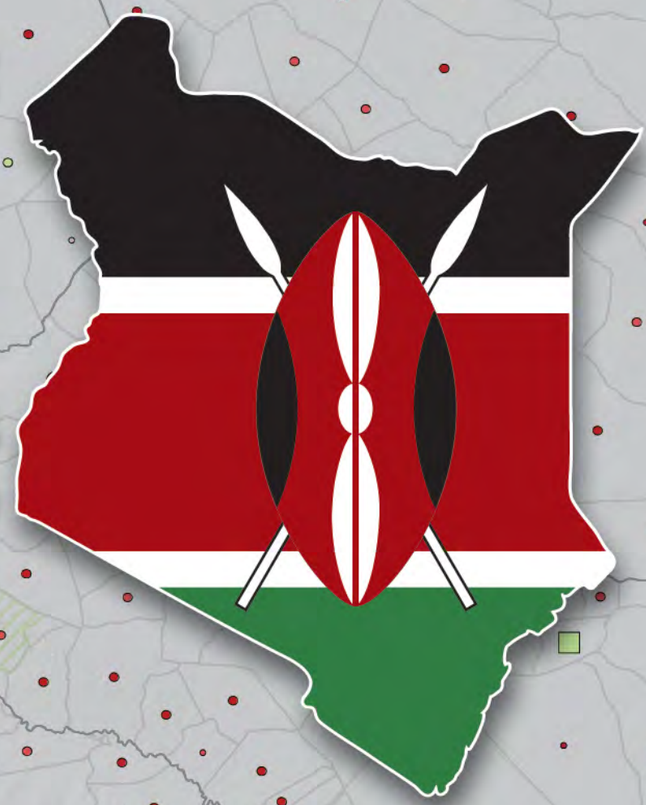
Socio-Economic Atlas of KENYA

Depicting the National Population Census by County and Sub-Location



Second, revised edition

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Depicting the National Population Census by County and Sub-Location

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Centre for Development and Environment (CDE), University of Bern, Hallerstrasse 10, CH-3012 Bern, Switzerland, mailto: info@cde.unibe.ch

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Authors:
Urs Wiesmann (CDE), Boniface Kiteme (CETRAD), and Zachary Mwangi (KNBS)

Main contributors:
Paul Samoei and Samuel Kipruto (KNBS); Evanson Njuguna (CETRAD); Matthias Engesser, Lilian Trechsel, and Patrick Baer (CDE)

Contributors:
Mary Wanyonyi, Vivianne Nyarunda, Paul Waweru, George Kamula, Henry Osoro, Joshua Musyimi, Emma Odhiambo, and Rosemary Bowen (KNBS); Elizah Peter (CETRAD); Cordula Ott, Silvia Lörcher, and Michael Epprecht (CDE)

Reviewers:
Geoffrey K. Ndenge (UNICEF), Jane W. Kabubo-Mariara (UON), Michael Bowen (Daystar University), Eldah Onsomu (KIPPRA), Andrew Mutuku (UON), George Odipo (UON), Robert K. Nderitu (KNBS), Zachary Gariy (JKUAT), Hanspeter Liniger (CDE), Lorenz Hurni (ETHZ)

Language editing:
Marlène Thibault, Anu Lannen, and Tina Hirschbuehl Hufschmid (CDE); Robert Blasiak (University of Tokyo); Erin Gleeson (SciencEdit.CH); and Evie Dovaston (Textmax GmbH)

Proofreading:
Stefan Zach (z.a.ch GmbH)

Cover design:
Simone Kummer, Matthias Engesser, and Lilian Trechsel (CDE)

Layout:
Simone Kummer, Matthias Engesser, Lilian Trechsel, and Patrick Baer (CDE)

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Foreword

The present *Socio-Economic Atlas of Kenya* is one of several reports developed based on the *2009 Kenya Population and Housing Census* data set. It arrives at a crucial development juncture, following the development of the Second Medium Term Plan (2013–2017) and the upcoming post-2015 Sustainable Development Goals agenda. The development and implementation of these national development plans and other strategies will benefit greatly from the depiction and deep analysis of socio-economic indicators in this atlas.

It is important to note from the outset that a number of other highly informative reports have been developed using data from the *2009 Kenya Population and Housing Census*. The Kenya National Bureau of Statistics has produced a number of specific reports, most notably 13 monographs covering topics such as population distribution (four volumes); population dynamics and projections; migration; urbanization; labour dynamics; housing, amenities, and assets; education; disability; and gender dimensions. The Bureau has also published a *National Census Atlas*, and will soon publish a volume on the spatial dimensions of well-being. However, the present socio-economic atlas differs from these other publications in terms of its structure, its format of data application and presentation, and its high spatial resolution.

As noted, the atlas uses a high degree of spatial resolution to vividly illustrate the factors that define and influence the standards of living and coexistence of Kenyan citizens. It depicts Kenya's geographic and socio-economic characteristics and how they vary by location and at various levels.

It can be inferred from this atlas that Kenya has made great achievements in all spheres of life over the past half-century, particularly in combatting poverty, ignorance, and disease. Overall, Kenya has registered significant milestones in improving the general welfare of its citizens. Various government initiatives have been implemented to improve the welfare of Kenyans through targeted resource allocation at lower levels of governance. These initiatives include the Constituency Development Fund, the Orphans and Vulnerable Children (OVC) programme, the recent allocation of county budgets, and the Uwezo Fund. Education infrastructure, facilities, and enrolment at all levels have improved significantly, and today over 90% of Kenyans have some formal education. The health sector has also made great strides, as evidenced by the growing concentration of health facilities and improved ratios of health workers to patients, bringing health services closer to the people and ensuring high-quality service delivery.

This socio-economic atlas represents an invaluable resource for those in charge of devising development initiatives at both the national and the county government levels. The disaggregation of indicators in the atlas will provide fact-based insights for both levels of government. The atlas illuminates a broad range of indicators that will inform targeting, monitoring, and evaluation. County governments, in particular, will find the atlas highly useful as a planning and policy tool, as they strive to fulfil their critical functions and steer development processes at devolved levels. This product is therefore well suited to the needs of governors and their support teams – county assemblies, county executive committees, and sub-county administrators.

Further, the structure and format of the atlas is tailored to provide insights for both governments and the private sector. It is a good source of general information for the representatives of the commercial and non-commercial private sector, as well as for the broader public, who can utilize it as a valuable source of evidence to support specific development debates and decisions.

Structurally, the atlas brings together various policy fields and topics, integrating them in a single volume. It enables comparison across the various fields and topics, which include population characteristics and dynamics, water and sanitation, household assets, levels of poverty and education, and economic activities. These aspects are presented in an innovative format: the maps display population characteristics at the sub-location level, using symbols that indicate the size of the population. This has distinct advantages over maps that use shaded areas, which can create a misleading visual impression. In this way, the maps offer detailed insights into local conditions, giving readers precise information on where exactly particular circumstances prevail and how many people are affected.

Based on these two unique principles of clear structure and high-resolution maps, the authors offer important fact-based insights that reflect their own interpretations and understanding, without limiting readers' freedom to derive their own insights and draw their own conclusions. By structuring, interpreting, and presenting census data in this manner, the present atlas provides a strong basis for tracking Kenya's further progress and documenting new changes that will be reflected in the next national population census in 2019.

At this crucial juncture in Kenya's political, social, and economic development focusing on the transformation of the country, this atlas arrives at the right time and equipped to inform planning, decision-making, policy formulation, and subsequent implementation of the national policies and strategies.

Eng. Peter Oganga Mangiti
Principal Secretary/Planning
Ministry of Devolution and Planning

Acknowledgements

Compilation of the *Socio-Economic Atlas of Kenya* was a true team effort involving dedicated staff from three organizations: the Kenya National Bureau of Statistics (KNBS), the Nanyuki-based Centre for Training and Integrated Research in ASAL Development (CETRAD), and the Centre for Development and Environment (CDE) at the University of Bern, Switzerland.

Following joint development of the initial project idea, sub-location-level data for each atlas theme were extracted from the original *2009 Kenya Population and Housing Census*. The data were then harmonized and mapped at high resolution. We wish to thank Paul Waweru, George Kamula, and Emma Odhiambo (KNBS), who did this with expert precision while simultaneously fulfilling various data requests from the teams working on individual atlas themes.

A chapter dealing with poverty and welfare was planned from the outset. However, this required combining the 2009 census data with data from household surveys by means of a complex modelling approach. Paul Samoei and Samuel Kipruto (KNBS) worked closely with Michael Epprecht (CDE), developing and implementing the model, eventually generating poverty and welfare estimates at the sub-location level. While developing the model in an iterative process, Paul Samoei and Samuel Kipruto played key roles in harmonizing data and coordinating KNBS's contributions with the teams from CETRAD and CDE. We greatly appreciate their invaluable contributions.

The atlas contains additional information – integrated to ease interpretation of findings – which was not derived from the 2009 census. This includes information on climate, land cover, rivers, parks, roads, and other aspects. Evanson Njuguna and Elizah Peter (CETRAD) compiled the information from various sources, including CETRAD and CDE's joint database, and then harmonized it with the spatial references used in the atlas. We are very grateful for their dedicated work and their good collaboration with the teams from CDE and KNBS.

While developing the atlas, members of all three institutions helped elaborate its themes and topics by critically reviewing data, putting findings into context, and formulating insights and interpretations. We particularly wish to thank Mary Wanyonyi, Vivianne Nyarunda, Rosemary Bowen, and Henry Osoro (KNBS), as well as Cordula Ott and Silvia Lörcher (CDE) for their crucial contributions in this process.

Our very special thanks go to Matthias Engesser and Lilian Trechsel (CDE). In addition to coordinating and harmonizing the database and the overall project workflow together with KNBS and CETRAD, they analysed the data for every map and graph and finally produced each component using sophisticated GIS software, in close and continuous collaboration with the authors. Without their hard work and dedication, the atlas would not have been published.

At different stages of production, external reviewers made valuable comments on one or several atlas themes. We especially wish to thank Geoffrey K. Ndenge (UNICEF), Jane W. Kabubo-Mariara (UON), Michael Bowen (Daystar University), Eldah Onsomu (KIPPRA), Andrew Mutuku (UON), George Odipo (UON), Robert K. Nderitu (KNBS), Zachary Gariy (JKUAT), and Hanspeter Liniger (CDE) for their respective inputs. Further, we wish to thank Lorenz Hurni (ETHZ) for his important advice in the field of cartography.

We are also very grateful to our team of editors: Marlène Thibault, Anu Lannen, and Tina Hirschbuehl Hufschmid (CDE), as well as Robert Blasiak (University of Tokyo), Erin Gleeson (SciencEdit.CH), and Evie Dovaston (Textmax GmbH). Their thorough editing and harmonization of texts benefited the atlas immensely. Further, we wish to express our warm thanks to Simone Kummer, who developed and implemented the layout of the atlas together with Matthias Engesser and Lilian Trechsel. We also wish to thank Stefan Zach of z.a.ch GmbH for proof-reading, the team at Rubmedia for their helpful advice and excellent printing, and Schumacher AG for binding this volume.

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We are also very thankful for the general logistical support we received from our mother institutions – KNBS, CDE, and CETRAD – as well as the enabling environment facilitated by the Government of Kenya through the Ministry of Devolution and Planning and the Ministry of Environment, Water and Natural Resources.

Last but not least, we wish to thank our families and friends for their wonderful support throughout the entire process.

Urs Wiesmann
Boniface Kiteme
Zachary Mwangi

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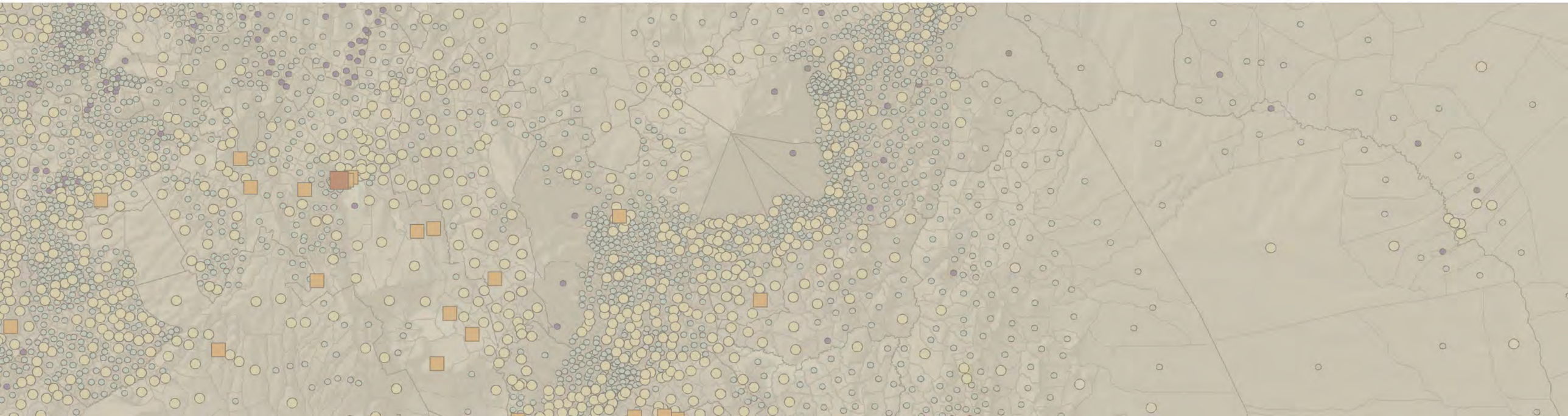
Introduction & Background



Introduction

This socio-economic atlas is a special gift to all Kenyans as they celebrate the 50th anniversary of the Republic of Kenya. In the five decades since independence, Kenya's population has increased by a factor of four; at the same time, the country has developed rapidly in many socio-economic fields, lifting it from a development to a transition country. This atlas illustrates the great achievements made and, at the same time, helps identify fields where further improvements are desirable.

Since 2010 the Republic of Kenya has a new Constitution that defines a new interplay between the levels of the national government and the governance structures of 47 newly founded counties, which are both committed to sustainable and equitable development. This atlas is designed to serve both levels of governance by displaying information at scales adequate to either of them, thereby promoting informed decision-making and planning. At the same time, the atlas aims to enhance the knowledge of Kenya's citizens and the broader public regarding the diversity of situations and developments in this fascinating country.

This atlas is the result of a unique institutional collaboration between the Kenya National Bureau of Statistics (KNBS), the Centre for Training and Research in ASAL Development (CETRAD), and the Centre for Development and Environment (CDE) at the University of Bern, Switzerland. KNBS hosts the best available socio-economic data in the country, CETRAD has decades of experience in integrating research and development, and CDE has long-standing collaborative links with Kenya and considerable experience in producing such an atlas. By joining their respective expertise, these institutions have embarked on an innovative process that has made this atlas possible.

The atlas mainly depicts the results of the 2009 National Population and Housing Census, but it also refers to other surveys and is enriched with some additional thematic layers (see sources in the respective chapters). The idea for this atlas was conceptualized shortly after the census results were released, but the actual work on the atlas began in 2012, when the main census reports – notably the 13 monographs – were being developed. The present atlas is intended to supplement these other releases from the 2009 census by emphasizing the spatial variation of the main findings.

This atlas is unique in several respects, namely its spatial resolution, its population-centred display, its combined thematic foci and its emphasis on relative values for pattern detection. These four unique characteristics are discussed briefly here:

(1) High-resolution maps with two distinct spatial levels

The aim of this atlas is to serve both the national government and the county governments. The presentation of the data therefore follows administrative units. Although comparative county figures may serve most purposes at the national level, county governments require higher-resolution data about their territories. The sub-location, the smallest administrative unit available, is therefore the best spatial reference. This atlas combines a high-resolution display of the 7,149 sub-locations in Kenya with aggregated data for the 47 counties. These two spatial reference systems are systematically used in all themes and maps, thereby enabling comparisons between all themes and maps.

(2) Population-centred display

The problem of many conventional maps depicting population characteristics is that they use area shading, meaning that an area with certain population characteristics is shaded in a certain colour. This may be very misleading in a country like Kenya, where population densities vary greatly between vast arid pastoralist zones, high-potential agricultural areas, and urban settings, because the shading of a large area with a small population may make a greater visual impression than a town with one million inhabitants. To avoid this problem, this atlas does not use area shading, but instead applies a population-centred display. This display depicts sub-locations by means of proportional symbols which indicate the size of the population in the given sub-location. These symbols – instead of the sub-locations' areas – are shaded to display the information depicted on the given map. All maps in this atlas contain enlarged insets to enable this type of display in densely populated areas and major towns. By applying these principles throughout the atlas, sub-locations across the country are displayed with equal visual weight.

(3) Combining different thematic foci in a comparative manner

This atlas covers a comprehensive range of six main themes relevant to development. Five of these themes are taken directly from the 2009 census. The theme on population distribution and dynamics is covered in chapter 2 and includes 14 maps that dwell on population densities, basic demographic factors, and sociocultural diversity. Water, sanitation, and energy are addressed in eight maps in chapter 3, focusing on access to safe water, sanitation, and different forms of energy. Household assets (eight maps) are reviewed in chapter 4, which touches on housing, transport means, and information and communication technology. Chapter 6 tackles the subject of education in nine maps that highlight primary and secondary school attendance rates and touch on the overall education levels reached by the adult population. Chapter 7 (seven maps) discusses employment rates and aspects of the labour force from multiple perspectives.

The final theme is poverty and welfare; it was addressed by combining data from the *2009 Kenya Population and Housing Census* and the *Kenyan Integrated Household Budget Survey 2005/06*. This theme, which is covered in seven maps in chapter 5, addresses poverty and welfare at the high-resolution, sub-location level. Some additional information on spatial characteristics is also provided in this chapter. By standardizing the way data are presented across all six themes, we have made it possible to compare information for any given area.

(4) Emphasis on relative values for pattern detection

In the five years since the census, some absolute figures will have changed. Therefore, this atlas seeks to discourage readers from focusing too closely on absolute population numbers down to the single person, and indicates these numbers in thousands at the county level and in millions at the national level. Indeed, the emphasis of the atlas is on relative figures, such as proportions of the total population, as these relative figures will remain relevant for a longer time than the absolute values. The use of relative values also enables the detection of patterns that hint at underpinning processes and dynamics. Some of these patterns are highlighted in the texts accompanying each map, with the goal of instigating further discussion and evaluation. Similarly, each map is accompanied by a graph that shows the relative distributions among rural and urban contexts, as the rural–urban gradient has proven to be important in most themes.

These four characteristics make this atlas a unique and valuable complement to the other products stemming from the 2009 census.

This introductory chapter gives background information for the optimal use of the atlas and its six themes. It contains nine maps that are clustered into three groups:

Maps 1.01 and 1.02 give an introduction to the geography of Kenya and to the counties as basic reference units. These two maps are mainly addressed to readers who are less familiar with Kenya.

Maps 1.03 to 1.05 deal in more detail with the principles of this atlas. They explain the different components of the standardized layout by showing the considerations behind the population-centred display, and by highlighting the methodology behind the standardized display of the rural–urban dimension that accompanies every map. These three maps are relevant for everyone who wishes to develop a deeper understanding of the advantages and limitations of the approaches used in this atlas.

Maps 1.06 to 1.09 display topical background information that may be useful for interpreting the maps on the six themes. These include the agroclimatic zones that are crucial for understanding the population distribution; a rough land-cover map that illustrates the relationship between ecological conditions and land use; information on the distribution of forests and parks as important conservation areas, as well as on the extent of the large river basins that link counties through upstream–downstream relations; and finally, transport systems and accessibilities that to a large degree mould centre–periphery patterns. These four maps are addressed to readers who want to link observations in the thematic maps with potential causal factors.

Thus, this atlas is intended not only as an information tool, but also as a tool for developing informative conclusions through the creative combination of its contents. Ideally, this atlas will be used by readers interested in and working for the development of this fascinating country, and particularly by governments concerned with sustainable and equitable development at both the national and the county levels.

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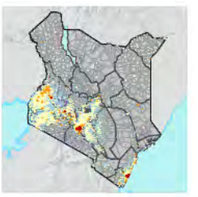

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1.01 Geographical Overview of Kenya

The Republic of Kenya is a fascinating country with rich geographical features as well as diverse sociocultural and physical settings. Remarkable landmarks and expansive landscapes shaped by nature provide a home to over forty tribes and a range of languages that extend across the length and width of Kenya's 592,586 km^2. Kenya is neighboured by Tanzania to the southeast, Uganda to the west, South Sudan and Ethiopia to the north, and Somalia to the east.

The map shown here is derived from MODIS satellite imagery and hints at the diversity of the country. Greenish colours show high-potential zones where the majority of Kenyans live, while greyish to reddish colours indicate the vast arid and semi-arid zones. The map provides geographical context and shows the country's location on the equator. For additional orientation, the names of major towns and settlements are indicated, as well as some of the names of rivers that arise in the wet regions and nourish drier zones. The map also identifies the 47 newly designated counties that form a core reference point for this atlas. This satellite image map, however, is insufficient for completely showing the country's diversity. Therefore a brief overview of some of its major features is given here. The reader may wish to consult a higher-resolution map to locate the names given in this overview.

The country extends from the low-altitude coastal belt of the Indian Ocean in the southeast and gradually the elevation rises to just above 1,000 m above sea level before flattening along the extended length of the Yatta Plateau. The monotony of the flat plains is intermittently broken by residual hills, namely the Taita and Kyullu Hills, which are masses of broken boulders and inselbergs of the Kibwezi–Makindu line. The Yatta Plateau is flanked by the rising Mbooni and Machakos Hills to the west, where the elevation gradually drops down to the Tana River before climbing rapidly to form the Central Highlands. These reach an imposing 5,200 m above sea level to form the country's most spectacular snow-capped national landmark, Mount Kenya. To the west, the Aberdare ranges rise to just over 4,000 m above sea level. These two landmarks form one of the most important water towers in the country.

The Great Rift Valley, which enters Kenya from its southwestern neighbour, Tanzania, continues on to its northern neighbour, Ethiopia, and divides the Kenyan highlands into east and west, creating another very striking feature of Kenya's geography. The Kenyan highlands comprise one of the country's breadbaskets owing to the highly reliable precipitation and fertile soils. Livestock is raised here and it is also where the most successful large- and smallholder commercial farming is practised, with crops including tea, coffee, pyrethrum, wheat, and maize.

The western highlands separate the Lake region from the rest of the country, and stretch from Kisii in the south to the tea plantation areas of Kericho, before continuing through to Kitale, Eldoret, and further north to elevations 4,300 m above sea level. This is where the impressive Mount Elgon rises up, the product of an extinct volcano. These highlands are also known for their high agricultural potential, making them the second of Kenya's main breadbaskets.

In addition to Lake Victoria, Kenya is well endowed with small and large lakes, which dot the floor of the Rift Valley from Lake Amboseli in the south to Lake Turkana in the north. Lake Turkana, the "jade sea", crosses into Ethiopia at its northern end and is the world's largest desert lake. Lake Victoria, on the other hand, is the world's second-largest freshwater lake, and is shared by Kenya, Uganda, and Tanzania. The lake basin is dominated by the Kano plains, which are suitable for farming through irrigation.

The northern and northeastern parts of Kenya are dominated by arid plains and several isolated mountains, most notably the Mathew and Ndoto ranges, Mount Marsabit and its beautiful Lake Paradise. The Songot Mountains, Murua Ngithigerr Laima, Lokwonamoru, and Lorionestom are found in the central, northern, and northwestern corners of Turkana. These isolated hills and mountains enjoy higher levels of precipitation, and thereby become crucial areas for resource concentration. Consequently they represent convergence zones for both humans and livestock, especially those in search of water and pasture. Furthermore, numerous seasonal rivers and streams, which are important for distributing water to the much drier areas in the lowlands, are fed by sources in these hills and mountains, especially during rainy seasons.

The southern rangelands border Tanzania. They stretch from the Lolgorien Hills through the Nguruman Escarpment, the Maasai Mara, and the Namanga Hills to end in the southeastern corner of Kajiado, where they are bounded by the Kyullu Hills to the east and the northeastern slopes of Mount Kilimanjaro to the south. The isolated hills of Lolgorien, the Nguruman Escarpment, and Namanga are also important grazing and watering areas during dry seasons. The southern rangelands are rich in both livestock and wildlife resources, and are famous for the Maasai Mara game reserve, which forms one part of the monumental wildebeest migration along with the Serengeti National Park in Tanzania.

Kenya's coastal area is its major tourist attraction due to its beautiful and extensive beaches, first class tourist hotels, marine parks, and good weather that prevails throughout the year. The region has a lot to offer including its rich and largely intact culture and landmarks such as the Mombasa deep water Kilindini port, the national oil refinery, and the famous Fort Jesus. Further north, the coast has even more attractions like the Malindi wonders, which include one of Kenya's great unknown treasures, the thick canopy of the only surviving indigenous Arabuko Sokoke forest. This is also where one finds the Vasco Da Gama Pillar, which is over 500 years old, the Watamu and Malindi marine parks that open onto idyllic sandy beaches, and Hell's Kitchen a few kilometres to the north of Malindi. Further north, Lamu Island is home to one of the oldest and best-preserved Swahili settlements in East Africa. The town is almost devoid of motorized transport, and is traced by just alleyways and footpaths, making it no surprise that it has been listed as a World Cultural Heritage Site.

Kenya's advantageous geographical location makes it the gateway to East Africa and a global travel hub. It is a crossroads for trade and communication, serving eastern and central Africa as well as the Horn of Africa. The capital city Nairobi is the regional commercial hub, while Mombasa is the largest port and serves the entire East African hinterland.

All local and foreign trade and travel policies and legislation should therefore strive to facilitate the best possible conditions for reaping and preserving the potential provided by this rich geography.

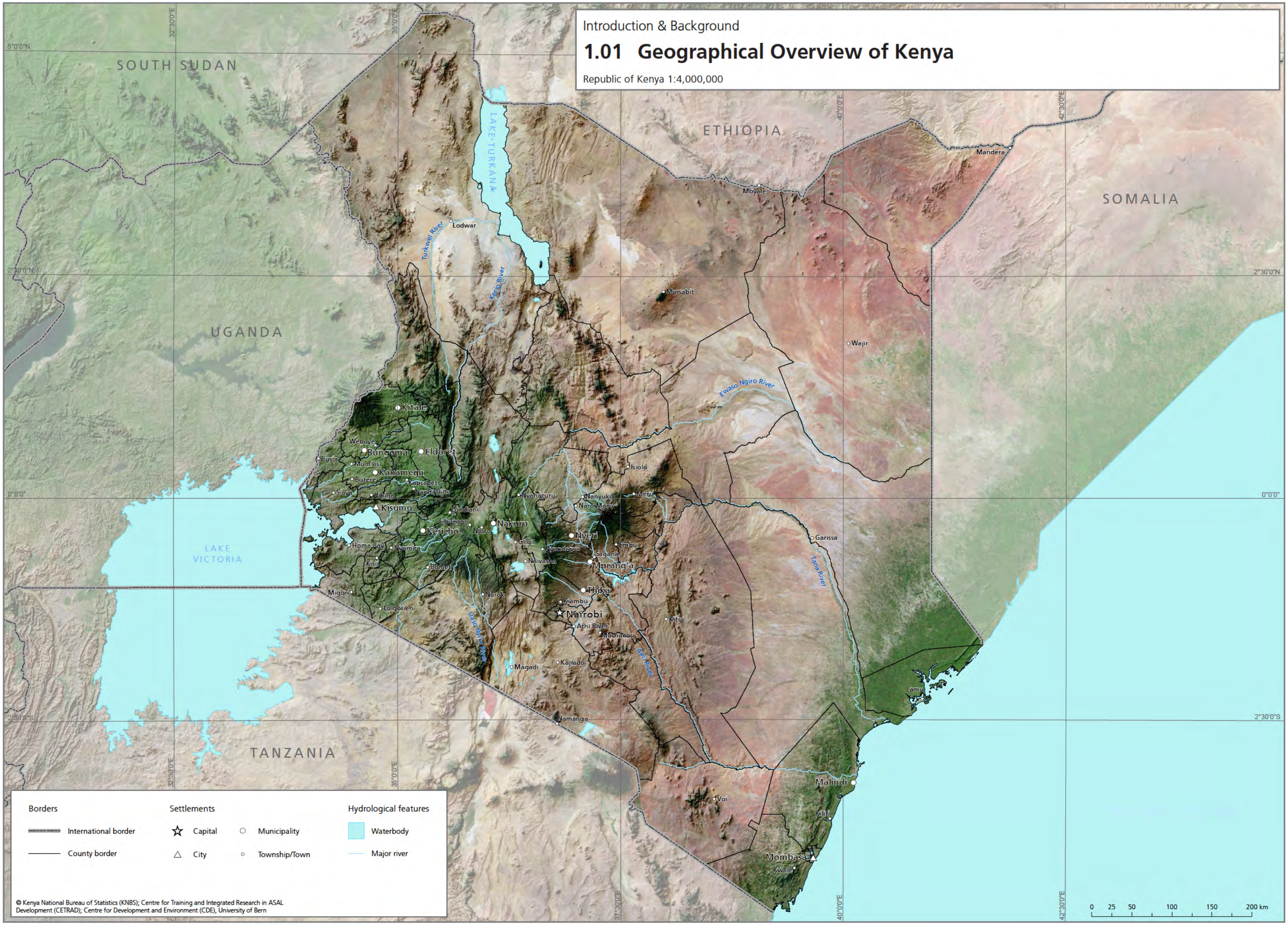
Data Source

Satellite Imagery: MODIS Satellite Image Mosaic, 2.5d enhanced.

Introduction & Background

1.01 Geographical Overview of Kenya

Republic of Kenya 1:4,000,000



Borders

- International border
- County border

Settlements

- Capital
- City
- Municipality
- Township/Town

Hydrological features

- Waterbody
- Major river

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1.02 Kenya's 47 Counties

The 2010 Constitution of Kenya created a new order with diverse institutional and governance implications. The most significant among these was the devolution of governance to 47 newly created county governments.

The counties are managed through a structure that includes a county assembly and executive committee. County assemblies consist of elected and nominated members and an assembly speaker as an ex-officio member. Members of county assemblies (MCAs) are elected to represent sub-units of counties known as wards. County assemblies are responsible for making county laws, exercising oversight over the county executive committee, receiving and approving plans and policies for managing county resources, and developing infrastructure and institutions.

Voters also directly elect the county governor; the latter, along with the deputy county governor, constitute the county's chief executive and deputy chief executive. Executive authority is vested in the county executive committee (CEC), which consists of the county governor, deputy county governor, and members appointed by the county governor. These appointments are made with the assembly's approval and must not be members of the assembly. The CEC is responsible for implementing county legislation, implementing national legislation to the required extent, and managing and coordinating the functions of the county administration and its departments. It is also responsible for preparing proposed legislation for consideration by the county assembly and providing the county assembly with full and regular reports on matters relating to the county. CEC members are accountable to the county governor for their performance and the exercising of their powers.

A county commissioner nominated by the president is the head of security and works closely with the county leaders as the central government's representative. Nationally, each county is represented at two levels. Firstly, respective county matters are legislated by members of parliament in the Senate. Secondly, in the national assembly, each county has one female representative and several members of parliament, depending on the number of constituencies in the county. Supplementing the Constitution, the two levels of parliament have enacted laws to govern the administrative and fiscal relationship between the central and county governments.

This map shows the 47 counties along with their administrative boundaries and headquarters. The map is mainly provided to help the reader locate the counties, because while the thematic maps in this atlas show county boundaries, they do not repeat the names.

The counties are coloured in various shades to illustrate the former provincial units, which are still recognized by most Kenyans. In addition to the map, a county table is provided and displays some general information including area (in km^2), the number of sub-locations that act as second-level reference areas in this atlas, the number of households, and the total population in thousands. This helps to show that these figures have already changed to some extent since the 2009 census. Both sets of information reveal great diversity across the counties in terms of area and population size.

In terms of population, ignoring the urban–rural context, four distinct classes can be easily discerned: (1) counties with over 2 million people, (2) counties with over 1 million people; (3) counties with over 0.5 million people, and (4) counties with fewer than 0.5 million people. Based on this classification, only one county, Nairobi, is in the first category. The second category includes nine counties, namely Kakamega, Kiambu, Nakuru, Bungoma, Meru, Kisii, Kilifi, Machakos, and Mandera in descending order. The lower end of the fourth category includes Lamu, Isiolo, Samburu, Tana River, Taita Taveta, Marsabit, Tharaka Nithi, Elgeyo Marakwet, and Laikipia. The remaining 28 counties are in the third category. Several surprises emerge: firstly, Mombasa has not yet reached the 1 million people mark; secondly, Mandera is one of the driest counties and has over 1 million people, making it the tenth-largest, ahead of Kisumu (position 13) and Mombasa (position 15) although both are cities; and finally, Kitui, another largely arid and semi-arid county, falls short of the 1 million mark by only 2,400 people. It is also interesting to note that aside from Meru and Kiambu, all of the counties in the central Kenya and Mount Kenya regions have more than 0.5 but fewer than 1 million people.

However, these population sizes must be contrasted with geographical size in order to appreciate the potential pressure on land and other natural resources. All of the heavily populated counties are relatively small in size, e.g. Kisii (1.14 million) is only 1,312 km^2, Kiambu (1.6 million) is 2,543 km^2, Kakamega (1.65 million) is 3,004 km^2, and Bungoma (1.4 million) is 3,018 km^2. This makes Kisii the most densely populated county with 870 people/km^2, followed by Kiambu (630 people/km^2), Kakamega (548 people/km^2), and Bungoma (452 people/km^2). In comparison, Mandera has a large population (1.023 million) in absolute terms, but only 39 people per square kilometre. These results are illustrated well in map 2.01 on population density.

Geographical size varies just as much, if not more, than population size. The range in rural counties is quite broad, from Marsabit (71,000 km^2) to Vihiga (562 km^2) – a factor of 126. The range across urban counties is not as large, with a variation factor of 3 separating Mombasa (220 km^2) and Nairobi (695 km^2). The ten largest counties, each with over 20,000 km^2, are found in the vast low-potential arid and semi-arid north, northeastern, southern Rift, and coastal regions. The 12 medium-sized counties (2,000 to 6,000 km^2), on the other hand, are in low- to medium-potential areas, e.g. Narok, Taita Taveta, Baringo, Laikipia, West Pokot, and Makueni. Meru is also in this category although it is an area of comparatively higher potential. With the exceptions of Siaya (2,515 km^2) and Tharaka Nithi (2,640 km^2), all of the small counties (under 4,000 km^2) are found in the high-potential regions of central and western Kenya.

It is important to emphasize the relevance of this analysis of county sizes based on population and total land area. The basic expectation of the devolution process is increased involvement by the respective communities in their development process. The size of a county is therefore very important, because it will directly affect the extent to which this basic expectation is successfully met. On the one hand, a large population will require a larger number of smaller administrative and planning units in order to ensure the highest degree of service delivery, as well as mobilization and inclusion in decision-making processes. On the other hand, large counties located in areas that are generally marginal and remote, will face major challenges in terms of mobility and mobilization, which, if not effectively addressed, can grossly curtail service delivery and people's participation in the development process. In any case, adequate allocation and efficient application of available resources will hold the key to successful implementation of the devolved government units.

County	Surface area (land area, excluding waterbodies; km^2)	Number of sub-locations	Number of households*	Total population*
Nairobi	695	112	985.0	3,078.9
Mombasa	220	34	268.7	920.6
Kwale	8,320	84	122.0	642.7
Kilifi	12,658	171	199.8	1,098.7
Tana River	38,502	93	47.4	238.8
Lamu	6,280	39	22.2	99.5
Taita Taveta	17,158	90	71.1	274.9
Garissa	44,199	92	98.6	616.9
Wajir	56,780	108	88.6	658.1
Mandera	26,083	119	125.5	1,023.1
Marsabit	71,171	114	56.9	288.5
Isiolo	25,364	44	31.3	139.4
Meru	6,936	325	319.6	1,337.7
Tharaka Nithi	2,640	123	88.8	360.2
Embu	2,819	112	131.7	508.5
Kitui	30,544	317	205.5	997.9
Machakos	6,212	225	264.5	1,085.6
Makueni	8,024	202	186.5	874.4
Nyandarua	3,242	80	143.9	589.6
Nyeri	3,336	196	201.7	679.4
Kirinyaga	1,479	81	154.2	521.1
Murang'a	2,558	201	255.7	935.7
Kiambu	2,543	193	469.2	1,603.4
Turkana	68,731	158	123.2	848.2
West Pokot	9,146	198	93.8	509.7
Samburu	21,029	108	47.4	221.3
Trans Nzoia	2,486	57	170.1	809.6
Uasin Gishu	3,335	97	202.3	872.1
Elgeyo Marakwet	3,022	180	77.6	366.8
Nandi	2,873	289	154.1	742.7
Baringo	10,995	270	110.6	548.7
Laikipia	9,456	79	103.1	391.6
Nakuru	7,482	210	409.8	1,566.0
Narok	17,892	185	169.2	841.5
Kajiado	21,920	143	173.5	677.0
Kericho	2,151	207	157.9	740.6
Bomet	2,783	174	144.6	724.0
Kakamega	3,004	231	355.7	1,647.1
Vihiga	562	115	123.3	549.0
Bungoma	3,018	149	270.8	1,362.7
Busia	1,685	181	154.2	737.1
Siaya	2,515	179	199.0	834.0
Kisumu	2,077	168	226.7	952.8
Homa Bay	3,166	211	206.3	955.2
Migori	2,582	164	180.2	907.7
Kisii	1,312	167	245.0	1,142.0
Nyamira	896	74	131.0	592.3
KENYA	**581,881**	**7,149**	**8,768.0**	**38,113.3**

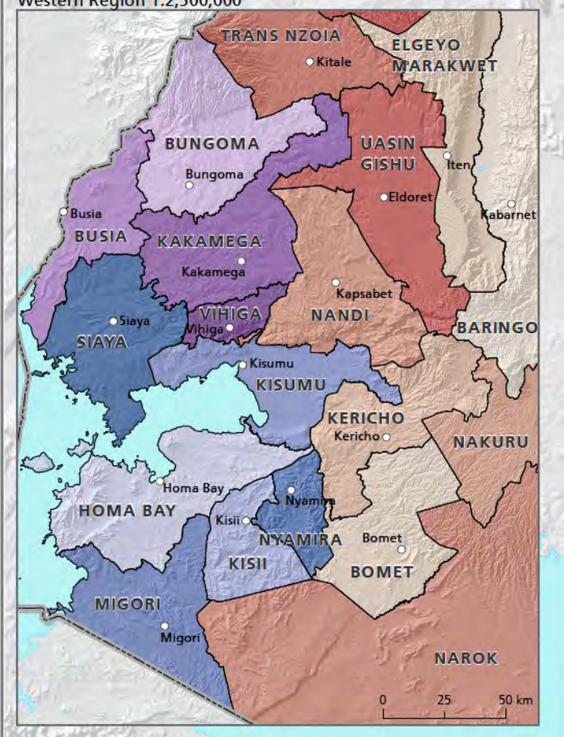
* in thousands

Introduction & Background

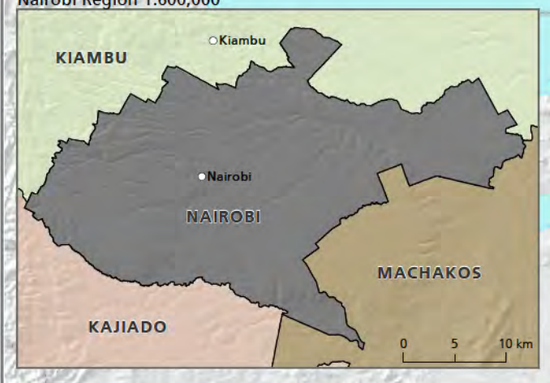
1.02 Kenya's 47 Counties

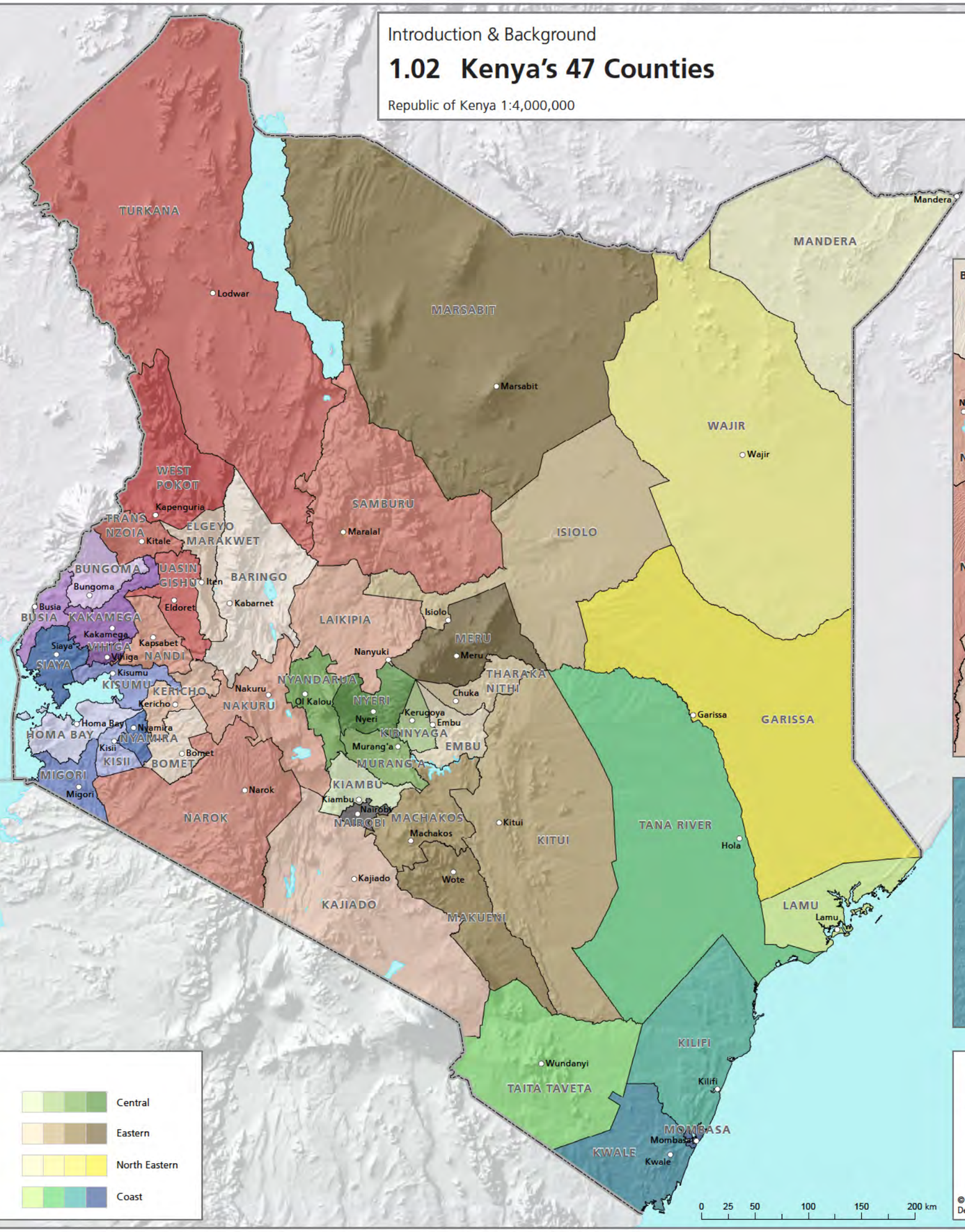
Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

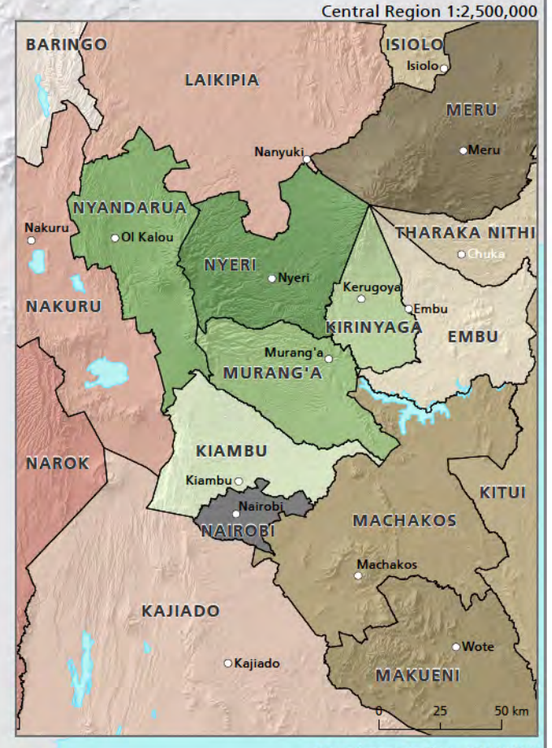


Nairobi Region 1:600,000

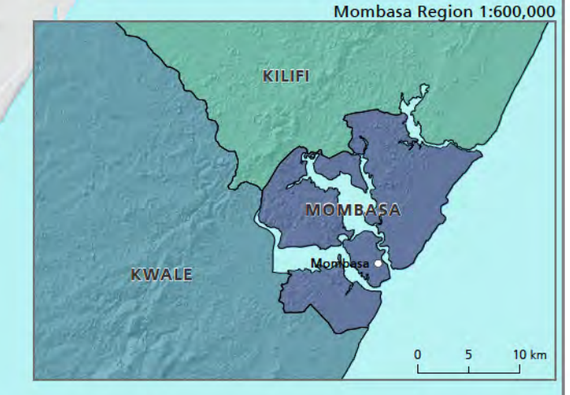




Central Region 1:2,500,000



Mombasa Region 1:600,000



Administrative unit

NAIROBI County name

County headquarters

Former provinces

Nairobi
Central
Western
Eastern
Nyanza
North Eastern
Rift Valley
Coast

Borders

International border

County border

Features

Waterbody

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1.03 Map Layout in This Atlas

This atlas aims to make detailed socio-economic information available to the public. More importantly, it aims at providing relevant information and analyses from Kenya's 2009 census to decision-makers and planners – particularly those working in the first and second levels of government established by the new Constitution of Kenya in 2010.

The sub-national overviews and comparative county-level information in this atlas will likely be of interest to people working at the level of the central government. Those involved in planning and decision-making at the county level will likely appreciate having easy access to information on the variation and distribution of relevant indicators within counties. To that end, the atlas presents data at the level of individual sub-locations, the smallest units that can be meaningfully depicted based on Kenya's 2009 census.

To meet the needs at both levels of governance, Kenya's 47 counties and its 7,149 sub-locations form the core spatial reference units of this atlas. Each section of the atlas is comprised of five components arranged side-by-side across two pages. These components – including maps, texts, graphs, and tables – are presented in the same layout each time to ease comparison. They are described in detail below.

The main map (odd page numbers)

Providing the desired degree of detail at the sub-location level posed a challenge to the scale and layout of the atlas. The size and population density of Kenya's counties and sub-locations vary greatly due to the country's rich diversity of geographical contexts rooted in the range of ecological belts (from arid and semi-arid to high-potential) as well as in historical developments. Depicting densely populated urban agglomerations by their individual sub-locations was particularly challenging.

To represent all contexts adequately, the main map consists of the following components:

1. *Kenya map:* The map at the centre of the page represents Kenya at a scale of 1:4,000,000. At this scale the sub-locations in less densely populated regions of Kenya are clearly visible. The map also provides an overview of the highly populated areas, but without each sub-location being clearly identifiable.
2. *Map insets for central and western Kenya:* Two map insets at a scale of 1:2,500,000 zoom in on the densely populated areas of central Kenya and western Kenya, which are home to about three-quarters of Kenya's population. The insets, both of identical size, are placed to the right and left of the country map. In the insets, most sub-locations in rural settings are clearly identifiable; sub-locations can also be identified, though less clearly, in most smaller to medium-sized towns.
3. *Map insets for Nairobi and Mombasa:* Two further map insets show Nairobi and Mombasa at a scale of 1:600,000 and allow urban sub-locations in these two counties to be identified. The insets cover the same surface area and thus illustrate the differences in size and density between the largest and second-largest cities in Kenya.

Map 1.03 shows the extent and position of the four map insets on the Kenya map. All maps in this atlas include the Kenya map with the four insets, with the exception of maps 1.01 (geographical overview) and 2.02 and 2.03 (demographic variables that cannot be disaggregated to the sub-location level). However, the positioning of the insets on the Kenya map is not repeated.

In order to enable navigation of the maps of this atlas, the Kenya map and its insets are underlaid by a digital terrain model and show national, county, and sub-location borders as well as major waterbodies and major conservation areas (i.e. national parks). However, the names of counties, major towns and settlements, and waterbodies are not repeated on the thematic maps of this atlas. To see these names, readers are asked to refer back to the maps in this introductory chapter (especially maps 1.01 and 1.02). The key to repeated elements is found on the right side below the insets, while the key to elements that change for each map is positioned to the left.

When texts refer to the main map, this includes the Kenya map and the four insets that show sub-location values at the scales mentioned above.

County map (even page numbers)

Unlike in this introductory chapter, all maps in chapters 2 to 7 are accompanied by a map at a scale of 1:11,500,000 in the lower right corner of the evenly numbered page, that shows the respective themes at the county level. By displaying average values per county, this map provides a national overview. Contrary to the main map, which uses proportional symbols representing the population size of sub-locations (see map 1.04), the county map uses no symbols but displays the average values per county in conventional area shading (choropleth map). The colour scheme and classes used in the county maps are identical with those in the main maps. This enables readers to easily compare county averages with the details displayed in the main map, e.g. to see what varying sub-location values result in the county average. The smaller reproduction of the county maps is also used in the content tables of each chapter to enable easy orientation.

In the texts, the map displaying county averages in national overview is generally referred to as county map.

County table (even page numbers)

This atlas does not aim to provide detailed statistics of the 2009 census, as these have been or will be published by the Kenya National Bureau of Statistics in other formats. Instead, it is designed to provide information on the variation of relevant census data at the county level (see county map) and the sub-location level (see main map). However, information on the themes displayed in this atlas may still be of interest, especially at the county and national levels. For this reason, each map includes a table in the third column of evenly numbered pages (or, in the case of this introductory chapter, in the fourth column) that displays concrete figures and information related to the theme of the map for each county and for Kenya as a whole. These tables are referred to as county tables in the texts. They all display the counties in the same order, so readers can always find the county of interest in the same row. This order follows the sequence of counties as they are listed in Kenya's 2010 Constitution, except that the capital, Nairobi, has been shifted from the bottom to the top row. The last row gives the overall figures for Kenya, making it an important reference for interpreting the respective map. The first two columns show the county name and average of the variable displayed on the map. Further columns give additional information relevant to the displayed theme. Most maps show relative values (e.g. percentage of the population). To complement these relative values, absolute numbers (e.g. how many people) were added in the county tables. It is important to note that all figures for absolute values per county of households or persons are given in thousands. This was done deliberately to show the wider dimension rather than an exact figure for each and every household and person.

Rural–urban graph (even page numbers)

Analyses have shown that many themes displayed in this atlas are strongly influenced by rural–urban gradients. For this reason, all maps in chapters 2 to 7 are accompained by a graph illustrating the differences between rural and urban areas. In each case, this graph is placed above the county map and referred to in the texts as rural–urban graph. Section 1.05 explain these graphs in more detail.

Texts (odd page numbers)

The first two columns contain a text explaining and commenting the map at hand. It normally starts by justifying the relevance of the theme displayed, followed by methodological explanations where needed. Then the overall national figures are explained and commented, followed by observations, comments, and interpretations of the variations shown at the county and sub-location levels, and ending with some general conclusions. It is important to note that these texts provide facts and background, but that the interpretation of these facts is done by the authors of this atlas. Readers should feel free to make additional observations based on the rich information displayed, and to draw additional or other conclusions than those of the authors. In that sense, the texts are intended to provoke further interpretation and discussion of the findings presented in this atlas.

Introduction & Background

1.03 Map Layout in This Atlas

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

Central Region 1:2,500,000

Nairobi Region 1:600,000

Mombasa Region 1:600,000

Extent indicator

Extent of detail maps

Administrative unit

NAIROBI County name

Settlements

Capital

City

Municipality

Township/Town

Borders

International border

County border

Sub-location border

Features

Waterbody

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1.04 Proportional Symbols Indicating Population Size in Sub-Locations

Section 1.03 gave an overview of the standardized components of each map or section in this atlas and explained the considerations behind the basic layout of the double page used for each section. These components are: the main map with its four insets, the county map, the county table, the rural–urban graph, and the texts. The present section explains why proportional symbols were chosen to display values at the sub-location level, rather than dot maps or area shading as in conventional mapping approaches.

Dot maps are used to display absolute numbers, e.g. number of households or number of people, with one dot representing a certain number, e.g. 5,000 people. However, dot maps were deemed unsuitable for this atlas as most of the information displayed in this atlas is expressed not as absolute values, but as relative values (e.g. percentages or indices characterizing the population).

Using area shading in this case would have meant colouring the whole area of a sub-location according to the characteristics shown by its population (choropleth map). This would have risked giving a misleading impression of Kenya, a country of diverse contexts. The problem is best illustrated by an example: assuming there is a sub-location somewhere in the arid parts of northern Kenya with a size of 500 km² and 1,000 inhabitants, and a sub-location in one of the large urban settlements, e.g. Nairobi, of 5 km² and with 50,000 inhabitants. According to the principle of area shading, the 500 km² in northern Kenya might be coloured red, indicating a low proportion of households with access to safe water sources, whereas the 5 km² in Nairobi might be coloured blue, indicating a high proportion of households with access to safe water sources. The reader would be left with a misleading visual impression, with red covering a surface 100 times the size of blue, despite red actually only representing 1,000 people, and blue 50,000 people. In relation to the population with high or low access to safe water sources, this would mean that the visual impression given would be wrong by a factor of 5,000, i.e. there would be 5,000 times too much red compared to blue. So greatly misleading a visual impression will cause even very experienced readers to draw wrong conclusions. This example is realistic for Kenya with its diversity of contexts, and it clearly shows that area shading is not appropriate for this atlas.

The solution chosen to appropriately display the sub-location values in this atlas is the following: each sub-location is marked by a proportional symbol (square or circle) whose shape and size represents population size, and whose colouring represents the population's characteristics. Sub-location borders, showing the sub-location's size in terms of surface area, are depicted on the main maps (see map 1.03). In the above example, this would mean that the larger symbol of the sub-location in Nairobi is shaded in blue and the smaller symbol in northern Kenya is shaded in red, while the sub-location borders would still show that the latter sub-location is larger in area size than the former.

Sub-locations were classified into five categories of population size, with symbols assigned as follows (see also key in any of the thematic maps):

1. *Large square:* Marks sub-locations with a population size above 50,000 people

2. *Medium square:* Marks sub-locations with a population size of 20,000 to 50,000 people

3. *Medium circle:* Marks sub-locations with a population size of 5,000 to 20,000 people

4. *Small circle:* Marks sub-locations with a population size of 1,000 to 5,000 people

5. *Very small circle:* Marks sub-locations with a population size below 1,000 people

These symbols, in terms of their shapes and sizes, are a spatial reference that remains constant throughout all chapters; their colour, however varies from one map to the next, displaying population characteristics according to the various map themes. The symbols are positioned at the geometric centres of the sub-locations and should not be mistaken for settlements: they represent the entire population of a sub-location, however scattered within the area of the sub-location they may live. Further, the size of the symbols remains constant throughout, even on the larger-scale maps. At first glance this may distort the impression when moving from the Kenya map to one of the insets, as densities seem to decrease with zooming. But this approach allows the reader to compare situations directly between the different scales of the Kenya map and the insets (see map 1.03).

There is only one main map in chapters 2 to 7 that uses area shading instead of proportional symbols. This is the population density map (2.01), where choropleth mapping is appropriate because density is calculated per area and not per population size as in all other cases. In addition, area shading is also used in all county maps, including those in sections 2.02 and 2.03, where demographic key indicators are displayed at the county level. The use of choropleth maps to represent the county level visually symbolizes the greater level of generalization in these maps – which show average values per county – compared to the high-resolution representation of data at the sub-location level. Moreover, the visual distortion at the county level is not as marked as at the sub-location level.

The map presented here (1.04) shows the distribution of the five proportional symbols that represent population size classes of sub-locations. The five classes are coloured in distinctly different shades, providing an easy-to-read overview of how sub-locations of different population sizes are distributed across Kenya. The county table shows the number of sub-locations per county that fall into each of the five population size classes.

The map and table show that almost two-thirds (62%) of all 7,149 sub-locations are home to 1,000 to 5,000 people; this situation represents the majority in 36 counties, led by Elgeyo Marakwet, where 89% of all sub-locations fall into this class. Another 30% of sub-locations have 5,000 to 20,000 inhabitants, and this class is dominant in 11 counties, with the highest percentage recorded in Nyamira (74%). Uasin Gishu is a special case, with an equal number of sub-locations in both population size classes mentioned above (44%). The remaining population size classes (the two highest classes, and the lowest) do not apply to many sub-locations: 5% have fewer than 1,000 inhabitants, 2% have between 20,000 and 50,000, and less than 1% have more than 50,000. Not unexpectedly, rural sub-locations have smaller population sizes, while the largest ones are found in urban settings, with Nairobi and Mombasa hosting 22 of the 25 sub-locations with very large populations.

Overall, 92% of all sub-locations are home to 1,000 to 20,000 inhabitants. This community size is well suited for local bottom-up-driven development initiatives and enables adequate participation. This observation supports the choice of sub-locations as the main level for presenting 2009 census results in this atlas.

County	Large sub-locations*	Medium to large sub-locations*	Medium sub-locations*	Small sub-locations*	Very small sub-locations*
Nairobi	16	41	48	5	2
Mombasa	6	11	16	1	0
Kwale	0	3	52	26	3
Kilifi	1	5	72	89	4
Tana River	0	0	9	69	15
Lamu	0	0	6	23	10
Taita Taveta	0	0	10	76	4
Garissa	0	3	13	58	18
Wajir	0	0	30	73	5
Mandera	0	1	52	49	17
Marsabit	0	0	12	82	20
Isiolo	0	1	5	31	7
Meru	0	2	76	234	13
Tharaka Nithi	0	0	9	109	5
Embu	0	0	38	72	2
Kitui	0	0	32	279	6
Machakos	0	2	69	154	0
Makueni	0	0	71	125	6
Nyandarua	0	1	55	23	1
Nyeri	0	1	27	163	5
Kirinyaga	0	1	51	28	1
Murang'a	0	0	71	127	3
Kiambu	0	12	104	76	1
Turkana	0	1	60	96	1
West Pokot	0	0	16	152	30
Samburu	0	0	5	79	24
Trans Nzoia	0	14	36	7	0
Uasin Gishu	1	7	44	44	1
Elgeyo Marakwet	0	0	5	160	15
Nandi	0	0	26	227	36
Baringo	0	0	12	190	68
Laikipia	0	0	29	50	0
Nakuru	1	12	86	110	1
Narok	0	2	48	126	9
Kajiado	0	5	30	90	18
Kericho	0	1	42	156	8
Bomet	0	0	47	125	2
Kakamega	0	5	143	82	1
Vihiga	0	0	48	67	0
Bungoma	0	9	93	47	0
Busia	0	1	34	146	0
Siaya	0	0	61	118	0
Kisumu	0	4	60	100	4
Homa Bay	0	0	66	138	7
Migori	0	1	71	92	0
Kisii	0	1	104	61	1
Nyamira	0	1	55	18	0
KENYA	**25**	**148**	**2149**	**4453**	**374**

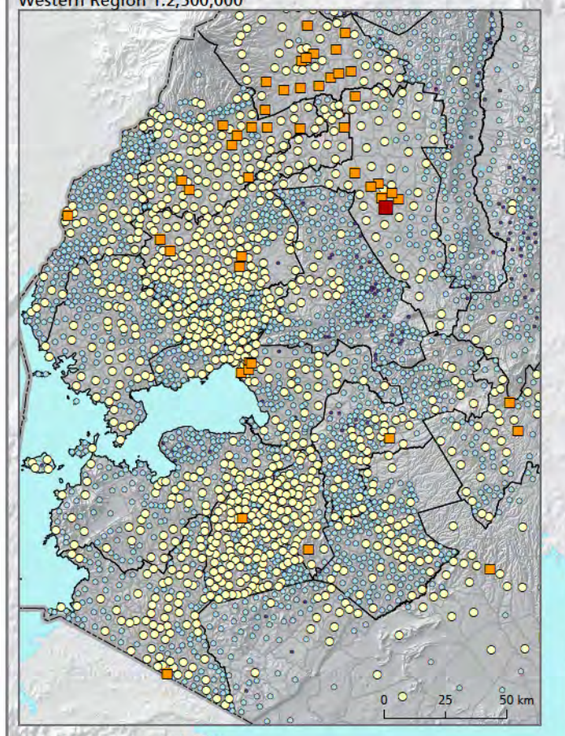
* in terms of population size

Introduction & Background

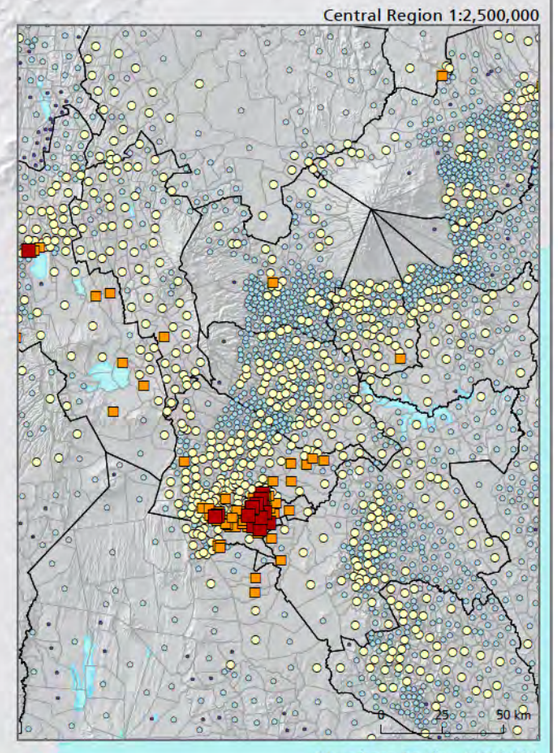
1.04 Proportional Symbols Indicating Population Size in Sub-Locations

Republic of Kenya 1:4,000,000

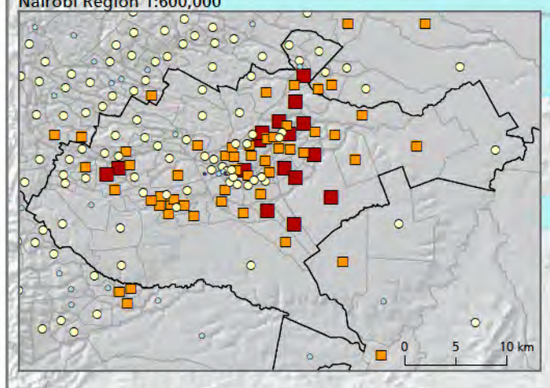
Western Region 1:2,500,000



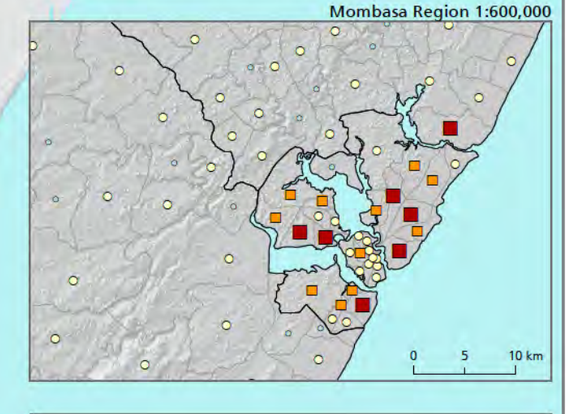
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Total population living in a sub-location

- Large sub-location (more than 50,000)
- Medium to large sub-location (20,000 to 50,000)
- Medium sub-location (5,000 to 20,000)
- Small sub-location (1,000 to 5,000)
- Very small sub-location (fewer than 1,000)

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- Waterbody

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1.05 Rural and Urban Sub-Locations

Analyses showed that many parameters characterizing the population of Kenya exhibit a clear gradient between rural and urban areas. Unlike other gradients, e.g. between different agroecological zones, the rural–urban gradient is not easily visible on the maps. For this reason, each map in chapters 2 to 7 of this atlas is accompanied by a graph illustrating rural–urban differences.

Classification of sub-locations as rural or urban

The most common way of classifying areas as rural or urban is to count the population in urban administrative units. In Kenya, these comprise the three cities of Nairobi, Mombasa, and Kisumu, as well as 37 municipalities, 68 towns with councils, and 5,318 smaller centres, including rural trading centres. Analyses showed, however, that some areas inside these administrative units have clearly rural characteristics, and that in many cases urban settlements are outgrowing their administrative boundaries.

Therefore, this atlas takes a different approach that better reflects the link between population characteristics and existing rural and urban environments. This approach is based on the pre-existing classification of enumeration areas for the 2009 census as rural, peri-urban, or urban. Enumeration areas are subsections of sub-locations, and a sub-location may comprise enumeration areas of all three types. This atlas classifies each sub-location as rural or urban based on whether the majority of its population live in rural or in urban and peri-urban enumeration areas. Peri-urban populations were treated as urban because their characteristics are more similar to those of urban than of rural populations.

Map 1.05 shows rural and urban sub-locations as classified following the above approach. This map forms the basis for all data and statements in this atlas that refer to rural and urban settings.

The resulting distribution of rural and urban areas

For the methodological reasons outlined above, county values are deliberately not displayed in detail in this section; this could lead to values conflicting with those based on other methods of determining the degree of urbanization. However, some national- and county-level observations may nevertheless be made. They are briefly discussed in what follows, without however claiming authority on the figures cited, as they were derived using the method described above, which was not designed to estimate urbanization but to establish a measure for comparing urban and rural sub-locations in the rural–urban graphs contained in each section.

Among Kenya's 7,149 sub-locations, 1,047 or 15% display urban characteristics. These urban sub-locations are home to 11.8 million people or 31% of Kenya's total population. In other words, Kenya's urbanization rate reached 31% in 2009 – and it is still on the rise (see section 2.04 of this atlas). The above figures also confirm the statement made in section 1.04 that urban sub-locations have considerably larger populations, on average, than rural sub-locations.

Only five counties have an urbanization rate of over 50%: Nairobi and Mombasa (both 100%); Kiambu (64%) and Machakos (52%), both located in the greater agglomeration of Nairobi; and Kisumu (51%), which hosts the country's third-largest city. Together, these five counties host more than half of Kenya's urban population (51%). Only six more counties show an urbanization rate above the national average of 31%. They include counties that host major regional centres, such as Nakuru (46%), Isiolo (41%) – where Isiolo town acts as a gateway to the vast neighbouring arid and semi-arid areas – or Uasin Gishu (35%) with Eldoret. But this category also includes semi-arid Kajiado (43%), which is influenced by nearby Nairobi. Nineteen counties show values below 15%, which is less than half the national average. Interestingly, such counties can be found in all major regions of Kenya, although in the coastal region only Tana River (14%) falls in this category. Siaya (11%) has the lowest urbanization rate in western Kenya, Meru (7%) in central Kenya, and Narok (6%) in the semi-arid and arid areas. The remaining 17 counties have urbanization rates between 15% and 31%. These rates generally reflect Kenya's economic landscape, with low rates in highly productive agricultural regions and the economic and ecological periphery, and higher rates in areas with growing secondary and tertiary sectors (see chapter 7).

The significance of this classification

A more detailed look at the map, especially for readers who are familiar with the local realities, reveals that "urban" sub-locations include a broad range of environments. Indeed, they span the entire range from fully urbanized city sub-locations, e.g. in Nairobi, to sub-locations of predominantly rural appearance, but where the majority of inhabitants live in a rural trading centre. This is because any sub-location is classified as "urban" if it shows signs of urban development that affect at least half of the population. In other words, in this atlas, the gradual transition from rural to urban, which in reality includes all intermediate stages, is subsumed under the two categories of rural and urban – and thereby grossly simplified. Accordingly, the above urbanization rates have to be treated and interpreted with caution, even though they provide important insights in relative terms.

For the same reason, map 1.05 should not be viewed as a result per se that gives precise indications down to the single sub-location. This is why it is included in this introductory chapter and not in one of the subsequent chapters displaying major results. Rather, the purpose of this map is to enable rough testing of whether the population characteristics depicted in chapters 2 to 7 display a rural–urban gradient or not, and how pronounced it is. The binary variable created and presented here is hence not used to analyse rural–urban differences at the sub-location or county levels, but exclusively at the overall national level. At this level – and only at this level – it is a useful indicator.

The rural–urban graphs in this atlas

The binary variable that classifies each sub-location as rural or urban provides the basis for the bar graphs accompanying each map in chapters 2 to 7. These graphs offer a national-level summary of how the variables depicted on the respective maps relate to the rural–urban gradient.

For example, map 3.01 shows the proportion of households that have access to safe water. The map classifies sub-locations into six water access classes, from very low to very high; a high water access rate means that a large proportion of households in a given area have access to safe water. Each of Kenya's 7,149 sub-locations falls in one of the six classes and is shaded accordingly on the main map. At the same time, each sub-location is also classified as either rural or urban. Thus, for each of the six water access classes we can say how many urban and how many rural sub-locations it contains. Let us make the fictive assumption that the class of very low rates of access to safe water contains 900 sub-locations classified as rural and only 100 sub-locations classified as urban. This means that very low proportions of households with access to safe water are found primarily in rural settings; only 10% of the sub-locations in this class are urban. However, as seen in section 1.04, urban sub-locations generally have larger populations than rural sub-locations. To account for this fact in the bar graph, all sub-locations are weighted by size of the statistical population being analysed in the given section. In section 3.01, this is the total number of households. Thus, in our fictive example, the weighting of sub-locations by their total numbers of households might result in weighted shares of 14% urban and 86% rural sub-locations with very low rates of access to safe water. These weighted shares are visualized in the bar graph by the vertical division of the relevant bar.

In more general terms, the various bars in a rural–urban graph display the shares of rural and urban sub-locations in each class, weighted by the size of the relevant statistical population in those sub-locations. This statistical population may vary, depending on the theme being depicted: besides households, as in the above example, it may consist of the total population, the total labour force, all school attendees, etc. The relevant population and its total size across all sub-locations in each class is indicated at the top of each bar. Classes are shaded in the same colours in all graphic components of a given section (rural–urban graph, county map, and main map).

The rural–urban graphs are intended to show at one glance whether a class is more frequently found in urban or in rural settings. The extent of differences between the individual bars in a rural–urban graph shows to what degree the characteristic depicted in the relevant map changes along the rural–urban gradient. Readers will witness that many of the themes displayed in this atlas show a clear relation to this gradient.

Data Source

2009 Kenya Population and Housing Census (Enumeration Area Type), Kenya National Bureau of Statistics.

Introduction & Background

1.05 Rural and Urban Sub-Locations

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

0 25 50 100 150 200 km

Type of sub-location

- Urban sub-location
- Rural sub-location

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- Waterbody

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1.06 Agroclimatic Zones

Kenya's economy and culture are still largely rural and agriculture-based although urbanization (see map 1.05) is increasing rapidly and non-agricultural sectors are gaining importance (see chapter 7). At the same time, Kenya is a water-scarce country, and water is the most limiting factor in primary production. Its distribution and availability in the different parts of the country have largely determined agricultural and pastoralist practices, and greatly influenced the distribution of populations. Rain-fed agricultural systems are dominant, making knowledge of spatial and temporal distribution of rainfall essential.

The climate is tropical, with high temperatures in the lowlands decreasing to moderate levels in the highlands. The seasonality of the climate is fundamentally determined by trade winds bringing humidity and rains from the Indian Ocean twice a year, resulting in two main rainy seasons: the long rains from March to early June, and the short rains from October to early December. This bimodal rainfall pattern has the advantage of providing two growing seasons, but means that the annual level of rainfall has to cater for two vegetation periods, making it not directly comparable to single-season situations, e.g. the sub-tropics with similar annual rainfall levels. The amount of rainfall in the different parts of the country is strongly influenced by topography, with highlands and mountains being natural obstacles and causing humidity to be released as rain, but also producing lee-effects with little rain in the wind shadow. In addition, rains are also moulded by the south-western to north-eastern direction of Kenya's coastline, causing the north-east trade winds to bring less rain to many parts of the country. The resulting rainfall pattern shows a high spatial variation, with mean annual rainfall ranging from 1,800 mm to 200 mm. In addition, the temporal variability increases with decreasing amounts of rainfall, making the drier conditions even more limiting. These patterns can be captured in so-called agroclimatic zones that are based on a moisture index that considers relationships between annual rainfalls, potential evapotranspiration, and temperature, and that gives indications on the agricultural suitability in different zones (Sombroek et al. 1982 – see Data Source).

This map displays the seven agroclimatic zones that were derived from the moisture index, ranging from low agricultural potentials to high agricultural potentials – in this atlas often referred to as low-potential and high-potential zones. The gradient of these zones plays an important role for agriculture but also for many other variables presented in this atlas. In addition, the map shows major rivers, many of which bring water from the higher-potential to lower-potential areas and are thus key resources for the drier parts of the country. To enable orientation and show the relevance of these agroclimatic zones for the 47 counties, their boundaries are included in the map, and the county table gives proportions of aggregated zones for each county. The agroclimatic zones are briefly characterized below. They are conventionally numbered from I to VII, I showing the highest and VII the lowest agroclimatic potential.

Zones I, II, and III form the agriculturally high-potential areas of Kenya. They cover about 12% of the surface and are inhabited by 63% of Kenya's population. They are highly suitable for cropping of any kind in both seasons, and are concentrated in the central and western highlands, around Lake Victoria and along the coastal strip, and on isolated mountains in the drylands. The difference between the three zones is decreasing humidity – from humid to sub-humid to semi-humid – and they are arranged concentrically on the highlands above 1,200 m, with annual rainfall above 800 mm and mean annual temperatures below 18° C. In these zones intense mixed agricultural activities (see map 1.07) take place and some of the leading market-oriented crops are grown, such as tea, coffee, wheat, maize, and sugarcane.

Zone IV is semi-humid to semi-arid and marks a transitional zone between the high-potential and low-potential areas of Kenya. It covers about 6% of the country and hosts 16% of Kenya's population. It has low to medium cropping potential and is situated as a belt around the highlands and includes parts of the coastal region. Annual rainfall is around 800 mm, but spatial and temporal variability is increasing. Ranching, pastoralist activities, wheat and barley production, and wildlife conservancy are practised. In many areas, small-scale farming is dominant, partly by in-migrants from high-potential areas.

Zones V, VI, and VII form the agriculturally low-potential areas of Kenya. They cover about 82% of Kenya and host 21% of the population. These zones cover most of Kenya outside the highlands to the south, to the east between highlands and coast, and in particular to the vast areas in the north and north-east. Rainfall decreases from about 800 mm to 200 mm within the three zones from semi-arid to arid to very arid, and temporal and spatial rainfall variability is increasing. There is marginal cropping potential in Zone V, and while small-scale mixed farming is widespread, it is exposed to high risks associated with rainfall variability. Livestock keeping is dominant in ranches or in pastoralist systems, and wildlife conservancy also plays a significant role.

The agricultural potential of an area is a major factor influencing the location of human settlements in Kenya, especially those dependent on rain-fed agriculture. People have tended to settle in humid regions, making these the centres of most socio-economic developments. However, land pressure in the high-potential areas has forced people to migrate into the transition zones, where they practise rain-fed agriculture and are exposed to drought and food insecurity. This pressure on the transition zone, including Zone V, has cut pastoralists from dry season pastures and led to overuse of river water, as expansion of farming into drier areas affects downstream communities. These dynamics illustrate that not only the agroclimatic zone of a given area or county matters, but that the zones are also linked through dynamic and complex processes of land use change.

With a population growth rate of 2.9%, pressure is increasing on the available arable lands where rain-fed agriculture is practised. For the country to feed itself, other food production practices must be encouraged, including irrigation, conservation agriculture, and efficient large-scale mechanized farming. This will require developing and enforcing national land use plans, especially on the issue of land fragmentation and growing of incompatible and less profitable crops in various zones.

Data Source

Agroclimatic zones: Sombroek, W.C., Braun, H.M.H., and van der Pour, B.J.A. (1982). Explanatory Soil Map and Agro-climatic Zone Map of Kenya. Report E1. National Agricultural Laboratories, Soil Survey Unit, Nairobi, Kenya, 56 pp.

County	Semi-humid to humid area (zones I–III)	Semi-humid to humid area (km²)	Semi-arid/semi-humid to very arid (zones IV–VII)	Semi-arid/ semi-humid to very arid (km²)
Nairobi	28.8%	200	71.2%	495
Mombasa	71.0%	155	29.0%	63
Kwale	16.3%	1,342	83.7%	6,893
Kilifi	4.4%	545	95.6%	11,943
Tana River	0.0%	0	100.0%	38,426
Lamu	0.0%	0	100.0%	5,935
Taita Taveta	1.0%	177	99.0%	16,903
Garissa	0.0%	0	100.0%	44,049
Wajir	0.0%	0	100.0%	56,664
Mandera	0.0%	0	100.0%	25,880
Marsabit	0.1%	57	99.9%	70,533
Isiolo	0.0%	0	100.0%	25,338
Meru	52.3%	3,628	47.7%	3,306
Tharaka Nithi	36.5%	963	63.5%	1,676
Embu	31.5%	888	68.5%	1,930
Kitui	0.7%	202	99.3%	30,297
Machakos	4.0%	247	96.0%	5,962
Makueni	5.9%	472	94.1%	7,537
Nyandarua	50.0%	359	50.0%	359
Nyeri	77.1%	2,574	22.9%	764
Kirinyaga	79.9%	1,182	20.1%	297
Murang'a	88.2%	2,257	11.8%	302
Kiambu	71.0%	1,805	29.0%	739
Turkana	0.0%	0	100.0%	68,535
West Pokot	25.5%	2,306	74.5%	6,755
Samburu	1.9%	409	98.1%	20,612
Trans Nzoia	100.0%	2,468	0.0%	0
Uasin Gishu	100.0%	3,345	0.0%	0
Elgeyo Marakwet	73.3%	2,222	26.7%	808
Nandi	100.0%	2,884	0.0%	0
Baringo	21.0%	2,310	79.0%	8,705
Laikipia	7.5%	709	92.5%	8,754
Nakuru	62.9%	4,714	37.1%	2,781
Narok	44.9%	8,053	55.1%	9,875
Kajiado	0.9%	197	99.1%	21,706
Kericho	100.0%	2,441	0.0%	0
Bomet	100.0%	2,510	0.0%	0
Kakamega	100.0%	3,018	0.0%	0
Vihiga	100.0%	564	0.0%	0
Bungoma	100.0%	2,961	0.0%	0
Busia	94.7%	1,419	5.3%	80
Siaya	78.5%	1,941	21.5%	532
Kisumu	100.0%	2,071	0.0%	0
Homa Bay	94.6%	2,815	5.4%	162
Migori	91.2%	2,339	8.8%	225
Kisii	100.0%	1,318	0.0%	0
Nyamira	100.0%	900	0.0%	0
KENYA	**12.3%**	**70,967**	**87.7%**	**505,821**

Introduction & Background

1.06 Agroclimatic Zones

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

Central Region 1:2,500,000

Nairobi Region 1:600,000

Mombasa Region 1:600,000

Agroclimatic zones of Kenya

- Zone I: humid
- Zone II: sub-humid
- Zone III: semi-humid
- Zone IV: semi-humid/semi-arid
- Zone V: semi-arid
- Zone VI: arid
- Zone VII: very arid

Settlements

- Capital
- City
- Municipality
- Township/Town

Transport infrastructure

- International road

Borders

- International border
- County border

Features

- Waterbody
- Major river

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1.07 Dominant Land Cover

Map 1.06 provided an overview of Kenya's agroclimatic zones, particularly with regard to their suitability for primary production. Humidity and precipitation were highlighted as the most decisive factors in this respect. It was argued that the country's varying agroclimatic conditions have had a great influence on the historical development of Kenya's uneven population distribution and land use patterns.

The present map shows Kenya's land cover – the result of centuries of interaction between environmental (i.e. agroclimatic) conditions and human activities (i.e. land use systems). This overview of generalized land cover types is intended for readers who are not familiar with Kenya's diverse landscapes. It is important to note that this map is not a land use map. It shows neither the dominant agricultural systems (e.g. large-scale or small-scale agriculture or pastoralism) nor the intensity or ecological sustainability of land use. However, by displaying the general land cover categories, it gives a good overview of the agroecological zones often referred to in this atlas, such as "high-potential areas with intense agriculture" or "vast semi-arid and arid areas with predominantly pastoralist use". These can be identified with the help of this map.

The generalized land cover map was derived from the Africover database (FAO 2002), which is based mainly on satellite imagery. The map differentiates between ten land cover classes (see key of main map) and shows that land cover classes are strongly correlated with agroclimatic zones (see map 1.06). Some of the classes represented in the map, especially those in arid and semi-arid areas, are difficult to detect using satellite imagery. The exact boundaries may therefore not be exact representations of realities on the ground. Nevertheless, map 1.07 provides a general picture that is accurate enough for the purposes of this atlas.

The first two classes – *agriculture (dense)* and *agriculture (sparse)* – represent areas where agriculture has developed. In most cases, agriculture in these regions consists of rain-fed, small-scale crop and livestock production with some degree of cash crop production. However, these classes also include large-scale farming, horticulture, and irrigation farming. In total, agricultural areas cover about 13% of Kenya. The variety of crops is wide and includes staple foods such as maize, beans, and potatoes.

Areas of dense agriculture are concentrated in the humid zones, or agroclimatic zones I, II, and III (see map 1.06). Here, the main cash crops are grown either on plantations or on individual farms and include tea, coffee, sugar cane, tobacco, rice, and a large variety of horticultural products. Population density is high (map 1.02) in most of these areas, leading to pressure on natural resources and small per capita land resources.

Areas of sparse agriculture are found in the drier parts of the country, at the fringes of the high-potential areas, and particularly to the east of the highlands and in the coastal hinterland. The sparse agriculture class occurs primarily in agroclimatic zones IV and V, indicating semi-humid and mainly semi-arid conditions with high rainfall variability. Here, small-scale farmers concentrate on staple crops and try to compensate for the high risk of crop failure through increased livestock husbandry. Large-scale wheat and barley producers, as well as large-scale ranchers, can also be found in areas falling in this class. Sparse agriculture zones are considered critical because they are often characterized by high population densities (see map 2.01), high in-migration rates (see map 2.04), and high rates of poverty (see map 5.02).

A second group of land cover categories – *grassland*, *bushland (sparse)*, *bushland (dense)*, *woodland*, and *barren land* – mark the areas where livestock keeping is the dominant land use practice, mainly in the form of pastoralist activities. Together, these land cover types constitute over 80% of Kenya's land mass. They occur in most semi-arid to arid areas, or agroclimatic zones V, VI, and VII (see map 1.06).

The predominant land cover in these zones is bushland, which covers about 60% of Kenya's land mass and constitutes a mixture of grasses, herbaceous plants, shrubs, and thorn trees. These habitats have high wildlife concentrations; as a result, many of the protected areas occur within this land cover zone (see map 1.08). Grasslands and woodlands occupy about 2% and 3% of Kenya's land area, respectively, and are also rich in wildlife. Grasslands are partly used for market-oriented, large-scale ranching. Barren lands are mainly found in the northern parts of the country and constitute about 16% of the national land mass. These areas are semi-deserts with sparse vegetation but are used for pastoralist activities.

Finally, a third group of land cover categories – *forest*, *swamp*, *waterbody*, and *town* – are important azonal features, meaning they do not follow strict agroclimatic zones. Natural and planted forests cover about 2.4% of Kenya's land mass. Due to their importance, they are highlighted in more detail in the following map (map 1.08). Swamps and wetlands occupy only about 1% of the total land mass, but they constitute important hotspots of biodiversity and play an important role in the land use systems of drier regions. Permanent waterbodies and major urban areas complete the picture of land cover in this map.

In summary, the land cover map largely reflects agroclimatic zones but includes some important azonal features. The main land cover types indicate the main land use types – agriculture and pastoralism. However, it is important to note that densities of use in many parts of these zones may be at the upper limits of their respective carrying capacities, with consequences for the environmental and social health of the region. At the same time, and in reaction to high population pressure and land scarcity, there is a tendency to expand land use systems into zones with lower agroclimatic potential, thereby causing a range of socio-environmental problems and challenges.

Data Source

FAO Africover (2002): Multipurpose Landcover Database for Kenya.

County	Dominant land cover class	Share of dominant land cover class in total county surface area
Nairobi	Town	42.6%
Mombasa	Town	12.0%
Kwale	Bushland (dense)	61.5%
Kilifi	Bushland (dense)	50.7%
Tana River	Bushland (dense)	70.9%
Lamu	Bushland (dense)	56.3%
Taita Taveta	Bushland (dense)	82.1%
Garissa	Bushland (dense)	74.9%
Wajir	Bushland (dense)	69.9%
Mandera	Bushland (dense)	72.0%
Marsabit	Barren land	65.4%
Isiolo	Bushland (dense)	50.6%
Meru	Bushland (dense)	31.2%
Tharaka Nithi	Agriculture (sparse)	63.3%
Embu	Agriculture (sparse)	55.8%
Kitui	Bushland (dense)	58.0%
Machakos	Agriculture (sparse)	45.3%
Makueni	Agriculture (sparse)	57.7%
Nyandarua	Agriculture (dense)	55.7%
Nyeri	Forest	35.7%
Kirinyaga	Agriculture (dense)	64.3%
Murang'a	Agriculture (dense)	62.8%
Kiambu	Agriculture (dense)	42.5%
Turkana	Bushland (sparse)	56.7%
West Pokot	Bushland (sparse)	45.0%
Samburu	Bushland (dense)	61.5%
Trans Nzoia	Agriculture (dense)	53.4%
Uasin Gishu	Agriculture (dense)	73.3%
Elgeyo Marakwet	Forest	26.7%
Nandi	Agriculture (dense)	75.6%
Baringo	Bushland (dense)	54.3%
Laikipia	Woody grassland	59.0%
Nakuru	Agriculture (dense)	36.1%
Narok	Bushland (dense)	38.1%
Kajiado	Bushland (dense)	66.0%
Kericho	Agriculture (dense)	68.9%
Bomet	Agriculture (dense)	72.2%
Kakamega	Agriculture (dense)	94.4%
Vihiga	Agriculture (dense)	93.0%
Bungoma	Agriculture (dense)	79.6%
Busia	Agriculture (dense)	76.4%
Siaya	Agriculture (dense)	87.5%
Kisumu	Agriculture (dense)	66.5%
Homa Bay	Agriculture (dense)	77.8%
Migori	Agriculture (dense)	91.3%
Kisii	Agriculture (dense)	100.0%
Nyamira	Agriculture (dense)	98.2%
KENYA	–	–

Introduction & Background

1.07 Dominant Land Cover

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

Nairobi Region 1:600,000

Central Region 1:2,500,000

Mombasa Region 1:600,000

Main land cover classes

- Agriculture (dense)
- Agriculture (sparse)
- Grassland
- Bushland (dense)
- Bushland (sparse)
- Woodland
- Forest
- Swamp
- Barren land
- Town

Settlements

- Capital
- City
- Municipality
- Township/Town

Transport infrastructure

- International road

Borders

- International border
- County border

Features

- Waterbody
- Major river

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1.08 Basins, Forests, and Parks

The previous two maps gave a generalized overview of Kenya's agroclimatic zones (map 1.06) and of the country's land cover (map 1.07) – the latter also providing some indication regarding the forms of land use in the respective zones. With the present map, the focus shifts to drainage basins, forests, and parks. These three features shape Kenya's natural resource base and are crucial for the country's environmental and socio-economic development. In view of their key role, they are regulated through special legislative measures. The three features are included in this atlas for two reasons. Firstly, the regulations that govern their use influence many of the themes addressed in this atlas. Secondly, these features often extend across county borders and therefore require new collaborative efforts between governing agencies.

Parks

Wildlife conservation parks – no doubt the best-known of the three features – constitute a key component in Kenya's environmental policy and form the backbone of the country's international tourism market. These protected areas are categorized as either national parks or national reserves and cover about 8% of Kenya's land mass. In national parks, the principle of complete nature protection is applied. Tourism and research activities are strictly controlled. In contrast, reserves allow for limited other activities such as fishing or firewood collection.

Kenya's protected areas include a variety of ecosystems, from forests and savannahs to wetlands and marine ecosystems. In total, Kenya has 23 terrestrial national parks, 28 terrestrial national reserves, 4 marine national parks, and 6 marine national reserves. Map 1.08 displays the main parks and reserves in terms of surface area.

Forests

Forests play an important role as sources of wood and non-timber products and as regulators of water flows. In addition, natural forests are key biodiversity hotspots. Over the past century, forest cover in Kenya has been reduced to about 2.4% of the total land area. The decline of forest cover in Kenya is a reason for concern, especially in view of the vital function forests have in protecting water resources. Although Kenya's water towers forests are found mainly within the humid climatic zones, their existence has a great influence on downstream water supplies. Mount Kenya, the Aberdare ranges, the Mau complex, Mount Elgon, the Kakamega and Nandi forests, and the Cherangani Hills are particularly important in this respect. Forests outside the highlands include the Arabuko Sokoke and the Shimba Hills in the coastal region, as well as Mount Marsabit and the Mathews and Ndoto ranges in the arid and semi-arid areas. The protection, preservation, and sustainable use of these forests is important for Kenya's natural resource base, and poses both challenges and opportunities for inter-county collaboration.

Drainage basins

The previous maps (1.06 and 1.07) showed that, in many parts of the country, water is the most limited and limiting resource. Rivers link the more humid highland areas with the drier lowlands, where they provide a key water resource either directly as river water or indirectly through accumulation in groundwater aquifers. Land use development and upstream water use have a direct impact on many downstream populations and ecosystems. These links are of great importance to the development of Kenya. As a result, the Government of Kenya has established five drainage basins in which upstream–downstream water use is carefully coordinated to ensure sustainable and equitable use of this resource. Collaborative water management between counties may be challenging, but it also represents an opportunity to find basin-specific solutions.

Of the five basins, only three have a single watershed that drains to a single outlet. These are the Tana River Basin, the Athi River Basin, and, to a large degree, the Ewaso Ng'iro River Basin. The Rift Valley Inland Basin and the Lake Victoria Basin both consist of several hydrological watersheds but share common characteristics and challenges. Four of the five drainage basins link humid upstream areas with drier downstream areas; only the Lake Victoria Basin remains largely in humid and semi-humid zones. The following brief overview will enable readers to appreciate the importance of these basins.

The Ewaso Ng'iro North River Basin (35% or 209,592 km^2 of Kenya's area): This is the largest drainage system in the north-eastern part of the country. Most of its rivers originate from the northern slopes of Mount Kenya and the Aberdare ranges and drain into the Ewaso Ng'iro River, which disappears into the Lorian Swamp in Isiolo County.

The Rift Valley Inland Basin (23% or 137,899 km^2): This is an area of internal drainage discharging into various lakes, including Lake Natron in the south and Lake Turkana in the north. The basin also consists of several sub-basins that drain into a number of smaller lakes such as Baringo, Bogoria, Nakuru, Naivasha, Elementaita, and Magadi. The main water sources are the Mau complex and the western slopes of the Aberdare ranges. Some of the major rivers are Southern Ewaso Ng'iro, Kerio, and Turkwel (which has a hydropower station).

The Tana River Basin (22% or 126,065 km^2): The Tana River is Kenya's longest and largest river. It is fed by tributaries coming from the southern and eastern slopes of Mount Kenya, the eastern slopes of the Aberdares, and parts of the Nyambene Hills. The river discharges into the Indian Ocean through the Tana delta in Tana River County. Over 65% of Kenya's hydroelectric power is produced along the Tana River, by a series of power stations including Kindaruma, Kamburu, Gitaru, Masinga, and Kiambere.

The Athi River Basin (11% or 67,185 km^2): The Athi River is the second-longest and second-largest river in Kenya. Tributaries coming from the southern end of the Aberdares feed into the Athi River, which finally discharges into the Indian Ocean; in the coastal region, it is known as the Sabaki or Galana River.

The Lake Victoria Basin (9% or 50,237 km^2): The basin comprises the whole area west of the Rift Valley and drains into Lake Victoria. The main rivers include Nzoia, Yala, Nyando, Sondu Miriu (with a hydropower station), and the Mara River, which passes through the Maasai Mara National Reserve, where it is crossed by the wildebeest during their annual migration.

Many of the themes and topics addressed in this atlas are linked directly or indirectly to the components shown in this map. The map therefore gives additional background for the interpretation of the findings presented in the following chapters. More importantly, any policy on sustainable development must take account not only of population characteristics but also of the various regions' natural limitations.

County	Share of parks in county*	Parks in county (km^2)	Share of forests in county*	Forests in county (km^2)	Main basin in which county is located
Nairobi	7.7%	53	4.9%	34	Athi River Basin
Mombasa	3.2%	7	7.5%	16	Athi River Basin
Kwale	2.6%	212	2.6%	213	Athi River Basin
Kilifi	1.4%	180	3.9%	494	Athi River Basin
Tana River	12.5%	4,821	0.2%	88	Tana River Basin
Lamu	12.7%	798	2.3%	143	Tana River Basin
Taita Taveta	60.3%	10,301	0.7%	111	Athi River Basin
Garissa	6.9%	3,046	0.0%	15	Tana River Basin
Wajir	0.0%	0	0.0%	0	Ewaso Ng'iro River Basin
Mandera	1.7%	439	0.0%	0	Ewaso Ng'iro River Basin
Marsabit	6.7%	4,717	0.3%	199	Ewaso Ng'iro River Basin
Isiolo	3.8%	957	0.0%	0	Ewaso Ng'iro River Basin
Meru	36.9%	2,558	8.3%	578	Tana River Basin
Tharaka Nithi	13.8%	363	12.7%	334	Tana River Basin
Embu	9.7%	275	6.8%	191	Tana River Basin
Kitui	28.5%	8,690	0.2%	59	Tana River Basin
Machakos	0.4%	27	0.4%	22	Athi River Basin
Makueni	13.1%	1,046	1.5%	123	Athi River Basin
Nyandarua	7.0%	0	16.1%	522	Rift Valley Basin
Nyeri	34.4%	0	35.7%	1,190	Tana River Basin
Kirinyaga	18.9%	0	16.5%	301	Tana River Basin
Murang'a	1.9%	0	13.4%	342	Tana River Basin
Kiambu	0.0%	0	16.4%	416	Athi River Basin
Turkana	1.5%	1,032	0.0%	0	Rift Valley Basin
West Pokot	0.7%	65	2.9%	263	Rift Valley Basin
Samburu	1.9%	400	4.7%	978	Ewaso Ng'iro River Basin
Trans Nzoia	5.3%	132	9.8%	244	Lake Victoria Basin
Uasin Gishu	0.0%	0	9.7%	323	Lake Victoria Basin
Elgeyo Marakwet	2.4%	71	26.7%	808	Rift Valley Basin
Nandi	0.0%	0	13.4%	387	Lake Victoria Basin
Baringo	1.6%	180	5.6%	620	Rift Valley Basin
Laikipia	3.8%	357	3.2%	299	Ewaso Ng'iro River Basin
Nakuru	9.3%	695	14.0%	1,052	Rift Valley Basin
Narok	10.0%	1,787	12.7%	2,284	Lake Victoria Basin
Kajiado	2.3%	497	0.5%	104	Athi River Basin
Kericho	0.0%	0	12.4%	303	Lake Victoria Basin
Bomet	11.6%	291	15.9%	400	Lake Victoria Basin
Kakamega	0.9%	26	4.7%	142	Lake Victoria Basin
Vihiga	0.0%	0	3.6%	21	Lake Victoria Basin
Bungoma	3.0%	92	12.1%	367	Lake Victoria Basin
Busia	9.1%	155	0.0%	0	Lake Victoria Basin
Siaya	0.0%	0	0.0%	0	Lake Victoria Basin
Kisumu	0.2%	3	0.3%	6	Lake Victoria Basin
Homa Bay	4.7%	148	1.0%	31	Lake Victoria Basin
Migori	0.0%	0	0.0%	0	Lake Victoria Basin
Kisii	0.0%	0	0.0%	0	Lake Victoria Basin
Nyamira	0.0%	0	0.0%	0	Lake Victoria Basin
KENYA	**7.6%**	**44,419**	**2.4%**	**14,024**	–

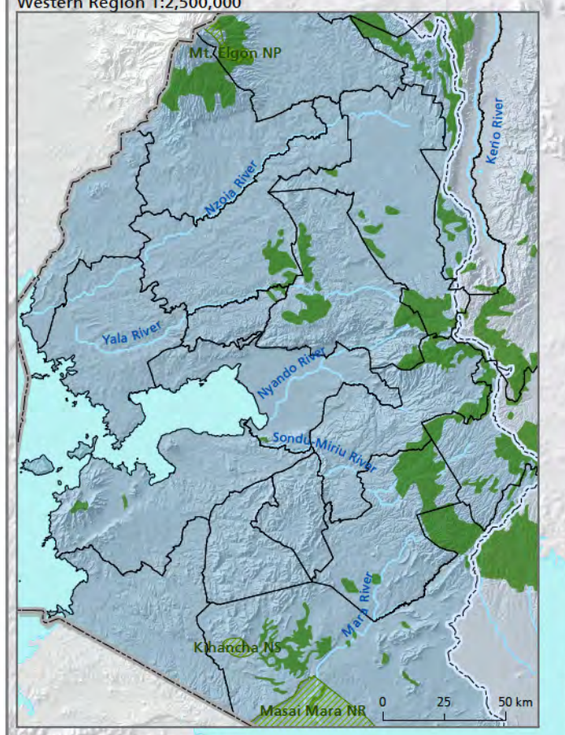
* in terms of land area

Introduction & Background

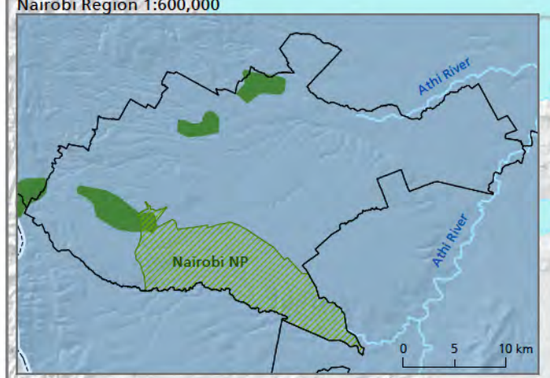
1.08 Basins, Forests, and Parks

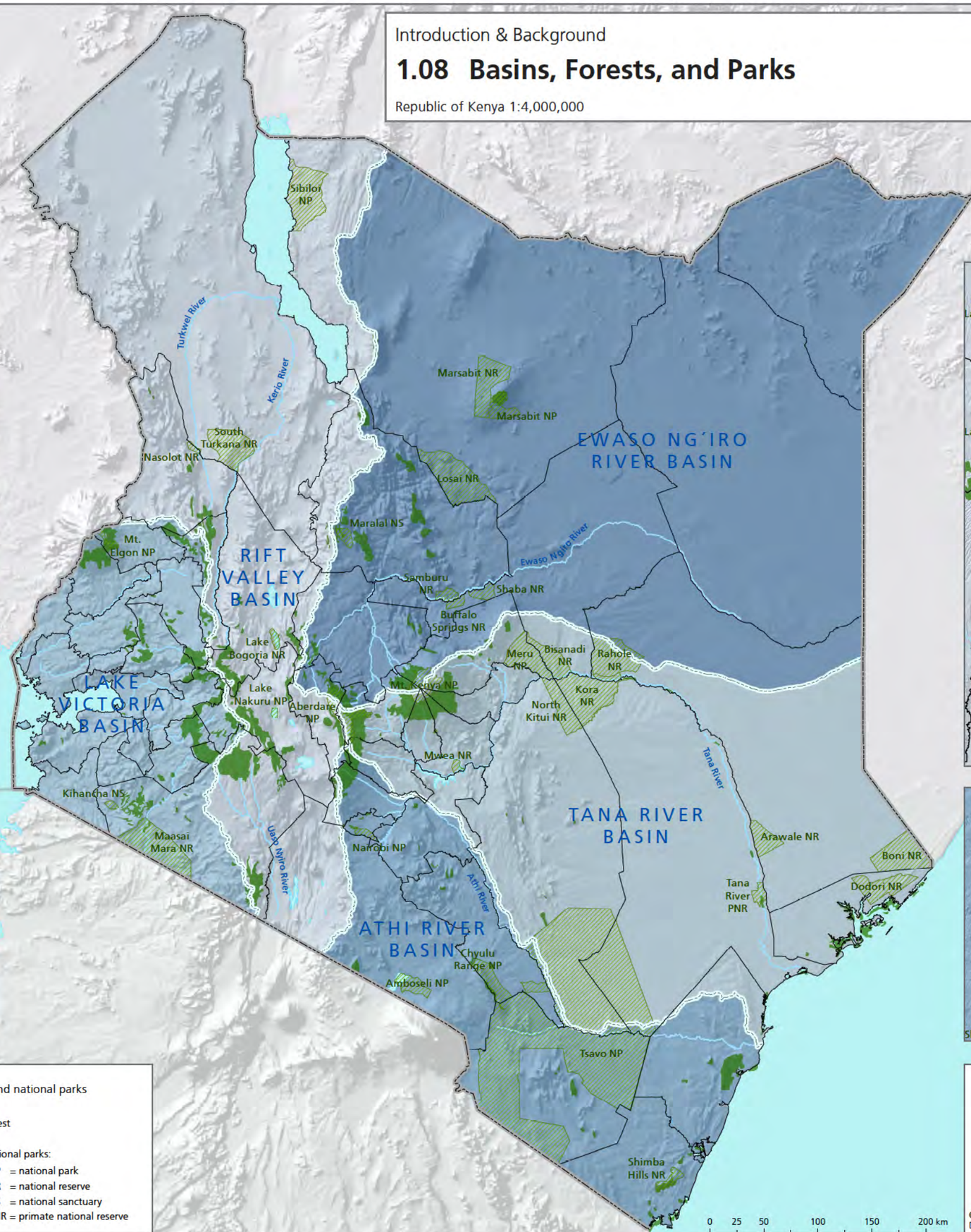
Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

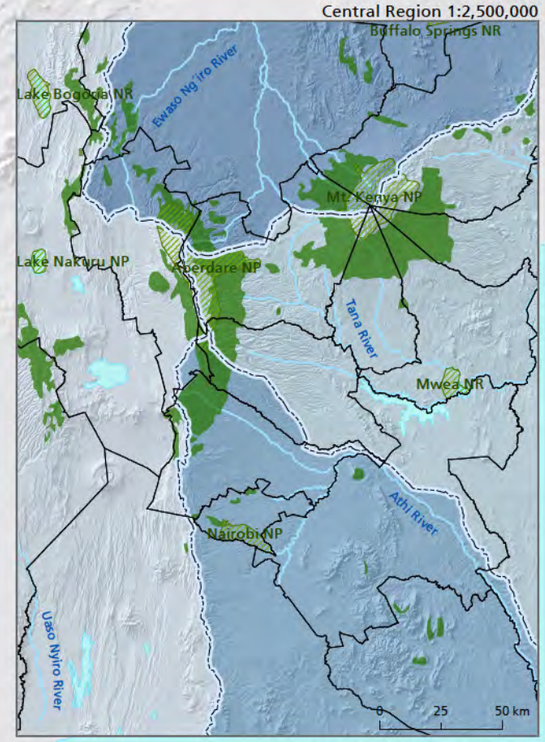


Nairobi Region 1:600,000

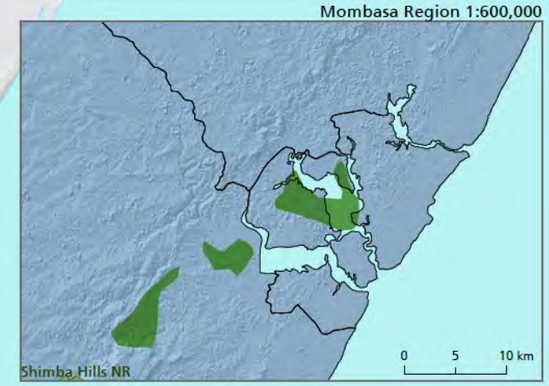




Central Region 1:2,500,000



Mombasa Region 1:600,000



Major rivers and their drainage basins

- Lake Victoria Basin
- Rift Valley Basin
- Athi River Basin
- Tana River Basin
- Ewaso Ng'iro River Basin
- Drainage basin border
- Major river

Forests and national parks

- Forest
- National parks:
  - NP = national park
  - NR = national reserve
  - NS = national sanctuary
  - PNR = primate national reserve

Borders

- International border
- County border

Features

- Waterbody

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1.09 Accessibility and Transport

The last map in this chapter deals with physical accessibility. Accessibility is an important indication of the centrality–remoteness gradient, a key explanatory factor for many observations related to population characteristics and activities. The degree of physical accessibility strongly influences the degree of service provision in many fields, as well as the availability of goods and infrastructure, market accessibility, and the costs of market access. Accessibility has become even more important in the course of Kenya's transformation from a predominantly rural society with considerable subsistence production to a modern economy with modernized agriculture and growing manufacturing and service sectors. Physical accessibility relies on transport infrastructure (e.g. roads and railways), its spatial distribution and density, and its working condition.

Historically, Kenya's transport infrastructure evolved around the East African Railway. In the early 20th century, the East African Railway became the main transport axis between Mombasa on the coast and Kisumu on Lake Victoria. The development of the railway led to the foundation of Nairobi at the middle of this axis – the city that later became Kenya's capital and main economic centre. The railway linked the largest port on the East African coast with the highly populated Lake region, thereby forming a long-distance trading axis. This international line was subsequently supplemented with branches to access production areas and markets within the territory of Kenya. Today, with the exception of the branch to Lake Magadi that transports mined soda ash, all branches are dysfunctional and the semi-functional main line no longer plays a significant role in the transport infrastructure. Nevertheless, this railway network still constitutes the geometrical backbone of Kenya's transport infrastructure.

Following Kenya's independence, railways were successively supplanted by road transport. Today, Kenya's transport system is almost entirely dependent on its road network. Trading axes have been established perpendicular to the main highway axis and the road network has been expanded such that most parts of the country are now accessible. The road network currently has a total length of more than 160,000 km, about 11,000 km of which are paved. In comparison, the railway has a length of only 1,700 km. In addition, major airports in Nairobi, Mombasa, Kisumu, Eldoret, and recently in Isiolo mark important nodes in Kenya's transport network.

Based on this transport network, WHO (see data source information) developed an accessibility model that calculates the travel distance to the nearest town with more than 50,000 inhabitants (using population figures from 1999). The travel distance was calculated by factoring in the time needed to reach a road on foot and then to travel to the nearest larger town by car. The model incorporates the different classes of roads and some topographical factors, but does not consider the actual maintenance condition of the road network.

The model results are displayed here in accessibility classes ranging from less than one to more than 24 hours' travel distance to the nearest town with more than 50,000 inhabitants. The county table gives the average travel time from all places (i.e. 1x1-km raster squares) within a county, as well as the proportion of each county with less than two hours or more than six hours' travel time. Although different model parameters, e.g. the incorporation of smaller towns in the accessibility assessment, would show different results, the map gives a good indication of the accessibility gradient within a county. The absolute travel time value in hours should therefore not be taken at face value, but their relative proportions are highly indicative.

Overall, about 7% of Kenya's surface area is within a two-hour walk and drive of a town with more than 50,000 inhabitants. Such areas may be considered central, and are indicated on the map in yellow and light green. However, two-thirds of the country is located more than six hours away from the nearest larger town. These areas are marked in bluish shades and are considered remote. With driving times to the nearest larger town between two and six hours, the remaining 23% of the country is considered moderately central.

The resulting picture mirrors high- and low-potential areas (see map 1.06), population densities (map 2.01), and major urban nodes (map 1.05). The central and western highlands and the coastal strip up to Malindi are mainly central or moderately central, with a few remote pockets. The moderately central areas extend from the highlands into the drier areas to the north and east and especially to the south-east, where small-scale agriculture is found in semi-arid environments (see map 1.07). The semi-arid and arid zones to the south and east and in the whole northern region of Kenya are mainly remote.

These observed general patterns are a result of the population distribution, varying agroclimatic potential, and economic landscape across Kenya (see chapter 7). At the same time, they strongly influence or limit future opportunities for development, e.g. in terms of service provision or market integration. Better accessibility, especially in remote areas, could enhance development options.

In this regard, it is interesting to note current trends in the development of transport infrastructure in Kenya. In the last decade, the government has invested significant funds in expanding the network and upgrading and maintaining the roads in and around major population centres. The newly opened Thika highway and the increase in access lines to the more remote regions are evidence of the government's commitment to connecting Kenya's populations, economic centres, and also remoter regions. The planned construction of the Mombasa–Nairobi railway will considerably strengthen the main transport axis between these major economic hubs, and the construction of the Lamu Port and Lamu–Southern Sudan–Ethiopia Transport (LAPSSET) initiative will open a large transport corridor to the region north of the highlands. This is expected to significantly reduce the remoteness of large parts of northern Kenya.

Data Source

Nelson, A. (2008). Estimated travel time to the nearest city of 50,000 or more people in year 2000. Global Environment Monitoring Unit – Joint Research Centre of the European Commission, Ispra, Italy. Available at http://bioval.jrc.ec.europa.eu/products/gam/ (accessed on 19 February 2014).

County	Average travel time to nearest city (min)*	Share of surface area within time distance of 2 hours	Share of surface area outside time distance of 6 hours
Nairobi	30	96.1%	0.0%
Mombasa	71	74.5%	0.5%
Kwale	461	14.6%	42.9%
Kilifi	398	7.6%	46.0%
Tana River	520	4.1%	68.4%
Lamu	679	0.0%	95.2%
Taita Taveta	404	0.2%	50.6%
Garissa	527	4.3%	61.5%
Wajir	663	0.0%	96.6%
Mandera	775	0.0%	99.8%
Marsabit	827	0.0%	98.8%
Isiolo	501	0.9%	61.7%
Meru	259	29.4%	20.4%
Tharaka Nithi	235	20.3%	13.5%
Embu	312	5.6%	31.8%
Kitui	381	0.3%	49.4%
Machakos	167	38.2%	5.5%
Makueni	314	10.4%	35.5%
Nyandarua	249	26.0%	18.1%
Nyeri	326	35.3%	32.6%
Kirinyaga	407	25.9%	38.1%
Murang'a	268	36.5%	24.6%
Kiambu	187	53.4%	18.4%
Turkana	793	0.0%	95.4%
West Pokot	417	8.5%	44.0%
Samburu	580	0.0%	71.6%
Trans Nzoia	133	66.8%	9.1%
Uasin Gishu	94	73.5%	0.9%
Elgeyo Marakwet	279	19.3%	27.6%
Nandi	189	42.5%	13.1%
Baringo	309	8.4%	29.0%
Laikipia	222	11.0%	8.4%
Nakuru	188	43.3%	14.0%
Narok	501	0.2%	70.5%
Kajiado	367	5.1%	42.2%
Kericho	232	13.1%	16.3%
Bomet	417	0.0%	49.4%
Kakamega	100	73.9%	2.0%
Vihiga	104	68.4%	0.0%
Bungoma	305	42.7%	24.1%
Busia	160	24.4%	0.5%
Siaya	155	35.6%	1.9%
Kisumu	112	65.1%	1.2%
Homa Bay	218	6.6%	7.7%
Migori	295	0.0%	18.6%
Kisii	262	0.0%	18.5%
Nyamira	274	0.3%	19.3%
KENYA	**544**	**6.5%**	**66.2%**

* Average of all 1x1-km squares in county

Introduction & Background

1.09 Accessibility and Transport

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

Central Region 1:2,500,000

Nairobi Region 1:600,000

Mombasa Region 1:600,000

Accessibility: Travel time to nearest urban centre (population ≥50,000)

- Less than 1 hour
- 1 to 2 hours
- 2 to 3 hours
- 3 to 4 hours
- 4 to 6 hours
- 6 to 8 hours
- 8 to 12 hours
- 12 to 18 hours
- 18 to 24 hours
- More than 24 hours
- Thika Urban centre with population ≥50,000

Transport infrastructure

- International road
- National road
- Primary road
- Railway line (partly functional)

Settlements

- Capital
- City
- Municipality
- Township/Town

Borders

- International border
- County border

Features

- Waterbody
- Major river

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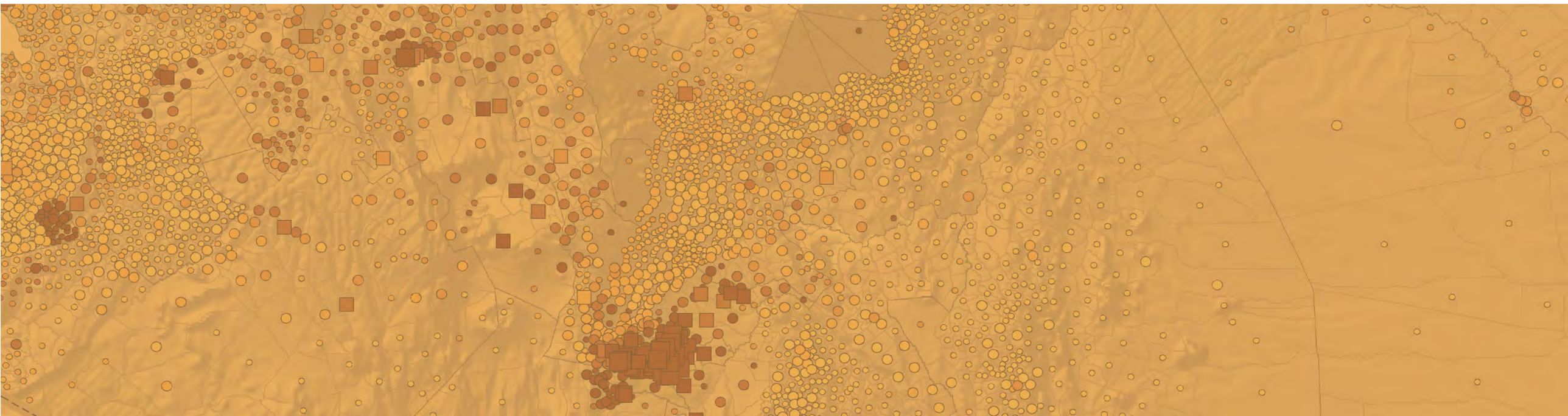
2

Population Distribution & Dynamics



Introduction

Accurate information regarding the size of a population, the distribution of people within a nation, their composition e.g. in terms of age and gender, and their dynamics in space and time is the backbone of any national planning process. From developing the infrastructure for medical care, education, and market access to ensuring that all citizens can be involved in the development of the nation, census data enable the targeted formulation and implementation of any development-related policy. While such information can be provided on a sectoral basis through a variety of sampling surveys, full coverage data are provided by national censuses. In Kenya, the last National Population and Housing Census was carried out in August 2009. This census provides an enormous amount of data that can be used in many different policy fields to improve national development outcomes.

In the 50 years since independence, Kenya's population has grown by a factor of 4, from about 9.5 million (10.9 million in the 1969 census) to 38.1 million in 2009. Growth rates reached values as high as 3.8% in the 1970s and 1980s, and the population continues to grow at a rate of about 2.9%. These dynamics have resulted in the distribution and structure of Kenya's population that is described in this chapter. The focus of this chapter is on the spatial analysis of the data gathered during the 2009 census, and not on the dynamics, projections, or detailed analysis of the population composition and structure. The Kenya National Bureau of Statistics (KNBS) provides a wealth of information on these aspects in other products and formats. In this atlas, Kenya's population data are provided for all 7,149 sub-locations, a spatial resolution that is unprecedented. These data reveal spatial patterns that hint at underlying processes and – more importantly – provide spatially differentiated information for all levels of governance, in particular for the newly constituted county governments. Information at the sub-location level is therefore supplemented by county-level summaries.

This chapter presents 14 maps on five topics: population density (one map), population dynamics (three maps), population structure (four maps), household characteristics (three maps), and sociocultural diversity (three maps).

Map 2.01 presents population density at the sub-location level. This is the only map in this atlas that uses area shading for sub-locations, as population is related to area (see map 1.04). The average population density in Kenya is 66 people per square kilometre, but varies greatly from county to county. Spatial patterns mirror agroecological potential, as well as the rapid, ongoing process of urbanization.

The next three maps (2.02 to 2.04) illustrate population dynamics in terms of natural growth and migration, the two determinants of population growth.

Maps 2.02 and *2.03* present data regarding the factors that drive the natural growth of a population. These maps build on detailed demographic evaluations of the census data that were made by KNBS independently of this atlas. The findings are included here to give this crucial information as background to the understanding of many of the themes of this atlas, and they are presented in six county maps as such information cannot be meaningfully dissolved to the sub-location level. Map 2.02 displays information about birth rates, death rates, and growth rates, while 2.03 details total fertility rates, maternal mortality rates, and child mortality rates. The distributions of these key determinants of natural population dynamics indicate that different regions of the country have reached different stages in the demographic transition.

Map 2.04 addresses migration, one of the main drivers of population dynamics. The map shows for each sub-location the proportion of the population that was not born in their current county of residence. Although it focuses primarily on in-migration, the map reveals that 21% of the total population, including children, have migrated at some point in their lifetimes. Urban areas and rural areas undergoing modernization processes are important destinations. As a result, the majority of the population in some of these in-migration areas are lifetime migrants.

Maps 2.05 to 2.08 depict important structural characteristics of the population in terms of gender, age class, and orphanhood.

Map 2.05 shows the general sex ratio. At the national level, the total numbers of males and females are near parity. However, this ratio varies from one region to another and is strongly related to selective migration patterns. As a result, there is a strong rural–urban gradient in the sex ratio in some counties.

Maps 2.06 and *2.07* deal with the age structure. As a reflection of Kenyan growth rates, slightly more than half (50.1%) of Kenyans are 18 years old or younger, while only 3.5% are above the age of 64. However, these proportions vary greatly across the country. In some parts of the country, youths constitute as much one-third of the population; in others, as much as two-thirds. The distribution of these proportions is closely related to the dynamics of natural growth and migration, and reflects different stages of demographic transition.

Map 2.08 focuses on orphanhood, which has gained considerable attention in relation to the AIDS pandemic. The map shows the rate of total orphaned children below the age of 15 years. At the national level, 190,000 children (1.2%) have lost both parents. As with the other population parameters, this rate varies greatly across the country. Particularly high rates are recorded in the Lake region, and the majority of orphans (73%) live in rural settings.

With maps 2.09 to 2.11, the focus shifts to household characteristics that are less dependent on demographic transition processes but are strongly influenced by socio-economic and sociocultural factors.

Maps 2.09 and *2.10* depict household sizes and show the distribution of small households (1 to 3 people) and large households (7 and more people). Of the 8.8 million households in Kenya, 3.7 million (42%) are considered small, 3.4 million (39%) medium, and 1.7 million (19%) large. Small and large households are found in all parts of the country and show clear – but inverse – rural–urban gradients, with small households accounting for 60% and more of all households in urban centres. The distribution of household sizes also reflects cultural patterns and selective migration processes.

Map 2.11 displays the distribution of female-headed households and reveals that women head almost one-third of all Kenyan households (32% or 2.8 million) in the absence of men. While the spatial distribution confirms the assumed relationship between migration patterns and the resulting multi-local families, it also shows that the occurrence of female-headed households is a complex phenomenon with multiple socio-economic and sociocultural determinants.

The last three maps (2.12 to 2.14) focus on the sociocultural diversity of Kenya. A major characteristic of the nation, this diversity creates both challenges and opportunities for the development of the nation.

Map 2.12 illustrates the distribution of different religious faiths throughout Kenya. The familiar pattern of Muslim and Christian areas is obvious, but the map also reveals increased mixing along rural–urban gradients at both the county and the sub-location levels.

Maps 2.13 and 2.14 focus on ethno-linguistic communities, the diversity of which represents a major asset for Kenya. *Map 2.13* considers the dominant ethno-linguistic communities, or those that are represented by at least 50% of the population in at least three of the 7,149 sub-locations. Their distribution is shown for those sub-locations where one of the communities constitutes at least 50% of the population. The map also shows the sub-locations where no community reaches majority. These sub-locations with no majority community are concentrated in and around the larger urban centres, which makes for increasingly diverse community mixes. This is further evaluated in *map 2.14*, which provides the number of represented communities per sub-location. The map shows that the community mix at the sub-location level increases where economic development is strongest. It also reveals that, on average, 12 of the 34 communities considered in this map are represented in each sub-location of Kenya.

Overall, this chapter reveals a country that is still experiencing highly dynamic demographic processes and a high diversity of populations in terms of demographic characteristics, household structures, and sociocultural backgrounds. It therefore paves the way for appreciating the themes of the chapters to follow.

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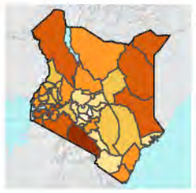

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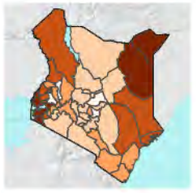

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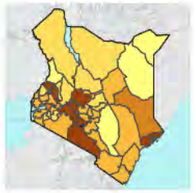

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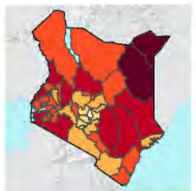

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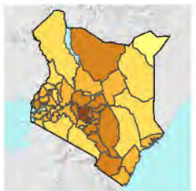

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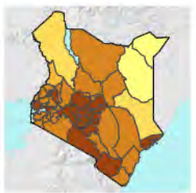

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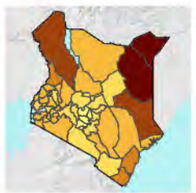

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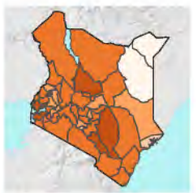

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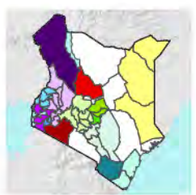

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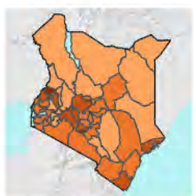

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2.01 Population Density

Population density is the population of a region divided by the land area in square kilometres, expressed as people per square kilometre (people/km²). It is an important geographic and demographic measure because it indicates where people are and how many people occupy a given area. Population density measures can be used to identify areas of population concentration, which are valuable for targeting any form of service provision. Services such as schools, health facilities, water, electricity, and transport networks are easier to provide where concentrations of people are higher because they cost less per capita as compared to services in sparsely populated areas.

The overall population density of Kenya is about 66 people per square kilometre. The spread is, however, very uneven across the country, ranging from less than 10 to over 4,000 people/km² at the county level. The main map in this section displays population densities at the sub-location level. It is the only map in this atlas that uses area shading to indicate values at the sub-location level; this format was chosen here because the population density measure is related to area (see map 1.04). The distribution of high population densities follows the pattern of zones with a high agroecological potential (see map 1.06) as well as economic and administrative centres and urban areas (see map 1.05).

The urban counties of Nairobi and Mombasa show the highest population densities, with 4,429 and 4,206 people per square kilometre, respectively. Other densely populated counties are Kisii, Nyamira, Vihiga, Kakamega, and Kiambu, all of which have population densities exceeding 500 people per square kilometre. These counties are also all located in high-potential regions and include urban areas. On the other extreme, Isiolo, Tana River, Marsabit, and Wajir are the least populated, with densities of fewer than 10 people per square kilometre. These counties are located in arid and semi-arid zones with few urban centres.

Indeed, the general pattern of population densities reflects the uneven regional distribution of agricultural potential and employment opportunities. The pattern is the result of past and ongoing adaptation processes triggered by natural growth rates (see map 2.02) and migration (see map 2.04), both of which are influenced by a range of socio-economic and cultural factors.

The densely populated urban centres of Mombasa, Nairobi, and other large towns reflect the concentration of industrial, commercial, and administrative activities. These areas tend to attract people in search of employment opportunities and other basic services that are presumed to be best offered in the cities, such as education and medical care. Hence, urban concentration is strongly influenced by migration patterns. Providing the infrastructure and services to absorb this population influx poses challenges. The counties that border the major cities of Nairobi and Mombasa also show high densities (see main map) as they act as dormitory areas, indicating urban sprawl.

In predominantly rural settings, such as the agriculturally dominated areas of Vihiga, Kisii, Nyamira, and surroundings, high population densities indicate high agricultural potential. In these areas, reliable rainfall and fertile soils permit people to make a decent living, reducing the need for migration. Many of these high-potential agricultural areas have experienced high fertility rates, leading to higher population densities. However, this may lead to insufficient per capita productivity. For example, where population densities exceed 500 people per square kilometre, the per capita land area decreases on average to less than half an acre of land. This, in turn, influences wealth and poverty levels and may, above certain thresholds, lead to out-migration.

Low population densities reflect arid and semi-arid areas with unreliable rainfall (see map 1.06), where pastoralist activities are most adapted to the natural environment. Although the population densities may remain low in these regions, high population growth rates may bring these systems to the limits of their ability to sustain the population. In addition, the lack of accessibility (see map 1.06) in low-density regions hinders the provision of services (e.g. transportation, market access, education, medicine). The inability of under-served areas to successfully integrate into the national economy may again trigger migration processes.

These observations suggest that each population density class and context poses specific challenges. Devolution may trigger interventions that help target these challenges in a context-specific manner. Their success, however, will also depend on how population structures and dynamics develop over time – subjects that are addressed in the following sections of this chapter.

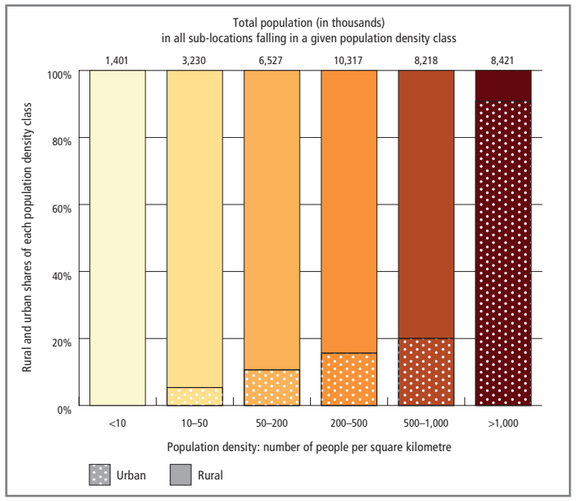
County	Population density (people/km²)	Rank	Total population*	Surface area (land area, excluding waterbodies; km²)
Nairobi	4,429	1	3,078.9	695
Mombasa	4,206	2	920.6	220
Kwale	78	31	642.7	8,320
Kilifi	87	30	1,098.7	12,658
Tana River	6	45	238.8	38,502
Lamu	16	40	99.5	6,280
Taita Taveta	16	39	274.9	17,158
Garissa	8	43	616.9	44,199
Wajir	7	44	658.1	56,780
Mandera	24	38	1,023.1	26,083
Marsabit	4	47	288.5	71,171
Isiolo	6	46	139.4	25,364
Meru	193	23	1,337.7	6,936
Tharaka Nithi	136	27	360.2	2,640
Embu	180	25	508.5	2,819
Kitui	33	36	997.9	30,544
Machakos	175	26	1,085.6	6,212
Makueni	109	29	874.4	8,024
Nyandarua	182	24	589.6	3,242
Nyeri	204	22	679.4	3,336
Kirinyaga	352	12	521.1	1,479
Murang'a	366	11	935.7	2,558
Kiambu	630	6	1,603.4	2,543
Turkana	12	41	848.2	68,731
West Pokot	56	32	509.7	9,146
Samburu	11	42	221.3	21,029
Trans Nzoia	324	16	809.6	2,486
Uasin Gishu	261	18	872.1	3,335
Elgeyo Marakwet	121	28	366.8	3,022
Nandi	258	20	742.7	2,873
Baringo	50	33	548.7	10,995
Laikipia	41	35	391.6	9,456
Nakuru	209	21	1,566.0	7,482
Narok	47	34	841.5	17,892
Kajiado	31	37	677.0	21,920
Kericho	344	14	740.6	2,151
Bomet	260	19	724.0	2,783
Kakamega	546	7	1,647.1	3,004
Vihiga	973	3	549.0	562
Bungoma	449	9	1,362.7	3,018
Busia	435	10	737.1	1,685
Siaya	330	15	834.0	2,515
Kisumu	457	8	952.8	2,077
Homa Bay	300	17	955.2	3,166
Migori	350	13	907.7	2,582
Kisii	867	4	1,142.0	1,312
Nyamira	659	5	592.3	896
KENYA	**66**	**–**	**38,113.3**	**581,881**

* in thousands

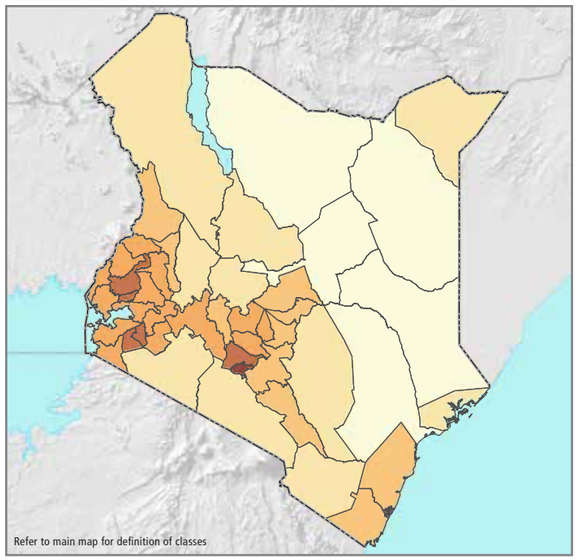
Data Source

2009 Kenya Population and Housing Census (Variable P11: Sex), Kenya National Bureau of Statistics.

2.01 Rural–Urban Distribution of Population Density Classes



2.01 Average Population Density at County Level

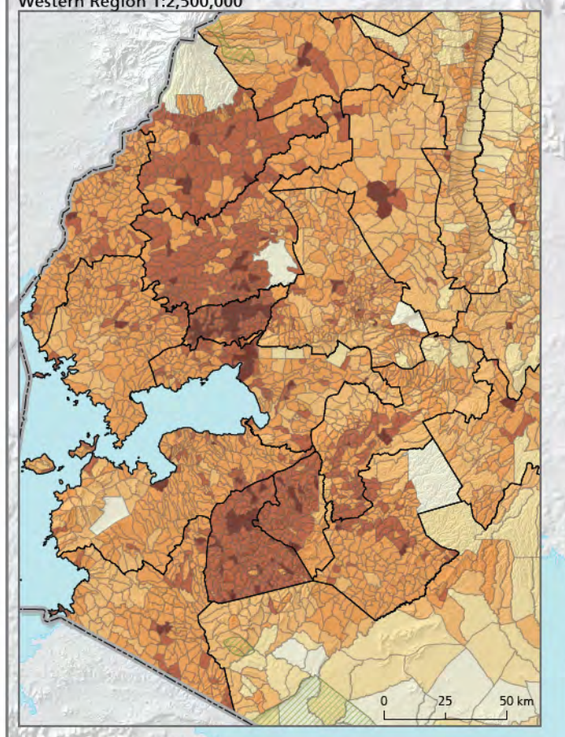


Population Distribution & Dynamics

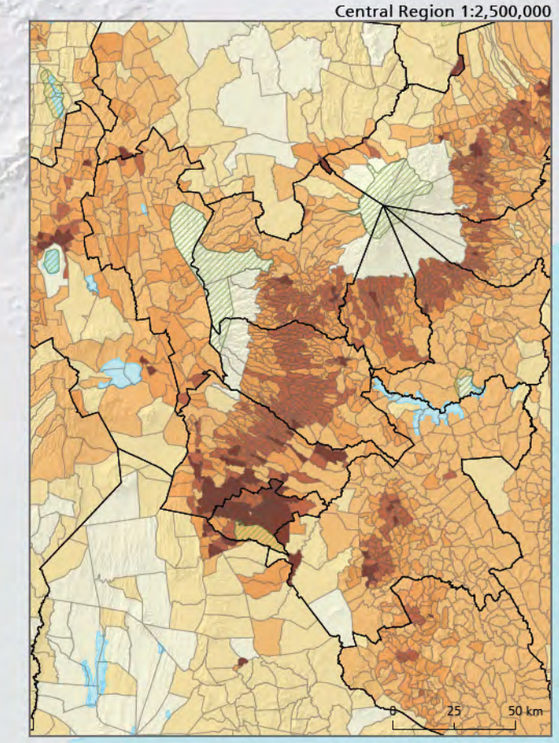
2.01 Population Density

Republic of Kenya 1:4,000,000

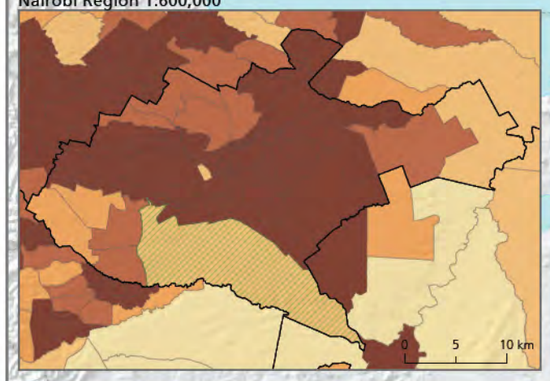
Western Region 1:2,500,000



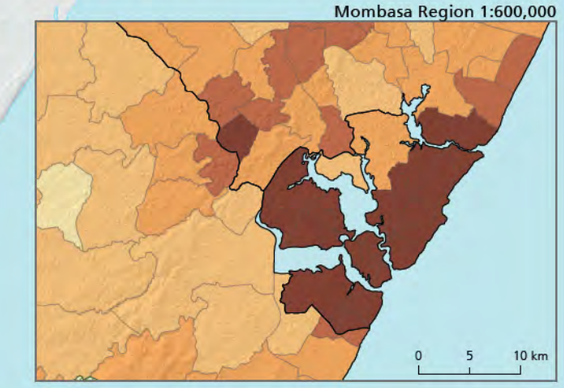
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Population density classes: Number of people per square kilometer (people/km²)

- Fewer than 10 people/km²
- 10 to 50 people/km²
- 50 to 200 people/km²
- 200 to 500 people/km²
- 500 to 1,000 people/km²
- More than 1,000 people/km²

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.02 Birth Rate, Death Rate, and Growth Rate

In the absence of migration, births and deaths are the main demographic processes that drive population changes in a country. The shift in death and birth rates from high to low levels is referred to as the demographic transition. The decline in mortality usually precedes the decline in fertility, thus resulting in rapid population growth during the transition. Analysis of these rates gives an indication of a country's stage in the transition process.

The crude birth rate is the number of live births per year and per 1,000 people. Similarly, the crude death rate is the number of deaths per year and per 1,000 people. The growth rate, or the rate of natural increase, is therefore the balance of births and deaths, excluding migration effects.

Natural increase in Kenya in 2009 was 28.0 per 1,000 people, with 38.4 and 10.4 births and deaths per 1,000 people, respectively. As shown in the county table, the birth rate was highest in Kajiado, with 63.2 live births per 1,000 people. Nyamira, Mandera, and Kericho follow with 56.5, 54.9, and 54.3 live births per 1,000 people, respectively. Murang'a and Kirinyaga have the lowest birth rates at 23.5 and 26.8 live births per 1,000 people, respectively. The crude death rate is highest in Siaya, with 19.1 deaths per 1,000 people.

The maps for birth, death, and growth rates depict a general trend in which the counties with higher growth rates also have higher birth rates. Some counties around Mount Kenya, however, display relatively high growth rates coupled with relatively low birth rates.

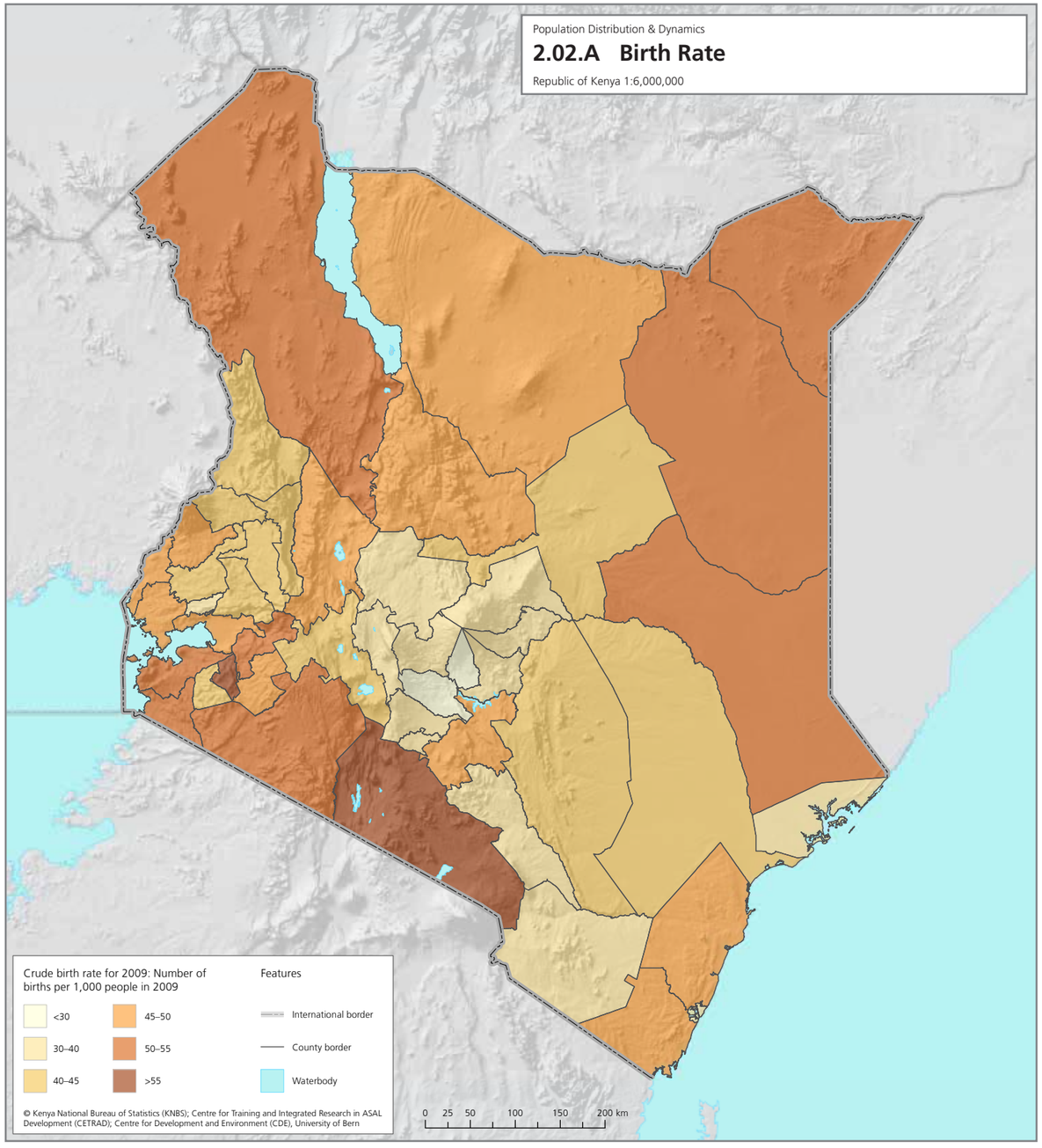
Clearly, different regions of the country are at different stages of demographic transition. For a country whose long-term strategy is to become a newly industrialized middle-income country, policy measures should focus on reducing death rates. Lower birth rates will follow in turn. To achieve this, specific programmes need to be developed on the basis of what stage each county is at in the transition process.

Data Source

Rates derived by Kenya National Bureau of Statistics from *2009 Kenya Population and Housing Census,* Kenya National Bureau of Statistics.

County	Crude birth rate	Crude death rate	Growth rate	Total population*
Nairobi	36.0	6.3	29.7	3,078.9
Mombasa	37.1	8.9	28.2	920.6
Kwale	47.5	10.1	37.4	642.7
Kilifi	47.0	9.3	37.7	1,098.7
Tana River	42.2	11.0	31.2	238.8
Lamu	33.0	11.5	21.5	99.5
Taita Taveta	33.0	15.2	17.8	274.9
Garissa	51.7	7.8	43.9	616.9
Wajir	52.2	9.3	42.9	658.1
Mandera	54.9	14.3	40.6	1,023.1
Marsabit	45.4	7.3	38.1	288.5
Isiolo	42.1	6.6	35.5	139.4
Meru	35.3	7.7	27.6	1,337.7
Tharaka Nithi	33.1	9.6	23.5	360.2
Embu	32.8	8.3	24.5	508.5
Kitui	42.8	10.2	32.6	997.9
Machakos	45.1	12.0	33.1	1,085.6
Makueni	36.2	11.9	24.3	874.4
Nyandarua	35.8	9.9	25.9	589.6
Nyeri	36.8	12.6	24.2	679.4
Kirinyaga	26.8	9.4	17.4	521.1
Murang'a	23.5	11.9	11.6	935.7
Kiambu	38.7	8.0	30.7	1,603.4
Turkana	51.2	10.9	40.3	848.2
West Pokot	44.0	10.2	33.8	509.7
Samburu	47.8	8.5	39.3	221.3
Trans Nzoia	44.0	9.7	34.3	809.6
Uasin Gishu	42.4	10.8	31.6	872.1
Elgeyo Marakwet	43.8	10.2	33.6	366.8
Nandi	43.0	11.5	31.5	742.7
Baringo	45.9	10.7	35.2	548.7
Laikipia	36.3	11.9	24.4	391.6
Nakuru	40.2	11.8	28.4	1,566.0
Narok	51.3	6.9	44.4	841.5
Kajiado	63.2	7.5	55.7	677.0
Kericho	54.3	10.3	44.0	581.2
Bomet	46.2	9.4	36.8	883.4
Kakamega	44.8	11.7	33.1	1,647.1
Vihiga	36.9	16.8	20.1	549.0
Bungoma	46.8	10.2	36.6	1,362.7
Busia	47.2	12.6	34.6	737.1
Siaya	46.3	19.1	27.2	834.0
Kisumu	45.1	13.7	31.4	952.8
Homa Bay	53.7	12.7	41.0	955.2
Migori	51.5	13.0	38.5	907.7
Kisii	44.4	9.8	34.6	1,142.0
Nyamira	56.5	9.7	46.8	592.3
KENYA	**38.4**	**10.4**	**28.0**	**38,113.3**

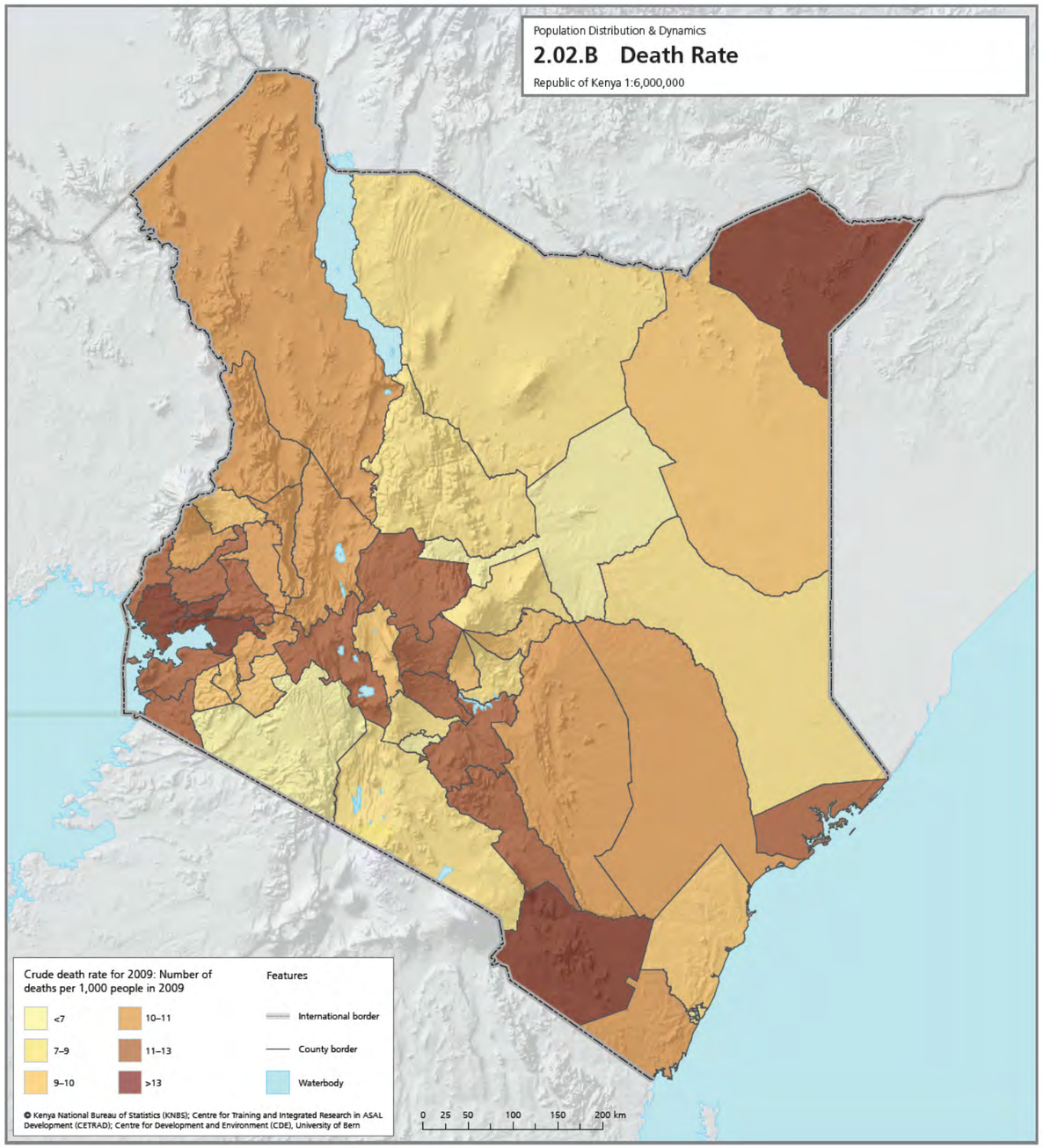
* in thousands



Population Distribution & Dynamics

2.02.B Death Rate

Republic of Kenya 1:6,000,000



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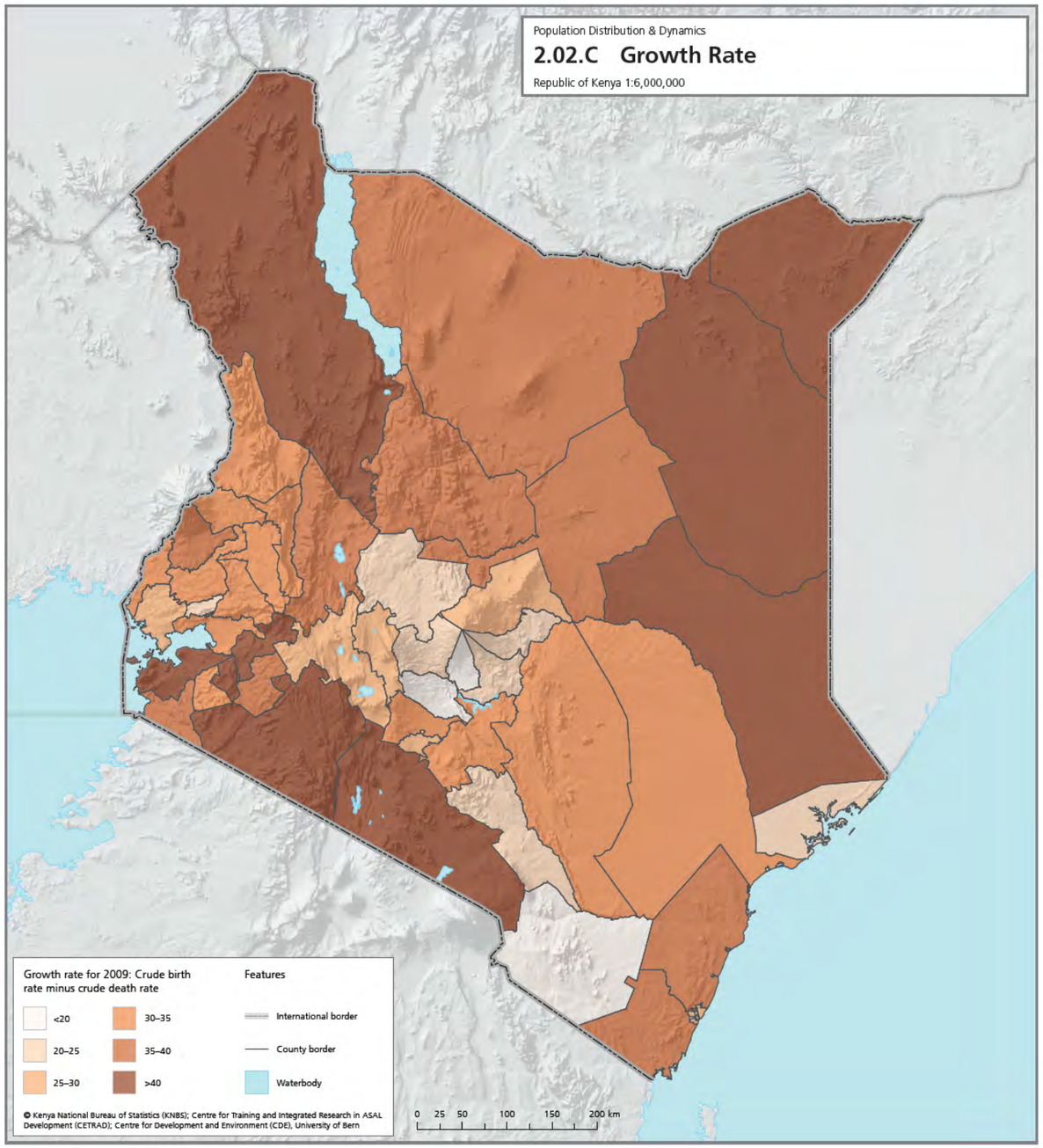
Population Distribution & Dynamics

2.02.C Growth Rate

Republic of Kenya 1:6,000,000



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2.03 Total Fertility Rate, Maternal Mortality Rate, and Child Mortality Rate

In addition to being a key input for projecting future population growth, fertility is one of the three parameters that determines the size and structure of a population. The fertility rate is also directly linked to maternal health, as the higher the fertility rate, the greater the risks associated with pregnancy. The maternal mortality rate therefore gives an indication of progress made in improving maternal health. However, because children are the most susceptible to changes in their environment, the child mortality rate is a key indicator of the socio-economic development of a country.

Three population-related indicators are presented here. The total fertility rate is defined as the number of children that a woman can bear during her lifetime, assuming that she will bear children throughout her reproductive life. Maternal mortality is the death of a woman during pregnancy or within 42 days of the termination of pregnancy from any cause related to or aggravated by the pregnancy or its management. The maternal mortality rate is calculated as the number of maternal deaths per 100,000 births. The child mortality rate or under-five mortality rate is the probability that a baby will die before reaching age five, and is reported per 1,000 live births.

Overall, the total fertility rate in Kenya stands at 4.8 births per woman; the maternal mortality rate is 495 deaths per 100,000 births; and the under-five mortality rate is 79 deaths per 1,000 live births. Fertility is lowest in Kirinyaga, Nyeri, Murang'a, Kiambu, and the cities of Nairobi and Mombasa, and highest in the arid and semi-arid counties. Mandera has the highest maternal mortality rate at 3,795 deaths per 100,000 births, followed by Wajir, Turkana, and Marsabit. At 187 deaths per 100,000 births, Elgeyo Marakwet has the lowest maternal mortality rate. The under-five mortality rate is highest in Siaya, Kisumu, Homa Bay, Migori, Wajir, and Mandera, while Elgeyo Marakwet, Meru, Embu, and Nandi each have fewer than 50 deaths per 1,000 live births.

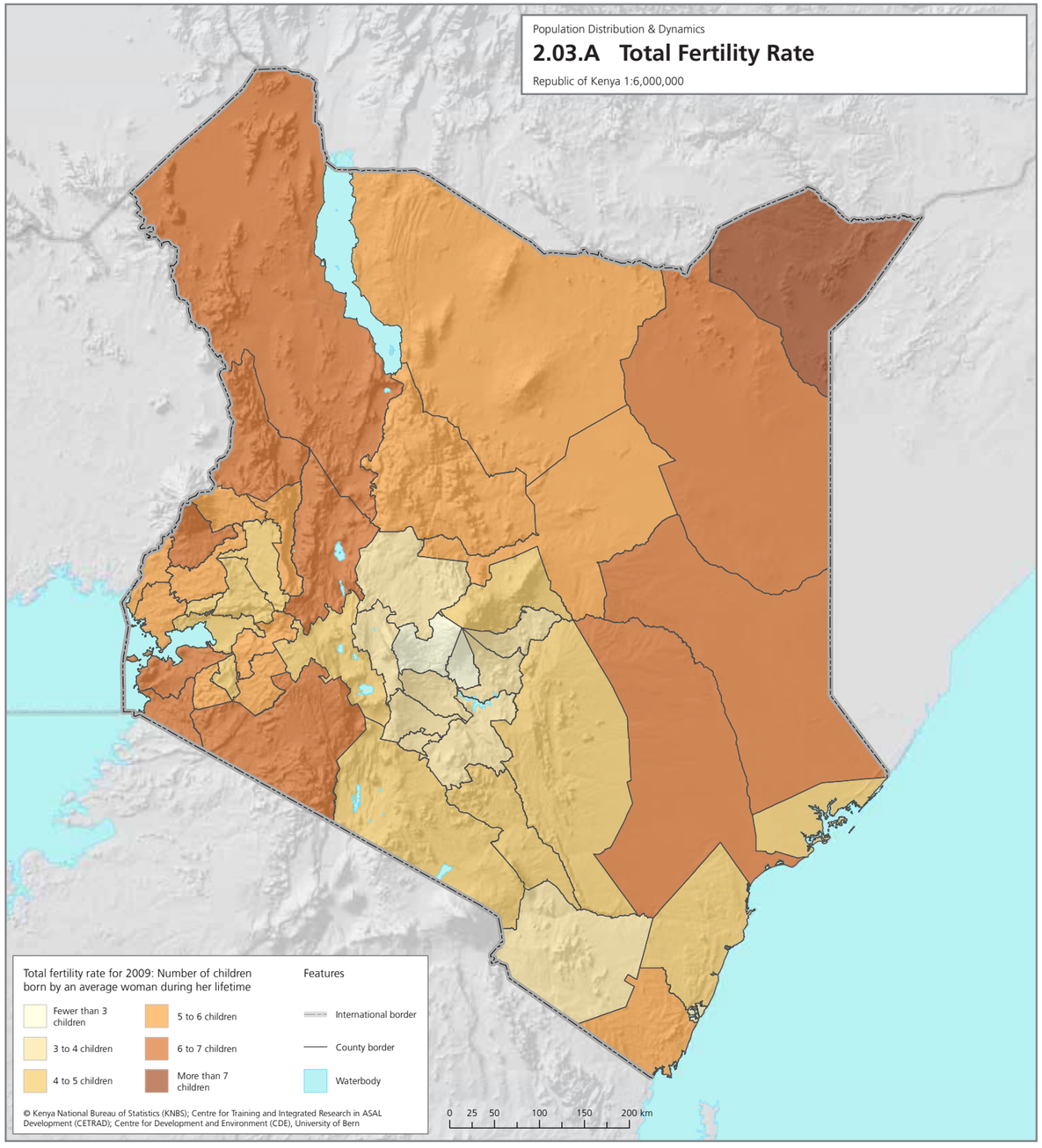
Maternal mortality rates reflect disparities between the non-poor and poor more than any other measure of health. As shown in the table, some of the counties with the highest fertility rates also have the highest maternal mortality rates. Policy interventions targeting the reduction of maternal mortality must therefore take into consideration the factors that drive fertility.

Data Source

Rates derived by Kenya National Bureau of Statistics from *2009 Kenya Population and Housing Census,* Kenya National Bureau of Statistics.

County	Total fertility rate	Maternal mortality rate	Child mortality rate	Total number of children under age five*
Nairobi	3.0	212	56	393.6
Mombasa	3.3	223	115	126.1
Kwale	5.2	346	77	115.5
Kilifi	4.8	290	72	190.1
Tana River	6.4	395	112	47.9
Lamu	4.6	676	106	15.6
Taita Taveta	4.0	603	78	37.4
Garissa	6.4	646	129	89.5
Wajir	6.5	1,683	158	91.7
Mandera	7.3	3,795	155	143.9
Marsabit	5.7	1,127	51	45.1
Isiolo	5.2	790	60	23.1
Meru	4.1	262	48	189.8
Tharaka Nithi	3.8	191	59	49.7
Embu	3.4	388	49	65.3
Kitui	4.9	330	57	160.2
Machakos	3.6	425	56	145.3
Makueni	4.2	400	61	125.5
Nyandarua	3.7	364	60	83.1
Nyeri	2.9	318	50	75.8
Kirinyaga	2.7	298	72	57.7
Murang'a	3.0	329	50	113.5
Kiambu	3.1	230	58	202.7
Turkana	6.4	1,594	121	109.2
West Pokot	6.7	434	104	96.7
Samburu	5.8	472	60	41.9
Trans Nzoia	5.5	333	63	140.3
Uasin Gishu	4.7	234	61	135.3
Elgeyo Marakwet	5.3	187	42	60.7
Nandi	4.9	408	49	123.2
Baringo	6.3	375	70	90.8
Laikipia	3.9	221	53	58.2
Nakuru	4.4	374	80	241.6
Narok	6.3	191	58	166.4
Kajiado	4.4	299	53	109.9
Kericho	5.1	243	69	118.4
Bomet	5.5	247	55	121.0
Kakamega	5.4	316	113	289.0
Vihiga	4.5	531	94	85.8
Bungoma	6.1	259	115	247.6
Busia	5.8	307	149	131.0
Siaya	5.5	691	227	141.2
Kisumu	5.0	597	182	159.4
Homa Bay	6.1	673	170	174.5
Migori	6.4	583	173	176.8
Kisii	5.1	302	101	193.0
Nyamira	4.6	385	75	96.4
KENYA	**4.8**	**495**	**79**	**5,896.5**

* in thousands



Population Distribution & Dynamics

2.03.B Maternal Mortality Rate

Republic of Kenya 1:6,000,000

Maternal mortality rate for 2009: Number of maternal deaths per 100,000 live births

- <250
- 250–350
- 350–450
- 450–750
- 750–1,500
- >1,500

Features

- International border
- County border
- Waterbody

0 25 50 100 150 200 km

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Population Distribution & Dynamics

2.03.C Child Mortality Rate

Republic of Kenya 1:6,000,000

Childhood mortalitiy rate, or under-five mortality rate: Number of deaths of children under age five per 1,000 live births

- <50
- 50–60
- 60–80
- 80–100
- 100–140
- >140

Features

- International border
- County border
- Waterbody

0 25 50 100 150 200 km

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2.04 Lifetime Migration

Besides the natural growth rate, which is driven by fertility and mortality (see maps 2.02 and 2.03), migration is the second most important determinant of the dynamics and structure of a population in a given area (see map 2.01). Migration describes the movement of people into a region in which they are not inhabitants in order to temporarily or permanently settle there. Migration may be the movement of people from one region of the country to another, or to a different country altogether. A number of push and pull factors drive migration, including economic, sociocultural, political, and environmental factors. In the context of Kenya, migration creates community mixing that influences economic and cultural changes, including in religious practices (see maps 2.12 to 2.14).

The 2009 census captured migration information using the key migration variables of place of birth, previous residence twelve months prior to census date, duration of stay in current place of residence, and place of enumeration. People living in a different administrative unit than the one they resided in twelve months prior to the census are considered to be recent migrants. People living in an administrative unit different from the one they were born in are referred to as lifetime migrants. The migration information obtained from the data indicates the number of migrants in a given place, but not the number of migration movements.

The maps in this section address lifetime migration and indicate for each county and sub-location the proportion of people whose birthplace is different from their current place of residence. Overall, the proportion of in-migrants is 20.9%, which is equivalent to 8.0 million people. This means that one out of every five Kenyans was not born in the county they currently live in. This indicates a high level of internal migration, especially considering that these figures comprise all people, including children. However, the map shows that this proportion varies greatly; while some counties have almost no migrants, lifetime migrants dominate in others.

The lowest lifetime in-migration rates are found, unsurprisingly, in the vast arid and semi-arid areas such as Mandera (1.1%). Kitui also shows very low rates in sub-locations where semi-arid small-scale farming is at its limits and in transition (see map 7.01) and from where out-migration to urban areas is taking place (see map 2.5). Similar situations can be found in sub-locations in the transition zones between high-potential and low-potential areas. Interestingly, Meru and Tharaka Nithi also have very low rates of migration, despite being highly productive agricultural counties. This may be due to the cultural confinement of these areas.

Also not unexpected are the high proportions of migrants in major towns like Nairobi (69%) and Mombasa (58%). As economic hubs, these towns attract migrants because they offer a large and diversified labour market (see chapter 7). This influx may also point to a cultural shift in terms of an urbanization of people's values and attitudes, as postulated elsewhere in this atlas (e.g. map 4.03). The rural–urban graph shows that lifetime migration to urban areas is a general phenomenon, with rates over 50% found almost exclusively in urban areas. The darker colours appearing around the larger towns on the main map confirm this phenomenon. These findings indicate that urbanization in Kenya takes place at a considerably faster rate than the already high natural growth rate (see map 2.02). This poses a range of challenges in terms of managing and servicing the growing urban centres.

The rural–urban graph shows that there are also areas with high lifetime in-migration in rural settings. A typical example is Laikipia, which has a number of sub-locations with high rates. Similar situations can be found in Nyandarua, Nakuru, Uasin Gishu, Lamu, and Trans Nzoia. This in-migration may be associated with settlement areas that were established after independence, the development of large-scale agricultural enterprises, or, in some cases, with tourism. Such rural in-migration areas also pose challenges with regard to providing services and forming functioning, stable local communities.

In summary, the in-migration patterns in Kenya are primarily dominated by the rural–urban gradient, but are also considerably influenced by new structures like settlement schemes in rural areas. In this sense, they primarily reflect economic gradients and disparities, but a sociocultural dimension may also play a growing role.

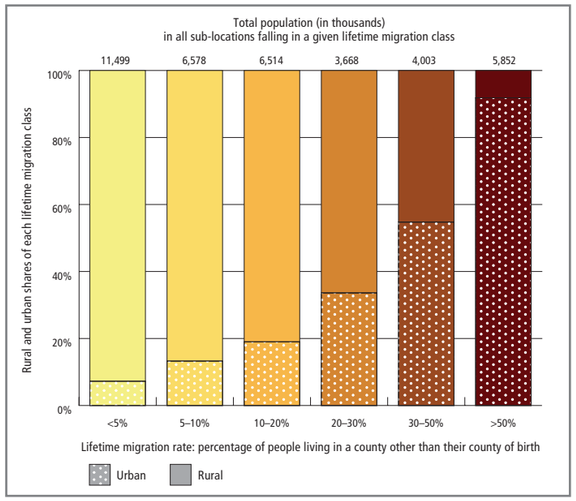
County	In-migration rate	Rank	Total number of in-migrants*	Number of in-migrants in urban sub-locations*
Nairobi	69.3%	1	2,135.0	2,135.0
Mombasa	57.6%	2	530.7	530.7
Kwale	10.1%	29	65.0	29.3
Kilifi	10.7%	27	117.1	78.5
Tana River	11.7%	25	28.0	5.8
Lamu	31.1%	9	30.9	5.0
Taita Taveta	17.0%	15	46.8	13.7
Garissa	21.1%	12	130.2	21.9
Wajir	1.6%	46	10.7	4.9
Mandera	1.1%	47	11.5	4.4
Marsabit	5.8%	39	16.8	4.9
Isiolo	19.3%	13	26.9	17.1
Meru	5.8%	40	77.6	21.2
Tharaka Nithi	5.6%	41	20.3	7.5
Embu	10.7%	26	54.6	17.9
Kitui	3.7%	44	36.6	9.5
Machakos	14.6%	21	158.9	124.0
Makueni	10.1%	30	88.1	20.0
Nyandarua	33.5%	7	197.3	41.4
Nyeri	15.5%	17	105.1	37.9
Kirinyaga	10.1%	31	52.5	14.7
Murang'a	10.4%	28	97.4	20.5
Kiambu	32.6%	8	522.3	435.1
Turkana	5.1%	43	43.0	11.7
West Pokot	3.1%	45	16.0	6.8
Samburu	5.3%	42	11.8	6.3
Trans Nzoia	30.5%	10	247.0	61.0
Uasin Gishu	38.4%	5	334.7	167.7
Elgeyo Marakwet	9.0%	34	33.1	8.3
Nandi	16.3%	16	121.2	22.2
Baringo	5.9%	38	32.5	11.2
Laikipia	39.8%	3	155.9	39.1
Nakuru	36.9%	6	577.2	333.5
Narok	17.3%	14	146.0	24.4
Kajiado	38.6%	4	261.0	188.0
Kericho	14.6%	20	108.5	50.3
Bomet	7.6%	36	55.3	6.5
Kakamega	12.7%	23	209.2	56.6
Vihiga	8.1%	35	44.5	16.0
Bungoma	9.8%	32	133.3	43.2
Busia	12.6%	24	92.9	27.4
Siaya	13.6%	22	113.6	15.1
Kisumu	25.8%	11	245.6	169.8
Homa Bay	15.0%	19	143.2	25.3
Migori	15.1%	18	136.8	78.7
Kisii	7.0%	37	79.9	34.6
Nyamira	9.5%	33	56.1	8.1
KENYA	**20.9%**	–	**7,958.5**	**5,012.6**

* in thousands

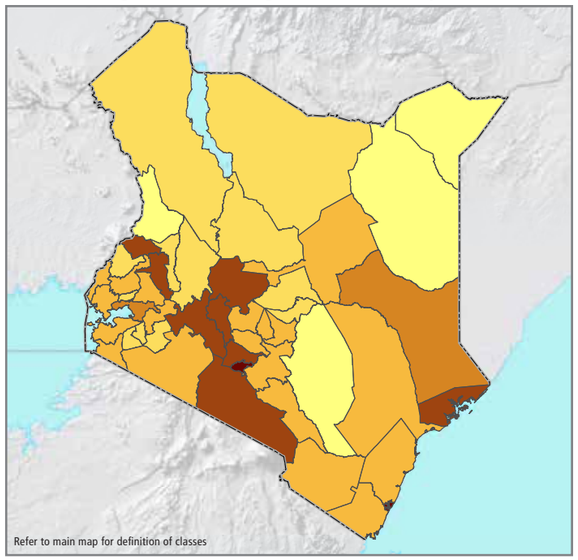
Data Source

2009 Kenya Population and Housing Census (Variable P18: Birth Place), Kenya National Bureau of Statistics.

2.04 Rural–Urban Distribution of Lifetime Migration Classes



2.04 Average Lifetime Migration at County Level

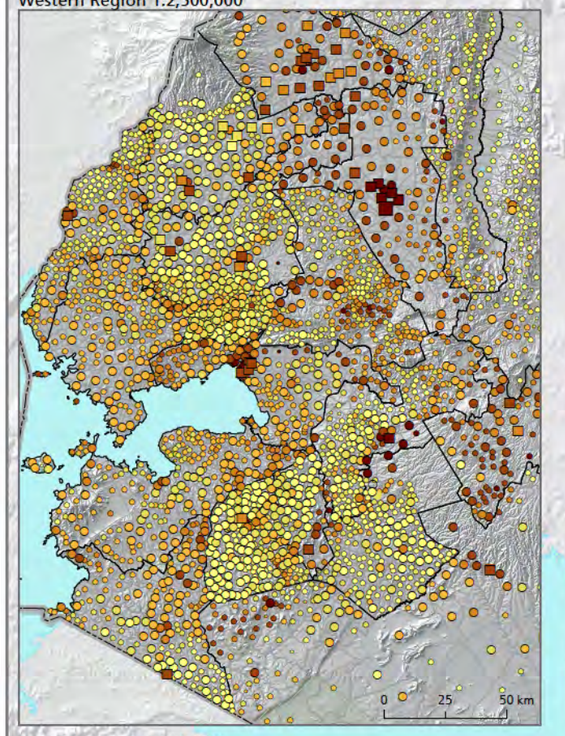


Population Distribution & Dynamics

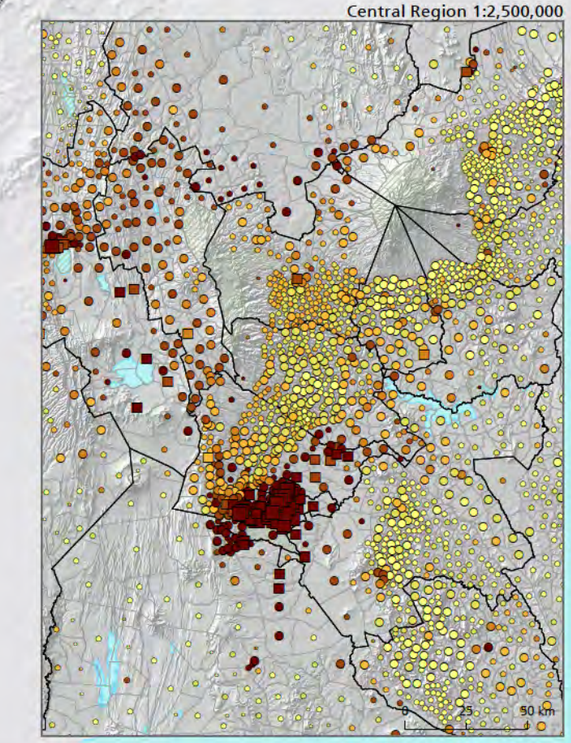
2.04 Lifetime Migration

Republic of Kenya 1:4,000,000

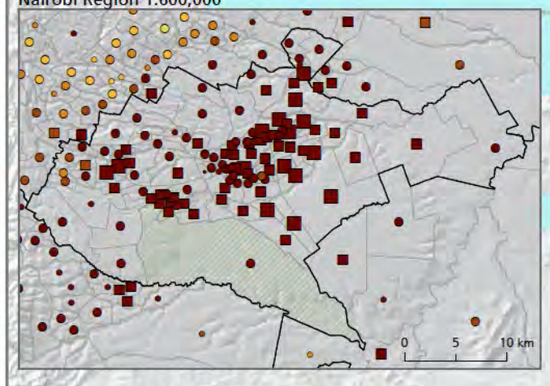
Western Region 1:2,500,000



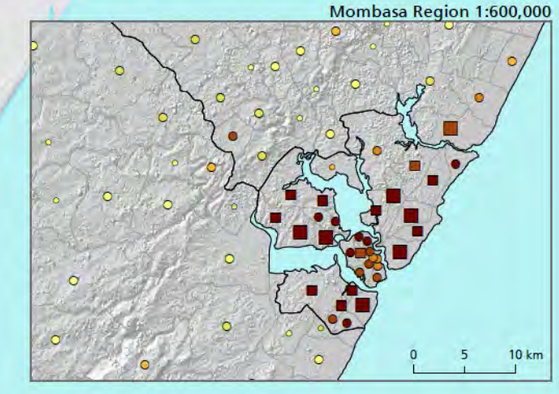
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



In-migration classes: Percentage of people living in a county other than their county of birth

- <5%
- 5 to 10%
- 10 to 20%
- 20 to 30%
- 30 to 50%
- >50%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.05 General Sex Ratio

In the 2009 census, focus was on the general sex ratio. The ratio of females to males is vital for development planning. It is important in monitoring various aspects of social development as they relate to gender. Sex ratios give an indication of survival rates for males and females in a given population and the resultant impact on the population. Imbalances in the sex ratio may arise from natural factors, war, or gendercide. The selective killing of either sex that is reported globally affects girls more than boys.

In demography, the general sex ratio is calculated as a ratio of all males in the population divided by all corresponding females. However, this atlas calculates the general sex ratio as a ratio of females to males, for comparison with other gender parity indices used, especially in the education section, as low values imply that females are disadvantaged. In the general sex ratio used here, a value of 1.00 indicates a balance between the sexes, while values of less than 1.00 imply an imbalance in favour of males and values of more than 1.00 show an imbalance in favour of females.

The country has a general sex ratio of 1.02, near to parity, with slightly more females. This ratio, however, varies within the country and reveals some distinct patterns. The county table shows an exact balance in sex ratios for Nandi and Kajiado. There is, however, an imbalance in favour of boys, with a ratio of less than 0.95, in the arid and semi-arid counties of Wajir, Mandera, Turkana, Marsabit, and Garissa. Although these regions have harsh climatic conditions and the cultural orientation is unfavourable to females, the reported sex ratio is still even lower than expected. An imbalance in favour of males is also noted in Lamu and Mombasa. In contrast, most counties in the western region of the country, including Busia, Kisii, Vihiga, and Siaya, as well as semi-arid Kitui in the east, show high sex ratios of more than 1.10, implying more females than males. This may be explained by the out-migration of males from the region to towns and cities in search of employment, indicating the phenomenon of multi-local families split between rural and urban settings.

Traditionally, males are often assumed to migrate to towns in search of better opportunities, leaving their families at home in rural areas; hence generally lower sex ratios would be expected in urban areas. Consulting the rural–urban graph does not confirm this assumption in an obvious way, however. The parity class reveals rural and urban shares to be almost equal to the overall distribution of the Kenyan population between rural and urban settings, with about 31% living in urban sub-locations (see map 1.05). There are more urban sub-locations with male-dominated low sex ratios, supporting the assumption of male in-migration. This is confirmed by the main map. The highlands and the coast have higher levels of males in larger towns and urban areas, where there are increased employment opportunities, e.g. in peri-urban industries, tourism, or large-scale agriculture. However, the graph also shows some urban settings with high sex ratios, revealing female dominance. These are mainly in the towns of arid and semi-arid areas, where the harsh environment, combined with employment opportunities in the service sector in the towns, may trigger female in-migration.

In the rural areas, the graph indicates that all classes have significant rural portions but that the class with sex ratios between 1.05 and 1.20 stands out, indicating more females than males in many rural areas. Their spatial distribution on the main map reflects selective male migration, e.g. in the Lake region, the eastern semi-arid lands, and the hinterland of the coast. This is also the case in pastoralist Samburu. These are all regions where agriculture either seems to be limited by population density (see map 2.01) or has limited natural potential. In contrast, some of the core agricultural areas of central and western Kenya show a dominance of parity, indicating the economic absorption of both genders in these rural areas.

Finally, the case of Nairobi is also interesting. As a county, it almost reaches parity, but with variations between its sub-locations, possibly indicating that this large agglomeration is turning into its own demographic cosmos, where the direct comparability of rural and urban is less clear-cut. This conclusion, however, would have to be substantiated by further studies.

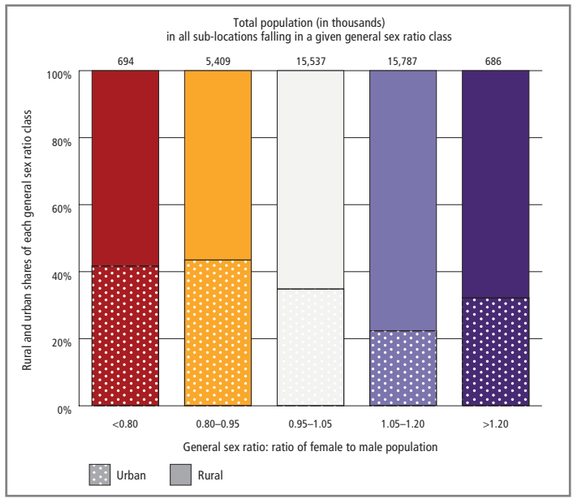
County	General sex ratio (females to males)	Total female population*	Total male population*	General sex ratio in urban sub-locations
Nairobi	0.97	1,513.7	1,565.2	0.97
Mombasa	0.94	446.6	474.0	0.94
Kwale	1.06	330.5	312.2	1.00
Kilifi	1.08	569.8	528.9	1.02
Tana River	1.01	120.1	118.8	1.01
Lamu	0.94	48.1	51.4	0.97
Taita Taveta	0.99	136.5	138.4	1.01
Garissa	0.87	286.6	330.3	1.04
Wajir	0.82	297.4	360.7	1.00
Mandera	0.83	465.3	557.8	0.96
Marsabit	0.94	139.6	148.8	1.00
Isiolo	0.98	69.0	70.4	1.06
Meru	1.03	677.7	660.0	1.05
Tharaka Nithi	1.05	184.2	176.0	1.03
Embu	1.03	258.3	250.2	1.05
Kitui	1.11	524.7	473.1	1.05
Machakos	1.03	549.7	535.9	0.98
Makueni	1.06	449.7	424.7	1.02
Nyandarua	1.04	300.9	288.7	1.05
Nyeri	1.05	347.9	331.4	1.06
Kirinyaga	1.03	264.5	256.6	1.06
Murang'a	1.06	481.6	454.0	1.04
Kiambu	1.02	811.6	791.8	1.02
Turkana	0.93	407.7	440.5	1.01
West Pokot	1.01	256.4	253.2	1.03
Samburu	1.01	111.2	110.1	1.05
Trans Nzoia	1.02	408.0	401.6	0.99
Uasin Gishu	1.01	437.5	434.7	1.00
Elgeyo Marakwet	1.01	184.4	182.5	1.03
Nandi	1.00	371.3	371.5	1.00
Baringo	0.99	273.1	275.6	1.05
Laikipia	1.02	198.2	193.4	1.08
Nakuru	1.01	785.8	780.3	1.02
Narok	0.99	418.9	422.7	0.99
Kajiado	1.00	338.5	338.5	0.99
Kericho	0.99	369.0	371.6	1.00
Bomet	1.01	363.7	360.3	1.01
Kakamega	1.08	854.4	792.8	1.05
Vihiga	1.11	288.8	260.2	1.09
Bungoma	1.05	697.8	664.9	1.05
Busia	1.10	385.5	351.6	1.09
Siaya	1.11	439.5	394.5	1.09
Kisumu	1.05	488.8	464.1	1.02
Homa Bay	1.09	497.9	457.3	1.09
Migori	1.07	468.9	438.8	1.07
Kisii	1.10	597.6	544.5	1.07
Nyamira	1.08	307.8	284.5	1.08
KENYA	**1.02**	**19,224.5**	**18,888.8**	**1.00**

* in thousands

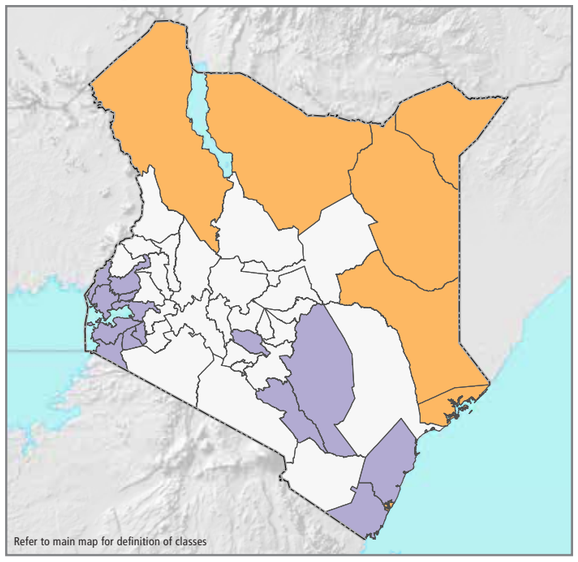
Data Source

2009 Kenya Population and Housing Census (Variable P11: Sex), Kenya National Bureau of Statistics.

2.05 Rural–Urban Distribution of General Sex Ratio Classes



2.05 Average General Sex Ratio at County Level

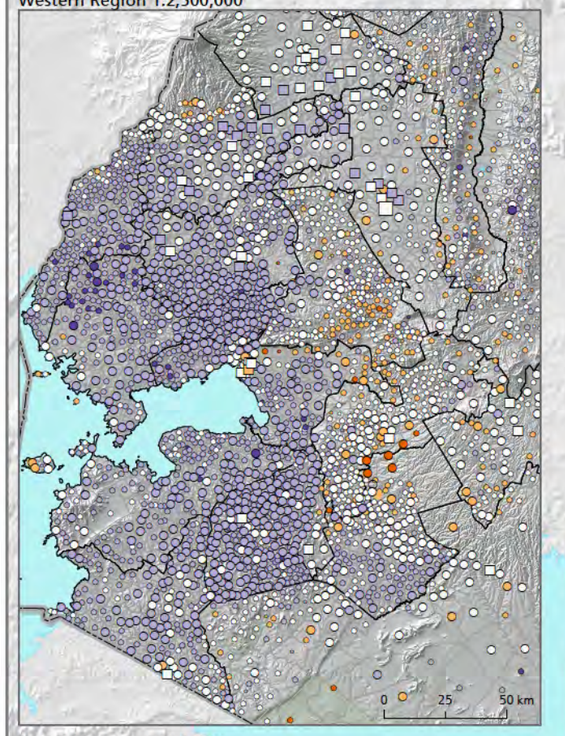


Population Distribution & Dynamics

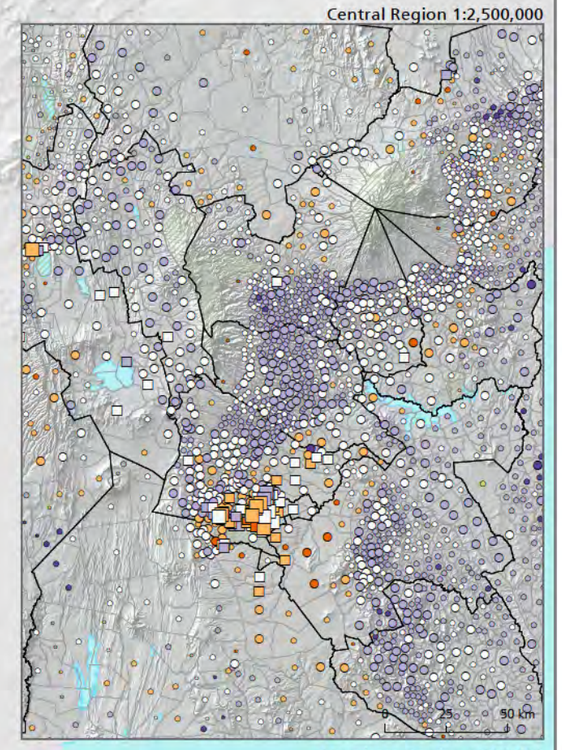
2.05 General Sex Ratio

Republic of Kenya 1:4,000,000

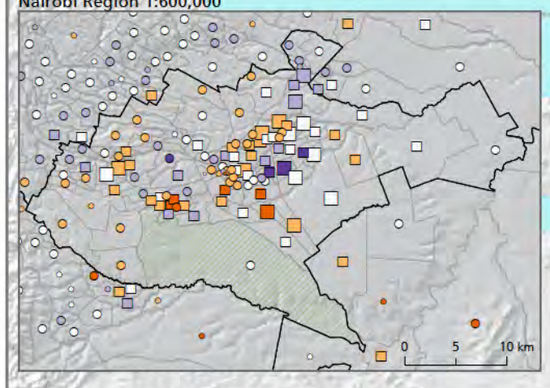
Western Region 1:2,500,000



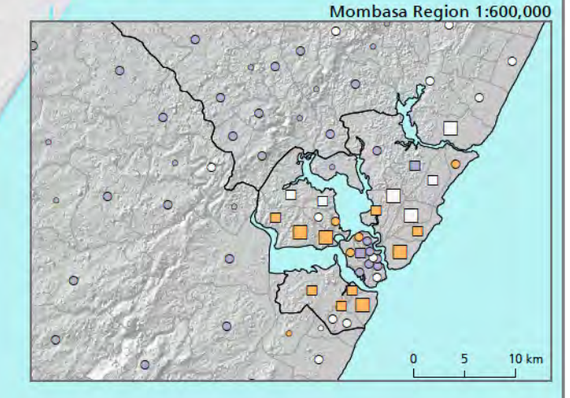
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



General sex ratio classes: Ratio of female to male population

More males:
- <0.80
- 0.80–0.95

Gender parity:
- 0.95–1.05

More females:
- 1.05–1.20
- >1.20

Total population per sub-location
- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders
- International border
- County border
- Sub-location border

Features
- National park
- Waterbody

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2.06 The Population Under Age 18

The proportion of young people in a given population is an important indicator of population dynamics and related development issues. A high proportion means that the population is growing, and it also implies that the economic and social burden of bringing up and educating children and youths is high. At the same time, a large number of young people represents great potential for the future. This section concerns the proportion of the population that has not yet reached the age of 18 years at the time of the census. This includes all young people within the official school-going age ranges for primary and secondary education in Kenya (see chapter 6).

19.1 million people, or 50.1% of Kenya's total population, are under 18 years old. By global standards, this is a high value, and it means that half the population has to raise and educate the other half. In addition, this high proportion implies that the population will grow considerably, even if fertility rates (see map 2.03) should diminish drastically. However, if the burden of caring for these children and youths is managed well, they will provide a strong workforce and basis for the future development of Kenya.

The children and youths are, however, not distributed equally across all regions of Kenya. At the county level, the proportion of the population under age 18 ranges from 35% in Nairobi to 62% in Mandera. This means that in the capital city, about one out of every three people is under age 18, while in the north-eastern regions of Kenya almost two out of every three people are children or youths.

The relatively low values of Nairobi and Mombasa point to a general pattern, with a higher proportion of young people in rural areas (53%) than in urban areas (42%). In absolute terms, there are about 14 million children and youths in rural settings and only about 5 million in urban settings. This distribution also shows clearly in the rural–urban graph. In general terms, more than 95% of the sub-locations with 60% and more of the population under age 18 are rural, while over 80% of those with less than 40% of the population under age 18 are urban. In the classes between these extremes, the shares of urban sub-locations increase steadily with decreasing proportions of the population under age 18. These patterns may be a result of higher birth rates in rural areas and, even more so, of the continued migration of people above age 18 into towns.

However, the main map shows that differences in the shares of people under 18 are not confined to the rural–urban gradient; there are considerable differences between different types of rural settings. High to very high proportions of children and youths are found in most arid and semi-arid areas, at the northern fringes of the western highlands, and in the hinterland of the coast. High values are also recorded in large parts of western Kenya and in semi-arid Ukambani. Comparatively low rates for rural areas are mainly found in large parts of central Kenya and the Mount Kenya region, and to some degree also in the Taita Hills – an area that displays similarities to the central highlands in terms of many of the aspects addressed in this atlas. This general pattern to some degree mirrors the economic landscape of Kenya (see chapter 7). Two main factors explain this: firstly, the demographic transition is more advanced in the economic core regions, leading to lower growth rates and lower proportions of young people (see map 2.02). Secondly, adult out-migration from the economic periphery and from regions where agricultural activities are under pressure due to high population densities or low natural potential may have an influence on the proportional relation between young people and adults, reducing the proportion of adults compared to the natural age pyramid.

There are both advantages and disadvantages to Kenya's youthful population. It represents potential for the future, but it also increases dependency rates and reduces economic participation in the present (see map 7.06). Regions with a high percentage of children and youths require policies that promote schools and services to meet their needs. In general terms, however, employment creation will be the key to tapping the potential of the expected future labour force and future market opportunities. This implies that job creation is not only a national priority as stipulated in Kenya's *Vision 2030*, but that it also requires efforts at the sub-national level; because grossly uneven population distribution will provoke major and increasing migration flows when today's children and youths reach adulthood. This points to the major role that devolved governance will play in harnessing these potentials and facing the challenges posed by high proportions of young people in the population.

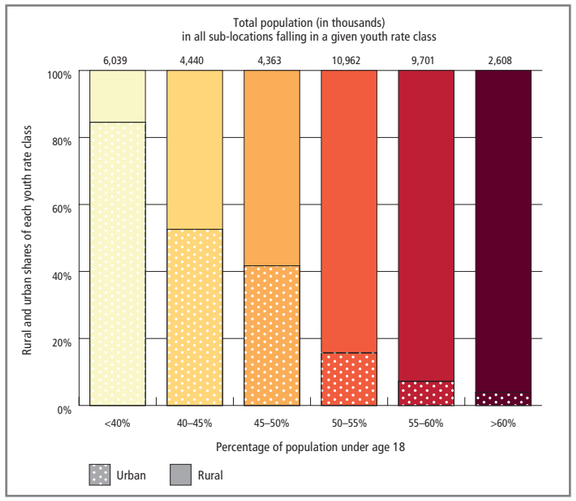
County	Percentage of population under age 18	Rank	Number of people under age 18*	Number of 18- to 64-year-olds*
Nairobi	35.4%	47	1,091.0	1,953.6
Mombasa	38.6%	46	355.7	549.6
Kwale	54.3%	17	348.9	272.2
Kilifi	53.9%	20	592.6	467.1
Tana River	57.1%	6	136.4	95.4
Lamu	48.9%	35	48.6	47.4
Taita Taveta	45.4%	40	124.8	135.8
Garissa	56.1%	9	346.2	256.3
Wajir	60.1%	2	395.4	248.3
Mandera	62.2%	1	636.3	367.7
Marsabit	54.7%	15	157.7	118.7
Isiolo	52.3%	24	73.0	61.3
Meru	46.7%	37	624.6	654.1
Tharaka Nithi	46.1%	39	166.0	175.0
Embu	44.3%	41	225.2	256.8
Kitui	55.0%	13	549.3	395.8
Machakos	46.4%	38	504.1	527.2
Makueni	51.9%	27	454.2	374.9
Nyandarua	50.3%	31	296.5	266.7
Nyeri	40.5%	43	275.1	359.5
Kirinyaga	38.8%	45	202.3	290.7
Murang'a	44.0%	42	412.0	459.5
Kiambu	40.3%	44	646.7	898.7
Turkana	54.7%	14	464.3	364.1
West Pokot	59.4%	3	302.8	193.2
Samburu	57.8%	4	127.8	86.8
Trans Nzoia	54.6%	16	441.7	345.4
Uasin Gishu	49.0%	34	427.0	420.1
Elgeyo Marakwet	54.0%	19	198.1	154.2
Nandi	52.3%	25	388.6	327.2
Baringo	56.7%	8	310.9	219.6
Laikipia	49.2%	32	192.8	183.0
Nakuru	49.1%	33	768.2	750.4
Narok	57.1%	7	480.4	340.3
Kajiado	48.0%	36	325.1	336.6
Kericho	51.2%	30	379.5	339.1
Bomet	53.9%	21	390.3	310.9
Kakamega	54.0%	18	889.8	697.8
Vihiga	52.3%	26	287.1	228.4
Bungoma	56.0%	10	763.6	557.7
Busia	55.6%	12	410.2	299.6
Siaya	52.7%	22	439.4	350.1
Kisumu	51.4%	29	489.5	432.2
Homa Bay	55.9%	11	534.1	385.6
Migori	57.2%	5	518.8	363.3
Kisii	52.6%	23	601.0	502.1
Nyamira	51.6%	28	305.7	265.8
KENYA	**50.1%**	–	**19,099.4**	**17,685.9**

* in thousands

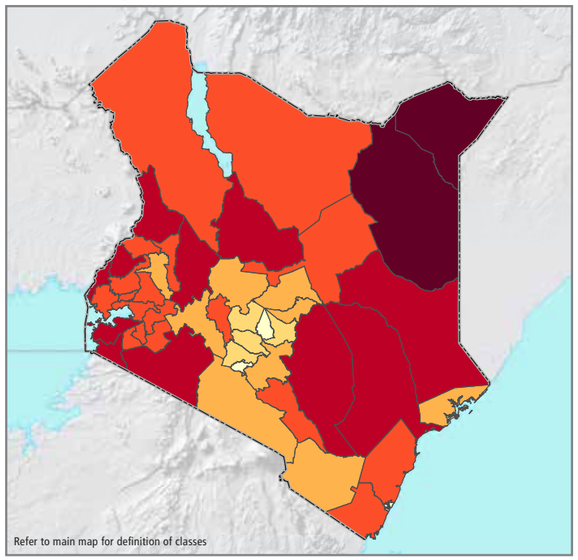
Data Source

2009 Kenya Population and Housing Census (Variable P12: Age), Kenya National Bureau of Statistics.

2.06 Rural–Urban Distribution of Youth Rate Classes



2.06 Average Youth Rate at County Level

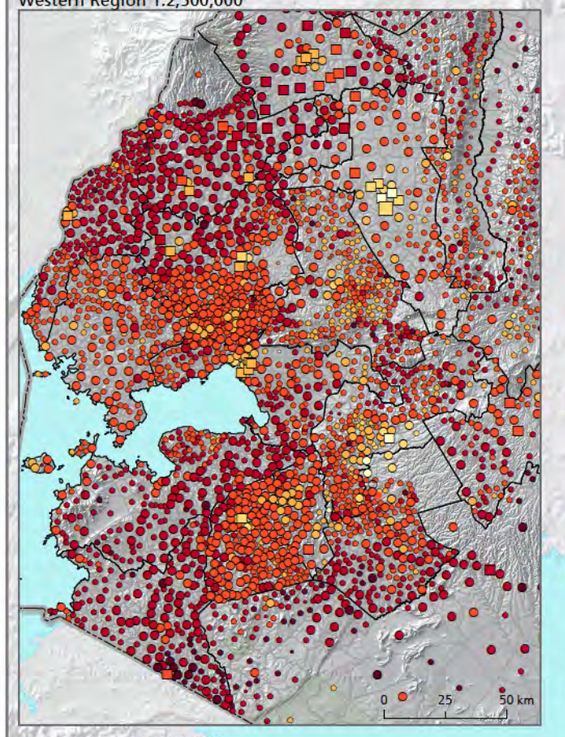


Population Distribution & Dynamics

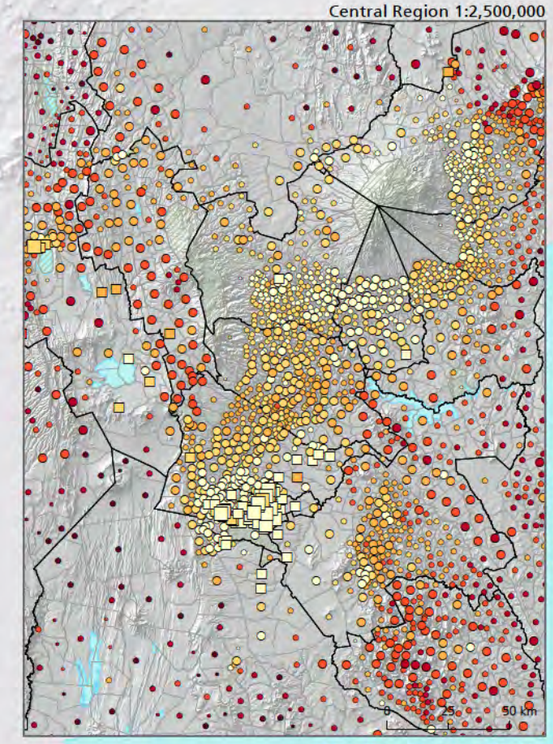
2.06 The Population Under Age 18

Republic of Kenya 1:4,000,000

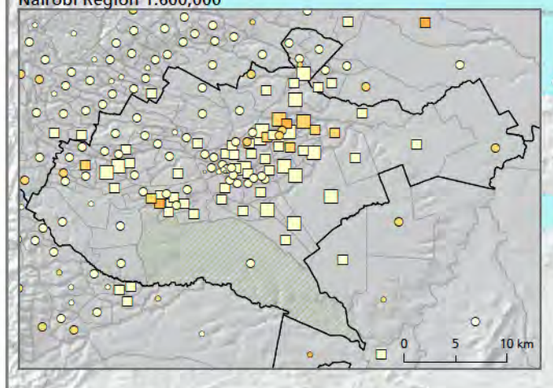
Western Region 1:2,500,000



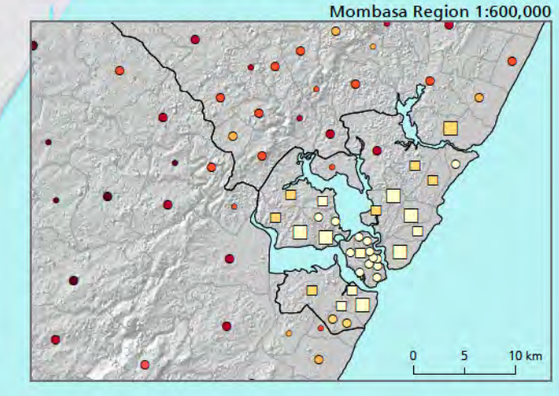
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Youth rate classes: Percentage of population under age 18

- Less than 40% of population
- 40 to 45% of population
- 45 to 50% of population
- 50 to 55% of population
- 55 to 60% of population
- More than 60% of population

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.07 The Population Over Age 64

Population dynamics fuelling Kenya's growth and changing age structure are rooted in the combined impact of increasing life expectancy and declining fertility. The trends of falling fertility rates and a sustained increase in longevity bring new social and economic challenges, including high dependency rates, with an increased requirement for health care, social security, and home care services for the aged. An ageing population also becomes more susceptible to various chronic conditions and mild disability. The shift in the specific health care needs of an older population requires major adjustments.

Map 2.06 dealt with the high proportion of youths in Kenya's population. The present map shows the proportion of the population aged 65 and older. The national rate stands at 3.5%, or 1.3 million people, which is still quite low by international comparison. But this population segment is increasing at an estimated rate of 4% per year. The absolute numbers of elderly in the country will continue to increase rapidly due to Kenya's youthful population structure.

As expected, the rate of elderly people varies considerably between the different parts of the country, with the highest proportion, above 6%, found in parts of Murang'a, Nyeri, and Vihiga counties. But Kirinyaga, Siaya, Tharaka Nithi, Kitui, Embu, Taita Taveta, Makueni, and Machakos also show county values of above 5%. This is consistent with the comparatively low fertility levels in these regions and indicates an advanced stage in the demographic transition in some parts of the central and western highlands as well as in Ukambani. The opposite is true for the rural counties with low rates, which are primarily found in the arid and semi-arid areas and in parts of western Kenya. This is an indication of low life expectancy and, like the high rates of people under age 18 found in these regions (see map 2.06), points to an earlier stage in the demographic transition.

The lowest rates, however, are found in Nairobi (1.1%) and Mombasa (1.7%). This cannot be explained by the demographic transition, which is also well advanced in these urban centres, but relates to migration patterns. There is an influx of people of working age, with people in the retiring age range returning to their rural homes, increasing the rates of elderly people there and reducing them in the urban areas. The rural–urban graph indicates that this is not a phenomenon confined to the two cities of Nairobi and Mombasa but applies to most of the larger towns.

The distribution of people over age 64 in the country therefore reflects the process of demographic transition as well as age-dependent migration patterns. The result of the cumulation of the two processes is also reflected in the working-age population between 18 and 64 years of age. It is clearly lowest in areas that are in an early stage of the demographic transition and may also show considerable out-migration. The lowest rates are found in the many semi-arid and arid counties and in some parts of western Kenya (Homa Bay and Migori), but also in counties like Kitui, which is more advanced in its demographic transition but experiences high out-migration of 18- to 64-year-olds. In these areas, the rates of working-age population are 40% or below, indicating high dependency rates. The highest rates of working-age population are, however, clearly found in Nairobi and Mombasa, with 63% and 60%, respectively. Kiambu and Kajiado, both under the urban influence of Nairobi, also have high rates. These are the results of selective migration processes, reflecting the economic significance of urban settings for Kenya's labour force (see chapter 7).

In areas with comparatively high rates of elderly people – namely the high-potential rural areas that are advanced in the demographic transition – appropriate interventions are required to address the needs of this population segment. The national government has enacted a social protection policy targeting vulnerable members of society, and both the national and county governments could invest in continued training to help older workers master new skills as the economy changes. Moreover, employees' longer working lives will lead to gains in productivity for firms which have made past training investments. A higher county-specific legal retirement age for those employing older people can increase these benefits. Financing health care systems in the rural areas will be a good step towards taking care of this population.

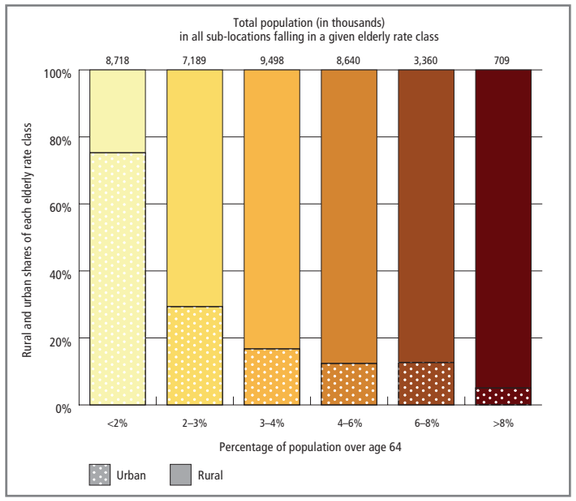
County	Percentage of population over age 64	Rank	Number of people over age 64*	Number of 18- to 64-year-olds*
Nairobi	1.1%	47	34.2	1,953.6
Mombasa	1.7%	46	15.4	549.6
Kwale	3.4%	27	21.6	272.2
Kilifi	3.6%	23	39.0	467.1
Tana River	2.9%	35	7.0	95.4
Lamu	3.5%	25	3.5	47.4
Taita Taveta	5.2%	9	14.3	135.8
Garissa	2.3%	42	14.4	256.3
Wajir	2.2%	44	14.4	248.3
Mandera	1.9%	45	19.1	367.7
Marsabit	4.2%	14	12.1	118.7
Isiolo	3.7%	17	5.2	61.3
Meru	4.4%	13	59.0	654.1
Tharaka Nithi	5.3%	6	19.2	175.0
Embu	5.2%	8	26.4	256.8
Kitui	5.3%	7	52.7	395.8
Machakos	5.0%	11	54.3	527.2
Makueni	5.2%	10	45.3	374.9
Nyandarua	4.5%	12	26.4	266.7
Nyeri	6.6%	2	44.7	359.5
Kirinyaga	5.4%	4	28.1	290.7
Murang'a	6.9%	1	64.2	459.5
Kiambu	3.6%	22	58.0	898.7
Turkana	2.3%	41	19.9	364.1
West Pokot	2.7%	39	13.7	193.2
Samburu	3.0%	33	6.6	86.8
Trans Nzoia	2.8%	38	22.4	345.4
Uasin Gishu	2.9%	36	25.0	420.1
Elgeyo Marakwet	4.0%	16	14.6	154.2
Nandi	3.6%	20	27.0	327.2
Baringo	3.3%	28	18.3	219.6
Laikipia	4.0%	15	15.8	183.0
Nakuru	3.0%	32	47.4	750.4
Narok	2.5%	40	20.8	340.3
Kajiado	2.3%	43	15.3	336.6
Kericho	3.0%	34	22.1	339.1
Bomet	3.1%	30	22.8	310.9
Kakamega	3.6%	21	59.6	697.8
Vihiga	6.1%	3	33.5	228.4
Bungoma	3.0%	31	41.3	557.7
Busia	3.7%	19	27.3	299.6
Siaya	5.3%	5	44.5	350.1
Kisumu	3.3%	29	31.2	432.2
Homa Bay	3.7%	18	35.4	385.6
Migori	2.8%	37	25.6	363.3
Kisii	3.4%	26	39.0	502.1
Nyamira	3.5%	24	20.8	265.8
KENYA	**3.5%**	**–**	**1,328.0**	**17,685.9**

* in thousands

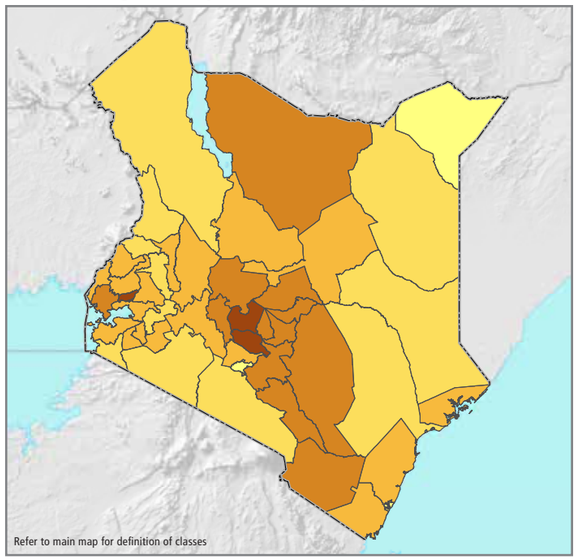
Data Source

2009 Kenya Population and Housing Census (Variable P12: Age), Kenya National Bureau of Statistics.

2.07 Rural–Urban Distribution of Elderly Rate Classes



2.07 Average Elderly Rate at County Level

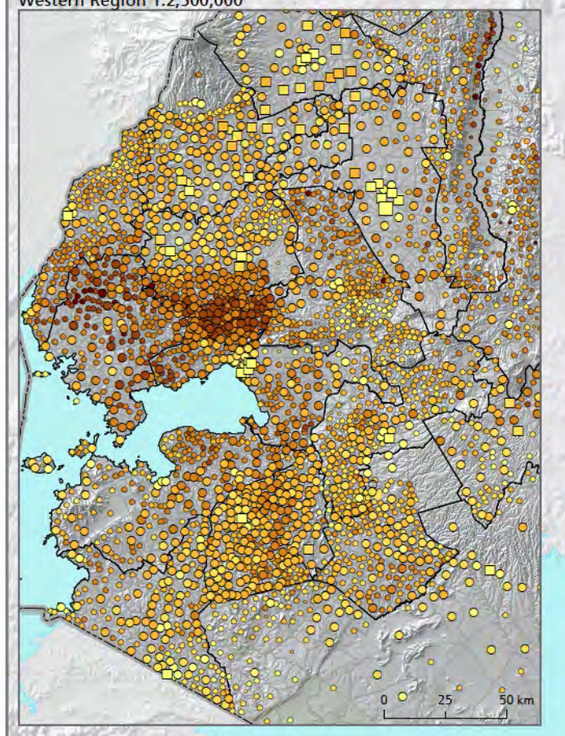


Population Distribution & Dynamics

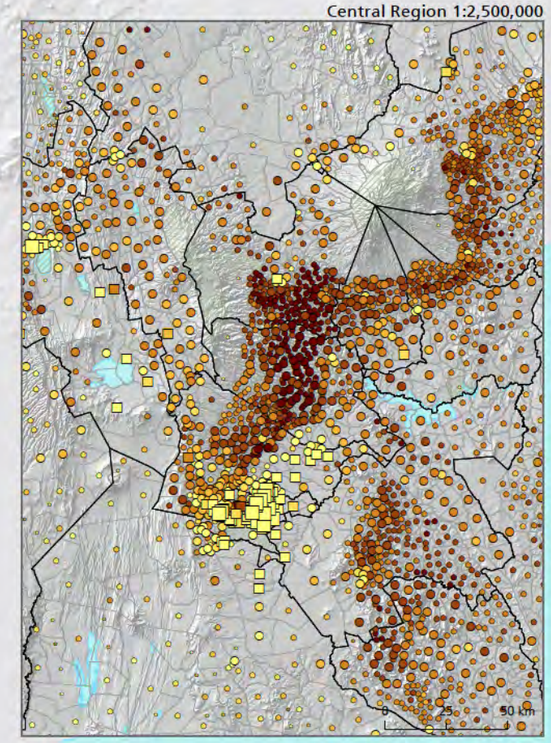
2.07 The Population Over Age 64

Republic of Kenya 1:4,000,000

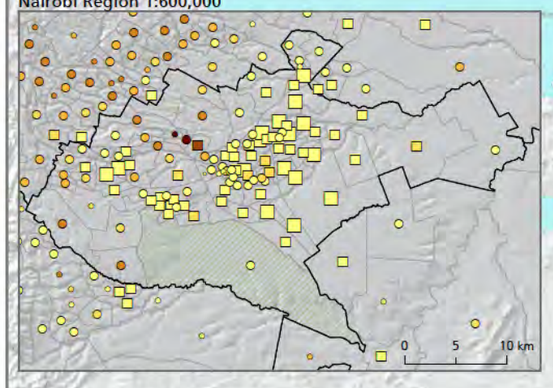
Western Region 1:2,500,000



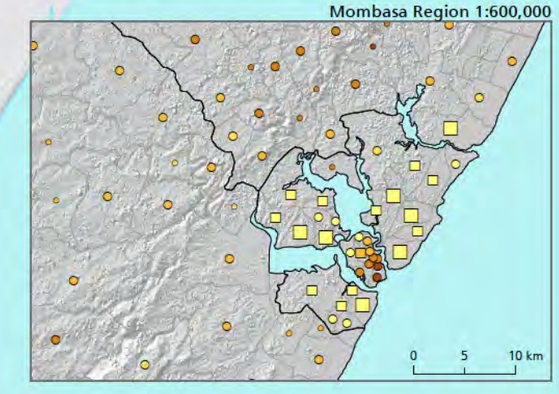
Central Region 1:2,500,000

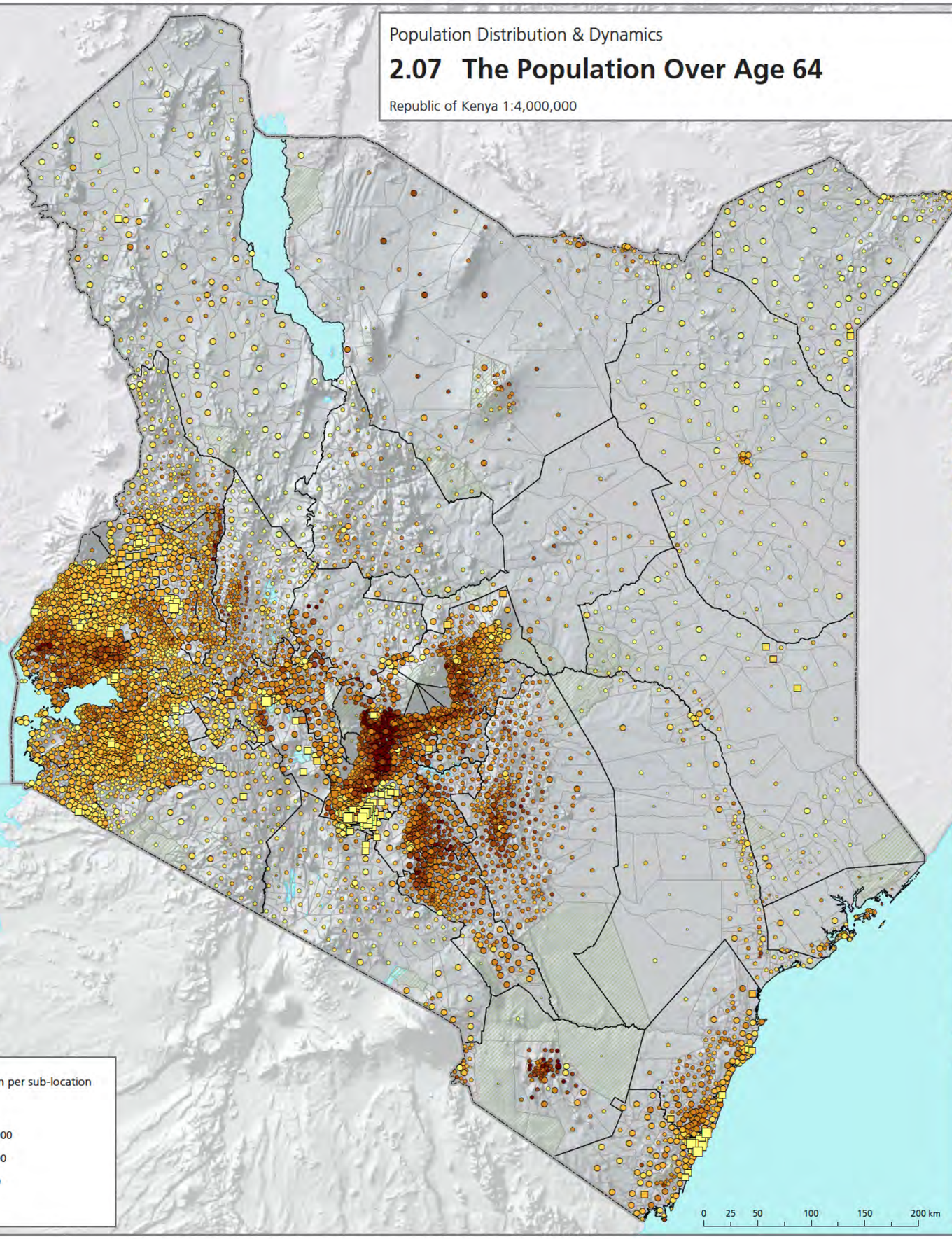


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Elderly rate classes: Percentage of population over age 64

- Less than 2% of population
- 2 to 3% of population
- 3 to 4% of population
- 4 to 6% of population
- 6 to 8% of population
- More than 8% of population

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.08 Orphanhood of Children Under Age 15

Conventionally, orphanhood refers to a condition of being a child without one or both parents. However, orphanhood as a social process and mode of life is culture-specific, and therefore its meaning may vary from one cultural context to another, depending on prevailing local conditions. Based on this understanding of orphanhood, the definition of "orphan" also inevitably varies from one context to another; without delving into the divergent concepts of orphanhood, this chapter builds on the consensus that orphans are parentless children who are socially and materially dependent on the wider society for their safe passage through childhood.

Although orphanhood is not a new phenomenon in Kenya, there has been considerable national and local concern in the last two decades, as the number of orphaned children continues to rise due to the HIV/AIDS pandemic; AIDS has devastated the social and economic fabric of Kenyan societies and made orphans of a whole generation of children. Besides jeopardizing the rights and well-being of children, orphanhood compromises Kenya's overall development prospects. Without responsive policies, and given the nature of their survival strategies – especially reducing the number and size of meals per day and disposing of family assets – orphaned children can be deprived of basic needs such as education and food and are vulnerable to poor health, poor development, and child labour. As the numbers soar, poverty levels in households deepen and national resources to cater for their rising needs become overstretched.

The present map shows the spatial distribution of the ratio of children who have lost both parents to the total population of children under age 15. Kenya has about 190,000 children in this age group who have lost both parents. This represents 1.15% of the total of 16.4 million children within this age range.

The spread of orphanhood is nationwide, but the problem is more concentrated in the Lake region dominated by the Luo community. The rate is highest in Siaya county, with 4.5% of about 376,000 children under age 15 having lost both parents. Together, the five counties with the highest rates (Siaya, Busia, Kisumu, Migori, and Homa Bay) are situated around the Lake, with about 69,000 parentless children, or 36% of all orphaned children in Kenya. This is to be expected, because this region also has the greatest incidence of HIV/AIDS. Other than these, about 27 counties range between 0.5% and 1.5%, while the remaining five counties, including Narok, Elgeyo Marakwet, West Pokot, Tana River, and Mandera, have a rate of less than 0.5% orphans among their children under age 15. Elgeyo Marakwet has the least, with 0.34%, representing about 600 orphaned children.

The eastern semi-arid parts of Kenya, i.e. Makueni, Machakos, and Kitui, as well as Taita Taveta in the coastal region, are also comparatively highly affected, with an average of 1.3%. It is rather difficult to explain this pattern, especially for Taita Taveta, which stands out clearly in the coastal region, where all other counties exhibit rates below 1%. But these are areas where health care is comparably poor, which is a possible cause of orphanhood. Interestingly, while the rates in the Rift Valley and in the northern and north-eastern counties are relatively low, there is a distinct divide between Turkana and the rest. With 4,600 orphans – about 1.2% of children under age 15 – Turkana ranks tenth nationally. It would be interesting to find out why two sub-locations in Turkana and Kitui have each registered over 5% of parentless children, and why the coastal counties have such a low rate; but this would require further investigation.

From the rural–urban perspective, orphanhood appears to be a largely rural phenomenon: of Kenya's 190,000 children without parents, about 73% live in rural areas. The rural–urban graph shows that the majority of sub-locations with less than 0.5%, as well as those with more than 5% of orphans are found in rural areas. There is, however, a significant percentage of orphans in urban sub-locations, with shares of between 0.5% and 5%. The majority of these urban sub-locations are found in towns rather than in the cities of Mombasa and Nairobi, which have fewer than 1% of orphans. It is disturbing that the larger population of orphaned children is in rural areas, where poverty levels are higher (see map 5.02) and care facilities are presumably less developed.

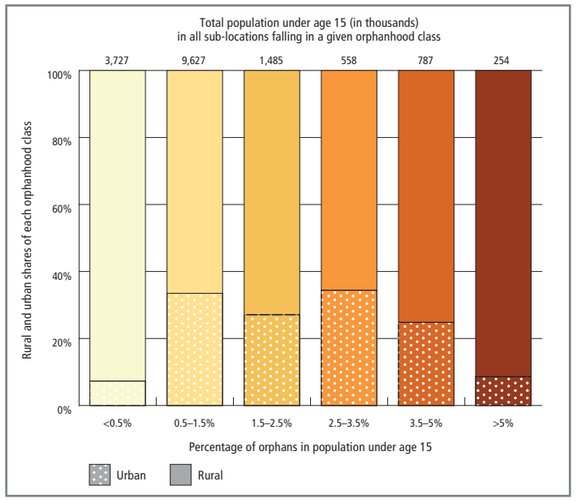
County	Percentage of full orphans in population under age 15	Rank	Number of full orphans under age 15*	Total population under age 15*
Nairobi	0.9%	25	8.4	943.3
Mombasa	0.9%	24	2.8	306.9
Kwale	0.8%	29	2.3	305.1
Kilifi	0.6%	32	3.3	515.2
Tana River	0.5%	44	0.6	121.8
Lamu	0.8%	27	0.3	42.2
Taita Taveta	1.3%	7	1.4	106.3
Garissa	0.8%	28	2.4	298.2
Wajir	0.5%	40	1.9	341.9
Mandera	0.5%	43	2.7	549.4
Marsabit	0.7%	30	1.0	135.1
Isiolo	1.0%	17	0.6	62.9
Meru	0.6%	34	3.4	535.2
Tharaka Nithi	0.6%	35	0.9	140.5
Embu	1.0%	21	1.8	191.7
Kitui	1.2%	11	5.5	467.9
Machakos	1.3%	8	5.7	427.3
Makueni	1.3%	9	4.8	383.3
Nyandarua	1.1%	15	2.8	253.5
Nyeri	1.1%	14	2.6	229.3
Kirinyaga	0.8%	26	1.4	172.2
Murang'a	1.1%	16	3.7	349.3
Kiambu	0.9%	23	5.2	553.3
Turkana	1.2%	10	4.6	388.4
West Pokot	0.4%	46	1.0	266.2
Samburu	0.9%	22	1.1	112.2
Trans Nzoia	0.7%	31	2.8	382.7
Uasin Gishu	0.6%	33	2.4	367.8
Elgeyo Marakwet	0.3%	47	0.6	170.7
Nandi	0.5%	41	1.8	334.7
Baringo	0.5%	42	1.4	266.6
Laikipia	1.0%	20	1.6	166.7
Nakuru	1.0%	18	6.7	662.2
Narok	0.4%	45	1.7	425.9
Kajiado	0.6%	38	1.6	283.3
Kericho	0.6%	36	2.0	325.1
Bomet	0.6%	37	1.9	336.2
Kakamega	1.0%	19	7.7	771.8
Vihiga	1.5%	6	3.7	245.6
Bungoma	0.6%	39	3.7	661.6
Busia	1.5%	5	5.5	354.6
Siaya	4.5%	1	17.0	375.7
Kisumu	3.8%	3	16.0	419.1
Homa Bay	4.1%	2	18.8	460.6
Migori	2.6%	4	11.9	451.7
Kisii	1.1%	12	5.9	515.4
Nyamira	1.1%	13	3.0	261.6
KENYA	**1.2%**	**–**	**189.8**	**16,438.5**

* in thousands

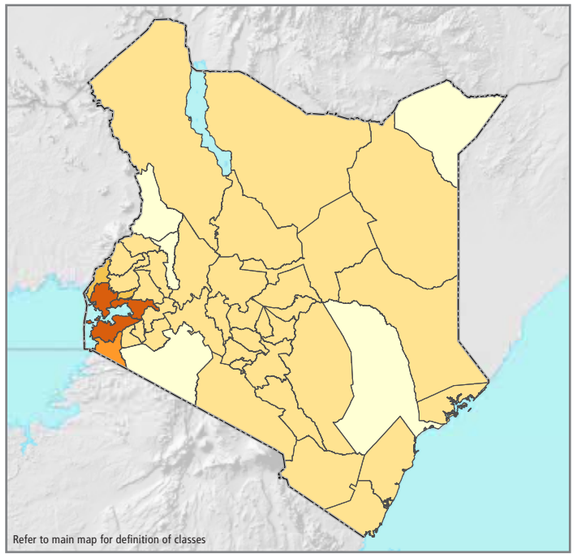
Data Source

2009 Kenya Population and Housing Census (Variables P22 and P23: Orphanhood), Kenya National Bureau of Statistics.

2.08 Rural–Urban Distribution of Orphanhood Classes



2.08 Average Orphanhood at County Level

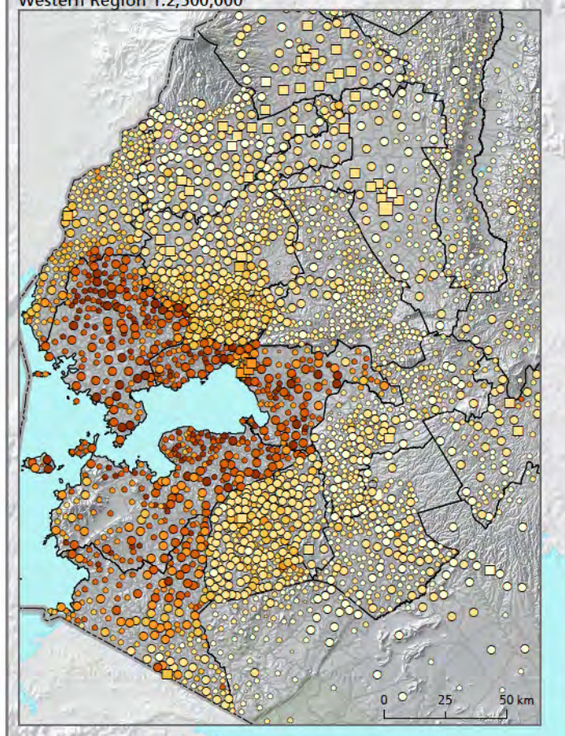


Population Distribution & Dynamics

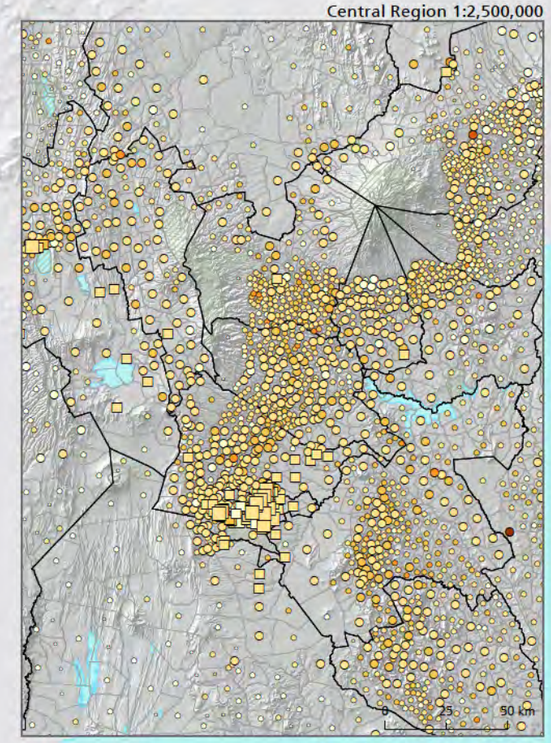
2.08 Orphanhood of Children Under Age 15

Republic of Kenya 1:4,000,000

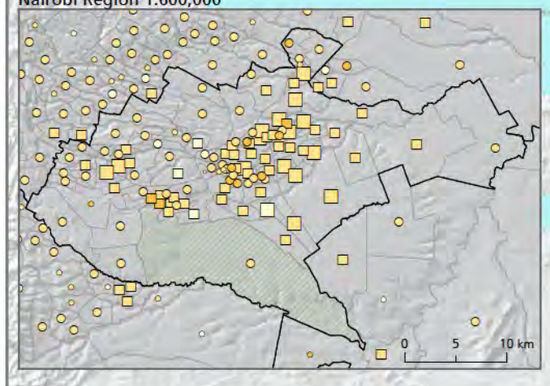
Western Region 1:2,500,000



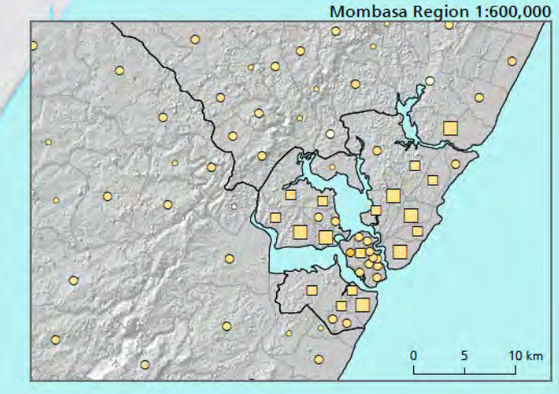
Central Region 1:2,500,000

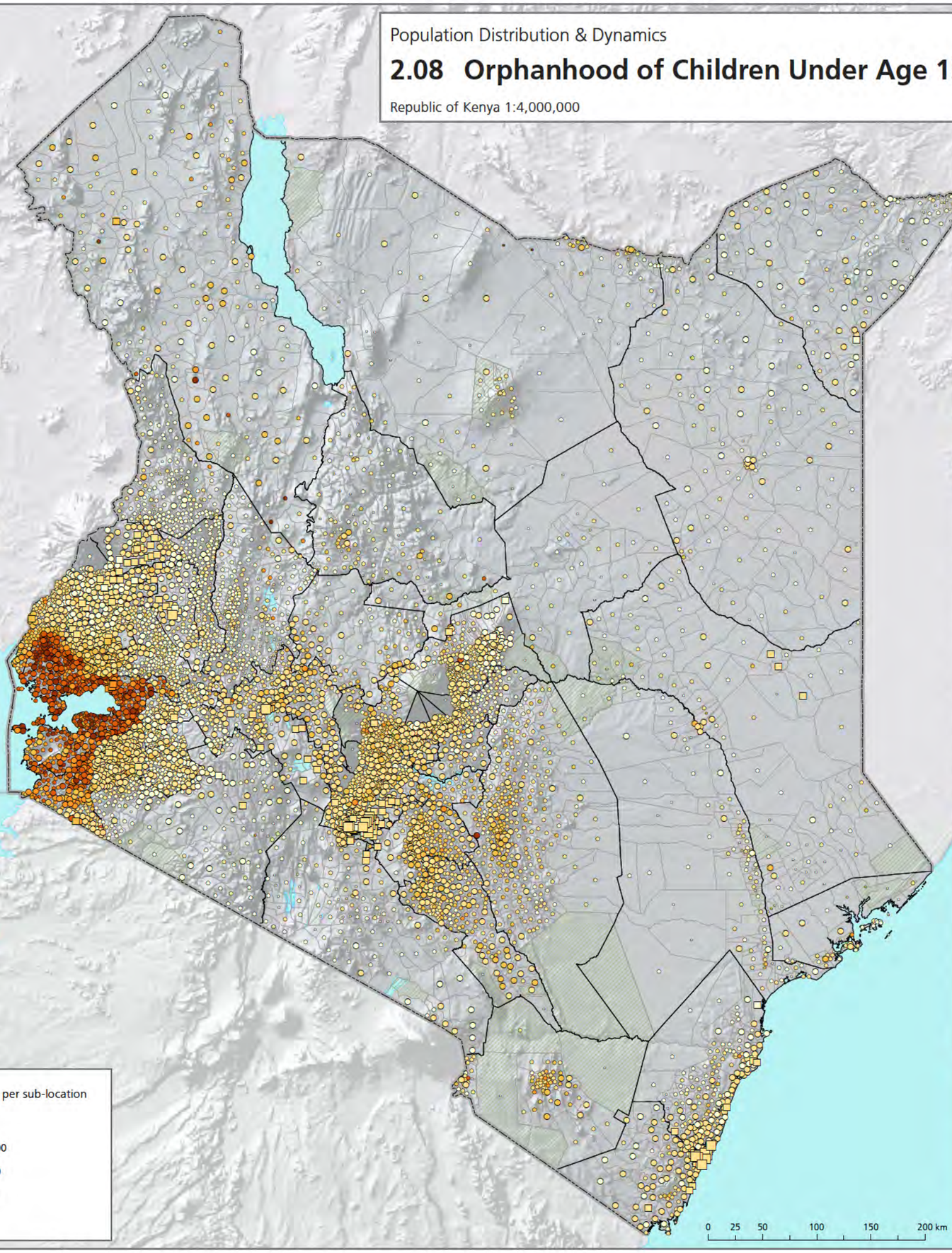


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Orphanhood classes: Percentage of orphans in population under age 15

- Less than 0.5%
- 0.5 to 1.5%
- 1.5 to 2.5%
- 2.5 to 3.5%
- 3.5 to 5%
- More than 5%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.09 Households of One to Three People

For the purposes of the *2009 Kenya Population and Housing Census*, a household was defined as a group of people (or just one person) who make common provision for food (eating from the same cooking pot), shelter, and other essentials for living; take decisions jointly; and share the same compound. Accordingly, a household is the most basic and fundamental socio-economic institution in a society, where important decisions regarding labour force assignment, production, consumption, and investments originate and are implemented. It is, therefore, the most central unit for economic analysis and for use as a basis for devising development policies. Understanding household characteristics in terms of size, composition, structure, and patterns of change is very important. Among other factors, the average household size is a good indicator of social and cultural change and of a society's economic advancement.

There has been a steady decline in household size in Kenya over the years; and although there are still areas where household sizes average more than seven people, the national average of Kenya's 8.8 million households is now about 5.1. Household size, composition, and distribution of households of one to three people in Kenya are depicted and discussed in this section; households of seven and more people are the subject of section 2.10. For households of four to six people – of which there are more than 3.4 million – see the corresponding table to the right (not displayed on map).

The county table shows about 3.7 million households consisting of one to three people, representing a national average of about 42% of total households in Kenya. Households of one to three people are found everywhere in the country, but the emerging distribution clearly reflects age structure characteristics, fertility trends, cultural practices, and labour migration among Kenyan communities. Consequently, the highest concentrations are in Nairobi (63%) and Mombasa (60%). Counties in central Kenya follow with an average of 52%, the highest percentage being found in Nyeri at about 56%, occupying the third position overall. This is probably due to low fertility rates and a relatively large proportion of the population over age 64. One-third to half of households in western Kenya are small, including in Kisumu, the central Rift, some areas along the coastline, and the Kamba counties. These are areas where middle-aged people have out-migrated to supply labour to major urban areas. Lamu and Taita Taveta have exceptionally high percentages of households in this class. For Lamu, in particular, the sub-locations contributing to this outcome pattern are at the seafront, where most tourist facilities are located. It is not clear what accounts for the pattern in Taita Taveta, which may require further analysis, but its positioning vis-à-vis Tsavo National Park and the presence of a road to Mombasa may offer a plausible explanation, perhaps because the labour involved in servicing the facilities may attract smaller household units.

Most pastoral arid and semi-arid areas show low percentages; the lowest overall is in Mandera (3.5%). These are mostly areas with limited labour migration and high fertility rates, where cultural practices are still prominent. The exceptions are Kajiado and Laikipia (48% and 49%, respectively), which can be explained by their close proximity to Nairobi on the one hand, and the sizeable population of white farmers, large-scale horticulture farming, and game ranching, on the other, all of which attract small households of labourers.

The patterns shown in the rural–urban graph confirm the hypothesis expressed above, that smaller households are largely confined to urban areas. The graph shows a clear divide between urban and rural settings, with urban sub-locations accounting for a substantial share of the class of 40% to 60% small households and for an overwhelming majority of sub-locations with 60% and more households of one to three people. The clear concentration of small households in urban settings reflects selective migration patterns, the flexibility and mobility required in a dynamic labour market, and probably also high living costs that contribute to families being split between rural and urban contexts. To what extent urban lifestyles also contribute to this concentration of small households remains an open question and would require further investigation.

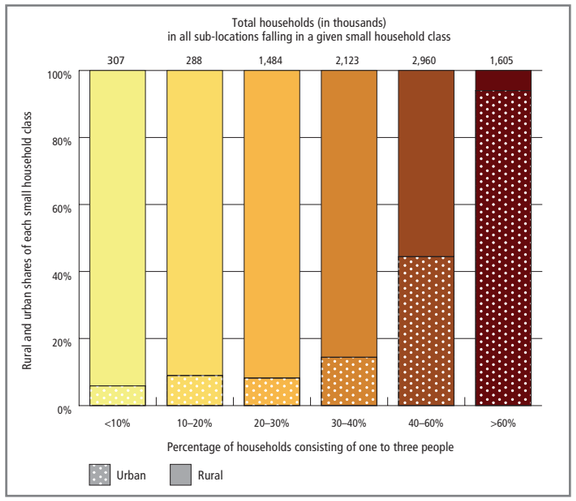
County	Percentage of households of 1–3 people	Rank	Number of households of 1–3 people*	Number of households of 4–6 people*
Nairobi	63.0%	1	620.1	305.0
Mombasa	59.6%	2	160.2	81.6
Kwale	32.1%	36	39.2	45.1
Kilifi	33.7%	31	67.3	64.5
Tana River	30.2%	42	14.3	20.4
Lamu	41.2%	19	9.1	8.2
Taita Taveta	49.0%	9	34.8	26.4
Garissa	17.2%	44	16.9	36.4
Wajir	7.3%	46	6.4	24.8
Mandera	3.5%	47	4.4	24.1
Marsabit	30.6%	39	17.4	24.2
Isiolo	39.7%	20	12.5	12.8
Meru	42.2%	18	134.8	136.4
Tharaka Nithi	43.8%	12	38.9	38.2
Embu	47.0%	11	61.9	54.8
Kitui	32.5%	35	66.7	87.5
Machakos	42.8%	16	113.3	113.0
Makueni	34.5%	27	64.4	80.0
Nyandarua	43.3%	14	62.3	60.9
Nyeri	55.8%	3	112.6	76.4
Kirinyaga	55.3%	4	85.3	60.9
Murang'a	50.4%	6	129.0	103.4
Kiambu	55.2%	5	259.2	175.5
Turkana	13.7%	45	16.9	38.8
West Pokot	24.5%	43	22.9	40.3
Samburu	34.4%	28	16.3	21.2
Trans Nzoia	35.1%	25	59.7	69.9
Uasin Gishu	42.6%	17	86.2	77.0
Elgeyo Marakwet	36.6%	22	28.4	29.5
Nandi	33.0%	33	50.8	65.9
Baringo	33.3%	32	36.8	42.6
Laikipia	49.4%	8	50.9	39.7
Nakuru	50.0%	7	204.7	149.9
Narok	30.7%	38	51.9	73.4
Kajiado	47.5%	10	82.4	68.0
Kericho	35.0%	26	55.2	66.5
Bomet	30.5%	40	44.2	61.6
Kakamega	35.7%	23	126.8	152.2
Vihiga	37.8%	21	46.6	53.7
Bungoma	30.9%	37	83.7	113.2
Busia	34.4%	29	53.0	64.1
Siaya	43.6%	13	86.7	78.7
Kisumu	43.1%	15	97.8	90.6
Homa Bay	35.6%	24	73.4	88.9
Migori	30.5%	41	55.0	76.6
Kisii	32.5%	34	79.7	116.1
Nyamira	33.9%	30	44.5	63.7
KENYA	**42.0%**	**–**	**3,685.8**	**3,402.6**

* in thousands

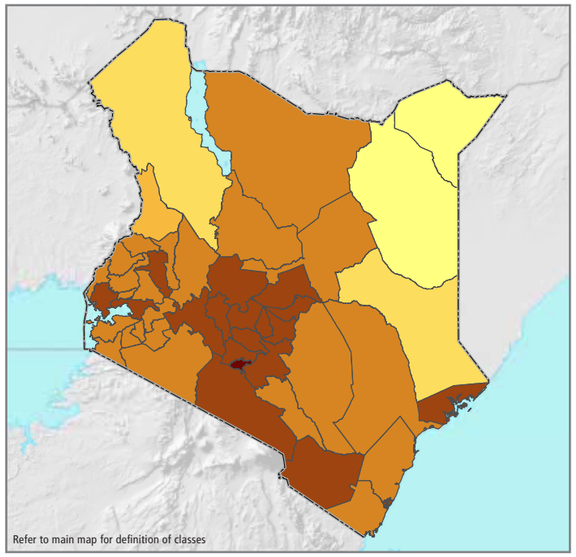
Data Source

2009 Kenya Population and Housing Census (Variable P00: Name), Kenya National Bureau of Statistics.

2.09 Rural–Urban Distribution of Small Household Classes



2.09 Average Small Households at County Level

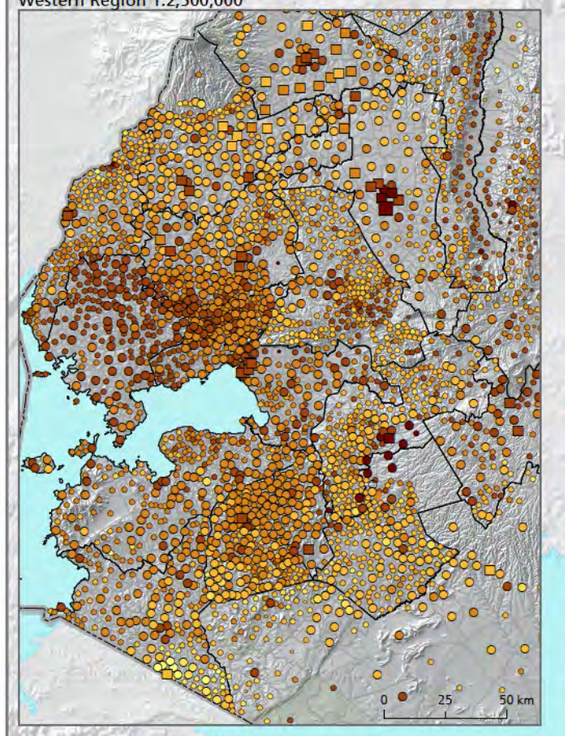


Population Distribution & Dynamics

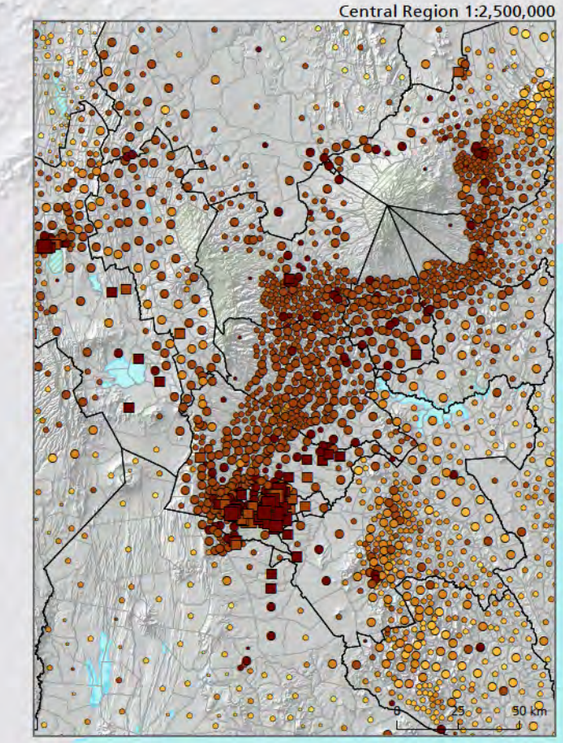
2.09 Households of One to Three People

Republic of Kenya 1:4,000,000

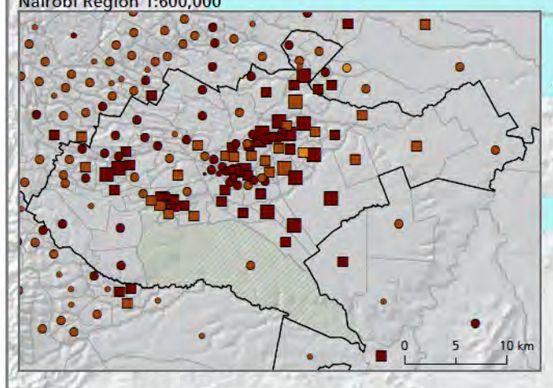
Western Region 1:2,500,000



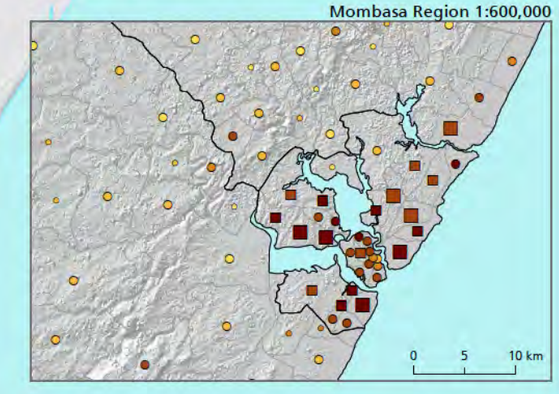
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Small household classes: Percentage of households consisting of one to three people

- Less than 10% of households
- 10 to 20% of households
- 20 to 30% of households
- 30 to 40% of households
- 40 to 60% of households
- More than 60% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.10 Households of Seven and More People

As previously observed (see map 2.09 on small households), it is important to understand the household characteristics of a country because a household forms the most basic unit for socio-economic development planning; moreover, the average household size is a good indicator of social and cultural change and of the economic advancement of a society.

The present map shows households of seven and more people. As noted in section 2.09, household size in Kenya has experienced a steady decline over the years. This is confirmed by the figures in this section, which reveal a fairly low national average of 19.2% of households (about 1.7 million) consisting of seven and more people.

Households of seven and more people appear in all parts of the country, but the rates vary. The areas with the lowest rates lie in the central parts of Kenya and in major urban settlements such as Nairobi and Mombasa; Kirinyaga county surprisingly records the lowest overall percentage, with only 5.2%, or just over 8,000 out of a total of about 154,200 households. With the exception of Nyandarua (14.3%), fewer than 10% of households in the other central Kenyan counties have seven and more people. Western Kenya, including the Lake region, generally also has low rates, with 17% both in and around Kisumu and Siaya, but increasing northwards through Kakamega (22%) to Bungoma (27%). The latter two are comparable to the arid and semi-arid counties of Kitui and Makueni. One pattern that stands out, in the south-eastern part of Migori county, might be explained by the culture of the dominant Kuria community, which is associated with high fertility rates of over seven children per woman (see also map 2.03 on total fertility).

The situation is different in the very arid and marginal north and north-eastern counties. These areas are still associated with comparatively large households. As seen on the county map, Turkana and Garissa have high concentrations, reaching their peak of 77% in Mandera. Interestingly, however, these high levels drop drastically, to an average of 24%, in the neighbouring counties of Isiolo, Samburu, and Marsabit, pointing to distinct cultural differences among the main communities living in these areas.

In the coastal region, there are, as would be expected, low percentages in the major towns, i.e. Mombasa, Kilifi, and Malindi, all with less than 10% of households consisting of seven and more people. There are, however, areas between the towns of Kilifi and Malindi with higher concentrations than the Kilifi county average of 34%. These high percentages continue into the interior parts. Further north, along the coast in Tana River and Lamu, the range drops to between 20% and 30%. Interestingly, Taita Taveta stands out with a strikingly low percentage (14%) and thus falls into the same range as counties in high-potential areas around Mount Kenya and in the central Rift.

Looking at the observations so far, and contrasting them with the values obtained from related parameters (see maps 2.03, 2.06, and 2.07), counties with a low rate of households consisting of seven and more people also record high rates of people over age 64, low rates of people under age 18, and low total fertility rates; this is in contrast to counties with a high rate of households with seven and more people, which for the same parameters record values at the other end of the spectrum. This indicates that demographic transition is one of the most decisive factors in relation to household size. In other words, the rate of large households can be seen as a rough proxy of an area's demographic transition. A low rate indicates an advanced stage, as in some parts of the highlands, whereas a high rate indicates an early stage in this transition, such as in large parts of northern and north-eastern Kenya. This is exemplified by the case of Taita Taveta, mentioned above, where low rates of large households coincide with parameters such as population over 64 years (5.2%), population below 18 years (45%), and total fertility rate (4%), revealing advanced demographic transitioning.

The rural–urban graph shows that large households are mostly a rural phenomenon. Although this implies that factors other than demographic transition play a role in urban settings, the trend is confirmed by low values in Nairobi (6.1%, or about 60,000 households) and Mombasa (10%, or 27,000 households). However, there are still large households dispersed in all urban areas. Especially in the case of the cities, this may possibly be explained by the phenomenon of people living together to share the burden of rent and the high cost of living – which would be less related to demographic transition and more to individuals' economic strategies.

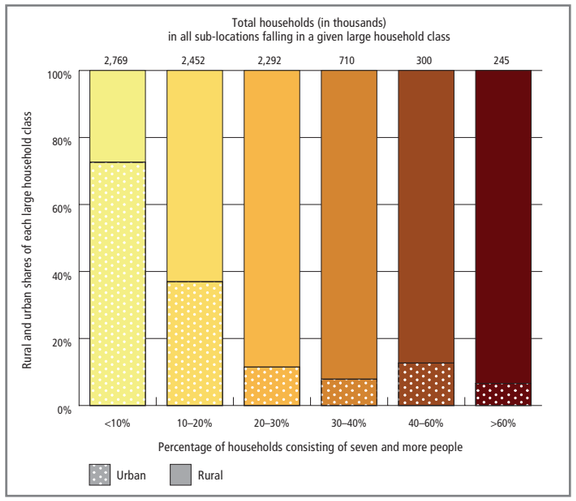
County	Percentage of households of 7 and more people	Rank	Number of households of 7 and more people*	Total number of households*
Nairobi	6.1%	46	59.9	985.0
Mombasa	10.0%	42	26.9	268.7
Kwale	30.9%	7	37.7	122.0
Kilifi	34.0%	5	67.9	199.8
Tana River	26.7%	13	12.6	47.4
Lamu	21.7%	22	4.8	22.2
Taita Taveta	13.8%	36	9.8	71.1
Garissa	45.9%	4	45.3	98.6
Wajir	64.7%	2	57.3	88.6
Mandera	77.3%	1	97.0	125.5
Marsabit	27.0%	11	15.4	56.9
Isiolo	19.5%	27	6.1	31.3
Meru	15.1%	33	48.4	319.6
Tharaka Nithi	13.2%	39	11.8	88.8
Embu	11.3%	41	14.9	131.7
Kitui	25.0%	16	51.3	205.5
Machakos	14.5%	34	38.2	264.5
Makueni	22.5%	21	42.0	186.5
Nyandarua	14.3%	35	20.6	143.9
Nyeri	6.3%	45	12.7	201.7
Kirinyaga	5.2%	47	8.0	154.2
Murang'a	9.1%	43	23.4	255.7
Kiambu	7.4%	44	34.5	469.2
Turkana	54.7%	3	67.4	123.2
West Pokot	32.6%	6	30.6	93.8
Samburu	20.8%	25	9.8	47.4
Trans Nzoia	23.8%	19	40.5	170.1
Uasin Gishu	19.3%	28	39.1	202.3
Elgeyo Marakwet	25.3%	15	19.7	77.6
Nandi	24.2%	17	37.3	154.1
Baringo	28.3%	8	31.3	110.6
Laikipia	12.1%	40	12.5	103.1
Nakuru	13.5%	37	55.3	409.8
Narok	26.0%	14	44.0	169.2
Kajiado	13.3%	38	23.0	173.5
Kericho	22.9%	20	36.2	157.9
Bomet	26.9%	12	38.9	144.6
Kakamega	21.5%	23	76.6	355.7
Vihiga	18.7%	29	23.0	123.3
Bungoma	27.3%	9	74.0	270.8
Busia	24.1%	18	37.1	154.2
Siaya	16.9%	32	33.6	199.0
Kisumu	16.9%	31	38.3	226.7
Homa Bay	21.3%	24	43.9	206.3
Migori	27.0%	10	48.6	180.2
Kisii	20.1%	26	49.2	245.0
Nyamira	17.5%	30	22.9	131.0
KENYA	**19.2%**	**–**	**1,679.5**	**8,768.0**

* in thousands

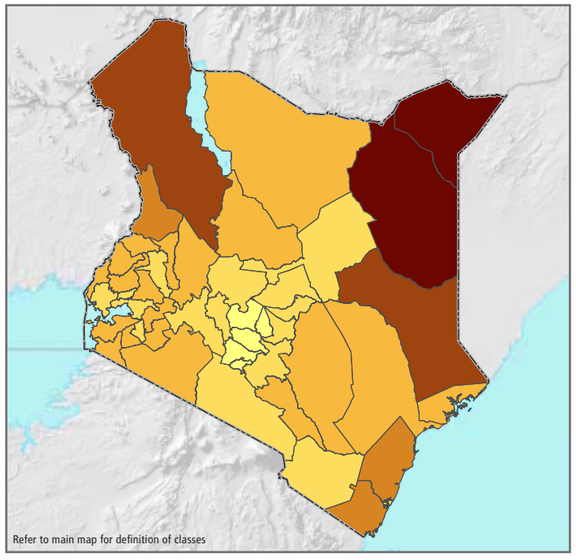
Data Source

2009 Kenya Population and Housing Census (Variable P00: Name), Kenya National Bureau of Statistics.

2.10 Rural–Urban Distribution of Large Household Classes



2.10 Average Large Households at County Level



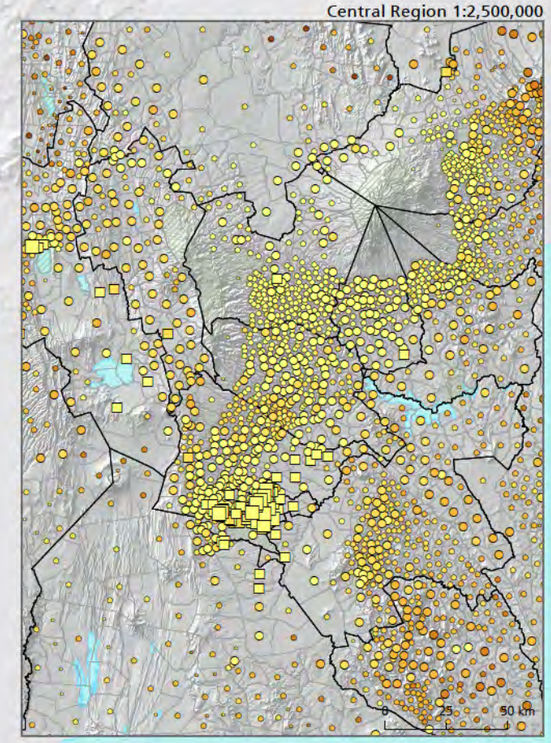
Population Distribution & Dynamics

2.10 Households of Seven and More People

Republic of Kenya 1:4,000,000

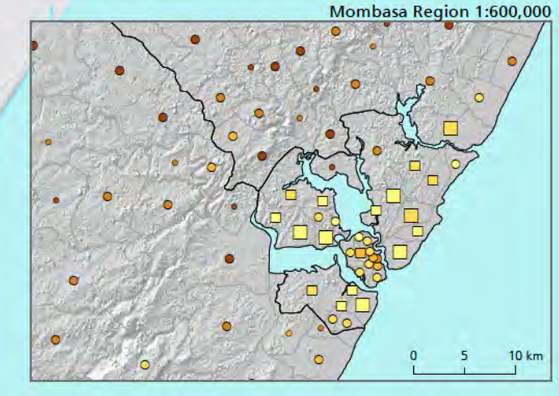
Western Region 1:2,500,000

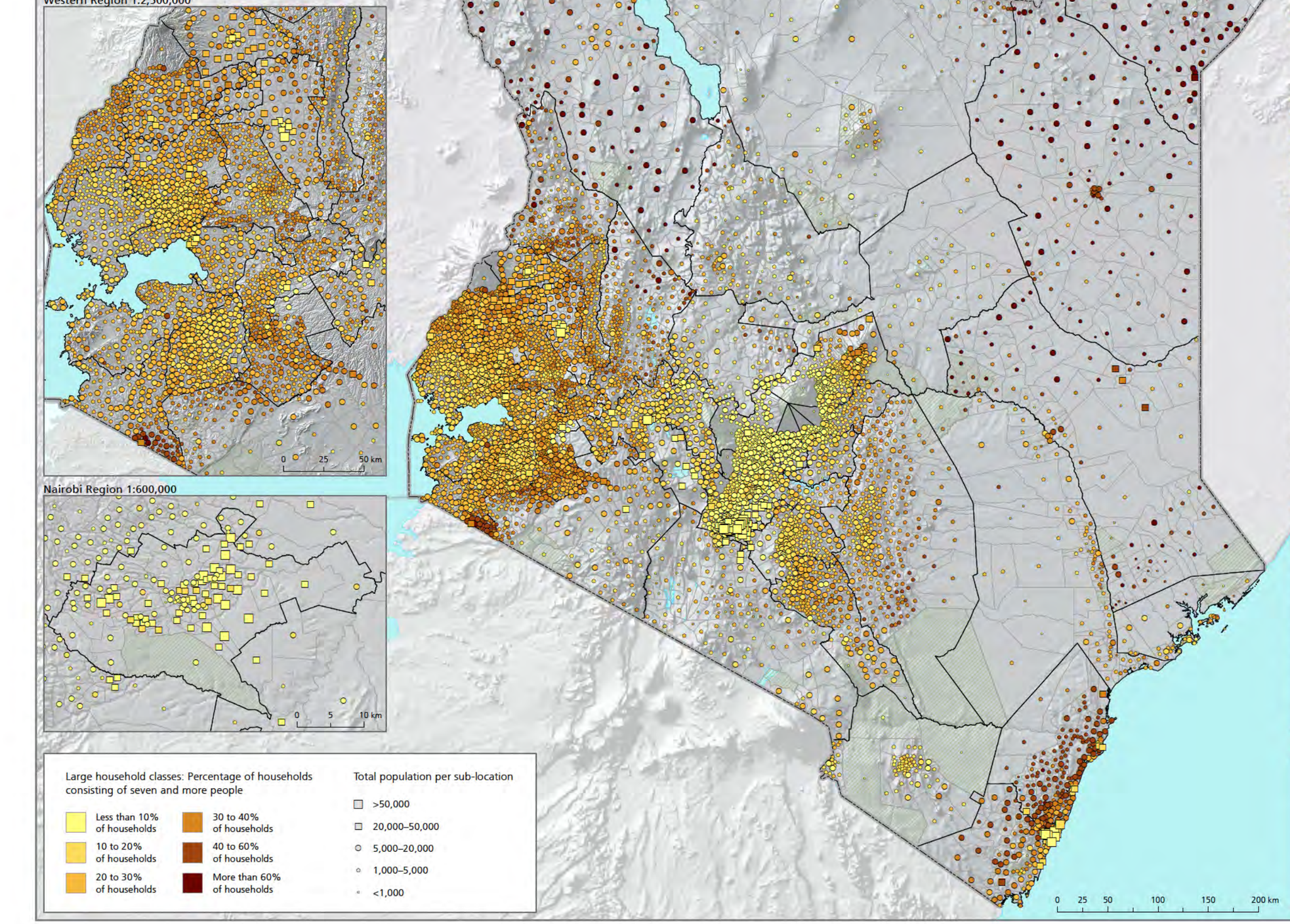
Central Region 1:2,500,000



Nairobi Region 1:600,000

Mombasa Region 1:600,000





Large household classes: Percentage of households consisting of seven and more people

- Less than 10% of households
- 10 to 20% of households
- 20 to 30% of households
- 30 to 40% of households
- 40 to 60% of households
- More than 60% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.11 Female-Headed Households

Kenya in general is a patriarchal society. However, the advent of female empowerment, coupled with the migration of men in search of jobs outside their areas of residence, has increasingly led to the phenomenon of female-headed households. Women and children are in most instances considered to be more susceptible to poverty than men, given their limited opportunities to engage in income-generating activities. In addition, some cultural practices hinder widows from inheriting their spouses' property, thereby rendering them and their offspring destitute.

In the context of the 2009 census, households are considered female-headed if key day-to-day household decisions are taken by a woman whose authority is recognized by all other household members. The household head has to be a regular member of the household to qualify for headship. For the 2009 census, husbands were enumerated only in the households they were found in on the census night, regardless of whether they had multiple (polygamous) unions. Any wives living in other households were classified as the heads of those households.

Using this definition, the 2009 census indicates that females head 32% of households in Kenya. This means that females head 2.8 million households, or one in every three. In a basically patriarchal society that assigns household leadership to one person and one gender, this is a high value. It implies that men are absent in one-third of all Kenyan households; in these households, women make the majority of the decisions concerning household matters and livelihoods. In the case of multi-local families (see map 2.04), in which men are employed in towns and women and children remain in the family's rural home, the harmonization of decision-making between the absent male family head and the present female household head may be challenging.

At first glance, county values do not reveal a specific spatial pattern in the distribution of female-headed households. Proportions range from 19% in Mandera (one in every five households) to 48% in Samburu (every second household). Both counties are situated in the predominantly pastoral semi-arid and arid zones. However, high values are also recorded in Siaya and Kitui (both 45%), which are situated in very different contexts. Given that Mombasa (22%) and Nairobi (24%) have some of the lowest proportions of female-headed households, with lower values only in Mandera and Wajir, rural–urban gradients may play a role in the regional distribution of female-headed households.

The rural–urban graph confirms this by showing that proportions of female-headed households below the national average prevail in urban settings; in contrast, high to very high proportions of female-headed households are clearly a rural phenomenon. This suggests that the selective migration of men, which results in more female-headed multi-local families, is an important factor leading to the high rate of female-headed households in rural areas. A look at the main map supports this hypothesis: the Lake region, the fringes between the high-potential areas and the pastoral areas, and especially the semi-arid smallholder areas to the east show particularly high rates. As discussed in section 2.05, these are all areas with high out-migration rates because the men leave in search of employment in urban areas. However, aspects such as increased rates of polygamy and widowhood (see map 2.08) may play a role in some of these contexts.

The lower rates of female-headed households in the arid and semi-arid north-eastern zones, as well as in the coastal region, may be linked to cultural and religious factors. In some urban settings, it appears that higher rates result from the economic empowerment of women. In cities with sufficient employment opportunities, women may be able to sustain themselves, perhaps even leading better lives than their male counterparts. These disparate reasons for the differences in female-headed household rates indicate that this is a multifaceted phenomenon that cannot be captured by stereotypes.

However, the fact remains that women are the main decision-makers in nearly one-third of Kenyan households. Decisions at the household level eventually shape local, regional, and national development in social, economic, and environmental dimensions. It is therefore important to consider female-headed households in all fields of policy intervention in order to harness their potential for development. Female-headed households should not be solely construed as being vulnerable; rather, many such households are well-off, and many have considerable potential to contribute to advancement in many fields, from education to medical care to economic well-being. Nevertheless, households headed by widows, and particularly by aged women, may not be able to sustain themselves and their dependants without some form of intervention. These are the beneficiaries that the government should vet and target under its social protection policy.

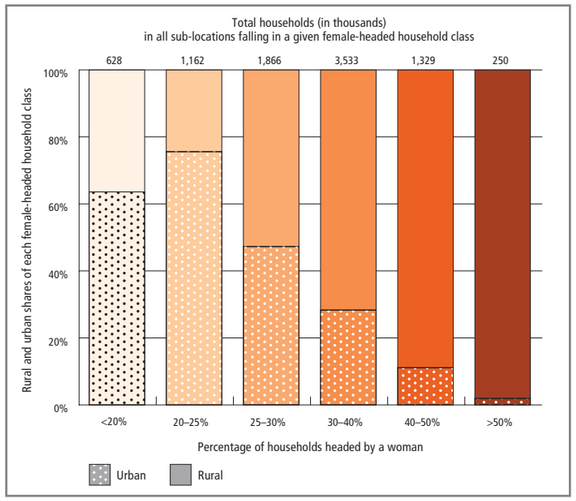
County	Percentage of female-headed households	Rank	Number of female-headed households*	Number of youth-headed households*
Nairobi	23.7%	44	233.0	3.4
Mombasa	22.3%	45	59.9	1.0
Kwale	33.0%	24	40.3	0.8
Kilifi	32.5%	27	65.0	1.2
Tana River	30.5%	34	14.4	0.4
Lamu	24.9%	43	5.5	0.1
Taita Taveta	33.6%	23	23.9	0.4
Garissa	25.4%	42	25.0	0.3
Wajir	19.0%	46	16.9	0.2
Mandera	18.7%	47	23.4	0.2
Marsabit	37.9%	9	21.6	0.4
Isiolo	38.5%	7	12.1	0.3
Meru	28.7%	37	91.8	1.0
Tharaka Nithi	31.9%	28	28.3	0.3
Embu	32.7%	26	43.0	0.4
Kitui	45.1%	3	92.8	2.2
Machakos	36.6%	13	96.9	1.5
Makueni	41.3%	5	77.1	1.5
Nyandarua	34.5%	19	49.7	0.6
Nyeri	35.7%	16	71.9	0.6
Kirinyaga	30.0%	35	46.2	0.3
Murang'a	37.2%	11	95.2	0.9
Kiambu	28.2%	39	132.2	1.3
Turkana	37.0%	12	45.6	0.5
West Pokot	34.6%	18	32.4	0.6
Samburu	47.5%	1	22.5	0.7
Trans Nzoia	29.4%	36	50.1	0.9
Uasin Gishu	28.7%	38	58.1	1.0
Elgeyo Marakwet	30.9%	31	24.0	0.5
Nandi	28.0%	40	43.2	0.5
Baringo	35.0%	17	38.8	0.9
Laikipia	35.9%	15	37.1	0.6
Nakuru	31.4%	29	128.6	2.2
Narok	34.3%	22	58.0	1.2
Kajiado	31.4%	30	54.4	1.0
Kericho	27.1%	41	42.8	0.6
Bomet	30.6%	33	44.2	0.5
Kakamega	34.5%	20	122.8	1.7
Vihiga	40.4%	6	49.8	0.6
Bungoma	30.7%	32	83.3	1.0
Busia	37.8%	10	58.4	0.7
Siaya	45.3%	2	90.1	1.1
Kisumu	36.4%	14	82.5	1.4
Homa Bay	43.7%	4	90.1	1.4
Migori	38.3%	8	69.0	1.0
Kisii	34.3%	21	84.0	1.7
Nyamira	32.9%	25	43.1	0.6
KENYA	**32.1%**	**–**	**2,818.8**	**42.0**

* in thousands

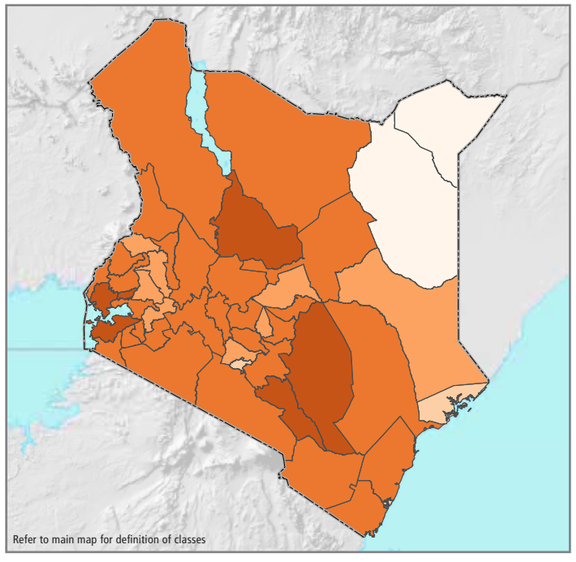
Data Source

2009 Kenya Population and Housing Census (Variable P10: Relationship, P11: Sex), Kenya National Bureau of Statistics.

2.11 Rural–Urban Distribution of Female-Headed Household Classes



2.11 Average Female-Headed Households at County Level

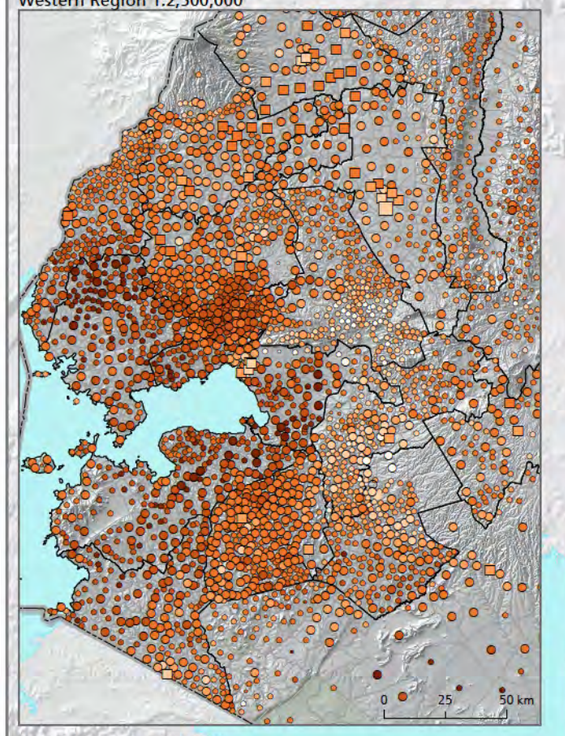


Population Distribution & Dynamics

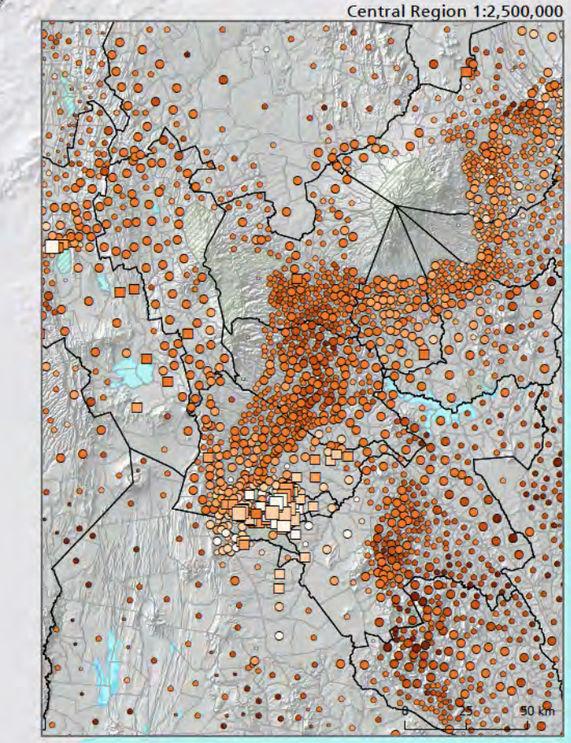
2.11 Female-Headed Households

Republic of Kenya 1:4,000,000

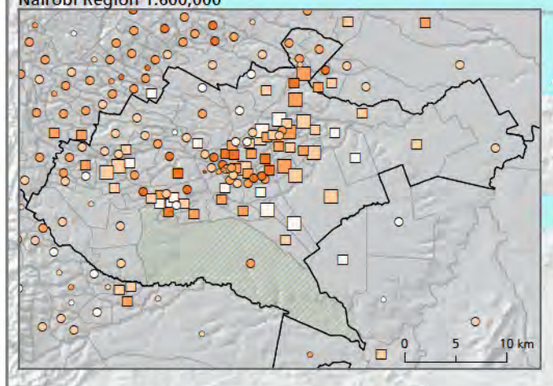
Western Region 1:2,500,000



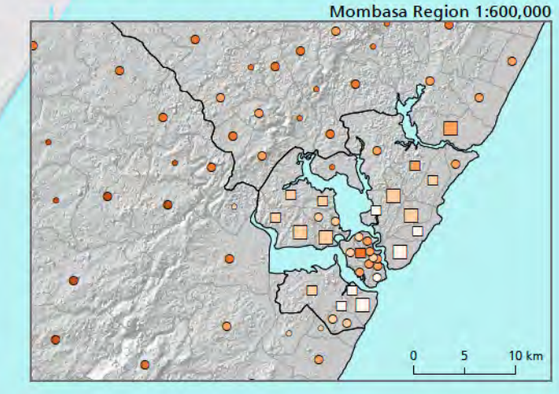
Central Region 1:2,500,000

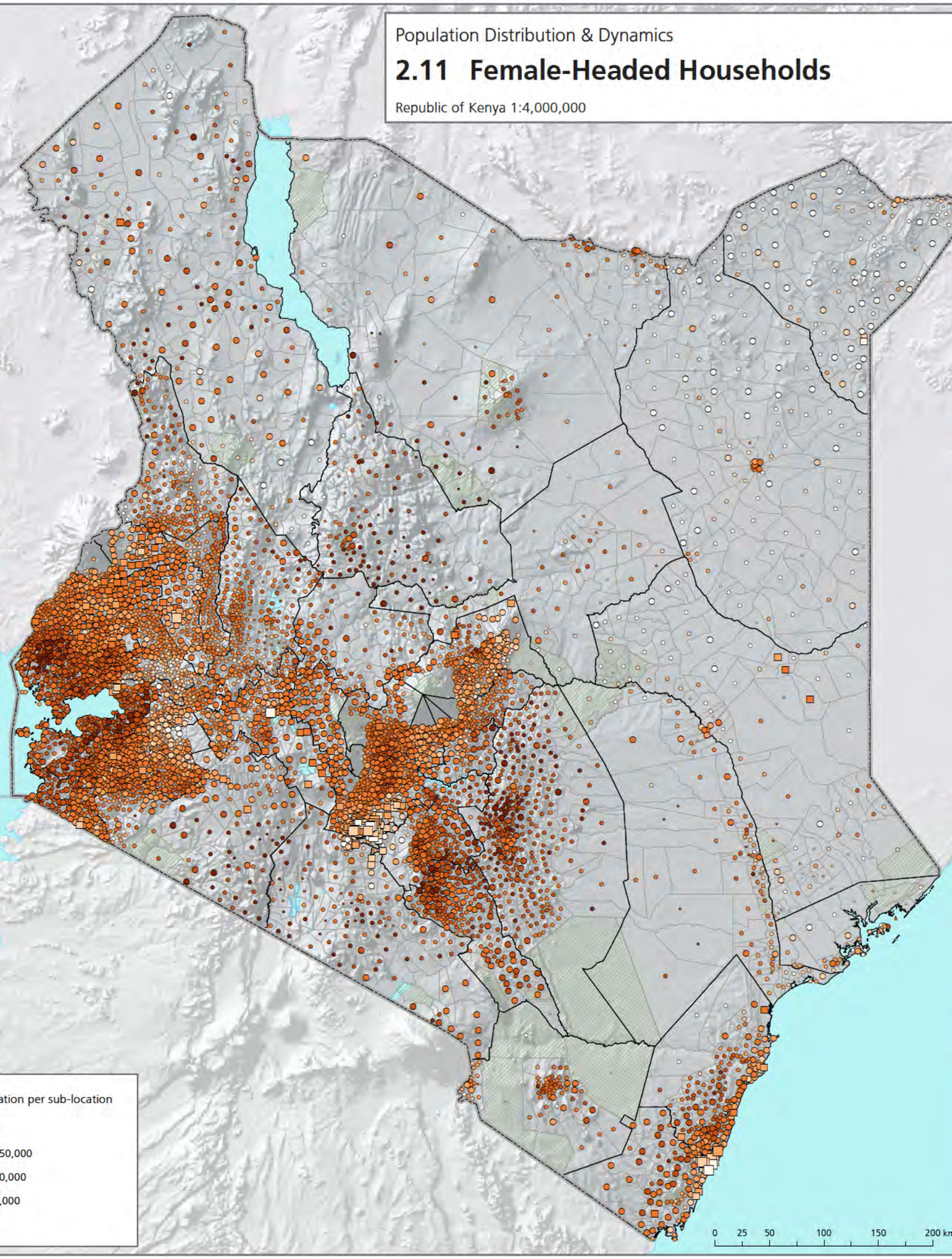


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Female-headed household classes: Percentage of households headed by a woman

- Less than 20% of households
- 20 to 25% of households
- 25 to 30% of households
- 30 to 40% of households
- 40 to 50% of households
- More than 50% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.12 Main Religions

Kenya is a country of multiple cultures forming one nation. This diversity may at times lead to friction, but above all it is a vital source of development potential. Combining the experiences and strengths of different cultures fosters innovation in all fields of development. At the same time, intercultural collaboration is capable of advancing Kenyan society and enabling the country to tackle the challenges of a globalizing world with its own unique vision of development. For this reason, the present atlas includes three maps on Kenya's religious and cultural diversity (maps 2.12 to 2.14). The primary purpose of these maps is not to highlight individual cultures, but rather to indicate the degree to which they are intermixed throughout the country.

Map 2.12 displays Kenya's main religions, their distribution, and how they are mixed. These religions are depicted here because they may play a role in many of the topics touched upon in this atlas, including the nature and dynamics of demography. In the 2009 census, each member of a household was asked to indicate his or her religion. People's responses were categorized between several "main" religions, keeping in mind that the actual religious diversity is greater. To illustrate the distribution patterns in map 2.12, the main religion of each area – county or sub-location – was determined by identifying the particular faith cited by 50% or more of the total population in that specific area. For areas in which no single religion was cited by at least 50% of the population, the colour white is used to indicate that there is no main religion in that area. Five different religious categories reached the 50% threshold in multiple sub-locations: Catholicism, Protestantism, other forms of Christianity, Islam, and Traditionalism. These five categories are therefore differentiated on the map.

The county map and table confirm the generally perceived distribution of religions in Kenya, with Islam representing the main religion throughout much of the north-eastern, eastern, and coastal regions, while forms of Christianity represent the main religion in the highlands and neighbouring areas. Viewed nationally, the breakdown is as follows: due to population densities in the highlands, followers of Christian faiths comprise 85% of the population (24% Catholics; 61% Protestants and other Christians); followers of Islam comprise 12%, and followers of other religions including Traditionalism comprise 3%. Despite this generally observed distribution pattern, it must be noted that there are ten Kenyan counties in which none of these religious categories account for 50% of the population: Nairobi, Kirinyaga, Marsabit, Laikipia, Turkana, West Pokot, Kakamega, Busia, Siaya, and Kisumu. It is also interesting to note that there are only six counties – Mandera, Wajir, Garissa, Tana River, Vihiga, and Kericho – in which one religion accounts for more than 80% of the population.

The main map – showing patterns at the sub-location level – confirms the county-level observation that there are only few regions in Kenya where a single faith is so dominant that it captures almost the entire population. In many areas, differently coloured sub-locations are visible in the mix, e.g. Catholics are spread throughout the country – with the exception of the north-east – and appear to some extent in the coastal region, while Traditionalists may be found in Marsabit, Turkana, West Pokot, Samburu, Baringo, Narok, Isiolo, and Kilifi counties. Further, there are many regions featuring sub-locations for which no main religion may be identified. These non-designated sub-locations are found, in particular, in the Lake region and parts of central Kenya, where a mix of different Christian faiths prevails, or in the coastal region and Mombasa, where they reflect the coexistence of Muslims and Christians.

It is also noticeable that in certain towns and, in particular, in Nairobi, there are many sub-locations that have no main religion. This indicates that religious and cultural diversity increases in economic centres. The rural–urban graph confirms this observation. It shows that urban sub-locations reach their highest share in the class with no majority religion. It further reveals that sub-locations dominated by Catholicism, other forms of Christianity, or Traditionalism are mainly concentrating in rural areas. By contrast, Protestantism and Islam are spread more evenly between rural and urban areas.

Overall, the degree of religious and cultural diversity tends to be greater in areas experiencing higher levels of in-migration (see map 2.04). In most cases, these areas are also economic centres and hubs of innovative activity. The following map (2.13) explores this relationship further.

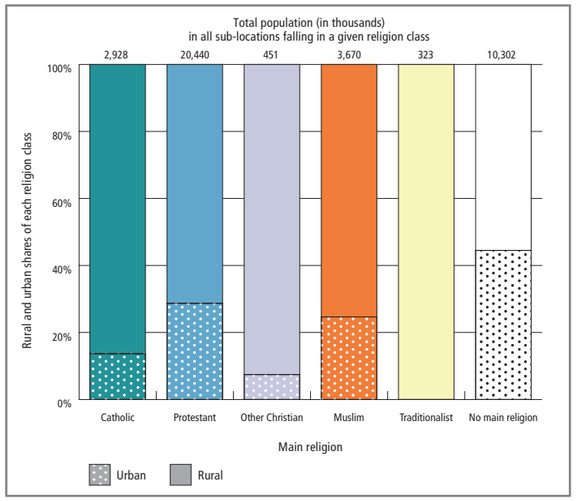
County	Number of Catholics*	Number of Protestants and other Christians*	Number of Muslims*	Number of people of other faiths*
Nairobi	851.2	1,862.4	221.4	93.1
Mombasa	167.7	387.6	337.9	15.5
Kwale	39.9	152.6	424.0	12.0
Kilifi	97.5	528.0	210.3	73.9
Tana River	8.3	30.1	197.3	0.9
Lamu	11.6	32.7	52.3	1.1
Taita Taveta	67.0	181.6	20.9	2.3
Garissa	4.6	9.6	601.9	0.2
Wajir	1.2	1.7	654.7	0.2
Mandera	1.2	1.1	1,020.4	0.2
Marsabit	60.0	24.7	132.6	68.7
Isiolo	26.1	14.8	88.1	9.6
Meru	337.9	943.5	11.4	21.7
Tharaka Nithi	117.0	233.9	0.8	4.3
Embu	157.2	334.9	2.5	8.3
Kitui	253.8	688.7	6.2	23.9
Machakos	430.6	627.1	6.7	11.5
Makueni	290.3	557.7	4.9	12.2
Nyandarua	112.8	430.2	0.6	14.4
Nyeri	203.2	454.3	4.0	8.9
Kirinyaga	175.3	327.2	2.0	10.4
Murang'a	246.8	658.0	3.0	12.2
Kiambu	441.9	1,086.8	13.5	25.5
Turkana	369.9	243.1	25.4	126.4
West Pokot	191.9	230.4	2.6	54.1
Samburu	135.1	43.0	2.2	32.4
Trans Nzoia	196.8	577.4	8.3	15.2
Uasin Gishu	205.5	622.0	13.1	15.6
Elgeyo Marakwet	189.4	165.4	1.0	2.7
Nandi	186.2	524.7	5.0	14.3
Baringo	89.3	356.1	4.2	77.7
Laikipia	130.3	220.8	7.1	15.1
Nakuru	312.2	1,113.6	19.7	29.2
Narok	145.2	514.8	3.9	101.1
Kajiado	143.4	473.6	18.3	22.7
Kericho	101.6	593.2	2.3	10.2
Bomet	132.7	550.1	0.6	15.7
Kakamega	336.3	1,164.9	90.2	47.4
Vihiga	21.9	499.2	4.6	20.2
Bungoma	279.7	1,026.1	19.6	25.8
Busia	274.9	420.0	14.1	22.3
Siaya	225.1	553.7	3.1	44.8
Kisumu	210.1	674.3	14.4	47.0
Homa Bay	185.9	726.4	5.7	31.8
Migori	199.1	667.1	6.4	26.6
Kisii	405.1	717.4	2.2	10.0
Nyamira	154.4	430.2	0.6	3.8
KENYA	**8,924.7**	**22,676.6**	**4,292.3**	**1,243.2**

* in thousands

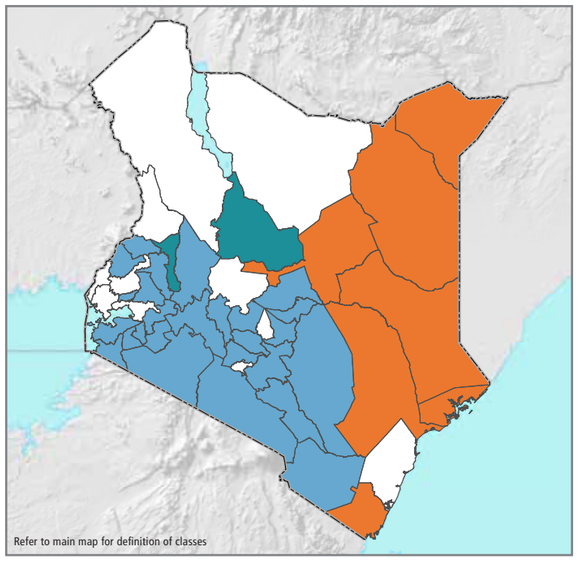
Data Source

2009 Kenya Population and Housing Census (Variable P16: Religion), Kenya National Bureau of Statistics.

2.12 Rural–Urban Distribution of Main Religions



2.12 Main Religions at County Level

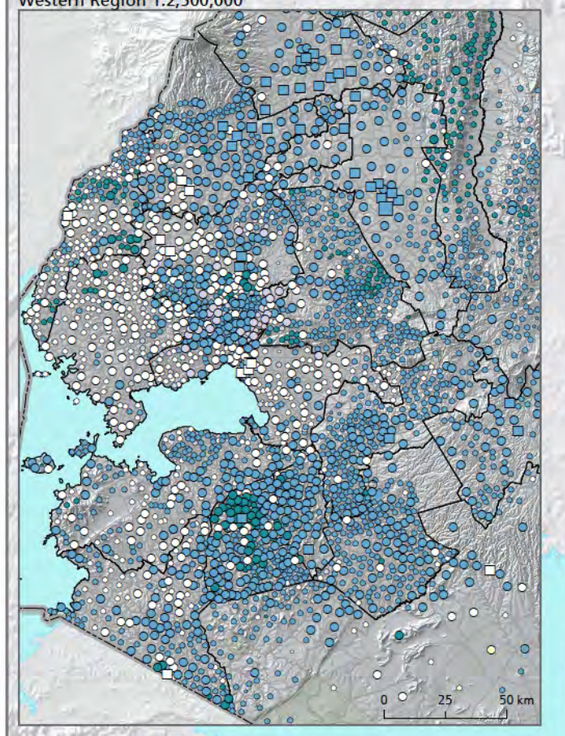


Population Distribution & Dynamics

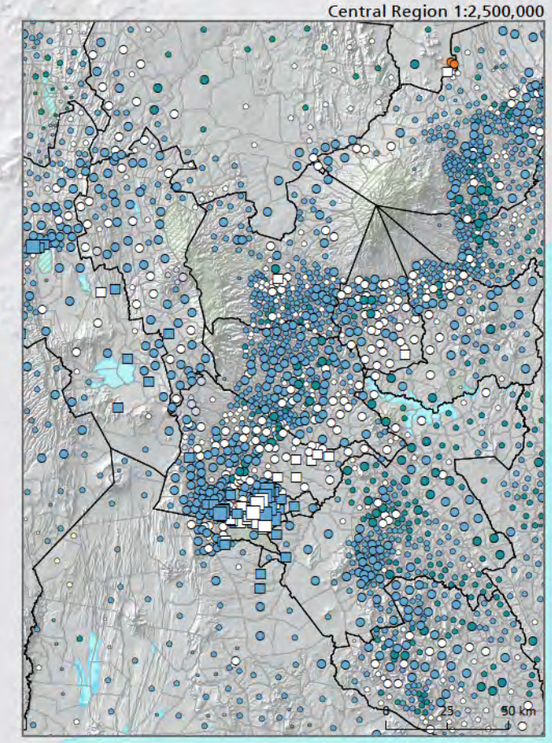
2.12 Main Religions

Republic of Kenya 1:4,000,000

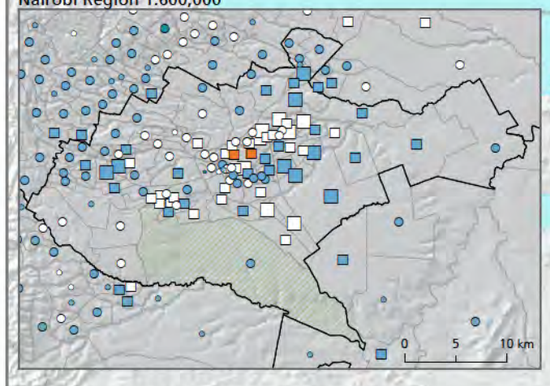
Western Region 1:2,500,000



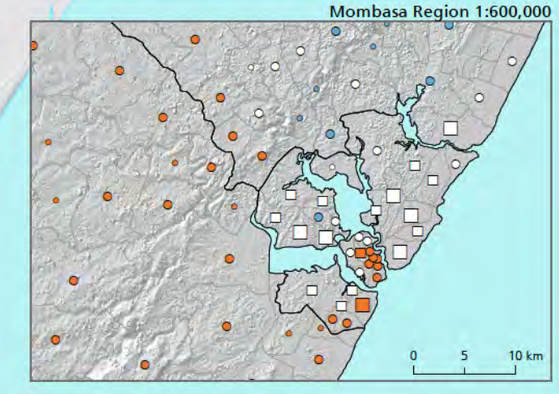
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Religion classes: Main religion, or faith of at least half of the population

- More than 50% Catholics
- More than 50% Protestants
- More than 50% other Christians
- More than 50% Muslims
- More than 50% Traditionalists
- All faiths below 50% of the population

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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2.13 Main Communities

The previous map illustrated Kenya's religious diversity, confirming that it is a country of multiple cultures forming one nation. This is even more evident when looking at Kenya's ethno-linguistic composition. The common view holds that Kenya is home to 42 communities, popularly but debatably referred to as "tribes". However, if one takes an even more differentiated view, as was done in the 2009 census, it is possible to distinguish at least 108 communities or sub-communities – a figure that does not include the diverse groups of non-nationals residing in Kenya. As stated earlier, Kenya's incredible diversity may pose certain challenges, but, more importantly, it represents a wellspring of human resources on behalf of economic development and innovation. Properly channelled, Kenya's diversity will enable the country to define its own vision and path forward in a globalizing world, combining the experiences and strengths of its many local cultures.

Kenya's communities may be broadly ethno-linguistically grouped into Bantu, Nilotic, and Cushitic populations. Such ethno-linguistic grouping should occur on the basis of self-identification, with language as the main identifier. However, it should be noted that for the purpose of the present map, some communities were grouped together not based on ethno-linguistic characteristics, but rather according to shared socio-economic and cultural practices.

In the 2009 census, household members were asked to indicate their "tribe" or nationality. Their responses were grouped according to the broad categories described above, and each sub-location was then assessed to determine whether a given community comprised 50% or more of its total population. If more than three of Kenya's 7,149 sub-locations displayed a majority population of a given community, then that community was adopted for further analyses. The analyses eventually resulted in the 29 communities displayed on this map: 16 Bantus, six Nilotes, six Cushites, and a summary category of "others of African origin". The last category seldom occurs, mainly in refugee camps.

Using different colours, the main map displays each of the sub-locations in which one of these 29 communities constitutes at least 50% of the population. Sub-locations without a majority community are filled in white, indicating a mix. The same colour system is used in the county map, i.e. only counties in which one community comprises 50% or more of the population are shaded one colour or another. Finally, the county table shows the largest community in each county, even if it does not reach 50%. It also indicates the second- and third-largest communities in each county.

The county map shows that Bantu and Nilotic communities inhabit Kenya's western region; Cushitic communities inhabit the entire north-eastern region and parts of Kenya's eastern region; Bantu communities dominate its entire central and lower eastern regions including the coast; and most of the Rift Valley is dominated by Nilotic communities (see main map for details). The county table also shows that there are 30 counties in which the largest community has a clear majority, constituting upwards of 75% of the population; there are also ten counties in which a given community constitutes 50 to 66% of the population. Finally, the county map displays seven counties without a majority community of 50% or more: Marsabit (largest community: 28%), Tana River (28%), Nairobi (29%), Lamu and Mombasa (both 30%), Isiolo (37%), and Kajiado (44%). Closer examination of the main map reveals that this is the result, on the one hand, of communities sharing a broad area in which they alternatingly dominate different neighbouring sub-locations (e.g. in Marsabit or Tana River). On the other, it is the result of counties containing many sub-locations in which no one community is dominant. This is clearly the case in Nairobi and Mombasa counties, but also in Kajiado, near Nairobi. This indicates that Kenya's economic centres and hubs are very ethno-linguistically diverse. The two map insets of Mombasa and Nairobi further show that this high degree of diversity extends all the way down to the sub-location level. Nairobi is an interesting case: some of its sub-locations seem to function as entry points for migrants from specific communities, who eventually assimilate into the broader mix.

In addition, the main map shows that all of Kenya's major towns are ethno-linguistically diverse (visible in white). Finally, the rural–urban graph further confirms that urban contexts are more ethno-linguistically mixed than rural contexts: sub-locations whose largest community does not exceed 50%, or even 30%, are overwhelmingly urban, while sub-locations whose largest community exceeds 90% are found almost exclusively in rural settings. Thus, the mix of communities appears to be a key issue worthy of additional analysis. This is done in the following section (2.14).

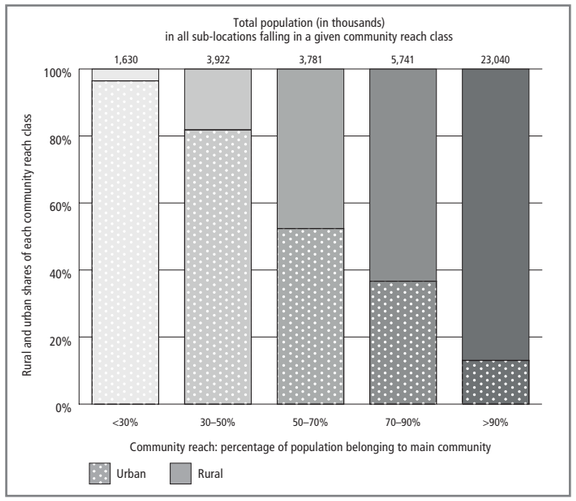
County	Largest community	Share of largest community in total population	Second-largest community	Third-largest community
Nairobi	Kikuyu	29.4%	Kamba	Luo
Mombasa	Miji Kenda	30.1%	Kamba	Luo
Kwale	Miji Kenda	82.7%	Kamba	Luhya
Kilifi	Miji Kenda	86.5%	Kamba	Swahili
Tana River	Pokomo	27.5%	Orma	Wardei
Lamu	Swahili	30.2%	Kikuyu	Miji Kenda
Taita Taveta	Taita	63.3%	Kamba	Taveta
Garissa	Somali	79.6%	Other Afr. Origin	Kamba
Wajir	Somali	98.7%	Gabra	Other Afr. Origin
Mandera	Somali	97.6%	Gabra	Other Afr. Origin
Marsabit	Gabra	28.7%	Borana	Rendille
Isiolo	Borana	37.0%	Somali	Samburu
Meru	Meru	93.7%	Kikuyu	Kamba
Tharaka Nithi	Meru	54.8%	Tharaka	Mbeere
Embu	Embu	50.4%	Mbeere	Kamba
Kitui	Kamba	96.6%	Tharaka	Other Afr. Origin
Machakos	Kamba	91.0%	Kikuyu	Luhya
Makueni	Kamba	98.1%	Kikuyu	Other Afr. Origin
Nyandarua	Kikuyu	96.3%	Luhya	Kisii
Nyeri	Kikuyu	94.0%	Meru	Kenyan Kenyan
Kirinyaga	Kikuyu	95.2%	Kamba	Embu
Murang'a	Kikuyu	94.0%	Kamba	Luhya
Kiambu	Kikuyu	80.9%	Kamba	Luhya
Turkana	Turkana	94.3%	Other Afr. Origin	Luhya
West Pokot	Kalenjin	95.1%	Luhya	Turkana
Samburu	Samburu	78.8%	Turkana	Kikuyu
Trans Nzoia	Luhya	52.0%	Kalenjin	Kikuyu
Uasin Gishu	Kalenjin	58.1%	Luhya	Kikuyu
Elgeyo Marakwet	Kalenjin	92.5%	Luhya	Other Afr. Origin
Nandi	Kalenjin	77.4%	Luhya	Luo
Baringo	Kalenjin	88.0%	Maasai	Kikuyu
Laikipia	Kikuyu	63.0%	Maasai	Kalenjin
Nakuru	Kikuyu	52.4%	Kalenjin	Luhya
Narok	Maasai	51.4%	Kalenjin	Kikuyu
Kajiado	Maasai	44.5%	Kikuyu	Kamba
Kericho	Kalenjin	87.5%	Luo	Kikuyu
Bomet	Kalenjin	95.7%	Kisii	Luo
Kakamega	Luhya	92.4%	Luo	Kikuyu
Vihiga	Luhya	95.5%	Luo	Kalenjin
Bungoma	Luhya	82.9%	Kalenjin	Teso
Busia	Luhya	57.2%	Teso	Luo
Siaya	Luo	94.8%	Luhya	Other Afr. Origin
Kisumu	Luo	88.9%	Luhya	Kalenjin
Homa Bay	Luo	87.5%	Basuba	Kisii
Migori	Luo	60.2%	Kuria	Luhya
Kisii	Kisii	96.5%	Luo	Kenyan Kenyan
Nyamira	Kisii	97.2%	Luo	Kenyan Kenyan
KENYA	–	–	–	–

Abbreviation: Afr. = African

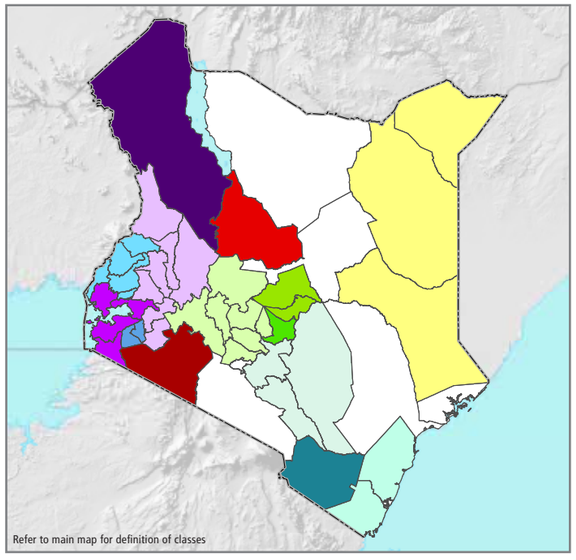
Data Source

2009 Kenya Population and Housing Census (Variable P15: Tribe/Nationality), Kenya National Bureau of Statistics.

2.13 Rural–Urban Distribution of Community Reach Classes



2.13 Main Communities at County Level

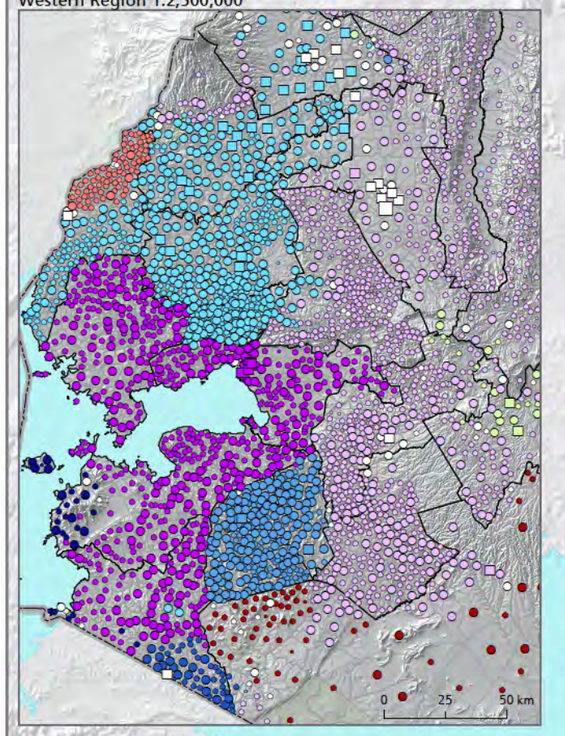


Population Distribution & Dynamics

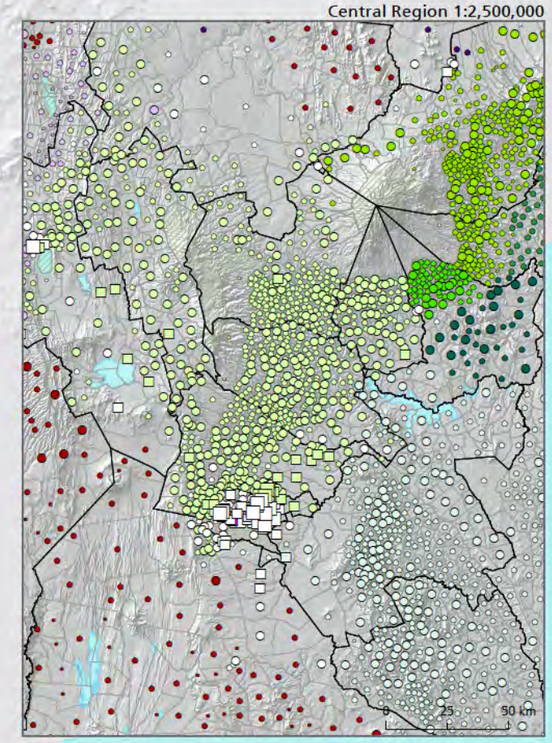
2.13 Main Communities

Republic of Kenya 1:4,000,000

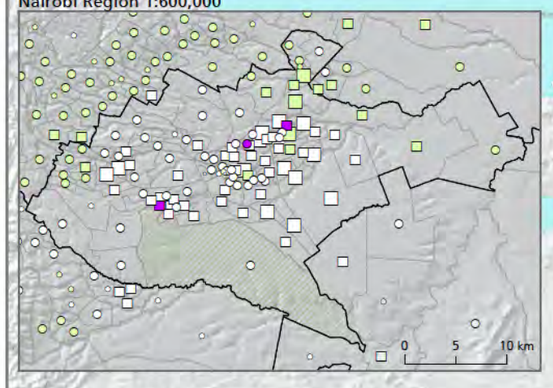
Western Region 1:2,500,000



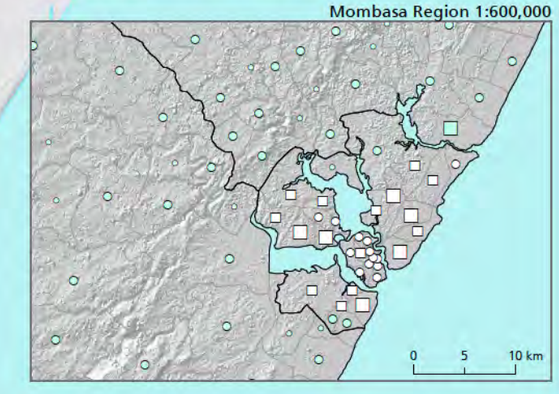
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Main community: Community to which at least half of the population belongs

Bantu
- Luhya
- Kuria
- Kisii
- Basuba
- Kamba
- Kikuyu
- Embu
- Mbeere
- Tharaka
- Meru
- Walwana
- Pokomo
- Miji Kenda
- Taita
- Taveta
- Swahili

Nilotic
- Kalenjin
- Turkana
- Teso
- Maasai
- Samburu
- Luo

Cushitic
- Somali
- Rendille
- Orma
- Borana
- Gabra
- Wardei

Other
- Others of African origin
- No main community (all below 50%)

Total population per sub-location
- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders
- International boder
- County border
- Sub-location border

Features
- National park
- Waterbody

0 25 50 100 150 200 km

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2.14 Diversity of Communities

Maps 2.12 and 2.13 illustrated Kenya's religious and ethno-linguistic diversity. The maps and corresponding analyses followed the majority principle in an effort to show where particular religions or communities predominate, but nevertheless form a mosaic of cultural diversity at various levels. At the same time, the analyses suggested that having a mix of cultures in a given area – e.g. sub-location or county – could be important from a development perspective. Both religions and especially communities showed increasing rates of mix along rural–urban gradients.

For this reason, the present map takes a closer look at existing mixes of cultures at the sub-location level. The analyses described here are based on the same ethno-linguistic communities shown in map 2.13. However, this time the majority principle is not applied. Instead, every community present in a given sub-location is noted. If at least one member of a particular community resides in a given sub-location, that community is recorded as found in the sub-location. No matter how small, the presence of different minorities in a given sub-location can be important at the local level.

Map 2.13 distinguished between 29 different communities, each of which comprised a majority in at least three sub-locations. Several communities and cultural groups were left out of the analyses, since they did not meet this majority criterion. In the current analyses, they are reincorporated and grouped into five categories: Kenyan Arabs, Kenyan Asians, Kenyan Europeans, Kenyan Americans, and other Kenyans. Added to the 29 other communities, the total number of communities distinguished rises to 34. In this way, each sub-location is assigned a value between 1 (= only one community represented) and 34 (= all communities represented).

The resulting map shows that there are scarcely any sub-locations comprising only one community. Those that do exist are small and very remote. Calculated nationally, the average sub-location in Kenya contains 12 of 34 communities. This is an impressive figure – it shows that, on average, one-third of Kenya's cultural diversity is present in each sub-location. Nevertheless, the map also shows that the actual levels of diversity vary greatly throughout Kenya's different regions.

At the county level, it is notable that every county comprises members of at least 32 of the 34 Kenyan communities. Calculating the average diversity of all sub-locations in a given county is particularly interesting. Diversity is clearly highest in Nairobi and Mombasa – in these counties, the average sub-location comprises 30 communities. Just behind them is Trans Nzoia, in which an average sub-location contains 23 communities, followed by Kiambu, featuring 18 communities in an average sub-location. The lowest averages – i.e. between six and nine communities in a sub-location – are found in arid and semi-arid areas as well as in Bomet and Kitui. With the exception of Trans Nzoia, these values suggest a gradient between urban centres and rural areas, especially those with low agricultural potential.

The rural–urban graph confirms that greater numbers of communities are found in urban sub-locations. A look at the average number of communities present in each county's urban or rural sub-locations (calculated from the county table) is especially revealing. In most counties, the average urban sub-location contains at least four more communities than the average rural sub-location. Vihiga, Kisii, Nyamira, and Homa Bay counties are exceptions – they exhibit community mixes above the national average in both rural and urban contexts. However, there are 18 counties in which the average urban sub-location has at least ten more communities than the average rural sub-location – that average difference reaches as high as 21 in one county. Overall, urban areas clearly bring together a wide range of communities and cultures, especially as a result of ongoing in-migration (see map 2.04). Many urban areas are hubs of activity (e.g. economic, administrative) that attract a diversified human resource base, which in turn promotes innovation and development.

Nevertheless, the main map and the rural–urban graph also show that there are certain rural areas – Trans Nzoia stands out – that display significant numbers of communities at the sub-location level. Further analysis reveals that rural areas featuring above-average mixes of cultures are frequently places where settlement schemes, modern large-scale agriculture, or tourism serve to attract immigrants and workers (see map 2.04). Considered together with the findings on urban centres, this suggests that greater numbers of cultural communities are found in settings where economic growth is underway. It remains an open question whether this diversity stems from or produces economic development, but it certainly appears probable that having a greater mix of cultures contributes to innovation and development. Nevertheless, the most important finding in this section is that the community mix is greater in all parts of Kenya than is commonly assumed.

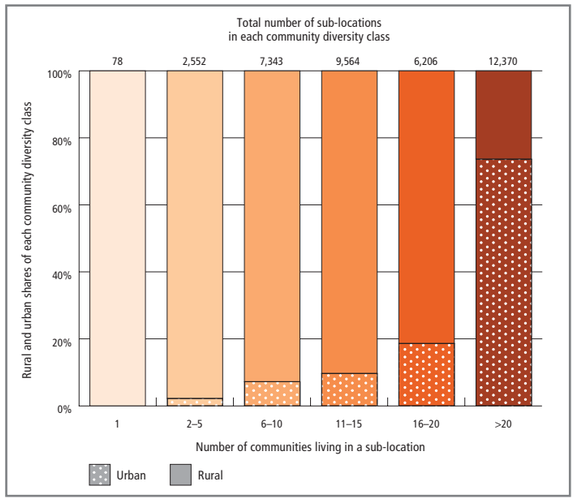
County	Average no. of communities per sub-location	Rank	Average no. of communities in urban sub-locations	Average no. of communities in rural sub-locations
Nairobi	30	1	30	–
Mombasa	30	1	30	–
Kwale	16	9	26	15
Kilifi	13	17	32	11
Tana River	11	31	19	10
Lamu	17	6	27	16
Taita Taveta	15	12	24	15
Garissa	9	38	24	7
Wajir	8	40	17	7
Mandera	6	47	14	5
Marsabit	9	38	18	8
Isiolo	12	24	22	11
Meru	13	17	25	12
Tharaka Nithi	12	24	15	12
Embu	14	14	21	14
Kitui	8	40	14	8
Machakos	12	24	14	10
Makueni	10	34	15	9
Nyandarua	16	9	19	15
Nyeri	13	17	18	12
Kirinyaga	14	14	24	14
Murang'a	12	24	16	11
Kiambu	18	5	24	15
Turkana	8	40	22	7
West Pokot	7	45	17	6
Samburu	7	45	18	6
Trans Nzoia	23	3	28	22
Uasin Gishu	19	4	29	17
Elgeyo Marakwet	10	34	14	10
Nandi	10	34	15	9
Baringo	8	40	19	7
Laikipia	17	6	28	16
Nakuru	17	6	25	15
Narok	13	17	26	12
Kajiado	14	14	29	12
Kericho	10	34	13	9
Bomet	8	40	11	8
Kakamega	15	12	22	14
Vihiga	13	17	14	13
Bungoma	16	9	23	15
Busia	12	24	21	12
Siaya	11	31	20	11
Kisumu	13	17	18	10
Homa Bay	11	31	17	10
Migori	12	24	14	11
Kisii	12	24	14	11
Nyamira	13	17	15	13
KENYA	**12**	**–**	**20**	**11**

Abbreviation: no. = number

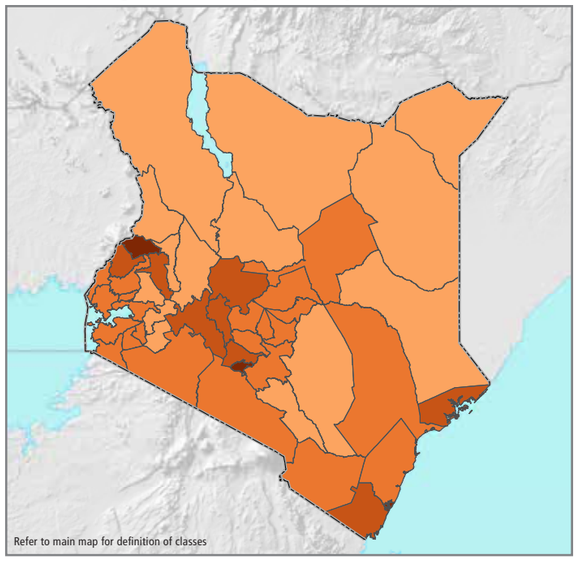
Data Source

2009 Kenya Population and Housing Census (Variable P15: Tribe/Nationality), Kenya National Bureau of Statistics.

2.14 Rural–Urban Distribution of Community Diversity Classes



2.14 Average Community Diversity at County Level

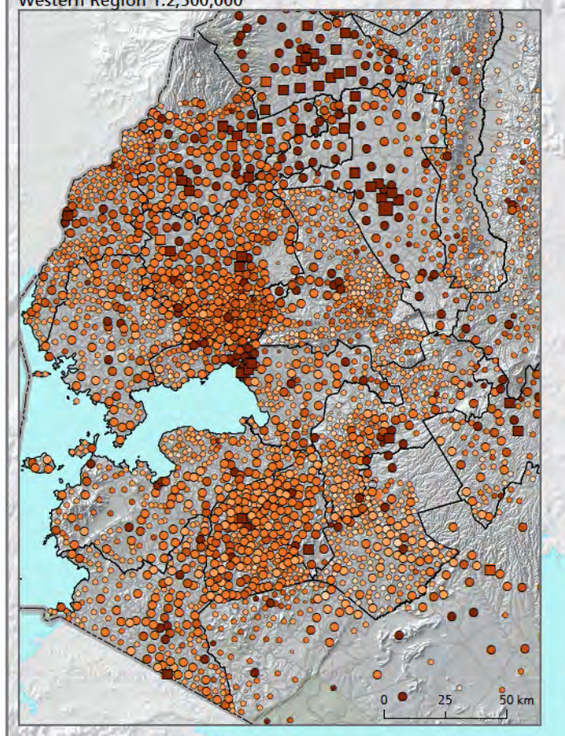


Population Distribution & Dynamics

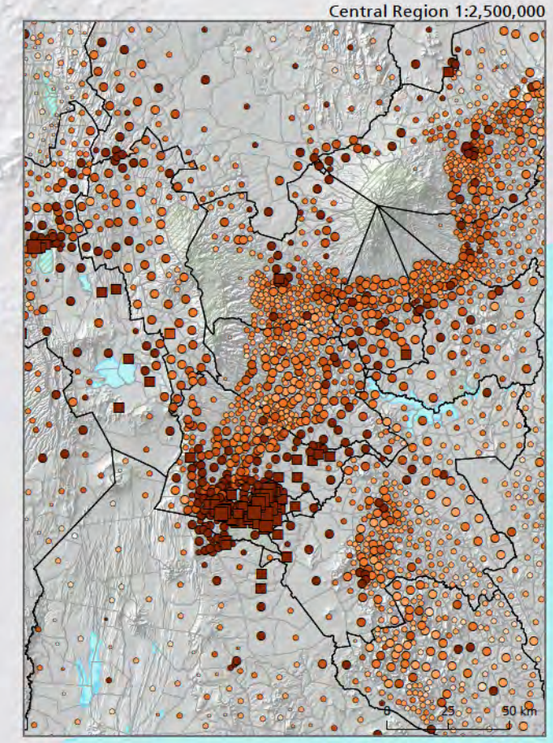
2.14 Diversity of Communities

Republic of Kenya 1:4,000,000

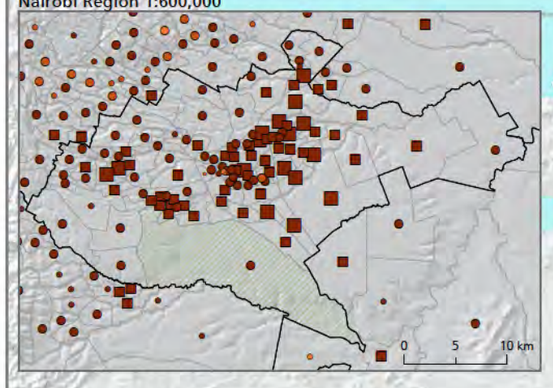
Western Region 1:2,500,000



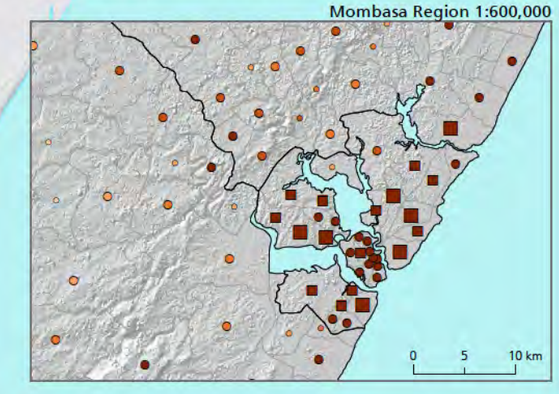
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Community diversity classes: Number of different communities living in each sub-location

- 1 community
- 2 to 5 communities
- 6 to 10 communities
- 11 to 15 communities
- 16 to 20 communities
- More than 20 communities

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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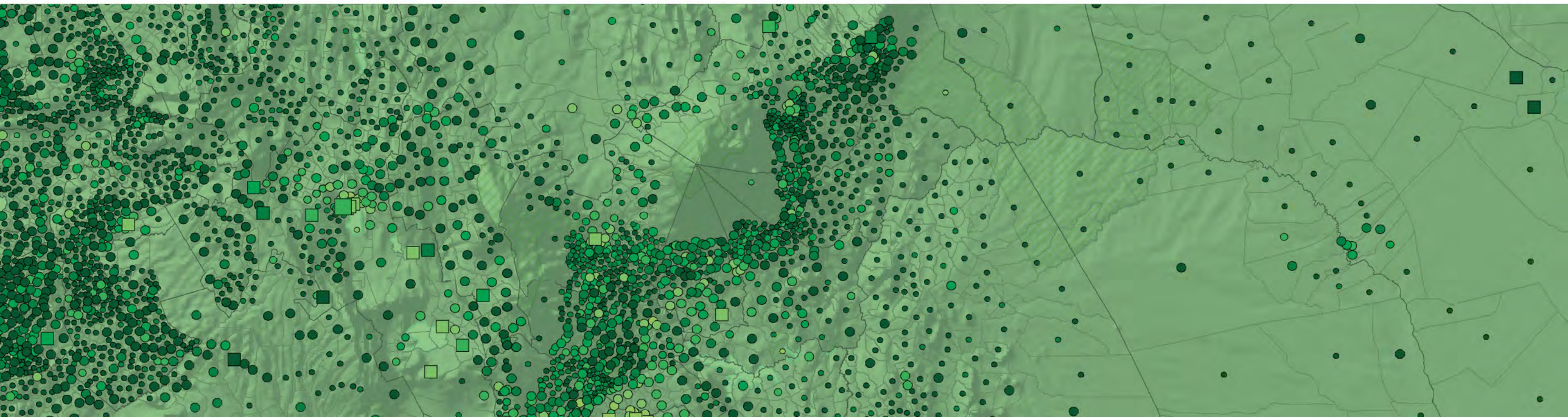
3

Water, Sanitation & Energy



Introduction

Water, sanitation, and energy are key requirements for a decent standard of living. This presupposes that households have access to safe water for human consumption and household use, organized and safe human waste disposal, and energy sources for basic household functions. In addition, all three requirements interrelate closely with the natural environment and natural resources by relying on the provision of ecosystem services and by influencing ecological dynamics and conditions. The Government of Kenya therefore gives these sectors high priority in a broad range of policy fields, such as in the Water Act of 2002 and, more recently, in Kenya's *Vision 2030*, in conjunction with international conventions and initiatives such as the Millennium Development Goals.

Against this background, this chapter examines the three sectors of water, sanitation, and energy from the perspective of Kenya's 8.8 million households. It highlights whether, to what degree, and where in the country households have access to safe water, sanitation facilities, and energy sources. This household-centred perspective does not include any assessment of the state of the three sectors' supply side in terms of natural resources and infrastructure. The chapter is grouped into three parts – one for each sector.

Maps 3.01 to 3.03 deal with access to safe water. In the 2009 census, households were asked about their main domestic water source; their answers form the basis for this evaluation. The maps show the location of the sources and whether they are considered "safe" or "unsafe" under World Health Organization (WHO) guidelines.

Map 3.01 shows the proportion of households in counties and sub-locations with access to a safe water source. The map reveals that 56% of all households have access to safe water: this means that 3.85 million households have no access. Access rates vary greatly along ecological, economic, and rural–urban gradients; the map indicates areas where improvement is most urgently needed.

Map 3.02 establishes which source of water is most commonly used by households with access to safe water. Piped water is the most dominant source, followed by boreholes and protected springs. Protected wells also play an important role, while rainwater harvesting has a supplementary function.

Map 3.03 shows unsafe water sources most commonly used by households with no access to safe water. In urban settings, water vendors are the most dominant source. In many rural areas, streams and rivers are the main source, indicating the importance of watershed management. Knowing the location of heavily used unprotected wells and springs will facilitate targeted improvement of unsafe water sources.

Maps 3.04 and 3.05 deal with access to improved sanitation facilities that reduce risks associated with the incorrect disposal of human waste. The 2009 census established the types of sanitation facility primarily used by individual households. Following WHO guidelines, these were classified into "improved" and "unimproved" facilities, forming the basis for the sanitation-related maps.

Map 3.04 displays the percentage of households in counties and sub-locations with access to improved sanitation facilities. Overall, 65% of Kenyan households have access to improved sanitation. While considerable, this rate varies greatly by sub-location and partly mirrors population densities. Problematic areas requiring special attention are those with low improved sanitation rates and high population densities, found in rural as well as urban settings.

Map 3.05 specifies the most commonly used sanitation facilities, improved and unimproved, in different parts of the country. It illustrates that main sewers and septic tanks remain confined to larger urban centres and that covered latrines are the most common safe facility in rural settings. It also reveals that uncovered latrines and open defecation ("bush") are widespread in many parts of the country, but especially critical in densely populated areas.

Maps 3.06 to 3.08 illustrate the main energy sources used by households for the two basic functions of cooking and lighting. Based on the 2009 census results, the maps highlight important aspects of Kenyan households' use of solid biofuels, fossil fuels (e.g. in the form of paraffin), and electricity.

Map 3.06 shows the percentage of households in counties and sub-locations that mainly use solid biofuels for cooking. Solid biofuels include direct use of biomass such as wood from trees and shrubs, grass and crop residues, dung, and biomass transformed into charcoal. Overall, 82.5% or 7.2 million households still rely on solid biofuels for cooking, while only a minority, mainly in urban areas, use other sources such as paraffin, gas, or electricity. At 17%, charcoal plays a role in and around urban centres, while firewood still remains the main energy source for cooking for 64% of Kenyan households.

Map 3.07 illustrates the use of fossil fuels in the form of paraffin for lighting. It reveals that more than two-thirds (69.5%) or 6.1 million of all Kenyan households use paraffin as their main energy source for lighting. The spatial distribution suggests that this high percentage can be interpreted as a transitional phenomenon in the absence of alternatives, especially electricity.

Map 3.08 thus illustrates the use of electricity for lighting by households. Overall, 23% or almost one in four households use electricity for lighting, a comparatively high figure in the East African context. However, the spatial distribution reveals that the use of electricity remains mainly confined to urban settings; the agglomeration of Nairobi is home to roughly half of all households using this energy source.

Together, the maps presented in this chapter paint a picture of Kenya that is in rapid transition, with fairly steep centre–periphery and urban–rural gradients. These developments affect the water, sanitation, and energy sectors, and cause households to transform their respective strategies. The maps reveal the regions in which these sectors have reached good standards and where special efforts may still be required.

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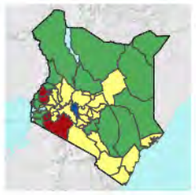

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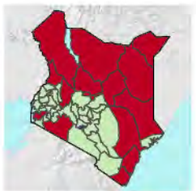

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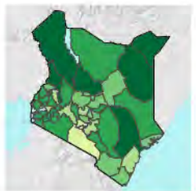

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3.01 Access to Safe Water Sources

Lack of safe water for drinking and basic sanitation directly affects human health. About 80% of all communicable diseases are water-related and include water-borne diarrhoea, trachoma, cholera, typhoid, and bilharzia. Long distances to safe water sources encourage unsafe water use closer to home; result in economic losses; and represent an added burden in terms of fetching water, a task which often falls on women and girls. Access to safe water for domestic use is thus an important indicator of household well-being.

In the 2009 census, households were asked to name their main domestic water source. Identifying the number of households with access to one or more safe water sources is possible using World Health Organization classification, under which piped water, boreholes, protected wells, protected springs, and rainwater collection are safe. This indicator cannot take into account the actual working condition of the source, nor its reliability in terms of quantity or seasonality. It can, however, show the differences in access to safe water sources in the country, and thus identify areas in need of intervention and further improvement.

Kenya is considered a water-scarce country due to the large proportion of semi-arid and arid areas (see map 1.06). Only slightly more than 56% of all households have access to a safe source of domestic water. This means that 44% of the population – 3.85 million households – have no access to safe water, a situation that compares unfavourably with some of the neighbouring countries with fewer dry zones. However, the map reveals that access to safe water is not just a function of aridity gradients but also of economic differences including rural–urban gradients.

At the county level, the highest rates of households with access to safe water sources are found in Nairobi City, which, at 83%, is 27% above the national average. This is followed by Uasin Gishu, Kiambu, Mombasa, and Bungoma, all of which have rates of above 70%. In 20 other counties, more than half the households have access to safe water. While most of these counties are located in high-potential areas in Kenya's central, western, and coastal regions, it is notable that the semi-arid counties of Kajiado (67%), Garissa (64%), and Isiolo (61%) are also among them. The semi-arid and arid counties of Wajir (46%), Turkana (44%), and Tana River (42%) are also among counties with rates only slightly below the national average. Rates decrease further in some counties around Lake Victoria, and the lowest rates are found in Narok, West Pokot, Baringo, Kitui, Bomet, Homa Bay, and Migori, where only around one-quarter of households have access to safe water. These observations suggest that besides ecological gradients, economic differences including rural–urban gradients significantly influence access to improved and safe water sources.

At the sub-location level, only few communities show rates of more than 95%, confirming the observation that economic differences are an important factor in access to safe water. The communities with high levels of access are mostly found in the Nairobi region and around protected mountains and hills; e.g. on the eastern slope of Mount Kenya around Meru, at the coast in Kilifi around Arabuko Sokoke Forest, and in a few places near Mau Forest. High rates of access to safe water also prevail in the vicinity of these sub-locations. In general, however, the pattern is mixed in the high-potential and densely populated areas, mainly fluctuating between 25% and 75% and with clear links to poverty and well-being (see chapter 5). In arid and semi-arid areas, the proximity of high and low rates is an expression of the numerous water projects underway there; the map shows where such interventions are still needed to improve people's access.

In general, urban areas have better access to safe water sources than rural areas, as seen in the case of Nairobi. The rural–urban graph shows that more than 60% of the people living in sub-locations with high or very high rates of access to safe water are located in urban settings. This may primarily be due to higher wealth rates in towns (see chapter 5) and the lower per capita costs of infrastructure in densely populated environments. However, it is notable that a number of urban sub-locations are found in areas of lower access to safe water. This mainly points to the situation of low-income quarters or slums in larger towns, where low access to safe water sources brings higher health risks due to higher population densities than in rural areas of similar rates. Thus, risk or safety largely depend on the types of safe or unsafe water sources, an issue that is addressed in the next two maps (3.02 and 3.03).

County	Percentage of households with access to safe water	Rank	No. of households with access to safe water*	No. of households without access to safe water*
Nairobi	82.7%	1	814.2	170.8
Mombasa	73.9%	4	198.7	70.0
Kwale	51.5%	23	62.8	59.2
Kilifi	67.9%	6	135.7	64.0
Tana River	42.3%	32	20.1	27.4
Lamu	54.9%	19	12.2	10.0
Taita Taveta	66.1%	9	47.0	24.1
Garissa	64.1%	11	63.2	35.4
Wajir	46.0%	28	40.7	47.9
Mandera	37.6%	35	47.2	78.3
Marsabit	38.2%	34	21.8	35.2
Isiolo	60.9%	17	19.1	12.3
Meru	61.4%	15	196.2	123.4
Tharaka Nithi	48.2%	27	42.8	46.0
Embu	51.1%	24	67.2	64.5
Kitui	27.2%	44	55.9	149.5
Machakos	39.4%	33	104.1	160.4
Makueni	36.9%	37	68.8	117.7
Nyandarua	59.3%	18	85.3	58.6
Nyeri	65.1%	10	131.3	70.4
Kirinyaga	53.9%	22	83.1	71.1
Murang'a	43.2%	31	110.3	145.3
Kiambu	75.9%	3	356.2	113.1
Turkana	44.3%	29	54.6	68.6
West Pokot	24.0%	46	22.5	71.3
Samburu	35.2%	40	16.7	30.7
Trans Nzoia	66.1%	8	112.5	57.6
Uasin Gishu	77.3%	2	156.4	45.9
Elgeyo Marakwet	36.4%	38	28.3	49.3
Nandi	37.6%	36	57.9	96.2
Baringo	25.9%	45	28.7	82.0
Laikipia	54.0%	21	55.7	47.4
Nakuru	61.6%	14	252.6	157.2
Narok	21.4%	47	36.2	133.0
Kajiado	67.2%	7	116.7	56.8
Kericho	43.9%	30	69.3	88.6
Bomet	27.5%	43	39.8	104.8
Kakamega	61.2%	16	217.7	138.0
Vihiga	63.2%	12	78.0	45.3
Bungoma	72.3%	5	195.8	75.1
Busia	62.3%	13	96.0	58.2
Siaya	36.1%	39	71.9	127.2
Kisumu	54.8%	20	124.3	102.4
Homa Bay	28.3%	42	58.5	147.8
Migori	28.8%	41	51.9	128.3
Kisii	50.9%	25	124.8	120.2
Nyamira	48.9%	26	64.0	67.0
KENYA	**56.1%**	**–**	**4,914.5**	**3,853.5**

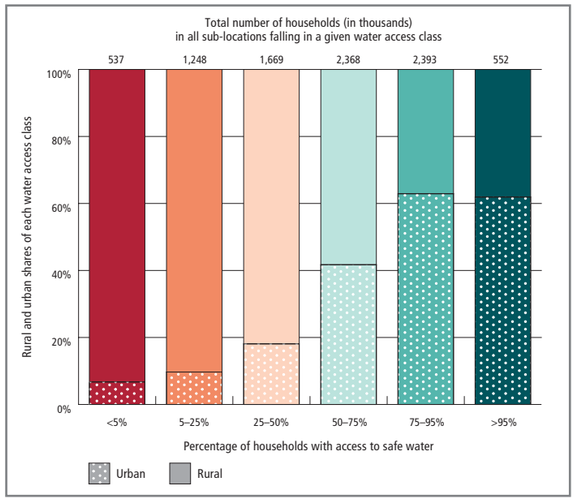
Abbreviation: no. = number

* in thousands

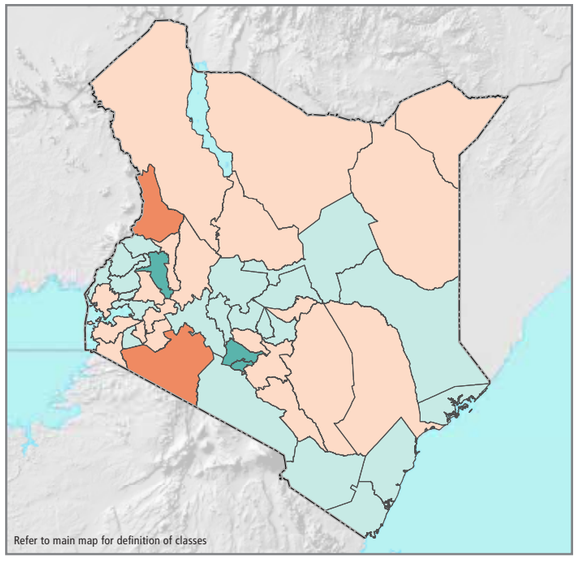
Data Source

2009 Kenya Population and Housing Census (Variable H24: Main Source of Water), Kenya National Bureau of Statistics.

3.01 Rural–Urban Distribution of Water Access Classes



3.01 Average Water Access at County Level

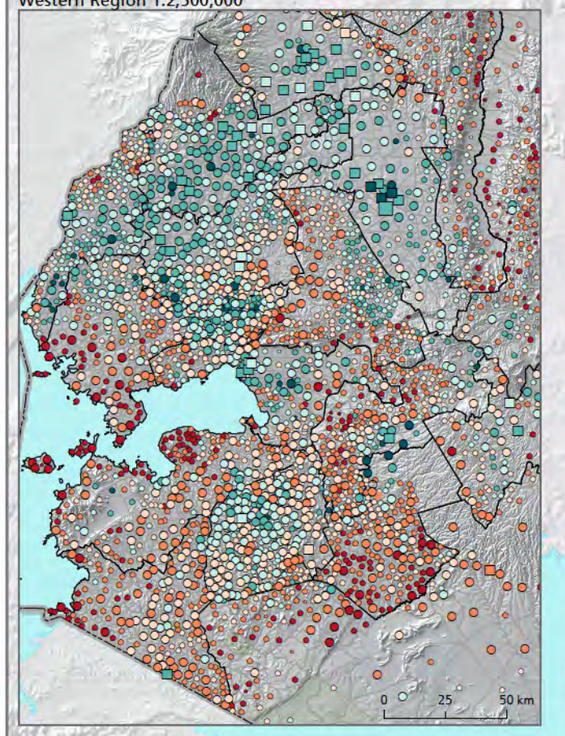


Water, Sanitation & Energy

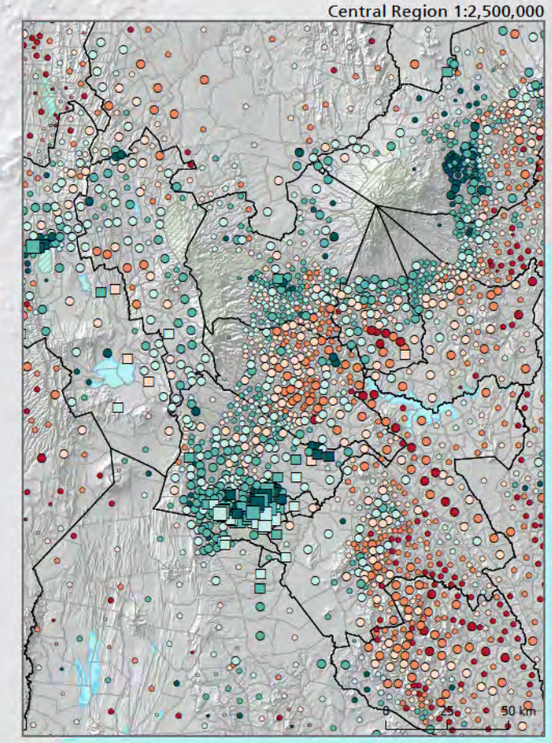
3.01 Access to Safe Water Sources

Republic of Kenya 1:4,000,000

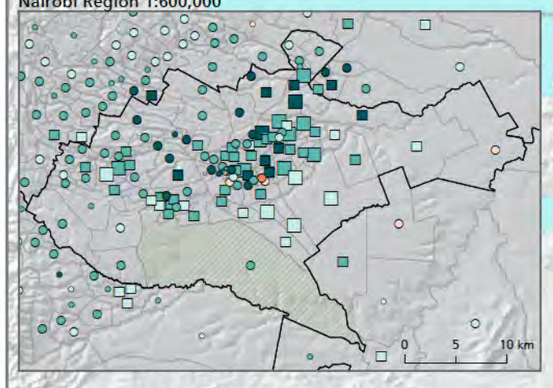
Western Region 1:2,500,000



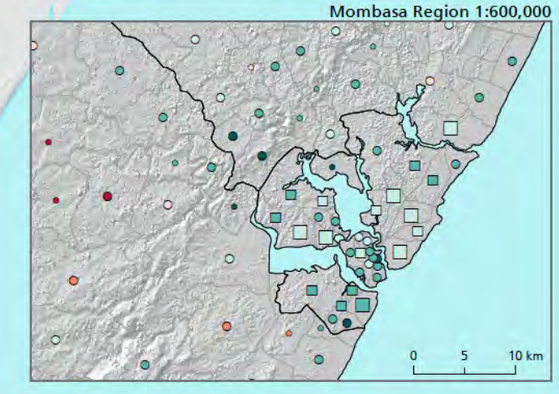
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Water access classes: Percentage of households with access to safe water sources (piped water, borehole, protected well, protected spring, and rainwater collection)

- Less than 5% of households
- 5 to 25% of households
- 25 to 50% of households
- 50 to 75% of households
- 75 to 95% of households
- More than 95% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.02 Most Commonly Used Safe Water Source

Map 3.01 displayed access to safe water sources as an important indicator of the well-being of households; slightly more than half of Kenyan households (56%) were seen to have access to safe water. Water sources classified as safe by the World Health Organization are: piped water, boreholes, protected wells, protected springs, and rainwater collection. The present map shows which of these sources are most commonly used in the different regions of Kenya. This could provide information on which sources to further develop, and may also give first indications regarding issues of reliability, seasonality, and maintenance.

On the map, the water source used by the greatest number of households in a given area as their main source is classified as "most commonly used". This implies that other sources, both safe and unsafe, may also be accessible and used by individual households, e.g. if their main water source is affected during times of water scarcity. Despite limiting the perspective to the most commonly used safe water source, quite clear spatial patterns occur.

Nairobi county has the highest percentage of households (83%) with access to safe water; for 76% of all households, the safe source is piped water, partly even into dwellings. The situation of Nairobi is replicated in most major urban settlements where piped water tops the list of safe water sources. But also many rural areas benefit from piped water fed by various water sources such as river intakes, springs, or groundwater. This leads to a pattern at the county level that sees most humid and semi-humid counties with piped water as the most common safe water source, with highest rates in Taita Taveta (where 59% of all households have access to piped water while the overall access rate to safe water is 66%), Nyeri (56%/65%), Meru (55%/61%), Kilifi (54%/68%), and Mombasa (53%/74%), and only slightly lower rates in Isiolo (49%/61%), Kiambu (46%/76%), and Kirinyaga (41%/54%).

Boreholes are dominant in the northern and western arid and semi-arid counties, especially in Garissa (33% of all households have access to boreholes while the overall access rate to safe water is 64%) and Wajir (33%/46%), and in particular also in the counties around Lake Victoria. Protected spring and well-water dominate in Vihiga (57% of all households have access to protected springs and wells while the overall access rate to safe water is 63%), Bungoma (47%/72%), Kakamega (45%/61%), Kisii (44%/51%), and Nyamira (42%/49%). Benefitting from the Aberdare ranges, Nyandarua is a special case, as it is the only county where protected wells are the most common safe water source: they are used by just slightly more households than piped water.

The main map, which displays the most commonly used safe water source at the sub-location level, shows that piped water dominates at the slopes of rain-fetching mountains, hills, and ranges. This is so particularly in sub-locations in the south and west of Mount Kenya, along the eastern Aberdares into Nairobi, in the hilly coastal region and Mombasa, in the Taita Hills, or towards Mount Kilimanjaro. In the western region, sub-locations equipped with piped water are grouped along the Mau Escarpment, at the slopes of Mount Elgon, along the Elgayo and Nandi Escarpment, or in the Lake Victoria Basin, especially in Kisumu. With growing distance from mountains and ranges, in flatlands and river valleys, sub-locations increasingly rely on borehole water. This is especially the case in the semi-arid southeast of Mount Kenya, near the shores of Lake Victoria, and in most of the arid and semi-arid areas. In-between, protected wells spread all over the humid to semi-humid areas, mainly along the Aberdares towards Lake Bogoria, in Machakos, or in the Lake Victoria Basin, but they also dot the more arid zones. The most significant concentration of sub-locations relying on protected springs is found in middle altitudes in the Lake Victoria Basin. Rainwater collection is widespread in rural Kenya, but there are only few sub-locations where this is the main safe water source, e.g. along the shores of Lake Victoria or in Mandera.

Some 44% of Kenyans have no access to safe water, and only about one-quarter of all households have access to piped water. This and the diversity of safe water sources means that providing safe water to all Kenyans remains an important development challenge.

County	No. of households with access to safe water*	Households using piped water	Households using protected springs and wells	Households using boreholes
Nairobi	814.2	75.7%	0.9%	6.0%
Mombasa	198.7	52.9%	7.5%	13.6%
Kwale	62.8	28.2%	7.0%	16.0%
Kilifi	135.7	53.9%	7.4%	6.5%
Tana River	20.1	12.3%	12.0%	17.9%
Lamu	12.2	30.5%	16.6%	7.5%
Taita Taveta	47.0	59.2%	3.2%	3.5%
Garissa	63.2	28.1%	2.6%	33.1%
Wajir	40.7	1.5%	11.6%	32.6%
Mandera	47.2	5.7%	3.8%	27.0%
Marsabit	21.8	6.8%	11.6%	19.3%
Isiolo	19.1	49.2%	1.8%	9.8%
Meru	196.2	54.8%	3.1%	2.7%
Tharaka Nithi	42.8	32.4%	5.9%	9.9%
Embu	67.2	37.3%	5.4%	8.1%
Kitui	55.9	7.7%	8.5%	10.9%
Machakos	104.1	14.2%	11.6%	13.0%
Makueni	68.8	21.8%	9.8%	4.9%
Nyandarua	85.3	24.5%	22.3%	6.9%
Nyeri	131.3	56.0%	4.0%	1.9%
Kirinyaga	83.1	40.5%	8.3%	4.8%
Murang'a	110.3	24.1%	10.0%	6.1%
Kiambu	356.2	45.8%	18.1%	11.2%
Turkana	54.6	12.4%	4.2%	27.7%
West Pokot	22.5	9.1%	3.1%	11.7%
Samburu	16.7	14.4%	5.1%	15.4%
Trans Nzoia	112.5	11.6%	33.3%	21.0%
Uasin Gishu	156.4	32.4%	24.3%	20.5%
Elgeyo Marakwet	28.3	19.7%	10.5%	6.1%
Nandi	57.9	13.6%	17.2%	6.3%
Baringo	28.7	14.1%	4.7%	6.8%
Laikipia	55.7	29.6%	9.0%	14.2%
Nakuru	252.6	36.7%	7.6%	14.2%
Narok	36.2	6.9%	8.2%	5.6%
Kajiado	116.7	36.8%	4.7%	25.2%
Kericho	69.3	26.6%	11.7%	4.8%
Bomet	39.8	15.1%	8.5%	2.9%
Kakamega	217.7	5.8%	44.6%	10.5%
Vihiga	78.0	4.5%	56.6%	1.1%
Bungoma	195.8	10.3%	47.5%	14.4%
Busia	96.0	5.6%	33.6%	22.9%
Siaya	71.9	6.8%	13.9%	14.7%
Kisumu	124.3	25.3%	10.6%	18.0%
Homa Bay	58.5	5.6%	9.4%	12.8%
Migori	51.9	2.4%	13.2%	12.9%
Kisii	124.8	4.0%	43.8%	2.4%
Nyamira	64.0	3.8%	41.7%	1.8%
KENYA	**4,914.5**	**30.0%**	**14.3%**	**11.0%**

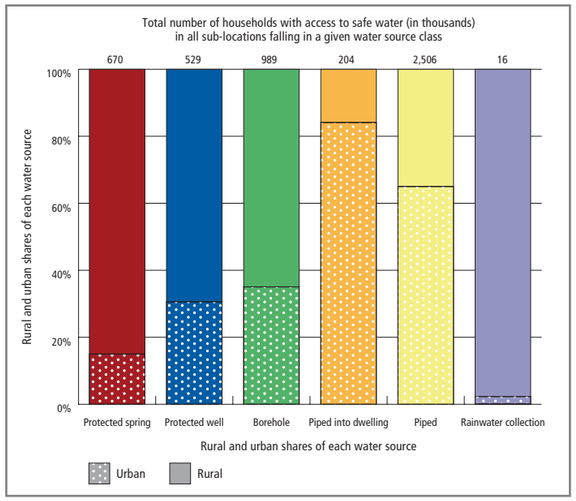
Abbreviation: no. = number

* in thousands

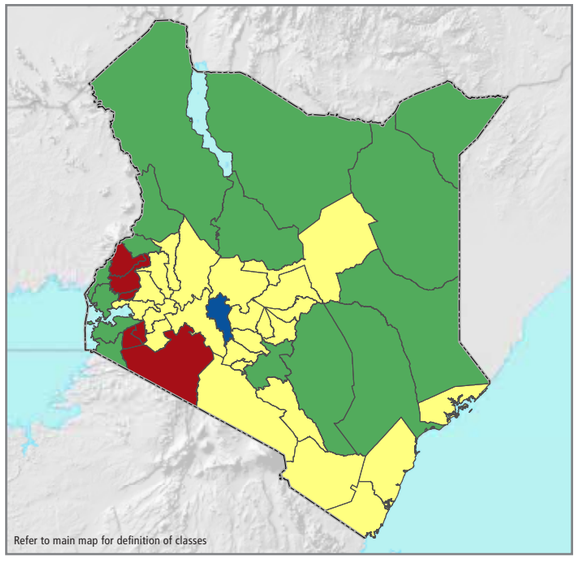
Data Source

2009 Kenya Population and Housing Census (Variable H24: Main Source of Water), Kenya National Bureau of Statistics.

3.02 Rural–Urban Distribution of Safe Water Sources



3.02 Most Common Safe Water Source at County Level



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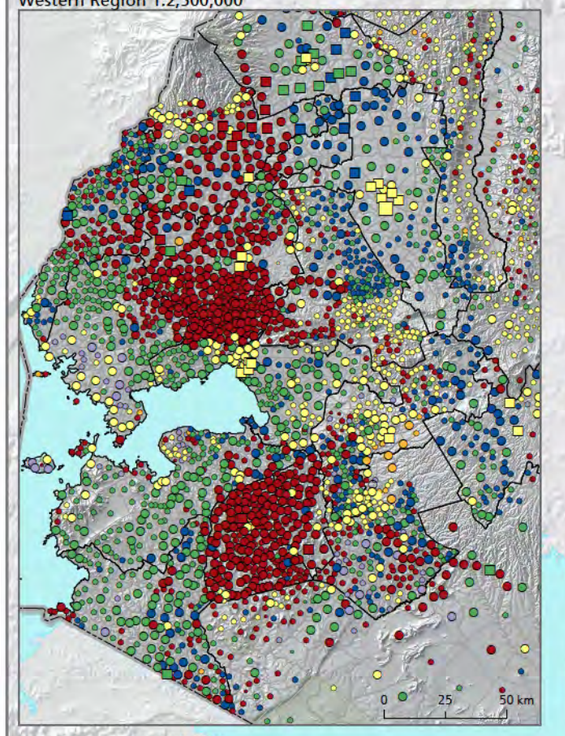
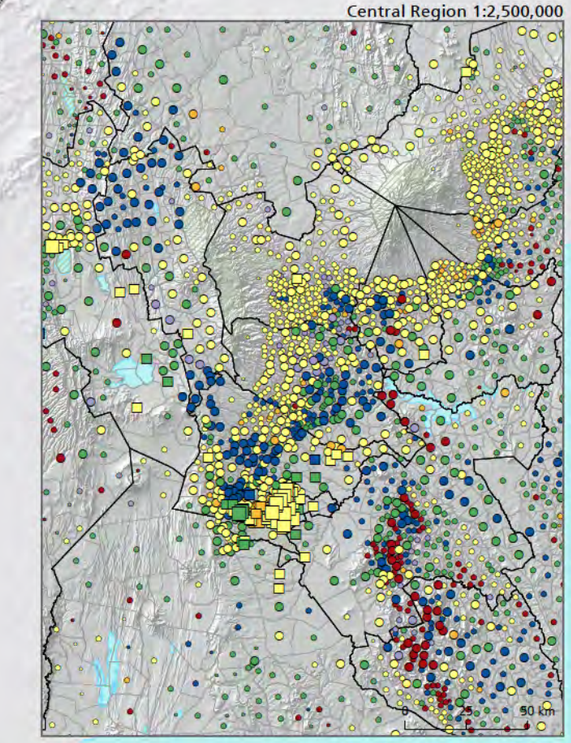
3.02 Most Commonly Used Safe Water Source

Republic of Kenya 1:4,000,000

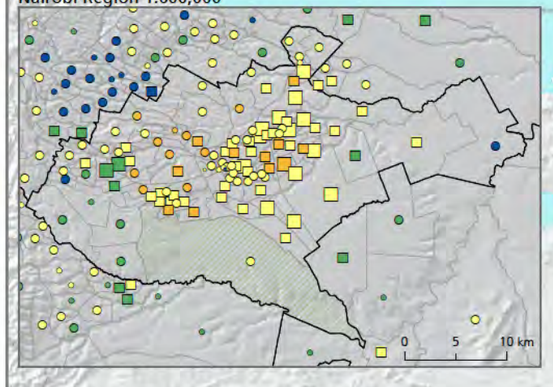
Western Region 1:2,500,000



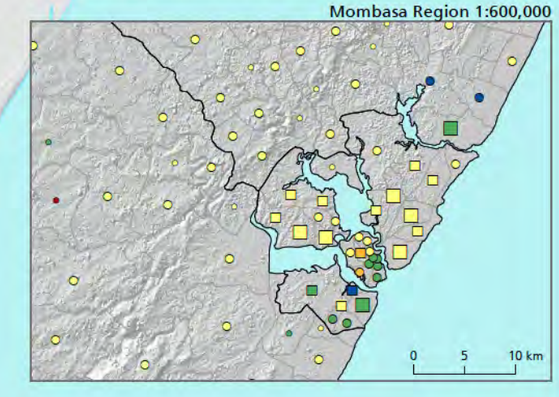
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Water source classes: Most commonly used safe water source (used by more than any other safe water source)

- Protected spring
- Protected well
- Borehole
- Piped into dwelling
- Piped
- Rainwater collection

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.03 Most Commonly Used Unsafe Water Source

Maps 3.01 and 3.02 indicated the location, number, and percentage of households (56%) with access to safe water, as well as the most common safe water sources in each region. The present map, by contrast, focuses on the 44% (3.85 million) of households that depend on unsafe water sources for their domestic needs. Based on the World Health Organization (WHO) classification of unsafe water sources, the map shows these households' most commonly used water sources. People using these sources face greater health risks and a greater burden in terms of fetching water, a task often carried out by women and girls.

WHO classifies the following water sources as unsafe: streams, unprotected wells, unprotected springs, ponds, lakes, dams, *jabias* (underground water collecting tanks and ponds) and vendor water (in small cans or tanker trucks). On the map, a water source is classified as "most commonly used" when the greatest number of households in a given area named it as their main source. This implies that other sources, both unsafe and safe, may also be accessible and used by individual households, e.g. when their main source is affected by water scarcity.

Despite limiting the perspective to the most commonly used unsafe water sources, quite clear patterns occur. Streams and rivers are by far the most important unsafe water source as they are used by 22% of all Kenyan households or 52% of all households with no access to safe water as their main water source. This is followed by unprotected wells and springs (10%/23%), and by water bought from vendors (7%/15%).

Streams and rivers are the most commonly used unsafe water source of the high-potential and the neighbouring semi-humid to semi-arid areas; the use of this source of water is dominant in rural sub-locations in the Mount Kenya and eastern Aberdare catchments, all along the Tana River to the coast, along the Athi River, in the Lake Victoria Basin, and along the rivers in the Rift Valley. Because of the relatively low rates of access to safe water sources (see map 3.01) the population of some counties is highly dependent on stream and river water, led by West Pokot, where 59% of all households depend on unsafe water from streams, followed by Elgeyo Marakwet (55%), Baringo (54%), Narok (47%), Bomet (42%), and Kitui (41%). In other counties of the said regions overall dependency on streams and rivers is not as high, simply because the percentage of the population with access to safe water sources is higher (see map 3.01); however, those households with no access to safe water remain highly dependent on stream and river water.

Ponds play an important role in Siaya and Homa Bay, lower parts of Bomet, rural Kwale and Kilifi, parts of Narok and Kisumu, and in the northern parts of Wajir and Mandera, while dams are especially important in rural Kilifi, parts of the north-eastern region, and in Nyandarua, Machakos, Tana River, or Laikipia. It should be borne in mind that ponds, dams, and lake water depend on surface flow from perennial and non-perennial streams.

Together with the high dependency on stream water this means that by far the majority of unsafe water sources are dependent on surface water flows. Considering that much piped water (see map 3.02) also depends on river intakes, it becomes clear that management of catchments in terms of water quantity and quality is a key development issue in most parts of Kenya. It is therefore particularly important to consider upstream and downstream relations and dependencies, in particular for those arid and semi-arid areas that depend on water flowing from high-potential areas.

Compared to surface water, groundwater-borne sources such as unprotected wells and springs play a less important role at the national level, but are still important or even dominant in some regions, e.g. in Uasin Gishu, Busia, the coastal region, and especially in large parts of the arid and semi-arid zones. The high numbers of unprotected springs and wells highlight one great potential for local improvement towards safer water sources.

In most urbanized settings like Nairobi, Mombasa, and most larger towns, the most common unsafe water source is water bought from vendors in cans or tanker trucks. Besides the health risks this may pose for the households without access to safe water, it also includes the problem that people forced to purchase water in this way (usually the poor) pay more per quantity than those (usually the rich) with their own access to safe water.

County	No. of hhs without access to safe water*	Hhs using streams or lake water	Hhs using ponds, dams, *jabia*	Hhs using unprotected springs/wells	Hhs using vendor water
Nairobi	170.8	0.1%	0.4%	0.3%	16.5%
Mombasa	70.0	0.1%	0.5%	1.0%	24.4%
Kwale	59.2	11.3%	21.1%	14.0%	2.1%
Kilifi	64.0	4.6%	13.7%	7.3%	6.1%
Tana River	27.4	27.8%	7.9%	13.1%	3.6%
Lamu	10.0	3.1%	13.5%	27.3%	1.2%
Taita Taveta	24.1	23.3%	0.9%	3.8%	5.7%
Garissa	35.4	7.7%	4.3%	11.3%	3.0%
Wajir	47.9	0.1%	14.5%	26.8%	12.5%
Mandera	78.3	6.8%	31.7%	10.4%	13.2%
Marsabit	35.2	1.9%	11.1%	38.1%	10.6%
Isiolo	12.3	10.8%	0.9%	23.5%	3.4%
Meru	123.4	24.8%	0.5%	4.2%	8.8%
Tharaka Nithi	46.0	44.6%	0.4%	6.1%	0.6%
Embu	64.5	31.1%	3.8%	10.9%	3.1%
Kitui	149.5	41.0%	5.1%	23.1%	3.5%
Machakos	160.4	23.2%	8.0%	18.5%	10.9%
Makueni	117.7	33.4%	5.2%	19.9%	4.6%
Nyandarua	58.6	20.3%	9.5%	7.5%	3.4%
Nyeri	70.4	27.7%	1.4%	3.4%	2.4%
Kirinyaga	71.1	41.0%	0.4%	2.8%	1.9%
Murang'a	145.3	45.6%	1.4%	8.0%	1.8%
Kiambu	113.1	11.4%	0.8%	2.5%	9.3%
Turkana	68.6	23.3%	0.6%	30.0%	1.5%
West Pokot	71.3	58.8%	3.5%	13.2%	0.5%
Samburu	30.7	25.3%	5.6%	32.5%	1.3%
Trans Nzoia	57.6	20.3%	0.7%	10.5%	2.2%
Uasin Gishu	45.9	9.0%	0.8%	11.5%	1.3%
Elgeyo Marakwet	49.3	54.6%	0.8%	7.8%	0.3%
Nandi	96.2	41.9%	1.1%	18.5%	0.9%
Baringo	82.0	54.3%	6.5%	9.2%	1.1%
Laikipia	47.4	26.1%	8.0%	8.4%	3.5%
Nakuru	157.2	17.3%	2.6%	4.2%	14.2%
Narok	133.0	46.8%	13.7%	12.0%	5.7%
Kajiado	56.8	9.1%	4.2%	4.8%	14.5%
Kericho	88.6	42.7%	1.0%	10.7%	1.7%
Bomet	104.8	42.0%	18.4%	11.4%	0.7%
Kakamega	138.0	22.6%	0.8%	14.8%	0.6%
Vihiga	45.3	22.3%	0.5%	13.0%	1.0%
Bungoma	75.1	9.6%	0.3%	16.6%	1.2%
Busia	58.2	15.4%	1.2%	20.4%	0.5%
Siaya	127.2	37.4%	14.5%	10.2%	1.7%
Kisumu	102.4	26.8%	4.4%	5.1%	8.8%
Homa Bay	147.8	48.3%	11.9%	10.1%	1.3%
Migori	128.3	46.0%	5.4%	19.0%	0.7%
Kisii	120.2	31.7%	0.3%	16.6%	0.4%
Nyamira	67.0	30.2%	0.9%	19.7%	0.3%
KENYA	**3,853.5**	**22.7%**	**4.3%**	**10.1%**	**6.5%**

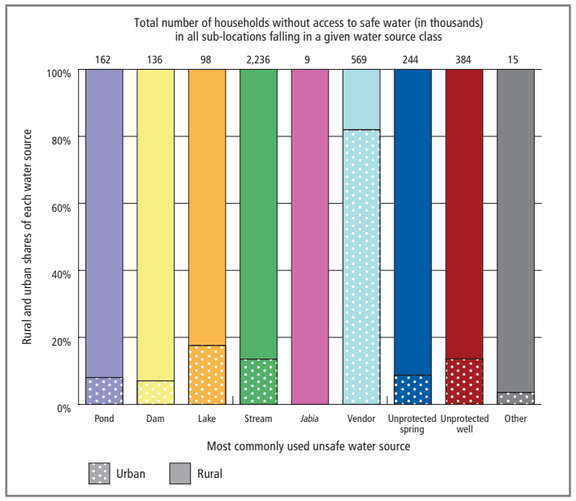
Abbreviations: no. = number; hhs = households

* in thousands

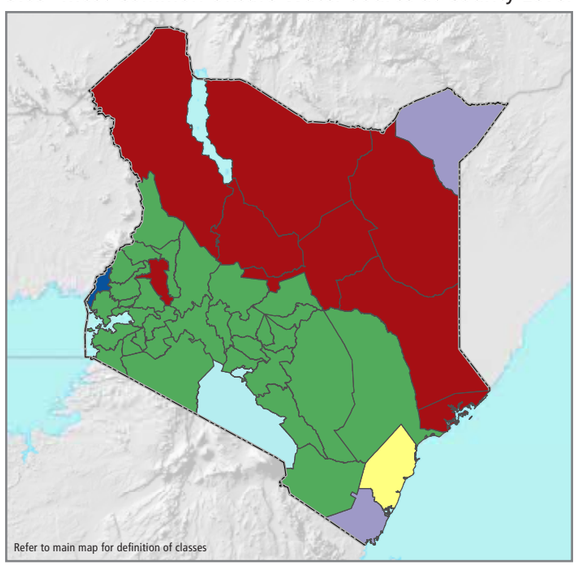
Data Source

2009 Kenya Population and Housing Census (Variable H24: Main Source of Water), Kenya National Bureau of Statistics.

3.03 Rural–Urban Distribution of Unsafe Water Sources



3.03 Most Common Unsafe Water Source at County Level



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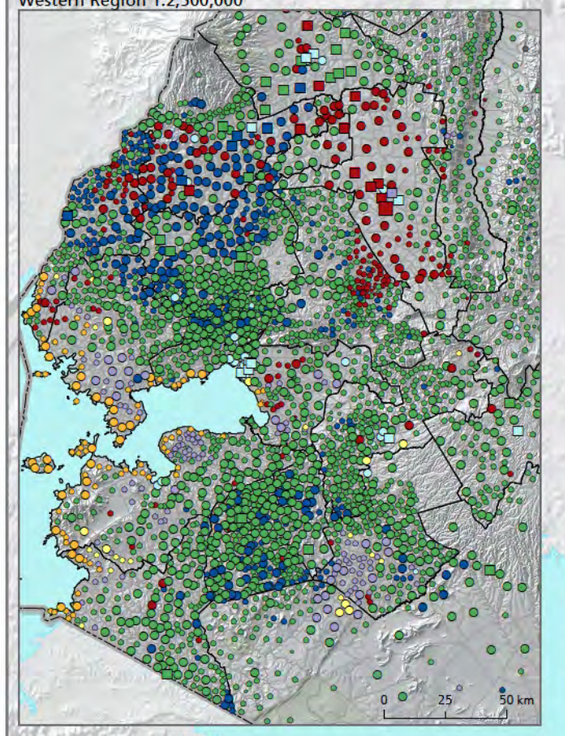
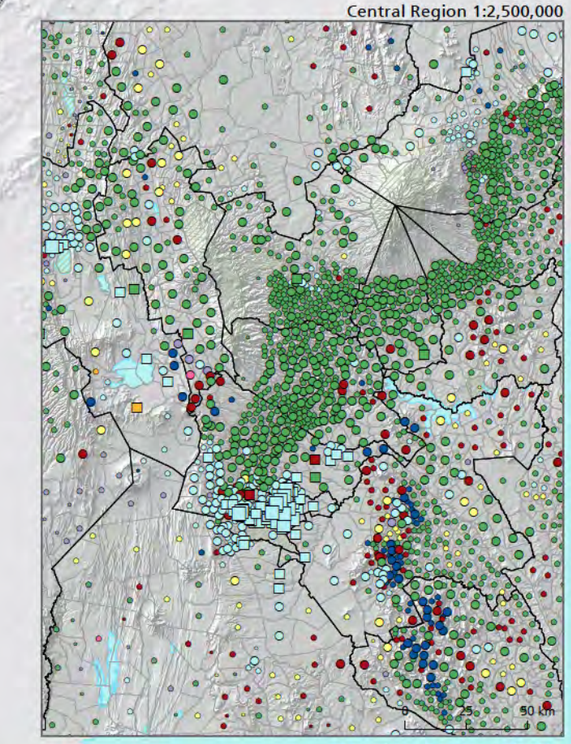
3.03 Most Commonly Used Unsafe Water Source

Republic of Kenya 1:4,000,000

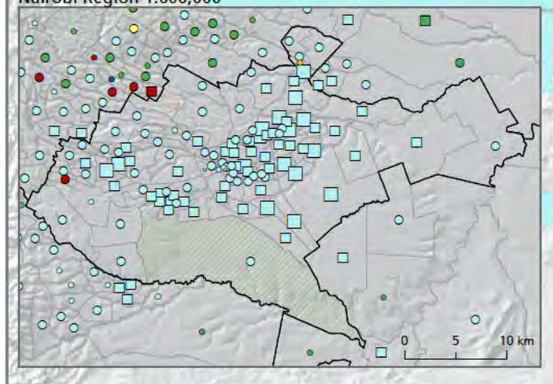
Western Region 1:2,500,000



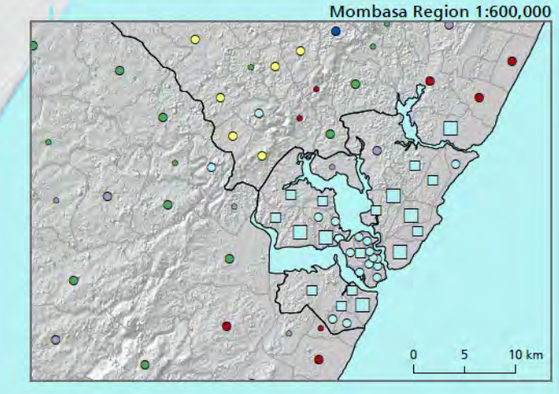
Central Region 1:2,500,000

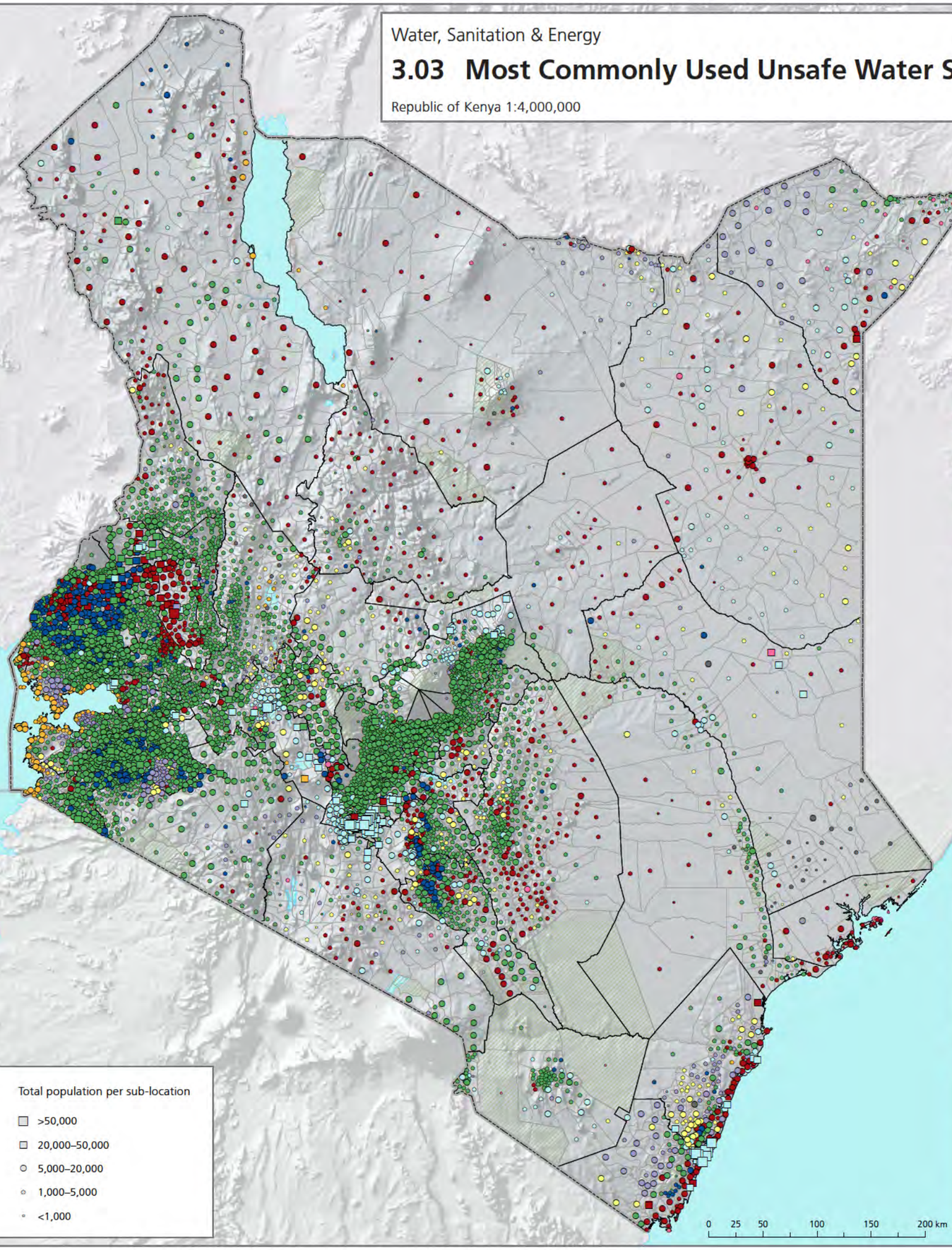


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Water source classes: Most commonly used unsafe water source (used by more households than any other unsafe water source)

- Pond
- Stream
- Unprotected spring
- Dam
- *Jabia*
- Unprotected well
- Lake
- Vendor
- Other

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.04 Access to Improved Sanitation

High proportions of populations in many regions of the world still have no access to sanitary infrastructure and services to hygienically dispose of human excreta. Poor hygiene standards and dependency on unsafe water are often interrelated, affecting people's health, the economy, and the environment. The state of sanitation thus remains a powerful indicator of human development in any community.

The 2009 census assessed the main sanitation facilities used by households. According to the World Health Organization, these can be classified into improved and unimproved sanitation facilities. Improved facilities include covered latrines; flush or pour-flush toilets or latrines connected to a main sewer line; ventilated improved pit latrines (VIPs); septic tanks as part of a small-scale sewage treatment system; cesspools in the form of pits; conservancy tanks; or covered cisterns. Unimproved facilities include flush or pour-flush toilets and uncovered latrines which discharge directly into open sewers or ditches, bucket latrines, and defecation in the bush or a field and other modes of directly discharging into a waterbody or in the open. The present map shows the proportion of households with access to an improved sanitation facility, while the next map (3.05) shows which of the improved and unimproved sanitation facilities are most common in the different parts of the country.

In Kenya, two in three households (65%) have access to improved sanitation facilities. This corresponds to the global average and is high compared to the figures for most of sub-Saharan Africa. However, the map reveals that the proportion of households with access to improved facilities varies greatly in Kenya. At the sub-location level, access varies from 0% to 100%, and even at the county level it spans from 8% in Wajir to 87% in Nairobi.

Both the county map and the main map reveal similar regional patterns to those of access to safe water (see map 3.01). This is not astonishing as water and sanitation access are often developed in parallel. However, while 5.7 million households have access to improved sanitation facilities, only 4.9 million have access to safe water. One possible explanation is that in the sanitation sector, individual and local solutions are more easily implemented than in the water sector.

A spatial pattern that becomes apparent at the county level and even more so at the sub-location level is the divide between high-potential areas and semi-arid/arid regions. The high-potential areas of central and western Kenya reach an average access rate of 72%, with as many as six counties showing rates of more than 80% (see table). In contrast, the lower-potential areas exhibit an average access rate of 44%, with five counties showing rates of below 25%; this means that on average, not even every fourth household has access to an improved sanitation facility. The pattern becomes even more marked in rural sub-locations, with most showing values of below 25% and in many areas below 5%.

This pattern partly reflects the distribution of welfare and poverty in the country (see chapter 6) but it mainly also mirrors population densities (see map 2.01). In highly populated areas, poor sanitation facilities pose a higher risk to human health and the environment than in low density zones, where agro-pastoralism and pastoralism prevail. This consideration implies that developing improved sanitation facilities deserves special attention in low-access areas located in high-potential and highly populated zones. Pockets of low access to improved sanitation facilities are mostly found in the Lake region, but also in the hinterland of the coast and in the vicinity of urban centres in the arid and semi-arid zones where population densities increase.

The second distinct pattern is the difference between rural and urban areas. Nairobi and Mombasa are among the counties with the highest rates; the rural–urban graph also shows that many urban settings have access rates of above 75%. As high population densities increase risks associated with poor sanitation, the considerable number of urban areas with access rates of below 75% or even below 50% deserve special attention in water and sanitation policies and approaches.

County	Hhs with access to improved sanitation	Rank	No. of hhs with access to improved sanitation*	No. of hhs without access to improved sanitation*
Nairobi	86.8%	1	855.4	129.6
Mombasa	81.2%	5	218.2	50.5
Kwale	34.0%	39	41.5	80.5
Kilifi	48.0%	33	95.8	104.0
Tana River	23.1%	43	10.9	36.5
Lamu	57.1%	27	12.7	9.5
Taita Taveta	67.8%	18	48.2	22.9
Garissa	31.0%	40	30.6	68.0
Wajir	7.5%	47	6.6	82.0
Mandera	16.4%	45	20.5	105.0
Marsabit	25.9%	42	14.7	42.2
Isiolo	42.1%	35	13.2	18.1
Meru	78.1%	8	249.6	70.0
Tharaka Nithi	60.6%	26	53.8	35.0
Embu	65.6%	20	86.3	45.4
Kitui	54.0%	30	111.0	94.5
Machakos	62.7%	23	166.0	98.5
Makueni	56.4%	28	105.1	81.4
Nyandarua	74.1%	12	106.6	37.3
Nyeri	74.3%	11	149.9	51.8
Kirinyaga	82.9%	4	127.8	26.4
Murang'a	69.1%	16	176.7	79.0
Kiambu	80.5%	6	377.5	91.7
Turkana	12.2%	46	15.0	108.2
West Pokot	26.8%	41	25.1	68.7
Samburu	21.6%	44	10.2	37.1
Trans Nzoia	75.0%	10	127.6	42.6
Uasin Gishu	78.6%	7	159.0	43.3
Elgeyo Marakwet	48.4%	32	37.6	40.0
Nandi	72.7%	13	112.0	42.1
Baringo	41.0%	36	45.4	65.2
Laikipia	72.3%	14	74.5	28.6
Nakuru	76.9%	9	315.0	94.8
Narok	36.7%	38	62.1	107.1
Kajiado	61.0%	24	105.8	67.7
Kericho	64.4%	21	101.6	56.3
Bomet	69.0%	17	99.8	44.8
Kakamega	83.5%	3	297.0	58.7
Vihiga	85.6%	2	105.6	17.7
Bungoma	71.5%	15	193.7	77.1
Busia	60.7%	25	93.5	60.7
Siaya	47.9%	34	95.3	103.7
Kisumu	56.2%	29	127.5	99.3
Homa Bay	40.7%	37	83.9	122.3
Migori	51.4%	31	92.6	87.7
Kisii	64.0%	22	156.7	88.3
Nyamira	66.8%	19	87.6	43.4
KENYA	**65.0%**	**–**	**5,702.8**	**3,065.2**

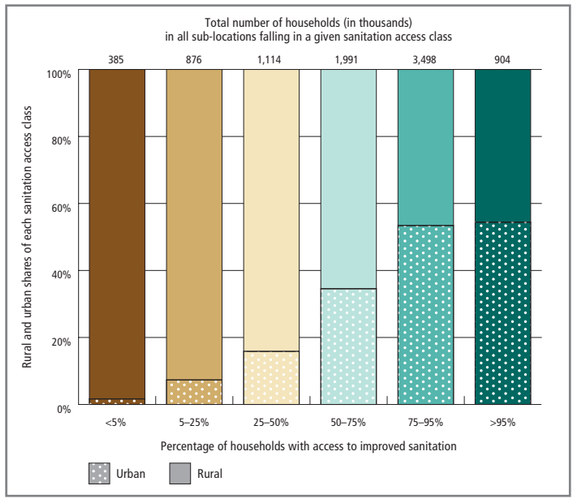
Abbreviations: hhs = households; no. = number

* in thousands

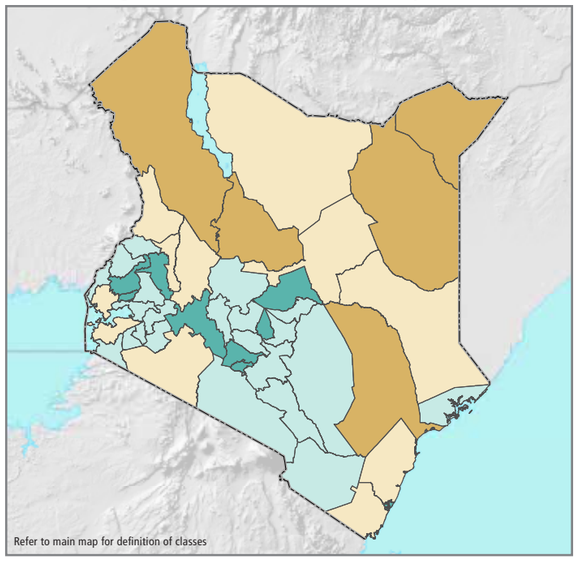
Data Source

2009 Kenya Population and Housing Census (Variable H25: Main Mode of Human Waste Disposal), Kenya National Bureau of Statistics.

3.04 Rural–Urban Distribution of Sanitation Access Classes



3.04 Average Sanitation Access at County Level

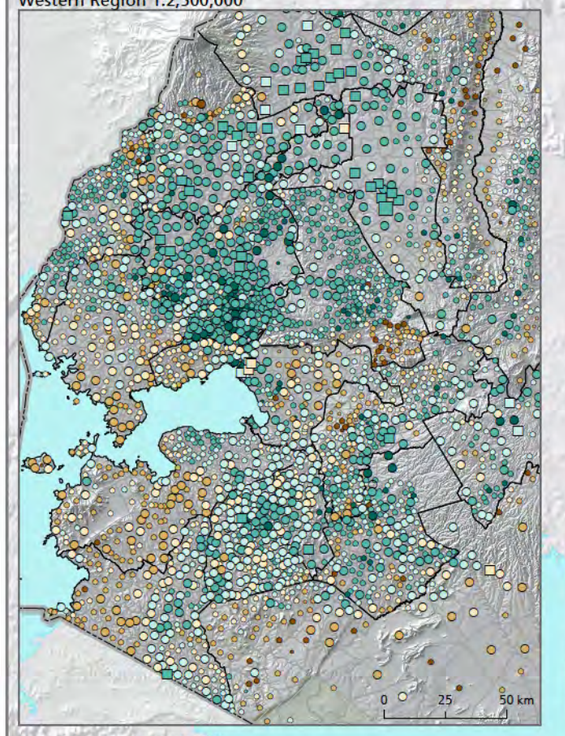


Water, Sanitation & Energy

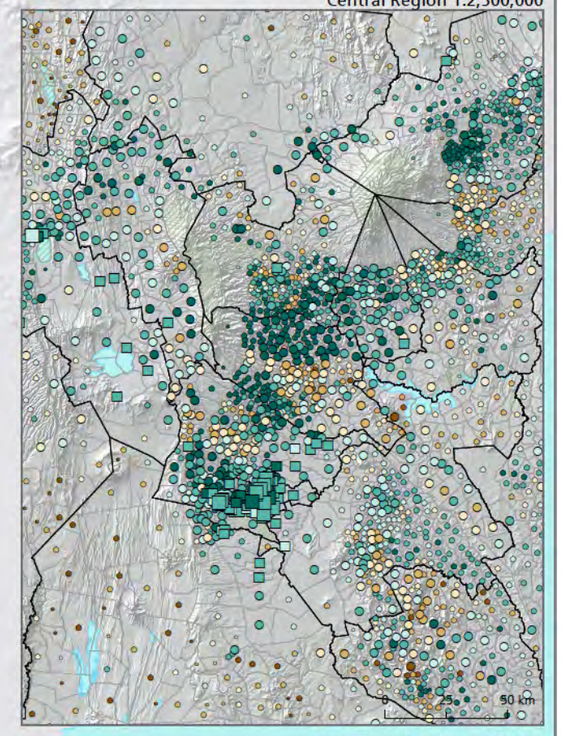
3.04 Access to Improved Sanitation

Republic of Kenya 1:4,000,000

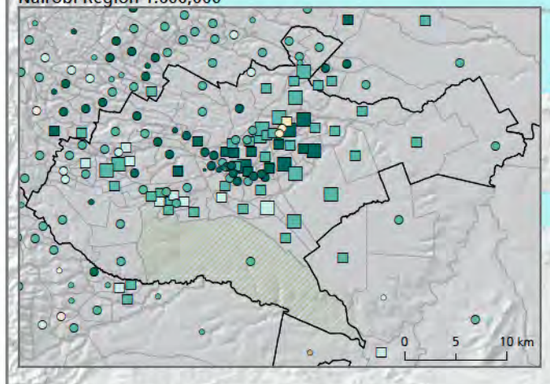
Western Region 1:2,500,000



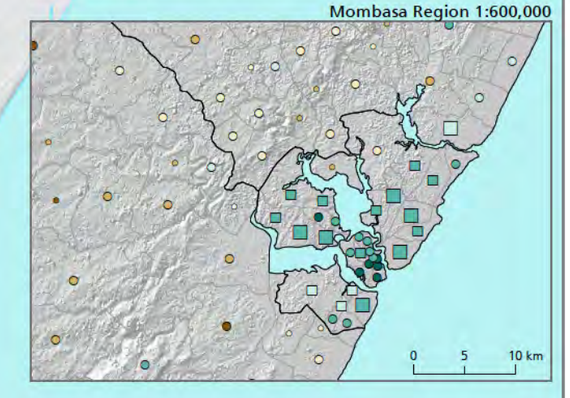
Central Region 1:2,500,000

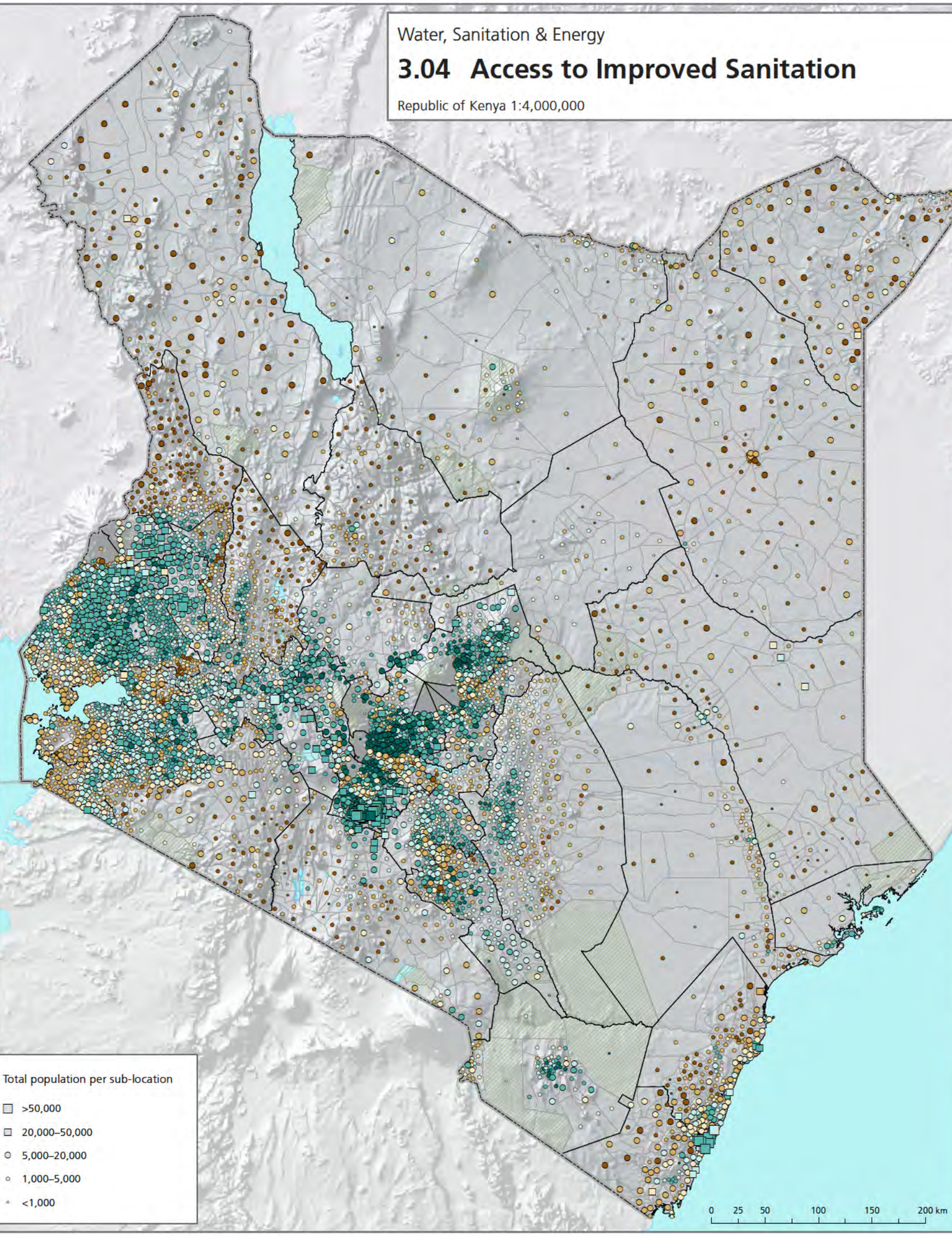


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Sanitation access classes: Percentage of households with access to improved sanitation (sewer, cesspool, septic tank, ventilated improved pit latrine, covered latrine)

- Less than 5% of households
- 5 to 25% of households
- 25 to 50% of households
- 50 to 75% of households
- 75 to 95% of households
- More than 95% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.05 Most Commonly Used Sanitation Facility Type

Poor sanitation facilities pose significant risks to human health and the environment, especially in densely populated areas. Controlled and safe human waste disposal through improved sanitation facilities is imperative for human well-being and a healthy environment. Map 3.04 showed the proportion of Kenyan households with access to improved sanitation facilities. While almost two-thirds of households have access, there are considerable differences along ecological and centre–periphery gradients. The present map (3.05) goes into further detail by showing the most commonly used sanitation facilities in the different parts of the country. A facility is marked thus when in a given area no other facility type is used by more households.

More than half of all households in Kenya (54% or 4.9 million) rely on covered latrines and ventilated improved pit latrines (VIPs), both of which are classified as improved sanitation facilities by the World Health Organization. Another 11% or almost 1 million households have access to other improved facilities. These include flush or pour-flush toilets or latrines connected either to a main sewer line or to septic tanks, cesspools in the form of pits, conservancy tanks, or covered cisterns. Although these figures compare favourably with most other sub-Saharan contexts and match the global average, there are still 35% or about three million households in Kenya that have no access to improved sanitation facilities. Far more households than are connected to sewers are forced to dispose of their human waste in uncovered latrines and buckets (21% or 1.9 million) or in the bush (14% or 1.2 million).

Covered latrines are by far the most dominant improved sanitation facility in the densely populated high-potential areas and along the coast. In seven counties located in these areas, more than 70% of households have access to covered latrines, led by Vihiga (85%) and Kakamega (81%). However, throughout these areas there are still pockets of unimproved facilities in the form of uncovered latrines. While not dominant in any of the counties, their proportion increases at the fringes of high-potential areas where poverty rates are higher (see map 5.02). Special attention must be paid to densely populated parts of the country where open defecation is dominant, as risks related to poor or non-existing sanitation are particularly high. These areas are concentrated especially in the Lake region as well as along the coast and the Tana River; open defecation is the single most commonly used form of sanitation in Homa Bay, Kwale, Kilifi, and Tana River counties.

Open defecation also clearly dominates in all arid and semi-arid areas of the country. In seven counties of these zones more than 60% use this form of sanitation, led by Turkana (82%). But as population densities in these regions are typically below 50 people per square kilometre, this form of human waste disposal poses fewer risks than in the high-potential areas where densities are above 200 or even 500 people per square kilometre (see map 2.01). Improving sanitation systems becomes important in areas of emerging higher population densities in the arid and semi-arid zones, in particular in and around towns.

Main sewers, septic tanks, and cesspools are exclusively confined to urban settings (see rural–urban graph). They dominate in many sub-locations of the major towns of the country and in particular in Nairobi, where 58% of all households have access to these improved types of sanitation facilities that are adequate for the high population densities in urban environments. However, the map and graph show that a considerable number of urban sub-locations all over the country still rely on non-improved sanitation facilities in the form of uncovered latrines, buckets, and even open defecation. At population densities of more than 500 or 1,000 people per square kilometre, these pose high risks that require extra efforts in the field of water and sanitation. In addition, a large number of urban sub-locations rely on covered latrines. These are classified as improved sanitation facilities, but it is uncertain whether this type of sanitation facility is appropriate in the long run for high-density urban areas.

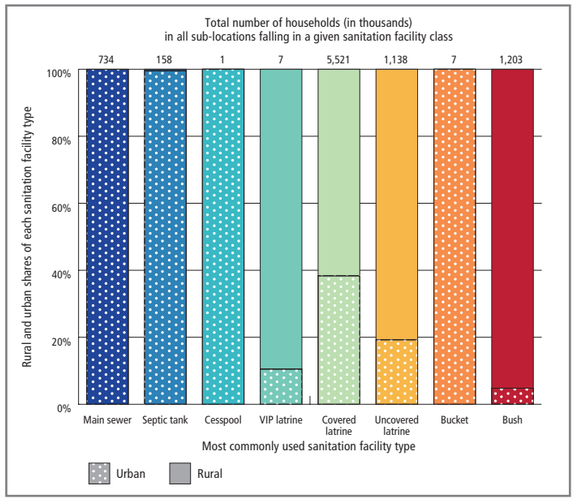
County	Hhs using main sewer, septic tank, or cesspool	Hhs using VIP latrine or covered latrine	Hhs using uncovered latrine or bucket	Hhs using bush
Nairobi	58.4%	28.4%	12.4%	0.4%
Mombasa	28.4%	52.8%	16.5%	2.1%
Kwale	3.2%	30.8%	14.8%	51.1%
Kilifi	9.5%	38.5%	18.1%	33.8%
Tana River	0.9%	22.2%	6.5%	70.2%
Lamu	4.2%	52.9%	20.8%	21.7%
Taita Taveta	6.1%	61.7%	26.5%	5.6%
Garissa	2.2%	28.9%	20.8%	47.6%
Wajir	0.6%	6.8%	15.8%	76.5%
Mandera	0.3%	16.0%	17.6%	65.7%
Marsabit	0.3%	25.6%	9.6%	64.3%
Isiolo	7.0%	35.1%	13.7%	43.9%
Meru	2.4%	75.6%	19.4%	2.3%
Tharaka Nithi	1.7%	58.9%	35.6%	3.7%
Embu	5.9%	59.6%	32.7%	1.7%
Kitui	0.9%	53.1%	15.1%	30.8%
Machakos	8.2%	54.5%	34.4%	2.6%
Makueni	1.0%	55.3%	41.6%	2.0%
Nyandarua	1.0%	73.1%	25.7%	0.2%
Nyeri	8.6%	65.7%	25.4%	0.2%
Kirinyaga	4.2%	78.7%	16.5%	0.5%
Murang'a	3.2%	65.9%	30.6%	0.2%
Kiambu	16.5%	64.0%	19.3%	0.2%
Turkana	0.5%	11.7%	5.7%	82.0%
West Pokot	0.4%	26.4%	6.1%	67.1%
Samburu	0.9%	20.7%	5.0%	73.4%
Trans Nzoia	2.6%	72.4%	22.3%	2.6%
Uasin Gishu	11.7%	66.9%	19.6%	1.7%
Elgeyo Marakwet	0.9%	47.6%	32.9%	18.7%
Nandi	0.9%	71.8%	22.5%	4.7%
Baringo	1.3%	39.7%	16.0%	42.9%
Laikipia	12.0%	60.2%	16.4%	11.3%
Nakuru	12.3%	64.5%	20.3%	2.7%
Narok	1.4%	35.3%	14.9%	48.3%
Kajiado	11.6%	49.4%	13.4%	25.5%
Kericho	2.7%	61.7%	29.0%	6.6%
Bomet	0.8%	68.3%	25.2%	5.7%
Kakamega	2.4%	81.1%	15.0%	1.4%
Vihiga	0.6%	85.1%	13.5%	0.7%
Bungoma	1.6%	69.9%	25.2%	3.0%
Busia	1.0%	59.7%	31.4%	7.8%
Siaya	0.6%	47.3%	31.9%	20.0%
Kisumu	7.4%	48.8%	31.3%	12.1%
Homa Bay	1.1%	39.6%	20.5%	38.5%
Migori	0.9%	50.5%	15.5%	33.0%
Kisii	1.2%	62.7%	35.3%	0.7%
Nyamira	0.4%	66.5%	32.6%	0.5%
KENYA	**11.4%**	**53.6%**	**21.2%**	**13.6%**

Abbreviations: hhs = households; VIP = ventilated improved pit

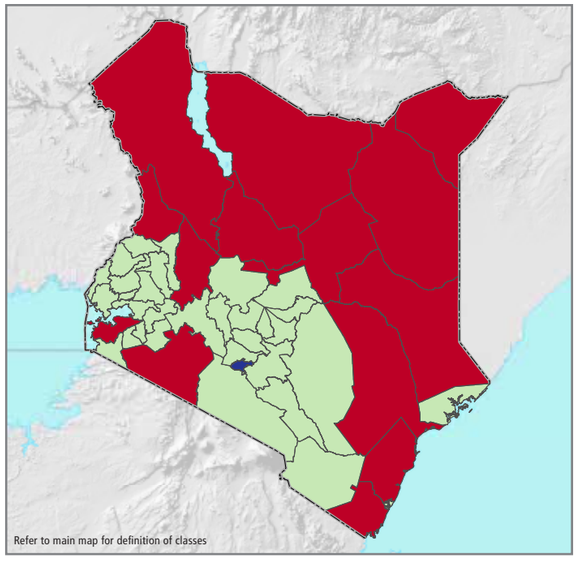
Data Source

2009 Kenya Population and Housing Census (Variable H25: Main Mode of Human Waste Disposal), Kenya National Bureau of Statistics.

3.05 Rural–Urban Distribution of Sanitation Facility Types



3.05 Most Common Sanitation Facility at County Level

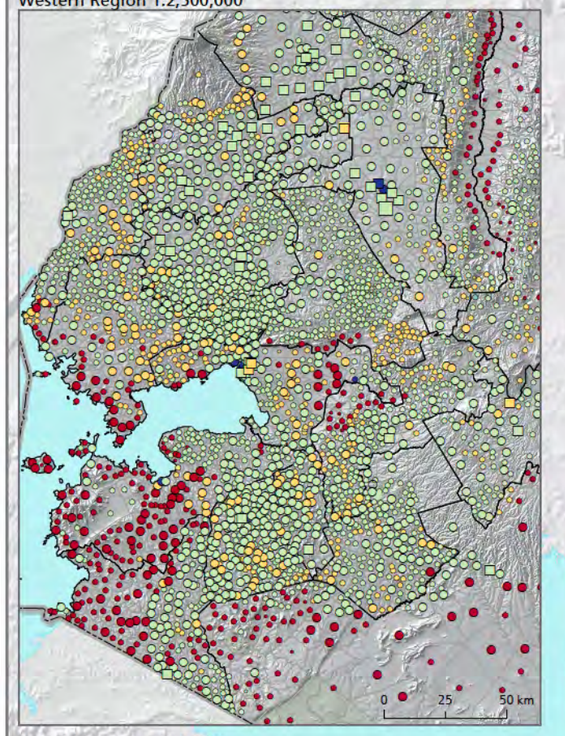


Water, Sanitation & Energy

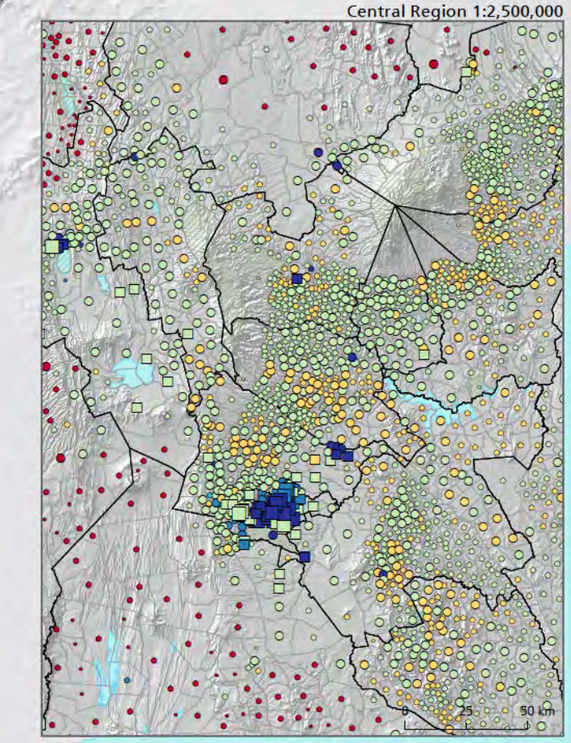
3.05 Most Commonly Used Sanitation Facility Type

Republic of Kenya 1:4,000,000

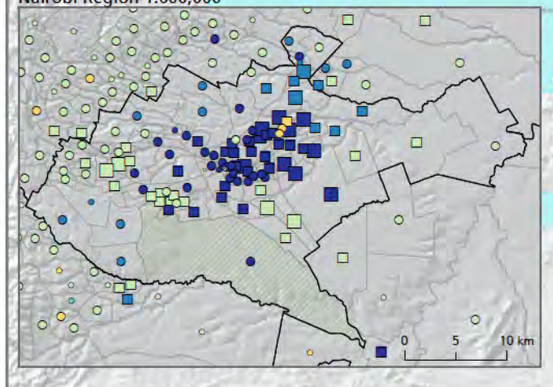
Western Region 1:2,500,000



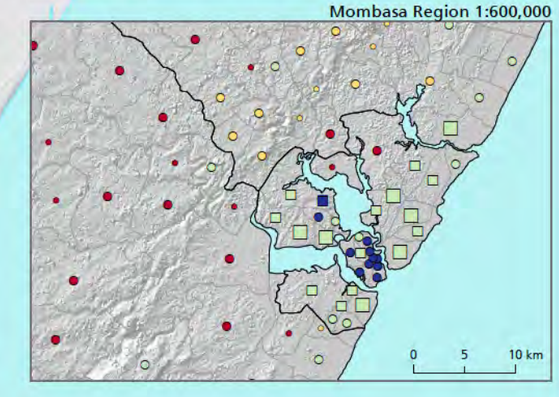
Central Region 1:2,500,000

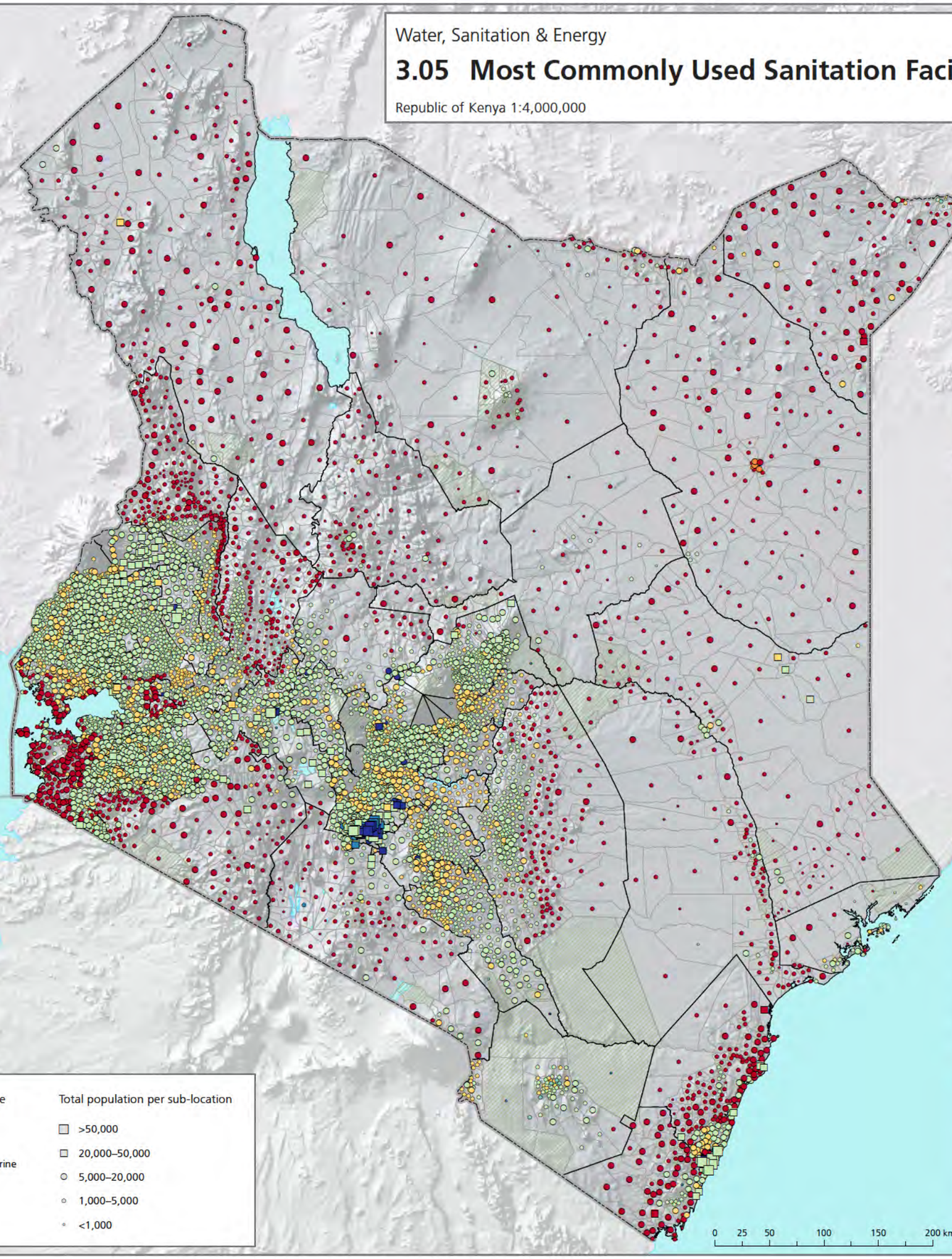


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Sanitation facility classes: Most commonly used sanitation facility type (used by more households than any other sanitation facility type)

Improved:
- Main sewer
- Septic tank
- Cesspool
- Ventilated improved pit latrine
- Covered latrine

Unimproved:
- Uncovered latrine
- Bucket
- Bush

Total population per sub-location
- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders
- International border
- County border
- Sub-location border

Features
- National park
- Waterbody

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3.06 The Use of Solid Biofuels for Cooking

After highlighting the aspects of water and sanitation on the previous maps in this chapter, the following maps display the use of energy by households. The composition of energy use in the different parts of the country gives important indications as to levels of economic development and the interaction with the natural environment. Cooking and lighting are basic household needs that require energy; the main energy sources to cover these needs are solid biofuels, fossil fuels, and electricity. The following three maps (3.06, 3.07, 3.08) illustrate the diversity of energy sources used by Kenyan households for cooking and lighting.

Solid biofuels come from biomass such as wood, shrubs, grass, crop residues, and dung. Biomass is either directly used for energy, or transformed into charcoal in kilns. The direct energy use of biomass usually takes place close to its production, while charcoal has separate sites of production and use, and is often transported over long distances. The advantage of solid biofuels is their reliance on the country's own resources, but overuse of biomass can cause gross environmental degradation. In addition, the technologies used for cooking with solid biofuels, such as open fires or stoves (*jikos* in the Kenyan context), result in incomplete combustion and high levels of smoke exposure. A broad range of respiratory diseases attributable to indoor air pollution affect, in particular, young children and women. Women are also mostly affected by the time used for fuel gathering, limiting productive alternatives.

The present map shows that overall, 82.5% or 7.2 million households use solid biofuels as their main energy source for cooking. Only 1.6 million households refer to other energy sources such as paraffin (11.5%), gas (5%), and electricity (1%). With this high reliance on solid biofuels, Kenya is comparable to most of sub-Saharan Africa where biofuel dependency is estimated at 80%. Energy for cooking still largely depends on biomass production close to home; almost two-thirds (64.5%) of all Kenyan households still rely on the use of unprocessed biomass, while only 17% mainly use charcoal.

The map shows that most households in Kenya – 90% or more – rely on traditional cooking fuels. Only four counties are below the national average of 82.5%: Nairobi (19%), Mombasa (49%), Kiambu (63%), and Kajiado (67%). This points to a clear divide between the large urban centres on the one hand, and smaller towns and rural areas on the other. This is confirmed by the rural–urban graph and is clearly visible on the main map, where the cities of Mombasa and Nairobi stand out. The case of Nairobi is particularly interesting, because the map shows that sub-locations with low percentages of biofuel use are spreading beyond the boundary of Nairobi county, indicating the extent of this megacity. This expansion of Nairobi's agglomeration into Kiambu and Kajiado explains why these counties show values below the national average.

The divide between the major urban agglomerations and the rest of the country in terms of energy use is further reinforced by the dominant type of solid biofuels. While direct use of biomass – mainly in the form of firewood – prevails in most parts of Kenya, charcoal is used by 92% of all households relying on solid biofuels in Nairobi. High proportions of charcoal use are also recorded in Mombasa (87%), Nakuru (47%), and all other counties with larger urban agglomerations. These observations imply that in urban settings people are changing their energy use, either by diversifying to energy sources other than solid biofuels, or by importing biomass in the form of charcoal from rural areas. This creates income in the rural charcoal production areas, particularly in the semi-arid lands, where a major share of Kenya's charcoal is produced.

The same pattern may also apply to the better-off rural areas, possibly explaining the variation of percentages in the present map. However, special attention must be paid to poor urban and rural households which cannot afford the alternatives despite a shortage of firewood in densely populated areas. For these households, energy collection becomes a heavy burden and a threat to the environment, and calls for affordable alternatives.

County	Percentage of hhs using solid biofuels for cooking	Rank	No. of hhs using firewood for cooking*	No. of hhs using charcoal for cooking*
Nairobi	18.5%	47	13.9	162.5
Mombasa	48.8%	46	17.2	110.4
Kwale	91.9%	35	97.9	14.0
Kilifi	88.3%	39	133.9	41.6
Tana River	98.2%	7	38.4	8.1
Lamu	94.5%	30	15.7	5.1
Taita Taveta	92.4%	33	48.8	16.7
Garissa	97.5%	11	77.7	17.9
Wajir	98.7%	4	84.1	3.1
Mandera	99.1%	1	117.1	7.0
Marsabit	98.0%	9	52.2	3.5
Isiolo	94.4%	31	20.4	9.1
Meru	94.8%	29	261.8	40.4
Tharaka Nithi	96.5%	22	78.9	6.7
Embu	92.2%	34	105.9	15.1
Kitui	96.9%	18	181.5	17.3
Machakos	84.3%	43	181.0	41.3
Makueni	96.0%	25	158.1	20.8
Nyandarua	97.1%	17	111.9	27.7
Nyeri	88.7%	38	146.6	31.8
Kirinyaga	90.4%	37	116.3	22.9
Murang'a	91.3%	36	216.1	17.0
Kiambu	62.5%	45	167.3	124.0
Turkana	98.9%	2	106.9	14.4
West Pokot	98.8%	3	86.2	6.4
Samburu	98.5%	5	38.1	8.4
Trans Nzoia	94.9%	28	130.6	30.6
Uasin Gishu	86.4%	41	110.3	63.8
Elgeyo Marakwet	98.4%	6	70.0	6.3
Nandi	97.6%	10	137.2	13.1
Baringo	98.0%	8	95.6	12.6
Laikipia	92.5%	32	69.0	26.1
Nakuru	85.8%	42	186.8	163.5
Narok	96.5%	23	134.3	28.4
Kajiado	66.6%	44	71.1	43.6
Kericho	96.1%	24	132.4	19.1
Bomet	97.5%	12	132.8	8.1
Kakamega	95.8%	26	308.0	32.1
Vihiga	96.6%	19	112.2	6.9
Bungoma	96.5%	21	230.3	30.6
Busia	97.2%	16	128.5	21.1
Siaya	97.2%	15	164.1	29.1
Kisumu	87.9%	40	132.1	66.6
Homa Bay	97.5%	13	173.2	27.7
Migori	96.5%	20	143.6	30.1
Kisii	95.7%	27	211.5	22.9
Nyamira	97.4%	14	118.9	8.6
KENYA	**82.5%**	**–**	**5,666.2**	**1,483.9**

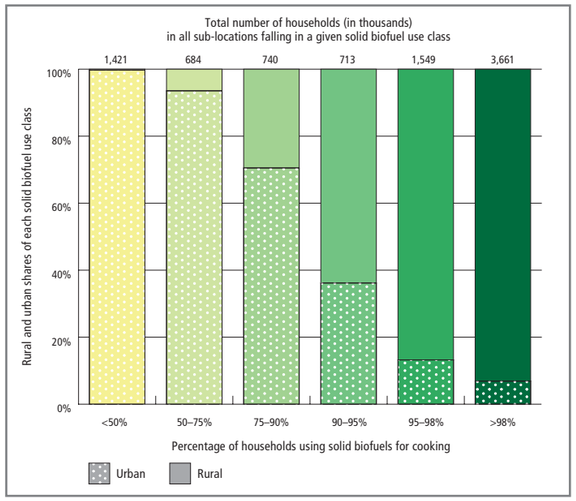
Abbreviations: hhs = households; no. = number

* in thousands

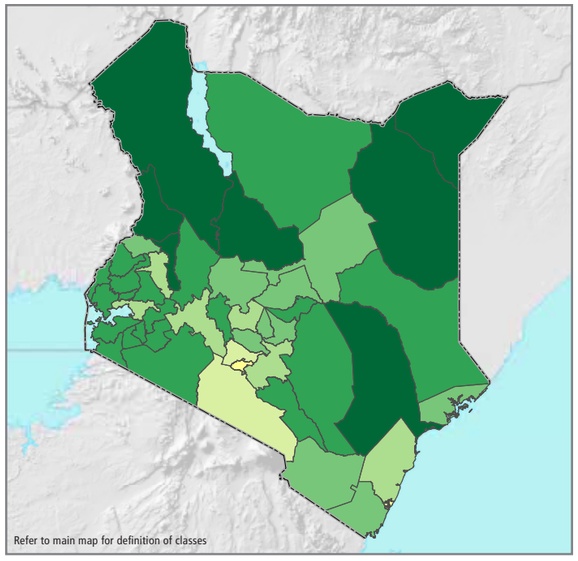
Data Source

2009 Kenya Population and Housing Census (Variable H26: Main Type of Cooking Fuel), Kenya National Bureau of Statistics.

3.06 Rural–Urban Distribution of Solid Biofuel Use Classes



3.06 Average Solid Biofuel Use at County Level



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3.06 The Use of Solid Biofuels for Cooking

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

0 25 50 100 150 200 km

Solid biofuel use classes: Percentage of households using solid fuels for cooking (mainly firewood and charcoal)

- Less than 50% of households
- 50 to 75% of households
- 75 to 90% of households
- 90 to 95% of households
- 95 to 98% of households
- More than 98% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.07 The Use of Paraffin for Lighting

Contrary to cooking (see map 3.06), lighting in homes and homesteads can generally not draw on traditional and locally available fuels except the shine of open fires. Modern energy in the form of fossil fuels and electricity plays a key role in increasing lighting in Kenyan homes and is the focus of maps 3.07 and 3.08.

In the absence of electricity, paraffin – or kerosene – is the main energy source used for lighting in many developing contexts worldwide, and particularly in South Asia and sub-Saharan Africa. Paraffin is a petroleum-based product used for lighting in simple wick lamps, more advanced pressure lamps, or lanterns. As paraffin may emit toxic fumes and contribute to indoor pollution, it can cause respiratory diseases. While it is an alternative energy source for wealthier households without access to electricity, it is energy-inefficient, risky, and, in particular, expensive for poor households. We focus on paraffin here as its use for lighting appears to mark a transitional stage in development.

More than two-thirds (69.5%) or 6.1 million of all Kenyan households use paraffin as their main energy source for lighting, while the others use electricity (22.7% – see map 6.08), firewood (4.5%), or other sources such as gas and solar power (3.3%).

While the map shows widespread use of paraffin in large parts of the country at rates of 75% and above, it is remarkable that the two counties showing the lowest rates of paraffin use – Turkana (20%) and Nairobi (27%) – are at opposite ends of the economic development/poverty–wealth gradient in Kenya. Nairobi has largely passed the stage of paraffin-lighting towards electrification, while Turkana is just reaching this stage of energy use, still largely using firewood as its only source of lighting. These observations support the assertion made above that using paraffin for lighting marks a transitional stage in development and modernization.

This pattern is repeated across the country, with most of the semi-arid to arid counties like Samburu, Marsabit, West Pokot, Mandera, Wajir, or Isiolo leaning, with their relatively low rates, towards the pole of Turkana, whereas Mombasa, Kiambu, Nakuru, or Nyeri, which also show comparatively low rates, are closer in situation to Nairobi (see county table). A special case is Kajiado with its relatively low rate of 56% that results from the combined effect of its location within the agglomeration of Nairobi and its semi-arid conditions. Against this background it is not surprising that the highest rates are found in counties that are making rapid progress towards the development levels found in the economic core regions of central Kenya. This mainly applies to most counties in western Kenya which take the first 11 ranks with rates of paraffin use for lighting above 90% (see county table), but also to the regions east of central Kenya and to large parts of the coastal region, including Tana River.

Similar patterns can be observed at the sub-location level, where rates may vary along ecological and accessibility gradients. But the most obvious variation occurs between urban and rural settings. Like Nairobi, all major towns in Kenya are connected to electricity grids and accordingly show lower rates than their surroundings. This is confirmed by the rural–urban graph, which shows a dominance of urban sub-locations in the three classes of paraffin use (rates of below 75%, 50%, or 25% respectively). However, a number of urban sub-locations also show high rates of paraffin use. In the urban centres of the semi-arid to arid zones they are a sign that the purchasing power has reached a level where households can afford this type of lighting. But in Nairobi and other major economic centres these higher rates are confined to low-income quarters where electrification is hindered by poor grid coverage, high costs for initial installation, and insecurity of land tenure. The next map (3.08) takes a closer look at issues related to electrification.

County	Percentage of hhs using paraffin for lighting	Rank	No. of hhs using paraffin for lighting*	No. of hhs using other energy sources for lighting*
Nairobi	26.6%	46	262.0	723.0
Mombasa	39.8%	43	107.0	161.7
Kwale	86.8%	14	105.9	16.2
Kilifi	80.2%	23	160.2	39.6
Tana River	86.7%	15	41.1	6.3
Lamu	72.6%	30	16.1	6.1
Taita Taveta	81.1%	21	57.7	13.4
Garissa	53.2%	37	52.5	46.1
Wajir	48.5%	39	43.0	45.6
Mandera	46.7%	40	58.6	66.9
Marsabit	35.3%	44	20.1	36.8
Isiolo	51.1%	38	16.0	15.3
Meru	77.9%	28	248.9	70.7
Tharaka Nithi	80.8%	22	71.7	17.1
Embu	79.8%	25	105.0	26.6
Kitui	86.0%	17	176.7	28.8
Machakos	79.2%	26	209.4	55.1
Makueni	89.0%	12	166.1	20.4
Nyandarua	82.3%	20	118.5	25.4
Nyeri	68.2%	33	137.5	64.2
Kirinyaga	78.9%	27	121.7	32.5
Murang'a	82.9%	19	211.9	43.8
Kiambu	44.3%	42	207.9	261.4
Turkana	19.7%	47	24.3	98.9
West Pokot	45.9%	41	43.0	50.8
Samburu	30.6%	45	14.5	32.9
Trans Nzoia	88.8%	13	151.0	19.1
Uasin Gishu	69.7%	32	141.0	61.3
Elgeyo Marakwet	75.3%	29	58.4	19.1
Nandi	91.5%	8	141.0	13.1
Baringo	59.8%	35	66.2	44.5
Laikipia	70.1%	31	72.3	30.8
Nakuru	61.9%	34	253.8	156.0
Narok	83.5%	18	141.3	28.0
Kajiado	55.5%	36	96.2	77.2
Kericho	86.5%	16	136.5	21.4
Bomet	91.3%	9	132.0	12.6
Kakamega	92.4%	6	328.6	27.1
Vihiga	90.9%	10	112.2	11.2
Bungoma	93.7%	3	253.7	17.1
Busia	92.5%	4	142.7	11.5
Siaya	94.0%	2	187.1	12.0
Kisumu	79.9%	24	181.1	45.6
Homa Bay	94.6%	1	195.2	11.0
Migori	92.5%	5	166.8	13.4
Kisii	90.0%	11	220.6	24.5
Nyamira	92.3%	7	121.0	10.1
KENYA	**69.5%**	**–**	**6,095.8**	**2,672.2**

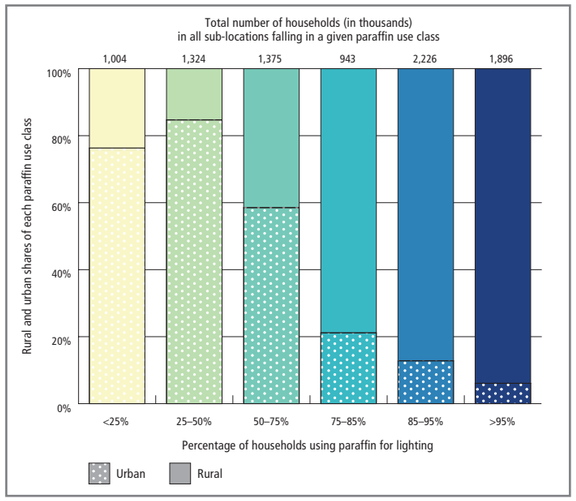
Abbreviations: hhs = households; no. = number

* in thousands

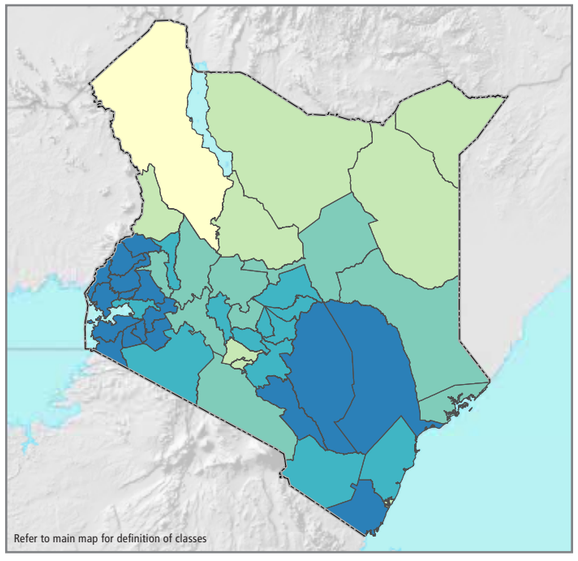
Data Source

2009 Kenya Population and Housing Census (Variable H27: Main Type of Lighting Fuel), Kenya National Bureau of Statistics.

3.07 Rural–Urban Distribution of Paraffin Use Classes



3.07 Average Paraffin Use at County Level

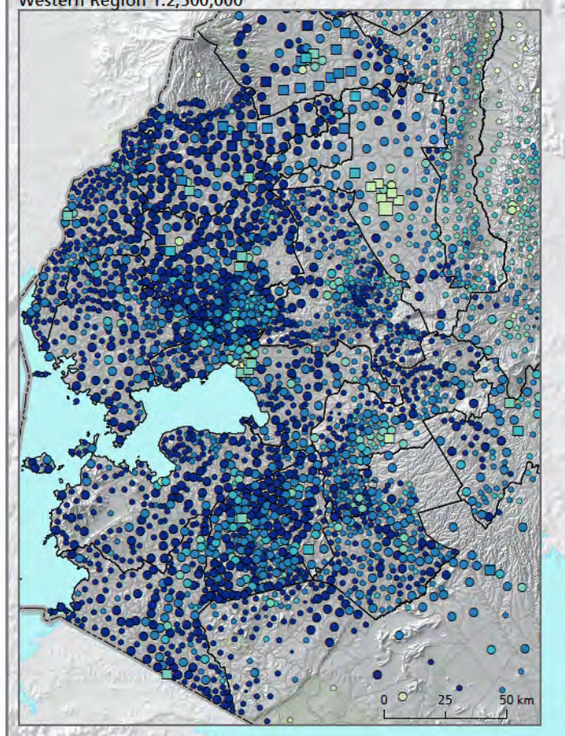


Water, Sanitation & Energy

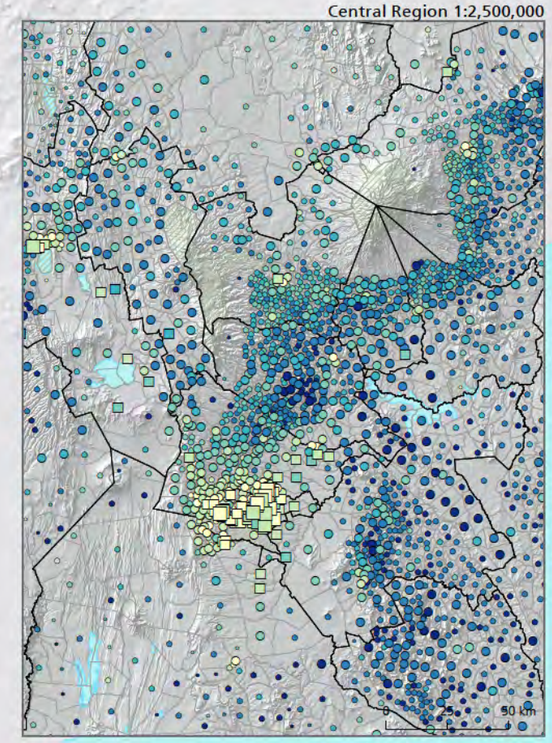
3.07 The Use of Paraffin for Lighting

Republic of Kenya 1:4,000,000

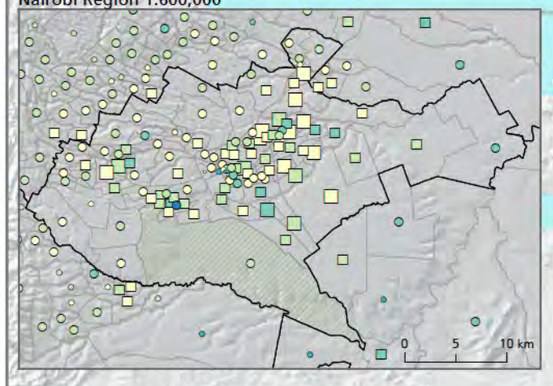
Western Region 1:2,500,000



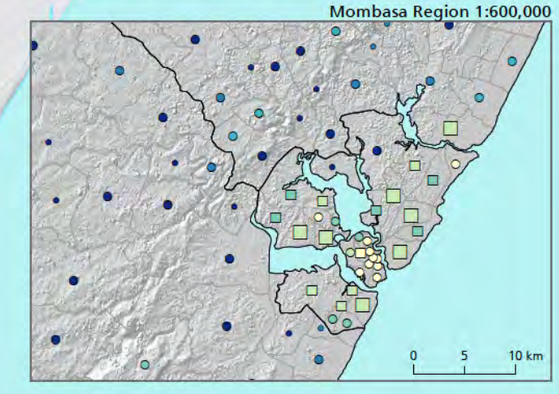
Central Region 1:2,500,000

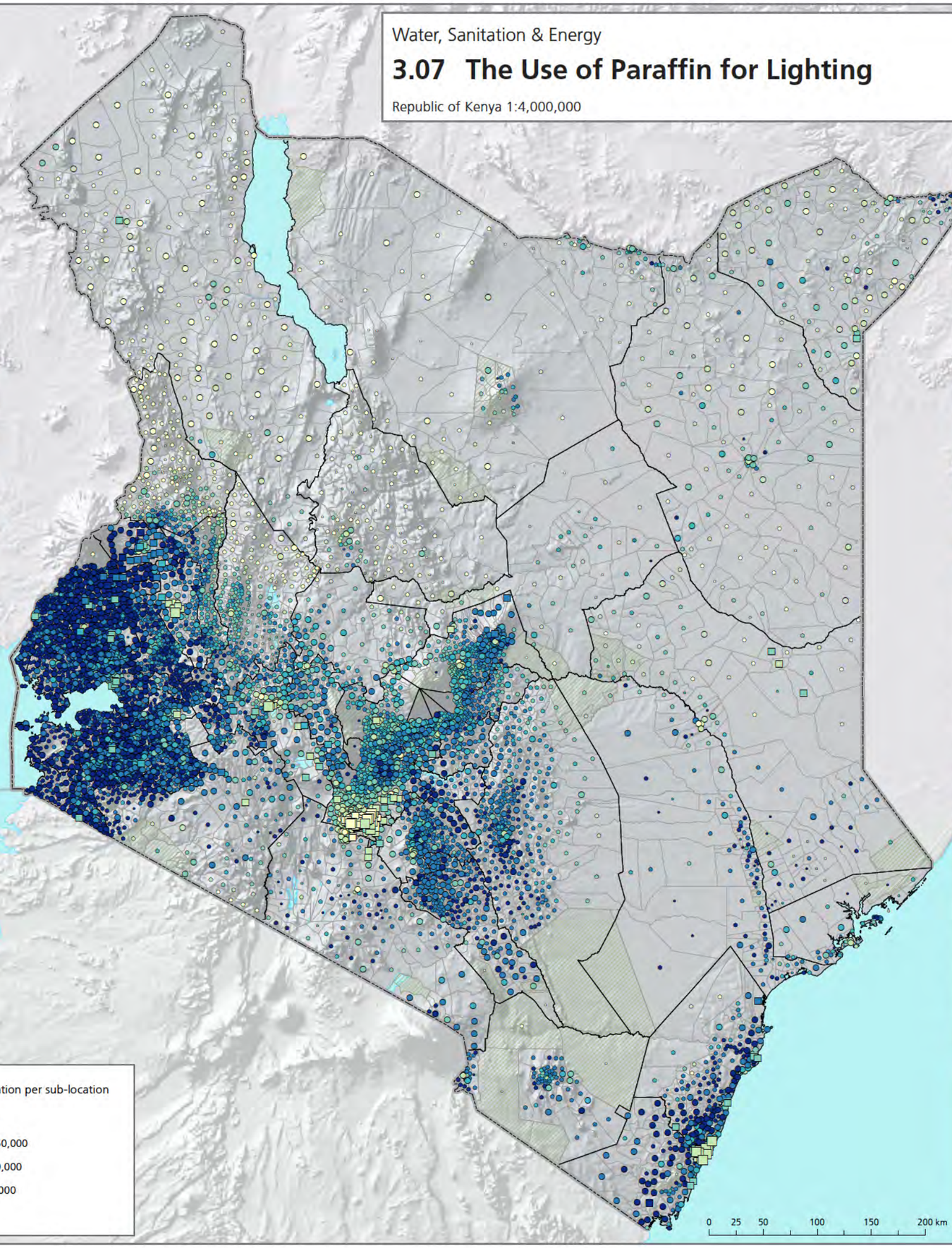


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Paraffin use classes: Percentage of households using paraffin for lighting (in simple wick lamps, pressure lamps, and lanterns)

- Less than 25% of households
- 25 to 50% of households
- 50 to 75% of households
- 75 to 85% of households
- 85 to 95% of households
- More than 95% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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3.08 The Use of Electricity for Lighting

Map 3.07 showed the high percentage of paraffin use for lighting among Kenyan households. It demonstrated that this type of energy use can be interpreted as a transitional phenomenon that applies to situations where electricity is either unavailable or unaffordable. The present map, therefore, explores the use of electricity by households. It uses a colour range from black to yellow that symbolizes increasing electric lighting.

Electricity for lighting and other uses is an important indicator of increasing living standards. Electricity enables households to substitute unhealthy, expensive, inefficient fossil-based fuels for lighting. This facilitates indoor household chores and study at dawn and dusk; outdoors, it increases safety at night. It encourages new income-generating activities for rural as well as urban dwellers, especially in the informal sector (see map 7.03), and plays an increasing role in modern communication technologies (see map 4.07). However, the power supply in developing countries is often inadequate, with national grids covering only parts of a country and low or unreliable power production. For households, the use of electricity is therefore mostly determined by availability, reliability, and affordability.

It is estimated that about one-third of Kenya is supplied by main electricity grids and that a broad variety of local or individual solutions are available, mainly using generators or battery storage of varying sizes. The map indicates the percentage of households that have indicated electricity as their main source of lighting without specifying whether the energy originates from a grid or a local or individual solution. The supply side of electricity is not evaluated.

In Kenya, almost two million households or 22.7% mainly use electricity for lighting. This corresponds to nearly one in four households and compares favourably to neighbouring countries such as Tanzania or Uganda. The other households mainly use paraffin (69.5% – see map 3.07), firewood (4.5%), or other sources such as gas and solar power (3.3%). However, the use of electricity is very unevenly distributed throughout the country, with only seven out of 47 counties showing rates above the national average. The highest rates were recorded in Nairobi (72%), Mombasa (59%), and Kiambu (54%), followed by Kajiado (40%), Nakuru (34%), Uasin Gishu (28%), and Nyeri (26%). All the other counties show rates of below 20% and mostly below 10%, with Tana River (2.5%) and Turkana (2.4%) in last place (see county table).

These county figures point to a clear spatial pattern confirmed by the main map, which shows the megacity of Nairobi at the centre with its agglomeration crossing the borders to Kiambu and Kajiado. This agglomeration is home to about half the households in Kenya that use electricity for lighting. From there, the map shows two main strands going north-east through central Kenya towards and around Mount Kenya, and north-west through Naivasha and Nakuru to Eldoret, with Mombasa forming an additional pole. This pattern of electricity use highlights the economic backbones of Kenya that are visible in many of the maps presented in this atlas (e.g. chapters 5 and 7). At the same time it illustrates that the use of electricity is still largely an urban phenomenon, with all larger towns and also most of the smaller centres marked with brighter colours on the map. This is confirmed by the rural–urban graph that shows that the three classes of more than 30%, 50%, and 75% of households using electricity for lighting are almost solely found in urban settings, with only parts of central Kenya showing signs of increased use of electricity in rural areas. However, a number of urban sub-locations show low rates. These are found in towns of the country's economic periphery where availability might be the main limiting factor. But as the map insets of Nairobi and Mombasa show, they also mark low-income quarters where affordability and inaccessibility due to land tenure issues limit the installation and use of electricity.

Together, these observations confirm that electricity is an important ingredient in development, modernization, and raising living standards in the country. Further increases of its availability, reliability, and affordability will support Kenya's *Vision 2030*.

County	Percentage of hhs using electricity for lighting	Rank	No. of hhs using electricity for lighting*	No. of hhs using electricity for cooking*
Nairobi	72.4%	1	712.9	28.6
Mombasa	59.0%	2	158.6	5.4
Kwale	10.6%	21	12.9	0.5
Kilifi	16.7%	13	33.4	1.9
Tana River	2.5%	46	1.2	0.1
Lamu	17.0%	12	3.8	0.1
Taita Taveta	15.0%	15	10.7	0.4
Garissa	11.6%	19	11.4	0.7
Wajir	3.4%	42	3.0	0.2
Mandera	2.5%	45	3.2	0.2
Marsabit	7.5%	27	4.3	0.1
Isiolo	18.5%	8	5.8	0.1
Meru	13.6%	18	43.4	1.2
Tharaka Nithi	8.4%	25	7.4	0.2
Embu	14.9%	16	19.6	0.7
Kitui	4.8%	38	9.9	0.2
Machakos	17.0%	11	45.1	1.4
Makueni	5.9%	34	10.9	0.3
Nyandarua	10.5%	22	15.1	0.3
Nyeri	26.3%	7	53.1	1.4
Kirinyaga	16.4%	14	25.4	0.8
Murang'a	13.9%	17	35.6	0.9
Kiambu	54.1%	3	254.0	5.1
Turkana	2.4%	47	3.0	0.4
West Pokot	2.6%	44	2.5	0.1
Samburu	6.2%	31	2.9	0.1
Trans Nzoia	8.9%	24	15.1	0.5
Uasin Gishu	27.9%	6	56.5	1.5
Elgeyo Marakwet	7.2%	28	5.5	0.2
Nandi	6.4%	30	9.8	0.4
Baringo	9.6%	23	10.6	0.2
Laikipia	17.7%	10	18.2	0.6
Nakuru	34.0%	5	139.4	4.3
Narok	5.9%	33	9.9	0.3
Kajiado	39.8%	4	69.1	2.1
Kericho	10.8%	20	17.0	0.7
Bomet	3.9%	41	5.6	0.3
Kakamega	5.6%	36	20.0	1.8
Vihiga	7.0%	29	8.7	0.3
Bungoma	4.5%	39	12.2	0.6
Busia	6.0%	32	9.3	0.3
Siaya	4.3%	40	8.6	0.4
Kisumu	18.3%	9	41.6	2.2
Homa Bay	3.3%	43	6.9	0.4
Migori	5.3%	37	9.6	0.9
Kisii	8.1%	26	19.8	0.7
Nyamira	5.8%	35	7.6	0.3
KENYA	**22.7%**	**–**	**1,989.7**	**70.4**

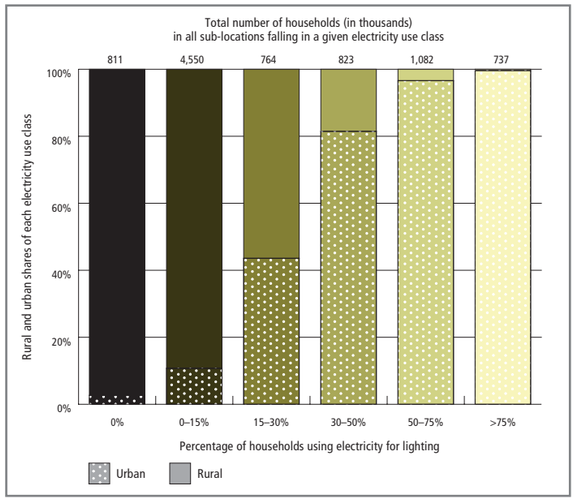
Abbreviations: hhs = households; no. = number

* in thousands

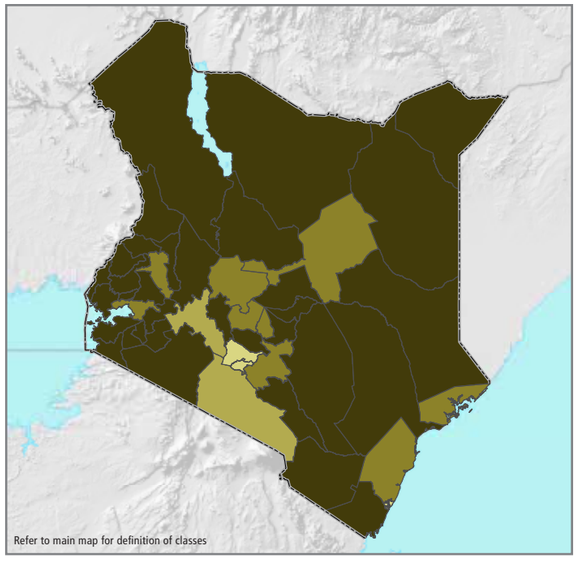
Data Source

2009 Kenya Population and Housing Census (Variable H27: Main Type of Lighting Fuel), Kenya National Bureau of Statistics.

3.08 Rural–Urban Distribution of Electricity Use Classes



3.08 Average Electricity Use at County Level

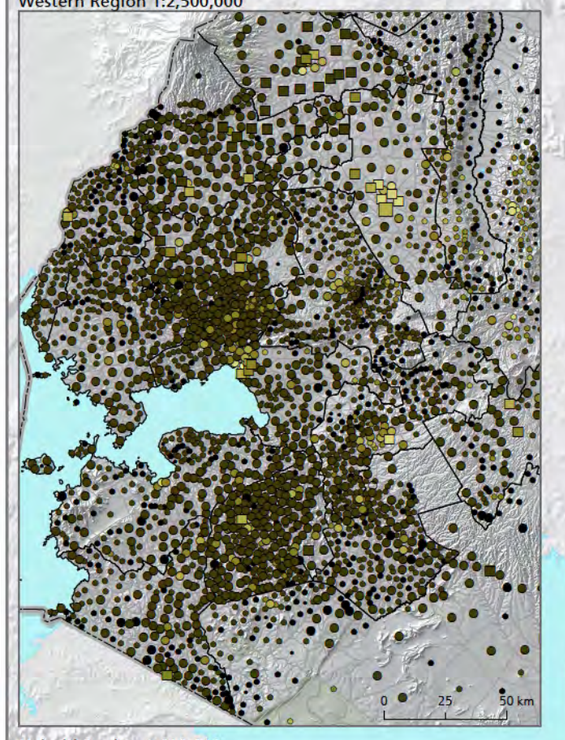


Water, Sanitation & Energy

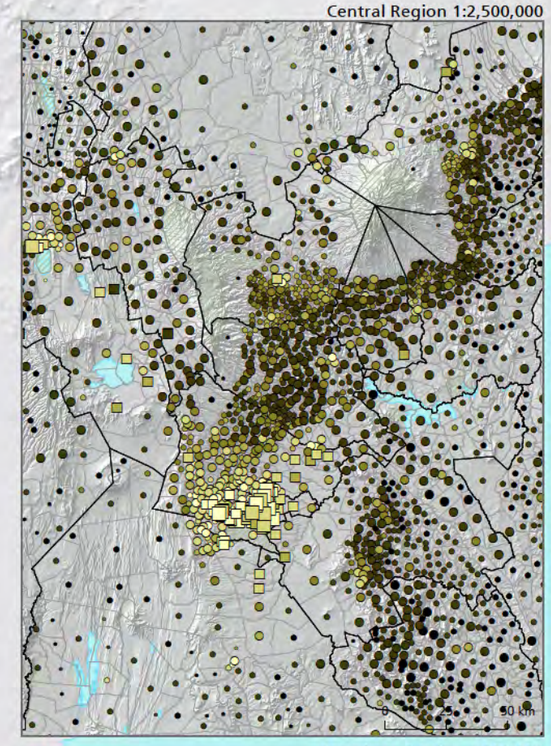
3.08 The Use of Electricity for Lighting

Republic of Kenya 1:4,000,000

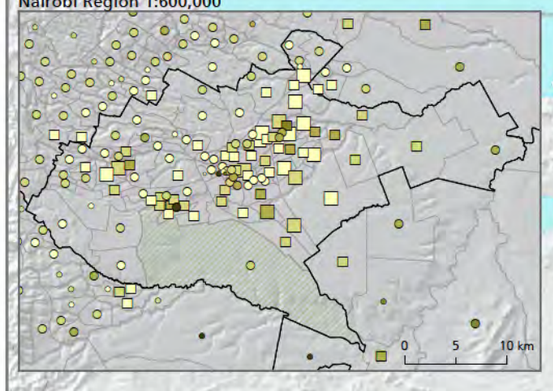
Western Region 1:2,500,000



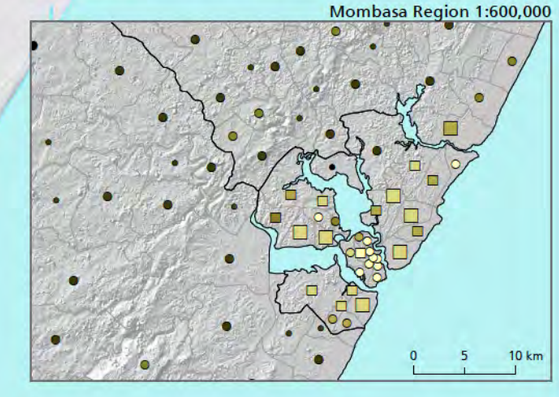
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Electricity use classes: Percentage of households using electricity for lighting

- 0% of households
- 0 to 15% of households
- 15 to 30% of households
- 30 to 50% of households
- 50 to 75% of households
- More than 75% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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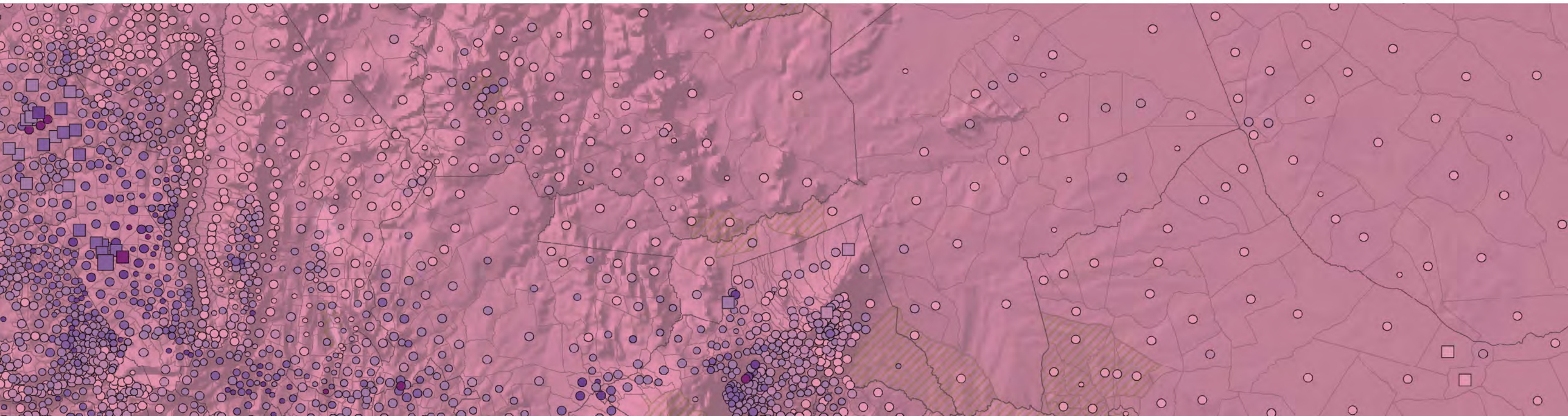
4

Household Assets & Communication



Introduction

The previous chapter dealt with water, sanitation, and energy sources that link households directly or indirectly to the natural environment, fulfil basic needs, and considerably impact people's quality of life. In this chapter, the focus shifts to household assets, such as homeownership, transport means, and communication tools that further influence quality of life and enable participation in economic and social activities. In addition, the nature and extent of these household assets are important indicators of people's welfare and involvement in economic development. Thus, the variation and distribution of such assets provide clues to important development disparities and potentials.

The following maps examine the distribution of household assets with regard to housing, transportation, information devices, and communication technology. The main emphasis is on variations in availability among Kenya's 8.8 million households and different regions. Thus, this chapter does not examine actual use of these assets per se, nor their supply, but rather emphasizes spatial patterns and factors influencing availability in different parts of the country and among different social strata. In line with the four asset categories addressed in Kenya's 2009 census, the chapter is structured into four parts featuring two maps each.

Maps 4.01 and 4.02 deal with housing and address rates of homeownership and the quality of people's dwelling units. The results presented in these maps are based on the results of 2009 census questions on whether households own their dwelling and what materials were used to construct its roof, walls, and floor.

Map 4.01 addresses the ownership of homes, displaying the rates of owner-occupied dwelling units. Homeownership is an important factor that influences people's rights and environmental security. Nationally, 6.0 million of Kenya's 8.8 million households are owner-occupied (68% homeownership rate). Thus, two out of every three Kenyan households have the increased rights and privileges associated with homeownership, while the remainder have fewer rights and are dependent on landlords. However, map 4.01 reveals significant variations in homeownership rates throughout the country and illustrates a clear divide between rural and urban settings.

Map 4.02 displays at the sub-location level the floor materials used in people's homes, and provides county-level figures regarding the materials used for roofs and walls. Floor material is a useful indicator of housing quality and wealth because floors are usually addressed last in home construction, after time and money have been spent on the roof and walls, especially in owner-occupied dwelling units. Nationally, 98% of Kenyan homes have either cement (41%) or earthen floors (57%). Comprising the majority, the latter floor type is problematic from a quality and health perspective. Interestingly, the pattern revealed in map 4.02 is almost the inverse of that shown in map 4.01, as earthen floors are found predominantly in owner-occupied dwelling units.

Maps 4.03 and 4.04 deal with household mobility and household ownership of transport means, whether of a motor vehicle or a human-powered bicycle.

Map 4.03 shows the distribution of privately owned motorized means of transport in Kenya. It reveals that 8% or 0.7 million Kenyan households own some form of motor vehicle; of these households, a little over half (57%) own cars. Map 4.03 shows clear differences between rural and urban contexts, and also reveals a relationship between the size of urban settings and the ownership rate of motor vehicles.

Map 4.04 examines household ownership of bicycles, traditionally very widespread in Kenya, which have only very recently begun to be replaced in part by motorcycles. Nevertheless, many more households (25% or 2.2 million) own bicycles than motorized means of transport. The spatial patterns observed further show that difficult terrain and heavy urbanization constrain bicycle use in different settings, but that bicycles still play a key role for households in agriculturally dominated rural settings.

Maps 4.05 and 4.06 focus attention on electronic information devices, namely radios and TVs, which provide households with access to information, news, education resources, and entertainment. Both also play an increasing role in triggering local initiatives and innovations, e.g. in the farming sector.

Map 4.05 shows that three out of every four Kenyan households (74%) own a stand-alone radio, and that the distribution of radio ownership is quite evenly spread, with only six counties in Kenya's vast arid and semi-arid zones displaying ownership rates below 50%. Radio remains very important in the country's agriculturally dominated high-potential areas and on their outskirts. However, rates of radio ownership are lower in urban settings, indicating a shift towards using other electronic means of getting and sharing information.

Map 4.06 shows the proportion of households owning a TV. Nationally, the rate stands at 28%. Since TVs are relatively expensive and require a stable source of electricity, they remain a status symbol and are typically concentrated in larger towns. Nevertheless, certain rural areas display sizable rates of TV ownership; interestingly, some such areas lack access to the grid, suggesting that households attach great importance to having a TV and are willing to invest in local electricity supplies to run one.

Maps 4.07 and 4.08 address modern information and communication technology, displaying rates of mobile phone ownership and Internet access. Of course, the data stem from the 2009 census. Since then, both sectors have rapidly expanded and undergone some fundamental changes due to innovations. As such, in contrast to the other maps in this volume, these two maps may be considered "historical". Nevertheless, they still display interesting spatial patterns that likely remain significant.

Map 4.07 shows that already in 2009, the mobile phone ownership rate had reached 63% – e.g. two out of every three households owned at least one – making landlines virtually irrelevant. The spatial patterns reveal that, in the span of a few years, mobile phones have come to rival radios in their level of distribution. Today, there are even large segments of poorer populations who consider mobile phones to be a basic asset. The introduction of M-Pesa in 2007 – an easy mobile-phone based money transfer system – helped establish use of mobile technology among Kenyans.

Map 4.08 displays the number of people who had Internet access in 2009, at least on a monthly basis. The low access rate found – only 6% – reflects the pre-smartphone era, when access was constrained by the need for landlines, complex technology, and electrical grids. Thus, Internet access was largely limited to large urban centres and wealthier population segments. This all changed after 2009 with the introduction of mobile Internet devices. The question remains as to whether this new Internet technology will spread as fast as mobile phones did.

This chapter's presentation of household ownership of assets in the categories of housing, transport means, electronic information devices, and communication technology reveals a nation that is changing quickly. Housing materials, bicycles, and radios are linked to growing sectors. Certain assets, like bikes and radios, may be gradually giving way to motor vehicles and TVs. And sectors such as mobile communication technology are truly booming in Kenya. The dynamic interplay between these types of assets will have far-reaching economic and social consequences at the household level and for the nation at large. The dynamics bear risks as well as vast potential.

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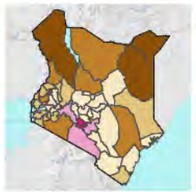

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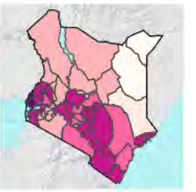

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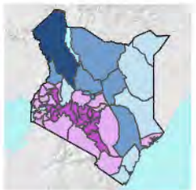

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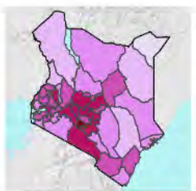

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4.01 Owner-Occupied Dwelling Units

An owner-occupied dwelling unit is a home (e.g. house, apartment, condominium) owned by its occupants. Homeownership is an important indicator of household well-being. It is a type of housing tenure that affords residents certain legal rights, protects them from eviction, and creates a right to occupation that can also be inherited. In this way, homeownership reduces residents' dependency and vulnerability. Occupants who own their home often have special status in particular contexts, especially in urban settings. Homeownership also frequently reflects prevailing land tenure arrangements and may serve as a useful proxy for formal or informal land rights and concomitant levels of access and security in a given place and time.

Whether in urban or rural settings, many Kenyans strongly desire to own their home. A great number choose to save their entire lifetime to fulfil this goal. However, many never live to achieve it because the costs are simply too high, especially in urban areas. In rural areas as well there are Kenyans who live out their lives as squatters.

The maps in this section show the distribution of homeownership rates. Nationally, there are six million owner-occupied dwellings, meaning that approximately seven of every ten dwellings (68%) are owner-occupied in Kenya. However, homeownership rates vary in different regions of the country. The maps show very high homeownership rates in the semi-arid and arid areas in northern, north-eastern, and eastern Kenya – there are even two counties here that have homeownership rates above 90%, with Wajir showing the highest homeownership rate in Kenya at 96% (corresponding to about 84,600 households). Besides these two counties and Vihiga – where the homeownership rate is also above 90% (roughly 112,300 households) – there are 30 other counties in Kenya with high homeownership rates, ranging between 75% and 90%. Finally, there are ten counties in central Kenya, the Rift Valley, the Lake region, and along the coast that exhibit medium rates of homeownership, ranging between 50% and 75%. The county map illustrates that these counties are located along Kenya's main economic axis.

Unsurprisingly, due to its close proximity to Nairobi, Kiambu County has a low rate of homeownership. Real estate investment in the rental market is on the rise here, targeting people who work in Nairobi, and suburban neighbourhoods are mushrooming along the newly constructed Thika Highway. Interestingly, Nakuru also displays a homeownership rate below 50%, likely because of its large migrant population of service workers in Nakuru town and because of the large numbers of renters who work on large-scale horticultural farms and in other businesses found along the Nakuru–Nairobi highway. The sub-locations contributing to low homeownership rates in the Nairobi–Nakuru corridor are clearly visible on the main map.

These observations confirm commonly seen patterns of high rental rates and low homeownership rates in urban areas. This trend is further underscored by the very low homeownership rates in Nairobi (13.5%) and Mombasa (22.5%). Overall, the rural–urban graph reveals a clear divide between urban and rural settings, showing that the classes of homeownership below 50% are found almost exclusively in urban contexts, whereas the classes above 50% are progressively found in rural areas. The map also shows that urban sub-locations with relatively high homeownership rates tend to be located either in the outer perimeter of large agglomerations or in municipalities and rural centres of trade distributed throughout the country.

Overall, homeownership rates appear to decrease markedly as the degree of urbanization increases and the development of non-agricultural sectors expands (see chapter 7). Housing construction, though booming, is unable to keep pace with ongoing (permanent and temporary) migration into major urban centres, where increasing housing costs preclude ownership and encourage renting. Equally high demand for housing among low-, medium-, and high-income earners and rapid urbanization are leading to processes of segregation, with some residents moving out of the inner areas of cities, especially in the larger agglomeration of Nairobi.

These dynamics in Kenya's economic centres and along its main economic axis can be contrasted with many rural areas, characterized by agricultural activities and pastoralism, in which a high percentage of dwellings are occupant-owned. However, the question arises as to the quality of these dwellings in rural areas and whether the high rates of ownership ensure suitable standards of habitation. This question is addressed in map 4.02.

County	Percentage of hhs owning the home they live in	Rank	No. of hhs owning the home they live in*	No. of hhs not owning the home they live in*
Nairobi	13.5%	47	132.6	852.4
Mombasa	22.4%	46	60.1	208.6
Kwale	82.6%	24	100.8	21.2
Kilifi	72.7%	37	145.3	54.5
Tana River	86.7%	13	41.1	6.3
Lamu	76.8%	31	17.0	5.1
Taita Taveta	73.6%	36	52.3	18.8
Garissa	83.0%	23	81.8	16.8
Wajir	95.6%	1	84.6	3.9
Mandera	95.3%	2	119.6	5.9
Marsabit	89.7%	5	51.1	5.9
Isiolo	71.8%	38	22.5	8.8
Meru	82.2%	26	262.8	56.8
Tharaka Nithi	88.7%	7	78.8	10.1
Embu	80.2%	28	105.6	26.0
Kitui	89.7%	4	184.3	21.2
Machakos	75.7%	33	200.2	64.3
Makueni	87.4%	10	163.0	23.5
Nyandarua	76.7%	32	110.3	33.5
Nyeri	74.1%	35	149.4	52.3
Kirinyaga	78.5%	30	121.0	33.2
Murang'a	84.2%	20	215.3	40.4
Kiambu	49.1%	45	230.6	238.6
Turkana	87.7%	8	108.0	15.2
West Pokot	89.3%	6	83.7	10.0
Samburu	85.6%	15	40.5	6.8
Trans Nzoia	68.8%	39	117.0	53.1
Uasin Gishu	56.4%	42	114.1	88.2
Elgeyo Marakwet	87.1%	11	67.5	10.0
Nandi	79.0%	29	121.7	32.4
Baringo	83.7%	22	92.6	18.1
Laikipia	66.5%	40	68.6	34.5
Nakuru	49.9%	44	204.6	205.2
Narok	82.2%	27	139.1	30.1
Kajiado	52.2%	43	90.6	82.9
Kericho	74.8%	34	118.1	39.8
Bomet	83.7%	21	121.0	23.6
Kakamega	86.6%	14	307.9	47.8
Vihiga	91.1%	3	112.3	11.0
Bungoma	84.5%	19	228.9	42.0
Busia	85.2%	16	131.4	22.8
Siaya	84.7%	17	168.7	30.4
Kisumu	63.4%	41	143.7	83.1
Homa Bay	84.7%	18	174.7	31.5
Migori	82.4%	25	148.5	31.8
Kisii	87.6%	9	214.6	30.5
Nyamira	86.7%	12	113.6	17.4
KENYA	**68.0%**	–	**5,961.7**	**2,806.3**

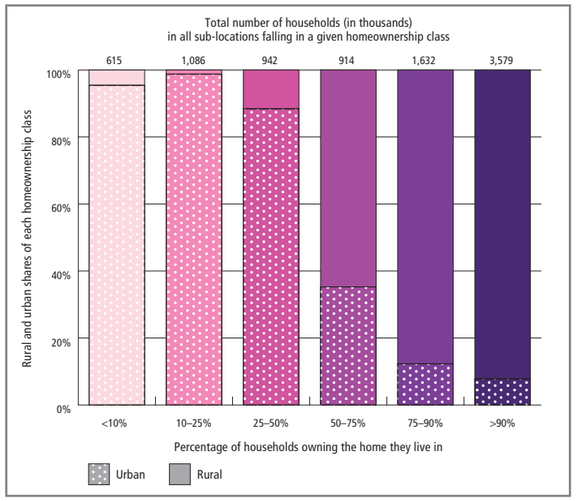
Abbreviations: hhs = households; no. = number

* in thousands

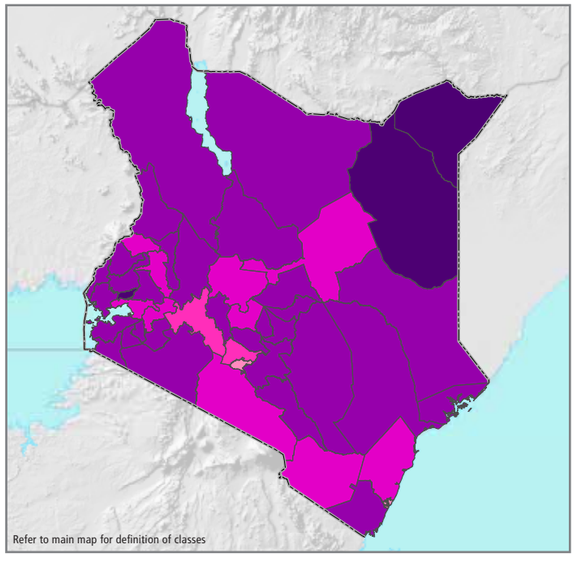
Data Source

2009 Kenya Population and Housing Census (Variable H20: Tenure Status of Main Dwelling Unit), Kenya National Bureau of Statistics.

4.01 Rural–Urban Distribution of Homeownership Classes



4.01 Average Homeownership at County Level



Household Assets & Communication

4.01 Owner-Occupied Dwelling Units

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

Homeownership classes: Percentage of households owning the dwelling unit they live in

- Less than 10% of households
- 10 to 25% of households
- 25 to 50% of households
- 50 to 75% of households
- 75 to 90% of households
- More than 90% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.02 Floor Material of Dwellings

The type of material used for the floor of a dwelling often serves as a useful indicator of housing quality from both a wealth and a health perspective. It is a proxy for wealth status because floors are typically given lesser priority for investment than walls and roofing, especially in owner-occupied dwellings in rural areas. High-quality, expensive floors are usually only invested in after the quality of these other construction elements has been secured. Floor materials may also provide indication of prevailing land tenure security or arrangements. From a health perspective, certain floor materials – such as earth and sand – expose occupants to health risks (e.g. infections) because they enable pests to breed, are a source of dust, and are difficult to keep clean.

The present map shows the distribution of earthen floors in Kenya, serving as an indicator of low wealth and increased health risks. In addition, the county table displays the percentages of households with cement flooring, iron roofing, and stone/brick walls.

Overall, the majority of Kenyan households (57% or 5 million) occupy dwelling units with earthen floors. Cement-floored dwelling units account for an additional 41% of households. The remaining households – only 2% – use other materials such as tiles for their floors. The clear dominance of dwelling units with either earthen floors or cement floors means that map 4.02, if read inversely, can also be used to discern the distribution of cement floors.

Looking at their regional distribution, earthen floors clearly dominate in northern and western Kenya. Other than Kisumu (55%), most of the counties in these regions, e.g. Kakamega, have rates of households with earthen floors of 80% or more. At over 90% each, Turkana, Wajir, and Mandera have the highest rates of households with earthen floors. The high-potential areas of central Kenya and the wider Mount Kenya region, including parts of the semi-arid Ukambani region, all display percentages around the national average, with Nyandarua exhibiting the highest percentage at 69%. Interestingly, Makueni has a rate (54%) that is lower than in some of the wealthier counties found in central Kenya, perhaps pointing to the phenomenon of multi-local families, where some family members live in the rural home and others in larger Nairobi. Similar dynamics coupled with high agricultural potential may explain why Taita Taveta is one of ten largely rural counties in Kenya whose percentage of dwellings with earthen floors (55%) is below the national average.

Kenya's coastal region displays comparatively low percentages and an interesting pattern. With the exception of Tana River (88%), the counties in this region show rates of 70% and below. These surprisingly low rates of earthen floors in the coastal region – where poverty incidences are high – are somewhat misleading and mask important variations. The main map reveals that the coastal region's hinterland is dominated by high rates of households with earthen floors, while the rapidly urbanizing coastline has low rates. Similarly, in the vicinity of Nairobi, Kiambu (23%), Machakos, and Kajiado display low rates as a result of urbanization in the corridor towns and dormitory towns of Thika, Kiambu, Athi River, Kitengela, and Ongata Rongai.

The role of urbanization in increasing the use of cement floors is further confirmed by the rural–urban graph and by the very low rates of earthen floors found in Nairobi (9%) and Mombasa (14%). The main map shows that these low rates are not limited to the two main centres, but rather are found in all medium to large Kenyan towns. However, the graph reveals that there are also urban settings with high rates of earthen floors. These are mainly found in small municipalities and rural trading centres. But even in Nairobi and Mombasa, certain sub-locations have high rates of earthen floors. This, coupled with low rates of homeownership (see map 4.01), suggests that landlords in these areas are providing housing of very low quality to tenants in low-income neighbourhoods.

The patterns of distribution observed with regard to floor materials, in both rural and urban contexts, largely mirror the variations in income levels observed throughout Kenya (see maps 5.01 and 5.02). Low-income areas with high poverty rates are clearly dominated by dwelling units with earthen floors. Thus, in the Kenyan context, floor materials are indeed a useful proxy for wealth levels, and point out health risks in poorer areas. At the same time, in many large parts of Kenya, the spatial distribution of earthen or cement floors bears interesting links to the spatial distribution of owner-occupied dwellings (map 5.01): comparison reveals economic centres and corridors with good-quality housing (at least in terms of floor material) but low rates of homeownership, as well as many rural settings where the inverse is true. Finally, comparing the distribution of roofs made of iron sheets (see county table) with the situation in certain core agricultural areas – especially in and around central Kenya – indicates that rural development can lead to a balance between better housing and homeownership.

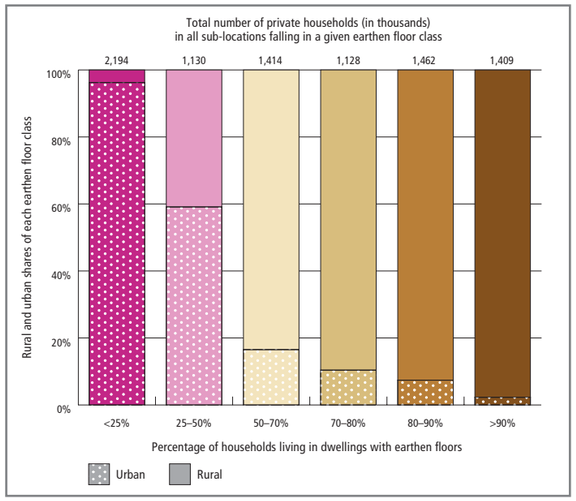
County	Percentage of hhs with earthen floor	Percentage of hhs with cement floor	Percentage of hhs with iron roofing	Percentage of hhs with stone/ brick walls
Nairobi	8.9%	82.3%	65.3%	61.4%
Mombasa	14.1%	80.7%	78.4%	74.3%
Kwale	70.2%	28.9%	37.1%	29.8%
Kilifi	65.3%	33.1%	42.3%	33.9%
Tana River	88.0%	11.4%	26.4%	7.6%
Lamu	62.3%	37.0%	31.6%	29.8%
Taita Taveta	55.4%	43.5%	86.0%	48.0%
Garissa	79.8%	18.7%	29.3%	17.7%
Wajir	91.5%	7.8%	10.4%	7.1%
Mandera	91.7%	7.4%	11.5%	7.4%
Marsabit	82.7%	16.4%	27.5%	6.5%
Isiolo	70.0%	28.9%	60.8%	17.0%
Meru	59.9%	37.3%	92.8%	15.7%
Tharaka Nithi	65.7%	32.9%	87.6%	19.0%
Embu	58.3%	40.6%	92.4%	38.2%
Kitui	66.3%	32.7%	76.4%	66.4%
Machakos	39.8%	58.4%	88.9%	86.1%
Makueni	53.5%	45.6%	86.6%	75.2%
Nyandarua	68.8%	28.8%	95.1%	16.1%
Nyeri	56.5%	41.2%	94.6%	26.3%
Kirinyaga	59.9%	39.1%	94.9%	41.1%
Murang'a	59.8%	39.1%	94.4%	42.6%
Kiambu	22.6%	74.6%	87.8%	53.2%
Turkana	92.0%	6.5%	13.8%	4.6%
West Pokot	86.7%	12.3%	25.0%	5.5%
Samburu	82.7%	16.6%	22.8%	6.3%
Trans Nzoia	72.9%	25.8%	81.6%	17.2%
Uasin Gishu	50.9%	46.3%	84.4%	31.1%
Elgeyo Marakwet	76.7%	21.6%	57.9%	15.9%
Nandi	69.0%	29.9%	82.6%	16.5%
Baringo	73.0%	24.8%	58.0%	8.8%
Laikipia	65.7%	32.5%	80.7%	17.2%
Nakuru	46.8%	50.9%	86.7%	38.6%
Narok	84.1%	14.6%	48.7%	9.5%
Kajiado	38.7%	57.3%	67.0%	35.2%
Kericho	64.1%	34.7%	83.5%	20.9%
Bomet	75.0%	24.1%	68.7%	14.3%
Kakamega	80.3%	18.6%	76.7%	14.4%
Vihiga	79.2%	19.8%	92.4%	16.0%
Bungoma	79.3%	19.9%	77.8%	15.8%
Busia	74.9%	24.3%	50.2%	18.8%
Siaya	70.1%	29.0%	65.9%	15.2%
Kisumu	55.3%	42.4%	85.1%	24.5%
Homa Bay	74.7%	24.4%	82.3%	11.2%
Migori	72.0%	27.0%	75.9%	18.1%
Kisii	77.3%	21.5%	83.5%	20.0%
Nyamira	76.3%	22.6%	89.8%	20.8%
KENYA	**56.5%**	**41.0%**	**73.2%**	**33.4%**

Abbreviation: hhs = households

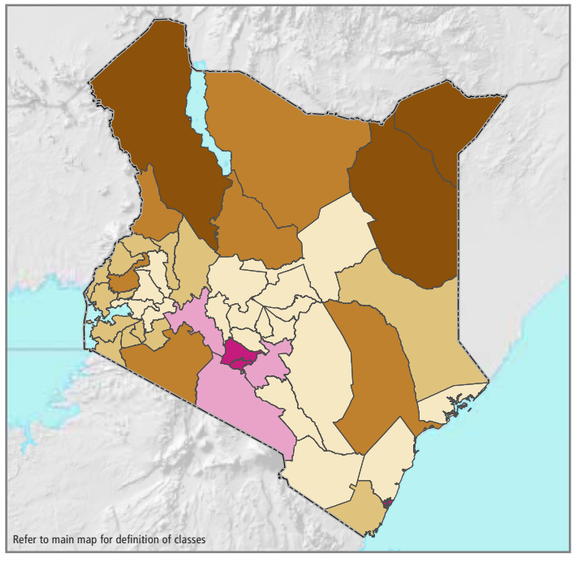
Data Source

2009 Kenya Population and Housing Census (Variable H23: Dominant Construction Material of Floor for Main Dwelling Unit), Kenya National Bureau of Statistics.

4.02 Rural–Urban Distribution of Earthen Floor Classes



4.02 Percentage of Earthen Floors at County Level

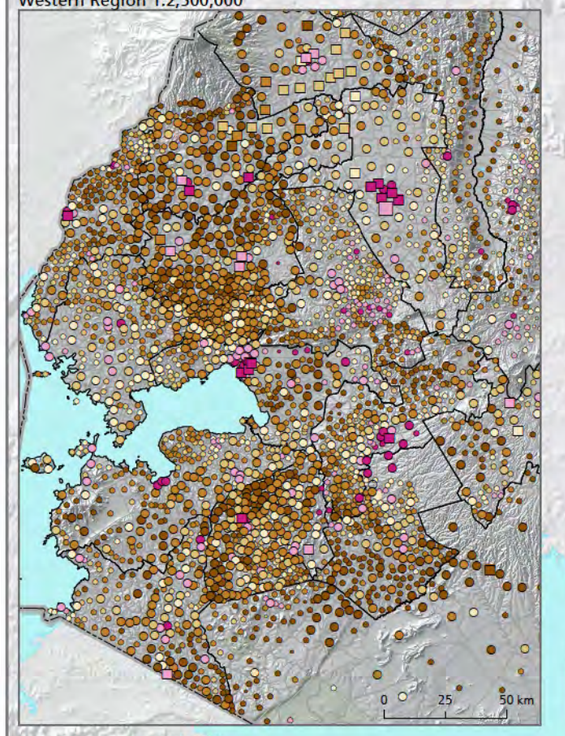


Household Assets & Communication

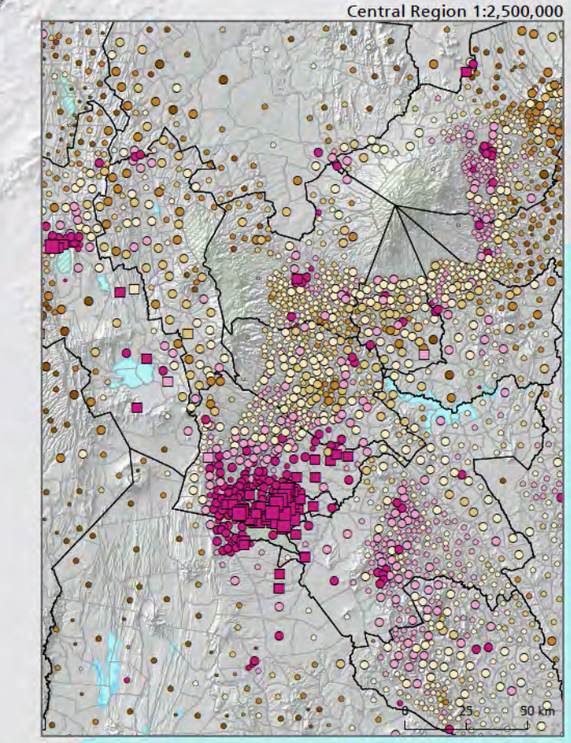
4.02 Floor Material of Dwellings

Republic of Kenya 1:4,000,000

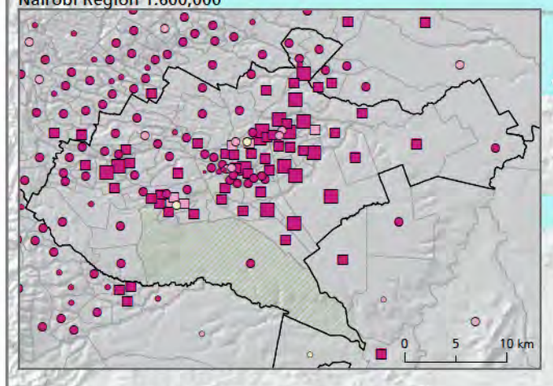
Western Region 1:2,500,000



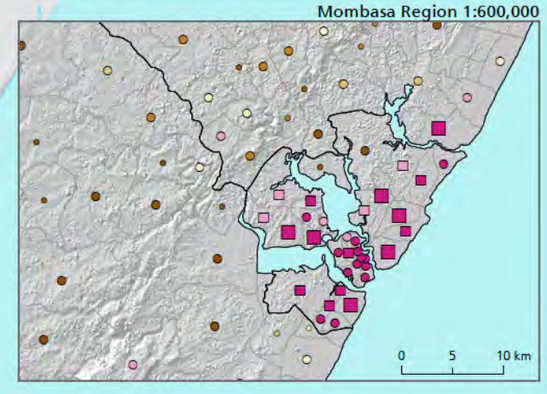
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Earthen floor classes: Percentage of households living in dwellings with earthen floors

- Less than 25% of households
- 25 to 50% of households
- 50 to 70% of households
- 70 to 80% of households
- 80 to 90% of households
- More than 90% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.03 Households Owning a Motorized Means of Transport

Most transport means in Kenya are motorized. Motorized transport largely determines the quality of public and private transit throughout the country. It is widely seen as critical to national development, in particular for its role in reducing poverty by increasing market access and promoting growth. In line with the data collected in Kenya's 2009 census, the present map focuses on privately owned means of motorized transport and does not assess Kenya's public motorized transport system.

The map displays rates of privately owned means of motorized transport. These include cars, motorcycles, trucks, lorries, tractors, buses, and tuk-tuks (three-wheelers). In Kenya, ownership of a motor vehicle is associated with a certain level of household wealth, since they are expensive to buy and costly to maintain. Further, the existence of private motorized transport in a given area provides insights into the health of the local transport system and the degree of spatial integration.

Nationally, approximately eight of every 100 households (7.6%, or 0.7 million households in total) own a motor vehicle. Of these, 57% own cars. This comparatively low rate is changing quickly, as evidenced by a rapid rise in motor vehicle use in Kenya in only the past few years. This trend is partly attributable to a cultural shift in consumption patterns and preferences among Kenya's burgeoning middle class, in favour of more urban forms of living.

As seen in the main map and the county map, private means of motorized transport are found everywhere in Kenya but ownership rates vary by region. The highest rates of motor vehicle ownership are found in urban areas and high-potential agricultural areas – the same areas that appear well served in terms of the quality and the integration of their road network (see map 1.09). Thus, motor vehicle ownership rates decrease with increasing remoteness and/or decreasing land productivity, moving from semi-arid to very arid areas. The county table confirms this general pattern: two counties with comparatively high rates of ownership – Nairobi (15%) and Mombasa (10%) – are urban, while three other counties with high ownership rates (also over 10%) are rural but encompass large urban areas (Kajiado, Kiambu, and Uasin Gishu). By contrast, the five counties with the least amount of private ownership of motorized transport – Tana River, West Pokot, Turkana, Mandera, and Wajir – are in the remote arid areas of northern and eastern Kenya. Among them, Wajir displays the lowest ownership rate at 1%.

The rural–urban graph and the main map reveal steep gradients between and within urban and rural areas. Generally, motor vehicle ownership is higher in urban settings than in rural ones. But a relationship may also be observed between the size of urban settings and rates of ownership. The megacity of Nairobi – which includes parts of Kiambu, Kajiado, and Machakos – clearly displays the highest ownership rates, with many of its sub-locations showing rates above 20%. Next comes Mombasa on the coast, followed by the major towns found in the high-potential areas of central and western Kenya (Meru, Murunga, Nyahururu, Nakuru, Eldoret, Kitale, Siaya, and Kisumu) in which concentrations of higher rates are visible. In the rest of Kenya's (generally smaller) towns, ownership rates remain below 20% in the sub-locations they comprise.

Possible reasons for the link between bigger cities/towns and higher ownership rates include higher local purchasing power (see map 5.01) as well as greater distances between homes and workplaces, better road infrastructure, insufficient or unreliable public transport systems, safety risks, limited possibilities for cycling or walking, and cultural change. These factors accumulate to make motor vehicle ownership an attractive choice and a symbol of wealth in certain places. They help explain the dominance of cars among the means of motorized transport used in Nairobi: among those who own a motor vehicle here, the vast majority own a car (80%) – well above the national average (57%).

However, there are also steep gradients visible within urban settings, as seen in the map inset for Nairobi. It reveals several sub-locations with ownership rates below 2.5% that are surrounded by sub-locations with ownership rates above 10% or even 20%. Strikingly, one such sub-location features only one car-owning household. These variations reflect the clustering of poor households in informal settlements, and concentrations of wealthier households in other parts of the city. In this way, the distribution of vehicle ownership within cities likely also provides insights into patterns of urban spatial and possibly social segregation.

In rural areas, rates of motor vehicle ownership can be very low. Indeed, there are 290 rural sub-locations where no households own a motor vehicle. Rural areas whose ownership rates are relatively high are typically located near trading centres or economic axes. In general, low rates of motor vehicle ownership in rural areas are a reflection of low levels of household income and a lack of sufficient road infrastructure.

County	Percentage of hhs owning motorized means of transport	Rank	No. of hhs owning motorized means of transport*	No. of hhs owning car*
Nairobi	14.5%	1	143.1	116.2
Mombasa	10.3%	5	27.6	17.3
Kwale	4.3%	36	5.3	1.9
Kilifi	6.3%	18	12.6	4.5
Tana River	2.3%	43	1.1	0.3
Lamu	5.4%	28	1.2	0.2
Taita Taveta	5.9%	23	4.2	1.4
Garissa	2.9%	40	2.9	1.8
Wajir	1.2%	47	1.1	0.6
Mandera	1.5%	46	1.9	1.0
Marsabit	2.7%	42	1.6	0.6
Isiolo	5.4%	29	1.7	0.9
Meru	6.3%	20	20.0	11.7
Tharaka Nithi	6.1%	21	5.5	2.8
Embu	8.0%	12	10.6	5.7
Kitui	5.5%	26	11.3	3.9
Machakos	7.5%	13	19.9	11.0
Makueni	6.1%	22	11.3	4.1
Nyandarua	7.3%	14	10.5	4.2
Nyeri	8.1%	11	16.3	10.0
Kirinyaga	8.6%	9	13.3	6.5
Murang'a	5.5%	27	14.0	7.0
Kiambu	11.4%	4	53.5	36.7
Turkana	1.7%	45	2.1	0.9
West Pokot	2.2%	44	2.1	1.0
Samburu	2.8%	41	1.3	0.6
Trans Nzoia	8.7%	8	14.7	6.5
Uasin Gishu	11.9%	3	24.2	13.4
Elgeyo Marakwet	5.2%	32	4.0	2.2
Nandi	6.7%	16	10.4	4.9
Baringo	5.2%	31	5.8	3.4
Laikipia	9.0%	7	9.3	4.8
Nakuru	9.5%	6	38.8	20.5
Narok	5.4%	30	9.1	4.0
Kajiado	12.8%	2	22.3	14.6
Kericho	6.5%	17	10.2	5.4
Bomet	6.3%	19	9.1	3.7
Kakamega	5.5%	25	19.7	7.9
Vihiga	4.1%	38	5.1	2.3
Bungoma	5.7%	24	15.6	5.6
Busia	4.7%	34	7.3	2.3
Siaya	4.4%	35	8.8	2.9
Kisumu	8.3%	10	18.7	9.2
Homa Bay	5.0%	33	10.3	2.9
Migori	6.8%	15	12.2	3.4
Kisii	4.3%	37	10.6	4.9
Nyamira	4.1%	39	5.3	2.6
KENYA	**7.6%**	**–**	**667.1**	**380.6**

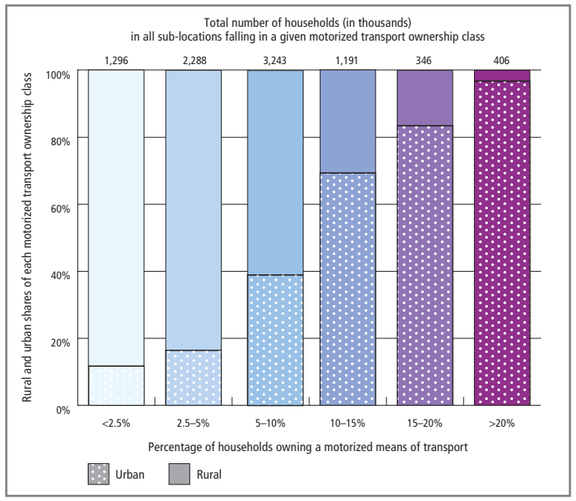
Abbreviations: hhs = households; no. = number

* in thousands

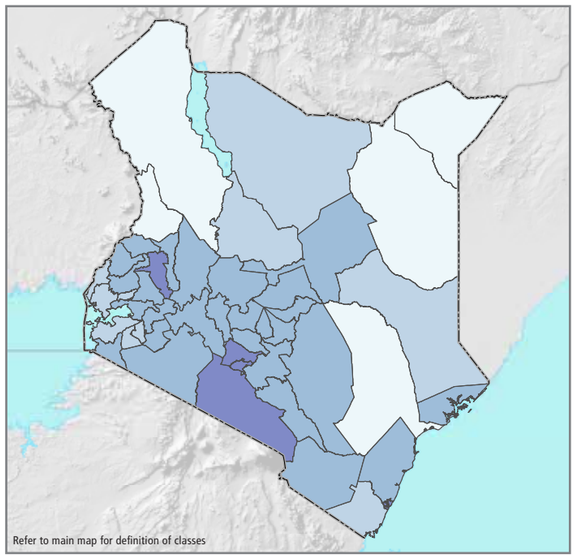
Data Source

2009 Kenya Population and Housing Census (Variable H28: Ownership of Household Assets), Kenya National Bureau of Statistics.

4.03 Rural–Urban Distribution of Motorized Transport Ownership Classes



4.03 Average Motorized Transport at County Level

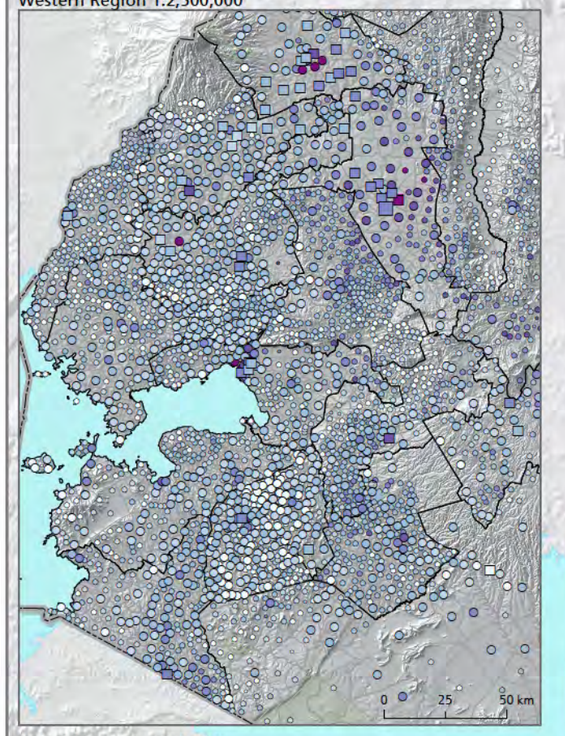


Household Assets & Communication

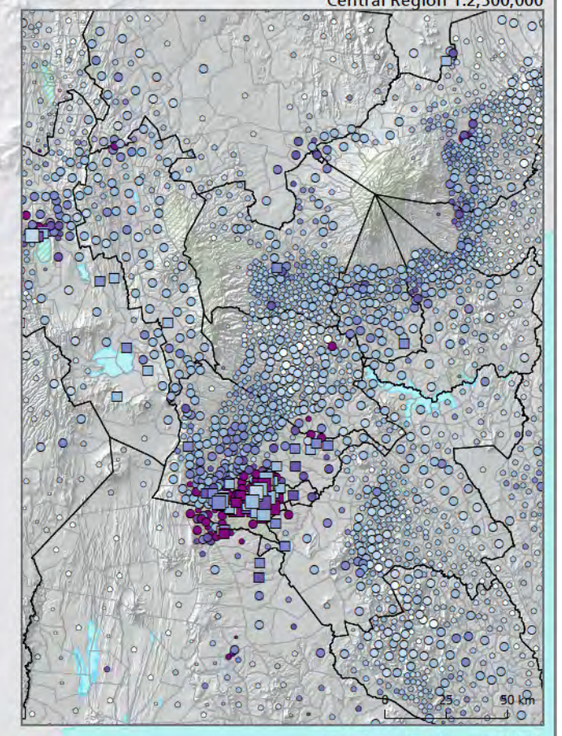
4.03 Households Owning a Motorized Means of Transport

Republic of Kenya 1:4,000,000

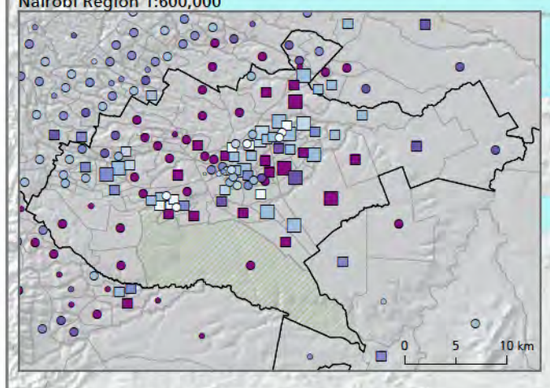
Western Region 1:2,500,000



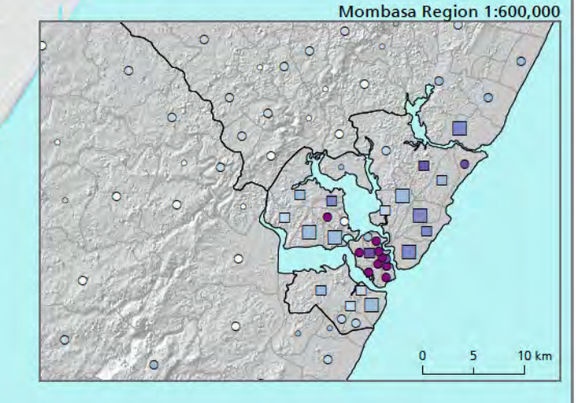
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Motorized transport ownership classes: Percentage of households owning a motorized means of transport (car, motorcycle, tuk-tuk, truck, bus, lorry, tractor)

- Less than 2.5% of households
- 2.5 to 5% of households
- 5 to 10% of households
- 10 to 15% of households
- 15 to 20% of households
- More than 20% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.04 Households Owning Bicycles

Historically, bicycles were the most widely used means of transport in Kenya's rural areas, in many rural trading centres, and in certain larger towns, where bicycle taxis called *bodaboda* are common. Use of bicycles predates Kenyan independence, and further boomed in many parts of the country after independence. This situation has begun to change only very recently – after the 2009 census – due to the large-scale introduction of motorcycles for commercial transportation. Motorcycles have begun to revolutionize small-scale/off-road transportation in Kenya, even in very remote areas. Nevertheless, bicycles remain a key means of transport at the household level, especially in rural settings where they are more affordable for low-income populations. For many households, a bicycle is a productive asset that enhances personal mobility, improves access to markets, and can reduce the work associated with small-scale transportation of goods (e.g. water, fuelwood).

Map 4.04 shows the proportion of households owning bicycles as found in the 2009 census. While the situation has changed somewhat since the census was taken (e.g. due to increased motorcycle use), the overall spatial patterns likely remain similar. Overall, every fourth household (25%, or 2.2 million households) owns at least one bicycle – this rate is lower than that of neighbouring Uganda and Tanzania. Still, Kenya's 2009 rate of bicycle ownership far exceeds its rate of motor vehicle ownership (8%, including motorcycles; see map 4.03).

Interesting spatial patterns are visible that show the importance and potential/limitations of this human-powered means of transport. Of the 11 counties whose bicycle ownership rates are below 10%, nine are in arid and semi-arid areas – Wajir and Mandera even display ownership rates below 1%. Possible reasons for these low rates include long travel distances, mobility of homes, and use of other traditional (non-motorized) transport means. The two other counties with ownership rates below 10%, that are not located in dry areas, are Kisii (7%) and Nyamira (8%). Kericho follows close behind with an ownership rate just over 10%. Likely reasons for the low rates of bicycle ownership in these high-potential counties include steep slopes and frequently wet conditions. Indeed, vast distances and steep, variable terrain place constraints on human-powered transportation. Nevertheless, sharp transitions in ownership rates along the border of Kisii and between many sub-locations in semi-arid and arid Turkana suggest that cultural factors and habits likely play an important role, too.

The highest rates of bicycle ownership are found in Busia and Siaya – both above 50% (i.e. one of every two households) – and in 14 other counties where at least one out of every three households owns a bicycle. These high ownership rates are mainly found in two types of settings. Firstly, in high-potential areas of central and, in particular, western Kenya where intensive small-scale agriculture prevails (see map 6.01) and the terrain is relatively favourable. Secondly, in semi-arid areas where small-scale agriculture dominates but is barely sufficient as a livelihood means (see map 6.01). The latter settings often exhibit high poverty rates (see map 5.02) and are found to the east or on the outskirts of Kenya's high-potential areas and in the coastal region, especially the coastal hinterland including along the Tana River.

Interestingly, Nairobi (11%) and Mombasa (14%) display very low rates as well. In Nairobi, more households own motor vehicles than own bicycles. This suggests that bicycles lose importance in large urban settings, likely because of safety concerns but also because of the status associated with owning a motor vehicle (see map 4.03). This observation is supported by other large towns showing similarly low rates, such as Nakuru and Eldoret. Exceptions include Kisumu and other towns in Kenya's Lake region where use of *bodaboda* is firmly established. Finally, Kenya's smaller towns and trading centres generally exhibit relatively high rates of bicycle ownership, especially those that are connected to rural areas where bicycles predominate.

The rural–urban graph reinforces these overall spatial observations. Urban sub-locations mostly fall in the middle two classes of bicycle ownership. Rural areas are split between the low-rate and high-rate classes of bicycle ownership, reflecting the division between arid/semi-arid rural areas with difficult terrain (low bicycle use), and high-potential rural areas or semi-arid small-scale agricultural areas (high bicycle use). It remains to be seen whether the cultural shift and status issues linked to increasing use of motor vehicles in urban areas (see section 4.03) will begin spilling over into rural areas – especially given the recent influx of motorcycles – gradually reducing bicycle use in traditional strongholds.

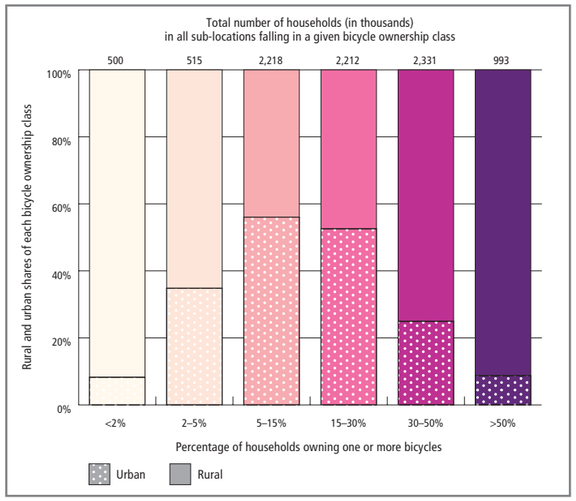
County	Percentage of households owning bicycle	Rank	Number of households owning bicycle*	Number of households owning motorcycle*
Nairobi	11.4%	35	112.0	12.9
Mombasa	13.7%	33	36.7	6.1
Kwale	34.0%	16	41.5	2.4
Kilifi	29.6%	22	59.1	5.9
Tana River	24.5%	23	11.6	0.5
Lamu	39.5%	7	8.8	0.8
Taita Taveta	31.4%	20	22.3	2.1
Garissa	2.4%	45	2.4	0.4
Wajir	0.4%	47	0.4	0.2
Mandera	0.7%	46	0.8	0.4
Marsabit	5.1%	44	2.9	0.6
Isiolo	6.6%	43	2.1	0.5
Meru	20.2%	28	64.5	5.5
Tharaka Nithi	38.4%	13	34.1	1.8
Embu	37.5%	14	49.4	3.1
Kitui	39.5%	6	81.3	5.7
Machakos	32.8%	18	86.8	5.7
Makueni	44.8%	3	83.6	5.3
Nyandarua	39.0%	10	56.2	4.0
Nyeri	20.8%	26	42.0	4.0
Kirinyaga	39.5%	8	60.8	5.2
Murang'a	20.5%	27	52.3	4.7
Kiambu	22.6%	25	105.8	9.3
Turkana	7.8%	39	9.6	0.9
West Pokot	7.2%	40	6.8	0.6
Samburu	7.1%	42	3.4	0.4
Trans Nzoia	39.3%	9	66.9	4.8
Uasin Gishu	32.2%	19	65.2	4.7
Elgeyo Marakwet	11.4%	34	8.9	0.9
Nandi	24.0%	24	37.0	3.3
Baringo	14.6%	32	16.2	1.4
Laikipia	38.5%	12	39.7	2.8
Nakuru	31.4%	21	128.8	11.9
Narok	9.7%	37	16.5	3.2
Kajiado	18.7%	30	32.5	5.0
Kericho	10.3%	36	16.3	3.2
Bomet	14.8%	31	21.3	4.2
Kakamega	44.0%	4	156.6	8.9
Vihiga	20.0%	29	24.6	2.3
Bungoma	43.5%	5	117.7	7.6
Busia	53.0%	1	81.8	3.8
Siaya	50.7%	2	100.8	4.6
Kisumu	38.6%	11	87.6	6.6
Homa Bay	33.2%	17	68.4	6.1
Migori	35.6%	15	64.1	7.6
Kisii	7.2%	41	17.5	4.1
Nyamira	8.3%	38	10.9	1.7
KENYA	**25.3%**	–	**2,216.4**	**187.9**

* in thousands

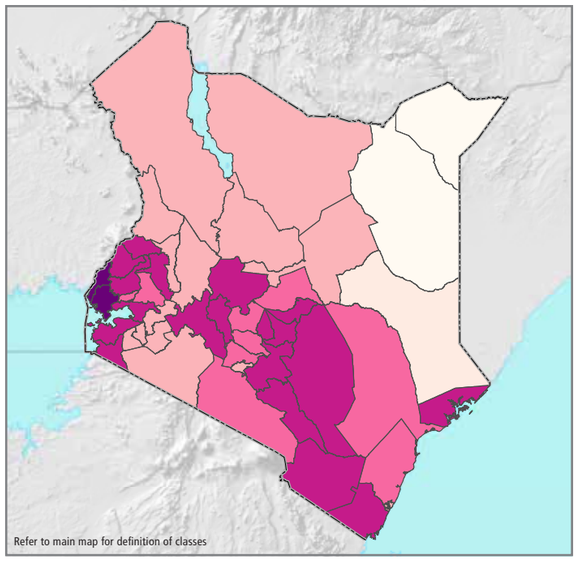
Data Source

2009 Kenya Population and Housing Census (Variable H28: Ownership of Household Assets), Kenya National Bureau of Statistics.

4.04 Rural–Urban Distribution of Bicycle Ownership



4.04 Average Bicycle Ownership at County Level

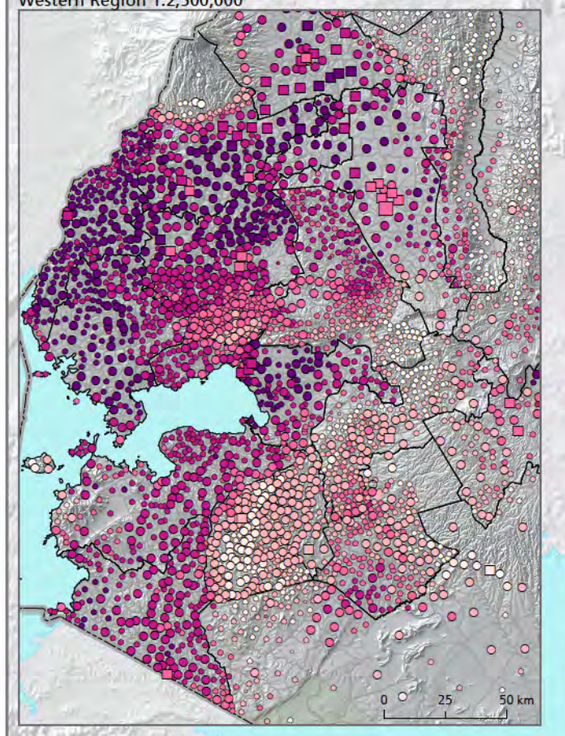


Household Assets & Communication

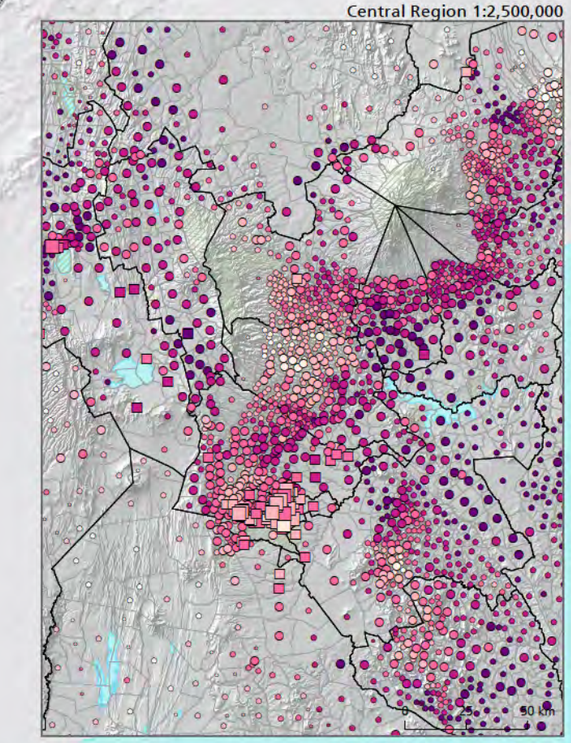
4.04 Households Owning Bicycles

Republic of Kenya 1:4,000,000

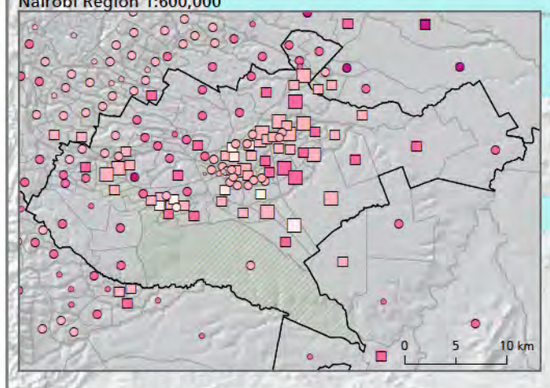
Western Region 1:2,500,000



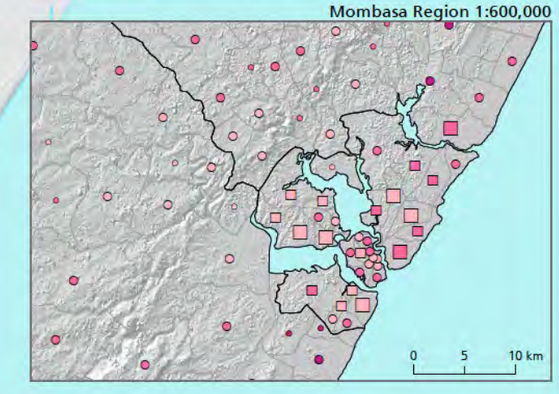
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Bicycle ownership classes: Percentage of households owning one or more bicycles

- Less than 2% of households
- 2 to 5% of households
- 5 to 15% of households
- 15 to 30% of households
- 30 to 50% of households
- More than 50% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.05 Households Owning Radio Sets

Electronic information and communication tools play an important role in the development of a nation. They provide easy access to information, enabling dissemination of content and national languages that may be relevant for development. They also provide entertainment that may trigger cultural change, and in the case of interactive media, they may change the form of social relations, and increase participation in sociopolitical discourses and in the economy. The following maps therefore examine the distribution of such tools in the different parts of Kenya. The sequence of maps follows the order of the tool's introduction, starting with radio on this map, and followed by television (4.06), mobile phones (4.07), and the Internet (4.08).

The data displayed here were collected in the 2009 census. In view of the rapid development in the information and communication technology sector, this means that some of the maps, especially 4.08, may be viewed as historical. Nevertheless, they give important indications as to how these innovations have spread in a country with such a high diversity of contexts.

In the decades following independence, radio played an important role in national, regional, and local information dissemination. In remote areas, where print media were inaccessible or unaffordable, radio was often the sole source of supra-local information and entertainment. Radio allowed transmission and reception of a wide variety of content in different national and local languages. This includes mainly national stations, but also a broad range of community, commercial, and international stations. It is beyond the scope of this atlas to discuss content, reach, and effects of such stations. Instead, we address the distribution of the means to receive this content: the radio.

This map shows the percentage of households owning standalone radio sets; the census did not count radios that are integrated with other gadgets, such as mobile phones. Overall, about three in four Kenyan households (74%, or 6.5 million of 8.8 million households in total) own a radio. This high rate indicates a product and technology that is mature, in the sense that it no longer undergoes significant change and has permeated most regions and social strata.

This is confirmed by the broadly homogenous distribution shown on the main map and in the county table. Out of 47 counties, 41 reach rates higher than 50% with at least every second household owning a radio, and with some regions reaching almost full cover, led by Nyandarua and Nyeri (both 88%). Only six counties, all in the vast arid and semi-arid areas to the north and east, show rates of below 50%. Nevertheless, five of them are still above 25%, with only Turkana having less than one radio in four households (18%).

In spite of this generally high coverage, some regional differences can be identified. As already indicated by the county table, sub-locations with ownership rates of less than 65% or even less than 50% are almost exclusively found in the arid and semi-arid zones where pastoralist activities prevail, as well as in the smallholder areas along the Tana River and at the coast, especially in its hinterland. In these zones, higher rates are almost only found in towns and trading centres. Here, the low rates may be triggered by reduced reception of signals, but in particular also by high poverty rates and high poverty severity (see map 5.05), the latter being especially pronounced in parts of the coastal region.

High rates of above 80% or almost full coverage are found in most rural settings of central Kenya, as well as in large parts of the semi-arid smallholder areas to the east of the highlands, including the Taita Hills, and in a number of high-potential areas of western Kenya. The rest of the highlands and the adjacent semi-arid areas show rates of almost exclusively between 65% and 80%. This distribution indicates a link to poverty rates in these areas, but also highlights that, for many, a radio is a basic good, and an important means of accessing information in agriculturally dominated rural Kenya, in cases where poverty does not turn it into a luxury good. Radio has opened and continues to open many possibilities to reach farmers with innovations and other information relevant for development.

In urban settings, especially in larger towns and cities, rates of radio ownership seem to be at a lower level than in neighbouring rural areas. This may be a sign that other electronic information systems have started replacing radio as the main or even sole receiver. This observation is further followed up in the next map (4.06) on ownership of television sets.

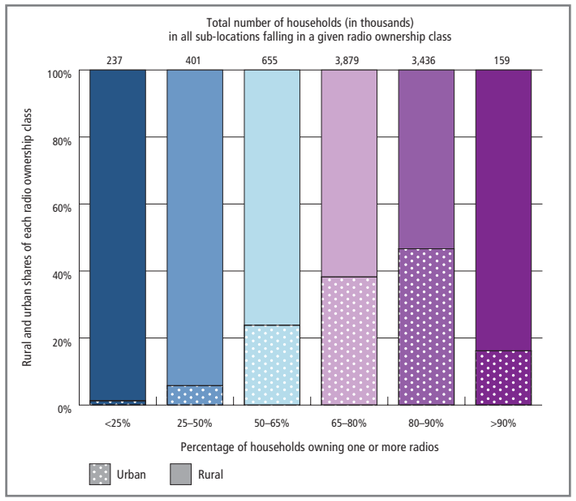
County	Percentage of households owning a radio	Rank	Number of households owning a radio*	Number of households owning a television set*
Nairobi	79.3%	14	780.7	606.7
Mombasa	69.5%	33	186.9	131.0
Kwale	58.3%	38	71.1	14.7
Kilifi	52.5%	40	104.9	31.0
Tana River	45.3%	43	21.5	1.9
Lamu	69.3%	34	15.4	3.0
Taita Taveta	78.6%	16	55.9	12.6
Garissa	50.3%	41	49.6	6.7
Wajir	57.5%	39	50.9	2.2
Mandera	59.6%	37	74.8	2.0
Marsabit	26.9%	46	15.3	3.7
Isiolo	47.3%	42	14.8	6.6
Meru	75.2%	22	240.5	84.8
Tharaka Nithi	76.4%	20	67.9	18.7
Embu	80.7%	9	106.3	40.3
Kitui	70.9%	31	145.7	22.3
Machakos	81.6%	8	215.8	68.4
Makueni	81.9%	7	152.8	21.2
Nyandarua	88.2%	1	126.9	43.8
Nyeri	87.5%	2	176.6	82.6
Kirinyaga	83.4%	4	128.7	58.1
Murang'a	83.3%	5	213.0	54.8
Kiambu	84.6%	3	397.0	256.0
Turkana	17.5%	47	21.5	4.0
West Pokot	35.9%	44	33.7	3.8
Samburu	28.0%	45	13.3	3.3
Trans Nzoia	77.8%	18	132.3	36.5
Uasin Gishu	80.4%	11	162.7	71.2
Elgeyo Marakwet	72.6%	28	56.3	9.5
Nandi	77.0%	19	118.7	27.4
Baringo	63.8%	36	70.6	16.7
Laikipia	78.7%	15	81.2	32.7
Nakuru	82.5%	6	338.0	164.8
Narok	65.2%	35	110.3	15.2
Kajiado	72.2%	30	125.2	65.7
Kericho	80.6%	10	127.2	28.5
Bomet	80.2%	12	115.9	14.8
Kakamega	77.8%	17	276.7	73.7
Vihiga	74.9%	23	92.4	23.0
Bungoma	74.8%	24	202.7	46.5
Busia	69.5%	32	107.3	24.5
Siaya	73.2%	27	145.7	27.5
Kisumu	80.0%	13	181.4	69.2
Homa Bay	73.9%	25	152.4	31.0
Migori	72.4%	29	130.4	26.9
Kisii	73.8%	26	180.9	43.8
Nyamira	76.3%	21	100.0	23.3
KENYA	**74.0%**	–	**6,489.5**	**2,456.6**

* in thousands

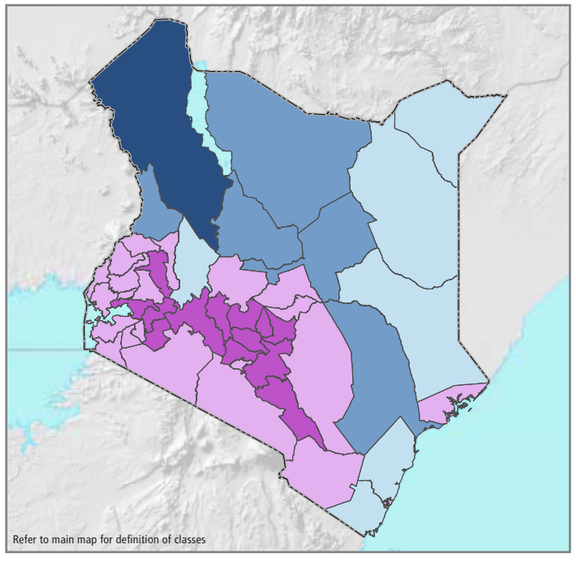
Data Source

2009 Kenya Population and Housing Census (Variable H28: Ownership of Household Assets), Kenya National Bureau of Statistics.

4.05 Rural–Urban Distribution of Radio Ownership Classes



4.05 Average Radio Ownership at County Level

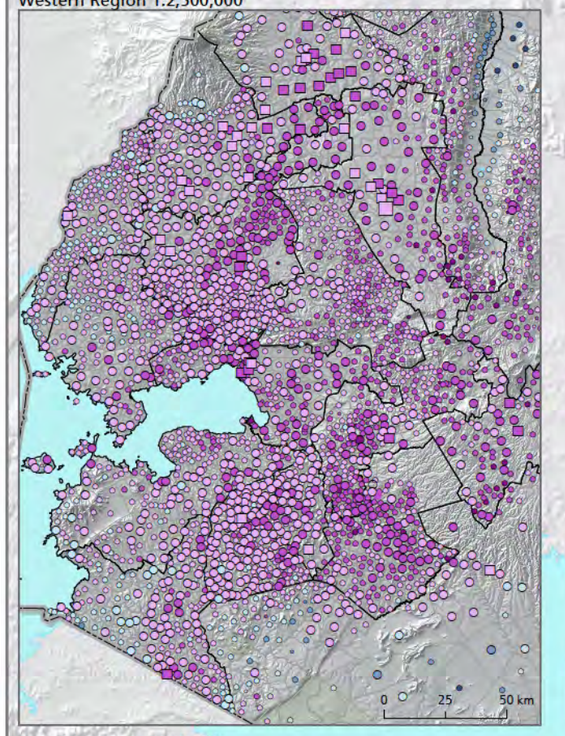


Household Assets & Communication

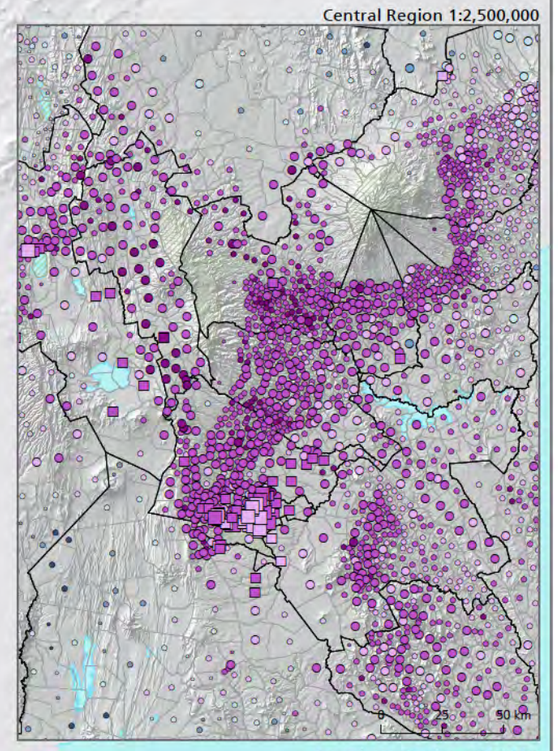
4.05 Households Owning Radio Sets

Republic of Kenya 1:4,000,000

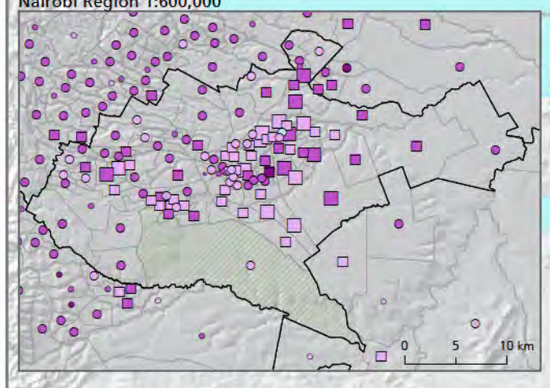
Western Region 1:2,500,000



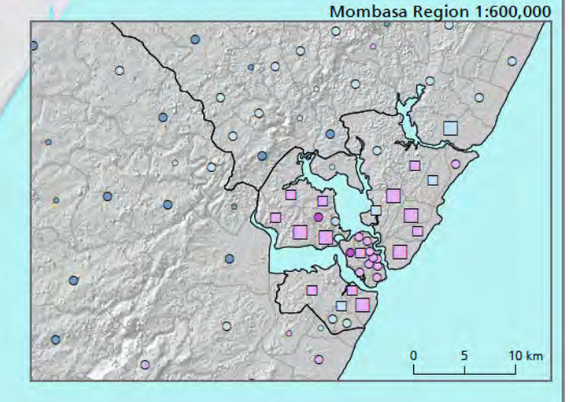
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Radio ownership classes: Percentage of households owning one or more stand-alone radio sets

- Less than 25% of households
- 25 to 50% of households
- 50 to 65% of households
- 65 to 80% of households
- 80 to 90% of households
- More than 90% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.06 Households Owning Television Sets

Television is a mass media tool that fulfils the same main functions as radio – providing information and entertainment – by broadcasting contents via a wide range of channels and services. Possession of a television set (TV) is viewed in many development contexts as an expression of wealth and status, in particular because the technical equipment is much more expensive than a radio, and requires reliable electricity from the grid, generators, solar power, or a car battery. Production of television programmes is relatively expensive, leading to the purchase of international mass productions from the global market. It is therefore more difficult for television programming than for radio to relate its contents to regional and local contexts (see map 4.03).

In Kenya, a first television channel was established in the late 1960s, although TVs only spread to a broader public in the 1980s. Programming was at first limited to state-owned stations, but liberalization of the airwaves in the 1990s led to a range of privately controlled commercial channels. In the new millennium, satellite television considerably broadened the spectrum by enabling access to many international information and entertainment channels. The broadening, privatization, commercialization, and internationalization of the programme supply has far-reaching sociocultural, sociopolitical, and economic implications which cannot be elaborated here. But the spread and distribution of the equipment providing access to this changing supply, TVs, can be shown.

This map shows the proportion of Kenyan households who owned a TV when the census was conducted in 2009. This proportion has certainly increased since then, but the spatial pattern still reveals interesting characteristics, especially compared to radio ownership. In Kenya, 28% or 2.5 million households – more than one in four – own a television set. This rate is quite high considering that 45% of Kenyans are still living below the poverty line (see map 5.02). In other words, every second non-poor household owns a TV.

Although both are mass media tools, TV ownership shows a distinctly different distribution pattern than radio ownership (see map 2.05). Most strikingly, TV ownership is still a largely urban phenomenon while radio ownership shows highest rates in the better-off rural areas. The rural–urban graph shows that the high concentration of TVs (owned by more than 50% of households) is almost exclusively confined to urban settings, while areas with rates below the national average (under 25%) are seldom urban and predominantly rural. This is confirmed by the main map where all towns show clearly higher rates than their immediate rural surroundings. This is also true for small centres and peripheral areas such as the vast arid and semi-arid zones to the north and east of the country.

The county table reflects this observation, and the ranking is largely influenced by the proportion of urban population per county. While Nairobi (62%) takes the lead, counties strongly influenced by the larger agglomeration of the capital also show high values, in particular Kiambu (55%) and Kajiado (38%). Mombasa (49%), Nakuru (40%) with Nakuru town, Uasin Gishu (35%) with Eldoret, and further counties with larger urban populations exhibit the same pattern. One reason for the clear dominance of urban contexts in TV ownership rates is certainly access to electricity grids (see map 3.08), besides the lower poverty rates (see map 5.02) and higher wealth levels (see maps 5.01 and 5.06) in urban settings. But also the cultural shift postulated in relation to car ownership (see map 4.03) may play a role. While this requires further confirmation, we postulate that in the course of urbanization, formerly rural-dominated status values such as land or livestock ownership are replaced by urban status symbols such as cars and also TVs.

In addition to the rural–urban gradient, the main map and the county table show that wealth gradients also play an important role, with better-off rural settings clearly showing higher rates than the economic periphery. TV ownership as a wealth and status symbol is indicated by the relation to energy supply and electricity for lighting (see county table). Interestingly, in many rural-dominated high-potential counties in the Mount Kenya region and especially in western Kenya, more than twice as many households own TVs as use electricity for lighting. This means that these households make it a priority to own a television set, using local energy supplies to operate it. This may be a sign of predominantly urban values gaining importance in rural areas as well, possibly indicating the spread of the cultural shift postulated above.

County	Percentage of households owning a TV	Rank	Number of households owning a TV*	Number of households using electricity for lighting*
Nairobi	61.6%	1	606.7	712.9
Mombasa	48.8%	3	131.0	158.6
Kwale	12.1%	35	14.7	12.9
Kilifi	15.5%	28	31.0	33.4
Tana River	4.0%	44	1.9	1.2
Lamu	13.4%	33	3.0	3.8
Taita Taveta	17.7%	25	12.6	10.7
Garissa	6.8%	41	6.7	11.4
Wajir	2.5%	46	2.2	3.0
Mandera	1.6%	47	2.0	3.2
Marsabit	6.6%	42	3.7	4.3
Isiolo	21.0%	18	6.6	5.8
Meru	26.5%	13	84.8	43.4
Tharaka Nithi	21.0%	17	18.7	7.4
Embu	30.6%	10	40.3	19.6
Kitui	10.9%	37	22.3	9.9
Machakos	25.8%	14	68.4	45.1
Makueni	11.4%	36	21.2	10.9
Nyandarua	30.5%	12	43.8	15.1
Nyeri	41.0%	4	82.6	53.1
Kirinyaga	37.7%	7	58.1	25.4
Murang'a	21.4%	16	54.8	35.6
Kiambu	54.6%	2	256.0	254.0
Turkana	3.2%	45	4.0	3.0
West Pokot	4.0%	43	3.8	2.5
Samburu	7.1%	40	3.3	2.9
Trans Nzoia	21.5%	15	36.5	15.1
Uasin Gishu	35.2%	8	71.2	56.5
Elgeyo Marakwet	12.3%	34	9.5	5.5
Nandi	17.8%	23	27.4	9.8
Baringo	15.1%	29	16.7	10.6
Laikipia	31.7%	9	32.7	18.2
Nakuru	40.2%	5	164.8	139.4
Narok	9.0%	39	15.2	9.9
Kajiado	37.9%	6	65.7	69.1
Kericho	18.0%	21	28.5	17.0
Bomet	10.3%	38	14.8	5.6
Kakamega	20.7%	19	73.7	20.0
Vihiga	18.7%	20	23.0	8.7
Bungoma	17.2%	26	46.5	12.2
Busia	15.9%	27	24.5	9.3
Siaya	13.8%	32	27.5	8.6
Kisumu	30.5%	11	69.2	41.6
Homa Bay	15.0%	30	31.0	6.9
Migori	14.9%	31	26.9	9.6
Kisii	17.9%	22	43.8	19.8
Nyamira	17.7%	24	23.3	7.6
KENYA	**28.0%**	**–**	**2,456.6**	**1,989.7**

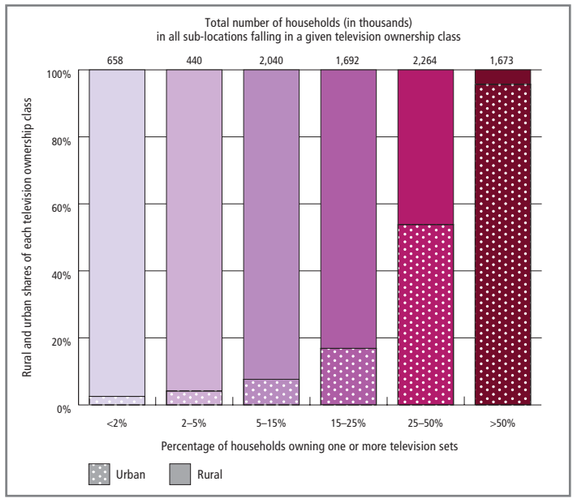
Abbreviation: TV = television set

* in thousands

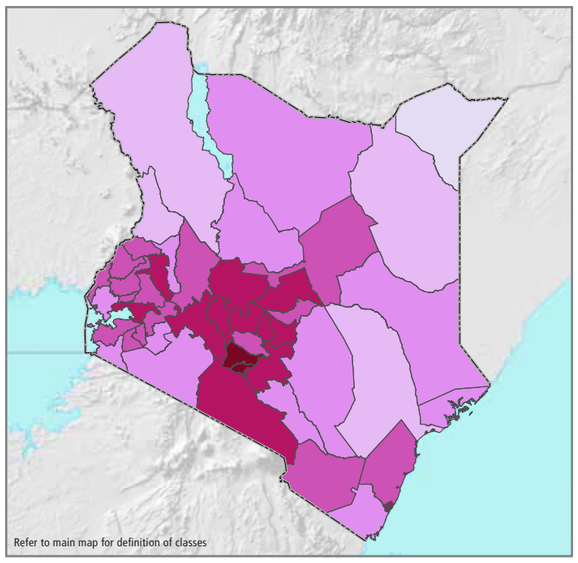
Data Source

2009 Kenya Population and Housing Census (Variable H28: Ownership of Household Assets), Kenya National Bureau of Statistics.

4.06 Rural–Urban Distribution of Television Ownership Classes



4.06 Average Television Ownership at County Level

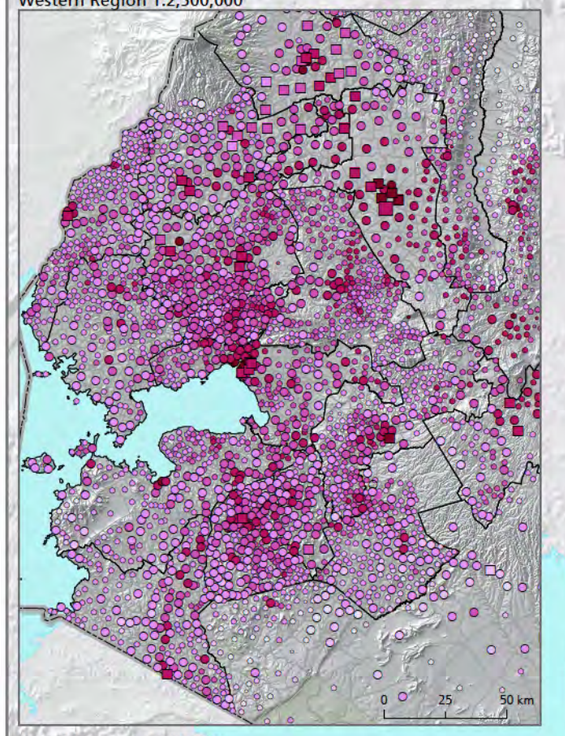


Household Assets & Communication

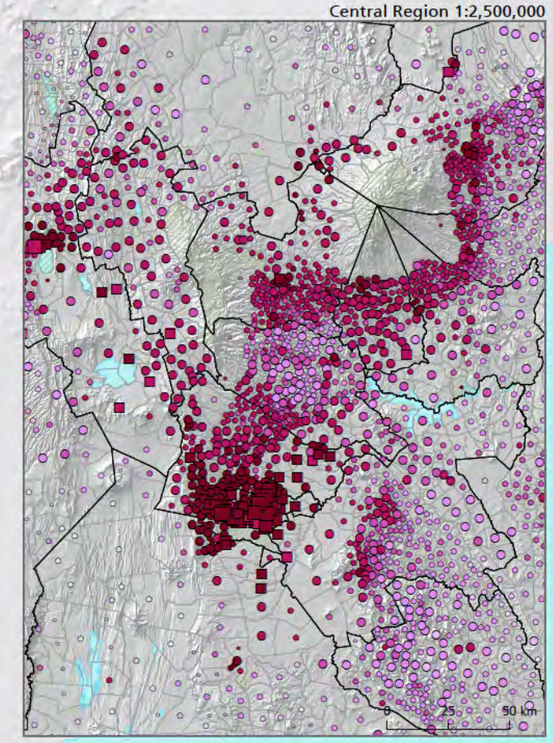
4.06 Households Owning Television Sets

Republic of Kenya 1:4,000,000

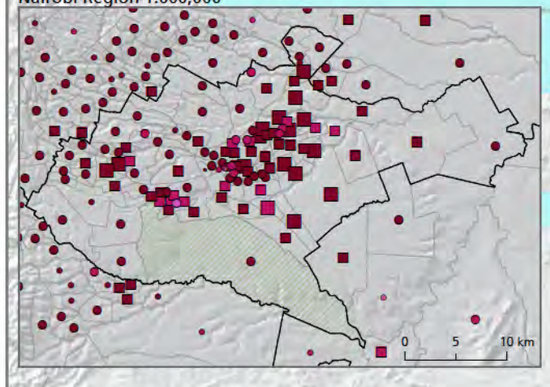
Western Region 1:2,500,000



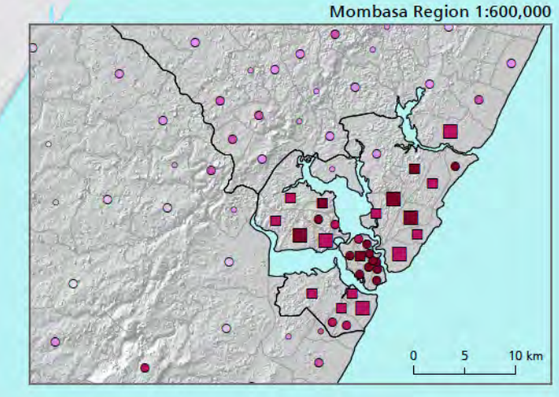
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Television ownership classes: Percentage of households owning one or more stand-alone television sets

- Less than 2% of households
- 2 to 5% of households
- 5 to 15% of households
- 15 to 25% of households
- 25 to 50% of households
- More than 50% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.07 Households Owning Mobile Phones

Globally, mobile phones have revolutionized telecommunication in the past two decades, with far-reaching consequences for social interactions and the economy. In development contexts, access to or ownership of mobile phones is seen as a productive asset, indicating a household's participation in a rapidly changing economy and society.

In Kenya, telecommunication was long dominated by landlines with limited reach and low reliability and accessibility. This started changing rapidly in the 1990s with the introduction of mobile phones, and led to an unprecedented boom in the second half of the past decade that is unbroken to date and has made landlines virtually insignificant. A major and globally leading innovation was the introduction in Kenya of M-Pesa, a mobile-phone-based payment system, in 2007. It added a crucial dimension to the communication functions of mobile phones by significantly easing the transfer of (relatively small amounts of) money, not only revolutionizing payment modes but also enabling transfer of remittances, e.g. among family members residing in urban and rural contexts. Against this background, the 2009 census captures the situation in the booming pioneer phase of mobile phone use in Kenya. Since then, growth rates have further boomed; there have been important innovations – most notably, smartphones with Internet access; and major service providers have become heavyweights in Kenya's economic arena.

This map shows the proportion of households who owned one or more mobile phones in 2009. This proportion has continued to increase rapidly, reaching full coverage in many parts of the country. However, the spatial patterns presented here still give insights into the diffusion process of what is socio-economically probably the most important single innovation in Kenya's history since independence – perhaps only comparable to the spreading and impact of maize after its introduction some centuries ago.

In 2009, about two-thirds of Kenyan households (63%) owned one or several mobile phones. Considering the poverty rate of 45% (see map 5.02) this ownership rate implies that mobile phones have already penetrated most social strata in Kenya. The fast diffusion of this communication tool into most socio-economic contexts is expressed in the spatial patterns that produced an astonishingly homogenous distribution that is in contrast to TV ownership (see map 4.06). And so, only ten of the 47 counties exhibited rates of less than 50%, meaning that in most counties at least one in two households already owned mobile phones. The ten counties showing rates between 16% (Turkana) and 49% (Baringo) are all found in the vast semi-arid and arid zones of the country. This is certainly linked to the high poverty rates in these areas, but also to the limited network coverage. Coverage has meanwhile improved, leading to an increase in mobile phone access and ownership.

However, the map also reveals some differences that, besides network coverage, are rooted in wealth levels and rural–urban gradients. Technological innovations tend to spread from urban centres to rural areas; accordingly, Nairobi (88%) and Mombasa (82%) show the highest county rates. Additionally, the rural–urban graph indicates that coverage of more than 80% is almost exclusively found in urban contexts. Thus, not only wealth levels but especially urbanity is an important factor in this diffusion process, and expressed by the fact that almost all sub-locations in Nairobi, including most of the low-income areas, have reached rates of 80% and above. In rural areas, however, wealth levels still seem instrumental in influencing the spread of mobile phones. While many sub-locations in the core agricultural regions of central Kenya and parts of western Kenya show rates of above 60%, these drop to 40% and less in the poorer regions of the high-potential areas, and to partly even below 20% in the semi-arid smallholder areas.

Overall, mobile phones have brought great advantages in terms of communication and service provision, e.g. in the health, education, and farming sectors, and especially also in transacting payments. They break all social and spatial boundaries and are becoming a basic asset in daily life. The status question of mobile phones has meanwhile shifted to the level of smartphones and the question remains open whether this new generation of gadgets allowing access to the Internet will follow a similar diffusion pattern, or whether mobile phones and smartphones will end up showing different patterns similar to those of the two mass media tools radio and television (see maps 4.05 and 4.06).

County	Percentage of hhs owning mobile phone	Rank	No. of hhs owning mobile phone*	No. of rural hhs owning mobile phone*
Nairobi	88.3%	1	870.2	–
Mombasa	81.6%	2	219.3	–
Kwale	52.5%	32	64.1	43.5
Kilifi	57.8%	23	115.5	63.7
Tana River	35.9%	41	17.0	12.9
Lamu	64.6%	14	14.3	10.8
Taita Taveta	64.7%	13	46.0	34.6
Garissa	37.5%	40	37.0	18.1
Wajir	18.2%	46	16.1	6.5
Mandera	29.5%	42	37.0	20.1
Marsabit	26.3%	44	15.0	7.9
Isiolo	46.6%	39	14.6	4.4
Meru	60.7%	18	194.1	169.1
Tharaka Nithi	56.9%	24	50.5	35.2
Embu	64.4%	16	84.8	66.1
Kitui	50.5%	37	103.8	81.6
Machakos	67.7%	11	179.0	70.4
Makueni	62.5%	17	116.6	98.8
Nyandarua	75.7%	5	109.0	90.4
Nyeri	77.4%	4	156.1	112.8
Kirinyaga	69.0%	10	106.4	89.6
Murang'a	64.5%	15	164.9	140.5
Kiambu	81.4%	3	382.1	113.3
Turkana	15.9%	47	19.6	11.1
West Pokot	25.4%	45	23.8	19.0
Samburu	27.3%	43	12.9	7.9
Trans Nzoia	60.1%	19	102.2	74.1
Uasin Gishu	73.5%	8	148.7	74.7
Elgeyo Marakwet	51.5%	34	40.0	32.0
Nandi	56.5%	25	87.0	71.4
Baringo	49.3%	38	54.5	43.6
Laikipia	69.9%	9	72.1	52.0
Nakuru	74.6%	6	305.9	126.0
Narok	52.0%	33	88.0	75.8
Kajiado	73.6%	7	127.7	51.8
Kericho	59.4%	21	93.8	59.4
Bomet	54.9%	27	79.4	68.4
Kakamega	56.2%	26	199.8	159.7
Vihiga	54.7%	28	67.5	44.2
Bungoma	50.8%	36	137.6	106.3
Busia	51.0%	35	78.7	64.2
Siaya	53.8%	29	107.1	92.6
Kisumu	66.3%	12	150.2	59.3
Homa Bay	53.7%	31	110.7	91.1
Migori	53.7%	30	96.8	55.1
Kisii	58.4%	22	143.2	108.4
Nyamira	59.6%	20	78.0	66.9
KENYA	**63.2%**	–	**5,538.7**	**2,905.2**

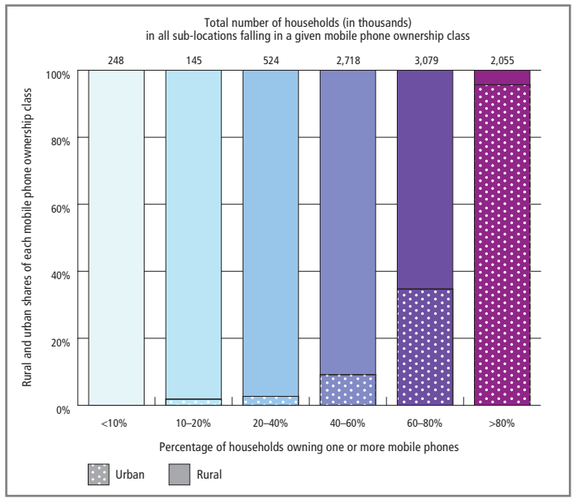
Abbreviation: hhs = households; no. = number

* in thousands

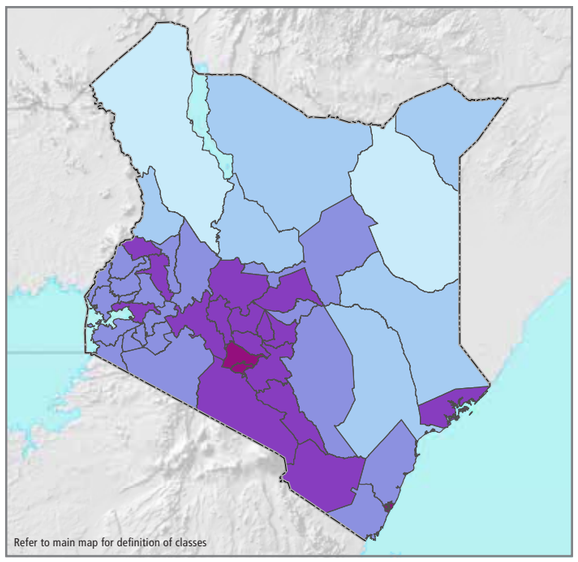
Data Source

2009 Kenya Population and Housing Census (Variable H28: Ownership of Household Assets), Kenya National Bureau of Statistics.

4.07 Rural–Urban Distribution of Mobile Phone Ownership Classes



4.07 Average Mobile Phone Ownership at County Level

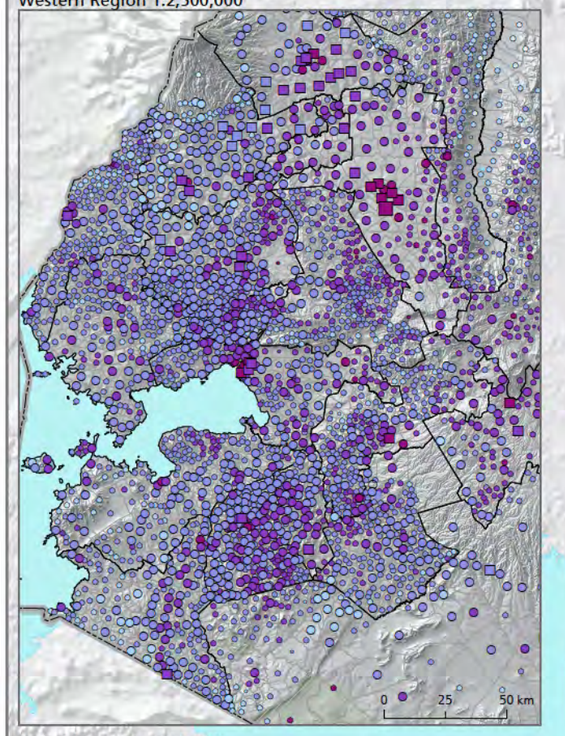


Household Assets & Communication

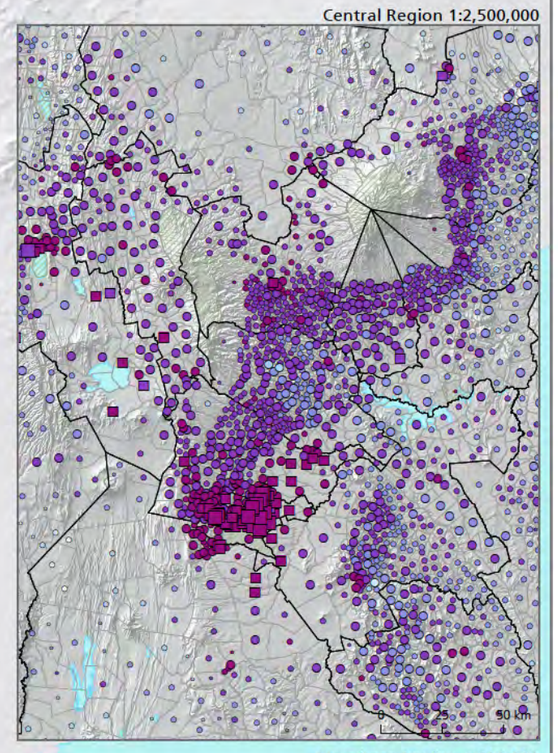
4.07 Households Owning Mobile Phones

Republic of Kenya 1:4,000,000

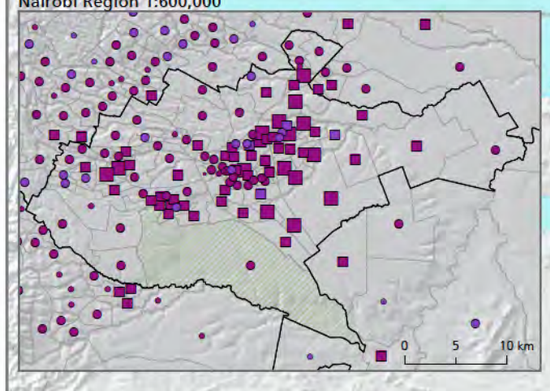
Western Region 1:2,500,000



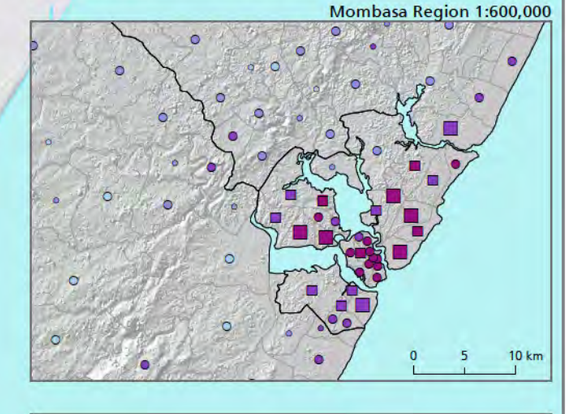
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Mobile phone ownership classes: Percentage of households owning one or more mobile phones

- Less than 10% of households
- 10 to 20% of households
- 20 to 40% of households
- 40 to 60% of households
- 60 to 80% of households
- More than 80% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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4.08 Use of the Internet

The Internet is a global network of computers in continuous exchange of data. It enables the dissemination and targeted sharing, worldwide, of information, news, opinions, and services. The Internet permits collaboration and interaction between individuals regardless of their geographic location, and is thus associated with economic growth and socio-economic development. In development contexts, computer ownership or Internet access are often used as indicators of a household's wealth, modernity, and development potential.

At the time of the 2009 census, Internet access in Kenya was mainly only possible through computers linked to the Internet through modems and landlines. This technology was expensive and demanding in terms of knowledge and support: individual households usually had no Internet, and computer access was provided in offices, institutions of higher learning, or Internet cafés. The situation has since drastically changed: the Internet is now accessible via mobile networks, making it independent of the limiting landline networks; smartphones and tablets make the complex and demanding technology of computers redundant. These innovations have provoked a boom in Internet access in the past two years comparable to the pioneering boom in mobile phone use a decade ago (see map 4.07). Against this background, Kenya is currently in a process of skipping the phase of computers – or confining them to professional use – and directly entering the phase of mobile computing, thereby rapidly narrowing what is termed the global digital divide. To what extent and for how long disparities in Internet access among the different regions of Kenya will persist cannot be addressed here, but it remains an important question for the future of the country.

The fundamental technological innovations that took place between the 2009 census and the publication date of this atlas clearly make this a historical map. And contrary to other rapidly spreading innovations presented in this chapter – see maps 4.03, 4.06, and 4.07 – the spatial patterns revealed here are not significant for the further development of Kenyans' access to the global Internet because of the recent technology shift to mobile computing. However, the map is still presented here to illustrate the spatial and social disparities that expensive and complex technologies may produce, and how important it is to promote innovations that can be absorbed in the different contexts of the country to advance overall national development.

The present map depicts the number of people aged four years or older who used the Internet daily, weekly, or at least monthly in 2009. Overall, only 6% or 2 million of the 32.6 million Kenyans aged four years or older accessed the Internet at least once a month at that time.

In only four counties this rate was above 10%: in Nairobi (22%) and in its larger agglomeration with Kiambu (12%) and Kajiado (11%), as well as in Mombasa (14%). Only four more counties, all of which host larger towns, showed rates above the national average: Uasin Gishu, Kisumu, Nakuru, and Nyeri. The main map and especially the rural–urban graph confirm that Internet access was almost exclusively confined to larger urban settings that provided the complex infrastructure for the dominant type of Internet access at the time. The map insets of Nairobi and Mombasa show that among urban dwellers, the wealthier population segments (compare map 5.01) clearly had better access.

In sum, the old technology of Internet access put up spatial and social barriers that were largely defined by infrastructure and wealth levels. The recent technological innovations of mobile computing and smartphones certainly break down the infrastructural barriers and to some degree probably also the high wealth barriers. It remains to be seen whether this technological shift will follow the diffusion patterns of mobile phones (see map 4.07) or produce more confined patterns such as TVs did (see map 4.06). In any case, the pattern presented in this map is undoubtedly evolving towards much broader access by Kenyans to the Internet.

County	Percentage of population using the Internet	Rank	No. of people using the Internet in 2009*	No. of people not using the Internet in 2009*
Nairobi	22.3%	1	630.7	2,203.0
Mombasa	14.3%	2	120.3	722.1
Kwale	3.0%	25	17.1	557.1
Kilifi	4.1%	13	40.2	945.4
Tana River	2.7%	35	5.6	204.6
Lamu	2.9%	27	2.7	87.8
Taita Taveta	4.2%	12	10.5	242.0
Garissa	2.4%	39	13.9	554.7
Wajir	1.6%	46	9.5	601.4
Mandera	1.3%	47	12.6	937.9
Marsabit	1.7%	45	4.4	258.7
Isiolo	3.7%	15	4.6	121.5
Meru	3.6%	16	43.7	1,182.7
Tharaka Nithi	3.0%	26	9.8	321.1
Embu	4.6%	10	21.6	448.8
Kitui	2.1%	41	19.3	883.4
Machakos	4.4%	11	44.0	955.3
Makueni	2.2%	40	17.9	782.6
Nyandarua	2.8%	31	15.2	527.6
Nyeri	6.2%	8	39.3	595.7
Kirinyaga	3.5%	17	17.0	470.2
Murang'a	2.8%	28	24.8	845.2
Kiambu	11.5%	3	170.4	1,311.4
Turkana	1.8%	43	13.9	776.2
West Pokot	1.7%	44	7.8	444.9
Samburu	2.1%	42	4.1	192.7
Trans Nzoia	3.4%	19	24.5	701.6
Uasin Gishu	8.0%	5	63.1	728.3
Elgeyo Marakwet	2.6%	37	8.5	322.4
Nandi	3.2%	22	21.1	648.7
Baringo	2.7%	34	13.2	482.8
Laikipia	4.8%	9	17.1	340.8
Nakuru	6.7%	7	95.3	1,328.0
Narok	2.5%	38	18.4	723.4
Kajiado	10.7%	4	65.6	545.6
Kericho	3.9%	14	26.0	644.4
Bomet	2.8%	29	18.5	633.9
Kakamega	3.0%	24	43.9	1,429.4
Vihiga	2.7%	36	13.2	484.9
Bungoma	3.1%	23	37.3	1,177.2
Busia	2.8%	30	18.6	639.9
Siaya	2.8%	32	20.9	727.9
Kisumu	7.1%	6	60.8	795.3
Homa Bay	3.3%	21	28.0	822.3
Migori	3.4%	18	27.4	772.8
Kisii	3.3%	20	34.3	993.1
Nyamira	2.7%	33	14.5	521.1
KENYA	**5.7%**	**–**	**1,990.9**	**32,637.6**

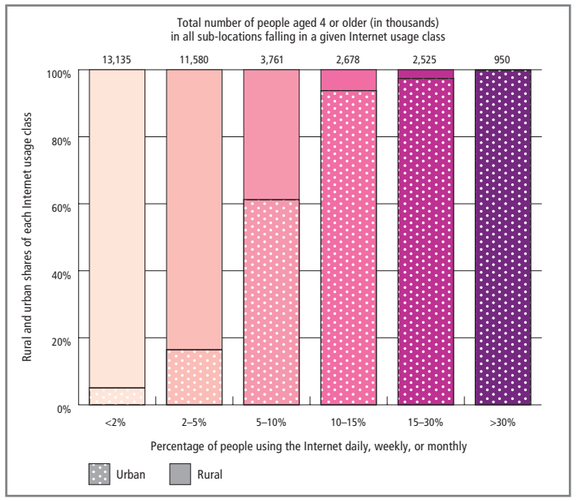
Abbreviation: no. = number

* in thousands

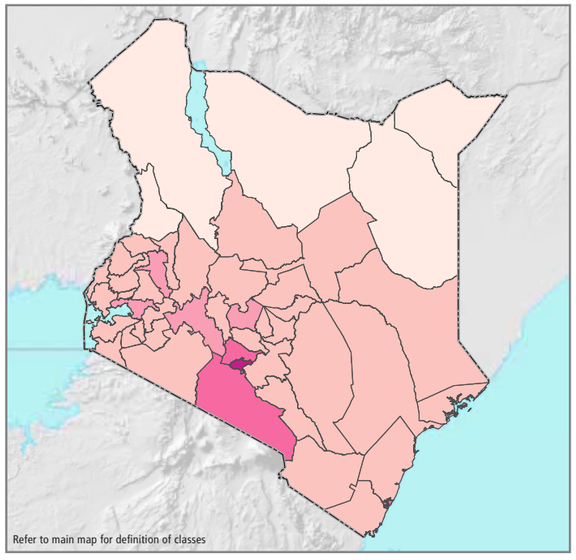
Data Source

2009 Kenya Population and Housing Census (Variable P50: Internet Use), Kenya National Bureau of Statistics.

4.08 Rural–Urban Distribution of Internet Usage Classes



4.08 Average Internet Usage at County Level



Household Assets & Communication

4.08 Use of the Internet

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

Internet usage classes: Percentage of people aged 4 or older using the Internet daily, weekly, or monthly

- Less than 2% of people
- 2 to 5% of people
- 5 to 10% of people
- 10 to 15% of people
- 15 to 30% of people
- More than 30% of people

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5

Welfare & Poverty

Introduction

This chapter focuses on the spatial distribution of welfare, poverty, and inequality in Kenya. These are complex, multidimensional phenomena, which are represented here in terms of their economic dimensions. A population's material welfare is a crucial component of its communal well-being and a key factor influencing prospects for economic growth and self-determined development. Low rates of wealth and high rates of poverty burden those directly affected and impede national development. Thus, in its *Vision 2030*, the Government of Kenya clearly articulates its goal of facilitating "enhanced equity and wealth creation opportunities for the poor". To implement *Vision 2030* and support development efforts, it is vital to have baseline information on the social and regional distribution of welfare and poverty in Kenya. This chapter aims to provide such information.

Levels of welfare, poverty, and inequality cannot be determined based on census data alone. Thus, this chapter additionally draws on the *Kenya Integrated Household Budget Survey 2005/06*. By combining these data sources and applying methods of small area estimation (SAE), it is possible to determine relevant indicators of welfare, poverty, and inequality at the sub-location level. For more on SAE methodology, refer to the box on this page.

Taken together, the seven maps in this chapter provide a comprehensive picture of the distribution of welfare and poverty in Kenya.

Map 5.01 provides the foundation for all other maps in this chapter. It displays the mean per person monthly expenditure (see box) at the sub-location level throughout Kenya. In 2006 prices, Kenya's per person mean monthly expenditure is 3,430 Kenyan shillings (KSh). If a cumulative inflation rate of 93% is applied in line with 2013 prices, this mean rises to KSh 6,620. However, individual expenditures vary greatly along ecological, economic, and urban–rural gradients.

Maps 5.02 to 5.05 illustrate additional dimensions of poverty. *Map 5.02* displays poverty incidences, i.e. the proportion of people living below the poverty line as a percentage of the population. Nationally, 45.2% of Kenya's 38 million inhabitants are considered poor. However, the poverty rate varies from near 0% in some areas of Nairobi to almost 100% in certain arid and semi-arid areas as well as in the coastal hinterland.

Whereas the map of poverty incidences illustrates which areas of Kenya are poor, *map 5.03* reveals where the greatest numbers of poor people live by showing what share each sub-location contributes to national poverty. As one would expect, some of the poor regions in the economic peripheries contribute significantly to national poverty. However, the map also reveals that large numbers of poor people live in regions with comparatively low poverty incidences in high-potential and urban areas.

Maps 5.04 and 5.05 further differentiate the picture by displaying two separate indicators that measure how deep and severe poverty is in different parts of Kenya. *Map 5.04* shows the poverty gap, which measures how far below the poverty line poor people in a given area live. *Map 5.05* displays poverty severity by showing where the poorest of the poor are located. The two indicators reveal that poverty has many faces in Kenya and that there are some regions – e.g. in the coastal hinterland – where poverty is both very deep and severe.

The last two maps deal with wealth and inequality. *Map 5.06* illustrates the wealth gap, i.e. how far above the poverty line Kenya's non-poor populations live (see box). In most of Kenya's wealthier regions, non-poor populations live well above the poverty line. But there are also regions – e.g. in marginal lands – where non-poor people live just slightly above the poverty line. These populations of non-poor could fall into poverty in the event of wider economic shocks or moderate changes in economic boundary conditions.

Map 5.07 displays the Gini coefficient, a well-known measure of inequality. The map is difficult to interpret on its own and should be viewed together with the other maps in this chapter. Nevertheless, at 0.45, Kenya's national Gini coefficient is quite high. Thus, poverty and inequality are clearly key issues for Kenya's national development, as reflected in its *Vision 2030*.

When viewed together, the maps in this chapter help indicate where it is appropriate to use approaches that directly target the poor, and where integrated regional development approaches are more adequate.

Measuring Welfare and Poverty

This chapter focuses on the economic dimensions of welfare and poverty, based on estimates of consumption expenditure per person. Small area estimation (SAE) methodology was used to derive measures of welfare and poverty. SAE uses survey data and census data to calculate per person consumption expenditure. The estimates presented in this atlas were calculated using the *Kenya Integrated Household Budget Survey 2005/06* (KIHBS) and the *2009 Kenya Population and Housing Census* (KPHC). Accordingly, they represent the 2009 situation, but at 2006 prices. Application of SAE made it possible to estimate numbers of poor – based on the rural or urban poverty line – and to present them in a spatially disaggregated way, i.e. at the sub-location level. The rural and urban poverty lines were derived from the KIHBS 2005/06: for rural areas, the agreed-upon poverty line (in 2006 prices) is KSh 1,562 monthly expenditure per adult equivalent; for urban areas, the agreed-upon poverty line (in 2006 prices) is KSh 2,913 monthly expenditure per adult equivalent (Kenya National Bureau of Statistics, *Basic Report on Well-Being in Kenya*, April 2007). When making calculations per person in adult equivalents, children under 15 years are factored in as some fraction of an adult (0.24 for children under five years; 0.65 for school-age children). In this chapter, we generally use "per person" to denote "per adult equivalent".

In deriving poverty estimates, the class of poverty measures developed by Foster, Greer, and Thorbecke (1984) – often called FGT indices – was used. The FGT measure, or $P_{(\alpha)}$, is defined as:

$$P_{(\alpha)} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{z-y_i}{z}\right)^{\alpha} I\left(y_i < z\right)$$

where z denotes the poverty line, y_i is the consumption expenditure of the i^{th} household, N is the population size for which the measure is calculated, $I\left(y_i < z\right)$ is an indicator function that maps a value of 1 when the constraint is satisfied (i.e. if the given person is poor) or assigns a value of 0 otherwise. The parameter α is the poverty sensitivity indicator. Its value is 0, 1, or 2, depending on the poverty index.

When calculating the incidence of poverty (headcount index), parameter α takes the value 0 and the formula is as follows:

$$P_{(\alpha=0)} = \frac{1}{N}\sum_{i=1}^{N} I\left(y_i < z\right)$$

When calculating the poverty gap, parameter α takes the value 1 and the formula is as follows:

$$P_{(\alpha=1)} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{z-y_i}{z}\right) I\left(y_i < z\right)$$

When calculating poverty severity, parameter α takes the value 2 and the formula is as follows:

$$P_{(\alpha=2)} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{z-y_i}{z}\right)^{2} I\left(y_i < z\right)$$

The wealth gap measure as conceived by KNBS, CETRAD, and CDE for this atlas denotes the mean aggregate consumption expenditure (above the poverty line) for a given non-poor population. The wealth gap is expressed as a percentage of the poverty line. In other words, it is the difference between the actual average consumption expenditure of a given non-poor population and the poverty line. The wealth gap index provides a clearer picture of how far above (or close to) the poverty line non-poor populations are living. The formula is:

$$P_{(\alpha=1)} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i-z}{z}\right) I\left(y_i > z\right)$$

where the parameters z, y_i, α, N and i are defined as described previously.

This atlas defines inequality as the difference in the distribution of actual consumption expenditure (as estimated) among the population. Inequality can be measured via several methods; the analysis described here uses the Gini coefficient. The Gini coefficient ranges from 0 to 1, where 0 represents perfect equality (i.e. everyone has an equal share of wealth), and 1 represents total inequality (i.e. a single individual captures all available wealth).

Finally, it is important to note that the total population in this chapter differs slightly from the value used in other chapters: instead of 38.1 million, 37.6 million is used. This is because the modelling approach included conventional household types only; other household types, such as collective households, were excluded from the calculations.

Content

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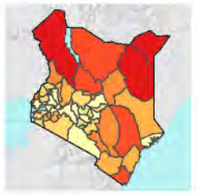

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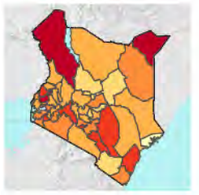

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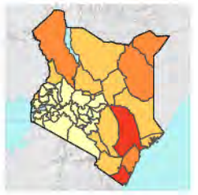

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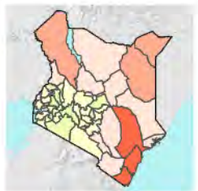

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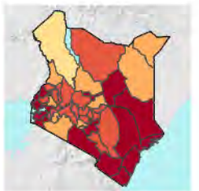

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5.01 Mean per Person Monthly Expenditure

A population's material welfare is a crucial component of its communal well-being and a key factor influencing prospects for further economic growth and self-determined development. Low rates of wealth and high rates of poverty burden those directly affected and significantly impede national development. Assessing levels of welfare and poverty and showing their social and regional distribution provides vital baseline information on behalf of development efforts in nearly all policy fields.

Welfare and poverty are highly complex, multidimensional phenomena. For the sake of comparative national-level assessment, it is useful to focus on their economic dimension. Two approaches are commonly used to assess welfare and poverty from an economic perspective. Both call for making estimates – one based on people's incomes, the other based on people's expenditures. The latter approach is better suited to developing-country contexts, where many people earn in-kind income besides monetary wages. In such contexts, expenditure more accurately reflects realities on the ground and over the long term.

Map 5.01 displays mean per person monthly expenditures in Kenyan shillings (KSh) at the sub-location level. This map provides the basis for the poverty and welfare estimates shown in the subsequent maps. Expenditure levels were calculated by combining data from the *2009 Kenya Population and Housing Census* with data from the *Kenya Integrated Household Budget Survey 2005/06* (see box in the introduction to this chapter).

In 2006 prices, Kenya's mean per person monthly expenditure for goods and services is KSh 3,430. If a cumulative inflation rate of 93% is applied in line with 2013 prices, this national mean rises to KSh 6,620. By this estimate, an average Kenyan family of five with two parents and three school-age children spends about KSh 26,000 per month on goods and services in 2013 prices. This average monthly estimate includes all monetary expenditures as well as consumption of self-produced farm, garden, and livestock products according to their market value.

Nevertheless, the key information conveyed by map 5.01 is not the specific estimates of expenditure in KSh taken individually, but rather the overall pattern of variation in expenditures between Kenya's different regions and sub-locations. Since these expenditure estimates are proxies of welfare, the map effectively illustrates mean levels of material welfare in different parts of Kenya and the range of variation across the country. This variation is significant: certain sub-locations – e.g. towns in north-eastern Kenya – display a mean per person monthly expenditure of less than KSh 500, or roughly KSh 950 in 2013 prices, whereas other sub-locations – e.g. in parts of Nairobi – display a mean per person monthly expenditure of more than KSh 14,000, or roughly KSh 27,000 in 2013 prices. In other words, the national mean monthly expenditure of KSh 26,000 for a family of five masks a very high degree of variation between sub-locations, with values ranging from KSh 3,800 to KSh 108,000 in 2013 prices.

Map 5.01 also reveals that in virtually all of Kenya's regions and counties there are both wealthier and poorer sub-locations. This implies that the variation in mean expenditure levels between counties is less pronounced than between sub-locations. Nevertheless, mean expenditure levels vary considerably even at the county level: Nairobi, Mombasa, and Kiambu occupy the top positions with mean per person monthly expenditures exceeding KSh 5,000, or KSh 10,000 in 2013 prices; Mandera, Turkana, and Wajir are at the bottom with mean per person monthly expenditures below KSh 1,500, or less than KSh 2,800 in 2013 prices. The emerging spatial pattern is characterized by ecological gradients between high- and low-potential areas, as well as by centre–periphery gradients and related differences in accessibility.

But the clearest pattern to emerge is that of the rural–urban divide. Map 5.01 illustrates how virtually all of Kenya's major towns exhibit higher mean per person monthly expenditures than their rural environs. The divide is further underscored by the fact that the two highest classes of mean per person monthly expenditure – i.e. KSh 6,000 to 10,000, and more than KSh 10,000 (in 2006 prices) – are found almost exclusively in urban settings. By contrast, the expenditure classes between KSh 1,000 and 3,500 are mostly found in rural sub-locations. This emphasizes the role of towns as national and regional economic hubs featuring growing secondary and tertiary sectors and the bulk of formal employment opportunities (see map 7.04), leading to continued rural–urban migration (see map 2.04). At the same time, it is interesting to note that the phenomenon of slums in the major cities is not visible in the rural–urban graph: The very lowest expenditure class (below KSh 1,000) is almost exclusively found in rural settings. Multidimensional poverty measures could help to better capture poverty in urban areas.

County	Mean p.p. monthly expendit., in 2006 prices (KSh)	Rank	Mean p.p. monthly expendit., in 2013 prices (KSh)	Total population*
Nairobi	7,230	1	13,954	3,068.8
Mombasa	5,790	2	11,175	918.7
Kwale	2,060	40	3,976	641.1
Kilifi	2,870	24	5,539	1,089.1
Tana River	2,010	41	3,879	238.4
Lamu	4,190	5	8,087	98.6
Taita Taveta	2,850	26	5,501	274.7
Garissa	2,640	31	5,095	421.9
Wajir	1,320	47	2,548	522.8
Mandera	1,400	45	2,702	927.6
Marsabit	1,860	44	3,590	288.3
Isiolo	3,030	21	5,848	190.4
Meru	3,070	20	5,925	1,337.0
Tharaka Nithi	3,220	18	6,215	359.7
Embu	3,330	14	6,427	508.0
Kitui	2,260	37	4,362	979.6
Machakos	3,860	7	7,450	1,084.1
Makueni	2,200	38	4,246	873.4
Nyandarua	3,250	17	6,273	582.4
Nyeri	3,850	8	7,431	678.7
Kirinyaga	3,740	10	7,218	520.6
Murang'a	3,320	15	6,408	935.3
Kiambu	5,050	3	9,747	1,601.1
Turkana	1,380	46	2,663	801.3
West Pokot	1,900	43	3,667	485.5
Samburu	1,930	42	3,725	221.0
Trans Nzoia	2,920	23	5,636	808.3
Uasin Gishu	3,710	11	7,160	867.7
Elgeyo Marakwet	2,420	35	4,671	366.1
Nandi	2,820	28	5,443	740.6
Baringo	2,430	34	4,690	548.1
Laikipia	2,720	29	5,250	385.4
Nakuru	3,960	6	7,643	1,562.6
Narok	2,510	33	4,844	838.6
Kajiado	3,780	9	7,295	676.0
Kericho	3,300	16	6,369	737.9
Bomet	2,390	36	4,613	721.9
Kakamega	2,710	30	5,230	1,644.3
Vihiga	3,570	12	6,890	548.7
Bungoma	3,030	21	5,848	1,360.0
Busia	2,110	39	4,072	735.3
Siaya	3,170	19	6,118	833.2
Kisumu	4,380	4	8,453	951.6
Homa Bay	2,870	24	5,539	954.3
Migori	3,450	13	6,659	905.7
Kisii	2,850	26	5,501	1,139.6
Nyamira	2,640	31	5,095	591.5
KENYA	**3,430**	**–**	**6,620**	**37,565.6**

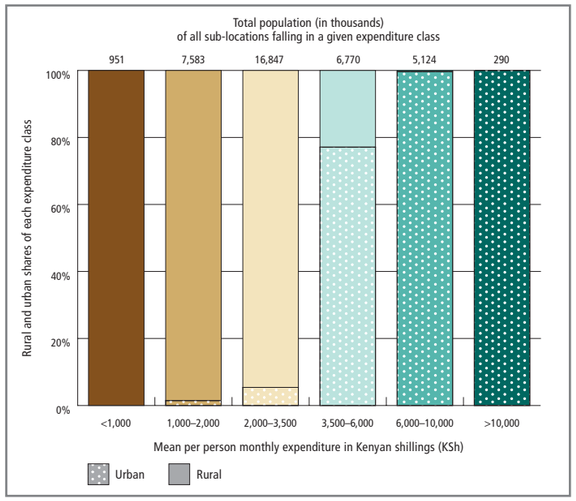
Abbreviations: p.p. = per person; expendit. = expenditure; KSh = Kenyan shillings

* in thousands

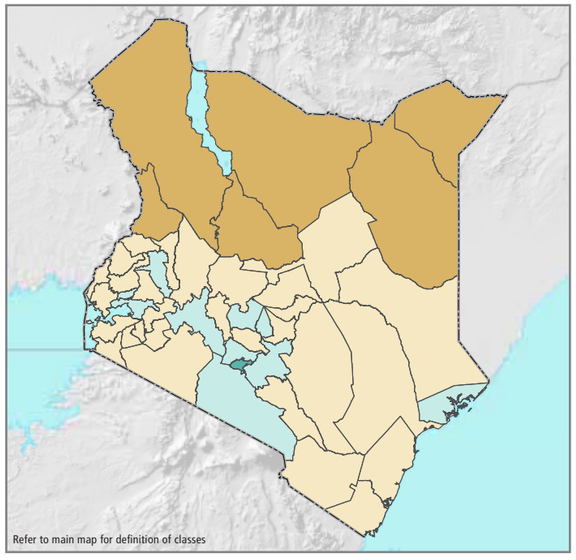
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.01 Rural–Urban Distribution of Expenditure Classes



5.01 Average Expenditure at County Level

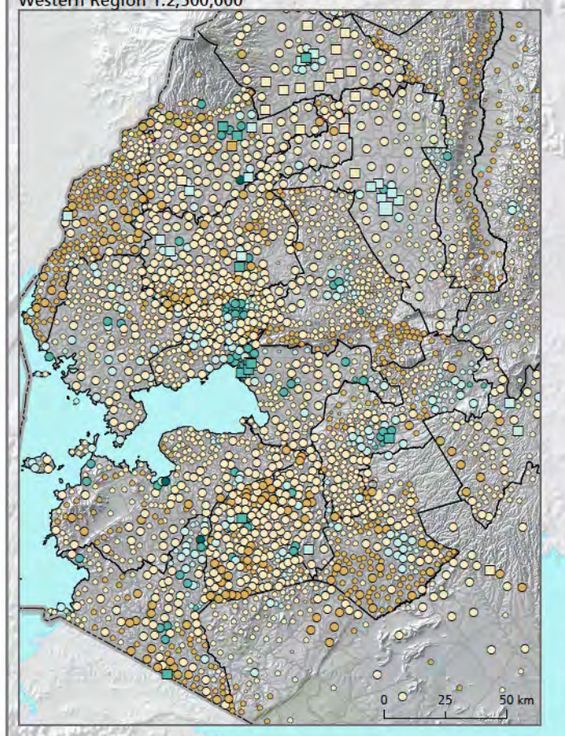


Welfare & Poverty

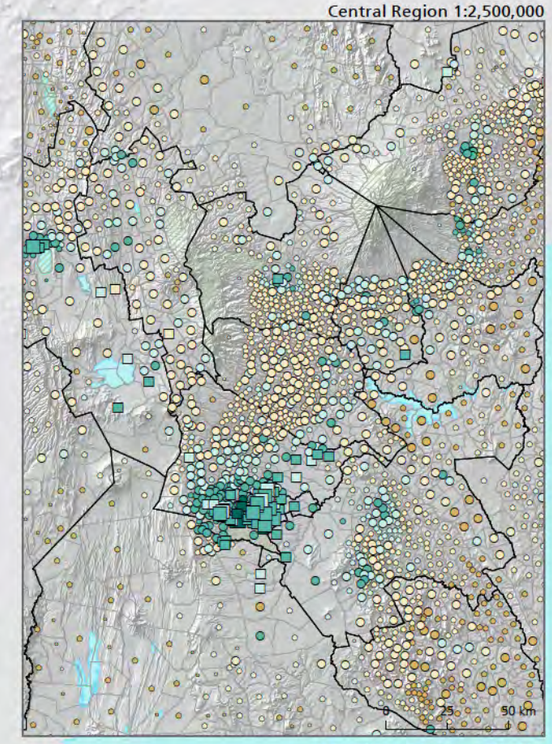
5.01 Mean per Person Monthly Expenditure

Republic of Kenya 1:4,000,000

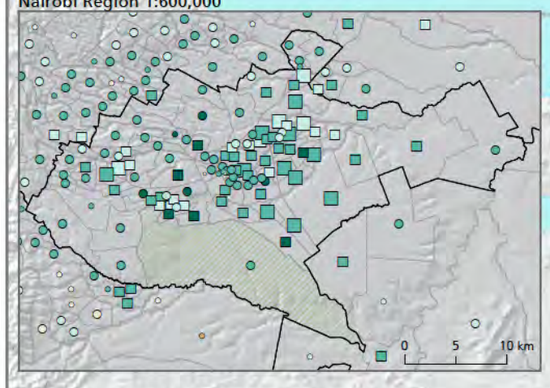
Western Region 1:2,500,000



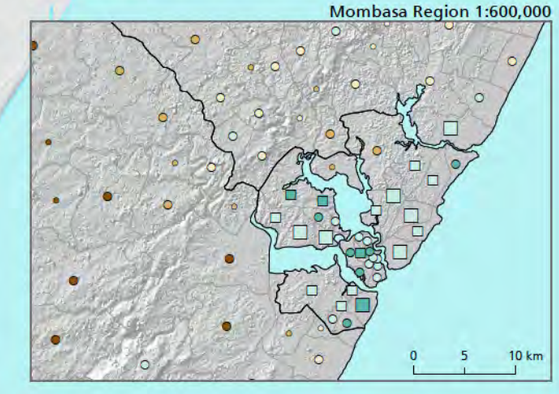
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Expenditure classes: Mean per person monthly expenditure in Kenyan shillings (KSh) in 2006 prices

- Very low (below KSh 1,000)
- Low (KSh 1,000–2,000)
- Low to medium (KSh 2,000–3,500)
- Medium (KSh 3,500–6,000)
- Medium to high (KSh 6,000–10,000)
- High (above KSh 10,000)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.02 Poverty Incidence

Poverty and poverty reduction are crucial development issues. On the one hand, material poverty adversely affects the poor, eroding their well-being, security, and development potential. On the other, high rates of poverty constrain national development by reducing overall domestic demand, hindering socio-political participation, and preventing the realization of human populations' full potential. Policies and efforts to successfully reduce poverty can only be devised if two basic questions are answered: In what areas of the country is a large proportion of the population poor? And where are the highest numbers of poor people in absolute terms? Maps 5.02 and 5.03 help answer these questions.

The most common indicator used to answer the first question is the poverty incidence or poverty rate. It indicates the number of poor people in a particular area as a percentage of the total population found there. A poverty rate of 10% means that one out of every ten people is poor; a poverty rate of 80% means that only two out of every ten people are non-poor. The present map displays the poverty incidence or rate for all of Kenya's sub-locations. The poverty rates were calculated by applying methods of small area estimation to data from the 2009 census and the 2005/06 household budget survey; material poverty was defined as occurring wherever levels of consumption expenditure (see map 5.01) fall below the poverty line. For rural areas, the poverty line was set at 1,562 Kenyan shillings (KSh) mean per person monthly expenditure; for urban areas, it was set at KSh 2,913 mean per person monthly expenditure (in 2006 prices).

Kenya's national poverty rate for 2009 is 45.2%. Despite recent declines in poverty incidences, this means that nearly half of Kenya's 38 million people are still poor. Clearly, poverty reduction must remain at the top of the country's development agenda. Nevertheless, map 5.02 also shows that the poverty rate varies greatly from one region, county, or sub-location to another.

In some sub-locations in the big cities, the poverty rate is 0%, meaning no-one there is considered poor. At the other extreme, some sub-locations in remote areas have poverty rates of 100%, meaning everyone there is considered poor. Even county-level comparisons reveal stark contrasts, e.g. between the four counties of Nairobi, Kiambu, Kirinyaga, and Nyeri, which have poverty incidences below 30%, meaning that seven of every ten people are non-poor, and the three counties of Wajir, Mandera, and Turkana, with incidences of roughly 85%, meaning that eight to nine of every ten people are living below the poverty line.

Certain regional patterns emerge as well. Poverty incidences are lowest in the broad region of central Kenya, which forms a triangle around the central high-potential areas between Nairobi, Nakuru, and Meru. Low poverty rates may also be found in and around the economic centres of Kenya's coastal region, in Ukambani, and in western Kenya. Medium poverty rates – ranging between 30% and 70% – may be found in large parts of the high-potential areas outside of central Kenya. Historical factors may play a role in these patterns. Overall, the visible patterns indicate that agricultural potential plays a role in poverty, but that having links and access to economic centres and non-agricultural economic sectors also contributes to reducing poverty incidences.

When moving from the high-potential areas to the semi-arid and arid parts of Kenya, a steep gradient becomes visible along which poverty incidences increase to 70% or more. However, these high rates of poverty are not confined to pastoralist areas, as might be anticipated, but also occur in agro-pastoral and smallholder areas of the semi-arid lands that link Kenya's high-potential and low-potential regions. Poverty rates are especially high in certain parts of these transition areas where mixed land use systems are common, e.g. in the coastal hinterland, along the Tana River, in parts of Makueni and Mwingi, and in north-western Kenya. This indicates that targeted development efforts may be needed in these transitional smallholder areas.

In addition, a significant pattern emerges between rural and urban settings (see rural–urban graph), with rural areas generally exhibiting higher poverty incidences than urban areas. However, the sharply drawn rural–urban divide observed in connection with the mean monthly expenditures (see map 5.01) does not emerge. This means that the economic potential of towns and cities generally reduces poverty incidences and increases mean wealth, but that economic disparities within urban areas become more pronounced. In particular, this dynamic may be observed in the megacity of Nairobi, where poverty levels vary greatly between the different sub-locations. In other words, while rural areas often exhibit widespread poverty, urban areas exhibit dynamics of segregation and inclusion–exclusion phenomena associated with disparities. These observations highlight the need for situation- and context-specific approaches to poverty reduction.

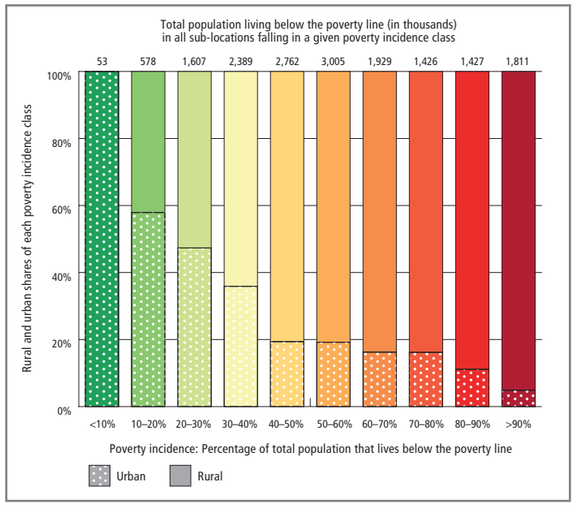
County	Poverty incidence	Rank	Population living below poverty line*
Nairobi	21.8%	1	668.8
Mombasa	34.8%	10	320.1
Kwale	70.7%	41	453.5
Kilifi	58.4%	34	636.0
Tana River	75.6%	43	180.2
Lamu	32.3%	6	31.8
Taita Taveta	50.4%	28	138.5
Garissa	58.9%	35	248.5
Wajir	84.2%	45	440.4
Mandera	85.8%	46	796.1
Marsabit	75.8%	44	218.4
Isiolo	65.2%	39	124.2
Meru	31.0%	5	415.1
Tharaka Nithi	41.0%	19	147.4
Embu	35.3%	11	179.4
Kitui	60.4%	37	591.6
Machakos	42.6%	22	462.2
Makueni	60.6%	38	529.2
Nyandarua	38.8%	14	226.2
Nyeri	27.6%	4	187.4
Kirinyaga	25.9%	3	135.0
Murang'a	33.2%	7	310.8
Kiambu	24.2%	2	387.8
Turkana	87.5%	47	701.3
West Pokot	66.3%	40	321.8
Samburu	71.4%	42	157.7
Trans Nzoia	41.2%	21	332.8
Uasin Gishu	33.9%	9	293.7
Elgeyo Marakwet	52.7%	33	193.0
Nandi	40.0%	18	295.9
Baringo	52.3%	32	286.4
Laikipia	47.9%	24	184.7
Nakuru	33.5%	8	523.6
Narok	41.0%	20	344.0
Kajiado	38.0%	12	256.9
Kericho	39.3%	16	290.0
Bomet	51.3%	30	370.4
Kakamega	49.2%	26	809.5
Vihiga	38.9%	15	213.4
Bungoma	47.3%	23	643.3
Busia	60.4%	36	443.8
Siaya	38.2%	13	318.3
Kisumu	39.9%	17	379.4
Homa Bay	48.4%	25	462.1
Migori	49.6%	27	449.5
Kisii	51.4%	31	586.2
Nyamira	50.7%	29	300.2
KENYA	**45.2%**	**–**	**16,986.5**

* in thousands

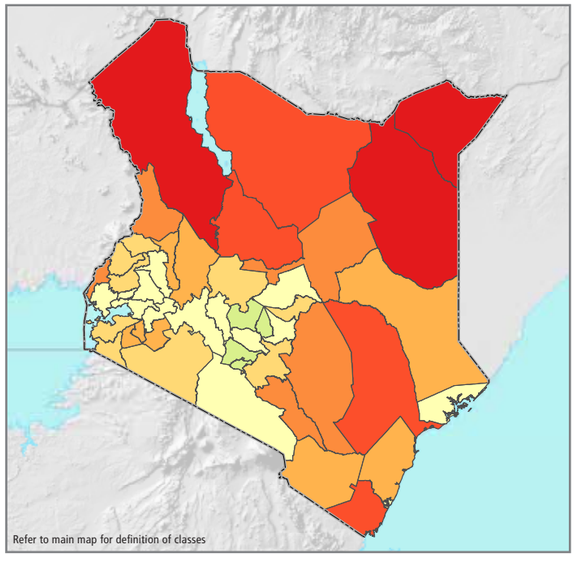
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.02 Rural–Urban Distribution of Poverty Incidence Classes



5.02 Average Poverty Incidence at County Level

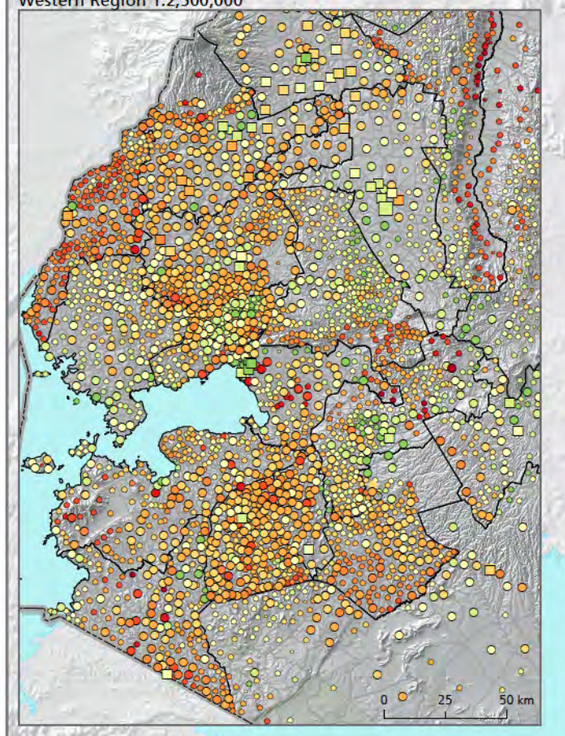


Welfare & Poverty

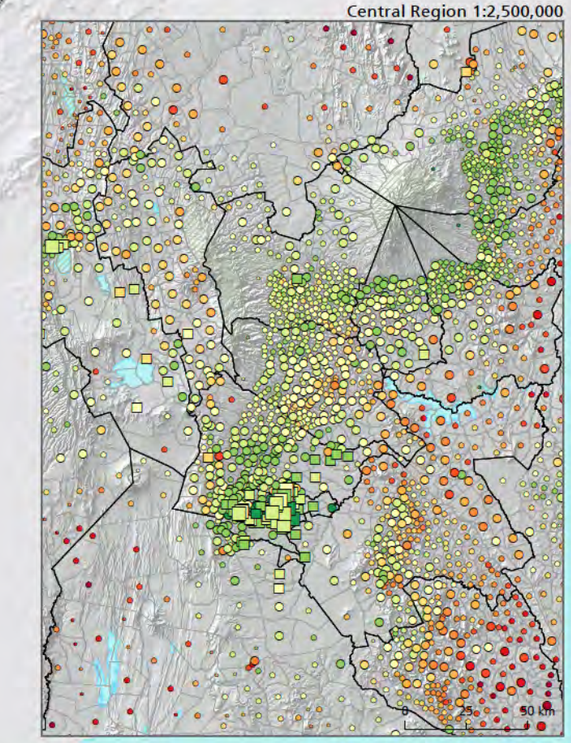
5.02 Poverty Incidence

Republic of Kenya 1:4,000,000

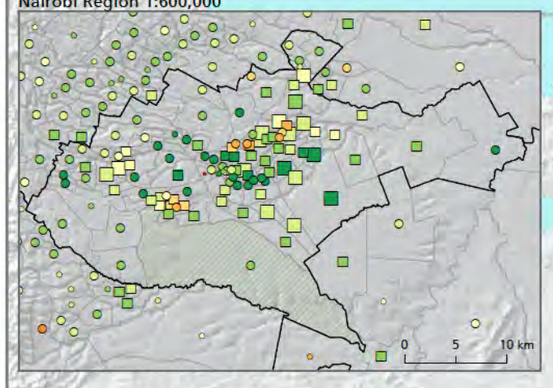
Western Region 1:2,500,000



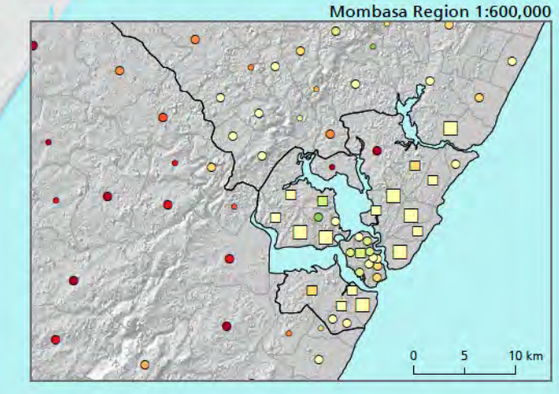
Central Region 1:2,500,000

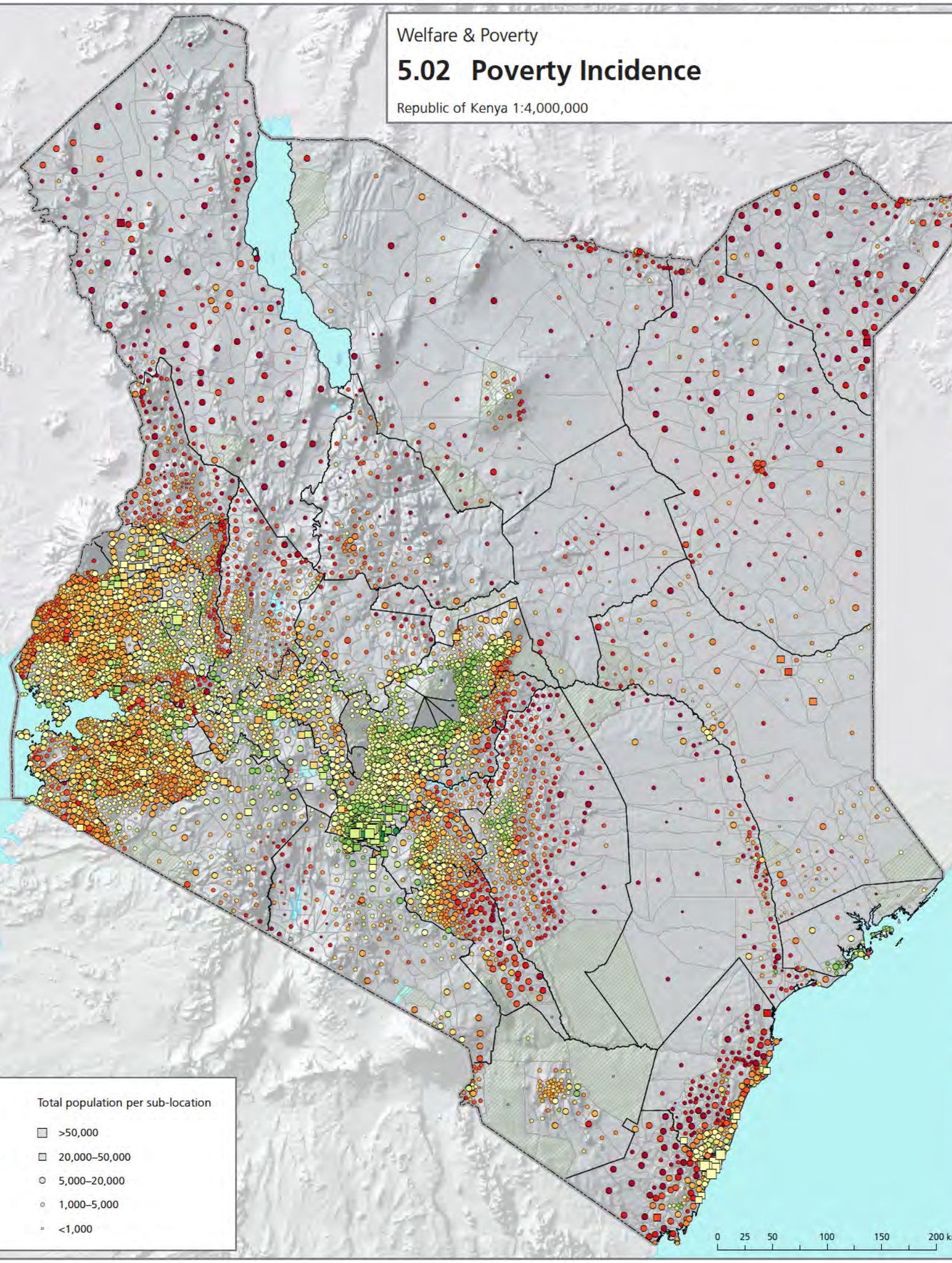


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Poverty incidence classes: Percentage of total population that lives below the poverty line

- <10%
- 10–20%
- 20–30%
- 30–40%
- 40–50%
- 50–60%
- 60–70%
- 70–80%
- 80–90%
- >90%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.03 Contribution to National Poverty

With the national poverty rate still over 40%, poverty reduction remains a top priority on Kenya's development agenda. Poverty reduction strategies and policies can adopt one of two basic approaches. The first calls for targeting poor areas, i.e. areas where a large proportion of the population is poor. These areas are visible in map 5.02, which displays poverty incidences, or the percentage of people who are poor in a given area. Poverty reduction strategies targeting poor areas must address issues and conditions of economic and social development that affect the area as a whole. Appropriate interventions include investments in infrastructure, expansion of market access, promotion of stable economic activities, introduction of incentive systems, etc.

The second approach calls for targeting poor people in areas that are not considered poor based on poverty incidences. These are often heavily populated urban areas where the overall poverty rate may be low, but the absolute number of poor is high. For example, a town with a population of 100,000 whose poverty rate is "only" 20% will still be home to 20,000 poor people; whereas a poor area with an attention-grabbing poverty rate of 90% and a population of 10,000 will "only" have 9,000 poor, which is significantly less. Strategies and policies targeting poor people in relatively well-off areas must seek to raise these people's wealth to average levels, rather than addressing the area's overall economic and social conditions. Interventions may include upgrading people's living conditions in low-income neighbourhoods and, in particular, improving the poor population's access to education and training and incentivizing their participation in productive activities.

While map 5.02 showed poor areas, the present map shows where the greatest absolute numbers of poor live – even if these areas as a whole may be considered relatively well off. Thus, map 5.03 shows which places are likely suitable for poverty reduction efforts that follow the second of the two approaches outlined above and target poor people directly. The measure used to locate high numbers of poor is the contribution, as a percentage, made by each area – sub-location or county – to the total number of poor in Kenya. An area whose contribution to national poverty is 1% will be home to 170,000 poor people out of 17 million poor nationwide.

The main map shows what percentage each of Kenya's 7,131 sub-locations contributes to national poverty. Contributions range from 0% to 0.19%. Thus, the sub-location with the highest contribution is home to approximately 30,000 poor.

The many sub-locations shown in yellow contribute less than 0.01% to national poverty, and are home to fewer than 1,700 poor people. These are typically fairly small rural sub-locations. The sub-locations shown in shades of orange are usually larger and may be found in all rural areas and many towns. They contribute between 0.01% and 0.045% to national poverty, meaning that they are home to between 1,700 and 7,500 poor people. The sub-locations shown in shades of red contribute more than 0.045% to national poverty and are home to between 7,500 and 30,000 poor. This type of sub-location may be found in all of Kenya's major cities, as well as along the coast, in western Kenya, and particularly in north-eastern Kenya. These areas should be given high priority for poverty reduction efforts.

Examination of the rural–urban distribution of poverty contribution levels reveals that sub-locations contributing the most to national poverty tend to be found in urban areas. Yet, as seen in map 5.02, urban areas generally exhibit lower poverty incidences. This has clear implications for poverty reduction strategies: while regional development approaches seem appropriate in most poor rural areas, poverty reduction approaches that target poor people directly are more likely to be successful in urban settings.

When devising national development policies, county-level analyses may be more useful than comparisons at the detailed sub-location level. Counties' poverty contributions range from 0.19% or 32,000 poor people in Lamu to 4.76% or 810,000 poor people in Kakamega. Examination of the counties contributing more than 600,000 poor reveals three different types. Counties that exhibit both high poverty incidences and high poverty contributions – e.g. Mandera, Turkana, and Kilifi – are prime targets for national poverty reduction strategies focusing on regional development. Counties that have medium poverty incidences but make high contributions to national poverty – e.g. Kakamega and Bungoma – call for combined development strategies targeting both the entire area and specific social groups. Finally, counties that have a low poverty incidence but make a very high poverty contribution – such as Nairobi and other major cities – require poverty reduction efforts that target poor people directly.

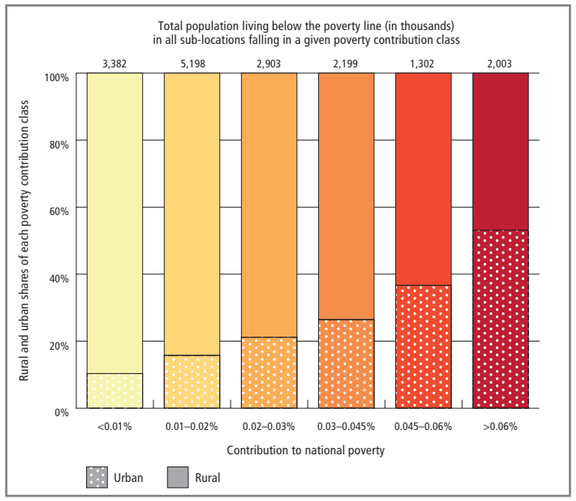
County	Contribution to national poverty	Rank	Poverty incidence	Population living below poverty line*
Nairobi	3.9%	4	21.8%	668.8
Mombasa	1.9%	24	34.8%	320.1
Kwale	2.7%	13	70.7%	453.5
Kilifi	3.7%	6	58.4%	636.0
Tana River	1.1%	40	75.6%	180.2
Lamu	0.2%	47	32.3%	31.8
Taita Taveta	0.8%	44	50.4%	138.5
Garissa	1.5%	33	58.9%	248.5
Wajir	2.6%	16	84.2%	440.4
Mandera	4.7%	2	85.8%	796.1
Marsabit	1.3%	35	75.8%	218.4
Isiolo	0.7%	46	65.2%	124.2
Meru	2.4%	17	31.0%	415.1
Tharaka Nithi	0.9%	43	41.0%	147.4
Embu	1.1%	41	35.3%	179.4
Kitui	3.5%	7	60.4%	591.6
Machakos	2.7%	11	42.6%	462.2
Makueni	3.1%	9	60.6%	529.2
Nyandarua	1.3%	34	38.8%	226.2
Nyeri	1.1%	38	27.6%	187.4
Kirinyaga	0.8%	45	25.9%	135.0
Murang'a	1.8%	26	33.2%	310.8
Kiambu	2.3%	18	24.2%	387.8
Turkana	4.1%	3	87.5%	701.3
West Pokot	1.9%	23	66.3%	321.8
Samburu	0.9%	42	71.4%	157.7
Trans Nzoia	2.0%	22	41.2%	332.9
Uasin Gishu	1.7%	29	33.9%	293.7
Elgeyo Marakwet	1.1%	37	52.7%	193.0
Nandi	1.7%	28	40.0%	295.9
Baringo	1.7%	31	52.3%	286.4
Laikipia	1.1%	39	47.9%	184.7
Nakuru	3.1%	10	33.5%	523.6
Narok	2.0%	21	41.0%	344.0
Kajiado	1.5%	32	38.0%	256.9
Kericho	1.7%	30	39.3%	290.0
Bomet	2.2%	20	51.3%	370.4
Kakamega	4.8%	1	49.2%	809.5
Vihiga	1.3%	36	38.9%	213.4
Bungoma	3.8%	5	47.3%	643.3
Busia	2.6%	15	60.4%	443.8
Siaya	1.9%	25	38.2%	318.3
Kisumu	2.2%	19	39.9%	379.4
Homa Bay	2.7%	12	48.4%	462.1
Migori	2.6%	14	49.6%	449.5
Kisii	3.5%	8	51.4%	586.2
Nyamira	1.8%	27	50.7%	300.2
KENYA	**100.0%**	**–**	**45.2%**	**16,986.6**

* in thousands

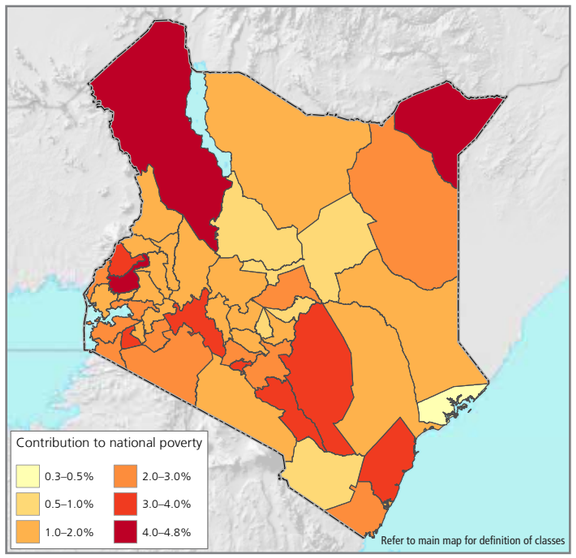
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.03 Rural–Urban Distribution of Poverty Contribution Classes



5.03 Average Poverty Contribution at County Level

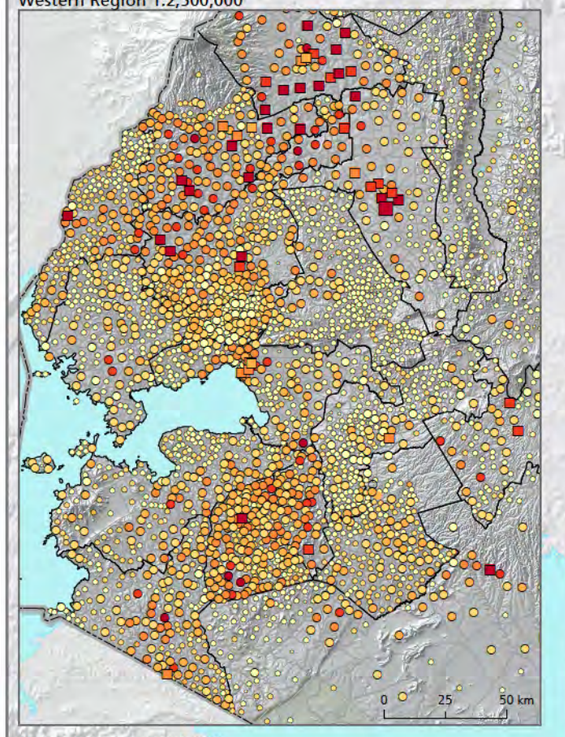


Welfare & Poverty

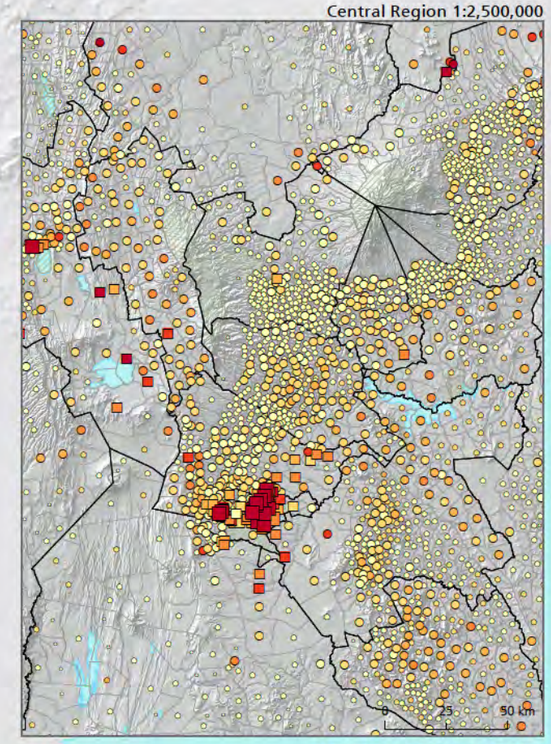
5.03 Contribution to National Poverty

Republic of Kenya 1:4,000,000

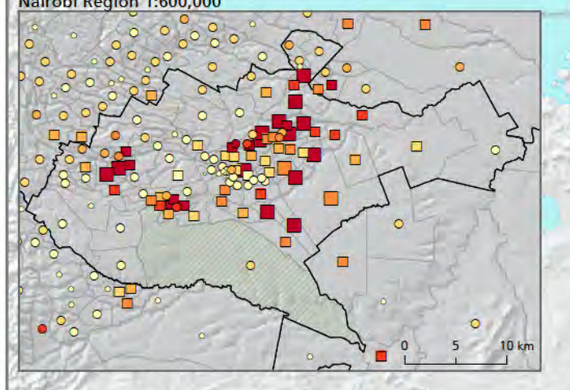
Western Region 1:2,500,000



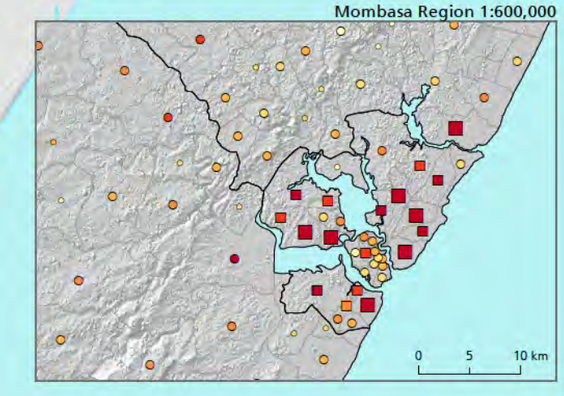
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Poverty contribution classes: Percentage contributed to the national population living below the poverty line

- Very low (below 0.01%)
- Low (0.01–0.02%)
- Low to medium (0.02–0.03%)
- Medium (0.03–0.045%)
- Medium to high (0.045–0.06%)
- High (above 0.06%)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.04 The Poverty Gap in Populations Living Below the Poverty Line

Maps 5.02 and 5.03 illuminated the spatial distribution of poverty by showing what areas of Kenya are poor as a whole and what areas are home to the greatest absolute numbers of poor. The corresponding indicators used were poverty incidence and contribution to national poverty, respectively. Maps 5.04 and 5.05 illustrate how pronounced poverty is based on two other commonly used indicators: poverty gap and poverty severity. The poverty gap indicator describes how far below the poverty line a given population of poor in a specific area lives. The poverty severity indicator measures the intensity of poverty, accounting for inequality within poor populations.

The poverty gap numbers illustrated here represent the shortfall that poor populations must make up to reach the poverty line. Since poverty levels were calculated based on monthly consumption expenditures (see map 5.01), the poverty gap figures indicate how much less, as a percentage, an average poor person in a certain area – e.g. a sub-location or a county – spends in comparison with someone living on the poverty line. In Nairobi, for example, the poverty line is set at 2,913 Kenyan shillings (KSh) average monthly expenditure per person (in 2006 prices; see box in introduction to this chapter) and the corresponding poverty gap is 4.1%. As such, the average poor person in Nairobi would have to spend KSh 119.40 more per month to reach the poverty line. Considering that there are over 650,000 poor people living in Nairobi, and taking account of inflation since 2006 (93%), this means that KSh 1,849 million annually – in 2013 prices – would be needed to lift Nairobi's poor out of poverty. This example vividly illustrates the high costs of combating poverty, and how even a slight widening of the poverty gap would cause a substantial increase in costs.

Kenya's overall poverty gap is 12.2%, meaning the country's roughly 17 million poor people are living at a level, on average, that is 87.8% that of the poverty line. However, the poverty gap varies greatly throughout Kenya. At the county level, the poverty gap is widest in Tana River, where it measures 46.1%; at the sub-location level, the greatest poverty gap even measures as much as 73.3%. In other words, an average poor person in Tana River would have to double his or her material means just to reach the poverty line; and an average person in the poorest sub-location would have to quadruple his or her means to climb out of poverty. As these examples show, the poverty gap is a useful indicator of how difficult and costly it is to combat poverty in different places in Kenya.

The narrowest poverty gaps – measuring less than 6% – are found in Nairobi, Kirinyaga, and Kiambu. Notably, the same three counties also have the lowest incidences of poverty (see map 5.02). In addition, 17 counties in the high-potential areas of central and western Kenya display relatively narrow poverty gaps of less than 10%; these counties all have low to medium poverty incidences. This is also true of most urban areas, where both poverty gaps and poverty incidences are smaller than in the majority of rural areas. This suggests an important relationship between the incidence of poverty and the poverty gap. Indeed, in Kenya's relatively well-off areas where the poverty rate is lower, poor people tend to be less poor, on average, when compared with poor populations in areas that have a higher incidence of poverty. This implies that wealth gradually diffuses through the population, and suggests that it could be easier and less costly to lift the poor out of poverty in areas that are relatively well off.

The inverse relationship also holds true. In general, the counties in Kenya with poverty gaps greater than 20% are also among those with the highest poverty incidences. Thus, not only do these counties have a high proportion of people living in poverty, it will also likely be more difficult and demand greater economic investment to lift their poor populations out of poverty. This twofold challenge of large population segments living far below the poverty line mainly affects Kenya's arid and semi-arid areas and its coastal counties.

Finally, these observations again highlight the unique challenges facing development and poverty reduction efforts in Kenya's low-potential areas, which are characterized by primary production in the context of pastoralist, agro-pastoralist, and smallholder mixed farming systems. A look at map 5.04 reveals that poverty gaps in pastoralist areas are considerable, but that the gaps are even larger in many of the sub-locations in Kwale, Kilifi, and Tana River counties. It suggests that poverty is especially severe and difficult to combat in settings of smallholder mixed farming in lower-potential areas. This observation is examined further in map 5.05.

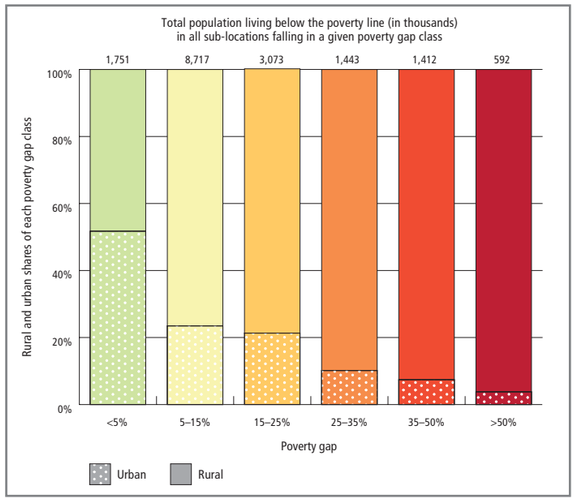
County	Poverty gap	Rank	Poverty incidence	Population living below poverty line*
Nairobi	4.1%	1	21.8%	668.8
Mombasa	9.9%	21	34.8%	320.1
Kwale	41.8%	46	70.7%	453.5
Kilifi	31.5%	43	58.4%	636.0
Tana River	46.1%	47	75.6%	180.2
Lamu	15.6%	33	32.3%	31.8
Taita Taveta	15.6%	32	50.4%	138.5
Garissa	18.7%	39	58.9%	248.5
Wajir	31.9%	44	84.2%	440.4
Mandera	32.4%	45	85.8%	796.1
Marsabit	22.9%	41	75.8%	218.4
Isiolo	18.9%	40	65.2%	124.2
Meru	6.0%	5	31.0%	415.1
Tharaka Nithi	9.5%	19	41.0%	147.4
Embu	7.7%	14	35.3%	179.4
Kitui	16.8%	37	60.4%	591.6
Machakos	9.7%	20	42.6%	462.2
Makueni	16.8%	35	60.6%	529.2
Nyandarua	9.4%	18	38.8%	226.2
Nyeri	6.2%	7	27.6%	187.4
Kirinyaga	5.7%	2	25.9%	135.0
Murang'a	7.7%	13	33.2%	310.8
Kiambu	5.9%	3	24.2%	387.8
Turkana	29.0%	42	87.5%	701.3
West Pokot	16.2%	34	66.3%	321.8
Samburu	17.4%	38	71.4%	157.7
Trans Nzoia	7.7%	12	41.2%	332.9
Uasin Gishu	6.0%	4	33.9%	293.7
Elgeyo Marakwet	12.2%	31	52.7%	193.0
Nandi	7.5%	9	40.0%	295.9
Baringo	11.4%	26	52.3%	286.4
Laikipia	10.5%	24	47.9%	184.7
Nakuru	6.1%	6	33.5%	523.6
Narok	7.1%	8	41.0%	344.0
Kajiado	7.8%	15	38.0%	256.9
Kericho	7.6%	11	39.3%	290.0
Bomet	10.4%	22	51.3%	370.4
Kakamega	12.0%	29	49.2%	809.5
Vihiga	8.8%	16	38.9%	213.4
Bungoma	11.7%	27	47.3%	643.3
Busia	16.8%	36	60.4%	443.8
Siaya	7.6%	10	38.2%	318.3
Kisumu	9.0%	17	39.9%	379.4
Homa Bay	10.5%	23	48.4%	462.1
Migori	12.1%	30	49.6%	449.5
Kisii	11.7%	28	51.4%	586.2
Nyamira	11.3%	25	50.7%	300.2
KENYA	**12.2%**	**–**	**45.2%**	**16,986.6**

* in thousands

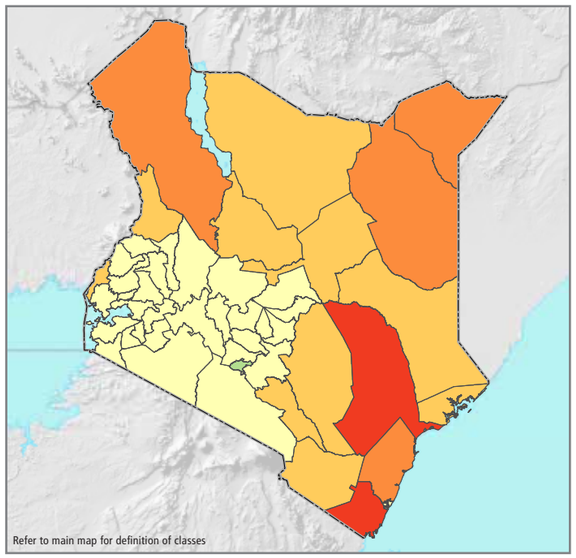
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.04 Rural–Urban Distribution of Poverty Contribution Classes



5.04 Average Poverty Gap at County Level

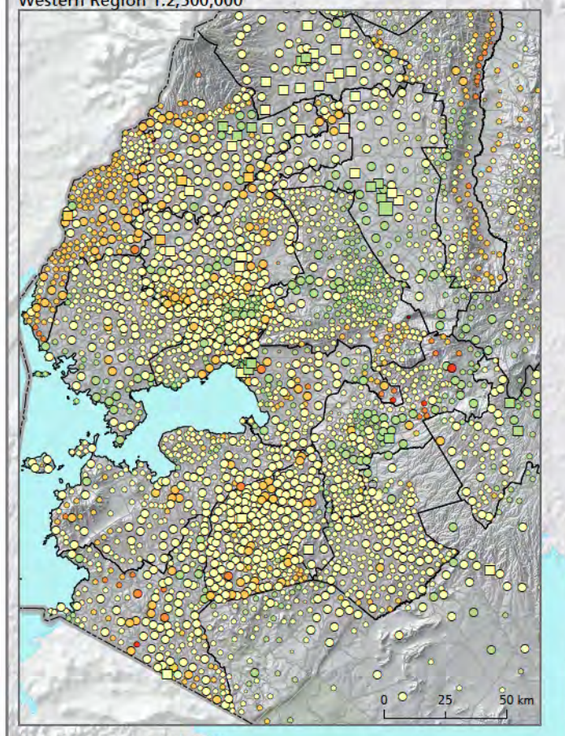


Welfare & Poverty

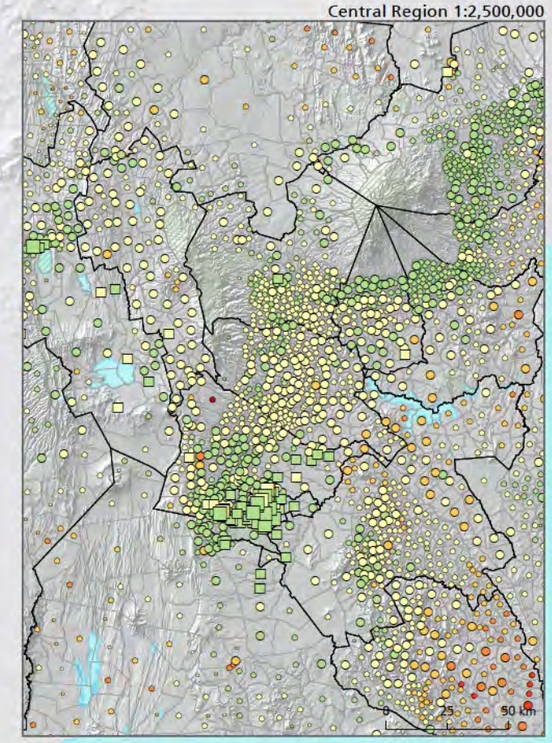
5.04 The Poverty Gap in Populations Living Below the Poverty Line

Republic of Kenya 1:4,000,000

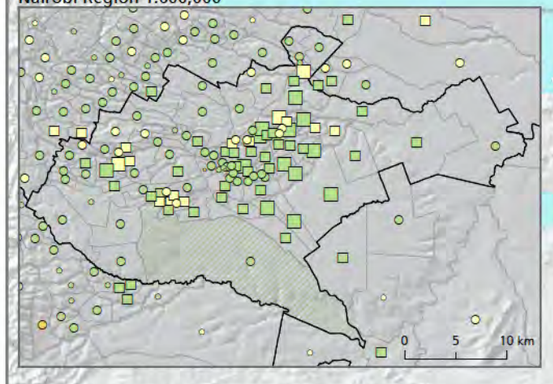
Western Region 1:2,500,000



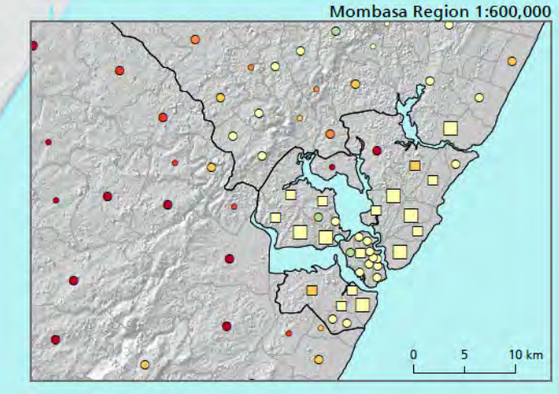
Central Region 1:2,500,000

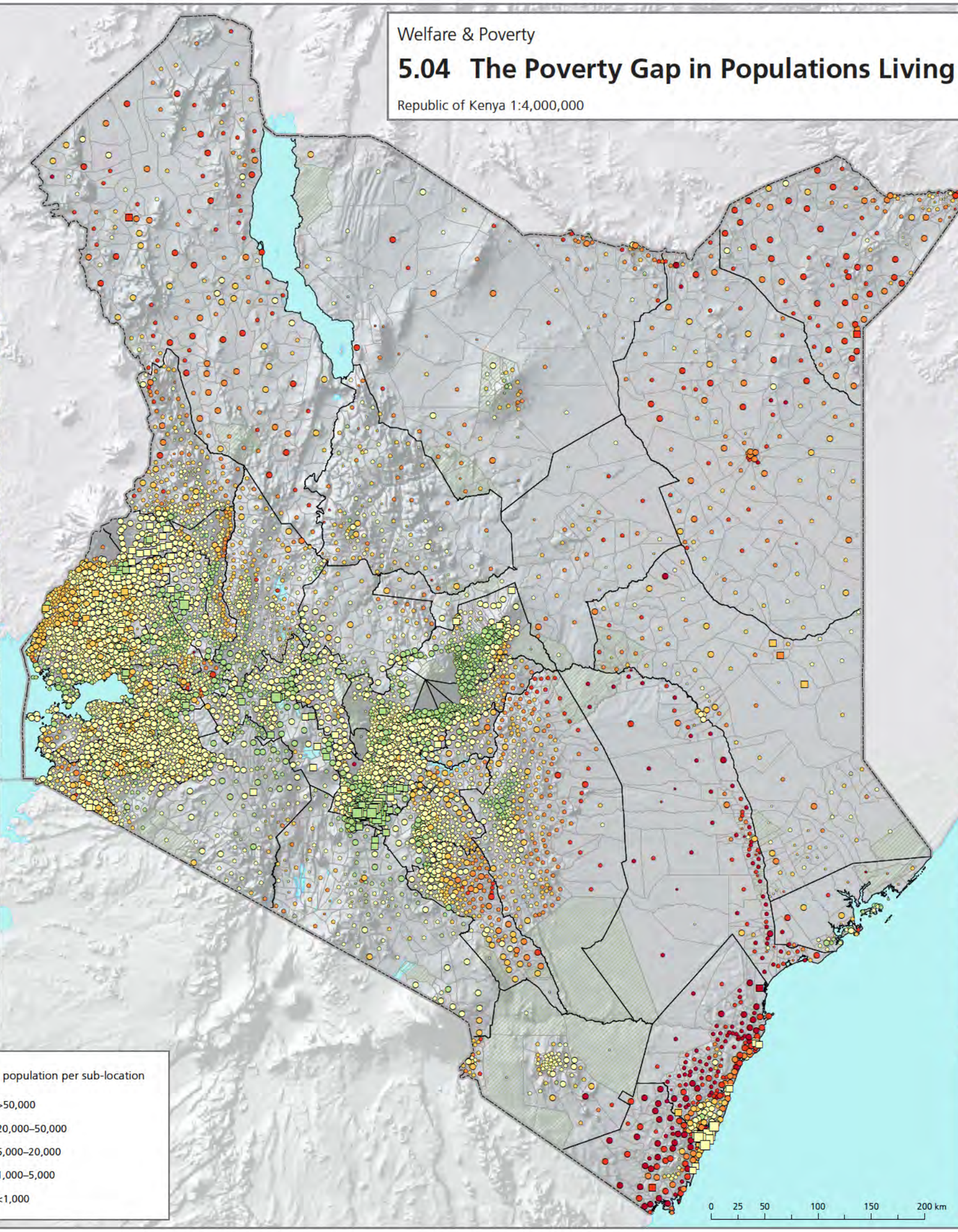


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Poverty gap classes: Shortfall between the poor population´s mean consumption expenditure and the poverty line, as a percentage of the poverty line

- Small (below 5%)
- Small to medium (5–15%)
- Medium (15–25%)
- Medium to large (25–35%)
- Large (35–50%)
- Very large (above 50%)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.05 The Poverty Severity Index

Similar to the poverty gap (see map 5.04), the index of poverty severity tries to capture how deep poverty is and how difficult it is to climb out of. However, measures of poverty severity give more weight to the poorest of the poor in a given area. If an area displays a high poverty severity index, it means that a sizable proportion of the poor population there is very poor and that lifting them out of poverty poses extra challenges that demand extra effort.

The poverty severity index builds on poverty gap measures (see map 5.04), but squares the distance to the poverty line. The effect of squaring gives more weight to the poorest of the poor, drawing attention to inequality between sub-populations of the poor. This may be illustrated by a simple example. Imagine two areas that both exhibit a poverty gap of 20%. In the first area, everyone is equally poor and must make up a 20% shortfall to reach the poverty line. In the second area, by contrast, half of the poor must only make up a 5% shortfall to reach the poverty line, while the other (poorer) half must contend with a much bigger 35% shortfall. In the first area, the severity index would be 0.2*0.2=0.04 or 4%, whereas in the second area, it would be ((0.05*0.05)+(0.35*0.35)/2)=0.0625 or 6.25%. Thus, in spite of exhibiting the same poverty gap, the two example areas differ significantly in their severity index – the index being higher in the area exhibiting greater inequality between the poor and a bigger number of very poor people.

The average poverty severity index of Kenya's poor is 4.89%, but this overall value disguises significant variations between different parts of the country. Whereas Nairobi shows a county index of only 1.2%, Tana River tops the index at 30.8%. If measured at the sub-location level, the poverty severity index reaches as high as 55% in certain sub-locations. This means that in Nairobi and other counties whose poverty severity index is less than 2% – e.g. Uasin Gishu, Meru, Nakuru, Narok, and Kirinyaga – poverty remains an important issue, but its severity and depth are not as acute as elsewhere – leaving hope that poverty could be further reduced here. However, in counties whose poverty severity index is over 10% – e.g. Wajir, Mandera, and Turkana – or over 20% – e.g. Tana River, Kwale, and Kilifi – the challenge of lifting large numbers of very poor people out of poverty is likely to be great.

Looking at the sub-location level on the main map, a more differentiated picture emerges. The general patterns are similar to those associated with the poverty gap (see map 5.04) but somewhat more pronounced. Closer examination of the map reveals that nearly every county contains pockets of medium to high poverty severity – even where the overall county-level poverty severity is quite low. These areas require special attention from national and county governments, since the severe poverty found there might not be easy to overcome. This is also true of Nairobi – the county with the lowest overall poverty severity index – because, as shown in the inset map of the Nairobi region, it contains several low-income neighbourhoods that exhibit exceptionally high poverty severity. This underscores, once more, the importance of directly targeting poor or very poor communities in major towns and cities (see also map 5.03).

However, similar to the poverty gap (see map 5.04), there are also regions where poverty severity is medium to high in most sub-locations. This is the case in certain highly populated, agriculture-dependent areas of western Kenya, as well as in arid and semi-arid areas where pastoral communities and agro-pastoral smallholders live in severe poverty. Situations such as those found in eastern Makueni or Mwingi, in the coastal hinterland, and along the Tana River further emphasize the need to develop poverty reduction strategies that address smallholder communities in Kenya's ecological and economic periphery as well as pastoralist communities in the vast arid and semi-arid lands. These strategies will have to go beyond directly targeting the poor and encompass concerted efforts to promote economic development across the region.

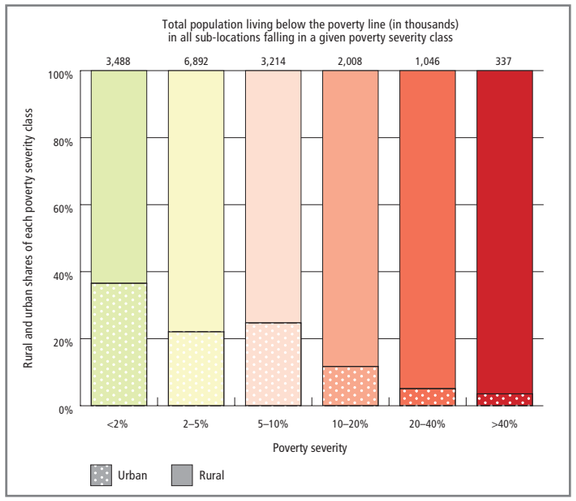
Maps 5.02 to 5.05 illustrate different aspects and views of poverty in Kenya, revealing poverty's complexity and diversity throughout the country. Maps 5.06 and 5.07 place poverty into an even broader context by addressing issues of wealth and inequality.

County	Poverty severity index	Rank	Poverty gap	Poverty incidence
Nairobi	1.2%	1	4.1%	21.8%
Mombasa	4.4%	31	9.9%	34.8%
Kwale	28.8%	46	41.8%	70.7%
Kilifi	20.8%	45	31.5%	58.4%
Tana River	30.8%	47	46.1%	75.6%
Lamu	9.6%	41	15.6%	32.3%
Taita Taveta	7.2%	38	15.6%	50.4%
Garissa	8.0%	39	18.7%	58.9%
Wajir	15.3%	44	31.9%	84.2%
Mandera	15.2%	43	32.4%	85.8%
Marsabit	8.8%	40	22.9%	75.8%
Isiolo	7.1%	37	18.9%	65.2%
Meru	1.6%	3	6.0%	31.0%
Tharaka Nithi	3.0%	19	9.5%	41.0%
Embu	2.3%	14	7.7%	35.3%
Kitui	6.1%	35	16.8%	60.4%
Machakos	3.0%	20	9.7%	42.6%
Makueni	6.0%	34	16.8%	60.6%
Nyandarua	3.3%	23	9.4%	38.8%
Nyeri	2.0%	9	6.2%	27.6%
Kirinyaga	1.8%	6	5.7%	25.9%
Murang'a	2.5%	15	7.7%	33.2%
Kiambu	2.1%	10	5.9%	24.2%
Turkana	11.4%	42	29.0%	87.5%
West Pokot	5.3%	32	16.2%	66.3%
Samburu	5.5%	33	17.4%	71.4%
Trans Nzoia	2.0%	8	7.7%	41.2%
Uasin Gishu	1.5%	2	6.0%	33.9%
Elgeyo Marakwet	3.8%	27	12.2%	52.7%
Nandi	2.0%	7	7.5%	40.0%
Baringo	3.3%	24	11.4%	52.3%
Laikipia	3.1%	21	10.5%	47.9%
Nakuru	1.6%	4	6.1%	33.5%
Narok	1.7%	5	7.1%	41.0%
Kajiado	2.3%	13	7.8%	38.0%
Kericho	2.1%	11	7.6%	39.3%
Bomet	2.9%	17	10.4%	51.3%
Kakamega	4.0%	29	12.0%	49.2%
Vihiga	2.8%	16	8.8%	38.9%
Bungoma	3.9%	28	11.7%	47.3%
Busia	6.1%	36	16.8%	60.4%
Siaya	2.2%	12	7.6%	38.2%
Kisumu	2.9%	18	9.0%	39.9%
Homa Bay	3.2%	22	10.5%	48.4%
Migori	4.1%	30	12.1%	49.6%
Kisii	3.7%	26	11.7%	51.4%
Nyamira	3.5%	25	11.3%	50.7%
KENYA	**4.9%**	**–**	**12.2%**	**45.2%**

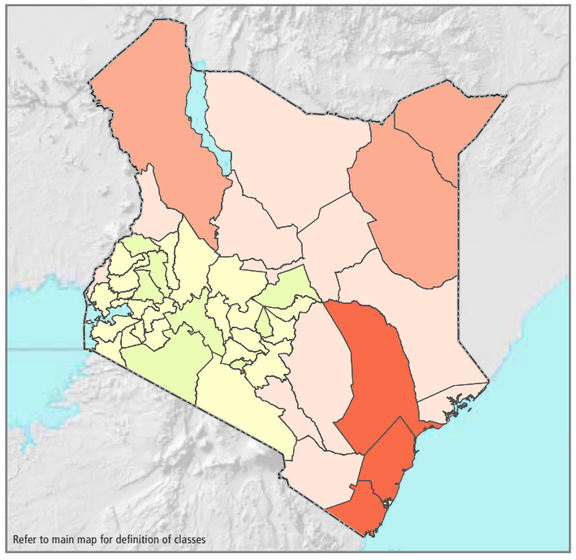
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.05 Rural–Urban Distribution of Poverty Severity Classes



5.05 Average Poverty Severity at County Level

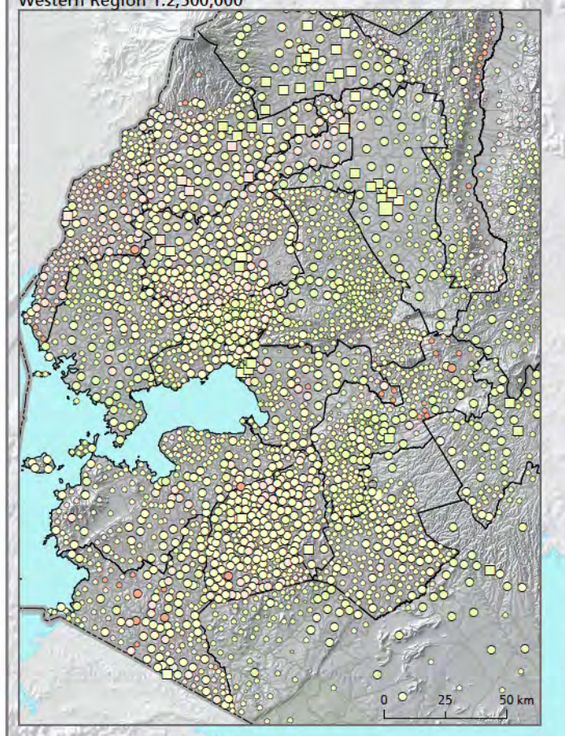


Welfare & Poverty

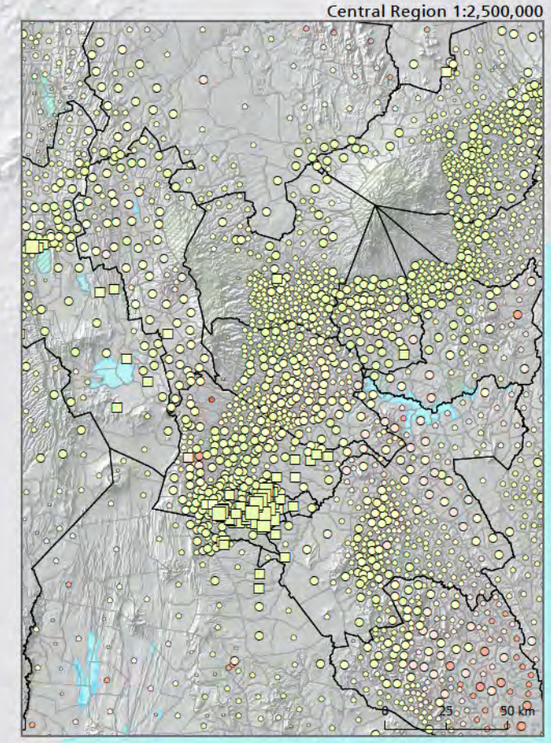
5.05 The Poverty Severity Index

Republic of Kenya 1:4,000,000

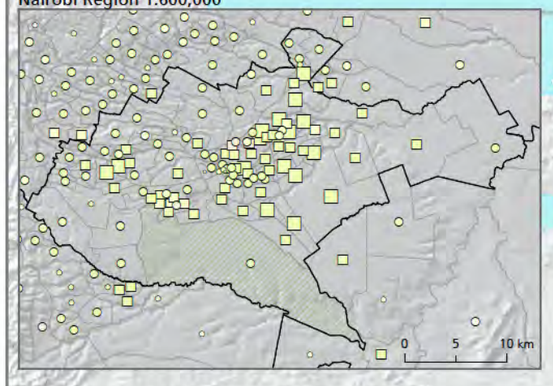
Western Region 1:2,500,000



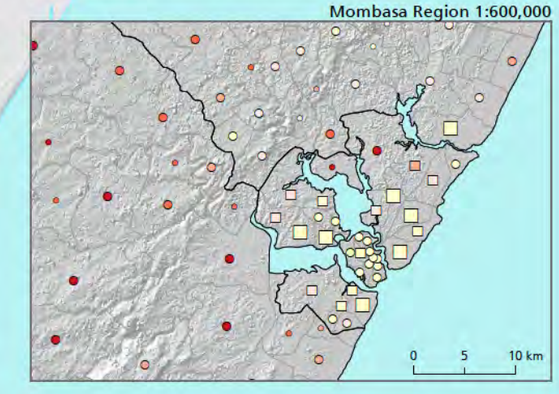
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Poverty severity classes: Poverty severity index, or mean square of all individual poverty gaps of people living below the poverty line

- Low (below 2%)
- Low to medium (2–5%)
- Medium (5–10%)
- Medium to high (10–20%)
- High (20–40%)
- Very high (above 40%)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.06 The Wealth Gap in Populations Living Above the Poverty Line

More than 20 million people in Kenya – about 55% of the total population – live above the poverty line and are thus categorized as non-poor. The question arises, however, as to how far above the poverty line they live, and how this varies throughout Kenya. This is important for at least three reasons. Firstly, it is useful to know the wealth of the majority compared to the population living in poverty. Secondly, wealth levels and their distribution are important indicators of economic potential and may reveal where buttressing processes of growth and diffusion can reduce poverty. Thirdly, populations living just above the poverty line could easily fall into poverty in the event of economic or ecological shocks, whereas a larger wealth margin could provide a buffer against such shocks.

This atlas attempts to provide an answer by means of a newly developed indicator: the wealth gap. The wealth gap describes how far above the poverty line, on average, a given area's non-poor population lives. Both poverty and wealth levels were calculated based on monthly consumption expenditures (see map 5.01). Accordingly, wealth gap figures indicate how much more, as a percentage, an average non-poor person in a certain area – e.g. a sub-location or county – spends in comparison with someone living on the poverty line. Thus, a wealth gap of 100% would mean that an average non-poor person in that area has a consumption expenditure that is double the poverty line. But unlike poverty gap measures, wealth gap measures can reach values far above 100% in cases where the average wealth of non-poor populations is more than double the poverty line. In fact, there are sub-locations in Kenya where the wealth gap is nearly 400% – meaning that its average non-poor spend five times as much as someone living on the poverty line.

The average wealth gap of Kenya's non-poor is 76.2%. In other words, their consumption expenditures are, on average, higher than the poverty line by a factor of 1.762. The converse factor among the poor population is 0.878, since the average poverty gap of Kenya's poor is 12.2% (see map 5.04). Comparing the two factors reveals a remarkable insight: Kenya's non-poor population has, on average, approximately twice the wealth of the poor population.

The wealth gap varies greatly throughout the country, however. In 15 counties, it is over 80%. There are even six counties where the wealth gap averages over 100%: Nairobi occupies the top slot at 152%, followed by Lamu, Kiambu, Kirinyaga, Mombasa, and Nyeri. The counties in central Kenya with high wealth gaps have relatively low poverty rates, which suggests a relationship between high prosperity and low poverty. These areas have growing economies that are still rooted in agriculture but are increasingly developing secondary and tertiary sectors linked to the economic hub of Nairobi. The situation in Mombasa and Lamu differs somewhat; they too have relatively low poverty incidences, but their levels of poverty severity are comparatively high. This suggests that the very poor in these economic centres have yet to benefit from any diffusion of wealth.

Looking at the rural–urban distribution of the wealth gap, the crucial role of multisectoral economic hubs in and around towns – in terms of creating wealth and reducing poverty – becomes abundantly clear: as illustrated in the main map, this not only applies to big cities like Nairobi and Mombasa, but also holds true for medium and even smaller towns. These centres of economic activity stand out in all regions, especially in western Kenya, in the high-potential areas to the west and east of central Kenya, and in the coastal areas that are developing but have yet to reach the level of central Kenya. Thus, regional development approaches that economically link rural areas to urban hubs could spread wealth, reduce poverty, and lessen rural–urban divides.

Fourteen counties display wealth gaps lower than 50%. In six of these counties – West Pokot, Samburu, Marsabit, Wajir, Mandera, and Turkana – wealth gaps are even lower than 30%. Turkana has the smallest gap with only 8%. These counties are at the fringes of Kenya's high-potential areas and encompass the country's vast semi-arid and arid areas. This geographical distribution of low wealth gaps is confirmed by the main map: it shows steep gradients of diminishing wealth gaps extending from the urban centres into the ecological and economic peripheries of Kenya, where low wealth gaps coincide with high poverty rates and elevated levels of poverty severity (see maps 5.02 to 5.05). The non-poor populations in these peripheral areas are living just slightly above the poverty line and could fall into poverty in the event of ecological shocks, such as droughts, or economic problems, such as reduced market access or price fluctuations. Once again, the high number of vulnerable non-poor people in these regions highlights the importance of integrated regional development efforts.

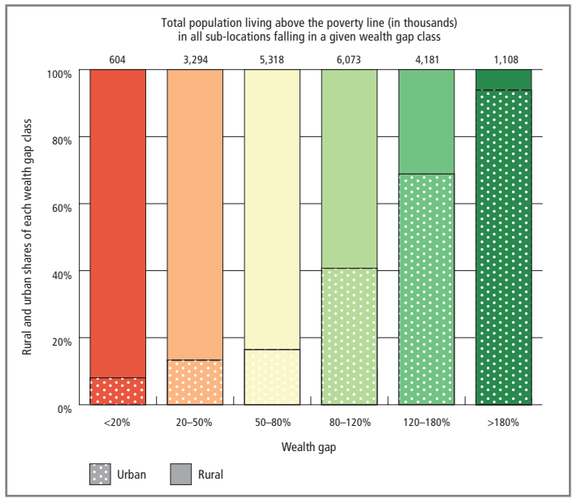
County	Wealth gap	Rank	Poverty gap	Population living above poverty line*
Nairobi	152.5%	1	4.1%	2,400.0
Mombasa	108.6%	5	9.9%	598.5
Kwale	47.6%	35	41.8%	187.7
Kilifi	70.1%	22	31.5%	453.1
Tana River	54.2%	32	46.1%	58.2
Lamu	137.9%	2	15.6%	66.8
Taita Taveta	70.1%	21	15.6%	136.2
Garissa	45.9%	37	18.7%	173.3
Wajir	12.1%	45	31.9%	82.4
Mandera	10.6%	46	32.4%	131.5
Marsabit	18.7%	44	22.9%	69.9
Isiolo	43.4%	39	18.9%	66.2
Meru	86.7%	11	6.0%	922.0
Tharaka Nithi	78.8%	17	9.5%	212.3
Embu	91.9%	9	7.7%	328.7
Kitui	45.4%	38	16.8%	388.0
Machakos	76.8%	19	9.7%	621.9
Makueni	43.1%	41	16.8%	344.2
Nyandarua	84.6%	14	9.4%	356.2
Nyeri	108.1%	6	6.2%	491.3
Kirinyaga	113.2%	4	5.7%	385.6
Murang'a	96.1%	8	7.7%	624.5
Kiambu	116.8%	3	5.9%	1,213.3
Turkana	7.6%	47	29.0%	100.0
West Pokot	27.8%	42	16.2%	163.7
Samburu	21.7%	43	17.4%	63.3
Trans Nzoia	63.9%	26	7.7%	475.4
Uasin Gishu	81.2%	15	6.0%	574.0
Elgeyo Marakwet	48.2%	34	12.2%	173.1
Nandi	67.1%	25	7.5%	444.7
Baringo	50.8%	33	11.4%	261.7
Laikipia	56.9%	31	10.5%	200.7
Nakuru	85.2%	13	6.1%	1,039.0
Narok	57.6%	30	7.1%	494.6
Kajiado	78.9%	16	7.8%	419.0
Kericho	69.8%	23	7.6%	448.0
Bomet	46.9%	36	10.4%	351.5
Kakamega	63.2%	27	12.0%	834.8
Vihiga	85.9%	12	8.8%	335.3
Bungoma	78.2%	18	11.7%	716.7
Busia	43.2%	40	16.8%	291.5
Siaya	89.2%	10	7.6%	515.0
Kisumu	96.3%	7	9.0%	572.2
Homa Bay	68.9%	24	10.5%	492.2
Migori	73.9%	20	12.1%	456.2
Kisii	61.9%	28	11.7%	553.4
Nyamira	58.7%	29	11.3%	291.3
KENYA	**76.2%**	**–**	**12.2%**	**20,579.0**

* in thousands

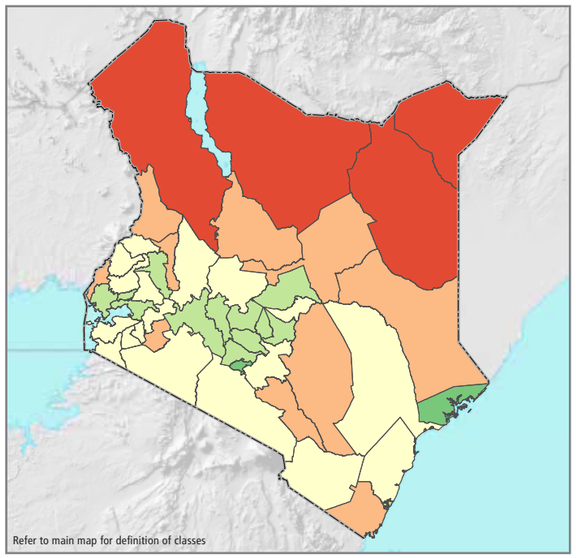
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.06 Rural–Urban Distribution of Wealth Gap Classes



5.06 Average Wealth Gap at County Level



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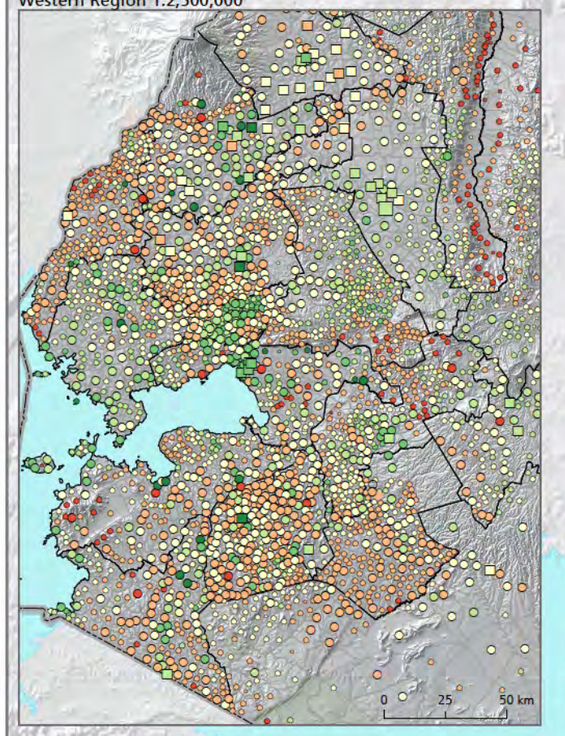
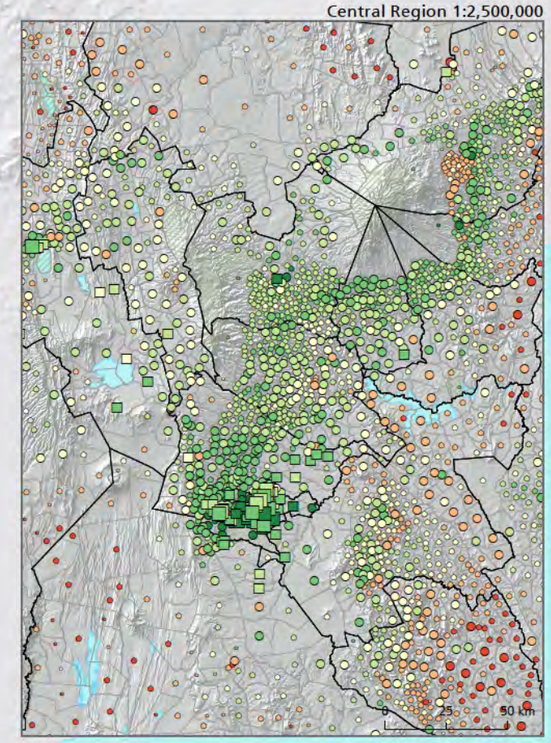
5.06 The Wealth Gap in Populations Living Above the Poverty Line

Republic of Kenya 1:4,000,000

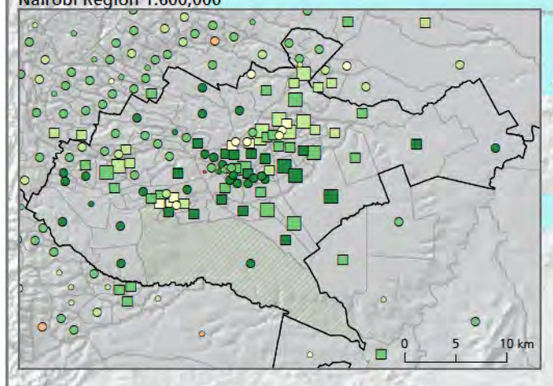
Western Region 1:2,500,000



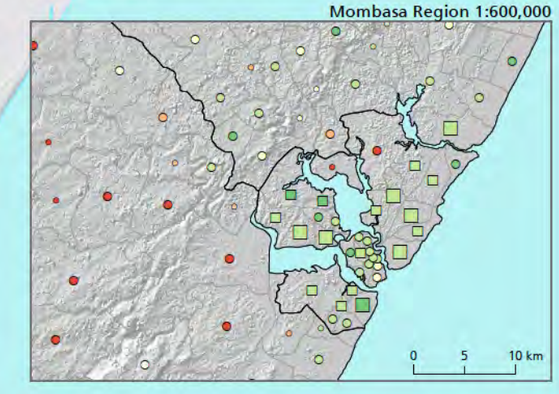
Central Region 1:2,500,000

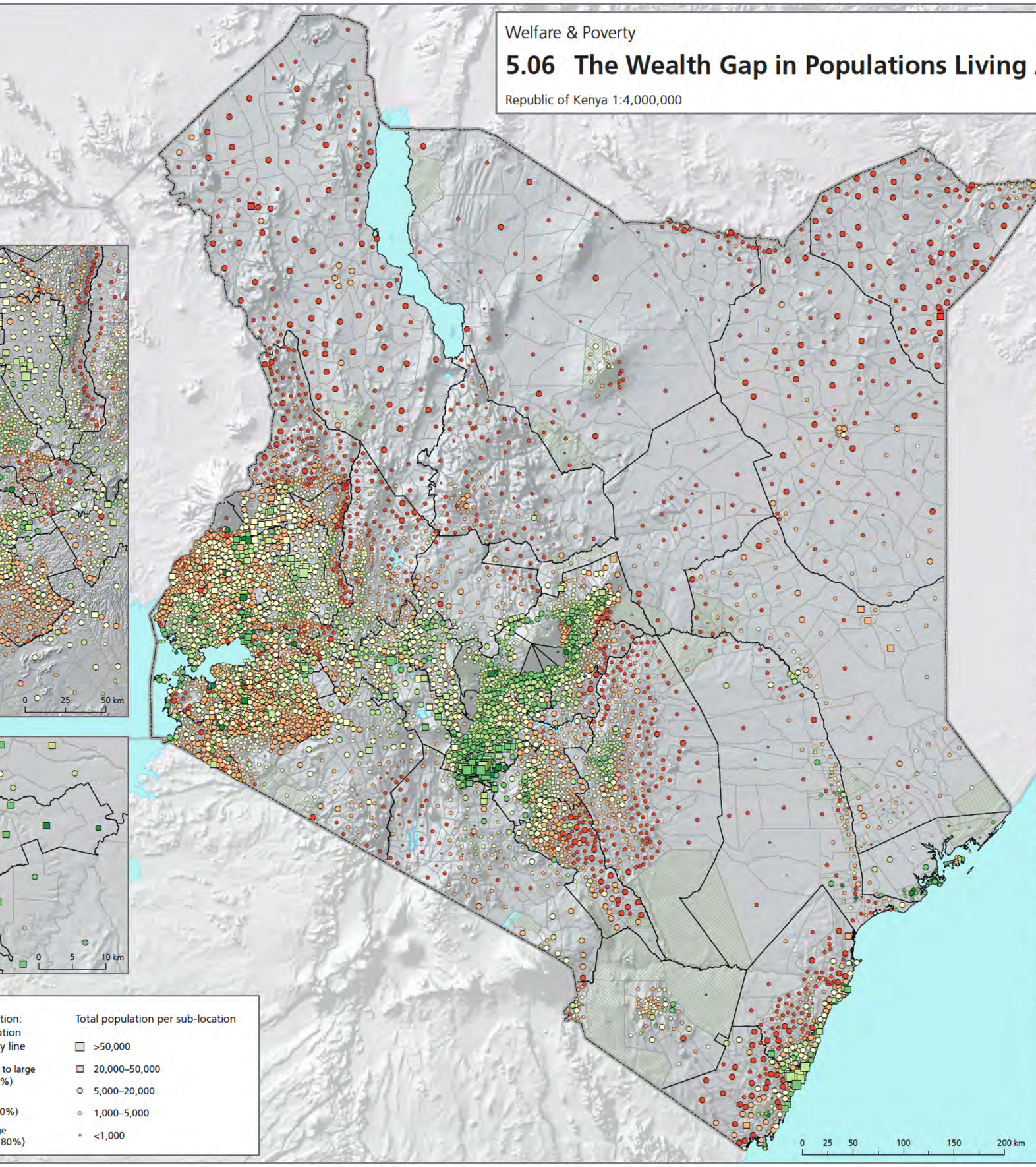


Nairobi Region 1:600,000



Mombasa Region 1:600,000





The wealth gap of the non-poor population: Percentage of surplus of mean consumption expenditures as compared to the poverty line

- Small (below 20%)
- Small to medium (20–50%)
- Medium (50–80%)
- Medium to large (80–120%)
- Large (120–180%)
- Very large (above 180%)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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5.07 Inequality Measured by the Gini Coefficient

Economic inequality can be viewed as a double-sided coin. On the one hand, high levels of inequality are a social and economic burden, and – especially when linked with poverty – they threaten the core values articulated in Kenya's 2010 Constitution. On the other hand, a certain degree of inequality is typical of an economy in transition, and it can promote competition, growth, and the gradual diffusion of wealth.

The previous maps in this chapter already touched on aspects of inequality. In particular, comparison of Kenya's overall wealth and poverty gaps showed that the non-poor, on average, have about twice as much wealth as the poor (maps 5.04 and 5.06). The other maps revealed additional examples of considerable inequality between different parts of Kenya. However, these observations were based on average values per county or per sub-location. The present map examines inequalities within specific areas, whether counties or sub-locations.

There are many indicators for measuring inequality in a given area. The one selected for use in this atlas is the Gini coefficient. It was chosen because it is probably the most commonly used indicator of inequality. The Gini coefficient builds on the Lorenz curve, which sums up all the wealth of a given population, from the poorest to the richest individual. If this curve resembles a straight line, the Gini coefficient for that population is 0, meaning that everyone has exactly the same amount of wealth. If one person has all the wealth, leaving nothing for the others, the curve will display a vertical jump and the Gini coefficient will be equal to 1. In reality, the Gini coefficient is never 0 or 1, but rather somewhere in between. The nearer to 1 it is, the more inequality there is in a given area, and vice versa. The results presented here build on the monthly expenditure values shown in map 5.01.

Kenya's overall Gini coefficient is 0.45. This value is comparatively high, higher than in neighbouring countries, and means that inequalities are quite pronounced at the national level. This reflects the economic diversity in the country, in particular the gradients between urban economic hubs and rural areas and between high-potential agricultural areas and very poor semi-arid and arid regions. The value is also typical of a nation on the verge of becoming a transition country, exhibiting rapid growth in economic centres and expanding secondary and tertiary sectors.

Inequalities are generally less pronounced at the county level, with most counties displaying a Gini coefficient lower than the national value. This is because conditions within most counties are more homogenous compared to the diversity present at the national level. Interestingly, all counties with a coefficient equal to or less than 0.33 are located in Kenya's predominantly pastoralist semi-arid and arid areas, e.g. Samburu, Mandera, Wajir, West Pokot, Narok, and Turkana. This once again emphasizes the double-faced nature of inequality: equality here is the result of widespread poverty, i.e. people are equally poor. The case of Isiolo indicates that Gini coefficients can increase once stronger economic centres develop.

Three counties stand out that have Gini coefficients between 0.57 and 0.62, far above the national average: Kilifi, Kwale, and Tana River. The high inequality in these counties is the result of economic division between the partly blossoming coastline and the poverty-stricken hinterland. At the same time, pockets of modern agriculture, remittances from economic centres, and trade along the Tana River coexist with strongly subsistence-oriented smallholder systems, engendering high levels of inequality even within individual sub-locations. The coexistence of modern economic developments and traditional rural structures may also be one key reason for the comparatively high Gini coefficients found in some rural communities of central and especially western Kenya. Finally, these local-level contrasts may explain why rural areas dominate in the highest inequality class, whereas on the overall average, urban sub-locations exhibit greater inequality than rural settings.

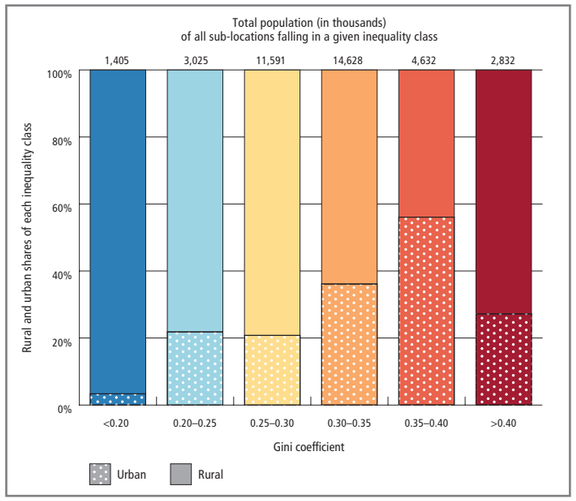
However, it is advisable to exercise caution when interpreting the results at the sub-location level. For one thing, some amount of uncertainty must be assumed when modelling Gini coefficients at this high spatial resolution. But more importantly, these measures of inequality or equality should not be interpreted without consulting the other maps in this chapter, which may provide critical information. For example, higher equality at the sub-location level could simply be the result of segregation between rich and poor, in which two neighbouring sub-locations display high equality, but one is overwhelmingly rich and the other is overwhelmingly poor. Nevertheless, the overall figures and values displayed in this section demonstrate the importance of considering inequality in any discussion of development in Kenya.

County	Gini coefficient	Rank	Wealth gap	Poverty gap
Nairobi	0.34	9	152.5%	4.1%
Mombasa	0.37	18	108.6%	9.9%
Kwale	0.60	46	47.6%	41.8%
Kilifi	0.57	45	70.1%	31.5%
Tana River	0.62	47	54.2%	46.1%
Lamu	0.47	44	137.9%	15.6%
Taita Taveta	0.44	41	70.1%	15.6%
Garissa	0.44	40	45.9%	18.7%
Wajir	0.32	4	12.1%	31.9%
Mandera	0.33	5	10.6%	32.4%
Marsabit	0.37	19	18.7%	22.9%
Isiolo	0.43	39	43.4%	18.9%
Meru	0.35	11	86.7%	6.0%
Tharaka Nithi	0.40	30	78.8%	9.5%
Embu	0.38	25	91.9%	7.7%
Kitui	0.39	26	45.4%	16.8%
Machakos	0.40	32	76.8%	9.7%
Makueni	0.38	22	43.1%	16.8%
Nyandarua	0.39	28	84.6%	9.4%
Nyeri	0.36	17	108.1%	6.2%
Kirinyaga	0.35	12	113.2%	5.7%
Murang'a	0.36	16	96.1%	7.7%
Kiambu	0.34	7	116.8%	5.9%
Turkana	0.28	1	7.6%	29.0%
West Pokot	0.32	3	27.8%	16.2%
Samburu	0.33	6	21.7%	17.4%
Trans Nzoia	0.36	15	63.9%	7.7%
Uasin Gishu	0.37	21	81.2%	6.0%
Elgeyo Marakwet	0.36	14	48.2%	12.2%
Nandi	0.34	10	67.1%	7.5%
Baringo	0.36	13	50.8%	11.4%
Laikipia	0.37	20	56.9%	10.5%
Nakuru	0.38	23	85.2%	6.1%
Narok	0.31	2	57.6%	7.1%
Kajiado	0.40	33	78.9%	7.8%
Kericho	0.38	24	69.8%	7.6%
Bomet	0.34	8	46.9%	10.4%
Kakamega	0.39	29	63.2%	12.0%
Vihiga	0.40	31	85.9%	8.8%
Bungoma	0.43	38	78.2%	11.7%
Busia	0.46	42	43.2%	16.8%
Siaya	0.40	34	89.2%	7.6%
Kisumu	0.43	37	96.3%	9.0%
Homa Bay	0.42	35	68.9%	10.5%
Migori	0.46	43	73.9%	12.1%
Kisii	0.42	36	61.9%	11.7%
Nyamira	0.39	27	58.7%	11.3%
KENYA	**0.45**	**–**	**76.2%**	**12.2%**

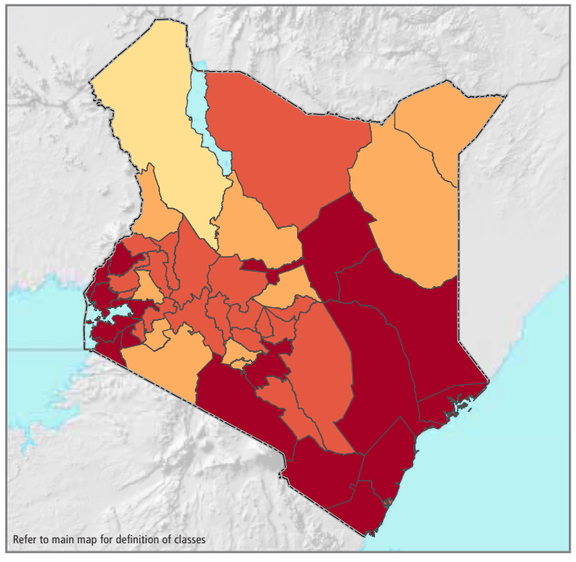
Data Source

2009 Kenya Population and Housing Census and *Kenya Integrated Household Budget Survey 2005/06,* Kenya National Bureau of Statistics.

5.07 Rural–Urban Distribution of Inequality Classes



5.07 Average Inequality at County Level

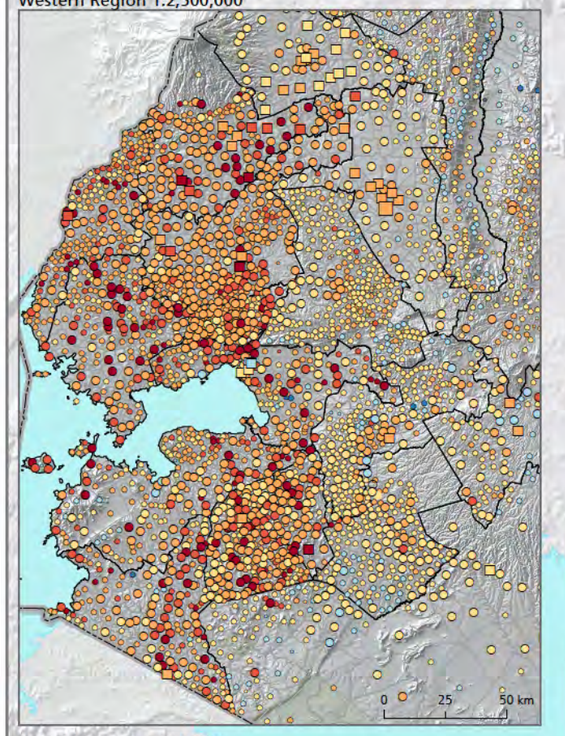


Welfare & Poverty

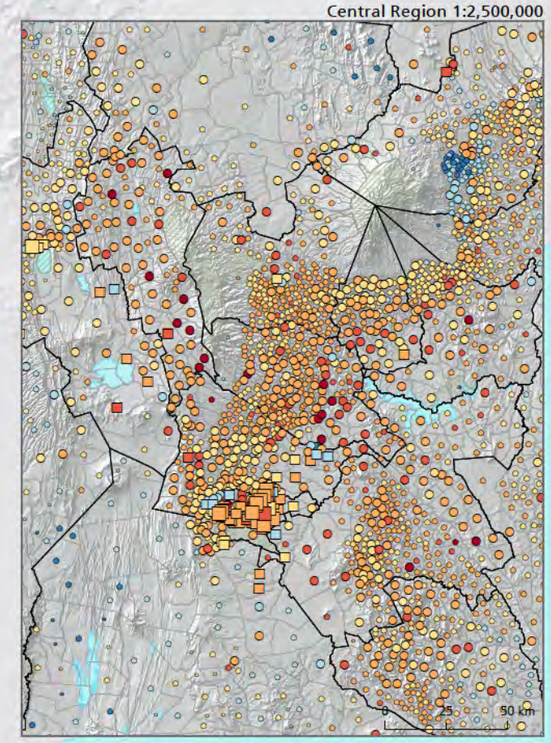
5.07 Inequality Measured by the Gini Coefficient

Republic of Kenya 1:4,000,000

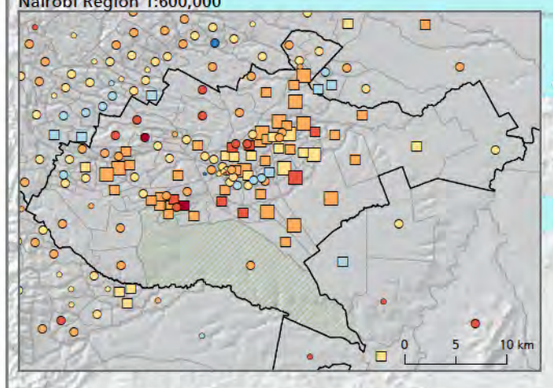
Western Region 1:2,500,000



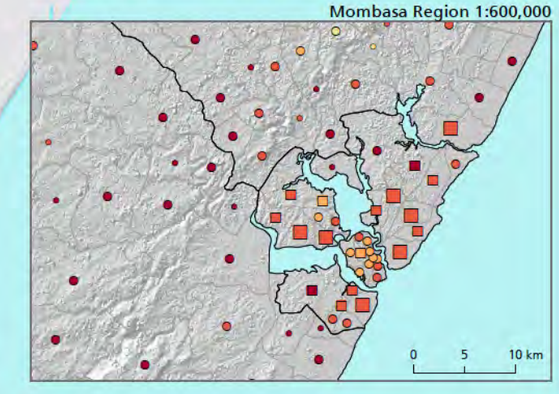
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Inequality classes: Gini coefficient, which expresses the level of inequality on a continuum between 0 (total equality) and 1 (total inequality)

- Low (below 0.20)
- Low to medium (0.20–0.25)
- Medium (0.25–0.30)
- Medium to high (0.30–0.35)
- High (0.35–0.40)
- Very high (above 0.40)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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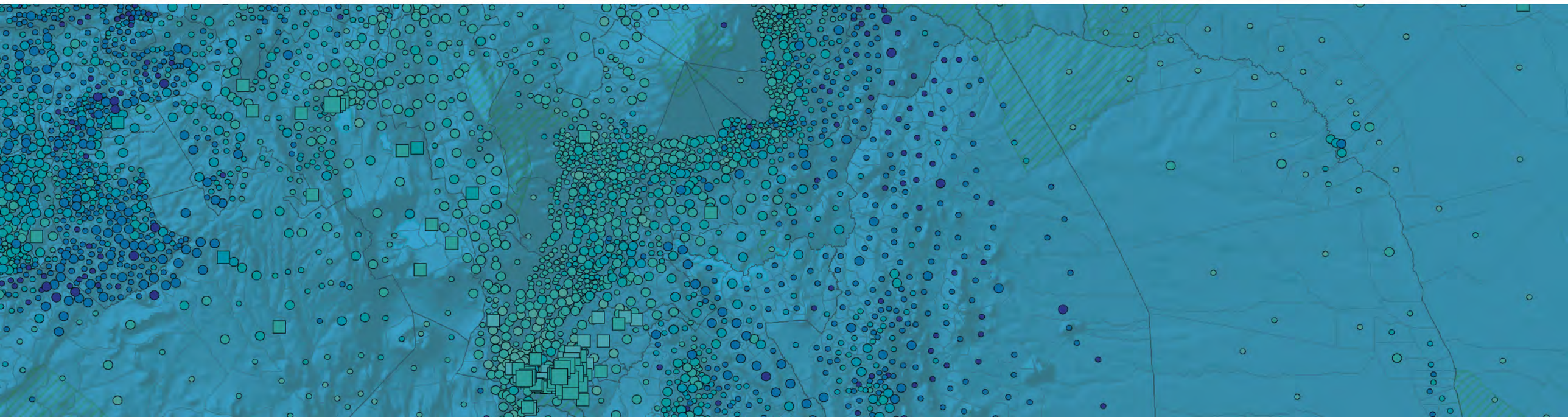
6

Education



Introduction

Basic and higher education are backbones of national development. Not only do they provide the human resources vital to economic growth, they also lay the foundation for self-determined social and political development. Thus, the Government of Kenya has committed itself to enabling quality education and training for all, as set forth in the Constitution, in its *Vision 2030*, and in other development commitments, among them the Millennium Development Goals (MDGs) and Education for All (EFA). Its firm commitment has led to major educational reforms in recent decades, beginning with the 1983 lengthening of primary education from 7 to 8 years, and the reshaping of secondary education in 1989. Other crucial policy changes include the introduction of Free Primary Education (FPE) in 2003 and the initiation of free public secondary education in 2008.

Using 2009 census data, this chapter looks at the state of education in Kenya and provides core information on the variation of key education indicators throughout the country. Overall, the chapter addresses two broad issues. Firstly, maps 6.01 to 6.06 examine school attendance rates – including gender perspectives – at the primary and secondary school levels. The analyses illustrate where progress has been made in education, and highlight possible remaining deficits requiring added effort. Secondly, maps 6.07 to 6.09 examine variation in education levels in Kenya's adult population – specifically, adults aged 25 years and older – so as to better understand the state of Kenya's current workforce.

The key indicators used to analyse the education system (primary and secondary school levels) are attendance rates, which measure the percentage of school attendees out of the total population in the corresponding official school-going age range. The net attendance rate focuses exclusively on students of official school-going age, while the gross attendance rate additionally accounts for older and younger students who fall outside the official age range. Both the net attendance rate and the gross attendance rate can be calculated by gender in order to examine gender parity. These indicators are explained in more detail in the box on this page.

Maps 6.01 and 6.02 display primary school attendance rates. *Map 6.01* shows the net attendance rate, i.e. the percentage of school-age children attending primary school out of the total population in this age group. Kenya's overall net attendance rate is 77%, meaning that at least three out of every four school-age children are attending primary school. However, attendance rates vary from over 90% throughout much of central Kenya to below 50% in six of its arid and semi-arid counties. *Map 6.02* turns attention to primary school attendees who fall outside the official age range – most are older. Indeed, about 2.82 million of the 9.34 million children attending primary schools in Kenya are overage, which translates into an attendance rate of 33% within this group. Combined with the net attendance rate figures, this results in an overall gross attendance rate of 110%. This sizable gross attendance rate hints at catching-up processes occurring in Kenya following the introduction of free primary education in 2003.

Maps 6.03 and 6.04 show attendance rates at the secondary school level. *Map 6.03* focuses on the secondary school net attendance rate, i.e. the number of secondary school attendees aged 14 to 17 years, expressed as a percentage of the total population in that age group. Nationally, this rate stands at 23.5%. Secondary school attendance rates exhibit spatial variations similar to those found at the primary school level, but they are even more pronounced – some counties differ from others by a factor of 14 for this indicator. *Map 6.04* focuses on the attendance rate among people who fall outside the official age range for secondary school. Remarkably, the rate is very high: 26.5%. In other words, out of the 1.72 million secondary school students in Kenya, more than half – or 0.91 million – fall outside the official age range. The majority of these are overage. On the one hand, the large number of overage secondary school students is an economic burden on individual households and the nation at large. On the other, it highlights a rapid increase in education that bodes well for the future – though not all regions of Kenya are equally involved.

Maps 6.05 and 6.06 examine gender parity at the primary and secondary school levels. *Map 6.05* shows that gender parity has almost been achieved at the primary school level, as evidenced by an overall gender parity index (see box) of 0.97. Interestingly, the regions that display low parity also display low overall rates of attendance. This suggests that boys are still favoured in contexts where primary schooling is not yet a matter of course. *Map 6.06* shows that girls' chances of attending secondary school are roughly 10% lower than boys', with the national gender parity index for secondary school standing at 0.91. However, the gender parity index varies greatly between the different regions of the country. In parts of Kenya's high-potential areas, high gender parity index values – i.e. upwards of 1.05 – point to catching-up processes in female education. Low gender parity index values tend to coincide with high costs or low incomes and boys being favoured to receive schooling in the face of economic pressures.

The second part of this chapter shifts attention to education levels among adults aged 25 years and older, excluding those still in the process of education. An education level index was developed (see box) that enables measurement of adults' average education level in a given area: an index value of 1.0 would mean that all adults, on average, have completed primary school; 2.0 would mean that all adults, on average, have completed secondary education.

Map 6.07 examines the education level index of adults in different parts of the country. Most strikingly, the national index stands at 1.03, indicating that, averaged together, all Kenyan adults have completed primary education. However, the index varies a lot throughout the country. In particular, a clear rural–urban divide is visible which is reflected in the labour market and results, among other things, in rural-to-urban migration of people with higher levels of education.

Maps 6.08 and 6.09 shed additional light on the education level index by distinguishing generational and gender aspects. *Map 6.08* examines whether those aged 25 to 34 years have higher education levels than those in older age ranges. Indeed, a substantial index difference of 0.31 is revealed, indicating that education levels are rising rapidly between generations – though this is not occurring at the same pace everywhere. *Map 6.09*, finally, presents gender differences in education levels. Overall, a considerable index difference of 0.23 in favour of men is revealed. Even higher index differentials favouring men may be found in certain parts of Kenya. Nevertheless, there are also signs that educational gender gaps are narrowing.

In summary, the maps in this chapter clearly confirm the impact of Kenya's concerted effort to promote education for all. Indeed, education levels are rising in the population. Lastly, the chapter also indicates places in Kenya where additional efforts are needed to achieve the goals set by the government.

Education Measures Used

(A) School attendance rates (maps 6.01 to 6.06)

The following measures are used to assess school attendance at the primary and secondary school levels:

Net attendance rate

The net attendance rate is defined as the percentage of school-age* students attending school out of the total population in that age range.

*In Kenya, the official age ranges for primary and secondary school are 6 to 13 years and 14 to 17 years, respectively.

Gross attendance rate

The gross attendance rate is defined as the percentage of all students attending school, including those outside the official school-going age range, compared with the total population in the official school-going age range.

In contrast to the net attendance rate, the gross attendance rate can exceed 100% because it also includes school attendees who fall outside the official age range.

Attendance rate of underage and overage students

This is defined as the gross attendance rate minus the net attendance rate. It reveals the ratio of underage and (more often) overage school attendees to the total population in the official school-going age range.

Gender parity index for school attendance

The gender parity index is defined as the gross attendance rate of females divided by the gross attendance rate of males. An index of 1.0 means parity; an index above 1.0 means higher female attendance; and an index below 1.0 means higher male attendance.

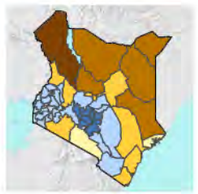
(B) Education level index (maps 6.07 to 6.09)

The education level index measures the average level of formal education reached by adults in a given area. It is calculated by averaging together the highest education level reached by each individual in a specific area. When calculating, the following index values are assigned to the different levels of formal education:

0.0 = No formal education
0.3 = Began pre-primary or primary school but did not reach Standard 5, or attended a madrasa
0.6 = Attended primary school up to Standard 5 or 6
1.0 = Completed primary school with Standard 7 or 8
1.5 = Began secondary school but did not reach Form 4, or completed Youth Polytechnics
2.0 = Completed secondary school
2.5 = Completed post-secondary school education or began university education but did not complete a degree
3.0 = Completed a university degree

An education level index for a given area of 1.0 means that, on average, all adults completed primary education; a value of 2.0 means that, on average, all adults completed secondary education. Of course, the index is an average value, i.e. the individuals in a given area can and will differ in their education levels.

Content



6.01 Primary School Attendance of 6- to 13-Year-Olds | 122

6.02 Primary School Attendance of Underage and Overage Students | 124

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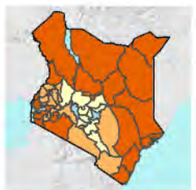
6.04 Secondary School Attendance of Underage and Overage Students | 128

6.05 Gender Parity in Primary School Attendance | 130



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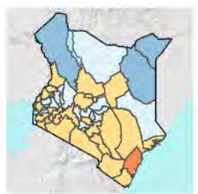
6.08 Age Group Differences in Education Levels | 136



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6.01 Primary School Attendance of 6- to 13-Year-Olds

Broad-based primary education is a crucial precondition for national development. On the one hand, it lays the foundation for a strong human resource base on behalf of economic development. On the other, education provides the basis for self-determined development in line with the fundamental rights stipulated in Kenya's Constitution of 2010. Thus, Kenya has invested heavily in educating its children and youths, maintaining a policy of free primary education since 2003.

The primary school attendance rate is an important measure of progress towards universal access to primary education in Kenya. The attendance rate expresses the ratio of school attendees to the total number of children in the official school-going age range of 6 to 13 years. An attendance rate of 100% would mean that all children in this age group attend school, whereas a rate of 20% would signify that only one out of five school-age children attends school.

In Kenya, the official primary school age range is from 6 years (Standard One) to 13 years (Standard Eight). Accordingly, the primary school attendance rates displayed in map 6.01 correspond to the total number of 6- to 13-year-olds currently attending school in a given area divided by the total school-age population in that area, with the resulting fraction expressed as a percentage. This rate is also referred to as the net attendance rate in primary education. It does not include children attending primary school who fall outside the official age range of 6 to 13 years (see map 6.02). The net attendance rate provides a good indication of the degree to which primary education is being standardly accessed in different parts of Kenya.

Kenya's overall primary school net attendance rate is 77%, meaning that approximately three out of every four children aged 6 to 13 attend one of the country's 26,133 primary schools. In many regions, the rate exceeds 80% or even 90%. In places like this, Kenya's goal of primary education for all has nearly been attained. This level of success is mainly found in the high-potential areas of western and, in particular, central Kenya, where net attendance rates around 85% are common and some counties register values exceeding 90%, e.g. Murang'a, Nyeri, Kirinyaga, Embu, Kiambu, as well as Nyandarua and Machakos. Very high attendance rates may also be found in most urban areas; however, interestingly, the rates of urban counties like Nairobi (87%) or Mombasa (81%) do not reach the level of the predominantly rural counties in central Kenya.

Nevertheless, the primary school net attendance rate is still quite low in some regions of Kenya. This applies to coastal counties where the net attendance rate averages 72% and, in particular, to the predominantly semi-arid and arid counties of Kenya where the net attendance rate averages 60%. In this region, six counties display net attendance rates below 50%: Marsabit (48%), Mandera (42%), Samburu (41%), Wajir (35%), Garissa (34%), and Turkana (25%). This implies that not even one out of every two children aged 6 to 13 attends primary school in these counties. In Turkana, it appears that only one out of every four children aged 6 to 13 attends primary school.

A closer look at attendance rates, as shown at the sub-location level in map 6.01, reveals that the situation within counties is not homogenous. Indeed, very high rates of attendance may be found in sub-locations of counties with low overall rates, and vice versa. These variations suggest that further efforts to raise primary school attendance rates in Kenya should adopt specific, contextualized approaches at the sub-county level.

Nevertheless, the attendance rates shown in map 6.01 do not capture the full picture of access to primary education in Kenya, since they exclude students who fall outside the official age range of 6 to 13 years. This aspect is analysed in the next map (6.02).

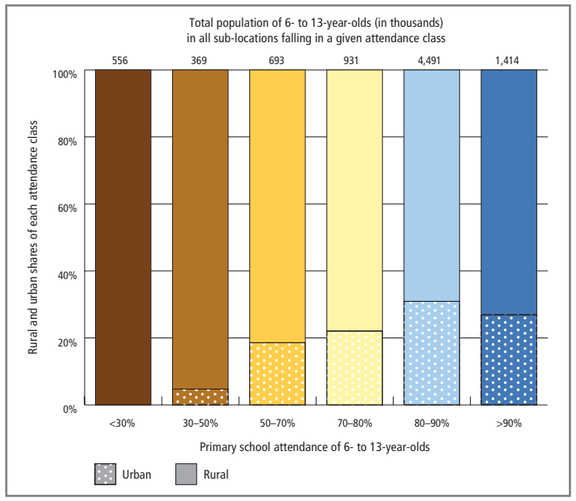
County	Net primary school attendance rate	Rank	Number of 6- to 13-year-olds in primary school*	Total population of 6- to 13-year-olds*
Nairobi	86.9%	15	379.8	437.3
Mombasa	81.1%	31	117.1	144.3
Kwale	69.5%	36	105.8	152.2
Kilifi	68.5%	37	178.6	260.9
Tana River	52.7%	40	30.9	58.6
Lamu	74.7%	33	15.9	21.3
Taita Taveta	86.4%	17	47.9	55.4
Garissa	33.9%	46	57.5	169.8
Wajir	34.5%	45	70.7	204.7
Mandera	41.9%	43	139.4	333.2
Marsabit	48.3%	42	35.0	72.4
Isiolo	63.3%	39	20.2	31.9
Meru	84.8%	20	234.0	275.9
Tharaka Nithi	88.0%	12	63.7	72.5
Embu	91.2%	4	92.4	101.3
Kitui	83.4%	24	205.7	246.6
Machakos	90.1%	7	202.8	225.2
Makueni	89.5%	8	185.0	206.8
Nyandarua	90.3%	6	123.7	137.0
Nyeri	92.5%	2	114.1	123.4
Kirinyaga	91.7%	3	84.3	92.0
Murang'a	93.4%	1	176.8	189.2
Kiambu	90.7%	5	255.4	281.4
Turkana	24.5%	47	55.5	225.9
West Pokot	51.0%	41	69.9	137.2
Samburu	41.2%	44	23.2	56.3
Trans Nzoia	83.0%	25	160.8	193.7
Uasin Gishu	85.0%	19	158.6	186.6
Elgeyo Marakwet	87.2%	14	76.8	88.0
Nandi	82.6%	27	140.3	169.9
Baringo	68.2%	38	96.4	141.4
Laikipia	80.8%	32	70.5	87.3
Nakuru	85.8%	18	289.6	337.7
Narok	69.6%	35	144.5	207.8
Kajiado	72.9%	34	101.2	138.8
Kericho	88.5%	9	146.7	165.7
Bomet	88.3%	10	151.7	171.7
Kakamega	82.5%	28	317.9	385.4
Vihiga	87.4%	13	112.6	128.8
Bungoma	84.4%	22	279.3	331.0
Busia	82.1%	30	146.6	178.4
Siaya	84.8%	21	158.9	187.4
Kisumu	84.0%	23	174.0	207.2
Homa Bay	82.8%	26	189.0	228.3
Migori	82.5%	29	180.7	219.2
Kisii	86.6%	16	222.0	256.4
Nyamira	88.0%	11	115.1	130.7
KENYA	**77.1%**	**–**	**6,518.5**	**8,453.7**

* in thousands

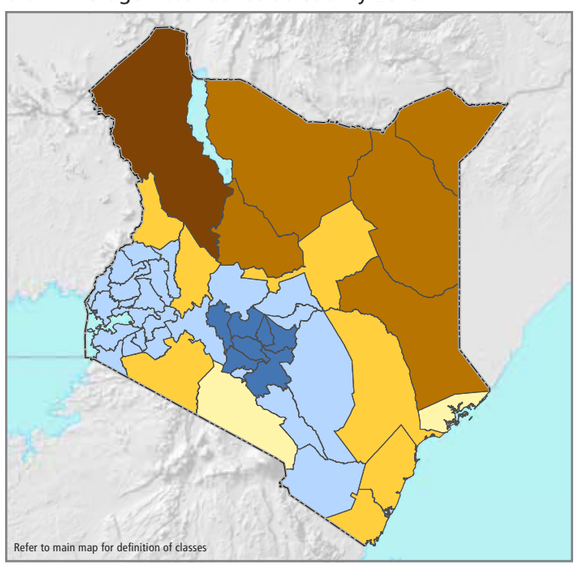
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.01 Rural–Urban Distribution of Attendance Classes



6.01 Average Attendance at County Level

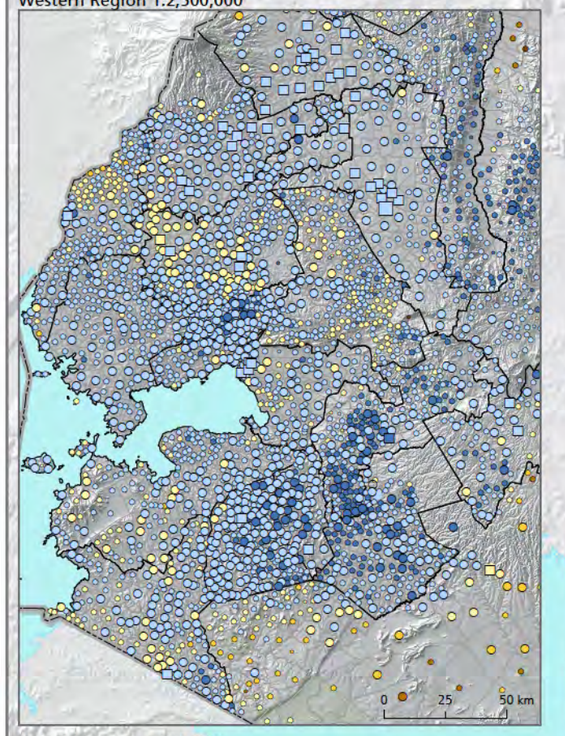


Education

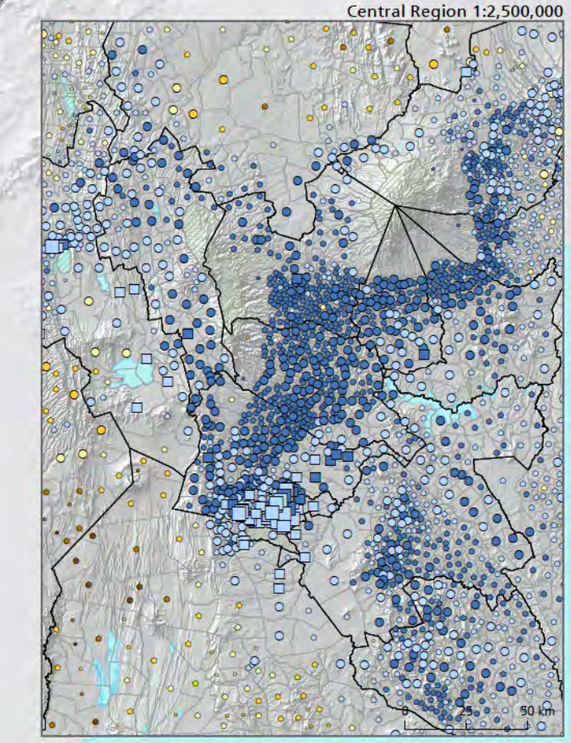
6.01 Primary School Attendance of 6- to 13-Year-Olds

Republic of Kenya 1:4,000,000

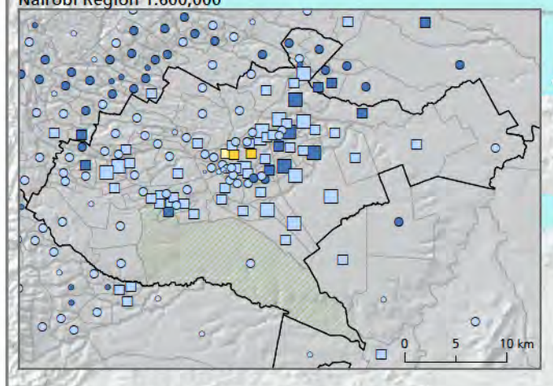
Western Region 1:2,500,000



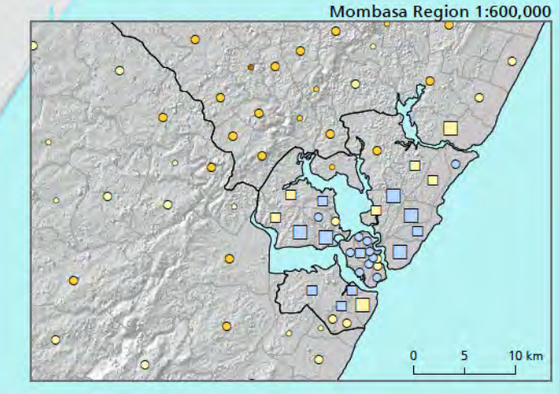
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Primary school attendance classes: Percentage of all 6- to 13-year-olds attending primary school, or primary school net attendance rate

- Below 30%
- 30–50%
- 50–70%
- 70–80%
- 80–90%
- Above 90%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.02 Primary School Attendance of Underage and Overage Students

The net attendance rates shown in map 6.01 represent primary school attendance of children in the official school-going age range of 6 to 13 years. However, there are children that fall outside this age range who are also attending primary school. Some are younger than six, but most are older than 13 years. This is typically a result of late enrolment, interrupted studies (e.g. due to financial problems), or because of grade repetition. However, many older primary school students may be the result of a backlog in primary education. Introduction of free primary education in Kenya in 2003 may have encouraged children and youths to begin or continue primary school at non-standard ages.

To get a fuller picture of primary education in Kenya, these non-standard students must be included. The indicator used to capture them is the ratio of underage and overage students to the total number of children in the official age range (6 to 13 years). This indicator is directly comparable with the ratio used in map 6.01. The sum of the two indicators used in maps 6.01 and 6.02 is the primary school gross attendance rate, i.e. the ratio of the total number of primary school attendees to the total number of children in the official age range. The gross attendance rate may even exceed 100%, implying that a catching-up process is occurring based on a backlog in primary school education.

Expressed as a percentage, the ratio of underage/overage primary school students to the overall population of 6- to 13-year-olds is 33.4%. This means that about three of every ten primary school students are either underage or, most often, overage. This gives rise to a primary school gross attendance rate of 110.5%. Figures like this indicate that Kenya is undergoing an intense process of catching up vis-à-vis a backlog in primary education. This positive development, however, also implies a heavy burden for society and the economy, since 9.34 million children – about one-quarter of the total population – are in primary school.

Against this background, one might expect the rate of underage/overage students to be low, in particular, in those regions where the net attendance rate of standard school-age children is high (see map 6.01) – and vice versa. Indeed, one may observe relatively low underage/overage student rates (20 to 30%) in central Kenya where the net attendance rates of standard school-age children are 90% or more. Further, high rates of underage/overage primary school students may be seen in counties with relatively low net attendance rates of standard school-age children, such as those in Kenya's high-potential areas and the coastal region. This especially applies to Kitui, Elgeyo Marakwet, Bungoma, Kilifi, Bomet, Migori, Busia, and Kericho, where the rate of overage/underage students exceeds 40%. With the exception of Kilifi, these counties have net attendance rates of 80% to 90%, indicating that primary education is rapidly expanding in the regions bordering Kenya's highest-potential areas.

However, when turning to Kenya's semi-arid and arid regions, this pattern no longer holds. In counties such as Marsabit, Mandera, Samburu, Garissa, Wajir, and Turkana, the attendance rate of underage/overage students is low, but the net attendance rate of standard school-age students is also low, typically below 50%. These counties rank last for primary school gross attendance rate, suggesting that even more momentum is needed – at least in these areas – to catch up with the backlog in primary education. Special efforts and policies are required to advance Kenya's arid and semi-arid regions on their pathway to primary education for all.

Interestingly, Kenya's major urban areas also show relatively low rates of underage/overage students, even though their net attendance rates of standard school-age students are below 90% – lower than those in the rural areas of central Kenya. This may be a sign that a certain ceiling has been reached with respect to school attendance, which could be attributed to the high socio-economic disparities found in many urban settings. Thus, efforts to boost school attendance in these settings should likely be directed towards slums and low-income neighbourhoods.

In sum, maps 6.01 and 6.02 indicate that Kenya has made a lot of progress towards meeting its Millenium Development Goal targets related to primary education. However, the maps also show that additional efforts are needed to address the educational backlog in arid and semi-arid areas, and to address the socio-economic disparities in urban settings.

County	Primary school att. rate of underage/ overage students	Primary school gross att. rate	No. of underage/ overage students in primary school*	Total no. of primary school attendees*
Nairobi	24.6%	111.4%	107.4	487.2
Mombasa	31.5%	112.6%	45.5	162.6
Kwale	38.8%	108.3%	59.1	164.9
Kilifi	43.1%	111.6%	112.5	291.1
Tana River	25.6%	78.3%	15.0	45.9
Lamu	34.2%	109.0%	7.3	23.2
Taita Taveta	36.5%	122.9%	20.2	68.1
Garissa	20.4%	54.3%	34.6	92.2
Wajir	17.6%	52.1%	36.0	106.7
Mandera	22.6%	64.5%	75.3	214.8
Marsabit	24.2%	72.5%	17.5	52.5
Isiolo	26.9%	90.2%	8.6	28.7
Meru	35.0%	119.8%	96.4	330.5
Tharaka Nithi	38.7%	126.6%	28.0	91.8
Embu	33.6%	124.8%	34.1	126.4
Kitui	43.9%	127.3%	108.1	313.9
Machakos	36.6%	126.6%	82.4	285.2
Makueni	37.9%	127.4%	78.4	263.5
Nyandarua	27.3%	117.6%	37.4	161.1
Nyeri	26.3%	118.8%	32.5	146.6
Kirinyaga	30.4%	122.1%	28.0	112.3
Murang'a	29.9%	123.3%	56.7	233.4
Kiambu	21.3%	112.0%	59.9	315.3
Turkana	17.4%	41.9%	39.2	94.7
West Pokot	31.3%	82.3%	43.0	112.9
Samburu	21.6%	62.7%	12.1	35.3
Trans Nzoia	37.0%	120.0%	71.6	232.5
Uasin Gishu	35.9%	120.9%	67.0	225.6
Elgeyo Marakwet	43.6%	130.8%	38.4	115.1
Nandi	39.4%	121.9%	66.9	207.2
Baringo	34.6%	102.8%	48.9	145.4
Laikipia	27.8%	108.6%	24.3	94.8
Nakuru	28.6%	114.3%	96.4	386.0
Narok	35.0%	104.6%	72.8	217.3
Kajiado	28.8%	101.7%	40.0	141.2
Kericho	40.9%	129.4%	67.8	214.5
Bomet	42.4%	130.8%	72.8	224.5
Kakamega	38.8%	121.3%	149.4	467.3
Vihiga	37.1%	124.6%	47.8	160.4
Bungoma	43.3%	127.7%	143.4	422.8
Busia	41.3%	123.5%	73.8	220.4
Siaya	38.8%	123.6%	72.7	231.7
Kisumu	34.6%	118.6%	71.8	245.7
Homa Bay	39.9%	122.7%	91.0	280.0
Migori	41.8%	124.2%	91.5	272.2
Kisii	37.0%	123.6%	94.9	317.0
Nyamira	34.3%	122.4%	44.8	159.9
KENYA	**33.4%**	**110.5%**	**2,823.5**	**9,342.0**

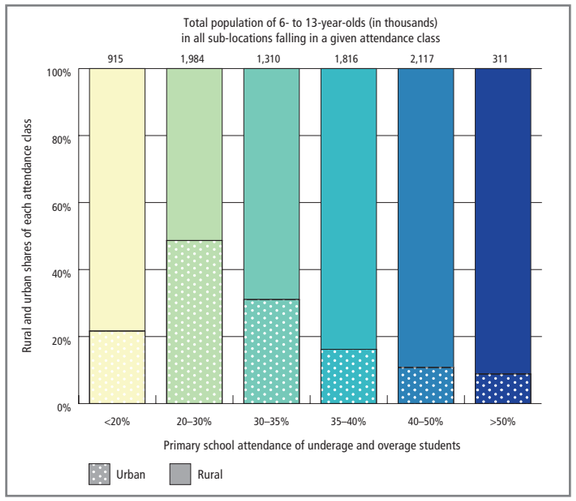
Abbreviations: att. = attendance; no. = number

* in thousands

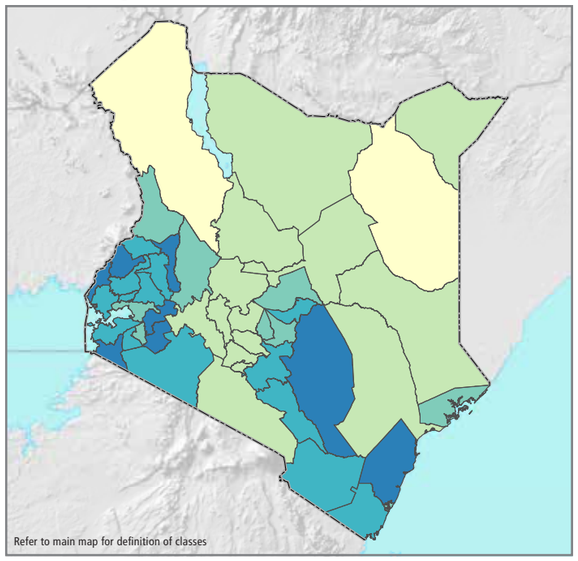
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.02 Rural–Urban Distribution of Attendance Classes



6.02 Average Attendance at County Level



Education

6.02 Primary School Attendance of Underage and Overage Students

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

Primary school attendance classes: Underage and overage students in primary school, or primary school gross attendance rate minus net attendance rate

- Below 20%
- 20–30%
- 30–35%
- 35–40%
- 40–50%
- Above 50%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.03 Secondary School Attendance of 14- to 17-Year-Olds

Primary education lays the foundation for national development, and maps 6.01 and 6.02 show that Kenya is on a promising path to fulfil this goal. Secondary education builds on this foundation while providing the basis for further, more specialized education at the tertiary level, particularly in colleges and at universities. In this way, secondary education is key to establishing a diversified, specialized human resource base capable of tackling the challenges of modern economic and social development. Further, secondary and tertiary education are cornerstones of knowledge societies – the kind of societies able to pursue self-determined national development in a globalizing world. Thus, broad-based participation in secondary education is crucial for national development and the realization of national objectives such as those in Kenya's *Vision 2030*.

Similar to primary education (see maps 6.01 and 6.02), participation in secondary education is measured by attendance rates. These rates express the ratio of secondary school attendees in a given area to the total number of people in the official secondary-school age range. The official age range for secondary school in Kenya is from 14 years (Form One) to 17 years (Form Four). However, similar to primary education, not all secondary school attendees fall within the official age range – many are overage. This stems in part from the carry-over of overage children in primary school (map 6.02). Other factors include delays in starting secondary studies after completing primary school.

Accordingly, two secondary school attendance rates may be differentiated. The first is the net attendance rate shown in this map; the second is the attendance rate of underage/overage students shown in map 6.04. The sum of the two rates is the secondary school gross attendance rate (see box in the introduction to this chapter).

In Kenya, the net attendance rate for secondary school is 23.5%, i.e. about one in every four youths aged 14 to 17 years attends one of the many secondary schools in Kenya. Given the importance of secondary education for national development, this figure is relatively low. However, it must be noted that almost the same number of non-standard-age (mostly older) students are attending secondary school, resulting in a gross attendance rate of 50%. Thus, Kenya has achieved a considerable level of overall attendance in secondary education. But the delayed entry of many secondary school students presents structural challenges and implies high economic and social burdens for individual households and the nation as a whole.

Nevertheless, the secondary school net attendance rate varies greatly among Kenya's different regions. At the sub-location level, the rate varies all the way from 0% to 100% attendance. At the county level, the highest rate, found in Kiambu (50.5%), is 14 times higher than the lowest rate, found in Turkana (3.5%). This means that a youth aged 14 to 17 years in Kiambu is 14 times more likely to attend secondary school than a peer in Turkana.

When compared with the primary school net attendance rate (map 6.01), the secondary school net attendance rate exhibits spatial patterns that are similar but even more pronounced. Central Kenya displays the highest attendance rates, led by Kiambu, Nairobi, and Nyeri, whose rates are all above 45%. Next comes a circle of counties around central Kenya and in western Kenya which all display rates above 25% – with Nyamira (39%) in the top spot. But, in general, the counties west of the Rift Valley and in the coastal region overwhelmingly lag behind the top-ranging counties as regards secondary school attendance – even more than in the case of primary school attendance (map 6.01). Further, the divide between high-potential areas and the arid and semi-arid regions is even sharper at the secondary school level. For example, Samburu, Tana River, Wajir, Garissa, West Pokot, and Turkana all show attendance rates under 8%. Finally, the urban–rural divide is also more pronounced: most urban sub-locations fall into secondary school net attendance classes of 25% and above; and urban sub-locations comprise the majority of sub-locations in classes above 35%.

In sum, the different gradients of net secondary school attendance in Kenya appear to reflect the country's economic landscape and existing centre–periphery patterns. However, to better assess the link between economic potential and access to secondary education, one must also consider the attendance rates of overage students shown in the next map (6.04).

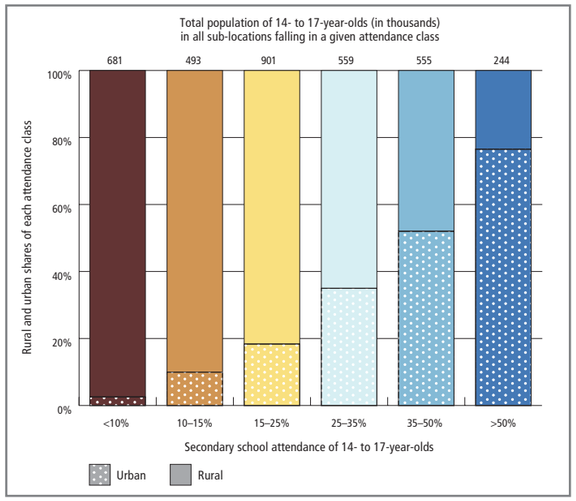
County	Secondary school net attendance rate	Rank	Number of 14- to 17-year-olds in secondary school*	Total population of 14- to 17-year-olds*
Nairobi	48.2%	2	89.0	184.5
Mombasa	32.4%	9	20.1	62.1
Kwale	8.6%	41	5.0	58.0
Kilifi	10.4%	38	10.6	102.1
Tana River	7.5%	43	1.5	20.4
Lamu	16.4%	34	1.4	8.7
Taita Taveta	22.3%	20	5.3	23.9
Garissa	7.0%	45	4.6	66.0
Wajir	7.3%	44	5.7	78.8
Mandera	8.9%	40	11.6	129.4
Marsabit	9.5%	39	2.9	30.3
Isiolo	16.9%	32	2.2	12.9
Meru	21.8%	22	24.4	111.7
Tharaka Nithi	27.0%	16	8.3	30.6
Embu	31.8%	12	13.4	42.1
Kitui	14.9%	36	15.3	102.5
Machakos	28.6%	13	28.5	99.3
Makueni	27.1%	15	24.6	90.8
Nyandarua	35.6%	7	19.2	54.0
Nyeri	47.0%	3	25.4	54.1
Kirinyaga	38.7%	6	14.1	36.5
Murang'a	39.3%	4	31.9	81.2
Kiambu	50.5%	1	58.7	116.3
Turkana	3.5%	47	3.6	102.2
West Pokot	5.6%	46	2.7	48.5
Samburu	7.9%	42	1.6	20.5
Trans Nzoia	19.0%	24	14.3	75.5
Uasin Gishu	26.6%	18	20.1	75.7
Elgeyo Marakwet	18.9%	25	6.8	36.0
Nandi	17.7%	30	11.6	65.5
Baringo	18.5%	28	10.6	57.3
Laikipia	32.2%	11	10.8	33.6
Nakuru	32.2%	10	41.8	130.1
Narok	10.4%	37	7.5	72.4
Kajiado	26.7%	17	14.0	52.3
Kericho	21.1%	23	14.1	67.1
Bomet	18.0%	29	12.5	69.3
Kakamega	18.8%	26	29.2	155.2
Vihiga	23.7%	19	12.6	53.2
Bungoma	16.6%	33	21.7	130.3
Busia	15.9%	35	11.6	73.3
Siaya	18.6%	27	15.2	81.5
Kisumu	27.3%	14	24.7	90.5
Homa Bay	22.3%	21	21.0	94.1
Migori	17.4%	31	15.1	86.9
Kisii	34.7%	8	38.5	111.1
Nyamira	38.7%	5	21.6	55.8
KENYA	**23.5%**	**–**	**806.9**	**3,433.8**

* in thousands

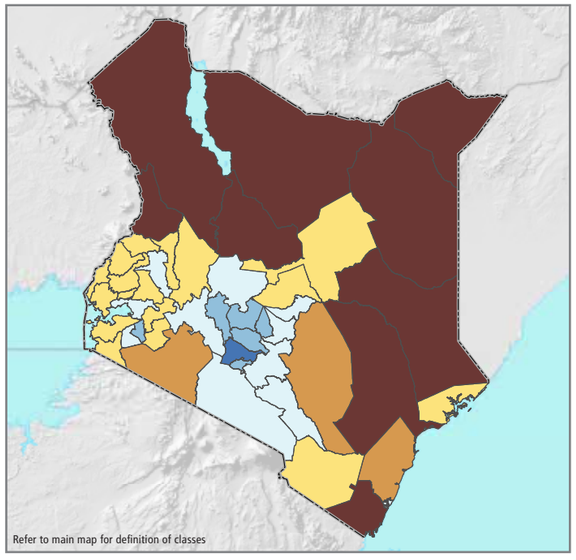
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.03 Rural–Urban Distribution of Attendance Classes



6.03 Average Attendance at County Level

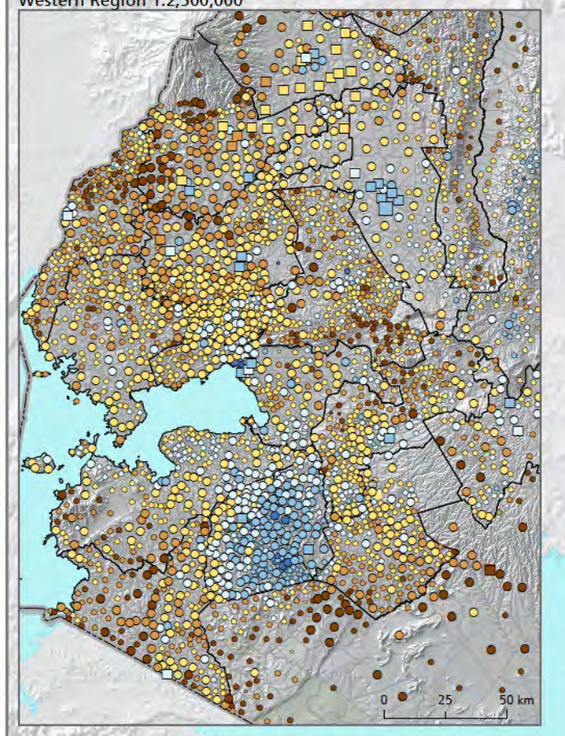


Education

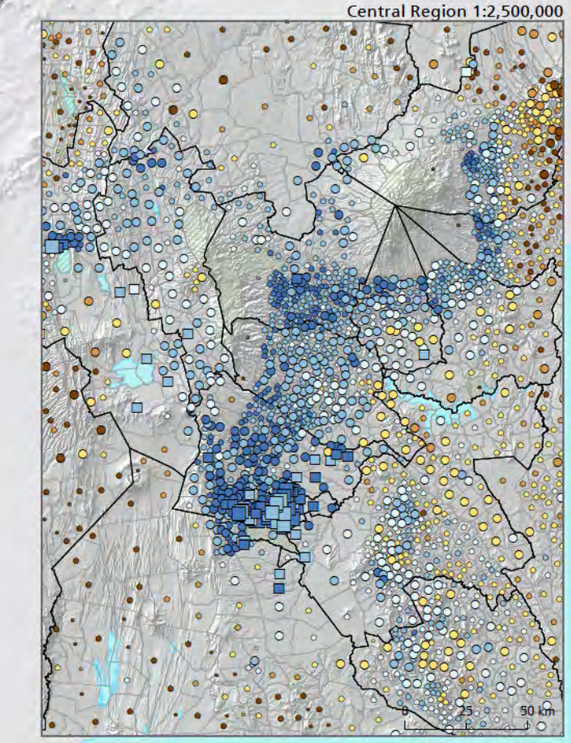
6.03 Secondary School Attendance of 14- to 17-Year-Olds

Republic of Kenya 1:4,000,000

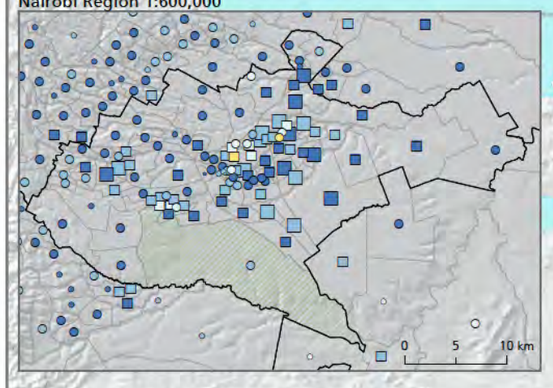
Western Region 1:2,500,000



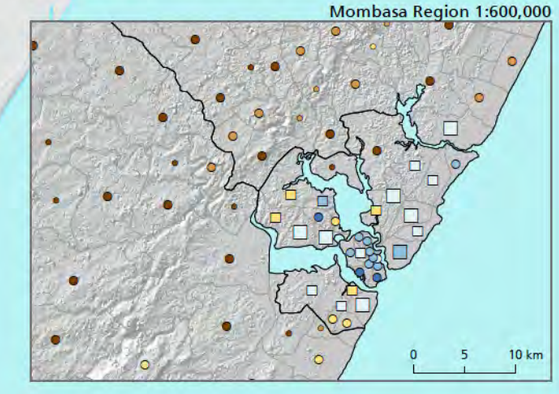
Central Region 1:2,500,000

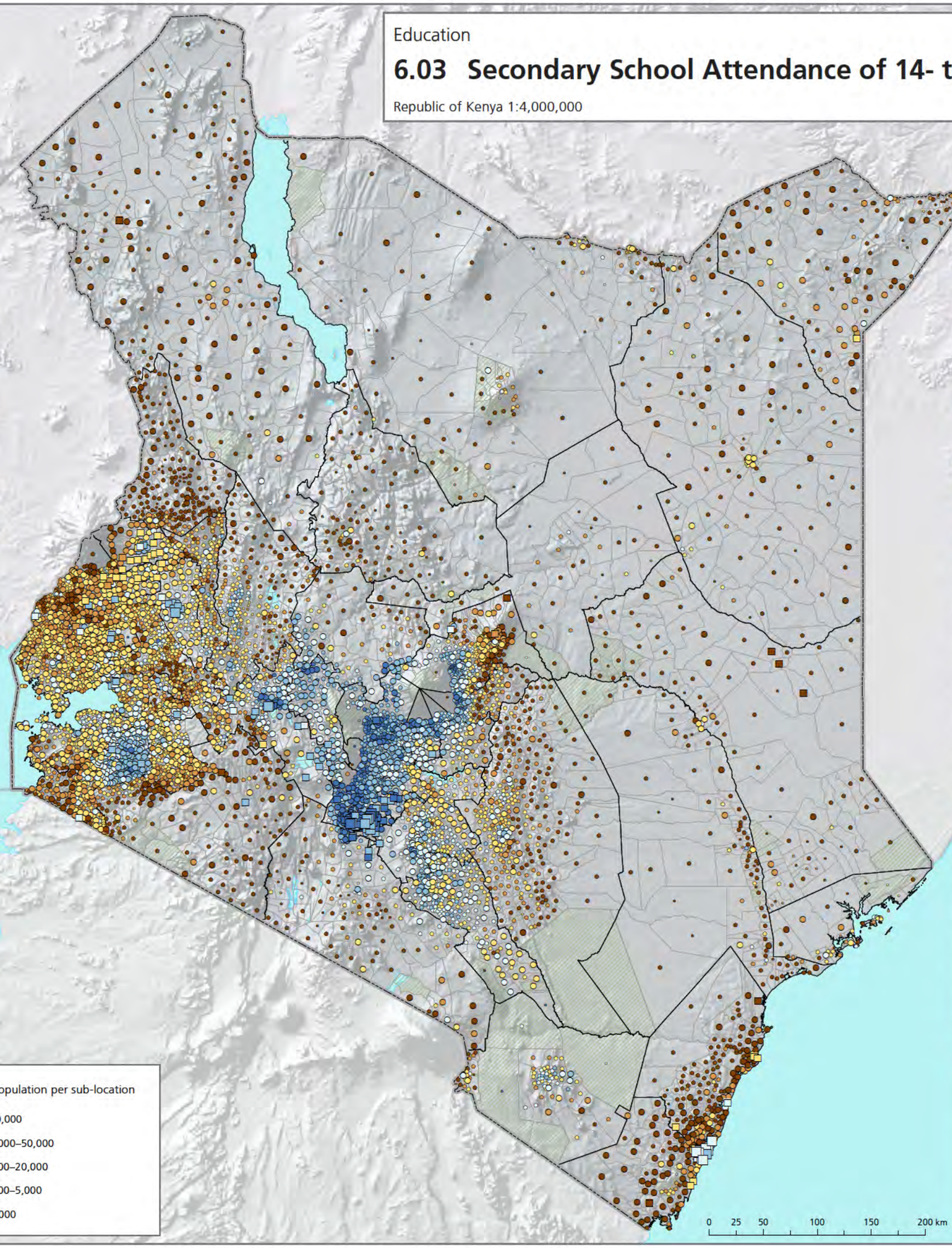


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Secondary school attendance classes: Percentage of all 14- to 17-year-olds attending secondary school, or secondary school net attendance rate

- Below 10%
- 10–15%
- 15–25%
- 25–35%
- 35–50%
- Above 50%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.04 Secondary School Attendance of Underage and Overage Students

The previous map (6.03) showed secondary school net attendance rates across Kenya, revealing a possible link between levels of economic development and access to secondary school. The present map switches perspectives to focus on secondary school attendees that fall outside the official secondary school age range of 14 to 17 years. Map 6.04 shows the number of underage/overage secondary school attendees as a percentage of the total population aged 14 to 17 years. Adding this percentage, or rate, to the secondary school net attendance rate gives you the secondary school gross attendance rate. A key question is whether underage/overage attendees make up for the disparities revealed by the net attendance rate, resulting in an overall secondary school gross attendance rate that is more evenly distributed over the country.

Kenya's secondary school gross attendance rate is 50%; the net attendance rate is only 23.5% (see map 6.03). Thus, the rate of underage/overage attendees is 26.5%. In other words, out of 1.72 million young people attending secondary school in Kenya, more than half – namely 0.91 million – falls outside the standard age range. Of these, the vast majority are older (aged 18 to 24 years). Hence, one out of every two students in Kenya's 6,491 secondary schools is aged 18 or older. This fact points to strains on the education system, which must handle a huge backlog of students. Further, the large number of older students presents heavy economic burdens on households, communities, and the nation at large.

Reasons for the high number of overage secondary school students include carryover of older primary school students (see section 6.02) and prolonged breaks between completion of primary school and starting secondary school. The introduction of free primary education in 2003 probably plays a significant role in these rates of older students: this policy shift enabled many children to enter or re-enter primary school who otherwise would have been prevented from doing so. At the time of the census (2009), this wave of increased participation in education was reaching the secondary school level. This suggests that Kenya is currently in a process of lifting its overall education levels at a higher speed than would be possible if only the official school-going age group were attending school. This catching-up process is both an economic strain and an important investment in Kenya's future.

Against this background, one might expect that those regions displaying a relatively low secondary school net attendance rate would display a high rate of overage secondary school attendees. In fact, there are a number of counties whose comparatively low secondary school net attendance rate is supplemented by a relatively high rate of overage attendees, lifting them near or above the national gross attendance rate of 50%. This is most apparent in Bungoma, where the rate of overage students (29%) lifts the gross attendance rate to 46%, as well as in Bomet and Nandi (both: overage rate 29%; gross rate 47%), Kericho (overage rate 30%; gross rate 51%), and Uasin Gishu (overage rate 35%; gross rate 62%). This suggests that western Kenya's high-potential areas are striving to catch up with the highest education levels in Kenya.

Overall, however, this pattern found in western Kenya is not the norm. Instead, the rates of overage secondary school students found elsewhere generally mirror spatial patterns seen in connection with the net attendance rate (map 6.03): for example, central Kenya has both the highest net attendance rates and the highest rates of overage secondary school attendees, led by Nairobi with a 45% rate of overage students and a resulting gross attendance rate of 94%. Outside of central Kenya, the rates of overage secondary school attendees drop, with some areas dipping below 30%. In areas along the coast and, in particular, in arid and semi-arid areas, the rates of overage students are even below 20%, with Turkana recording the lowest rate at 9%. As indicated by the example of Nairobi, rural–urban patterns seen in connection with the net attendance rate (map 6.03) are reflected, or even slightly more pronounced, in the rates of overage/underage secondary school attendees. Taken together, these observations suggest that the high proportion of overage secondary school attendees stems from a nationwide catching-up process in secondary education; however, this process does not appear to be reducing existing differences between regions.

Calculation of overage attendees' contribution (in %) to county-level gross attendance rates reveals values ranging from 38% in Kiambu to 72% in Turkana (see county table). Interestingly, as seen in Turkana where three out of four secondary school attendees are overage, several arid and semi-arid counties have high proportions of overage students. The question arises as to whether these numbers are first signs of a catching-up process in the periphery or the result of structural problems rooted in primary education. Elsewhere too in Kenya, the high proportion of overage secondary school attendees could be a sign either of structural problems or of positive growth in secondary education. Time will tell which perspective prevails.

County	Sec. school att. of underage/ overage students	Sec. school gross att. rate	No. of underage/ overage students in sec. school*	Total no. of sec. school attendees*
Nairobi	45.4%	93.7%	83.8	172.8
Mombasa	36.9%	69.4%	22.9	43.0
Kwale	14.6%	23.3%	8.5	13.5
Kilifi	18.7%	29.1%	19.1	29.7
Tana River	10.0%	17.5%	2.0	3.6
Lamu	22.6%	39.1%	2.0	3.4
Taita Taveta	23.6%	46.0%	5.7	11.0
Garissa	13.7%	20.7%	9.1	13.7
Wajir	11.6%	18.9%	9.2	14.9
Mandera	15.4%	24.4%	20.0	31.5
Marsabit	12.7%	22.2%	3.9	6.7
Isiolo	16.0%	32.9%	2.1	4.3
Meru	24.4%	46.2%	27.2	51.6
Tharaka Nithi	32.1%	59.1%	9.8	18.1
Embu	30.2%	62.0%	12.7	26.1
Kitui	20.5%	35.4%	21.0	36.2
Machakos	29.0%	57.6%	28.8	57.2
Makueni	30.7%	57.7%	27.8	52.4
Nyandarua	26.2%	61.7%	14.1	33.3
Nyeri	38.8%	85.8%	21.0	46.4
Kirinyaga	34.0%	72.7%	12.4	26.5
Murang'a	32.4%	71.7%	26.3	58.2
Kiambu	30.7%	81.2%	35.7	94.4
Turkana	8.8%	12.3%	9.0	12.6
West Pokot	14.1%	19.7%	6.8	9.6
Samburu	9.6%	17.5%	2.0	3.6
Trans Nzoia	24.9%	43.9%	18.8	33.1
Uasin Gishu	35.4%	62.0%	26.8	46.9
Elgeyo Marakwet	26.1%	45.0%	9.4	16.2
Nandi	29.2%	46.9%	19.1	30.7
Baringo	24.8%	43.2%	14.2	24.8
Laikipia	25.9%	58.0%	8.7	19.5
Nakuru	28.5%	60.6%	37.0	78.9
Narok	18.5%	28.9%	13.4	20.9
Kajiado	26.1%	52.8%	13.7	27.7
Kericho	29.9%	51.0%	20.1	34.2
Bomet	29.3%	47.3%	20.3	32.8
Kakamega	26.2%	45.0%	40.6	69.8
Vihiga	26.0%	49.6%	13.8	26.4
Bungoma	29.3%	46.0%	38.2	59.9
Busia	23.4%	39.2%	17.1	28.7
Siaya	21.8%	40.5%	17.8	33.0
Kisumu	27.0%	54.3%	24.4	49.1
Homa Bay	28.2%	50.5%	26.6	47.5
Migori	25.5%	42.9%	22.2	37.2
Kisii	38.8%	73.4%	43.0	81.5
Nyamira	38.4%	77.1%	21.4	43.0
KENYA	**26.5%**	**50.0%**	**909.4**	**1,716.3**

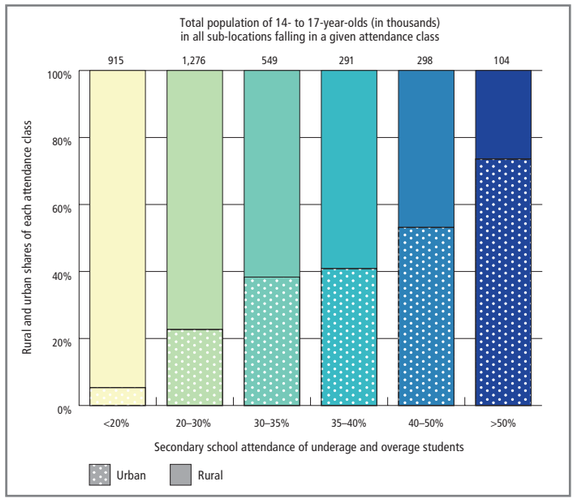
Abbreviations: sec. = secondary; att. = attendance; no. = number

* in thousands

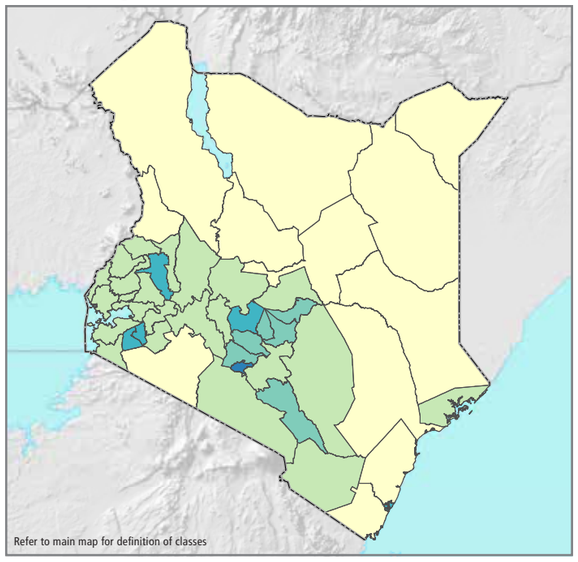
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.04 Rural–Urban Distribution of Attendance Classes



6.04 Average Attendance at County Level



Education

6.04 Secondary School Attendance of Underage and Overage Students

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

0 25 50 100 150 200 km

Secondary school attendance rate: Underage and overage students in secondary school, or secondary school gross attendance rate minus net attendance rate

- Below 20%
- 20–30%
- 30–35%
- 35–40%
- 40–50%
- Above 50%

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.05 Gender Parity in Primary School Attendance

Gender parity in education is vital at the individual level, where it indicates equal development chances, and at the national level, where it indicates optimal use of human resources. Non-parity implies untapped human resources for development. This is particularly relevant in transitional economies, whose growing tertiary sectors are typically capable of providing job opportunities equally to men and women.

As seen in this chapter, the education levels of men and women over age 24 still differ considerably in Kenya (see map 6.09). Thus, it is crucial to examine gender parity in primary school attendance (map 6.05) and secondary school attendance (map 6.06) to judge whether Kenya's education system is on track to gradually overcome gender disparities in education levels.

The indicator used to describe attendance levels is the gender parity index. The gender parity index is based on gross attendance rates (see maps 6.02 and 6.04) and is calculated by dividing the gross attendance rate for females by the gross attendance rate for males. Gross rates are used instead of net rates to ensure that underage/overage attendees are also factored in (see maps 6.02 and 6.04). A gender parity index at or near 1.0 indicates relative parity; an index of less than 1.0 indicates disparity in favour of males; and an index greater than 1.0 indicates disparity in favour of females.

A total of 9.34 million children attend primary school in Kenya: 4.80 million males and 4.54 million females. The gross attendance rate for males is 112% and that for females is 109%, leading to a gender parity index of 0.97. Thus, it appears that gender parity has almost been achieved at the national level in Kenya, with females only 3% less likely to attend primary school than males. This encouraging observation sharply contrasts with the gender-based educational disparities found among adults in Kenya (see map 6.09). It suggests a shift in gender roles in Kenyan society that may be attributed in part to the introduction of free primary education in 2003.

With the exception of Meru (gender parity index: 1.004), all of Kenya's counties display a gender parity index of less than 1.0. The lowest index is found in Samburu, where girls are 18% less likely to attend primary school than boys. However, 34 of Kenya's 47 counties display a gender parity index of 0.95 or higher, and the index dips below 0.90 in only five counties. With the exception of Isiolo and West Pokot, the counties exhibiting near parity (0.95 or higher) also have an overall gross attendance rate exceeding 100%. By contrast, the counties with relatively low female attendance display a low overall gross attendance rate, ranging between 42% and 78%. This suggests that girls' access to primary education is increased in places where more societal value is attached to primary education overall, whereas boys are favoured in places where primary school attendance rates are generally low.

The main map indicates that gender parity has been achieved in most sub-locations in the high-potential areas of central and western Kenya, as well as in Nairobi, Mombasa, and in certain areas along the coast. Sub-locations where more girls attend primary school than boys may be found scattered throughout Kenya – even in its arid and semi-arid regions – but are more concentrated in areas east and south-east of Mount Kenya. These areas could be making up for a backlog in girls' education, as they also exhibit comparatively high rates of overage students (see map 6.02).

Sub-locations with a gender parity index below 0.95 may also be found sprinkled throughout Kenya's high-potential areas; a concentration of such sub-locations in Kenya's Lake region causes the county-level indices of Migori and Homa Bay to drop below 0.95. However, the majority of sub-locations lacking parity may be found in Kenya's coastal hinterland and, in particular, in its arid and semi-arid regions where overall attendance rates are low. This implies that raising female attendance rates must go hand in hand with raising primary school attendance rates in general.

Interestingly, there is little difference in gender parity indices between rural and urban settings. In fact, the proportion of urban sub-locations in the gender parity classes below 0.95 is surprisingly high. This share of urban sub-locations is made up of towns in the arid and semi-arid regions, as well as low-income neighbourhoods in larger towns, and indicates that girls still have lesser chances to obtain an education in these settings.

Taken together, these observations suggest that in low-income or poverty-stricken areas, girls are less likely to attend primary school than boys. In these areas, special efforts are needed to achieve gender parity in primary education.

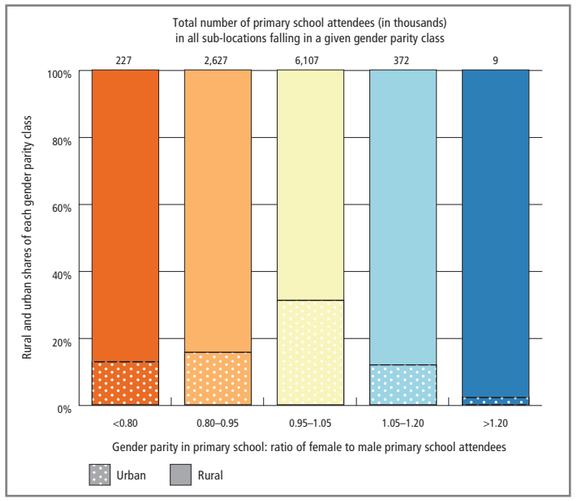
County	Gender parity index for primary school attendance	Rank	Total number of girls in primary school*	Total number of boys in primary school*
Nairobi	0.99	4	247.8	239.4
Mombasa	0.98	10	81.2	81.4
Kwale	0.93	39	79.1	85.8
Kilifi	0.95	34	140.9	150.2
Tana River	0.88	43	20.8	25.0
Lamu	0.93	40	11.0	12.2
Taita Taveta	0.97	24	33.3	34.9
Garissa	0.85	45	37.8	54.3
Wajir	0.85	46	43.1	63.6
Mandera	0.86	44	89.2	125.6
Marsabit	0.91	41	24.3	28.2
Isiolo	0.98	11	13.9	14.8
Meru	1.00	1	165.2	165.2
Tharaka Nithi	0.99	5	45.3	46.4
Embu	0.98	9	62.5	63.9
Kitui	1.00	3	154.4	159.4
Machakos	0.97	23	138.3	146.9
Makueni	0.98	18	128.5	135.0
Nyandarua	0.99	7	78.7	82.4
Nyeri	0.97	21	71.5	75.1
Kirinyaga	0.98	12	55.6	56.7
Murang'a	0.98	20	113.8	119.7
Kiambu	0.98	14	156.6	158.7
Turkana	0.90	42	42.1	52.6
West Pokot	0.95	33	54.2	58.7
Samburu	0.82	47	15.6	19.7
Trans Nzoia	0.98	13	114.8	117.6
Uasin Gishu	0.99	8	111.7	114.0
Elgeyo Marakwet	0.98	17	56.6	58.5
Nandi	0.98	16	101.9	105.2
Baringo	0.99	6	70.2	75.1
Laikipia	0.97	25	45.8	49.0
Nakuru	0.98	15	189.2	196.8
Narok	0.94	38	102.7	114.6
Kajiado	0.94	35	67.8	73.3
Kericho	0.96	29	104.8	109.7
Bomet	0.97	26	109.5	115.0
Kakamega	0.98	19	232.3	235.1
Vihiga	1.00	2	80.2	80.2
Bungoma	0.96	30	207.7	215.1
Busia	0.97	27	109.0	111.3
Siaya	0.97	28	112.8	118.9
Kisumu	0.96	31	121.3	124.4
Homa Bay	0.94	37	135.1	144.9
Migori	0.94	36	131.8	140.4
Kisii	0.97	22	156.0	160.9
Nyamira	0.96	32	78.5	81.4
KENYA	**0.97**	**–**	**4,544.9**	**4,797.1**

* in thousands

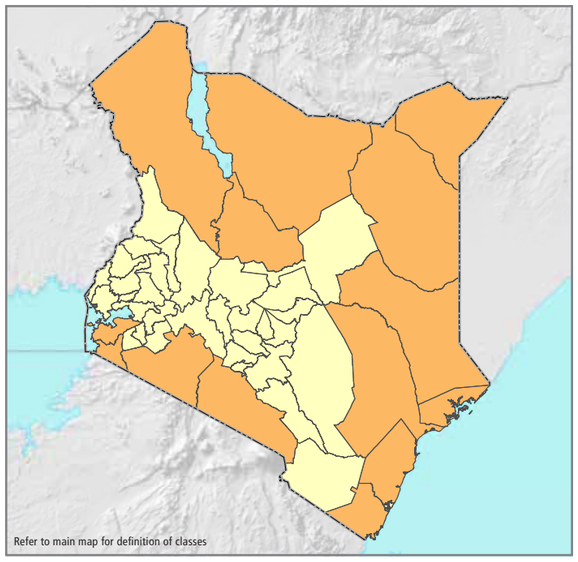
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.05 Rural–Urban Distribution of Gender Parity Classes



6.05 Average Gender Parity at County Level

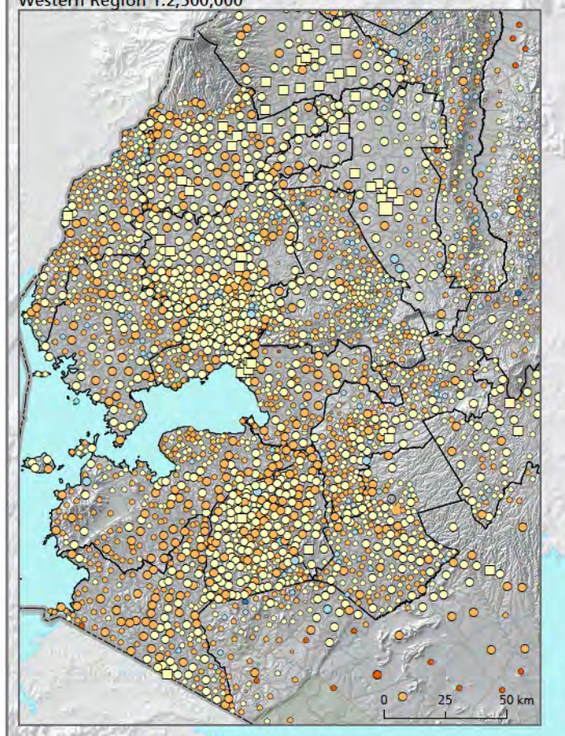


Education

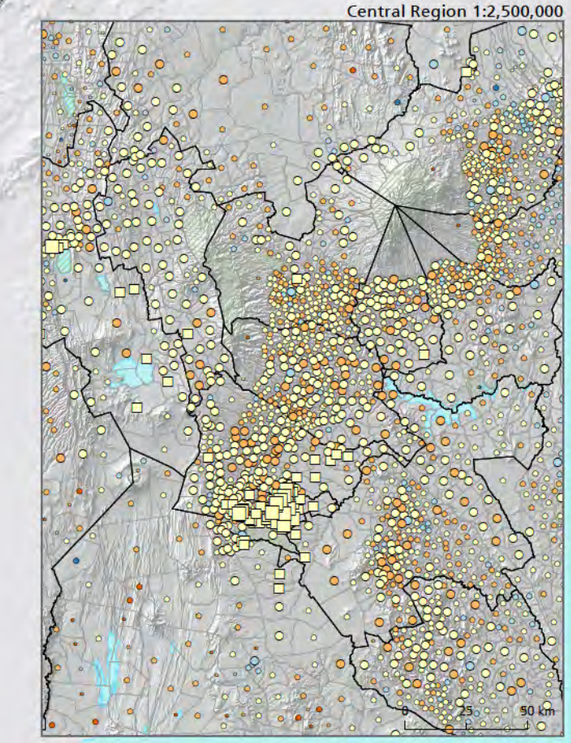
6.05 Gender Parity in Primary School Attendance

Republic of Kenya 1:4,000,000

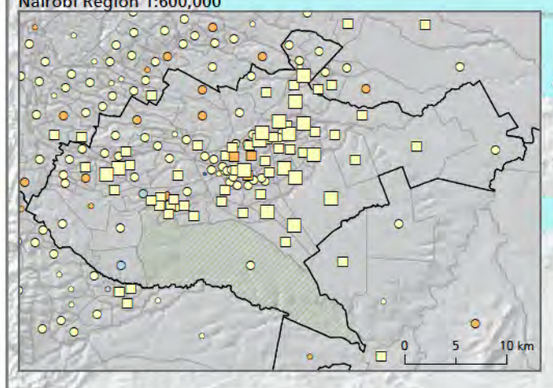
Western Region 1:2,500,000



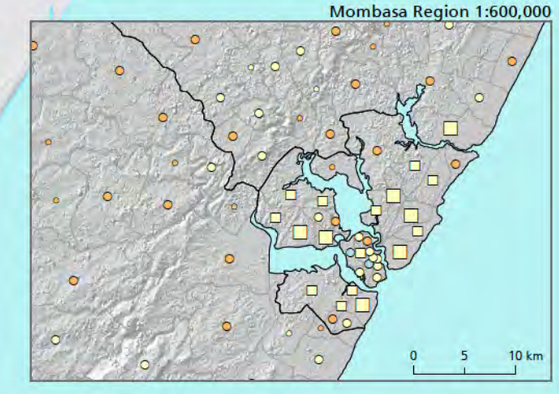
Central Region 1:2,500,000

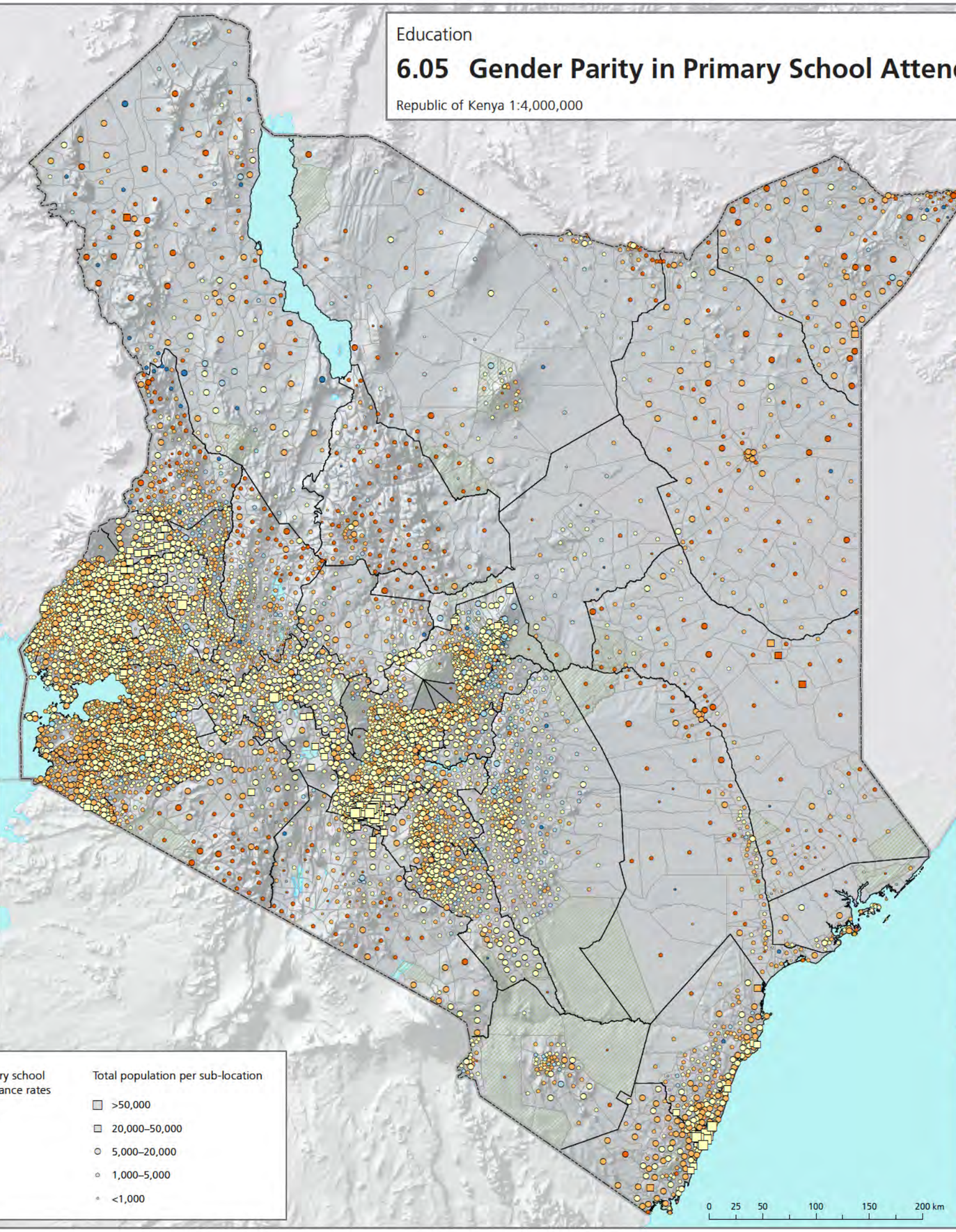


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Primary school gender parity classes: Gender parity index for primary school attendance, or ratio of female to male primary school gross attendance rates

More male attendees:	Gender parity:	More female attendees:
Parity index below 0.80	Parity index 0.95–1.05	Parity index 1.05–1.20
Parity index 0.80–0.95		Parity index above 1.20

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.06 Gender Parity in Secondary School Attendance

Gender parity in primary education (map 6.05) is vital for individual and national development. No less important is gender parity in secondary education, as schooling at this level helps provide the basis for a diversified, specialized human resource base capable of driving economic development. In addition, higher education is an important cornerstone of self-determined social and political development in a globalizing world. Gender disparities at the level of secondary education, therefore, point to untapped human resources and unequal participation in national development.

Shown in the present main map, the gender parity index for secondary school attendance is analogous to the primary school gender parity index (see map 6.05). The secondary school gender parity index is calculated by dividing the gross attendance rate for females by the gross attendance rate for males. A gender parity index at or near 1.0 indicates relative parity; an index of less than 1.0 indicates disparity in favour of males; and an index greater than 1.0 indicates disparity in favour of females. To ease comparison, the classes and colours used in map 6.06 mirror those used to illustrate the primary school gender parity index in map 6.05. A glance at both maps reveals differing and more varied patterns of gender parity at the secondary school level in comparison with the primary school level.

A total of 1.71 million youths attend secondary school in Kenya: 0.79 million females and 0.92 million males. The gross attendance rate for females is 47.4% and that for males is 52.4%, resulting in an overall gender parity index of 0.91. Thus, at the national level, gender disparity is more pronounced in secondary education than in primary education, where the gender parity index is 0.97 (see map 6.05). On average, girls are almost 10% less likely to attend secondary school than boys.

However, the gender parity index for secondary school exhibits greater spatial variation than that for primary school. While there are 34 counties near parity for primary education (see map 6.05), there are only 14 counties with indices at or above 0.95 for secondary education. Interestingly, however, five of these counties display indices above 1.0, favouring females, with Embu (1.08) and Nyandarua (1.06) topping the list. By contrast, at the primary level, there is only one county (Meru) with a gender parity index above 1.0. Further underscoring the greater variation of the secondary school gender parity index is the fact that 19 counties display indices below 0.80, with Tana River reaching only 0.59. In these counties, girls are 20 to 40% less likely to attend secondary school than boys.

Clear spatial patterns are visible in the broad variation of the secondary school gender parity index. Whereas gender parity has been achieved in most of central Kenya and in some of its neighbouring counties, indices between 0.80 and 0.95 may be found in most counties in western Kenya and at the fringes of central Kenya's high-potential areas. The 19 counties with indices below 0.80 are located in Kenya's Lake region, along the coast, and in its arid and semi-arid regions; with the exception of Mombasa (69%) and Kisumu (54%), all of these counties have a secondary school gross attendance rate below the national average (50%). By contrast, the majority of counties exhibiting higher parity values have a gross attendance rate at or above the national average. This suggests that boys have more access to secondary education than girls in contexts where secondary education is less anchored overall – though certain cultural and religious factors may also contribute.

At the sub-location level, a couple of noteworthy observations may be made. First, in most of the rural areas with parity indices above 1.05, the overage student attendance rate is also high (map 6.04). This suggests that a catching-up process is underway in these areas, leading to greater female secondary school attendance to make up for a backlog of female students. But interestingly, this is only true of rural sub-locations, not of sub-locations in larger urban settings. As indicated by the map details of Nairobi and Mombasa, secondary school parity index values are typically below 0.95 – or even below 0.80 – in urban areas. This applies not only to low-income neighbourhoods, but also to wealthier urban sub-locations. In these urban contexts, the postulated "backlog effect" – which appears to boost female attendance in certain rural areas – remains absent. One reason may be that secondary education standards and costs are high in urban agglomerations and that boys are favoured for schooling under conditions of household-level economic pressure.

In sum, reaching parity in secondary education still poses a greater challenge than in primary education. Economic constraints on households, whether high costs or low incomes, appear to play a key role where disparities persist. Reducing these constraints should pave the way for greater gender parity.

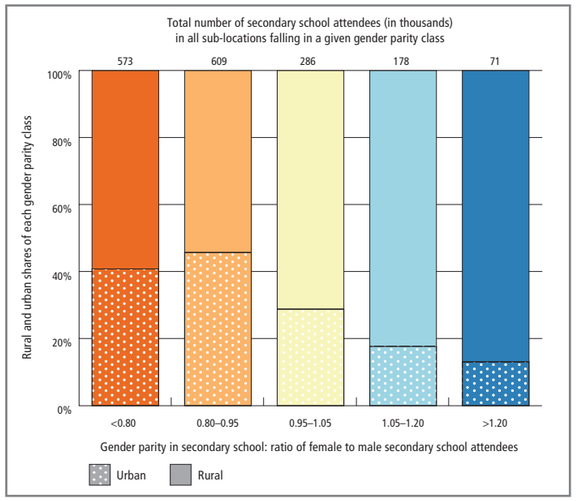
County	Gender parity index for secondary school attendance	Rank	Total number of females in secondary school*	Total number of males in secondary school*
Nairobi	0.82	27	86.7	86.1
Mombasa	0.78	30	20.1	23.0
Kwale	0.73	38	5.5	8.0
Kilifi	0.72	40	12.1	17.6
Tana River	0.59	47	1.3	2.3
Lamu	0.78	29	1.4	2.0
Taita Taveta	0.95	14	5.2	5.8
Garissa	0.65	44	4.4	9.3
Wajir	0.77	33	4.9	10.0
Mandera	0.73	39	10.1	21.4
Marsabit	0.63	46	2.4	4.4
Isiolo	0.77	32	1.8	2.4
Meru	1.03	3	26.6	25.0
Tharaka Nithi	0.98	9	8.9	9.2
Embu	1.08	1	13.2	12.9
Kitui	0.94	16	17.2	19.0
Machakos	0.98	10	27.2	30.0
Makueni	0.97	12	24.8	27.6
Nyandarua	1.06	2	16.6	16.7
Nyeri	1.01	5	22.8	23.6
Kirinyaga	0.99	7	12.8	13.7
Murang'a	0.99	6	28.1	30.1
Kiambu	0.98	8	47.7	46.8
Turkana	0.65	45	4.3	8.3
West Pokot	0.74	36	3.8	5.8
Samburu	0.70	41	1.3	2.2
Trans Nzoia	0.85	24	15.1	18.0
Uasin Gishu	0.93	17	23.0	23.9
Elgeyo Marakwet	0.91	19	7.6	8.6
Nandi	0.90	21	14.5	16.3
Baringo	1.01	4	11.9	12.9
Laikipia	0.97	11	9.3	10.2
Nakuru	0.94	15	37.8	41.1
Narok	0.73	37	8.4	12.6
Kajiado	0.92	18	13.1	14.5
Kericho	0.85	26	15.6	18.6
Bomet	0.80	28	14.4	18.4
Kakamega	0.91	20	33.1	36.7
Vihiga	0.96	13	12.9	13.5
Bungoma	0.85	25	27.3	32.5
Busia	0.75	34	12.3	16.5
Siaya	0.75	35	13.7	19.3
Kisumu	0.77	31	21.4	27.7
Homa Bay	0.70	42	18.8	28.8
Migori	0.67	43	14.7	22.6
Kisii	0.85	23	37.5	44.0
Nyamira	0.89	22	19.9	23.1
KENYA	**0.91**	**–**	**793.2**	**923.1**

* in thousands

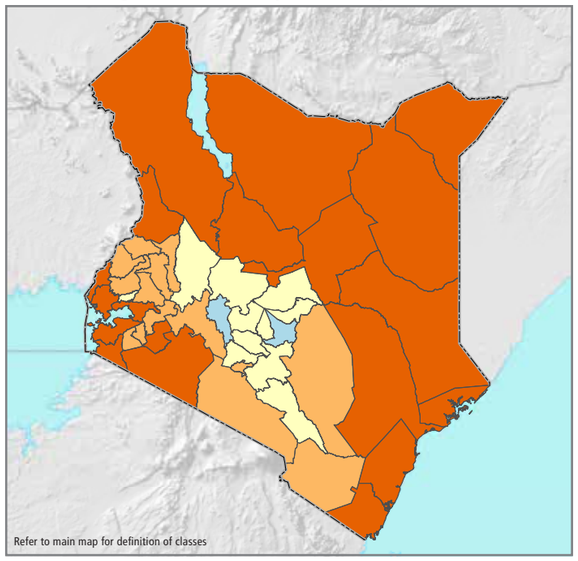
Data Source

2009 Kenya Population and Housing Census (Variable P40: Education Level Reached), Kenya National Bureau of Statistics.

6.06 Rural–Urban Distribution of Gender Parity Classes



6.06 Average Gender Parity at County Level

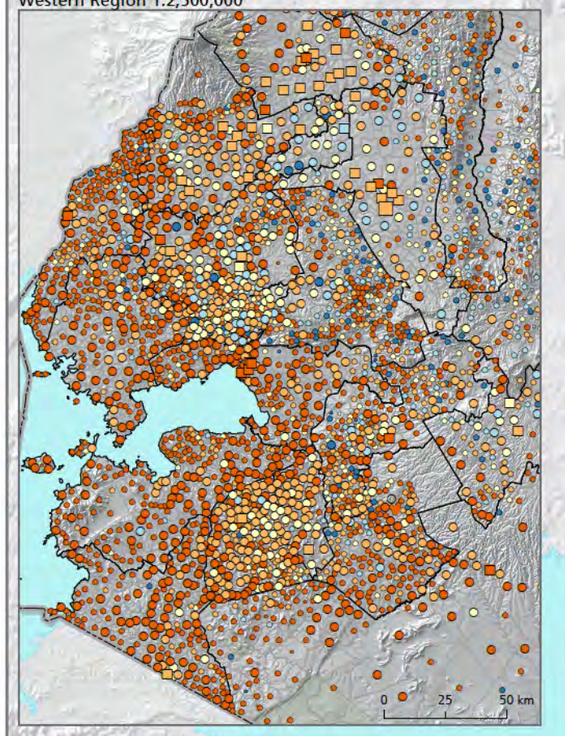


Education

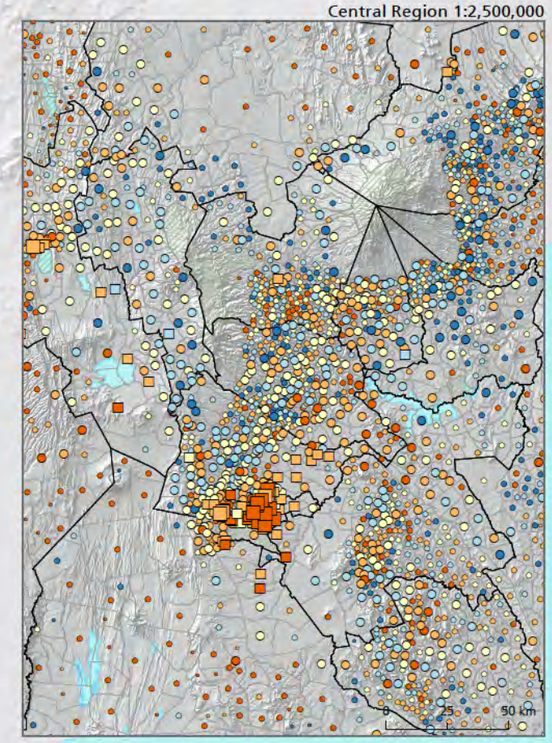
6.06 Gender Parity in Secondary School Attendance

Republic of Kenya 1:4,000,000

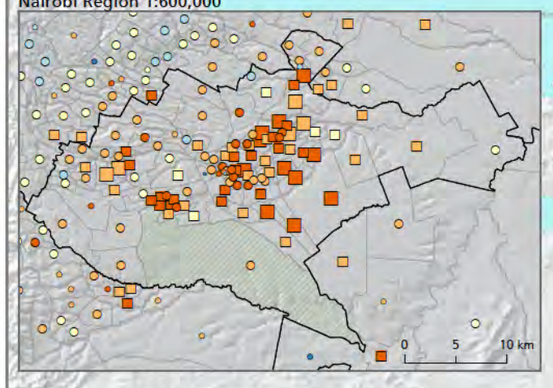
Western Region 1:2,500,000



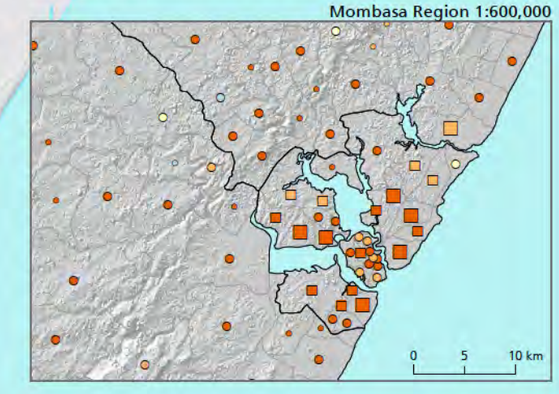
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Secondary school gender parity classes: Gender parity index for secondary school attendance, or ratio of female to male secondary school gross attendance rates

More male attendees:
- Parity index below 0.80
- Parity index 0.80–0.95

Gender parity:
- Parity index 0.95–1.05

More female attendees:
- Parity index 1.05–1.20
- Parity index above 1.20

Total population per sub-location
- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders
- International border
- County border
- Sub-location border

Features
- National park
- Waterbody

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6.07 Education Levels of People Aged 25 or Older

The previous maps addressed attendance levels in primary and secondary school, providing insights into Kenya's education system and its beneficiaries, which will shape the country's future. Map 6.07 shifts the focus to the levels of formal education reached by Kenya's adult population. These levels and their patterns of regional distribution are important indicators of the human resource base on which Kenya's economy and sociopolitical system will continue to build.

An index was developed to capture the average education level reached by the adult population in a given county or sub-location. The index refers to all individuals aged 25 or older who are no longer in a formal education programme. Each individual is assigned a specific value based on the highest level of formal education reached. Individuals who have completed primary school are assigned a value of 1.0; those who have completed secondary school are assigned a value of 2.0; and those who have completed a university degree are assigned a value of 3.0. Uncompleted levels of schooling and other education credentials are assigned values varying between 0.0 and 3.0 (see box in chapter introduction for details). Finally, all the education values in a given county or sub-location are averaged together, resulting in an education level index ranging between 0.0 and 3.0.

As seen in the main map, index values vary from below 0.3 to more than 2.0 at the sub-location level. Values below 1.0 are shaded in brownish colours, and values greater than 1.0 in bluish colours. An index value of 1.0 means that, on average, all the adults in a given sub-location have completed primary school at minimum. A value above 2.0 indicates that, on average, all the adults in a given sub-location have completed secondary school at minimum. Of course, the index is an average value for the population, i.e. some individuals may have obtained a university degree while others may not have completed primary school.

Map 6.07 reveals some clear patterns related to various dimensions and gradients. Most obvious is the concentration of high education levels in large urban settings, especially in Nairobi, but also in Mombasa, Nakuru, Eldoret, Kisumu, and elsewhere. A rural–urban divide is further confirmed by the near total lack of rural sub-locations displaying index values above 1.5. In addition, the majority of sub-locations with indices below 1.0 are found in rural settings. In other words, in most rural sub-locations the adult population has, on average, not completed primary school. By contrast, in most urban settings, the adult population has, on average, completed primary school or secondary school.

The distribution of education levels reflects Kenya's economic landscape and corresponding labour market. Agricultural activities, pastoralism, and informal markets dominate in rural areas, while the bulk of the formal economy, manufacturing, services, administration, etc. are concentrated in Kenya's medium to large urban centres, most notably Nairobi (see also chapter 7). Well-educated adults are not typically found in the areas where they originally attended school (see previous maps), but rather in areas with adequate labour markets and demand for skilled workers. Indeed, much of the rural-to-urban migration shown in chapter 2 (map 2.04) may be attributed to the movement of well-educated Kenyans seeking entry into the country's formal labour markets.

Another interesting gradient may be observed in rural settings: those regions with intensive, market-oriented agriculture in central and western Kenya display higher education levels than the semi-arid and arid regions of the country and the coastal hinterland. This could affect policies and decision-making on agriculture, economic development, and modernization efforts outside of Kenya's core high-potential areas, since relatively low education levels in the periphery further compound ecological, infrastructural, and service-related disadvantages.

County-level education level indices reflect the same gradients and divides described above. Accordingly, Nairobi has the top index value (1.68), while the lowest index values are found in the semi-arid and arid counties of northern and north-eastern Kenya. Notably, Kenya's national education index value is 1.03, meaning that, on average, all Kenyan adults aged 25 or older have completed primary school. Also worthy of note, 3.5 million of Kenya's 14.14 million adults aged 25 or older have at least a secondary education (index 2.0 or higher).

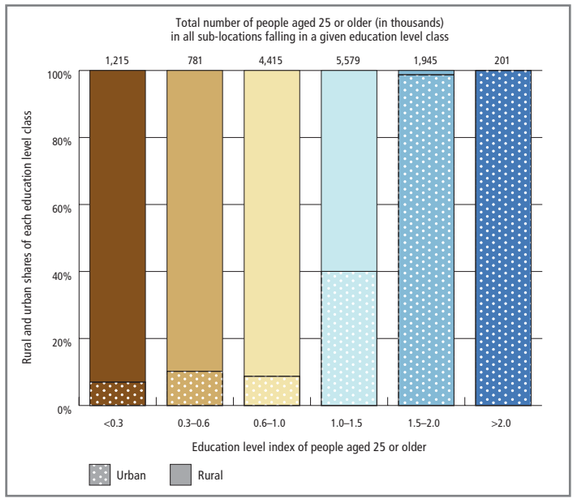
County	Education level index	Rank	Total number of people aged 25 or older*	Number of people aged 25 or older with index of 2.0 or more*
Nairobi	1.68	1	1,404.2	772.0
Mombasa	1.37	3	409.9	166.0
Kwale	0.64	38	221.7	28.4
Kilifi	0.71	36	372.9	56.1
Tana River	0.43	40	75.3	6.3
Lamu	0.75	35	38.9	5.3
Taita Taveta	1.00	21	118.5	23.8
Garissa	0.17	44	185.2	8.9
Wajir	0.11	46	183.6	4.9
Mandera	0.10	47	266.3	6.1
Marsabit	0.21	43	95.0	5.0
Isiolo	0.57	39	50.4	8.0
Meru	0.88	31	559.8	95.0
Tharaka Nithi	0.94	27	154.7	27.7
Embu	1.05	18	225.3	51.8
Kitui	0.78	34	345.8	42.4
Machakos	1.15	9	450.0	114.0
Makueni	0.98	23	324.9	56.9
Nyandarua	1.09	15	235.0	50.4
Nyeri	1.24	4	331.4	103.4
Kirinyaga	1.11	12	262.4	65.4
Murang'a	1.05	17	426.6	89.6
Kiambu	1.42	2	742.7	303.7
Turkana	0.12	45	267.9	8.1
West Pokot	0.37	41	148.6	10.1
Samburu	0.30	42	66.6	5.1
Trans Nzoia	1.06	16	270.3	60.8
Uasin Gishu	1.22	5	316.8	99.4
Elgeyo Marakwet	0.95	26	125.3	24.3
Nandi	0.99	22	264.2	48.9
Baringo	0.81	33	172.8	33.4
Laikipia	1.05	19	157.0	39.4
Nakuru	1.21	6	605.3	184.9
Narok	0.66	37	259.1	31.9
Kajiado	1.13	10	257.2	85.5
Kericho	1.10	14	263.3	64.4
Bomet	1.01	20	241.2	48.6
Kakamega	0.96	24	558.6	104.6
Vihiga	0.96	25	204.4	37.2
Bungoma	1.13	11	434.4	101.7
Busia	0.86	32	237.4	36.3
Siaya	0.88	30	297.5	41.4
Kisumu	1.16	8	329.4	86.9
Homa Bay	0.94	28	303.6	46.4
Migori	0.92	29	275.1	40.1
Kisii	1.10	13	389.5	102.4
Nyamira	1.17	7	212.4	62.7
KENYA	**1.03**	**–**	**14,138.3**	**3,496.0**

* in thousands

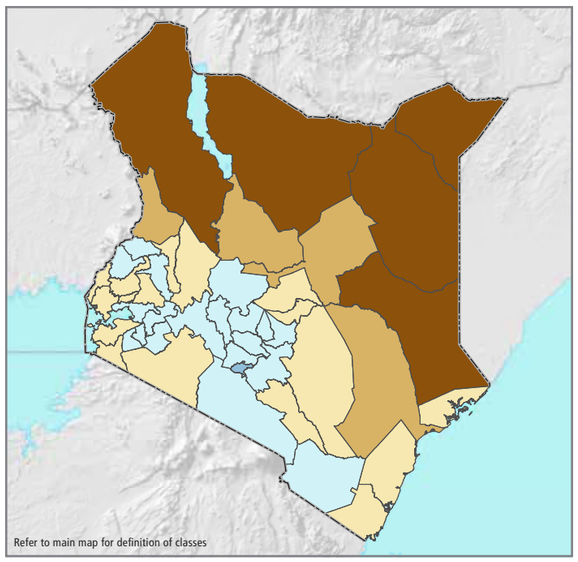
Data Source

2009 Kenya Population and Housing Census (Variable P41: Education Level Completed), Kenya National Bureau of Statistics.

6.07 Rural–Urban Distribution of Education Level Classes



6.07 Average Education at County Level

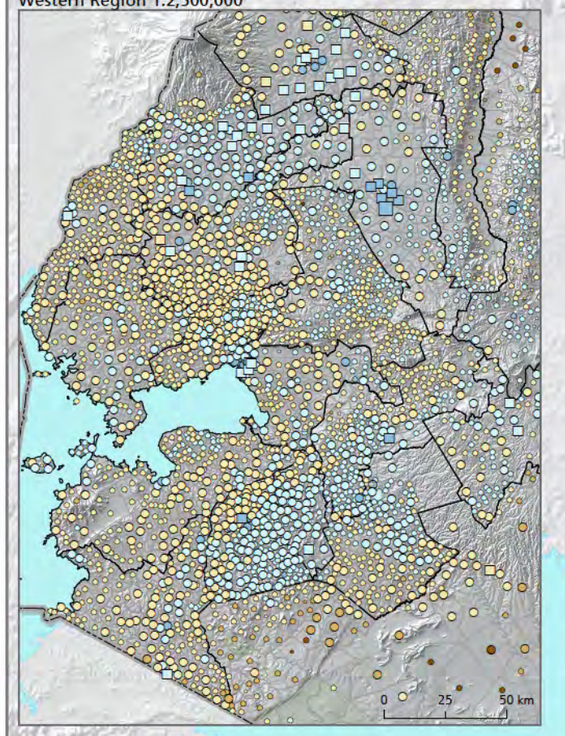


Education

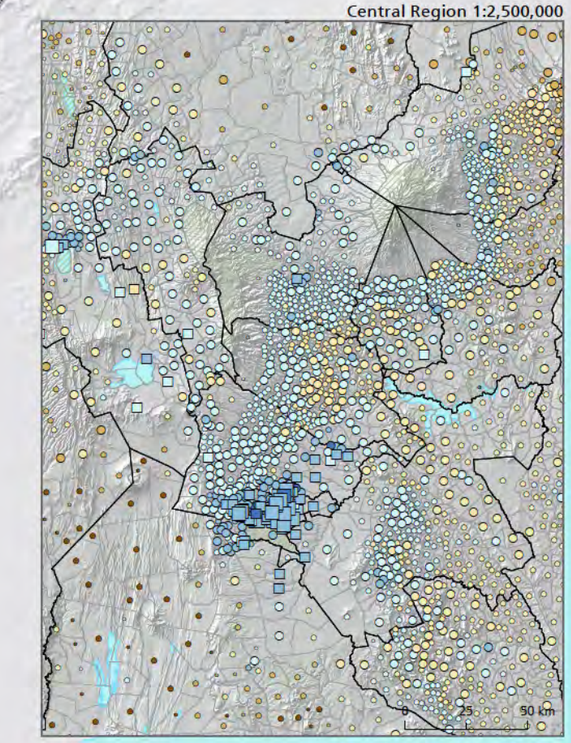
6.07 Education Levels of People Aged 25 or Older

Republic of Kenya 1:4,000,000

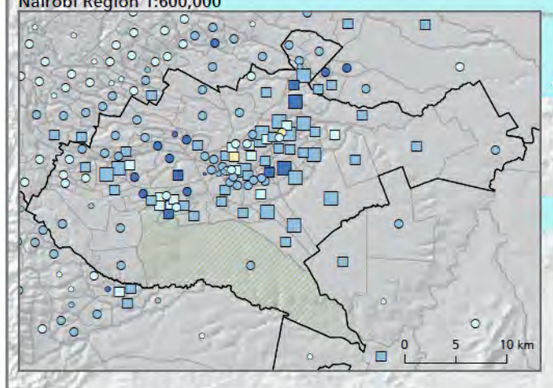
Western Region 1:2,500,000



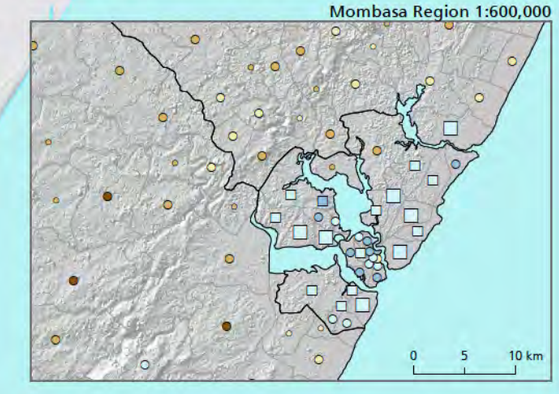
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Education level classes: Education level index of people aged 25 or older (1.0 = primary education, 2.0 = secondary education, 3.0 = tertiary education)

- Very low (below 0.3)
- Low (0.3–0.6)
- Low to medium (0.6–1.0)
- Medium (1.0–1.5)
- High (1.5–2.0)
- Very high (above 2.0)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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6.08 Age Group Differences in Education Levels

The preceding map presented average education levels among Kenya's adult population. It revealed that, on average, Kenya's adult population has completed primary education (index = 1.03; see definition in section 6.07), but that there are major regional differences and a significant rural–urban divide in adults' education levels.

Against this background, the question arises as to whether adults' education levels are changing over time and how this contributes to existing regional differences (e.g. increasing or decreasing them). To analyse this, the education level index was calculated for two different age groups: 25 to 34 years, and 35 years or older. Map 6.08 displays the differences found between the two age-related indices. A positive difference between the indices means that the younger age group in a given area has reached a higher education level than the older age group, suggesting that education levels are rising from one generation to the next. However, a negative difference between the two indices suggests that adults' education levels in a given area are decreasing over time.

Nationally, the education level index of those aged 25 to 34 stands at 1.21, an index value that is 0.31 points higher than that of adults aged 35 and older. This indicates that adults' education levels are increasing over time, likely due in part to the policy changes in Kenya's education system. This average increase may appear small at first glance. In reality, however, it means that three out of every ten Kenyan adults increased their education level by 1.0 points, the equivalent of completing primary education after having no education, or completing secondary education rather than just primary education. Viewed nationally, this is a substantial positive change. Considering this significant national increase in education levels, it appears crucial to distinguish whether and how this change is affecting the frequently sharp regional differences observed in map 6.07.

In fact, the observed overall increase in adults' education levels is clearly contributing to a reduction in the rural–urban divide. The rural–urban graph shows that increases above the national average are mainly found in rural sub-locations, whereas the majority of urban settings show increases in adults' education level that are below the national average. Certain urban sub-locations near Nairobi and other large towns even exhibit declining education levels between generations – possibly the result of low-income rural-to-urban migration. These observations suggest that the differences between rural and urban areas are gradually becoming less pronounced, although high education levels are still typically concentrated in urban areas. This in turn indicates that development gains may be diffusing from economic hotspots (e.g. Nairobi) to other parts of the country.

Interesting patterns emerge when examining adults' education levels by county. Counties at the fringes of high-potential areas in central and particularly western Kenya display above-average increases in adults' education levels, with Elgeyo Marakwet (0.50) and Baringo (0.39) among the top scorers. Yet even certain key agricultural areas outside of central Kenya exhibit above-average increases in education levels, including Kisii (0.41) and Nyamira (0.40), which rank in the top four. Similar trends are evident in parts of eastern Kenya and along the coast, indicating that Kenya's educational base for development is expanding spatially and socially, gradually diminishing the regional differences in adults' education levels.

Nevertheless, large parts of arid and semi-arid northern and north-eastern Kenya are excluded from this trend. Not only do Garissa, Turkana, Wajir, and Mandera display the lowest education levels among adults (see map 6.07), they also display the least change in these levels between generations. This pattern seen at the county level is also reflected at the sub-location level, e.g. in Baringo or West Pokot where lower levels of improvement are found in drier areas. Special efforts are needed to raise education levels among adults in Kenya's arid and semi-arid areas. Isiolo, which shows an above-average increase in adults' education levels (0.36), suggests that this is possible.

Interestingly, Nairobi has the highest education levels among adults in Kenya (see map 6.07) yet displays the smallest increase in these levels over time of all counties (0.06). Again, this could be the result of ongoing low-income in-migration. Nairobi may have reached its saturation point, and is now simply sustaining its position as a main economic hub while other parts of the country gradually catch up. Overall, the observed changes in adults' education levels suggest that Kenya's regional and social base for development is gradually expanding beyond its traditional centres of development.

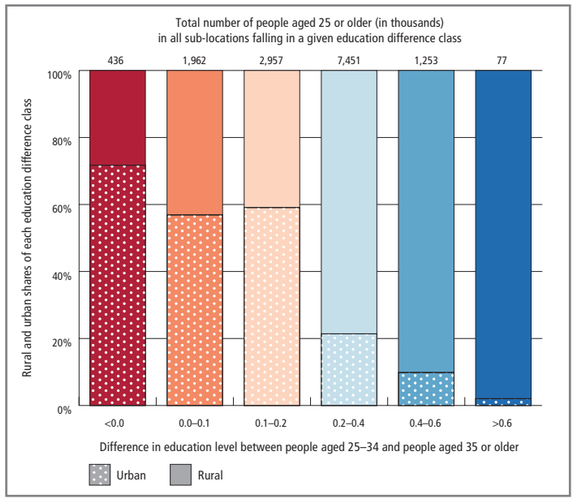
County	Difference in education level index between age groups 25–34/35+	Rank	Education level of people aged 25–34	Education level of people aged 35+
Nairobi	0.06	47	1.70	1.64
Mombasa	0.14	42	1.43	1.29
Kwale	0.27	29	0.80	0.53
Kilifi	0.32	13	0.90	0.57
Tana River	0.17	41	0.52	0.36
Lamu	0.27	27	0.91	0.64
Taita Taveta	0.28	25	1.18	0.90
Garissa	0.12	43	0.25	0.12
Wajir	0.08	45	0.16	0.08
Mandera	0.08	46	0.15	0.07
Marsabit	0.19	40	0.32	0.13
Isiolo	0.36	8	0.78	0.42
Meru	0.27	28	1.04	0.77
Tharaka Nithi	0.25	34	1.10	0.85
Embu	0.30	20	1.23	0.94
Kitui	0.37	6	1.03	0.66
Machakos	0.30	19	1.33	1.03
Makueni	0.31	16	1.18	0.87
Nyandarua	0.24	35	1.24	1.00
Nyeri	0.29	22	1.43	1.14
Kirinyaga	0.23	37	1.25	1.02
Murang'a	0.28	26	1.24	0.96
Kiambu	0.26	30	1.57	1.31
Turkana	0.09	44	0.17	0.08
West Pokot	0.23	36	0.50	0.27
Samburu	0.20	39	0.42	0.22
Trans Nzoia	0.25	33	1.20	0.95
Uasin Gishu	0.35	10	1.41	1.06
Elgeyo Marakwet	0.50	1	1.25	0.75
Nandi	0.32	14	1.18	0.86
Baringo	0.39	4	1.05	0.66
Laikipia	0.26	32	1.20	0.95
Nakuru	0.30	17	1.38	1.08
Narok	0.29	21	0.82	0.53
Kajiado	0.28	24	1.28	0.99
Kericho	0.36	7	1.30	0.94
Bomet	0.37	5	1.22	0.85
Kakamega	0.26	31	1.12	0.86
Vihiga	0.30	18	1.17	0.87
Bungoma	0.20	38	1.25	1.04
Busia	0.29	23	1.04	0.75
Siaya	0.36	9	1.11	0.76
Kisumu	0.33	12	1.34	1.01
Homa Bay	0.34	11	1.15	0.80
Migori	0.31	15	1.09	0.78
Kisii	0.41	2	1.35	0.94
Nyamira	0.40	3	1.41	1.01
KENYA	**0.31**	**–**	**1.21**	**0.90**

Abbreviations: 35+ = 35 or older

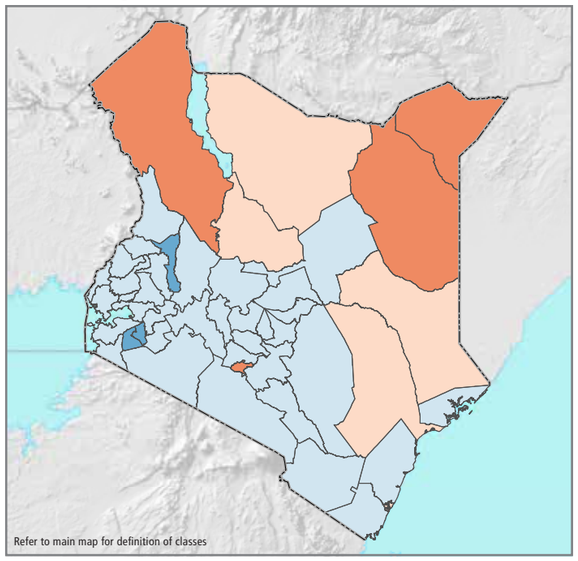
Data Source

2009 Kenya Population and Housing Census (Variable P41: Education Level Completed), Kenya National Bureau of Statistics.

6.08 Rural–Urban Distribution of Education Difference Classes



6.08 Average Education Difference at County Level

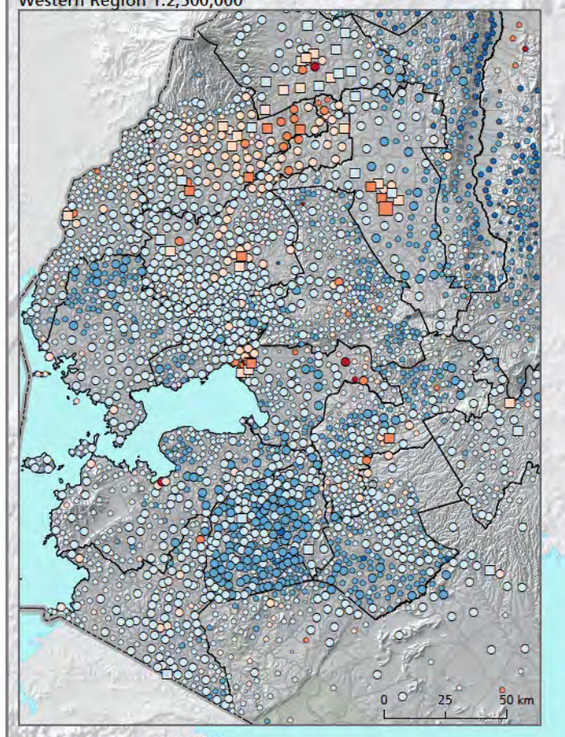


Education

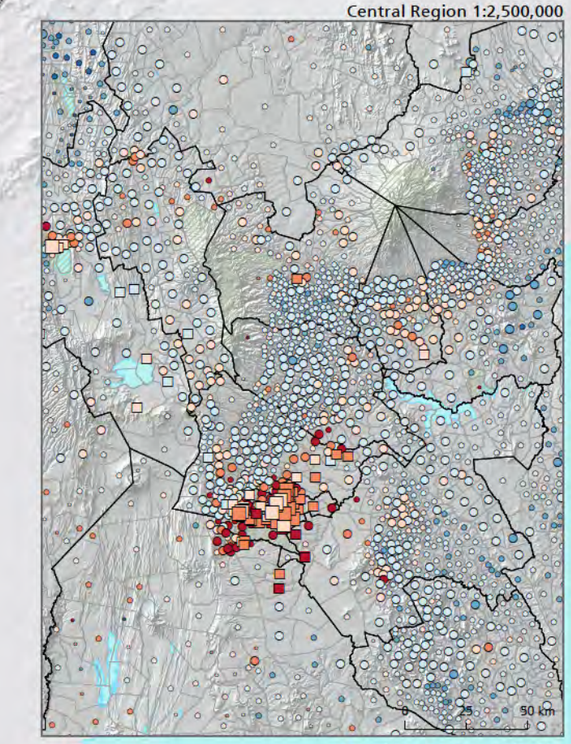
6.08 Age Group Differences in Education Levels

Republic of Kenya 1:4,000,000

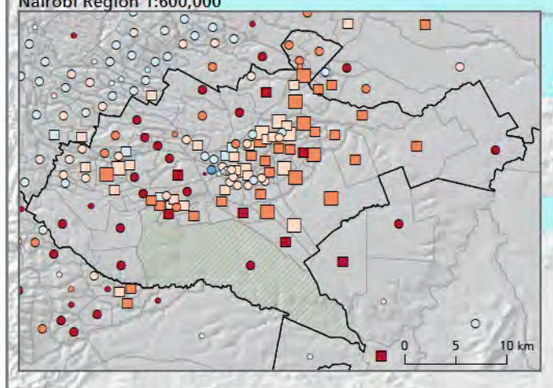
Western Region 1:2,500,000



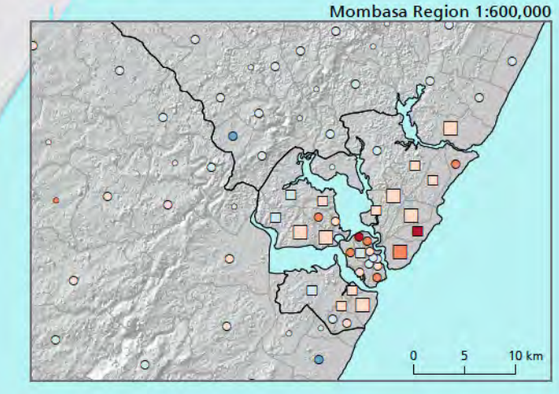
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Education difference classes: Difference in education level index between people aged 25–34 and people aged 35 or older (positive value means younger generation has higher index)

- Negative difference (below 0.0)
- Virtually no difference (0.0–0.1)
- Small difference (0.1–0.2)
- Medium difference (0.2–0.4)
- Large difference (0.4–0.6)
- Very large difference (above 0.6)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

0 25 50 100 150 200 km

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6.09 Gender Differences in Education Levels

The previous maps illustrated adults' average education levels and possible change over time. In this map, the focus shifts to a gender perspective on adults' education levels. Equal career opportunities for men and women greatly depend on equal chances in education. Not only is equality of opportunity important for its own sake, it is also crucial for socio-economic development because it strengthens the human resource base, especially during the transition to a modern service and knowledge society/economy.

To identify gender differences in education levels, the education level index presented in map 6.07 was calculated separately for men and women aged 25 years or older in each sub-location. The difference between the resulting gender-based indices is displayed in the present map.

At the national level, the difference between men's (1.15) and women's (0.92) average education level is 0.23. This means that, on average, men aged 25 or older have a higher formal education than women. The calculated difference is considerable, as may be illustrated by a simple example: for every five men who have completed primary education, only four of five women will have completed primary education while the fifth woman will have no formal education at all. Thus, gender disparities in education remain an important issue in Kenya, meriting continued national development efforts.

However, as seen in map 6.09, gender disparities in adults' education levels are not the same everywhere. Surprisingly, e.g. the arid and semi-arid counties of Mandera, Turkana, and Wajir display the least disparity between men's and women's education levels (index differences ranging between 0.08 and 0.10). Unfortunately, this has less to do with equality of opportunity and more to do with very low education levels among both women and men in these areas (index differences ranging between 0.10 and 0.12). By contrast, if one focuses on the places in the region where high education levels are concentrated – e.g. Lodwar, Wajir town, or Moyale – gender disparities in education are very evident. Thus, gender sensitivity remains crucial in education efforts located in arid and semi-arid areas.

As seen in map 6.07, a distinct rural–urban divide is visible in adults' education levels overall. This divide is less prominent with regard to levels of gender disparity in education, although the classes indicating greater equality are slightly more prevalent in urban settings. Also interesting to note are those relatively few sub-locations where women's average education levels are higher than men's. They are primarily found in the vicinity of Nairobi, possibly indicating selective immigration of well-educated women seeking jobs in the capital city's growing tertiary sector.

In addition to the patterns seen in arid and semi-arid areas and the slight rural–urban difference, map 6.09 and the county table reveal distinct clusters of gender disparity (or relative equality) in education. In central Kenya and certain parts of western Kenya – such as Nandi, Vihiga, and Uasin Gishu – disparities are below the national average, i.e. the educational gap between women and men is quite narrow here. However, in the coastal region, on the outskirts of Kenya's arid and semi-arid areas, and in large parts of western Kenya, disparities are above the national average, with Migori (index difference of 0.32), Kwale (0.35), and especially Kilifi (0.44) showing the greatest difference in men's and women's education levels.

To some extent, these differences may be attributed to sociocultural diversity in the country. However, deeper analysis reveals that the most pronounced levels of disparity are found in those regions where adults' education levels have shown the greatest increase overall (see map 6.08). This suggests that major increases in adults' education levels may initially favour men, with women experiencing gains (and possibly catching up) afterwards. The regional differences described above can therefore be interpreted as different stages in a time-dependent process.

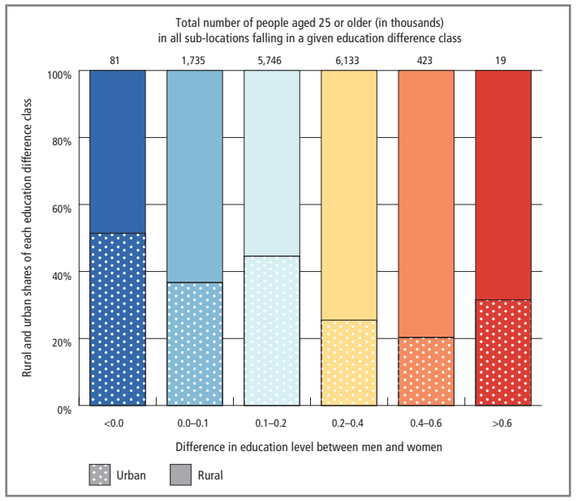
Indeed, a gender-differentiated view of change in adults' education levels (see map 6.08) shows that the rate of increase is significantly greater among women than among men. In other words, women are gradually catching up with men in terms of their levels of education, promising to narrow gender disparities in the future for the benefit of the nation and in accordance with Kenya's new Constitution.

County	Difference in education level index between men and women	Rank	Education level index of men	Education level index of women
Nairobi	0.11	4	1.72	1.62
Mombasa	0.22	28	1.46	1.25
Kwale	0.35	46	0.83	0.47
Kilifi	0.44	47	0.95	0.51
Tana River	0.26	35	0.56	0.30
Lamu	0.28	38	0.88	0.60
Taita Taveta	0.23	30	1.12	0.89
Garissa	0.15	7	0.25	0.10
Wajir	0.10	3	0.16	0.06
Mandera	0.08	1	0.14	0.06
Marsabit	0.17	13	0.29	0.12
Isiolo	0.28	36	0.70	0.43
Meru	0.13	5	0.95	0.82
Tharaka Nithi	0.14	6	1.02	0.88
Embu	0.15	8	1.13	0.98
Kitui	0.22	27	0.91	0.69
Machakos	0.22	26	1.26	1.04
Makueni	0.20	20	1.09	0.89
Nyandarua	0.19	16	1.19	1.00
Nyeri	0.17	12	1.33	1.16
Kirinyaga	0.18	15	1.21	1.02
Murang'a	0.20	21	1.16	0.96
Kiambu	0.18	14	1.51	1.34
Turkana	0.09	2	0.17	0.08
West Pokot	0.21	22	0.48	0.28
Samburu	0.23	29	0.42	0.19
Trans Nzoia	0.21	25	1.17	0.96
Uasin Gishu	0.17	10	1.30	1.14
Elgeyo Marakwet	0.19	17	1.05	0.86
Nandi	0.17	11	1.07	0.91
Baringo	0.20	19	0.92	0.72
Laikipia	0.21	23	1.16	0.95
Nakuru	0.21	24	1.32	1.11
Narok	0.29	39	0.81	0.51
Kajiado	0.25	34	1.26	1.01
Kericho	0.25	33	1.22	0.97
Bomet	0.30	40	1.17	0.86
Kakamega	0.19	18	1.07	0.88
Vihiga	0.16	9	1.05	0.89
Bungoma	0.25	32	1.26	1.01
Busia	0.32	41	1.04	0.72
Siaya	0.32	44	1.07	0.74
Kisumu	0.32	42	1.33	1.00
Homa Bay	0.33	45	1.13	0.80
Migori	0.32	43	1.09	0.77
Kisii	0.28	37	1.26	0.98
Nyamira	0.24	31	1.30	1.06
KENYA	**0.23**	**–**	**1.15**	**0.92**

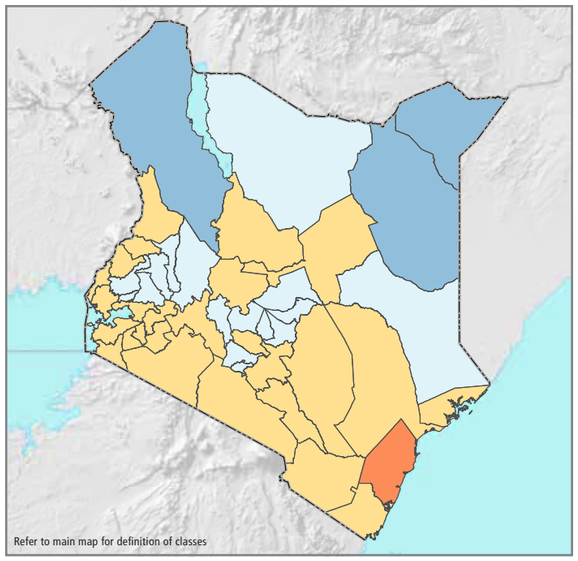
Data Source

2009 Kenya Population and Housing Census (Variable P41: Education Level Completed), Kenya National Bureau of Statistics.

6.09 Rural–Urban Distribution of Education Difference Classes



6.09 Average Education Difference at County Level



Education

6.09 Gender Differences in Education Levels

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

Education difference classes: Difference in education level index between men and women (positive value means men have higher index)

- Negative difference (below 0.0)
- Virtually no difference (0.0–0.1)
- Small difference (0.1–0.2)
- Medium difference (0.2–0.4)
- Large difference (0.4–0.6)
- Very large difference (above 0.6)

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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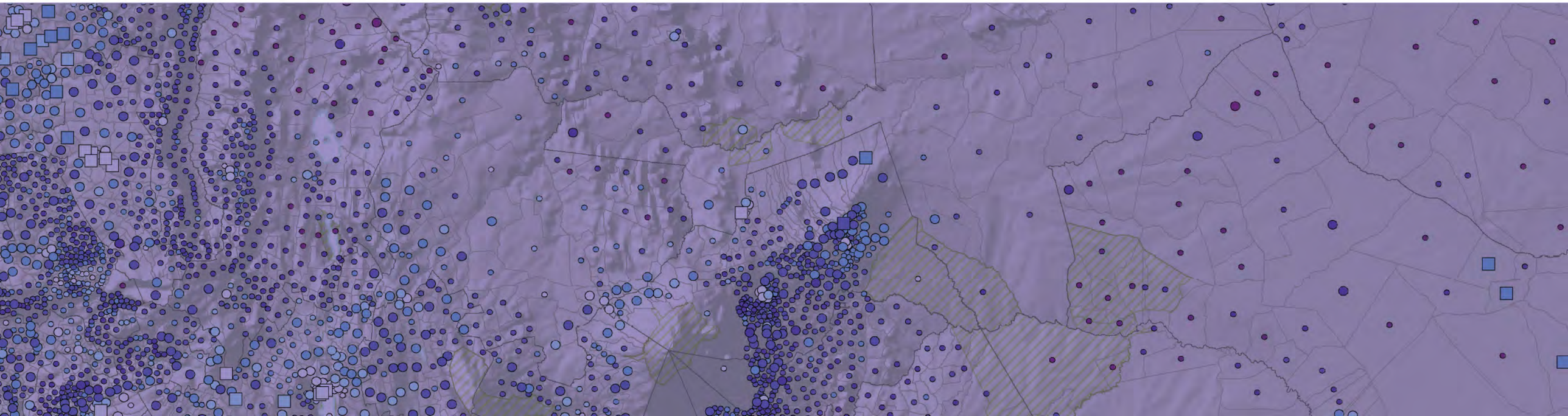
7

Economic Activities



Introduction

In this chapter, the focus shifts to the economic activities of the Kenyan population. Previous chapters presented impacts of these activities in terms of welfare and poverty distribution (chapter 5), the resulting material basis of people's livelihoods (chapters 3 and 4), and the education system as well as education levels that enable these activities (chapter 6). While this chapter does not present an analysis of the country's economy or private enterprises, by focusing on Kenya's economic activities, it does provide some reflection of the national economy. This perspective sheds light on issues such as how major economic sectors contribute to employment and income generation, and the degree of economic participation or exclusion of different regions of the country and of different segments of the population, including based on their gender.

Kenya's labour force, which is comprised of all 15- to 64-year-olds, is at the core of this chapter's analysis. Economic activities by these individuals are defined as involving the production and distribution of goods and services at all levels, with the purpose of earning income. The economic activities presented in this chapter are derived from the *2009 Kenya Population and Housing Census*, which defines three broad categories: (1) small-scale and pastoral activities, (2) the informal sector, and (3) the formal sector. People active in these sectors comprise the employed labour force of 14.3 million, which rises to an active labour force of 15.7 million when combined with the number of unemployed people seeking work. The total labour force of 20.5 million includes all 15- to 64-year-olds, encompassing both the active labour force and economically inactive people. The box on this page provides additional background on these categorizations within the labour force.

The chapter's first four maps focus on the employed labour force and examine its engagement in small-scale agriculture and pastoral activities, the informal sector, and the formal sector. The proportion of employment in each of these sectors is based on a question in the 2009 census about the respondent's main place of employment or self-employment. This does not exclude the possibility of a person also being partly employed in another sector, but this would not appear in the respective employment levels in each sector. Therefore a map on household ownership of livestock is included in the first part of this chapter, making it possible to establish whether or not a broader portion of the population is still engaged in agriculture, albeit no longer as a primary occupation.

Map 7.01 displays the proportion of the employed labour force that is primarily engaged in small-scale agriculture and pastoral activities. It reveals that 4.7 million people (33%) are employed in this sector. This rate is unexpectedly low, and its spatial distribution hints at two trends that may become dominant in the future. The first is a trend towards professionalization and specialization, especially in parts of high-potential areas, and the second trend is towards engaging in small-scale agriculture and pastoralism as a secondary occupation across much of the rest of the country.

Map 7.02 focuses on the same sector as map 7.01, and displays the proportion of households owning livestock. The finding that a high rate of 46% of all households own livestock indicates that significantly more Kenyan households are linked to the agriculture and livestock sector than the employment rate of 33% suggests. The spatial distribution supports the emerging trends suggested by map 7.01.

Map 7.03 displays the employment rate in the informal sector and shows that this sector has grown to be the largest in the country, involving 6.3 million, or 44% of the employed labour force. The map highlights this sector's crucial function in providing goods and services across the country, and shows how substantially it complements the formal sector; at the same time, the map also reveals that the informal sector's strong performance may mask structural weaknesses in Kenya's economy.

Map 7.04 shows the distribution of the formal sector, which only absorbs 3.3 million people, or 23% of the employed labour force. This illustrates how the sector is largely confined to urban settings – comprised primarily of just a few sectors like agribusiness and tourism – and exhibits tendencies towards spatial and social segregation from the rest of Kenya's economy.

The second set of four maps deals with the proportions of unemployed and economically inactive people, as well as the different levels of participation by men and women in economic activities, in order to identify further critical points and potential within Kenya's labour force and economy.

Map 7.05 displays the proportion of unemployed people in the active labour force (see box), which stands at almost 10% or 1.5 million people. It shows large differences across the country, resulting from varying combinations and absorption capacities of the three sectors. This may indicate structural problems in the interplay of the sectors.

Map 7.06 shows that 4.7 million (23%) of the total labour force of 20.5 million 15- to 64-year-olds are economically inactive, including 2.7 million who are full-time students. The proportion of economically inactive people who are not students reveals structural problems in parts of the country, while the total number of economically inactive people creates a heavy economic burden on the economically active population.

Maps 7.07 and *7.08* show the respective levels of male and female participation in economic activities. Not only is there considerable difference in the participation rate (see box) of men (82%) and women (72%), but the female rate also shows higher variation across the different regions. In addition, economic activities in the urban settings that host most of the formal sector and act as economic hubs of the country are still largely dominated by men. Differences between male and female participation in economic activities therefore include both quantitative and qualitative dimensions.

The maps in this chapter collectively illustrate Kenya's economic transition from a country dominated by agrarian activities to a modern economy that integrates the agrarian sector and develops the manufacturing and service sectors in view of Kenya's *Vision 2030*. The chapter points to a range of challenges stemming from this transition and relating to aspects of economic, social, and spatial integration, participation, and exclusion. At the same time, it reveals significant potentials to be promoted and tapped, in particular in relation to the labour force. The interplay between the different parts of the country and the nation at large will be crucial to mastering the challenges and tapping the potentials in this economic and social transition process. The modern Kenyan Constitution of 2010 lays the foundation for successfully managing this interplay and process.

Definitions and Indicators Used in This Chapter

(A) *Labour force categories*
The *total labour force* includes all people in the working-age group of 15- to 64-year-olds (20.5 million).

The *active labour force* is the total labour force minus economically inactive people (15.7 million).

The *employed labour force* is the active labour force minus unemployed people (14.3 million). All people in this category are employed in one of the three sectors described below.

(B) *Three economic sectors* *(based on 2009 census)*
The *small-scale agriculture and pastoralism sector* includes families and households working in agriculture and pastoralism.

The *informal sector* includes all small-scale economic activities that produce and provide goods and services, and which are semi-organized, unregulated, and use basic technologies. In Kenya, this is popularly known as the *jua kali sector*.

The *formal sector* comprises enterprises in the public and private sectors that are legally established or listed with the registrar of companies. Large-scale agriculture and ranching activities are included in this sector.

(C) *Employment rates*
The percentage *employment rate*s for each of the three sectors are calculated as the number of people primarily employed in each respective sector divided by the employed labour force. Even if active in several sectors, each individual is only counted within the sector of their primary employment. The employment rates of the three sectors therefore total 100%.

(D) *Unemployed people*
Unemployed people are those who, during the one-week reference period of the 2009 census, did not do any work and did not have a job or a business to return to. They did, however, indicate they were available for a job, irrespective of whether they had taken steps to look for one. The rate of unemployed people is calculated as this group's percentage of the active labour force.

(E) *Economically inactive people*
Economically inactive people are all 15- to 64-year-olds who are neither working for an income, nor available or looking for such work. The *rate of economically inactive people* is calculated as this group's percentage of the total labour force. This group is mainly comprised of *four categories*: homemakers, full-time students, retired people, and people with disabilities.

(F) *Male and female economic participation rates*
Economic participation rates are calculated as a percentage by dividing the male or female active labour force by the respective male or female total labour force.

(G) *Livestock ownership*
The *number of households owning livestock* is used as a proxy for involvement in the agrarian sector. As sole ownership of chickens does not serve as an effective proxy, households owning no livestock other than chickens were excluded.

Content

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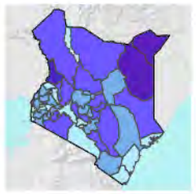

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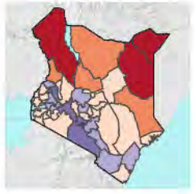

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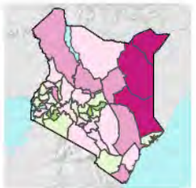

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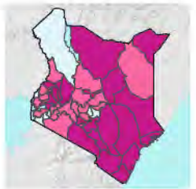

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7.01 Small-Scale Agriculture and Pastoral Activities

Small-scale agriculture and pastoralism are important sources of subsistence and employment – including self-employment – in countries like Kenya with largely rural populations. Such activities account for a major proportion of agricultural production, which in turn supports an agro-based manufacturing sector and contributes significantly to Kenya's gross domestic product.

This map shows the proportion of the employed labour force that is primarily engaged in small-scale agriculture and pastoral activities. In Kenya, this constitutes about 4.7 million people, or one-third of the employed labour force. Although the two activities are distinctly different, the census does not differentiate between small-scale agriculture and pastoral activities. By consulting maps 1.06 and 1.07 on agroecological zones and dominant land cover, however, it is possible to broadly identify where the two different activities are being practised.

The finding that no more than 33% of the employed labour force are engaged in these activities is somewhat unexpected and contradicts the statement made in the introductory paragraph. A picture of a changing economy emerges, one in which hitherto invisible economic activities, e.g. those in the informal sector, are gaining prominence and are gradually replacing small-scale agriculture and pastoralism. It must, however, be noted that the 2009 census asked about the primary employment sector. This means that a larger share of the employed labour force may still be engaged agriculture, but that this no longer constitutes their primary type of employment. A strong indication for this can be found in map 7.02, which illustrates livestock ownership distributions. These observations support the postulated gradual change and may also point to changing perceptions and valuations attributed to the three sectors.

Small-scale agriculture is found across the central and western highlands, and spreads into the semi-arid areas at the fringes of the highlands, particularly to the north and east. This land use type also dominates the Taita Hills, Kenya's coast and its hinterland, as well as areas along the Tana River. As the county table shows, in these zones, the highest values are found in Nyandarua, Nyamira, Busia, and Kisii (all above 50%), and the lowest values in Uasin Gishu, Kitui, and Machakos (all below 20%). However, these values are not very explanatory of the state of small-scale agriculture, as they are distorted by the share of urban population, or of large-scale agricultural activities that are accounted for in the formal sector (see map 7.04). Map 7.01 is more useful here as it shows the small-scale agriculture employment rates at the sub-location level. It illustrates that in most of the purely rural settings of the high-potential areas of central and western Kenya, rates are high with values above 50% or even 75%. At the same time, a drop in rates can be observed when moving from high-potential to semi-arid zones, e.g. east of the highlands or in the hinterland of the coast. These observations may be an indication, on the one hand, of professionalization of small-scale agriculture in the highlands, and, on the other hand, of farming transforming into a secondary source of employment in harsher environments. Although further evidence is needed to substantiate this conclusion, it would have far-reaching implications for agricultural policies and extension services.

Pastoral activities are concentrated within the country's vast semi-arid and arid regions. Rates for counties that are predominantly within the pastoralist zones show surprisingly low values of around 40 to 45% (see county table). As with small-scale agriculture in the semi-arid fringe zones, this may indicate transformation processes in the pastoralist communities of Kenya towards a diversification of economic activities.

Not surprisingly, the small-scale agriculture and pastoral sector is primarily confined to rural settings. However, the rural–urban graph shows that some people in urban settings are also engaged in this sector, albeit at lower rates. This captures the small-scale agricultural activities in and around rural trading centres, as well as urban, and particularly peri-urban, agriculture in the vicinity of main cities and municipalities. Peri-urban agriculture poses special planning and policy challenges when considering the fast growth of urban areas, the related high demand for agricultural products, and issues related to contamination of water and soils.

County	Perc. of empl. labour force in small-scale agr. and pastoralism	Rank	No. of people in small-scale agr. and pastoralism*	Employed labour force*
Nairobi	0.0%	47	0.0	1,481.7
Mombasa	1.7%	46	6.3	367.8
Kwale	39.4%	25	72.2	183.3
Kilifi	25.8%	39	85.6	331.5
Tana River	46.4%	11	32.8	70.7
Lamu	39.2%	27	15.4	39.4
Taita Taveta	35.6%	30	38.5	108.2
Garissa	26.7%	37	40.0	149.9
Wajir	44.5%	16	78.5	176.4
Mandera	40.4%	23	107.9	267.0
Marsabit	46.7%	10	47.1	100.7
Isiolo	31.9%	34	15.8	49.6
Meru	42.0%	20	242.1	576.1
Tharaka Nithi	49.4%	6	77.7	157.3
Embu	39.7%	24	93.2	234.9
Kitui	18.6%	43	56.1	302.0
Machakos	19.6%	42	76.4	389.2
Makueni	26.2%	38	66.5	253.6
Nyandarua	58.0%	1	140.6	242.2
Nyeri	41.0%	22	126.5	308.4
Kirinyaga	46.9%	9	127.5	272.1
Murang'a	48.8%	7	193.9	397.6
Kiambu	20.1%	41	140.8	698.9
Turkana	45.3%	14	150.5	332.1
West Pokot	39.2%	26	63.0	160.8
Samburu	45.9%	12	34.1	74.4
Trans Nzoia	35.4%	31	95.6	270.2
Uasin Gishu	16.5%	45	48.8	295.5
Elgeyo Marakwet	42.4%	17	49.7	117.2
Nandi	32.5%	33	88.4	272.4
Baringo	38.9%	28	65.1	167.4
Laikipia	31.8%	35	46.6	146.4
Nakuru	26.7%	36	165.2	618.5
Narok	41.8%	21	125.7	300.9
Kajiado	17.1%	44	41.0	239.7
Kericho	38.3%	29	116.4	304.3
Bomet	42.1%	19	119.2	283.1
Kakamega	42.2%	18	251.4	596.3
Vihiga	33.7%	32	60.5	179.6
Bungoma	47.5%	8	241.5	508.2
Busia	56.0%	3	154.2	275.5
Siaya	44.7%	15	138.1	308.6
Kisumu	20.4%	40	67.5	330.9
Homa Bay	45.4%	13	149.0	328.0
Migori	49.7%	5	163.3	328.5
Kisii	50.5%	4	229.0	453.1
Nyamira	57.2%	2	139.8	244.2
KENYA	**32.8%**	**–**	**4,685.0**	**14,294.2**

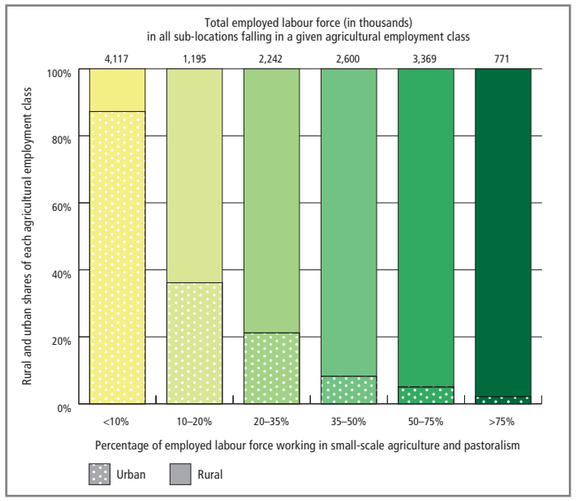
Abbreviations: perc. = percentage; empl. = employed; agr. = agriculture; no. = number

* in thousands

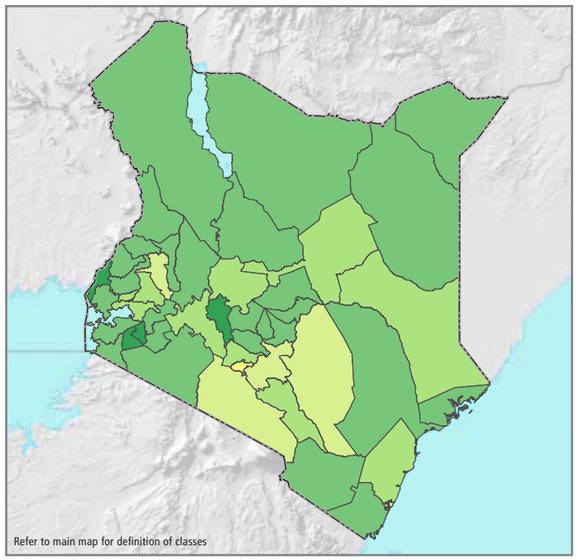
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.01 Rural–Urban Distribution of Agricultural Employment Classes



7.01 Average Agricultural Employment at County Level

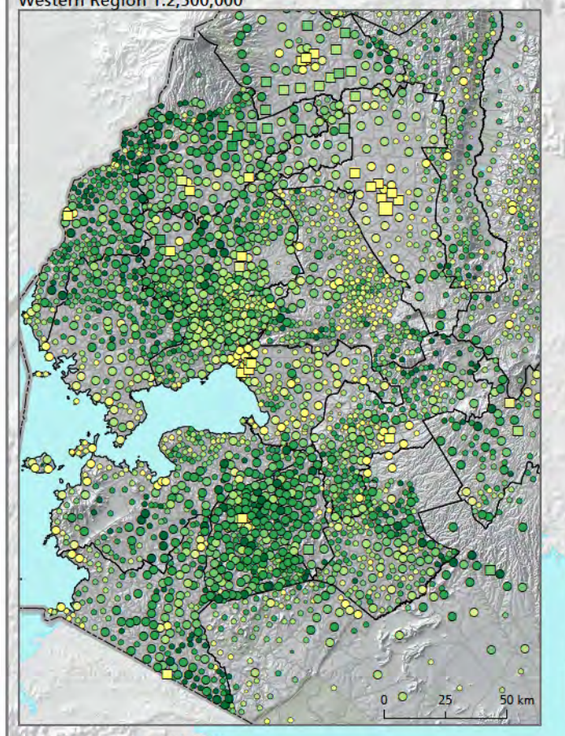


Economic Activities

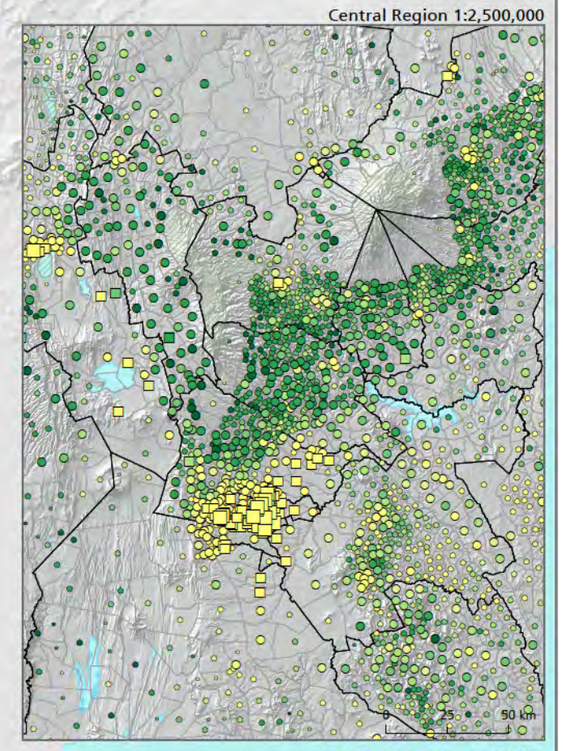
7.01 Small-Scale Agriculture and Pastoral Activities

Republic of Kenya 1:4,000,000

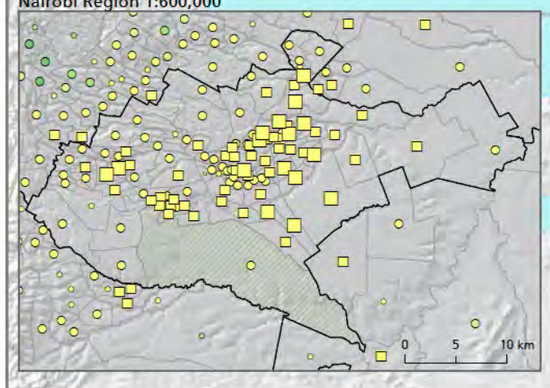
Western Region 1:2,500,000



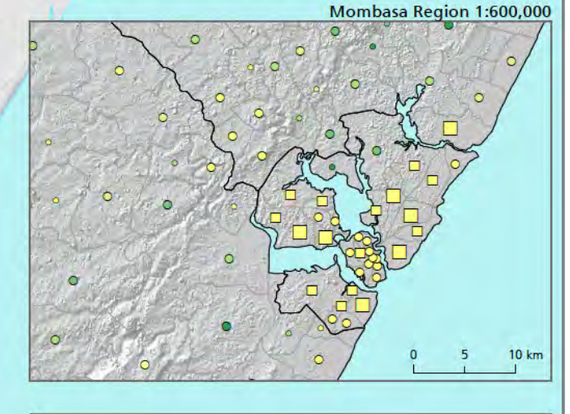
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Agricultural employment classes: Percentage of the employed labour force primarily working in small-scale agriculture and pastoralism

- Less than 10% of employed labour force
- 10 to 20% of employed labour force
- 20 to 35% of employed labour force
- 35 to 50% of employed labour force
- 50 to 75% of employed labour force
- More than 75% of employed labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.02 Households Owning Livestock

Livestock is an important component of national economic development in countries where the economic mainstay is largely agricultural. Besides being a direct source of income, wealth, and food, livestock also facilitates activities related to agricultural production, e.g. ploughing and transportation of water and fuelwood. Livestock holding and production is therefore considered an important economic activity in most parts of Kenya and is regarded as one of the major economic activities in the arid and semi-arid regions of the country.

The 2009 census found a total of about one hundred million animals including exotic and indigenous cattle (17% of all animals), sheep (17%), goats (27%), camels (3%), donkeys (2%), pigs (0.3%), beehives (2%), and indigenous and commercial chickens (32%). The results presented here do not, however, focus on livestock numbers, herd sizes, or herd composition, but rather show the proportion of all households that own livestock (other than chickens). The aim is to establish whether more households are still rooted in agriculture than is suggested by the 33% presented in map 7.01.

Overall, 4.1 million households, i.e. 46% of households in Kenya, own livestock and 3.1 million of these own cattle (see county table). Although employment and household figures are not directly comparable, the difference between the 33% employment rate and 46% livestock ownership indicates that significantly more Kenyan households are linked to the agriculture and livestock sector than is suggested by the primary employment rates in map 7.01.

The bulk of livestock production occurs in the vast low-potential arid and semi-arid areas that cover about 80% of Kenya (see map 1.06). It is therefore no coincidence that these areas also have the highest percentages of households owning livestock, with a regional average of 65% that far exceeds the national average, and where levels as high as 89% are recorded in individual counties such as Mandera. This highlights the significant potential of the arid and semi-arid lands to contribute to national economic development. However, many of these semi-arid and arid counties where over 75% of households own livestock also exhibit high poverty levels of 75% or more (see map 6.02). This is a sign that the livestock production system in these areas is not yet sufficiently mainstreamed into the national economy and remains vulnerable to risks such as droughts and livestock diseases. At the same time, this also shows that in these counties the difference between the employment rate in the sector (see map 7.01) and the proportion of households owning livestock is generally well above 30%, which implies that households remain linked to livestock production, but try to find primary employment in other sectors.

In the small-scale agriculture areas outlined in map 7.01, the proportion of households owning livestock was lower than in the pastoralist areas. The county values vary widely based on the size of the urban population, which explains e.g. the relatively low values for Kajiado, which is largely pastoralist, and Kiambu, which is dominated by small-scale agriculture. Many counties reach values well above 50% or even 70% (see county table), leading to two especially interesting observations. Firstly, in the two counties with the highest employment rates in the sector (Nyandarua and Nyamira – see map 7.01), there is minimal difference between the employment rate and the proportion of households owning livestock. At the same time, most households owning livestock include cattle in their herds (see county table). Similar observations can also be made for other areas in the high-potential highlands, which supports the trend suggested in map 7.01 that a professionalization and specialization in small-scale agriculture may be taking place in these areas. Secondly, very high percentages of households owning livestock can be found in semi-arid small-scale agriculture areas where the employment rate in the sector is low, as in Kitui, where the employment rate is 19% and the proportion of households owning livestock is 74%, but only 54% of these own cattle. This supports the assumption that households in these areas maintain their connections to agriculture, but diversify into other sectors, thereby making agriculture a supplementary source of income in their household strategies. These two trends pose significant challenges for effective agricultural policy and extension services.

With regard to livestock ownership in urban settings (see rural–urban graph), it is striking to note that there are quite a few urban areas where the proportion of livestock owners is above 20%, while in some areas it exceeds 40% or even 60%. This indicates that while the owners may reside in towns and be employed in other sectors, their livestock is located in rural areas. Policies related to livestock must therefore take such rural–urban linkages into account.

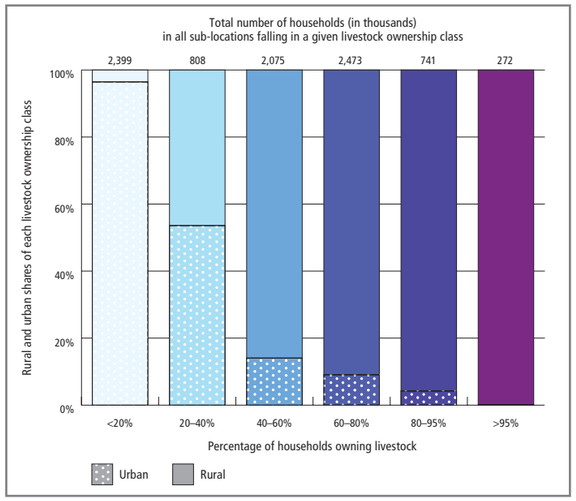
County	Percentage of households owning livestock	Rank	Number of households owning livestock*	Number of households owning cattle*
Nairobi	1.8%	47	17.4	8.3
Mombasa	2.1%	46	5.6	1.6
Kwale	37.8%	40	46.2	19.3
Kilifi	35.4%	43	70.8	28.9
Tana River	55.3%	27	26.2	13.3
Lamu	37.9%	38	8.4	2.4
Taita Taveta	47.3%	34	33.6	23.7
Garissa	64.1%	14	63.2	38.1
Wajir	86.9%	2	77.0	44.5
Mandera	88.5%	1	111.1	67.8
Marsabit	75.4%	5	42.9	23.9
Isiolo	51.2%	30	16.0	8.1
Meru	60.9%	17	194.6	158.9
Tharaka Nithi	71.7%	7	63.7	47.3
Embu	60.0%	19	79.0	57.7
Kitui	74.2%	6	152.4	82.1
Machakos	54.7%	28	144.7	101.1
Makueni	70.2%	9	131.0	89.3
Nyandarua	62.2%	16	89.5	79.3
Nyeri	55.9%	26	112.7	92.2
Kirinyaga	52.6%	29	81.1	66.1
Murang'a	63.9%	15	163.3	134.9
Kiambu	28.7%	45	134.7	109.5
Turkana	77.5%	4	95.5	41.1
West Pokot	80.9%	3	75.9	67.1
Samburu	69.3%	12	32.8	16.7
Trans Nzoia	38.5%	37	65.5	54.4
Uasin Gishu	37.6%	41	76.1	68.3
Elgeyo Marakwet	70.8%	8	54.9	44.0
Nandi	59.0%	21	90.9	86.4
Baringo	70.0%	10	77.4	57.6
Laikipia	45.8%	35	47.2	32.8
Nakuru	32.4%	44	132.8	101.4
Narok	66.8%	13	113.1	100.2
Kajiado	36.0%	42	62.5	42.9
Kericho	59.4%	20	93.7	90.2
Bomet	69.8%	11	100.9	97.3
Kakamega	50.2%	32	178.4	168.7
Vihiga	60.3%	18	74.4	74.1
Bungoma	50.2%	31	136.1	125.1
Busia	49.2%	33	75.9	53.1
Siaya	45.8%	36	91.1	72.7
Kisumu	37.9%	39	85.9	64.0
Homa Bay	57.9%	22	119.5	94.5
Migori	56.8%	24	102.4	91.7
Kisii	55.9%	25	136.9	131.3
Nyamira	56.9%	23	74.6	70.7
KENYA	**46.3%**	**–**	**4,059.8**	**3,144.8**

* in thousands

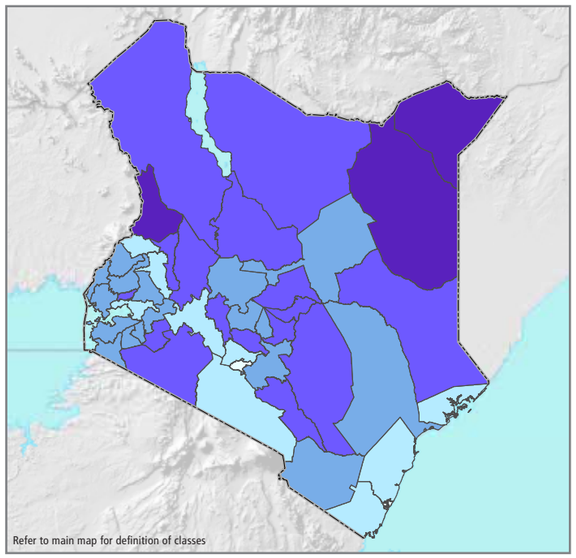
Data Source

2009 Kenya Population and Housing Census (Variable H17: Livestock), Kenya National Bureau of Statistics.

7.02 Rural–Urban Distribution of Livestock Ownership Classes



7.02 Average Livestock Ownership at County Level

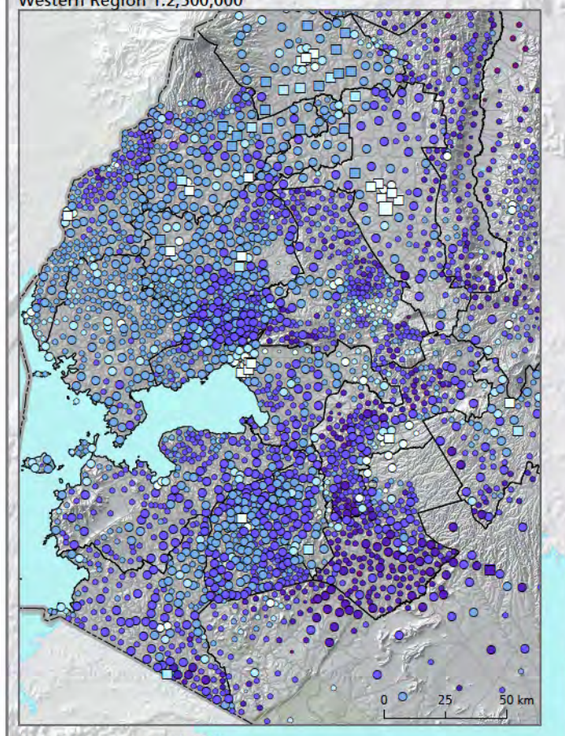


Economic Activities

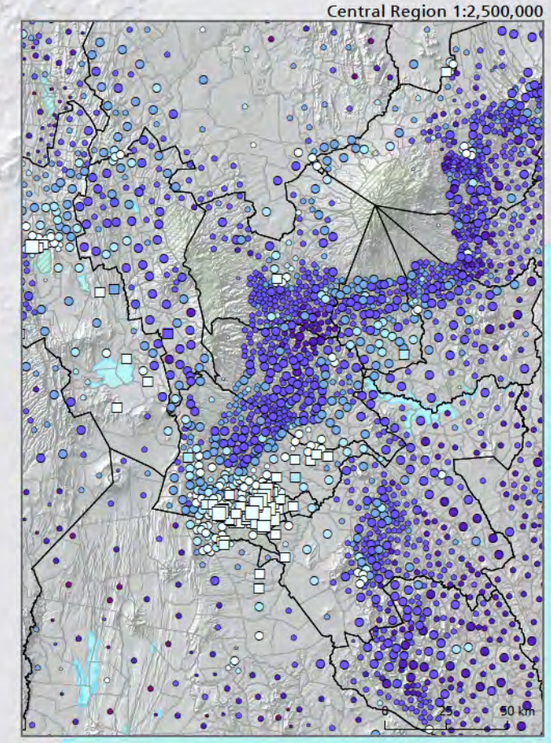
7.02 Households Owning Livestock

Republic of Kenya 1:4,000,000

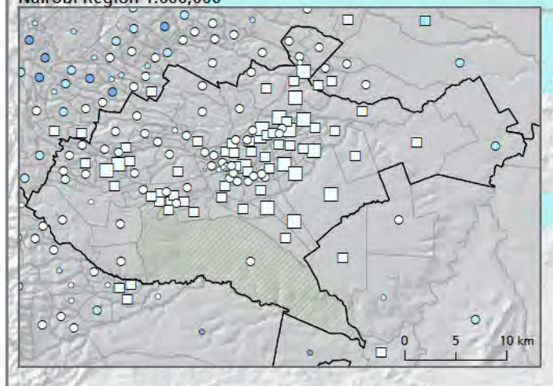
Western Region 1:2,500,000



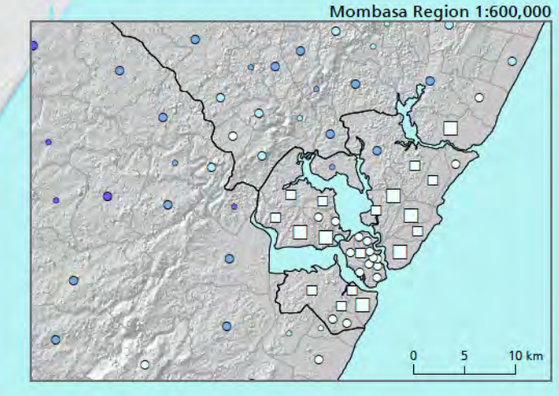
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Livestock ownership classes: Percentage of households owning livestock (cattle, sheep, goats, camels, donkeys, pigs, and bees)

- Less than 20% of households
- 20 to 40% of households
- 40 to 60% of households
- 60 to 80% of households
- 80 to 95% of households
- More than 95% of households

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.03 People Working in the Informal Sector

The informal sector continues to play an important role in the developing world, providing alternative employment opportunities to many rural and urban dwellers who miss out in the formal sector. In Kenya, the sector, also popularly known as *jua kali*, is defined to cover all small-scale activities that are semi-organized, unregulated, and use basic technologies. It plays an important complementary role to the modern economy by providing products and services not made available by the formal sector or which are unaffordable for the population concerned. It creates employment opportunities not only for young people who have left the education system, but also for the elderly who have exited the formal labour market. Map 7.03 shows the proportion of the employed labour force (see box in the introduction to this chapter) engaged in the informal sector in Kenya.

Overall the informal sector engages 44% of the employed labour force. This means that 6.3 million of the 14.3 million employed or self-employed people in Kenya are producing and providing goods and services in the informal sector. This high percentage signifies that it has clearly overtaken the previously discussed small-scale agriculture and pastoralist sector (see map 7.01), which employs 4.7 million people. At the same time, within the employed labour force, the informal sector employs twice as many people as the formal sector (see map 7.04), which employs 3.3 million people (23%). This means that a very large part of Kenya's labour force is employed in a sector that is semi-organized, largely unregulated, and characterized by poor job security and working conditions. At the same time, the high percentage indicates that the sector plays a key role in providing goods and services to Kenya's population.

The importance of the sector in creating employment and providing goods and services across the country is reflected in the fact that it is much more evenly distributed than the formal sector. Whereas county values for the formal sector vary by a factor of 13 (from 4% to 53%), the informal sector varies only by a factor of 2.4 (from 27% to 64%).

This considerable presence across the country reveals two sub-categories within the informal sector. On the one hand, there is the informal sector thriving in economically and socially marginalized and ecologically disadvantaged areas, where it represents the only alternative source of employment to small-scale agriculture and pastoral activities. On the other hand, the informal sector is also an integral part of economic activities in cities, urban areas, and high-potential rural settings, where it complements the goods and services provided by the formal sector. This distinction determines the nature of activities found in the sector in different geographical contexts.

The first sub-category is found in areas where small-scale agriculture and pastoral activities are still rooted, but have a reduced role in providing primary employment (see maps 7.01 and 7.02), and where the formal sector is marginal. These areas are mainly found in the semi-arid and arid parts of the country, where the informal sector reaches its highest values, e.g. in Garissa or Kitui (both 64%). The second sub-category is found in most parts of the highlands of central and western Kenya, as well as along the coastal belt. Lower values here are an average of 40%, and, interestingly, the two counties with the highest levels of small-scale agriculture employment, Nyandarua and Nyamira, have the lowest informal sector employment rates in the country (both below 30%). These observations suggest that in rural settings there is a reciprocating and substituting relationship between the quality strength of the agricultural and pastoralist sector and the size of the informal sector.

A closer look at the sub-location level on the main map, and in particular at the rural–urban distribution (see graph), reveals interesting and distinct patterns. While the high classes (above 65%) and low classes (below 35%) represent, respectively, the first and second sub-categories of the informal sector in rural settings mentioned above, urban sub-locations show a concentration in the two middle classes (between 35% and 65%). This indicates that the informal sector is an integral part of the economy here, complementing the goods and services of the formal sector to various degrees. However, there are also quite a few urban sub-locations that show high or very high rates of informal sector employment. These typically low-income or slum areas deserve special attention, because the complementary function to the formal sector is looser, and the possibility of supplementing employment with agriculture activities is hardly a given. A closer look at the enlarged inset map of Nairobi reveals that the complementary link between the formal and informal sectors may be endangered in the future by spatial and social segregation processes.

County	Percentage of empl. labour force in informal sector	Rank	Number of people in informal sector*	Employed labour force*
Nairobi	48.4%	13	716.5	1,481.7
Mombasa	45.6%	16	167.8	367.8
Kwale	41.0%	35	75.1	183.3
Kilifi	45.1%	19	149.5	331.5
Tana River	42.9%	29	30.3	70.7
Lamu	45.1%	18	17.8	39.4
Taita Taveta	43.4%	25	47.0	108.2
Garissa	63.7%	1	95.5	149.9
Wajir	51.5%	8	90.9	176.4
Mandera	54.7%	4	146.0	267.0
Marsabit	45.0%	20	45.4	100.7
Isiolo	49.8%	12	24.7	49.6
Meru	42.7%	31	246.1	576.1
Tharaka Nithi	37.0%	42	58.2	157.3
Embu	43.3%	26	101.8	234.9
Kitui	63.5%	2	191.9	302.0
Machakos	54.3%	5	211.1	389.2
Makueni	52.4%	7	132.8	253.6
Nyandarua	26.6%	47	64.5	242.2
Nyeri	37.2%	41	114.8	308.4
Kirinyaga	39.0%	38	106.0	272.1
Murang'a	34.5%	44	137.2	397.6
Kiambu	42.5%	32	297.1	698.9
Turkana	50.4%	11	167.4	332.1
West Pokot	53.1%	6	85.4	160.8
Samburu	44.7%	21	33.3	74.4
Trans Nzoia	42.3%	33	114.2	270.2
Uasin Gishu	51.1%	10	150.9	295.5
Elgeyo Marakwet	43.6%	24	51.1	117.2
Nandi	45.5%	17	123.9	272.4
Baringo	44.6%	22	74.7	167.4
Laikipia	42.8%	30	62.6	146.4
Nakuru	40.5%	37	250.7	618.5
Narok	46.2%	15	139.1	300.9
Kajiado	46.5%	14	111.3	239.7
Kericho	38.7%	39	117.9	304.3
Bomet	41.1%	34	116.5	283.1
Kakamega	43.2%	28	257.6	596.3
Vihiga	51.1%	9	91.8	179.6
Bungoma	41.0%	36	208.1	508.2
Busia	33.4%	45	92.1	275.5
Siaya	43.8%	23	135.2	308.6
Kisumu	55.2%	3	182.7	330.9
Homa Bay	43.2%	27	141.8	328.0
Migori	37.9%	40	124.4	328.5
Kisii	36.4%	43	164.8	453.1
Nyamira	29.8%	46	72.9	244.2
KENYA	**44.3%**	**–**	**6,338.3**	**14,294.2**

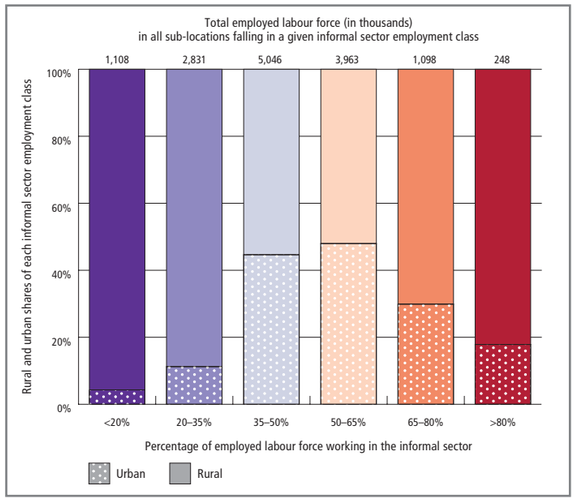
Abbreviation: empl. = employed

* in thousands

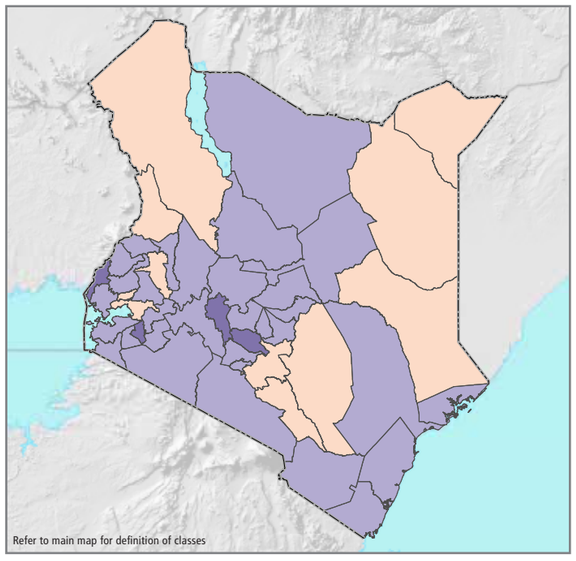
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.03 Rural–Urban Distribution of Informal Sector Employment Classes



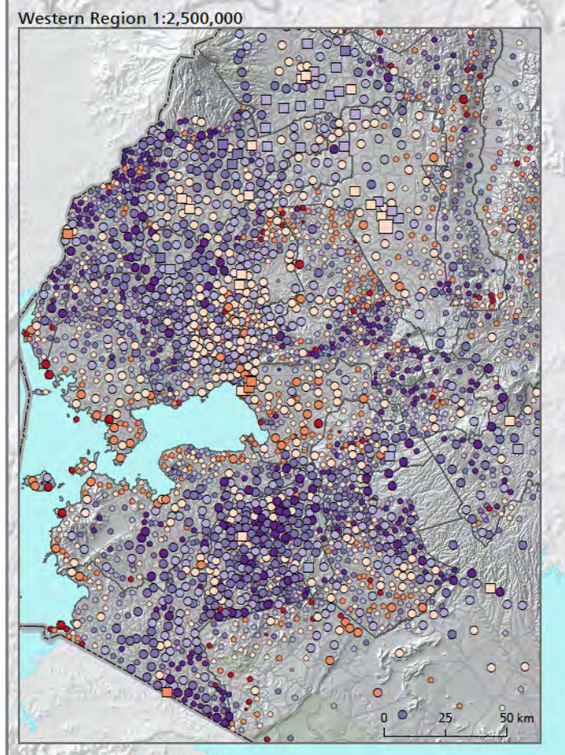
7.03 Average Informal Sector Employment at County Level

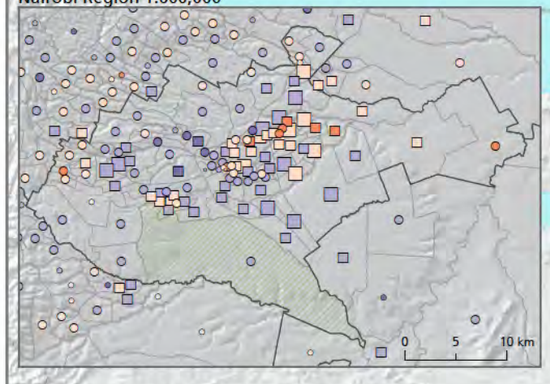


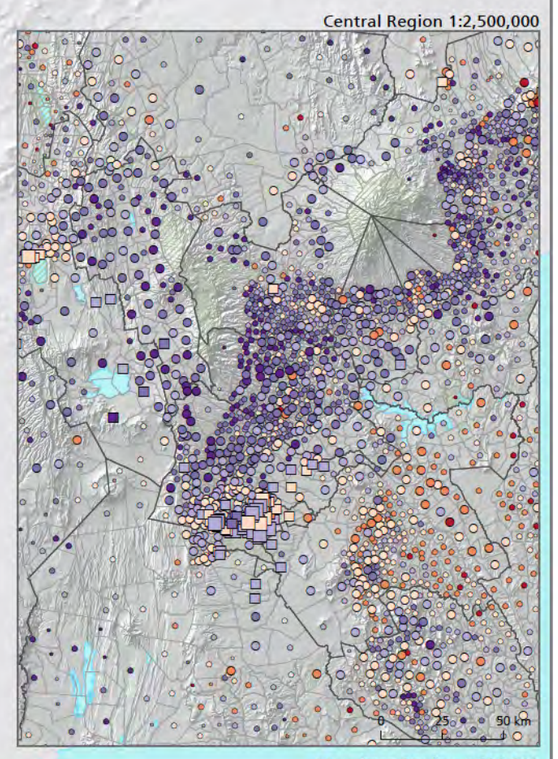
Economic Activities

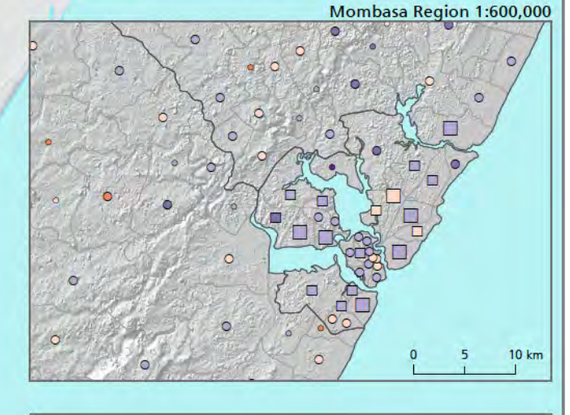
7.03 People Working in the Informal Sector

Republic of Kenya 1:4,000,000









Informal sector employment classes: Percentage of the employed labour force primarily working in the informal sector

- Less than 20% of employed labour force
- 20 to 35% of employed labour force
- 35 to 50% of employed labour force
- 50 to 65% of employed labour force
- 65 to 80% of employed labour force
- More than 80% of employed labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.04 People Working in the Formal Sector

The formal sector encompasses enterprises in the public and private sectors that have been legally established or are listed with the registrar of companies. This can include entities within the private sector, central and county governments, local and international non-governmental and faith-based organizations, as well as the modern sector of self-employment enterprises.

The present map depicts the proportion of the employed labour force working in the country's formal sector. At the national level, the formal sector absorbs only 3.3 million (23%) of the 14.3 million in the employed labour force, making it the smallest of the three sectors after small-scale agriculture and pastoral activities (33% – see map 7.01), and the informal sector (44% – see map 7.03). This low rate goes quite far in explaining the high rate of unemployment among young people, who prefer formal employment upon completion of higher formal education (see map 7.05 on unemployment and chapter 6 on education). Of the 3.3 million employed in the formal sector, private enterprises absorb over 60%, followed by the public sector with 22%. Another 6% work for non-governmental and faith-based organizations, while 9% are self-employed in the modern sector.

The formal sector strongly shapes the economic landscape of Kenya, as it is heavily concentrated in some areas, while virtually absent in other parts of the country. County values of the rate of employment in this sector therefore range from over 50% in Mombasa and Nairobi to below 5% in Turkana, Wajir, and Mandera. This stands in stark contrast to the informal sector (see map 7.03), which is much more evenly distributed, and once again emphasizes its importance in complementing the formal sector to provide goods, services, and employment across the country.

The main map clearly shows that the formal sector is largely an urban phenomenon. The highest concentration levels – especially those above 30% – are found in the cities of Nairobi and Mombasa, along the Nairobi–Nakuru–Eldoret corridor, as well as in other larger towns and the county headquarters. Interestingly, Nairobi, the capital and main economic hub of the country, shows slightly lower formal employment rates than Mombasa. This may be explained by the large number of labourers working in Nairobi but residing in the neighbouring dormitory and satellite towns of Kiambu, Ngong, Thika, Machakos, Kitengela, and Athi River. While these towns are situated in other counties, they belong to the greater Nairobi region. An additional explanation could be Nairobi's high rates of in-migration by people who are seeking employment in the formal sector, but have not yet found it (see map 2.04).

The rural–urban graph strongly confirms that the formal sector is mostly confined to urban settings. Nevertheless, there are a few areas in the high-potential agricultural areas of central and western Kenya that have formal employment rates above the national average. These are linked to the growing horticultural industry, other large-scale agricultural activities, and associated agro-based industrial establishments. The rest of the country, especially in the marginal areas, has very low formal sector employment levels. Kilifi is an interesting exception with its comparatively high proportion of people working in the formal sector despite high poverty levels. The main map reveals that the formal sector is concentrated right on the coast with its proximity to Mombasa and the large tourism sector, while poor sub-locations are found in the hinterland of the coast (see map 6.02).

The trend of formal sector employment being concentrated in larger urban settings is only broken to a small degree by large-scale agriculture and tourism, and remains a major challenge for the country. The extent and share of formal sector employment may be expanded by investments in infrastructure and by attracting new industries that provide formal employment, e.g. mining. But it will also be important to more closely link the formal and informal sectors and to lift enterprises from the informal to the formal sector by providing enabling conditions and incentives.

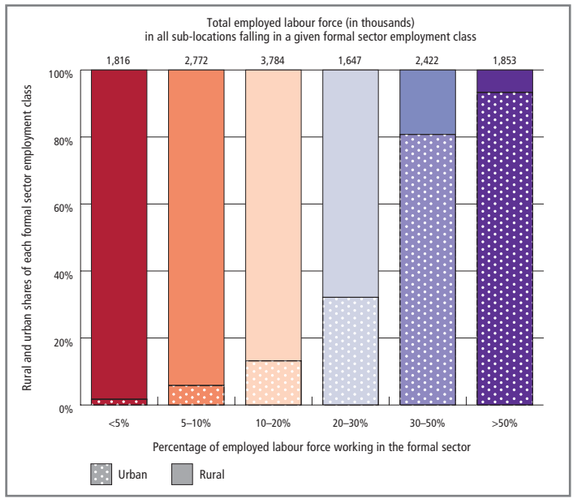
County	Percentage of employed labour force in formal sector	Rank	Number of people in formal sector*	Number of people in informal sector*
Nairobi	51.6%	2	765.1	716.5
Mombasa	52.7%	1	193.7	167.8
Kwale	19.6%	17	36.0	75.1
Kilifi	29.1%	7	96.5	149.5
Tana River	10.8%	39	7.6	30.3
Lamu	15.7%	24	6.2	17.8
Taita Taveta	21.0%	16	22.7	47.0
Garissa	9.6%	41	14.4	95.5
Wajir	4.0%	47	7.1	90.9
Mandera	4.9%	45	13.1	146.0
Marsabit	8.2%	43	8.3	45.4
Isiolo	18.4%	18	9.1	24.7
Meru	15.2%	26	87.8	246.1
Tharaka Nithi	13.6%	31	21.4	58.2
Embu	17.0%	20	40.0	101.8
Kitui	17.9%	19	54.1	191.9
Machakos	26.1%	8	101.7	211.1
Makueni	21.4%	15	54.3	132.8
Nyandarua	15.3%	25	37.1	64.5
Nyeri	21.7%	14	67.0	114.8
Kirinyaga	14.2%	29	38.6	106.0
Murang'a	16.7%	22	66.6	137.2
Kiambu	37.4%	3	261.1	297.1
Turkana	4.3%	46	14.2	167.4
West Pokot	7.7%	44	12.4	85.4
Samburu	9.4%	42	7.0	33.3
Trans Nzoia	22.4%	12	60.4	114.2
Uasin Gishu	32.4%	6	95.7	150.9
Elgeyo Marakwet	14.0%	30	16.4	51.1
Nandi	22.1%	13	60.1	123.9
Baringo	16.5%	23	27.6	74.7
Laikipia	25.4%	9	37.1	62.6
Nakuru	32.7%	5	202.5	250.7
Narok	12.0%	35	36.1	139.1
Kajiado	36.4%	4	87.3	111.3
Kericho	23.0%	11	69.9	117.9
Bomet	16.8%	21	47.4	116.5
Kakamega	14.6%	28	87.3	257.6
Vihiga	15.2%	27	27.3	91.8
Bungoma	11.5%	36	58.6	208.1
Busia	10.6%	40	29.2	92.1
Siaya	11.4%	37	35.3	135.2
Kisumu	24.4%	10	80.6	182.7
Homa Bay	11.3%	38	37.1	141.8
Migori	12.4%	34	40.8	124.4
Kisii	13.1%	32	59.2	164.8
Nyamira	12.9%	33	31.5	72.9
KENYA	**22.9%**	**–**	**3,270.8**	**6,338.3**

* in thousands

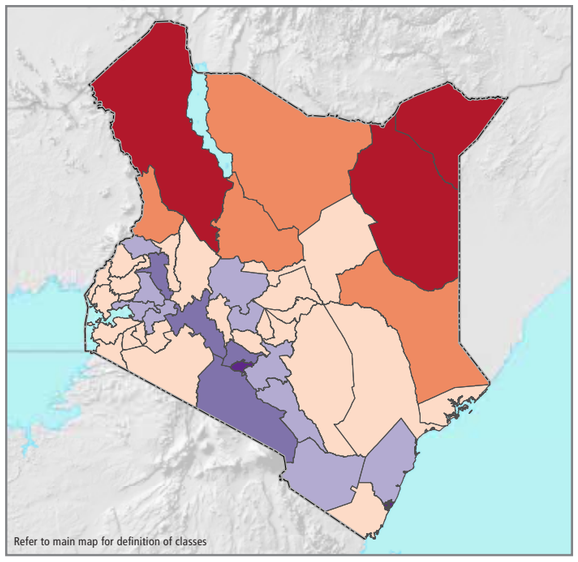
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.04 Rural–Urban Distribution of Formal Sector Employment Classes



7.04 Average Formal Sector Employment at County Level

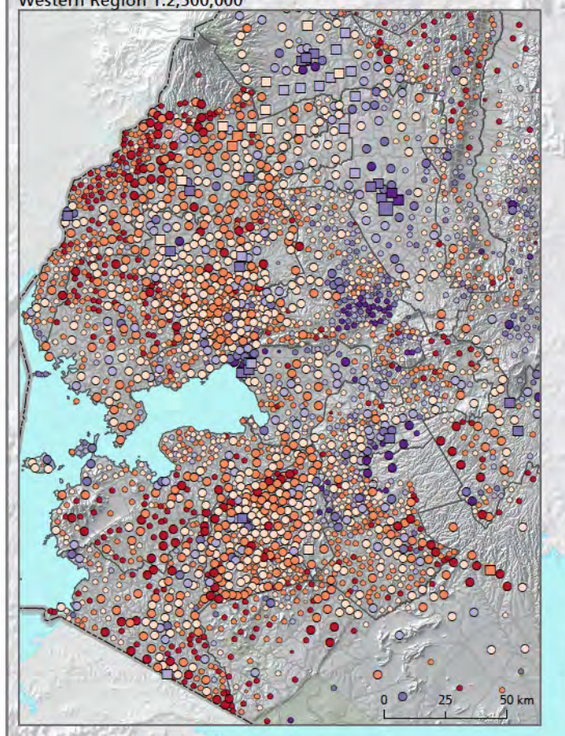


Economic Activities

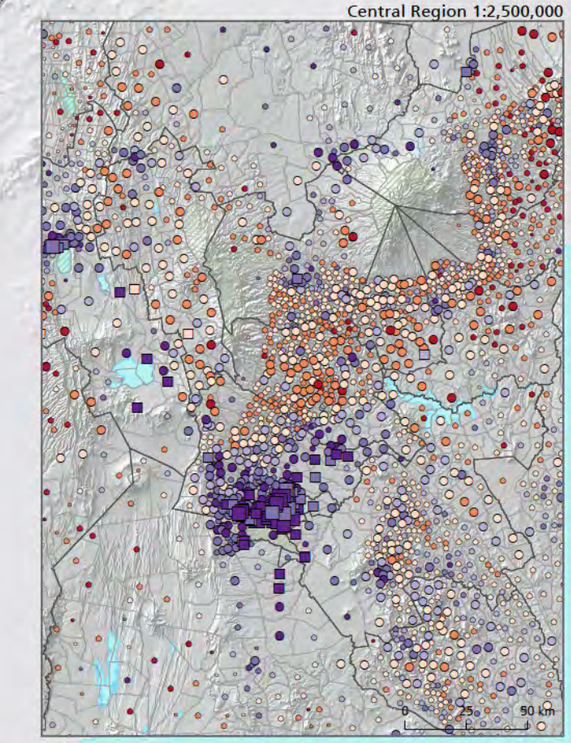
7.04 People Working in the Formal Sector

Republic of Kenya 1:4,000,000

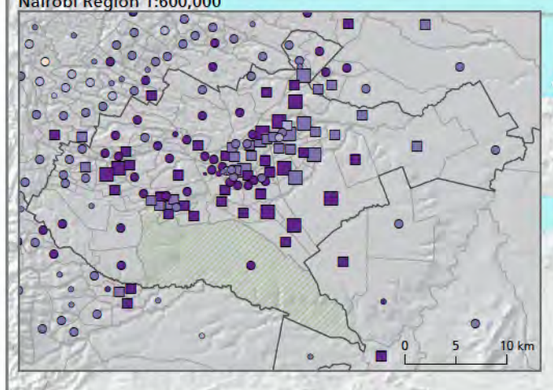
Western Region 1:2,500,000



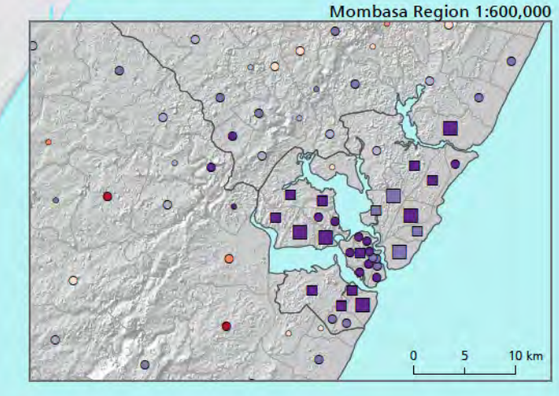
Central Region 1:2,500,000

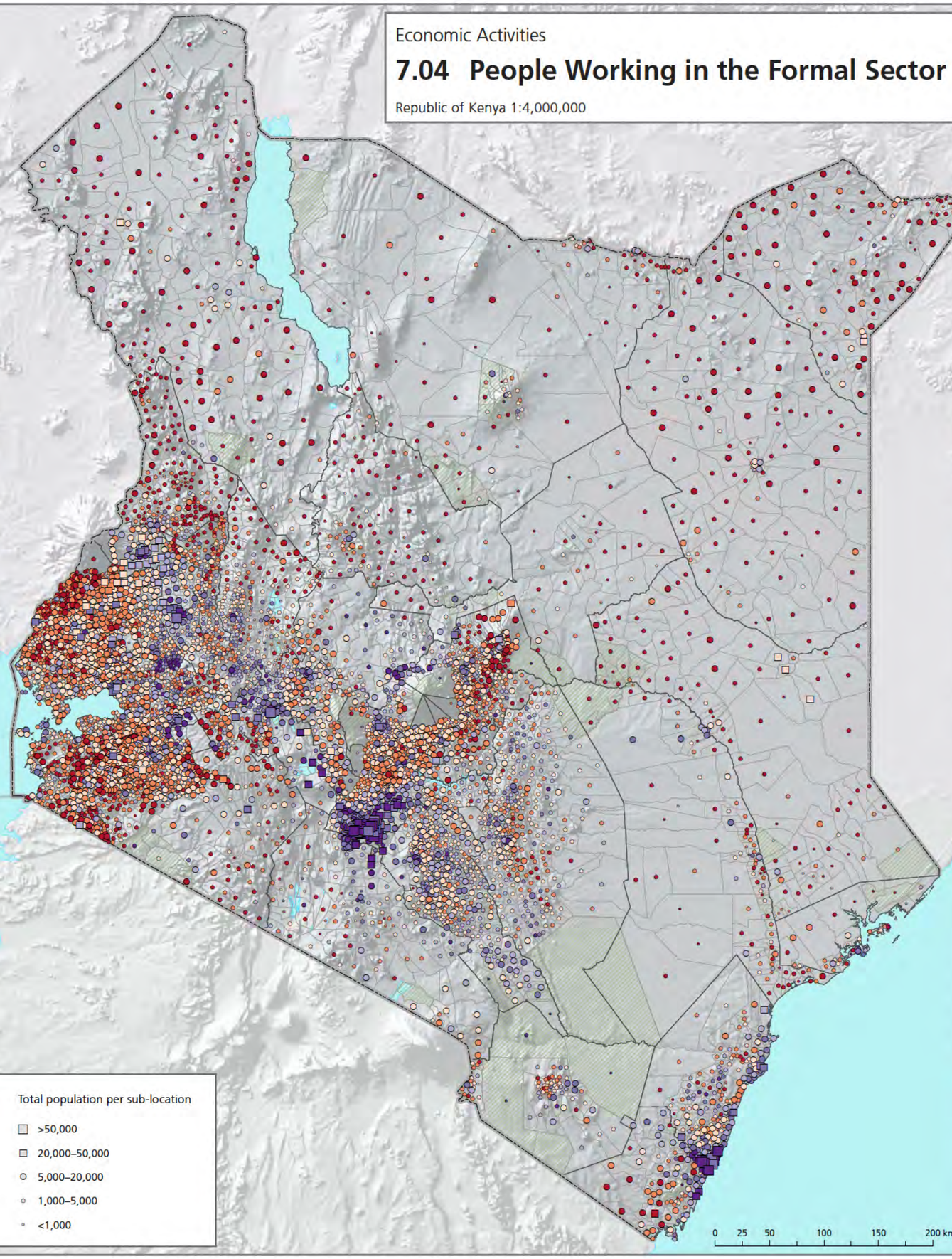


Nairobi Region 1:600,000



Mombasa Region 1:600,000





Formal sector employment classes: Percentage of the employed labour force primarily working in the formal sector

- Less than 5% of employed labour force
- 5 to 10% of employed labour force
- 10 to 20% of employed labour force
- 20 to 30% of employed labour force
- 30 to 50% of employed labour force
- More than 50% of employed labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.05 Unemployed People

Unemployment levels are an important indicator of the health of both developed and developing economies. Unemployment occurs when a person who is actively looking for a job fails to find one. A country's unemployment level is usually calculated as the number of unemployed people divided by the number of people in the labour force.

In Kenya, unemployment levels have been following an up-and-down trend, especially over the past decade, with the highest levels reaching about 40% in 2011/12. Those most affected by unemployment are young people entering the labour market directly from a variety of training institutions. They are targeting the formal sector, which has been clearly shown to be the smallest of the three sectors presented in this atlas in terms of job creation (see maps 7.01, 7.03, and 7.04). Unemployment among young people, if left unchecked, can be a serious barrier to national development, because it represents a failure to optimally engage one of the most productive segments of the available labour force, and can also be a major liability threatening the country's social and political stability.

This map shows the proportion of Kenya's active labour force of 15.7 million people (see box in the chapter's introduction) that is unemployed. Unemployment in this case is computed as the number of people who, in the week preceding the 2009 census, did not have a job, but were available for one, regardless of whether they had taken steps to find one. The figures presented here are therefore not directly comparable and are considerably lower than the conventionally known unemployment rate. They do not include or consider people looking for work, but meanwhile engaging in some activity in the agricultural or informal sectors, for which in many cases they may be overqualified.

Within the active labour force, 1.5 million people (9.7%) are unemployed, a low figure as described above compared with the conventionally known rate of up to 40%. This difference gives added insight into the informal sector, which was highlighted as the country's largest source of employment (see map 7.03). It means that the large informal sector is also in effect hiding unemployment and underemployment, while largely failing to generate productivity and earnings to meet the needs of the employed labour force.

Distinct patterns emerge based on regional differences. Firstly, the semi-arid and arid zones and counties show unsurprisingly high unemployment rates, with Garissa (38%), Wajir (27%), and Mandera (21%) being the most affected. At the sub-location level, similarly high values can be found across the semi-arid and arid areas, and most particularly in the drier regions dominated by small-scale agriculture, e.g. east and north of the highlands and in the hinterland of the coast. These are the regions where households are still rooted in traditional agriculture and pastoralism. Due to low productivity and high risks, they have needed to find employment in other sectors, and in these areas, the informal sector is virtually the only alternative (see maps 7.01 and 7.03). The high rates reflect the fact that the informal sector reaches its absorption capacity in areas of low population density and low purchasing power.

Secondly, there are low levels of unemployment in many parts of the largely rural, high-potential areas of central and western Kenya, with Nyamira (3%) recording the lowest levels, and many sub-locations with values below 4% or even 2%. These are regions where small-scale agriculture is becoming professionalized and specialized, and where population densities and purchasing powers enable a diversified informal sector.

Finally, the main map and the rural–urban graph show that in most urban areas unemployment rates are far above the national average. Located in the midst of arid and semi-arid counties, Mombasa and Nairobi are at the top of the unemployment rankings. Interestingly, these high rates are also found in the vicinity of most larger towns, e.g. in the Nakuru and Eldoret region. Several factors are playing a role here: the agricultural sector has limited absorption capacity, in-migration is high (see map 2.04) as people search for employment in the formal sector (see map 7.04), and education levels are markedly higher than in the rest of the country (see map 6.07), which reduces the possibility of assimilating into the informal sector.

Unemployment is therefore the result of varying combinations and absorption capacities of the three sectors – agriculture, informal, and formal – in different parts of the country. At the same time, unemployment can be interpreted as an indicator of larger hidden structural problems in the interplay of the three sectors.

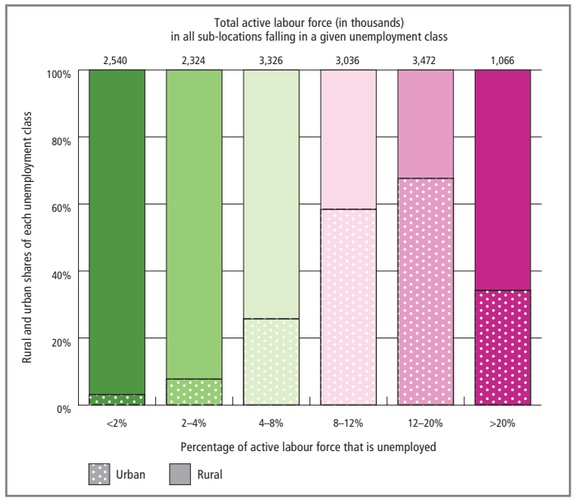
County	Percentage of unemployed in active labour force	Rank	Number of unemployed people*	Active labour force*
Nairobi	13.6%	6	232.4	1,710.6
Mombasa	17.3%	4	76.5	443.3
Kwale	13.3%	7	28.0	211.1
Kilifi	11.4%	13	42.6	373.2
Tana River	12.9%	9	10.4	80.7
Lamu	5.9%	31	2.5	42.0
Taita Taveta	7.6%	28	8.9	117.1
Garissa	38.0%	1	89.7	236.1
Wajir	27.1%	2	63.5	234.5
Mandera	20.9%	3	69.5	332.6
Marsabit	9.6%	21	10.6	109.8
Isiolo	12.3%	10	6.9	56.3
Meru	5.3%	34	32.3	607.9
Tharaka Nithi	3.5%	45	5.6	162.8
Embu	5.5%	32	13.6	248.5
Kitui	10.3%	18	34.4	333.6
Machakos	9.4%	23	40.2	429.7
Makueni	9.4%	22	26.4	279.8
Nyandarua	4.2%	42	10.6	252.8
Nyeri	5.3%	35	17.2	325.3
Kirinyaga	3.4%	46	9.5	281.5
Murang'a	5.1%	37	21.2	418.9
Kiambu	9.9%	20	76.6	775.3
Turkana	14.6%	5	54.6	373.9
West Pokot	8.8%	25	15.2	173.8
Samburu	12.1%	11	10.1	83.2
Trans Nzoia	9.2%	24	27.2	296.9
Uasin Gishu	13.1%	8	44.5	339.6
Elgeyo Marakwet	7.3%	29	9.2	126.2
Nandi	4.8%	38	13.7	285.8
Baringo	11.0%	14	20.6	186.9
Laikipia	10.8%	16	17.6	163.6
Nakuru	10.0%	19	68.3	685.7
Narok	4.2%	41	13.2	312.8
Kajiado	11.0%	15	29.3	267.7
Kericho	4.6%	39	14.6	318.7
Bomet	3.5%	44	10.1	292.8
Kakamega	7.6%	27	48.9	644.4
Vihiga	11.9%	12	24.3	203.8
Bungoma	4.4%	40	23.6	531.3
Busia	5.2%	36	14.9	289.9
Siaya	6.2%	30	20.5	328.4
Kisumu	10.8%	17	39.8	369.9
Homa Bay	8.2%	26	29.1	356.3
Migori	5.5%	33	18.9	346.8
Kisii	4.1%	43	19.3	472.1
Nyamira	3.1%	47	7.8	251.8
KENYA	**9.7%**	**–**	**1,524.6**	**15,765.4**

* in thousands

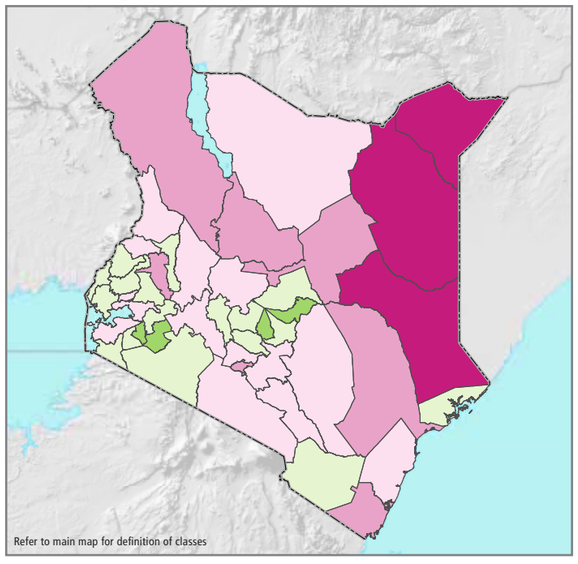
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.05 Rural–Urban Distribution of Unemployment Classes



7.05 Average Unemployment at County Level

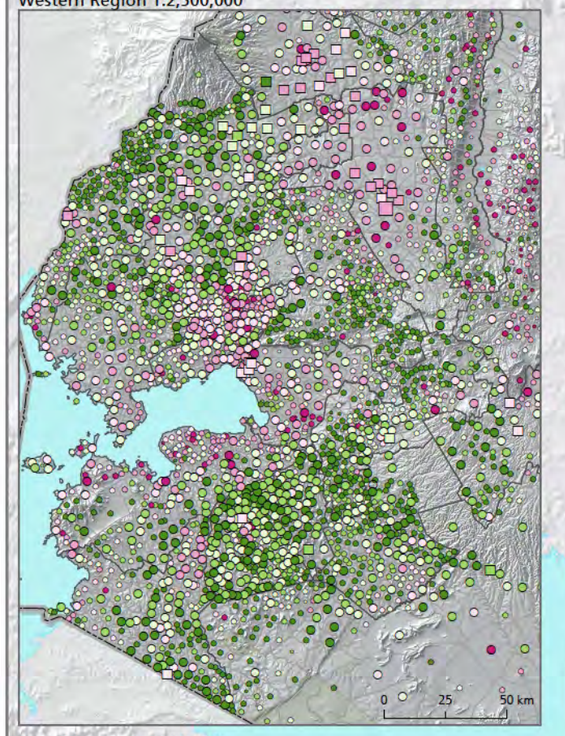


Economic Activities

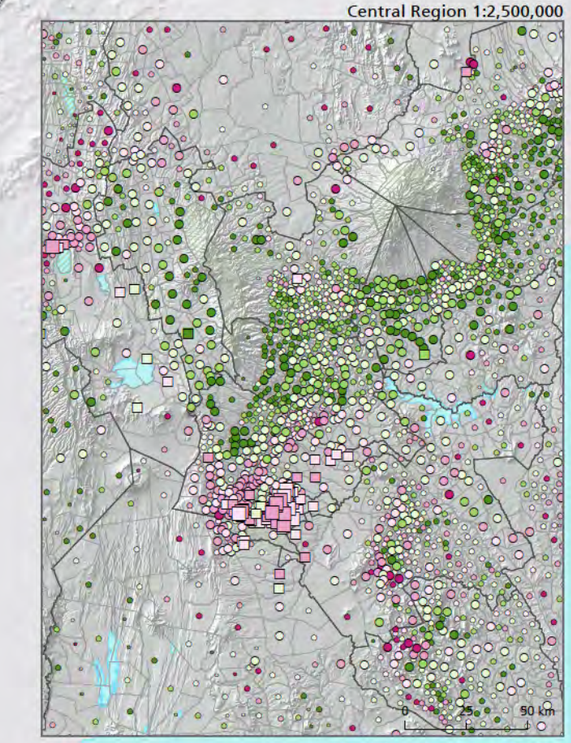
7.05 Unemployed People

Republic of Kenya 1:4,000,000

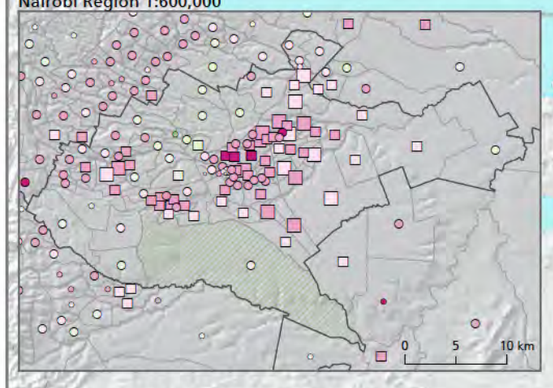
Western Region 1:2,500,000



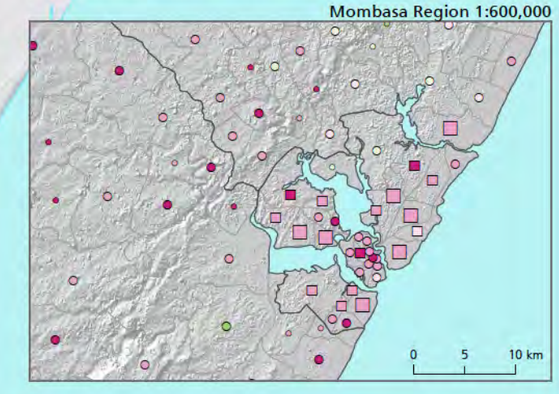
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Unemployment classes: Percentage of the active labour force that is unemployed

- Less than 2% of active labour force
- 2 to 4% of active labour force
- 4 to 8% of active labour force
- 8 to 12% of active labour force
- 12 to 20% of active labour force
- More than 20% of active labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.06 Economically Inactive Population

From a purely economic point of view, people of working age who are economically inactive are a burden to communities and the nation at large. They increase the number of dependants and their material survival has to be accommodated in one way or another by the rest of society. Taking a broader perspective, economically inactive people may play important roles for society and the economy, e.g. by handling non-remunerative household duties, engaging in community and social work, or undertaking advanced studies to contribute to the future of the economy.

The number of economically inactive people includes 15- to 64-year-olds, and is calculated by subtracting the active labour force from the total labour force. This group is broken down into four main categories: homemakers, students, retired people, and people with disabilities (see box in the introduction).

In Kenya, the economically inactive population totals 4.8 million, or 23% of the 20.5 million 15- to 64-year-olds. This seems to be a high rate, but it must be considered that 2.7 million of the economically inactive population (57%) are full-time students (see county table), mainly in secondary schools, universities, colleges, and training institutions. The high proportion of students is, among other things, a result of the large number of adult secondary school attendees (see map 6.04). This high proportion suggests an ongoing catching-up process in national education. Although this group of people currently represents an economic burden, it will provide an important human resource base critical for a growing economy like Kenya's. Another 40% of this group are homemakers engaged in domestic duties that, despite an absence of direct cash flows, provide important support to the activities of the economically active population. The group's final 3% consists of 2% of people with disabilities and 1% who are retired.

There is a lot of variation in rates of economic inactivity across the country, with county-level rates as low as 12% and 13% in Turkana and Kirinyaga, respectively, and as high as 34% in Kwale and even 38% in Makueni. At the sub-location level the variance extends from 0% to 95%, implying that the economic burden related to this category is very unevenly distributed across the country. In addition, the spatial patterns indicated by the main map and the county map do not resemble patterns from other maps in this chapter, making them difficult to interpret. This changes when one considers that nationally students comprise 57% of the economically inactive population, and when one recalls that the attendance rates in secondary schools vary greatly from region to region (see maps 6.03 and 6.04). The county table therefore includes a column giving the percentage of economically inactive people excluding students.

An example is the best way to show the effect of including or excluding students. At 18% and 19%, respectively, Samburu and Nyandarua counties exhibit similar overall rates of economic inactivity, but students only make up about one-third of this group (32%) in Samburu, whereas in Nyandarua students make up almost three-quarters (74%). This means that the economic inactivity for Nyandarua is given as 5% whereas in Samburu it is 12%.

Quite clear patterns emerge after taking this differentiation into account. After excluding students, twenty counties show rates of inactivity below 9%, with Nyamira and Kirinyaga even dropping below 3%. All these counties are found in the high-potential areas of central and western Kenya, implying that the economic burden of the economically inactive population is largely related to investment in higher education. Still excluding students, ten counties had economically inactive population rates of above 15%, with Tana River (22%) and Kwale (19%) topping the list. With the exception of Elgeyo Marakwet, all of these counties are situated along the coast and in the arid and semi-arid areas dominated by small-scale agriculture (see map 7.01). Here the education-related burden is compounded by up to one in five people being economically inactive, and in many of the respective sub-locations, conditions are far below the county average. The remaining 17 counties fall between the two groups mentioned above. In these areas, the same additive effect takes place, but the burdens are lower for both subsets of the group. Interestingly, most pastoralist counties are found in this middle category.

Two main factors underlie the size of the economically inactive population: education-related investments into the future, and structural problems in the condition and composition of economic sectors. A broad range of policy fields – from education to agriculture and economic policies – face important policy challenges in those settings where the latter factor prevails, and in particular where the two occur together.

County	Percentage of econ. inactive people in total labour force	Rank	Number of econ. inactive people*	Number of students*
Nairobi	19.3%	8	411.4	229.2
Mombasa	26.0%	35	156.4	62.0
Kwale	33.5%	46	106.7	45.8
Kilifi	31.5%	45	172.2	76.3
Tana River	26.6%	36	29.4	7.0
Lamu	22.5%	25	12.3	5.0
Taita Taveta	24.9%	31	39.0	17.4
Garissa	21.6%	24	66.2	23.6
Wajir	20.3%	17	61.5	28.3
Mandera	25.7%	33	117.1	60.7
Marsabit	21.6%	23	30.6	11.9
Isiolo	22.8%	28	16.7	7.9
Meru	18.8%	6	141.1	80.3
Tharaka Nithi	19.4%	9	39.2	24.7
Embu	15.1%	3	44.2	30.8
Kitui	30.4%	42	147.6	77.2
Machakos	29.3%	39	178.9	87.3
Makueni	37.5%	47	168.3	92.1
Nyandarua	19.0%	7	59.5	43.9
Nyeri	20.7%	18	85.1	56.3
Kirinyaga	12.7%	2	41.1	32.7
Murang'a	20.0%	13	105.1	70.4
Kiambu	22.5%	26	225.9	124.9
Turkana	12.1%	1	53.1	20.3
West Pokot	23.7%	30	54.7	25.4
Samburu	18.0%	4	18.6	6.4
Trans Nzoia	27.2%	38	111.3	63.2
Uasin Gishu	31.0%	44	152.6	91.6
Elgeyo Marakwet	30.9%	43	56.6	29.2
Nandi	25.8%	34	99.9	61.8
Baringo	29.4%	41	78.5	39.9
Laikipia	22.7%	27	48.1	27.1
Nakuru	21.5%	22	188.5	113.7
Narok	20.8%	19	82.8	39.4
Kajiado	29.4%	40	112.1	48.1
Kericho	19.9%	11	79.2	61.5
Bomet	20.0%	12	73.4	58.4
Kakamega	21.3%	21	175.4	119.1
Vihiga	25.4%	32	69.4	46.6
Bungoma	20.1%	15	133.9	103.9
Busia	18.6%	5	66.4	45.4
Siaya	21.1%	20	88.3	56.9
Kisumu	27.0%	37	137.1	85.4
Homa Bay	23.0%	29	106.6	70.3
Migori	20.2%	16	88.2	65.5
Kisii	20.0%	14	118.6	100.7
Nyamira	19.6%	10	61.6	53.7
KENYA	**22.9%**	**–**	**4,710.6**	**2,729.2**

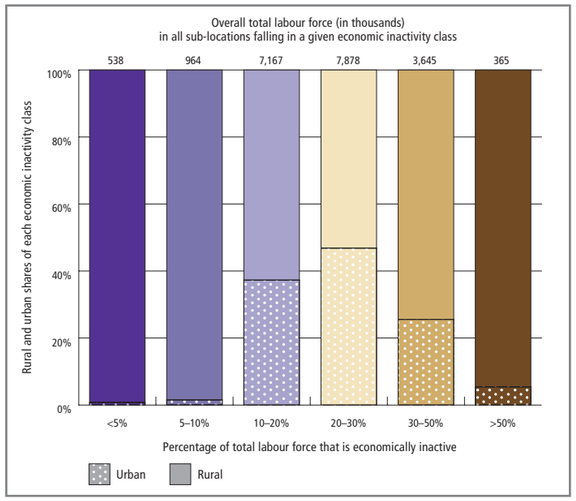
Abbreviation: econ. = economically

* in thousands

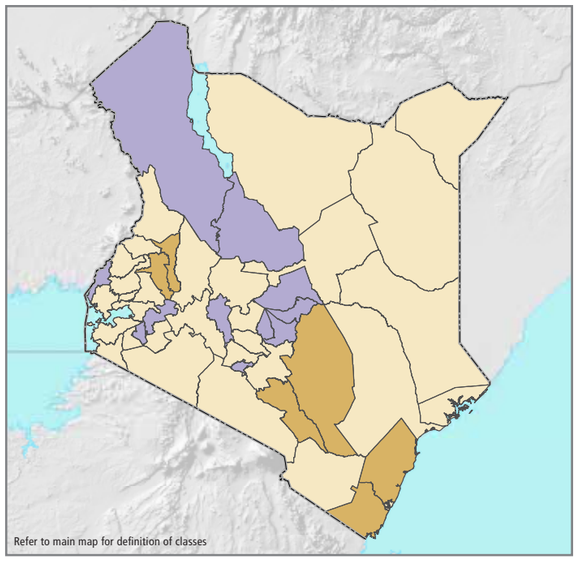
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.06 Rural–Urban Distribution of Economic Inactivity Classes



7.06 Average Economic Inactivity at County Level



Economic Activities

7.06 Economically Inactive Population

Republic of Kenya 1:4,000,000

Western Region 1:2,500,000

0 25 50 km

Central Region 1:2,500,000

0 25 50 km

Nairobi Region 1:600,000

0 5 10 km

Mombasa Region 1:600,000

0 5 10 km

0 25 50 100 150 200 km

Economic inactivity classes: Percentage of the total labour force that is economically inactive (e.g. students, homemakers, retired people, and people with disabilities)

- Less than 5% of total labour force
- 5 to 10% of total labour force
- 10 to 20% of total labour force
- 20 to 30% of total labour force
- 30 to 50% of total labour force
- More than 50% of total labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.07 Male Participation in Economic Activities

Participation in economic activities is an important indicator of the degree to which the working-age population actively drives an economy. Low economic participation signifies that the economy has a low absorption capacity and that a relatively small portion of the population is producing the economic value on which the rest of the population ultimately depends. This is especially critical when the proportion of the population that is not of working age is also high. Overall dependency rates will be high, if e.g. there are many children below the working age, because a large number of people will then rely on the economic activity of a few. In a broader perspective, this does not imply that the non-participating people do not hold important supporting or social functions that indirectly contribute to the economy and the nation's development (see also section 7.06).

The economic participation rate is calculated as the active labour force – those who are either employed or unemployed (see maps 7.01 and 7.03 to 7.05) – divided by the total labour force, which includes everyone in the working-age group of 15- to 64-year-olds, including economically inactive people (see box in the introduction). Using this definition, the participation rate is basically the inverse of the rate of economic inactivity presented in map 7.06, meaning that the two rates add up to 100%. However, it is interesting to differentiate the participation rate by gender to establish whether the economic participation of men and women differs across various regions of the country. Maps 7.07 and 7.08 show the economic participation rates differentiated by gender.

In Kenya, the total labour force includes 10.1 million men and 10.5 million women. While the overall participation rate is 77% (see map 7.06), the male rate is 82%, which is 10% higher than the female rate (72%). This means that 8.2 million men and 7.5 million women form Kenya's active labour force, while 1.8 million men and 3.0 million women are economically inactive.

This map shows how the male participation rate varies across the country. At first glance, the map illustrates similar, but inverse spatial patterns to those in map 7.06 on economic inactivity. The highest rate of male participation was recorded in Kirinyaga (88%) and the lowest in Makueni (71%), which are notable as the two counties with the lowest and highest rates of economic inactivity, respectively. Many counties replicate the pattern shown in map 7.06, but there are also counties with considerable differences. Mombasa, Lamu, Tana River, Isiolo, and Marsabit exhibit some of the highest rates of economic inactivity, but are shown here to have some of the highest levels of male participation. This indicates that in the coastal region and in large parts of predominantly pastoral counties, males dominate economic activities, which can be explained at least partially by cultural and religious factors. However, in some parts of western Kenya, e.g. in Nyamira, Kisii, and Busia, the inverse is true, with both relatively low rates of economic inactivity and quite low rates of male participation. This indicates a more important role for women in the economic activities of these regions, which may be related to the strong role of women in small-scale agriculture.

These observations and explanations may, however, not hold when one recalls that students form a large part of the economically inactive population (see map 7.06) and that the number of students varies greatly across different parts of the country (see maps 6.03 and 6.04). The county table therefore also shows the male participation rate after students have been excluded from the total labour force. After excluding students, the male participation rate increases to above 90% in all counties, with the highest levels of 99% in Kirinyaga. This means that most men in the total labour force are either economically active or they are studying and training. This is particularly true for most parts of the high-potential areas of central and western Kenya, while in the coastal region and large parts of the semi-arid and arid zones, there are higher numbers of men who are neither economically active nor studying.

It is also interesting to note that the two major cities of Nairobi and Mombasa are significantly better positioned in terms of male participation than in the rate of economic inactivity, and the rural–urban graphs accompanying the two maps confirm that this observation is valid for most urban settings. This means that men dominate urban economic activities. When one recalls that the formal sector is concentrated in urban areas (see map 2.05), this might hint at gender imbalances in Kenya's economy that are more pronounced than the participation rates may express. This observation shall be further pursued in map 7.08.

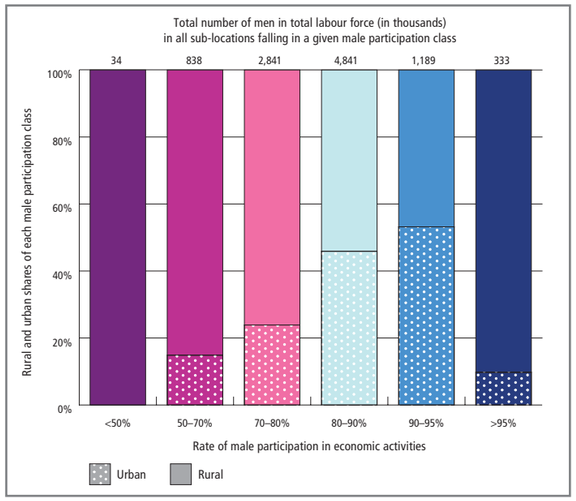
County	Male participation rate	Rank	Number of men in active labour force*	Number of men in total labour force*
Nairobi	87.8%	2	964.8	1,098.8
Mombasa	87.1%	6	274.9	315.6
Kwale	77.1%	40	115.0	149.1
Kilifi	76.7%	42	195.0	254.2
Tana River	86.9%	8	46.3	53.3
Lamu	87.7%	3	25.4	29.0
Taita Taveta	82.9%	19	66.1	79.7
Garissa	84.9%	13	137.2	161.6
Wajir	83.7%	15	138.5	165.5
Mandera	79.9%	29	199.7	250.1
Marsabit	86.8%	9	64.1	73.8
Isiolo	85.4%	10	31.9	37.3
Meru	85.1%	12	313.1	367.8
Tharaka Nithi	83.1%	17	80.9	97.4
Embu	87.2%	5	125.3	143.7
Kitui	73.3%	46	158.7	216.4
Machakos	78.5%	34	234.4	298.5
Makueni	70.9%	47	150.4	212.2
Nyandarua	82.7%	21	123.5	149.4
Nyeri	82.8%	20	164.9	199.0
Kirinyaga	88.0%	1	140.3	159.5
Murang'a	82.3%	22	206.7	251.1
Kiambu	85.2%	11	422.7	495.9
Turkana	87.5%	4	198.1	226.5
West Pokot	79.9%	30	89.3	111.9
Samburu	86.9%	7	43.8	50.4
Trans Nzoia	78.8%	33	158.2	200.7
Uasin Gishu	77.8%	37	192.0	246.6
Elgeyo Marakwet	76.6%	44	69.2	90.4
Nandi	79.4%	31	152.9	192.6
Baringo	77.4%	39	101.7	131.4
Laikipia	83.0%	18	86.1	103.6
Nakuru	83.4%	16	363.5	436.0
Narok	84.3%	14	166.3	197.2
Kajiado	81.9%	23	155.3	189.7
Kericho	81.4%	25	162.8	200.1
Bomet	80.0%	27	144.4	180.5
Kakamega	79.9%	28	307.4	384.8
Vihiga	76.6%	43	94.6	123.4
Bungoma	80.2%	26	255.0	318.2
Busia	81.4%	24	133.8	164.3
Siaya	79.2%	32	149.6	188.9
Kisumu	77.0%	41	188.4	244.8
Homa Bay	76.5%	45	163.8	214.1
Migori	78.5%	35	160.6	204.7
Kisii	77.7%	38	210.6	270.8
Nyamira	78.1%	36	113.3	145.0
KENYA	**81.8%**	**–**	**8,240.5**	**10,075.6**

* in thousands

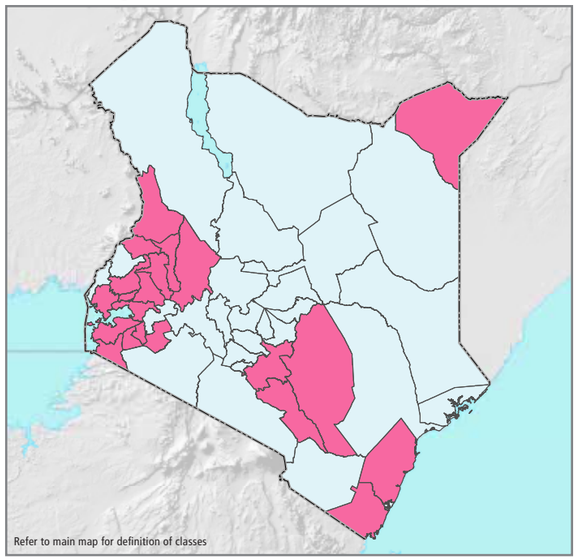
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.07 Rural–Urban Distribution of Male Participation Classes



7.07 Average Male Participation at County Level

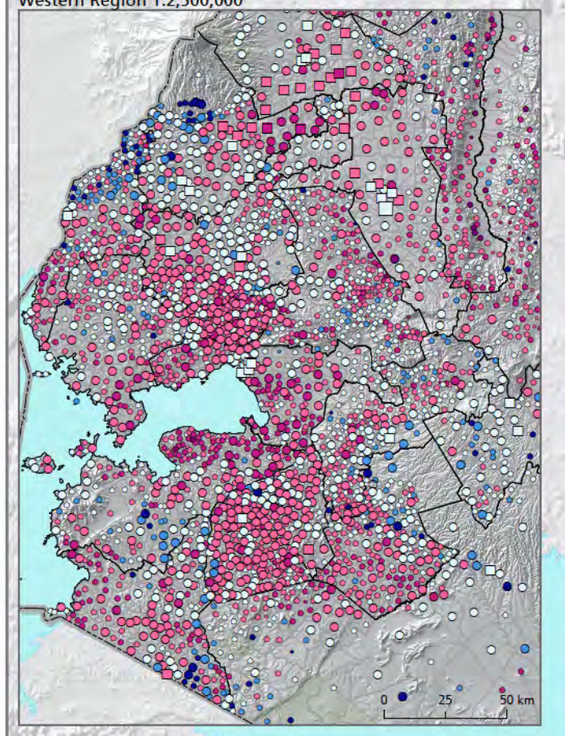


Economic Activities

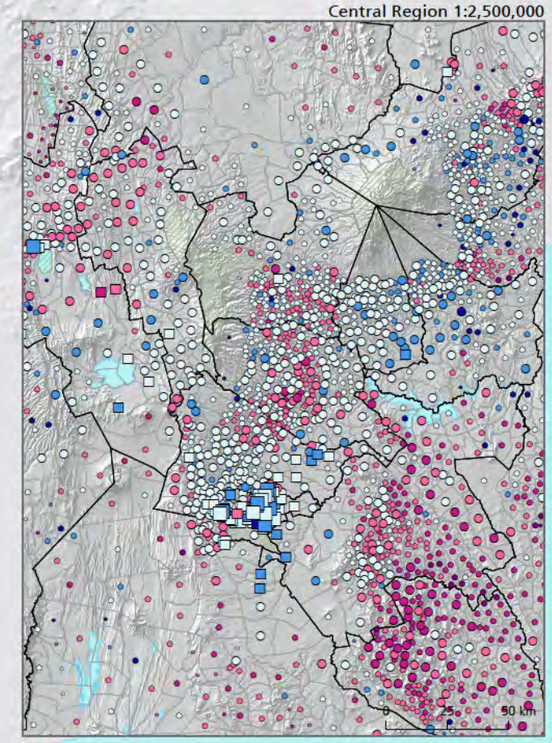
7.07 Male Participation in Economic Activities

Republic of Kenya 1:4,000,000

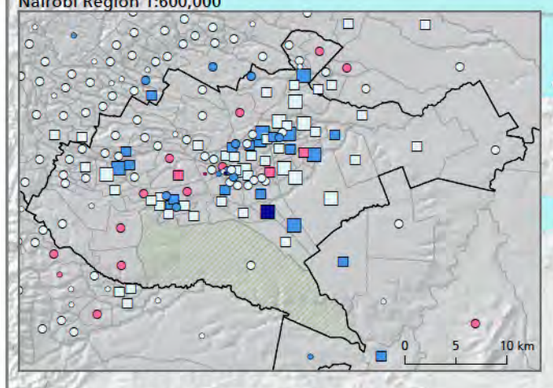
Western Region 1:2,500,000



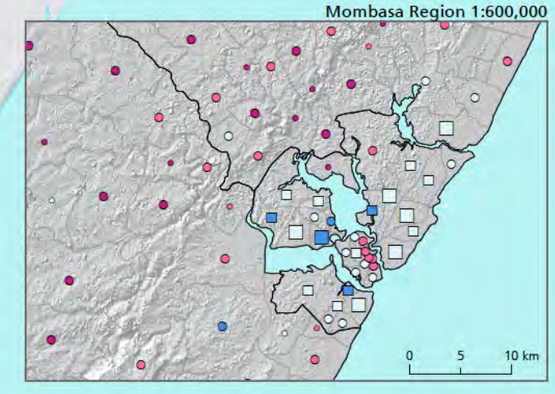
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Male participation classes: Rate of male participation in economic activities, or ratio of active male labour force to total male labour force

- Less than 50% of total male labour force
- 50 to 70% of total male labour force
- 70 to 80% of total male labour force
- 80 to 90% of total male labour force
- 90 to 95% of total male labour force
- More than 95% of total male labour force

Total population per sub-location

- >50,000
- 20,000–50,000
- 5,000–20,000
- 1,000–5,000
- <1,000

0 25 50 100 150 200 km

Borders

- International border
- County border
- Sub-location border

Features

- National park
- Waterbody

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7.08 Female Participation in Economic Activities

The level of female participation in economic activities is perhaps more interesting than that of male participation (map 7.07), because the latter have long dominated the labour market. A growing rate of female participation in economic activities can be a strong indication of improvements in gender mainstreaming policies and practices, equal employment opportunities, women's empowerment, and involvement of the total population's economic and national development potential.

This map therefore shows the rate of female participation in economic activities, which, in analogy to that of male participation, is calculated as the female active labour force divided by the total female labour force (see box in the introduction to this chapter). In Kenya, the average female participation rate stands at 72%, which is 10% lower than the male rate. In absolute terms, this means that 7.5 million women in the working-age group of 15- to 64-year-olds are economically active, while 3.0 million are economically inactive, but may be performing important non-remunerated supporting and social functions.

As with the male participation rate, the female rate is highest in Kirinyaga (86%) and lowest in Makueni (55%), but there is a much larger difference between these two counties for women than for men (88% and 71%, respectively). Maps 7.07 and 7.08 use the same scale and colour range, and a comparison confirms the prevalence of lower female rates in most parts of the country, as well as higher variation in these rates across the country. This means that women are generally less integrated in Kenya's economy and that the different regions of the country differ considerably in the rates of male participation. The difference between the male and female rates reveals different stages in the economic integration of women, with large parts of the high-potential counties of central and western Kenya showing differences of less than 5%, thereby indicating that women are quite well integrated. However, in large parts of the coastal region and in a considerable part of the arid and semi-arid counties, this difference is greater than 15%, with the largest differences in Mombasa (28%) and Tana River (26%). Besides cultural factors, structural economic problems and the economy's sectoral composition may play a role in this low integration of women.

Interestingly, in four counties female participation rates are higher than male rates, namely in the largely rural counties of Nyamira, Kisii, Migori, and Homa Bay in western Kenya. This can partly be explained by women's role in small-scale agriculture, but may also relate to the share of students in the rate of economic inactivity (see maps 7.06 and 7.07). The county table therefore also shows the female participation rate after excluding students from the total labour force. Comparison of this indicator with the corresponding male figure shows that these four counties have higher male rates, implying that students play an important role and that men have higher attendance rates than women (see map 6.06).

Female participation rates that exclude students from the total labour force show even more clearly than the general participation rate how many women are being excluded from Kenya's economy. While among males this indicator does not drop below 90% in any of the counties (see map 7.07), for females it is below 90% in 37 out of 47 counties and reaches values as low as 63% in Tana River. This means that in all these counties, at least one in ten, or even one in three women are neither economically active nor in school. Although they may fulfil important domestic functions without remuneration, their non-inclusion in the economy represents an underutilized potential and a sign of persistent gender inequalities in Kenya, even though these inequalities vary in degree between the highlands and large parts of the rest of the country.

It is also revealing to consider the female participation rate in towns after excluding students from the total labour force. Nairobi shows a clearly lower value (81%) than most counties of central and western Kenya, while Mombasa (66%) is the third lowest-ranked county, followed only by Kwale and Tana River. The main map shows comparatively lower female participation as a common characteristic in most urban settings, a finding confirmed by comparing the rural–urban graphs of the male and female participation rates. Considering that urban areas host most of the formal sector and are the national and regional economic hubs, this points to women's integration in Kenya's modern economic sectors lagging behind the generally lower overall economic participation rate of women. A lack of women's integration is therefore both a quantitative and a qualitative problem that poses a wide range of policy and development challenges. The increasing rates of female education levels (see map 6.09) may serve as a sign of hope in this respect.

County	Female participation rate	Rank	Number of women in active labour force*	Number of women in total labour force*
Nairobi	72.4%	23	745.8	1,029.5
Mombasa	58.9%	44	168.5	286.2
Kwale	56.7%	46	96.1	169.3
Kilifi	60.8%	41	178.2	293.0
Tana River	60.0%	42	34.4	57.3
Lamu	64.6%	37	16.6	25.8
Taita Taveta	66.4%	34	51.0	76.8
Garissa	68.5%	30	98.9	144.3
Wajir	70.3%	26	96.0	136.6
Mandera	64.8%	36	132.9	205.1
Marsabit	67.0%	32	45.7	68.2
Isiolo	68.0%	31	24.4	35.9
Meru	76.9%	17	294.8	383.2
Tharaka Nithi	78.0%	13	81.9	105.0
Embu	82.2%	2	123.1	149.9
Kitui	65.1%	35	174.9	268.5
Machakos	62.8%	39	195.2	311.1
Makueni	54.7%	47	129.4	236.6
Nyandarua	79.3%	10	129.3	163.1
Nyeri	75.7%	18	160.4	211.9
Kirinyaga	86.4%	1	141.2	163.5
Murang'a	77.5%	14	212.2	273.7
Kiambu	69.6%	27	352.6	506.3
Turkana	82.1%	3	175.8	214.2
West Pokot	71.0%	25	84.5	119.1
Samburu	74.7%	19	39.4	52.8
Trans Nzoia	66.6%	33	138.7	208.2
Uasin Gishu	59.9%	43	147.6	246.6
Elgeyo Marakwet	61.3%	40	56.9	92.9
Nandi	68.5%	29	132.9	193.9
Baringo	62.9%	38	85.2	135.4
Laikipia	71.2%	24	77.6	108.9
Nakuru	73.2%	21	322.2	440.2
Narok	73.3%	20	146.6	200.0
Kajiado	58.6%	45	112.4	191.9
Kericho	78.6%	11	155.9	198.3
Bomet	79.6%	8	148.4	186.6
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Vihiga	72.7%	22	109.2	150.3
Bungoma	79.4%	9	276.3	348.0
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Siaya	78.1%	12	178.7	229.0
Kisumu	68.8%	28	181.5	263.6
Homa Bay	77.0%	16	192.5	249.9
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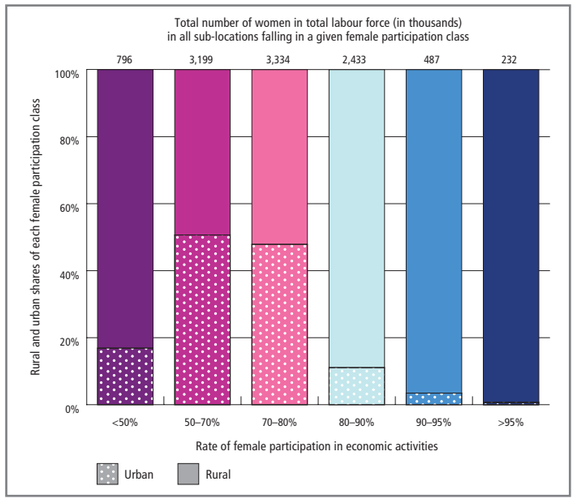
KENYA	**71.8%**	**–**	**7,524.9**	**10,481.1**

* in thousands

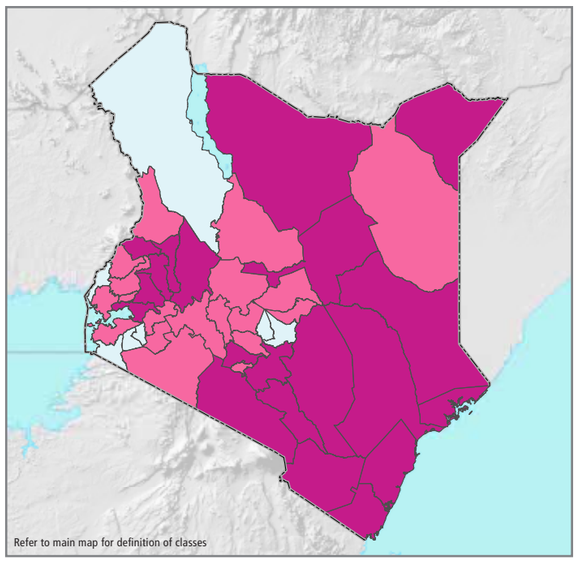
Data Source

2009 Kenya Population and Housing Census (Variable P42: Economic Activity), Kenya National Bureau of Statistics.

7.08 Rural–Urban Distribution of Female Participation Classes



7.08 Average Female Participation at County Level

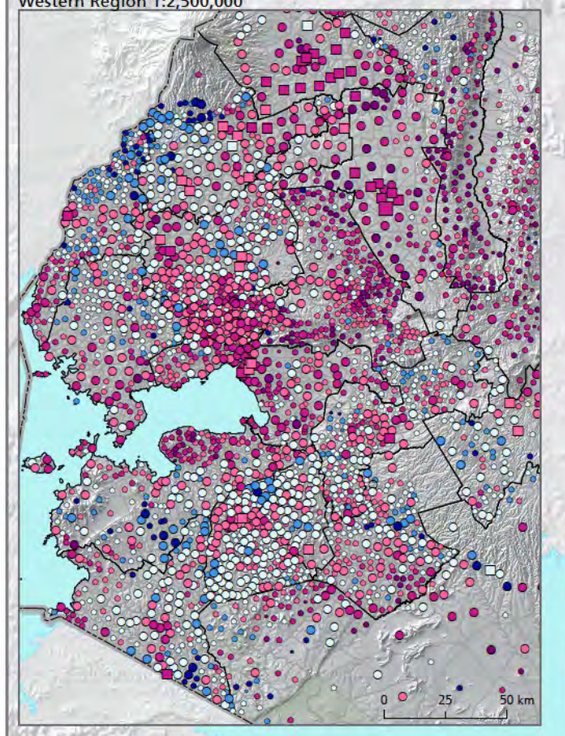


Economic Activities

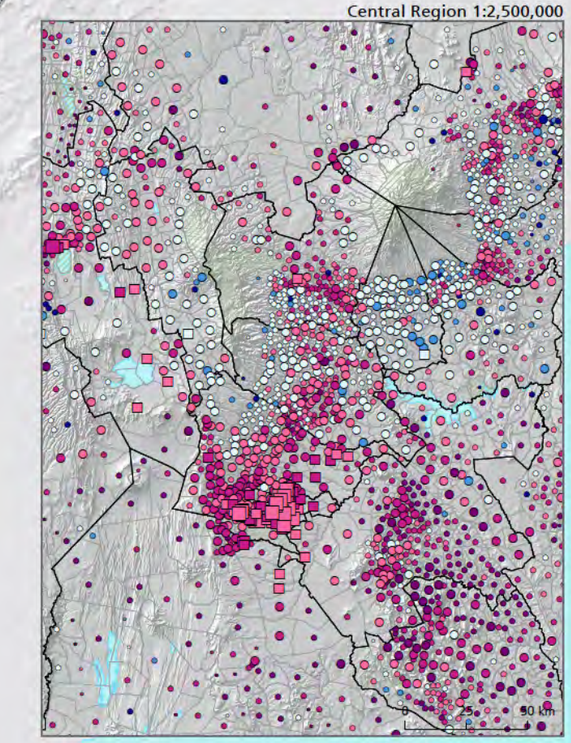
7.08 Female Participation in Economic Activities

Republic of Kenya 1:4,000,000

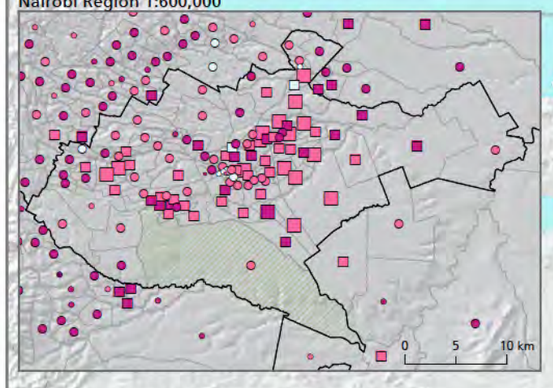
Western Region 1:2,500,000



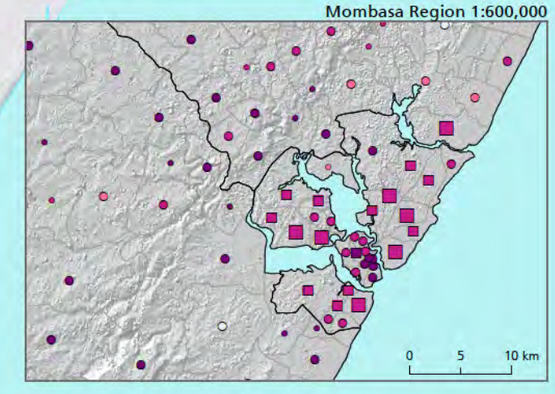
Central Region 1:2,500,000



Nairobi Region 1:600,000



Mombasa Region 1:600,000



Female participation classes: Rate of female participation in economic activities, or ratio of active female labour force to total female labour force

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The *Socio-Economic Atlas of Kenya* is the first of its kind to offer high-resolution spatial depictions and analyses of data collected in the *2009 Kenya Population and Housing Census*. The combination of geographic and socio-economic data enables policymakers at all levels, development experts, and other interested readers to gain a spatial understanding of dynamics affecting Kenya. Where is the informal economic sector most prominent? Which areas have adequate water and sanitation? Where is population growth being slowed effectively? How do education levels vary throughout the country? And where are poverty rates lowest? Answers to questions such as these, grouped into seven broad themes, are visually illustrated on high-resolution maps.

By supplying precise information at the sub-location level and summarizing it at the county level, the atlas facilitates better planning that accounts for local contexts and needs. It is a valuable decision-support tool for government institutions at different administrative levels, educational institutions, and others.

Three organizations – two in Kenya and one in Switzerland – worked together to create the atlas: the Kenya National Bureau of Statistics (KNBS), the Nanyuki-based Centre for Training and Integrated Research in ASAL Development (CETRAD), and the Centre for Development and Environment (CDE) at the University of Bern. Close cooperation between KNBS, CETRAD, and CDE maximized synergies and knowledge exchange.

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