 Green Economy Development Strategy: Action Plan 2023-2033

Table 17.4: Green Economy Development Strategy: Action Plan 2023-2033

Zone 1A: Conservation Zone (Ecological Integrity)			
Objective: To ensure that ecological goods and services as well as natural capital available are guaranteed for the present and future generations through the allocation of space for the conservation, preservation and protection of all environmentally significant areas in the County			
Strategy 1: There shall be concerted efforts in collaboration between the National and County Governments to gazette these areas of ecological integrity (environmental quality).			
ACTIVITY	TIMEFRAME	BUDGET	RESPONSIBLE
1.1: Prepare a County Bill to gazette the conservation zone	2023-2024	30M	County Government
1.2: Stakeholders' awareness (public participation)	2023-2024	30M	County Government
1.3: Gazette the Conservation in County Gazette	2024	200M	County Government
Strategy 2: There shall be concerted efforts to create buffer zones through the demarcation of these spaces.			
2.1 Stakeholders' Awareness (public participation)	2023-2024	20M	County Government
2.2 Survey to establish the buffer zone	2023-2024	50M	County Government
2.3 Demarcation of the buffer zone	2024-2026		County Government
Strategy 3: There shall be elaborate efforts geared towards enhancing the preservation, protection, and conservation of these spaces.			
3.1 Stakeholder engagement for conservation measures between community and Lead agencies	2023-2024	20M	County Government
3.2 Mobilize resources for conservation, preservation and protection,	2024-2029	40M	County Government
3.3 Restoration of degraded areas & lost biological habitat	2024-2030	100M	County Government
3.4 Afforestation and reforestation programmes	2024-2033	80M	County Government
Strategy 4: There shall be elaborate efforts to promote ecotourism ventures, (recreational) in these areas to realize revenue generation.			
4.1 Stakeholder Participation in Eco Ventures	2023-2024	30M	
4.2 Establish Local Community Eco-Ventures Institutions	2024-2026	100M	
4.3 Capacity Building for Local Community Groups	2024-2029	30M	
4.4 Establish Community Management Plans (conservation, Branding & Marketing)	2024-2030	200M	
Strategy 5: From time to time the National and County Governments shall progressively pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas for the benefit of humanity and environmental quality.			
5.1 Stakeholder awareness of environmental governance in policy, strategies, legislations, guidelines and standards for conservation Zones	2023-2033	30M	County Government
5.2 Drafting of Policies and County Bills	2024-2028	50M	County Government
5.3 Presentation of Policies and Bills for Ratification by County Assembly	2027-2031	50M	County Government

Zone 1B: Agricultural Productivity Zone			
Objective 2: To ensure that areas for productive engagement in agriculture for food production and raw material through the allocation of space at all times to realize food security and value addition in manufacturing.			
Strategy 6: From time to time there shall be elaborate efforts in collaboration between National and County Governments to pronounce policies, strategies, legislations, guidelines and standards to govern and manage these areas to promote agricultural productivity to realize food security and value addition in manufacturing in the County.			
6.1 Stakeholder awareness on to formulate policies and legislations on agricultural productivity to realize food security and value addition in manufacturing	2024-2027	30M	County Government
6.2 Drafting of Policies and Bills of Policies and Bills for ratification by County Assembly	2024-2028	50M	County Government
6.3 Presentation of Policies and Bills for Ratification by County Assembly	2027-2031	50M	County Government
Strategy 7: There shall be appropriate, affordable and reliable crop and livestock husbandry methods, and technology applied and transferred to the populace to engage in profitable agriculture and promote local economic growth.			
Transfer of appropriate technology in crop husbandry	2024-2025	20M	County Government
Transfer of appropriate technology in livestock husbandry	2024-2025	20M	County Government
Provide effective linkages and integration of agriculture productivity (crop and livestock) with the local economy (SME)	2024-2033	100M	County Government
Strategy 8: There shall be concerted efforts made to encourage the local populace to engage in agriculture, especially the youth, to create employment and increase income as well as a multiplier effect in other related economic activities, through backward and forward linkages.			
8.1 Capacity building programme for the youth in agronomy, husbandry and agribusiness	2024-2033	30M	County Government
8.2 Promote agribusiness enterprises county-wide as part of Small-holder activities	2024-2030	50M	County Government
8.3 Mobilize resources to establish youth enterprises (revolving fund)	2027-2033		County Government
Strategy 9: There shall be concerted efforts to expand land under agriculture, through small-holder farmer participation and increased farmer extension services.			
9.1 Land suitability analysis irrigation agriculture (crop husbandry)	2023-2024	100M	County Government
9.2 Surveying and mapping of irrigation land	2024-2027	80M	County Government
9.3 Feasibility study for various irrigation projects	2024-2028	50M	County Government
9.4 Proposal writing for funding	2027-2029	10M	County Government
9.4 Mobilize resources for irrigation development of different projects	2027-2031	50M	County Government
9.5 Establish irrigation project after securing funds	2027-2033		County Government

17.5 Blue Economy Development Strategy: Action Plan 2023-2033

Table 17.5: Blue Economy Development Strategy: Action Plan 2023-2033

STRATEGY	OBJECTIVE	ACTIVITY	TIMEFRAME	BUDGET	RESPONSIBILITY
Strategic Priority 1	Creating sustainable wealth	<p>Diversification of existing water-based sectors (fisheries, ecotourism, Ports) focusing on value addition, value chains, quality, sustainability and good practice</p> <p>Exploring new and emerging sectors such as mariculture, renewable energy, and biotechnology, while focusing on establishing policy setting, feasibility and pilot projects</p>	2023-2024	300 M	County Government, National Government, Private sector, development partners
Strategic Priority 2	Sharing prosperity	<p>Ensuring food security and well-being by focusing on improving local production systems and markets, and promoting healthy lifestyles</p> <p>Ensuring high-quality education and professional training, new jobs and employment opportunities</p> <p>Improving the business environment, encouraging local, regional and international investments, innovation, small and medium enterprises and a culture of entrepreneurship</p>	2023-2024	300 million	County Government, National Government, Private sector, development partners
Strategic Priority 3	Securing a healthy and productive Lake	<p>Ensuring ecosystem service accounting is built into economic measures such as GDP</p> <p>Protecting marine and water assets and addressing lake risks such as water pollution and climate change</p> <p>Implementing blue economy climate resilience through mitigation and adaptation strategies</p>	2025-2026	200 million	County Government, National Government, Private sector, development partners

		consistent with an obligation under the United Nations Framework Convention on Climate Change (UNFCCC)			
Strategic Priority 4	Strengthening the enabling environment	<p>Finalizing the Blue Economy zoning plan of Siaya County by 2020 which will help set the rules to apply for water-based development across maritime sectors</p> <p>Developing research and development and innovation capabilities to inform responsible management of lake and water resources and to transform knowledge into development opportunities and productive activities</p> <p>As a high-income county, financing blue economy through diversification of funding opportunities, taking advantage of local and international private sector investors' appetite to invest in sustainability; ensuring greater efficiency of revenue raising mechanism</p> <p>Incorporating blue economy risks in county marine security strategies and regional cooperation to address the impact of illegal activities, resource degradation and improved capacity for monitoring, control and surveillance</p> <p>International advocacy and partnerships to attract technical and financial resources and keep blue economy issues at the forefront of county development and climate change agendas</p>	2025-2026	100 M	County Government, National Government, Private sector, development partners

COUNTY PHYSICAL AND LAND USE DEVELOPMENT PLAN IMPLEMENTATION STRATEGY 2023-2033

PROGRAMME	TOTAL (KSHS)	TIMEFRAME	MONITORING INDICATOR	SOURCE OF FUNDS	IMPLEMENTING AGENCY
A: LAND USE PLANNING, ADMINISTRATION AND MANAGEMENT					
A1: Implementation of County Physical and Land Use Development Plan	50 million	SHORT TERM 2023-2026	Capacity Building, Monitoring & Evaluation	Government of Kenya	County Government
A2: Prepare Integrated Urban Development Plans (Siaya, Bondo, Ugunja, Yala, Rarieda, Ukwala)	200 million	SHORT TERM 2023-2026	Developed Plans	Government of Kenya	County Government
A3: Prepare Urban/Transport Corridor Zoning Guidelines	200 million	MEDIUM-TERM 2024-2030	Zoning Development Plans	Government of Kenya	County Government
A4: Prepare urban and peri-urban plans (60 towns and markets)	60 million	MEDIUM-TERM 2026-2031	Town Plans	Government of Kenya	County Government
A5: Prepare plans for fish landing and islands (50)	300 million	MEDIUM-TERM 2027-2033	Fish Landing Beach Plans	Government of Kenya	County Government
A6: Prepare Cadastral Plans Core Towns (Siaya, Bondo, Yala, Usenge, Ugunja, Ukwala)	140 million	MEDIUM-TERM 2024-2030	Cadastral Plans	Government of Kenya	County Government
A7: County Urban Development Policy	100 million	LONG TERM 2025-2028	Policy Developed	Government of Kenya	County Government
A8: County Physical and Land Use Development Planning Bill/Law	50 million	LONG TERM 2026-2028	Planning Bill/Law	Government of Kenya	County Government
A9: Development Control Enforcement	100 million	ROUTINE WORK	Development Control	Government of Kenya	County Government
A10: Valuation Roll for Core Towns and Sub-County Centres	140 million	SHORT TERM 2023-2026	Valuation Rolls	Government of Kenya	County Government
A11: County Land Information System	200 million	MEDIUM-TERM 2025-2028	Land Information System	Government of Kenya	County Government
A12: Mapping for Resources and Infrastructure	500 million	LONG TERM 2027-2033	Maps prepared	Government of Kenya	County Government
B: CAPITAL INVESTMENT PROJECTS					
B1: Urban Support Infrastructure in major towns (Core Centres) (Siaya, Bondo, Aram, Yala, Ugunja, Usenge and other growth centres): Storm Water	20 billion	MEDIUM-TERM 2023-2033	Developed Urban Infrastructure	Government of Kenya/ Development Partner Support	County Government

Drainage, Market, Street lights, Fire Station, Bus Station)					
B2: Housing Development in Major Urban Centres (core, sub-county and priority towns)	10 billion	LONG TERM 2027-2033	Houses Developed (Housing Estates)	Government of Kenya Public-Private Partnership	County Government
B3: Urban Access Roads in Core, Sub- County and Priority Towns	10 billion	MEDIUM-TERM 2025-2031	Urban access roads developed	Government of Kenya	County Government
B4: Rural Access and Priority Roads County Wide Class G, N, P (1700 Km)	60 billion	LONG TERM 2023-2033	Rural access roads	Government of Kenya	County Government
B5: Development of Urban Storm Drains of other Centres, not Core Centres	30 billion	MEDIUM-TERM 2027-2033	Storm Drains developed	Government of Kenya/ Development Partner Support	County Government
B6: Urban Water Supply	20 billion	MEDIUM-TERM 2026-2031	Urban Water Supply Developed	Government of Kenya	County Government
B7: Rural Water Supply	60 billion	LONG TERM 2018-2018	Rural Water Supply	Government of Kenya	County Government
B8: Market Infrastructure for Small Towns (growth and market centres)	10 billion	MEDIUM-TERM 2026-2031	Market infrastructure	Government of Kenya	County Government
B9: Industrial Development Infrastructure (Knowledge Hub, Innovation Hubs) in Growth Centres and Ward Centres	10 billion	LONG TERM 2023-2033	Industrial Innovation Hubs	Government of Kenya	County Government
B 10: Development of a Smart City (Techno-City): Lakefront Development and Hillside Development	20 billion	LONG TERM 2027-2033	Smart City/Techno City	Public-Private Partnership	County Government
B11: Economic Special Zones in each Sub- County	200 million	LONG-TERM 2027-2033	Economic Hubs	Government of Kenya	County Government
B12: ICT Infrastructure (hubs, fibre networks)	2 billion	SHORT TERM 2023-2026	ICT hubs	Government of Kenya	County Government
B 13: Health Facilities (150 Hospitals of various ranks) inwards/growth centres	10 billion	LONG TERM 2023-2033	Health facilities developed	Government of Kenya	County Government
B14: Improving Education Facilities and Construction of Educational Infrastructure (400 Schools)	50 billion	LONG TERM 2023-2033	Educational facilities (nursery, primary and secondary)	Government of Kenya	County Government
B15: Tertiary Educational Institutions (Universities and Colleges Infrastructural Development)	50 billion	LONG TERM 2023-2033	(University, technical & medical, educational colleges)	Government of Kenya	County Government
B16: Tourism & Cultural Heritage Infrastructure (Access roads, lodges, resort, restoration and improvement of heritage sites, fencing, bandas, campsites, signage, branding)	5 billion	MEDIUM-TERM (2023-2028)	Heritage Infrastructure	Government of Kenya Public-Private Partnership	County Government

B17: Protection, Conservation and Restoration of Environmentally Significant Areas (Hill Tops, Wetlands, Lake and River Riparian Reserves, Water Catchment & Ground Water Reserves, Rural and Urban Green Parks)	20 billion	LONG TERM 2023-2033	Environmental Management & Restorations	Government of Kenya	County Government
B 18: Agricultural Productivity: Land use & Irrigation Infrastructure: Mechanization (Tractors)	50 billion	LONG TERM 2023-2033	Agriculture development: Irrigation Infrastructure developed, Tractors Purchased	Government of Kenya Development Partner Support	County Government
B19: Telephone Lines	10 billion	SHORT TERM 2023-2026	Telephone lines	Government of Kenya	County Government
B20: Energy Power Networks (Electric Power, Solar Energy and Wind Power)	50 billion	MEDIUM-TERM 2023-2031	Power lines, Solar Installation, Wind Power	Government of Kenya	County Government
B21: Land Banking for Future Growth Poles and Growth Corridors (Lakefront)	50 billion	LONG TERM 2023-2033	Land Bank (Lake waterfront & Urban development)	Government of Kenya	County Government
B22: Land Acquisition and Compensation for Conservation and Infrastructure Development	50 billion	LONG TERM 2023-2033	Conservation areas, wildlife corridors)	Government of Kenya	County Government
B23: Resettlement Programme: Most human settlements and housing should be concentrated in nucleated settlements in the towns or urban centres to allow most of the land for farming (agriculture): Maximum allowable urban centres land sizes (A : growth centres: <i>Maximum Radius 7Km Radius, and 44 sq. km (4400 hectares)</i> B : Sub-County growth Centres (<i>Maximum Radius 5Km Radius, 31.43 sq. km (3143 hectares)</i> C : Urban centres (<i>Maximum Radius 3Km Radius; 18.86 sq. km (1866 hectares)</i> D : Market Centres <i>Maximum 1 (One)Km Radius; 6.29 sq. km (629 hectares)</i> E : rural and local centres (<i>Maximum Radius 0.5 KM; 3.14sq.km (314 hectares)</i>)	60 billion	LONG TERM 2023-2033	Resettlement Programmes & Land use guidelines implementation in growth nodes (core centres, sub-county centres, Priority centres, market centres, central village centres)	Government of Kenya Public-Private Partnership	County Government
B 24: Informality problem to be addressed during preparation of ISUDPs Stimulus markets to be re-designed so they are user-friendly, on-site sanitation	200 million	SHORT TERM 2023-2026	Regularize informal activities: Modernize stalls	Government of Kenya	County Government

facilities in marketplaces to be operated by organized and registered youth groups as sources of income					
B25: Plan and implement innovative security mechanisms including community policing, installation of street lighting and flood lights.	100 million	SHORT TERM 2023-2026	Urban centres and markets: Installation of Market infrastructures	Government of Kenya	County Government
B26: Establish Devolved Governance Structures County Wide: (Construction of Governors House, Sub- County and Ward Administrators offices)	500 million	MEDIUM-TERM 2023-2029	House and Offices Constructed	Government of Kenya	County Government
B 27: Establishment of Sports and Recreational Infrastructure (Construction of Stadium, Cultural Festival sites, Various Sports Grounds, Establish Green Parks, Amusement Centres, Beach Recreation, Marinas)	1 billion	LONG TERM 2023-2033	Sports, Culture, and Recreation Facilities Established	Government of Kenya Public-Private Sector Partnership	County Government
B28: Fish Landing Beaches and Ponds Infrastructure (Fish Banda, Refrigeration, Fish Processing: value addition, Fish Ponds and Cage Fish)	20 billion	MEDIUM-TERM 2023-2029	Fish Landing, Ponds, and Cages Infrastructure developed)	Government of Kenya Public-Private Sector Partnership Development Partner Support	County Government

Table 17.3: Monitoring and Evaluation Framework

NB Short-term (3 years) Medium Term (5 years) and Long Term (10 year

17.6 Strategic Environmental Assessment

It is a requirement that every plan, programme, project and policy document is subjected to an Environmental Impact Assessment (EIA) study as provided in the Environmental Coordination and Management Act (EMCA) No. 8 of 1999. In the case of a plan, such as the Siaya County Physical and Land Use Development Plan, the report is known as Strategic Environmental Assessment (SEA). The SEA requires that all the proposals in a plan are subjected to environmental assessment. This involves the identification of the environmental impacts and their effects as well as proposing mitigation measures.

Table 17. 4: Strategic Impact Assessment

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
Siaya County Physical and Land Use Development Plan and the Lower-Level Plans			
1	Waste Management in Siaya County	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various waste recycling. • Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
2	Water quality problems	<ul style="list-style-type: none"> • Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. • Liquid waste is not to be released directly into the environment. • Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
3	Compliance Aspects	<ul style="list-style-type: none"> • Develop an in-house environmental management regulation with an enhanced focus on health and safety. • Establish legal/ register with a focus on critical environmental laws and regulations. • Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
4	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> • Document guidelines and procedures on environmental management. • Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Fish Landing Bays and Islands (50)			
1	Waste Management in all fish landing bays.	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various waste recycling. 	All wastes are collected for proper disposal.

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> • Enhance waste minimization and segregation. 	
2	Water quality problems	<ul style="list-style-type: none"> • Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. • Liquid waste is not to be released directly into the environment. • Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
3	Compliance Aspects	<ul style="list-style-type: none"> • Develop an in-house environmental management regulation with an enhanced focus on health and safety. • Establish legal/ register with a focus on critical environmental laws and regulations. • Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
4	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> • Document guidelines and procedures on environmental management. • Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Urban Support Infrastructure (Siaya, Bondo, Aram, Yala, Ugunja, Usenge and other growth centres): Storm Water Drainage, Market, Street Lights, Fire Station, Bus Station)			
1	Increased water demand	<ul style="list-style-type: none"> • Harvest water from completed structures to ease the strain on regular water sources • Provide adequate storage during day times when other demands are high • Embrace water conservation techniques in all operations including timely repairs of water lines • Make optimum use of water harvesting opportunities • Re-use treated wastewater (recycling) 	Controlled and sustainable water use will ensure adequate supply and storage of water
2	Increased energy demand	<ul style="list-style-type: none"> • Utilize solar energy for lighting purposes • Use energy-efficient gadgets • Sensitize stakeholders on energy-saving strategies • Timely repairs and scheduled maintenance of machines and equipment 	This will cut down on operation costs as well as sustainable use of energy as a resource
3	Waste Management in all urban and peri-urban areas.	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various waste recycling. • Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
4	Water quality problems	<ul style="list-style-type: none"> • Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. 	Controlled discharges into the drainage system will reduce health effects on the

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> • Liquid waste is not to be released directly into the environment. • Installation of a water pumping system 	surrounding communities
5	Compliance Aspects	<ul style="list-style-type: none"> • Develop an in-house environmental management regulation with an enhanced focus on health and safety. • Establish legal/ register with a focus on critical environmental laws and regulations. • Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
6	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> • Document guidelines and procedures on environmental management. • Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Housing Development in Major Urban Centres (growth centres, sub-county growth centres, urban centres, market centres, rural and local centres)			
1	Increased extraction of raw materials	<ul style="list-style-type: none"> • Source building materials from suppliers who use environmentally friendly processes in their operations • Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered • Ensure that damage or loss of materials at the construction sites is kept minimal through proper storage • Use at least 5% - 10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert materials from landfills. 	To minimize extraction site impacts and ensure efficient use of raw materials in construction
2	Ecosystem disturbance	<ul style="list-style-type: none"> • Ensure proper demarcation and delineation of the housing project areas to be affected by construction workers • Specify locations for trailers and equipment and areas of the site which should be kept free of traffic, equipment and storage • Designate access routes and parking within the sites • Preserve some individual trees within the sites • Design and implement an appropriate landscaping programme to help in the revegetation of part of the project areas after construction 	To minimize vegetation and animal disturbance at and around the construction site
3	Runoff and soil erosion	<ul style="list-style-type: none"> • Create stormwater management practices, such as piping systems or retention ponds or tanks, which can be carried out after the housing projects are complete • Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of stormwater into the soil • Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the housing development sites 	To reduce runoff and soil erosion

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> • Ensure that any compacted areas are ripped to reduce run-off 	
4	Solid waste generation	<ul style="list-style-type: none"> • Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size or having large quantities of residual materials • Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of • Use of durable, long-lasting materials that will need to be replaced as often, thereby reducing the amount of construction waste generated over time • Dispose of waste more responsibly by dumping it at designated dumping sites or landfills only; the use of a registered waste disposal company is encouraged 	To minimize solid waste generation and ensure efficient solid waste management during construction
5	Utilization of water resources	<ul style="list-style-type: none"> • Promote recycling and reuse of water as much as possible • Promptly detect and repair water pipe and tank leaks 	To minimize water consumption and ensure more efficient and safe water use
6	Approval of building plans	<ul style="list-style-type: none"> • Ensure that all building plans are approved by the approving authority and local Occupational Health and Safety Office 	To minimize occupational health and safety risks
7	Fire protection	<ul style="list-style-type: none"> • Fire-fighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas 	To minimize occupational health and safety risks
Urban Access Roads in Core, Sub-County and Priority Towns			
1	Changes in hydrology/impeded drainage	<ul style="list-style-type: none"> • Install drainage structures properly 	This will ensure the efficiency of drainage structures
2	Soil erosion	<ul style="list-style-type: none"> • Control earthworks • Install drainage structures properly • Install erosion control measures • Grouted stone pitching and rock fill gabion works will be necessary to protect culvert inlets and outlets • Landscape embankments and re-vegetate gravel sites with grass (for example Tetrapogon bidentate or Chrysopogon ancheri) and indigenous shrubs • Ensure management of excavation activities 	To minimize soil erosion
3	Air pollution	<ul style="list-style-type: none"> • Water should be sprayed during the construction phase on excavated areas • In filling subgrade water spraying is needed to solidify the material and assist in compaction. After compaction, water spraying should be regular to prevent dust • Plant trees along access roads and around settlements (for example Acacia sp. and Commiphora sp.) 	This will ensure that air pollution is minimized to avert respiratory tract infections

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
4	Water sources	<ul style="list-style-type: none"> • Management of water usage • Plan for harvesting and storage of water during rains for later use • The plan works schedule according to water availability • Avoid abstraction of water • Abstraction is not to be done during low flow 	To minimize water consumption and ensure more efficient and safe water use
5	Waste Management	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various waste recycling. • Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
Rural Access and Priority Roads County Wide Class G, N, P (1700 Km)			
1	Changes in hydrology/impaired drainage	<ul style="list-style-type: none"> • Install drainage structures properly 	This will ensure the efficiency of drainage structures
2	Soil erosion	<ul style="list-style-type: none"> • Control earthworks • Install drainage structures properly • Install erosion control measures • Grouted stone pitching and rock fill gabion works will be necessary to protect culvert inlets and outlets • Landscape embankments and re-vegetate gravel sites with grass (for example Tetrapogon bidentatus or Chrysopogon ancheri) and indigenous shrubs • Ensure management of excavation activities 	To minimize soil erosion
3	Air pollution	<ul style="list-style-type: none"> • Water should be sprayed during the construction phase on excavated areas • In filling subgrade water spraying is needed to solidify the material and assist in compaction. After compaction, water spraying should be regular to prevent dust • Plant trees along access roads and around settlements (for example Acacia sp. and Commiphora sp.) 	This will ensure that air pollution is minimized to avert respiratory tract infections
4	Water sources	<ul style="list-style-type: none"> • Management of water usage • Plan for harvesting and storage of water during rains for later use • The plan works schedule according to water availability • Avoid abstraction of water • Abstraction is not to be done during low flow 	To minimize water consumption and ensure more efficient and safe water use
5	Waste Management	<ul style="list-style-type: none"> • Waste to be properly disposed of 	All wastes are collected for proper disposal.

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> Quantify the various categories of wastes Formalize solid waste disposal. Involve external interested parties in establishing improved options for various waste recycling. Enhance waste minimization and segregation. 	
Development of Urban Storm Drains			
1	Waste Management in Siaya County	<ul style="list-style-type: none"> Storm water to be properly disposed of Quantify the storm water Involve external interested parties in establishing improved options for storm water harvesting 	All storm water is collected for proper disposal.
2	Water quality problems	<ul style="list-style-type: none"> Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
4	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. Assess the carrying capacity of existing storm water drains. 	To provide necessary knowledge tools and awareness on environment and safety to all for effective human resource capacity development.
Urban Water Supply			
1	Environmental pollution	<ul style="list-style-type: none"> Build capacity and establish a Water Resource User's Association (WRUA) to ensure the environmental conservation of the resource 	To ensure water quality
2	Water quality problems	<ul style="list-style-type: none"> Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. Liquid waste is not to be released directly into the environment. Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
3	Wastewater and surface water pollution	<ul style="list-style-type: none"> Conduct physical, chemical and bacteriological analysis of water before utilization to have initial water quality data that can be used to gauge any pollution during operation 	To ensure water quality
4	Water wastage and shortage	<ul style="list-style-type: none"> Train the urban society on proper utilization of water through the formation of WRUA's Construct reservoir tanks to store adequate water for future use All households and institutions should embrace rainwater harvesting by constructing small water pans 	To ensure an adequate supply of water to all to meet the demand
5	Reduction of aquifer levels/lowering of the water table	<ul style="list-style-type: none"> All households to construct small water pans to supplement borehole water Train the society on the efficient utilization of water Develop alternative sources of water 	To ensure an adequate supply of water to meet the demand

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
Rural Water Supply			
1	Environmental pollution	<ul style="list-style-type: none"> • Build capacity and establish a Water Resource User's Association (WRUA) to ensure the environmental conservation of the resource 	To ensure water quality
2	Water quality problems	<ul style="list-style-type: none"> • Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. • Liquid waste is not to be released directly into the environment. • Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
3	Wastewater and surface water pollution	<ul style="list-style-type: none"> • Conduct physical, chemical and bacteriological analysis of water before utilization to have initial water quality data that can be used to gauge any pollution during operation 	
4	Water wastage and shortage	<ul style="list-style-type: none"> • Train the rural community on proper utilization of water through the formation of WRUA's • Construct reservoir tanks to store adequate water for future use • All households and institutions should embrace rainwater harvesting by constructing small water pans 	
5	Reduction of aquifer levels/lowering of the water table	<ul style="list-style-type: none"> • All households to construct small water pans to supplement borehole water • Train the community on the efficient utilization of water • Develop alternative sources of water • Reduce livestock numbers 	
Market Infrastructure for Small Towns (Market, rural and local centres)			
1	Increased water demand	<ul style="list-style-type: none"> • Harvest water from completed structures to ease the strain on regular water sources • Provide adequate storage during day times when other demands are high • Embrace water conservation techniques in all operations including timely repairs of water lines • Make optimum use of water harvesting opportunities • Re-use treated wastewater (recycling) 	Controlled and sustainable water use will ensure adequate supply and storage of water
2	Increased energy demand	<ul style="list-style-type: none"> • Utilize solar energy for lighting purposes • Use energy-efficient gadgets • Sensitize stakeholders on energy-saving strategies • Timely repairs and scheduled maintenance of machines and equipment 	This will cut down on operation costs as well as sustainable use of energy as a resource
3	Waste Management.	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various 	All wastes are collected for proper disposal.

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> waste recycling. Enhance waste minimization and segregation. 	
4	Water quality problems	<ul style="list-style-type: none"> Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. Liquid waste is not to be released directly into the environment. Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
5	Compliance Aspects	<ul style="list-style-type: none"> Develop an in-house environmental management regulation with an enhanced focus on health and safety. Establish legal/ register with a focus on critical environmental laws and regulations. Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
6	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Industrial Development Infrastructure (Knowledge Hubs, Innovation Hubs) in Growth Centres			
1	Increased water demand	<ul style="list-style-type: none"> Harvest water from completed structures to ease the strain on regular water sources Provide adequate storage during day times when other demands are high Embrace water conservation techniques in all operations including timely repairs of water lines Make optimum use of water harvesting opportunities Re-use treated wastewater (recycling) 	Controlled and sustainable water use will ensure adequate supply and storage of water
2	Increased energy demand	<ul style="list-style-type: none"> Utilize solar energy for lighting purposes Use energy-efficient gadgets Sensitize stakeholders on energy-saving strategies Timely repairs and scheduled maintenance of machines and equipment 	This will cut down on operation costs as well as sustainable use of energy as a resource
3	Waste Management.	<ul style="list-style-type: none"> Waste to be properly disposed of Quantify the various categories of wastes Formalize solid waste disposal. Involve external interested parties in establishing improved options for various waste recycling. Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
4	Water quality problems	<ul style="list-style-type: none"> Drains that may carry solid wastes from the premises should be filled with suitable interceptors or grit traps. 	Controlled discharges into the drainage system will reduce health effects on the

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> Liquid waste is not to be released directly into the environment. Installation of a water pumping system 	surrounding communities
5	Compliance Aspects	<ul style="list-style-type: none"> Develop an in-house environmental management regulation with an enhanced focus on health and safety. Establish legal/ register with a focus on critical environmental laws and regulations. Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
6	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Economic Special Zones in Sub- County			
1	Waste Management in Siaya County	<ul style="list-style-type: none"> Waste to be properly disposed of Quantify the various categories of wastes Formalize solid waste disposal. Involve external interested parties in establishing improved options for various waste recycling. Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
2	Water quality problems	<ul style="list-style-type: none"> Drains that may carry solid wastes should be filled with suitable interceptors or grit traps. Liquid waste is not to be released directly into the environment. Installation of a water pumping system 	Controlled discharges into the drainage system will reduce health effects on the surrounding communities
3	Compliance Aspects	<ul style="list-style-type: none"> Develop an in-house environmental management regulation with an enhanced focus on health and safety. Establish legal/ register with a focus on critical environmental laws and regulations. Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
4	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Health Facilities (150 Hospitals of various ranks) inwards/growth centres			
1	Increased extraction of raw materials	<ul style="list-style-type: none"> Source building materials from suppliers who use environmentally friendly processes in their operations Ensure accurate budgeting and estimation of actual construction material 	To minimize extraction site impacts and ensure efficient use of raw materials in construction

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<p>requirements to ensure that the least amount of material necessary is ordered</p> <ul style="list-style-type: none"> • Ensure that damage or loss of materials at the construction sites is kept minimal through proper storage • Use at least 5% - 10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert materials from landfills. 	
2	Ecosystem disturbance	<ul style="list-style-type: none"> • Ensure proper demarcation and delineation of the housing project areas to be affected by construction workers • Specify locations for trailers and equipment and areas of the site which should be kept free of traffic, equipment and storage • Designate access routes and parking within the sites • Preserve some individual trees within the sites • Design and implement an appropriate landscaping programme to help in the revegetation of part of the project areas after construction 	To minimize vegetation and animal disturbance at and around the construction site
3	Runoff and soil erosion	<ul style="list-style-type: none"> • Create storm water management practices, such as piping systems or retention ponds or tanks, which can be carried out after the health facilities are complete • Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil • Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the health facilities' development sites • Ensure that any compacted areas are ripped to reduce run-off 	To reduce runoff and soil erosion
4	Solid waste generation	<ul style="list-style-type: none"> • Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size or having large quantities of residual materials • Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of • Use of durable, long-lasting materials that will need to be replaced as often, thereby reducing the amount of construction waste generated over time • Dispose of waste more responsibly by dumping it at designated dumping sites or landfills only; the use of a registered waste disposal company is encouraged • Ensure that all facilities have incinerators 	To minimize solid waste generation and ensure efficient solid waste management during construction
5	Utilization of water resources	<ul style="list-style-type: none"> • Promote recycling and reuse of water as much as possible • Promptly detect and repair water pipe and tank leaks 	To minimize water consumption and ensure more efficient and safe water use
6	Approval of building plans	<ul style="list-style-type: none"> • Ensure that all building plans are approved by the approving authority and local 	To minimize occupational health and safety

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		Occupational Health and Safety Office	risks
7	Fire protection	<ul style="list-style-type: none"> • Fire-fighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas 	To minimize occupational health and safety risks
Improving Education Facilities and Construction of Educational Infrastructure (400 Schools)			
1	Increased extraction of raw materials	<ul style="list-style-type: none"> • Source building materials from suppliers who use environmentally friendly processes in their operations • Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered • Ensure that damage or loss of materials at the construction sites is kept minimal through proper storage • Use at least 5% - 10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert materials from landfills. 	To minimize extraction site impacts and ensure efficient use of raw materials in construction
2	Ecosystem disturbance	<ul style="list-style-type: none"> • Ensure proper demarcation and delineation of the housing project areas to be affected by construction workers • Specify locations for trailers and equipment and areas of the site which should be kept free of traffic, equipment and storage • Designate access routes and parking within the sites • Preserve some individual trees within the sites • Design and implement an appropriate landscaping programme to help in the revegetation of part of the project areas after construction 	To minimize vegetation and animal disturbance at and around the construction site
3	Runoff and soil erosion	<ul style="list-style-type: none"> • Create storm water management practices, such as piping systems or retention ponds or tanks, which can be carried out after the housing projects are complete • Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil • Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the educational facility's development sites • Ensure that any compacted areas are ripped to reduce run-off 	To reduce runoff and soil erosion
4	Solid waste generation	<ul style="list-style-type: none"> • Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size or having large quantities of residual materials • Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of • Use of durable, long-lasting materials that will need to be replaced as often, thereby reducing the amount of construction waste generated over time 	To minimize solid waste generation and ensure efficient solid waste management during construction

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> • Dispose of waste more responsibly by dumping it at designated dumping sites or landfills only; the use of a registered waste disposal company is encouraged 	
5	Utilization of water resources	<ul style="list-style-type: none"> • Promote recycling and reuse of water as much as possible • Promptly detect and repair water pipe and tank leaks 	To minimize water consumption and ensure more efficient and safe water use
6	Approval of building plans	<ul style="list-style-type: none"> • Ensure that all building plans are approved by the approving authority and local Occupational Health and Safety Office 	To minimize occupational health and safety risks
7	Fire protection	<ul style="list-style-type: none"> • Fire-fighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas 	To minimize occupational health and safety risks
Tertiary Educational Institutions			
1	Increased extraction of raw materials	<ul style="list-style-type: none"> • Source building materials from suppliers who use environmentally friendly processes in their operations • Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered • Ensure that damage or loss of materials at the construction sites is kept minimal through proper storage • Use at least 5% - 10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert materials from landfills. 	To minimize extraction site impacts and ensure efficient use of raw materials in construction
2	Ecosystem disturbance	<ul style="list-style-type: none"> • Ensure proper demarcation and delineation of the housing project areas to be affected by construction workers • Specify locations for trailers and equipment and areas of the site which should be kept free of traffic, equipment and storage • Designate access routes and parking within the sites • Preserve some individual trees within the sites • Design and implement an appropriate landscaping programme to help in the revegetation of part of the project areas after construction 	To minimize vegetation and animal disturbance at and around the construction site
3	Runoff and soil erosion	<ul style="list-style-type: none"> • Create storm water management practices, such as piping systems or retention ponds or tanks, which can be carried out after the housing projects are complete • Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil • Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the housing development sites • Ensure that any compacted areas are ripped to reduce run-off 	To reduce runoff and soil erosion
4	Solid waste generation	<ul style="list-style-type: none"> • Through accurate estimation of the sizes and quantities of materials required, 	To minimize solid waste generation and

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<p>order materials in the sizes and quantities they will be needed, rather than cutting them to size or having large quantities of residual materials</p> <ul style="list-style-type: none"> • Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of • Use of durable, long-lasting materials that will need to be replaced as often, thereby reducing the amount of construction waste generated over time • Dispose of waste more responsibly by dumping it at designated dumping sites or landfills only; the use of a registered waste disposal company is encouraged 	ensure efficient solid waste management during construction
5	Utilization of water resources	<ul style="list-style-type: none"> • Promote recycling and reuse of water as much as possible • Promptly detect and repair water pipe and tank leaks 	To minimize water consumption and ensure more efficient and safe water use
6	Approval of building plans	<ul style="list-style-type: none"> • Ensure that all building plans are approved by the approving authority and local Occupational Health and Safety Office 	To minimize occupational health and safety risks
7	Fire protection	<ul style="list-style-type: none"> • Fire-fighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas 	To minimize occupational health and safety risks
Tourism & Cultural Heritage Infrastructure			
1	Increased water demand	<ul style="list-style-type: none"> • Harvest water from completed structures to ease the strain on regular water sources • Provide adequate storage during day times when other demands are high • Embrace water conservation techniques in all operations including timely repairs of water lines • Make optimum use of water harvesting opportunities • Re-use treated wastewater (recycling) 	Controlled and sustainable water use will ensure adequate supply and storage of water
2	Increased energy demand	<ul style="list-style-type: none"> • Utilize solar energy for lighting purposes • Use energy-efficient gadgets • Sensitize stakeholders on energy-saving strategies • Timely repairs and scheduled maintenance of machines and equipment 	This will cut down on operation costs as well as sustainable use of energy as a resource
3	Waste Management.	<ul style="list-style-type: none"> • Waste to be properly disposed of • Quantify the various categories of wastes • Formalize solid waste disposal. • Involve external interested parties in establishing improved options for various waste recycling. • Enhance waste minimization and segregation. 	All wastes are collected for proper disposal.
4	Water quality problems	<ul style="list-style-type: none"> • Drains that may carry solid wastes should be filled with suitable interceptors or grit traps. 	Controlled discharges into the drainage system will reduce health effects on the

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
		<ul style="list-style-type: none"> Liquid waste is not to be released directly into the environment. Installation of a water pumping system 	surrounding communities
5	Compliance Aspects	<ul style="list-style-type: none"> Develop an in-house environmental management regulation with an enhanced focus on health and safety. Establish legal/ register with a focus on critical environmental laws and regulations. Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
6	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. Assess the carrying capacity of existing infrastructure (drainage sewers and solid waste disposal site). 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.
Protection and Conservation of Environmentally Significant Areas (Hill Tops, Wetlands, Lake and River Riparian Reserves, Water Catchment & Ground Water Reserves)			
1	Soil erosion and pollution due to the destruction of riparian vegetation	<ul style="list-style-type: none"> Educate, train and encourage the community to practice good methods of land management including terracing to enhance soil conservation 	To provide necessary knowledge and awareness on environment.
2	Deforestation, firewood fetching and charcoal burning	<ul style="list-style-type: none"> Fence and protect the environmentally fragile areas from encroachment Avoid disturbance of these areas as much as possible Practice farm plantation to provide firewood energy Introduce alternative sources of energy 	To reduce loss of bio-diversification, change of climate, reduction of carbon sinks thus contributing towards global warming
3	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> Document guidelines and procedures on environmental management. 	To provide necessary knowledge and awareness on environment.
4	Pollution of springs and rivers	<ul style="list-style-type: none"> Community to be educated on the conservation of riparian reserves and shown where not to cultivate Surveyors to take into consideration riparian reserves All water springs to be protected Cattle drinking points to be constructed 	To provide necessary knowledge and awareness on environment.
Agricultural Productivity: Land Use & Irrigation Development			
1	Uneconomic land subdivision in the county	<ul style="list-style-type: none"> Put in place guidelines for minimum land subdivision for optimum agricultural productivity Provide education on management skills for commercial farming 	To increase agricultural production in the county
	Over-reliance on rain-fed agriculture	<ul style="list-style-type: none"> Irrigation activities to be enhanced and encouraged 	This leads to a decrease in food security in the county
1	Soil erosion and pollution	<ul style="list-style-type: none"> Educate, train and encourage the community to practice good methods of land 	To provide necessary knowledge and

Item No	Environmental Issue	Proposed Mitigation Measures/ Actions	Remarks
	due to the destruction of riparian vegetation	management including terracing to enhance soil conservation	awareness on environment.
2	Deforestation, firewood fetching and charcoal burning	<ul style="list-style-type: none"> • Fence and protect the environmentally fragile areas from encroachment • Avoid disturbance of these areas as much as possible • Practice farm plantation to provide firewood energy • Introduce alternative sources of energy 	To reduce loss of bio-diversification, change of climate, reduction of carbon sinks thus contributing towards global warming
3	Compliance Aspects	<ul style="list-style-type: none"> • Develop an in-house environmental management regulation with an enhanced focus on health and safety. • Establish legal/ register with a focus on critical environmental laws and regulations. • Establish a schedule for annual environment audits as required by law. 	This will ensure compliance with laid down guidelines at all times on all relevant laws, statutes and policies.
4	Capacity building (documentation and human resources capacity)	<ul style="list-style-type: none"> • Document guidelines and procedures on environmental management. • Assess the carrying capacity of existing farm holdings. 	To provide necessary knowledge tools and awareness on environment and safety to all workers for effective human resource capacity development.

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APPENDIX

Appendix 1: Population Density and Distribution per Ward

Table 18. 1: Population Density and Distribution

Sub-County	Ward	2009		Estimates 2019		Projections 2022		Projections 2030		Area (KM ²)
		Population	Density	Population	Density	Population	Density	Population	Density	
UGENYA	West Ugenya	30,325	300	35,338	350	37,825	374	43,336	429	101.1
	Ukwala	21,270	381	24,786	443	26,531	475	30,396	544	55.9
	North Ugenya	27,081	398	31,558	464	33,779	497	38,700	569	68
	East Ugenya	30,258	311	35,260	362	37,742	388	43,240	444	97.3
	Sub-Total	108,934	338	126,944	394	135,877	422	155,672	483	322.3
UGUNJA	Sidindi	24,527	470	28,582	548	30,593	586	35,050	671	52.2
	Sigomere	29,632	433	34,531	505	36,961	540	42,345	619	68.4
	Ugunja	39,213	488	45,696	569	48,911	609	56,037	698	80.3
	Sub-Total	93,372	465	108,809	542	116,465	580	133,432	664	200.9
ALEGO USONGA	Usonga	13,601	172	15,850	200	16,965	214	19,436	245	79.2
	West Alego	32,234	326	37,563	380	40,206	407	46,064	466	98.9
	Central Alego	30,993	222	36,117	258	38,658	277	44,290	317	139.8
	Siaya Township	32,252	757	37,584	882	40,229	944	46,089	1,082	42.6
	North Alego	21,710	404	25,299	470	27,079	503	31,024	577	53.8
	South East Alego	56,453	295	65,786	344	70,415	368	80,673	421	191.5
	Sub-Total	187,243	309	218,199	360	233,552	386	267,576	442	605.8
GEM	North Gem	35,004	407	40,791	474	43,661	508	50,022	582	86
	West Gem	23,481	276	27,363	321	29,288	344	33,555	394	85.2
	Central Gem	23,854	454	27,798	529	29,754	567	34,088	649	52.5
	Yala Township	23,151	502	26,978	585	28,877	626	33,084	718	46.1

	East Gem	24,764	344	28,858	401	30,889	430	35,389	492	71.9
	South Gem	30,421	481	35,450	560	37,945	599	43,473	687	63.3
	Sub-Total	160,675	397	187,239	462	200,414	495	229,611	567	405
BONDO	Yimbo West	28,503	707	33,215	824	35,552	882	40,732	1,011	40.3
	Central Sakwa	20,093	236	23,415	275	25,062	294	28,714	337	85.2
	South Sakwa	23,260	226	27,105	264	29,013	283	33,239	324	102.7
	Yimbo East	27,189	171	31,684	199	33,913	213	38,854	244	159
	West Sakwa	25,313	231	29,498	269	31,573	288	36,173	329	109.8
	North Sakwa	33,164	345	38,647	403	41,366	431	47,393	494	96
	Sub-Total	157,522	266	183,564	310	196,479	331	225,105	380	593
RARIEDA	East Asembo	32,886	419	38,323	488	41,019	523	46,995	599	78.5
	West Asembo	33,072	327	38,540	381	41,251	408	47,261	467	101.1
	North Uyoma	21,245	287	24,757	335	26,499	359	30,360	411	73.9
	South Uyoma	19,536	338	22,766	394	24,368	422	27,918	483	57.8
	West Uyoma	27,819	302	32,418	352	34,699	377	39,754	432	92.1
	Sub-Total	134,558	334	156,804	389	167,836	416	192,288	477	403.4
Grand Total		842,304	333	981,558	388	1,050,626	415	1,203,683	476	2,530.40

Source: KNBS- Kenya Population and Housing Census

Appendix 2: Siaya County Water Demand Projection per Ward

Table 18. 2: Siaya County Water Demand Projection per Ward

Year	Ward	Projected population	Projected water demand (M ³)
2017	Central Alego	35467	1,035,636
2027		41979	1,225,787
2037		49687	1,450,860
2017	North Alego	24844	725,445
2027		29406	858,655
2037		34805	1,016,306
2017	Siaya Township	27470	802,124
2027		32514	949,409
2037		38484	1,123,733
2017	South East Alego	74040	2,161,968
2027		87635	2,558,942
2037		103726	3,028,800
2017	Usonga	15564	454,470
2027		18422	537,922
2037		21805	636,706
2017	West Alego	36887	1,077,100
2027		43660	1,274,872
2037		51677	1,508,968
2017	Central Sakwa	33432	976,214
2027		39571	1,155,473
2028		46837	1,367,640
2017	North Sakwa	37951	1,108,169
2027		44920	1,311,664
2037		53168	1,552,506
2017	South Sakwa	16179	472,427
2027		19149	559,150
2037		22665	661,818
2017	West Sakwa	28967	845,836
2027		34286	1,001,151
2037		40581	1,184,965
2017	West Yimbo	32618	952,446
2027		38607	1,127,324
2037		45695	1,334,294
2017	Yimbo East	31114	908,530
2027		36827	1,075,348
2037		43589	1,272,800
2017	Central Gem	27297	797,072

Year	Ward	Projected population	Projected water demand (M ³)
2027		31770	927,684
2037		38242	1,116,666
2017	East Gem	28339	827,500
2027		33542	979,426
2037		39701	1,159,270
2017	North Gem	40057	1,169,664
2027		47412	1,384,430
2037		56118	1,638,646
2017	South Gem	34812	1,016,510
2027		41205	1,203,186
2037		48770	1,424,084
2017	West Gem	26871	784,633
2027		31804	928,677
2037		37644	1,099,205
2017	Yala Township	26493	773,596
2027		31357	915,624
2037		37115	1,083,758
2017	East Asembo	37633	1,098,884
2019		44543	1,300,656
2020		52722	1,539,482
2017	North Uyoma	24312	709,910
2027		28776	840,260
2037		34059	994,523
2017	South Uyoma	22356	652,795
2027		26461	772,661
2037		31320	914,544
2017	West Asembo	37846	1,105,103
2027		44795	1,308,014
2037		53020	1,548,184
2017	West Uyoma	31835	929,582
2027		37680	1,100,256
2037		44599	1,302,291
2017	East Ugenya	40249	1,175,271
2027		47640	1,391,088
2037		56387	1,646,500
2017	North Ugenya	30990	904,908
2027		36681	1,071,085
2037		43416	1,267,747
2017	Ukwala	24340	710,728
2027		28810	841,252
2037		34099	995,691

Year	Ward	Projected population	Projected water demand (M³)
2017	West Ugenya	34703	1,013,328
2027		41075	1,199,390
2037		48616	1,419,587
2017	Sidindi	28068	819,586
2027		33221	970,053
2037		39321	1,148,173
2017	Sigomere	33910	990,172
2027		40136	1,171,971
2037		47505	1,387,146
2017	Ugunja	39250	1,146,100
2027		46457	1,356,544
2037		54988	1,605,650