# SUB CATCHMENT DIRECTORY FOR UPPER EWASO NGIRO RIVER BASIN

JULY 2014

CETRAD
Centre for Training and Integrated Research in ASAL Development

# Foreword

This new edition of the Sub-catchment Directory comes at the most appropriate time to respond to the rapidly growing demand, by the various stakeholder groups in the upper Ewaso Ngiro basin, for easy and timely access to detailed and relevant socio-ecological information on water use and management, including respective institutional arrangements and best governance practices. The timing is even more appropriate because it captures and presents important socio-ecological changes that have occurred in the last ten years, since the release of first edition, and which have had compelling impact on the environment and natural resources, particularly, water. Such changes are evident in population growth and expansion of settlements, especially in marginal areas, land use and land cover, growing water demand and emergence of new conflict hotspots, increased public participation in water and other natural resources management especially with the growth of the Water Resources Users Associations (WRUAs) movement, and formation of basin wide WRUA Forum, and devolution of governance structures to the county level.

One very important aspect of this new edition is the strong involvement of the Water Resources Users Associations (WRUAs) in the field campaigns that generated the data and information used in the revision process. The WRUAs were first trained on the use of modern technology – GPS and Smartphone – to capture spatial data and how to relay the same to the central database for processing. This great innovation had the impact of greatly reducing the high costs and length of time involved in the collection of data of this nature and magnitude. This also increases the level of ownership of the process and the final product. The WRUAs are highly appreciated for this invaluable contribution; and shall henceforth be part of all field data campaigns to be conducted in future.

This revised edition is presented in a simplified structure, appealing design and enriched content to make it more user friendly and thematically informative: The introduction has five new maps depicting population sizes at sub-location level, water resources and river water abstractions, water use conflict hot spots, and land cover for the upper basin. At the sub-catchment level, the Fact Sheets provide more detailed information on for example WRUA's membership, other water resources and wetlands, and large scale farming activities; as well as summary information of land cover, climate and learning institutions in each sub-catchment, which were not included in the 2005 edition. Furthermore, the different themes that were initially combined in one layer are, in this edition, presented individually in order to reduce congestion and accommodate more theme relevant data and information, and as well to enhance legibility and clarity.

This directory is intended to serve as an information dissemination tool as well as a tool to support planning and decision making among different stakeholder groups responsible for stewarding water resources management and governance within their areas of jurisdiction at local and regional level. The use of this directory as a planning tool will greatly improve targeting of water management related interventions, and make visible the impacts associated with such interventions. The Water Resources Users Associations (WRUAs) actively engaged in managing river water resources and solving related conflicts in their respective sub-catchments particularly will find this directory useful as a daily management tool. It provides a reliable baseline to support important processes such as regular monitoring of water use and related activities, inter-sub-catchment situation comparison, and as a tool to inform interaction (or negotiations) with funding agencies and development partners.

To stakeholders involved in managing water resources in other catchments in Kenya, this directory demonstrates some of the possibilities offered by modern information technology and spatial analysis tools, and may therefore prompt you to desire to have similar or other products, in which case CETRAD would be most obliged to help you achieve.

We wish you a positive reading, and welcome you to take advantage of this unique compilation to inform yourself as you occupy your rightful position to contribute to the sustainability of this rather rapidly changing but equally fascinating environment.

Dr. Boniface P. Kiteme
Director, CETRAD

# Acknowledgements

This directory is the result of a team work involving various persons and institutions.

The data used for the preparation of maps, was derived from the existing CETRAD database, field surveys for primary data collection and from collaborating institutions. The 2009 population data was sourced from Kenya National Bureau of statistics (KNBS). Some of the water abstraction data was sourced from Water Resource Management authority (WRMA) and also from WRUA baseline survey reports conducted by various consultants.

We would like to thank all the WRUAs for participating in the abstraction survey campaign by first attending the GPS/Smartphone training workshops and conducting the actual ground mapping work in their respective sub catchments. In particular we thank the following persons from the corresponding WRUAs;

Ngare Mara (Likiundu)- Peninnah Gakii & Samuel Ntongai; Isiolo – David Mwiti; Ngare Ndare- Wilson Kamau; Sirimon – Jim Muthomi & Martin Mugambi; Likii –Geoffrey Mwirigi, Ann Macharia, Mungatia Muriungi, James Mwangi; Nanyuki- Teresa Kaari, Brian Maina, Charles Kasale, Martin Nding'u; Rongai – David Weru Kahuthu, Christopher Warutere, Gerad Muriuki; Burguret - Joseph Ngarira & Justus Muriithi ; Naro Moru – Martin Ndungu; Moyok – Moses Muraria & Simon Njihia; Ewaso Ngiro East – Alex Ndanya & Christopher Wanyeki; Ngobet – Hannah Nyakio & Paul Kimani; Mutara – Nancy Nyambura & Delphine Nyambura; Lower Ewaso Narok – Philip Kiplangat & Allan Njuguna; Upper Ewaso Narok – John Kinga & Grace Abach; Melwa – Jimmy Mwangi & Bernard Kamawira; Kinamba – Samuel Mburu & Bilhah Kimondo; Equator – Gadson Maina & Wilson Maina; Nyahururu – Charles Kimondo & Amos Kingori.

We would also like to acknowledge the WRUA officials for outsourcing the above participants from their respective sub catchments, for supervising and guiding them during the abstraction survey campaign.

# Acknowledgements

The following persons actively participated in the project;

Dr. Jeniffer Kinoti, Senior Researcher CETRAD was the co-ordinator of the water initiative project and in particular lead the group that classified and did the ground truthing of the satellite images (January 2014) to create the land cover. Elizah Peter co-ordinated the GIS work in data capture, editing and mapping. Vitalis Kibiwott , Milton Mutuma and Philip Kungu participated in the training of participants and the actual ground data collection and processing. The drivers, Mercy Mathai, Benson Mwangi and Edward Thiga, for facilitating travel to the field during data collection campaign.

Finally, Dr. Boniface Kiteme, the director of CETRAD, who provided conceptual guidance and overall supervision to the project.

To those not mentioned here but made direct or indirect contribution, we deeply appreciate your participation and commitment.

Evanson C Njuguna

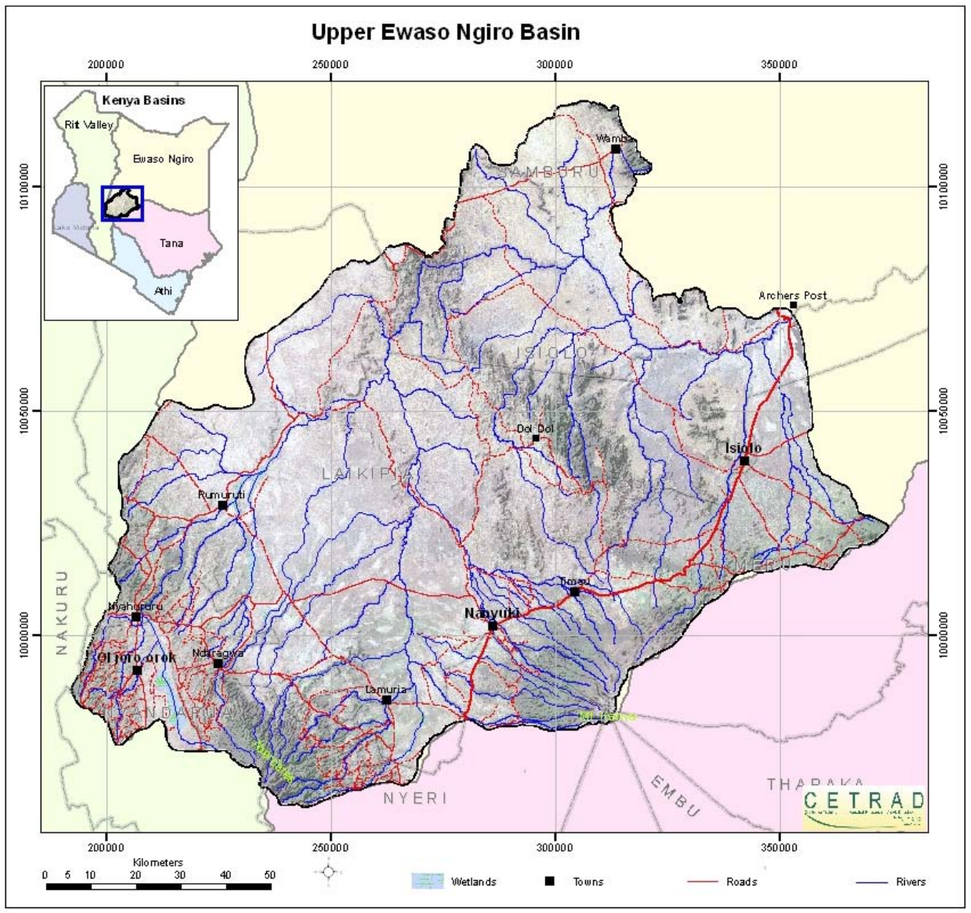
Head, Department of Information and Knowledge Management

(DIKM) CETRAD

# Upper Ewaso Ngiro River Basin

## Introduction

The Ewaso Ng'iro basin is the largest among the five drainage basins in Kenya. It covers an area of about 210,000 km$^2$ representing about 37% of the total area of Kenya. The basin contributes about 7% of the total annual river flows, making it a chronically water scarce basin. The upper Ewaso Ng'iro basin constitutes the upper stream section of this drainage area, covering about 15,000 km$^2$. This upper basin has an altitudinal variation that ranges from Mt. Kenya's 5200 m above sea level through the Laikipia plateau 1500 m, to just below 1000 m in the dry lowlands of Isiolo and Samburu of northern Kenya. The rainfall regime in the area follows this altitudinal profile. From the mountain highlands rainfall drops from over 1200 - 800 mm/year to between 500 – 300 mm in the Laikipia plateau and down to below 300mm in the lowlands, representing one of the steepest ecological gradients known. The temperatures vary between 20 to 37 $^0$C annually.




The main sources of water in the basin include rivers, ground water, dams, and water pans. However, the availability of this water (especially river water) varies considerably throughout the year both in space and time. Moreover, due to rainfall characteristics, water deficit increases drastically as one move from the highlands to the lowlands that are predominantly occupied by the pastoralists.

Historically, this basin has been used by nomadic pastoralist up to the early part of the 20$^{th}$ century, when the area was occupied by white colonial farmers. Upon independence in the 1960s, the land especially in the humid areas was sub-divided into small scale farms which were mainly bought by farming communities from central and eastern Kenya. The settlers continued to practice rain-fed agriculture and due to population pressure, farming has expanded into drier transition zones exposing the farmers to drought and food insecurity. This pressure on the transition zone has cut pastoralists from dry season pastures and led to overuse of river water affecting downstream communities.

Increasing water use demands in the upstream of the basin has resulted to water use conflicts downstream and the situation gets worse during the dry seasons. Population density in the basin averages about 60 persons km$^2$, but the distribution ranges from over 1000 persons km$^2$ in the urban areas of Nyahururu, Nanyuki and Isiolo, to 212 persons per Km$^2$ on the highland's small scale farming areas and to less than 24 persons per km$^2$ in the plateau areas. The differences in population densities relate to the land use systems which are quite diverse.

A large proportion of the upper basin is taken up by large scale commercial ranches for beef and dairy cattle. The large scale wheat, barley, and horticultural farms are found in the strips around Mt. Kenyaand the Nyandarua Ranges. Adjacent to these are the small scale settlements operated as mixed farms where maize is the predominant crop, supplemented by beans, peas, potatoes and vegetables.

# Notes on Sub-Catchments Maps

The bulk of this directory is composed of maps and fact sheets for 21 sub-catchments of the Upper Ewaso Ngiro River Basin. The maps are composed of three main thematic areas as shown below;

Population and Socio Infrastructure:

The main map shows population numbers , road network, schools, towns and health centres. The secondary map features the population density at sub locations level.

Water Resources and Abstraction Points:

The map shows the spatial spread of existing surface and ground water resources that include springs, dams, pans, boreholes, and shallow wells. The map also shows the distribution of rain gauge stations and river water abstraction points. The smaller side map shows the river water abstraction points in the year 2005, the met stations and Agro-climatic zones(ACZ), while the corresponding table shows the attributes of ACZ including ; agriculture potential , minimum and maximum rainfall and the corresponding land area of each zone. A graph of long term water discharge trends is shown where data is available.

Land cover:

The map features the land cover classes for the year 2014. The side maps feature the land classes for the year 1995 and a corresponding table comparing the area cover between the two time lines. Other two side maps show the soils and the slopes of the sub catchment.

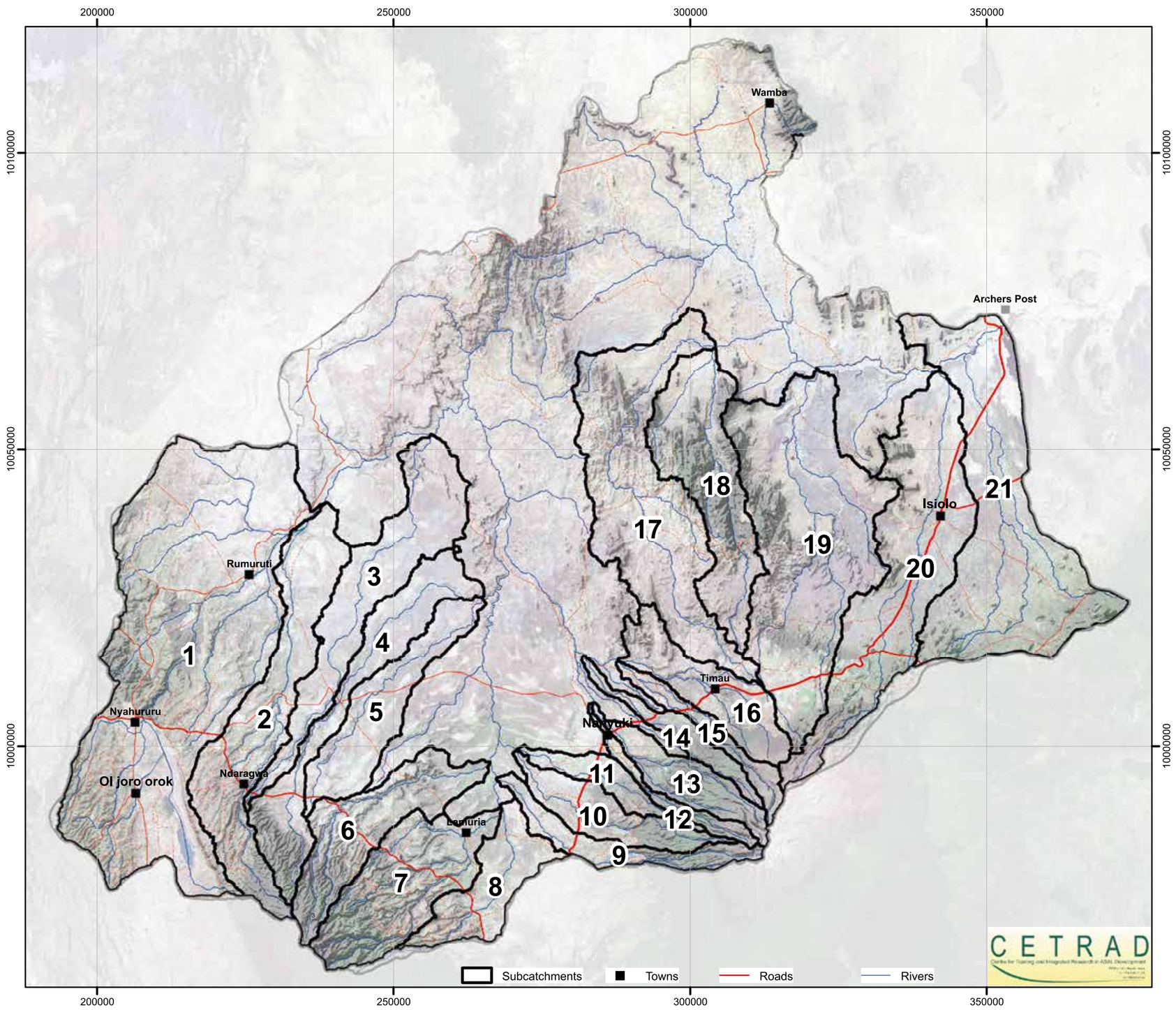
All the map sheets have their own legends, projection information, CETRAD mission and logo and copyright declaration. Therefore, they can be used either as part of the directory, or can be duplicated for separate use in reports and presentations, with proper citation and acknowledgement.

The maps have been arranged and numbered in West to East order as shown in the overview subcatchment map. The scales of the maps vary depending on the size of the sub-catchments portrayed, but all range between 1: 140,000 and 1: 250,000 for the main maps

The fact sheets provide for each sub-catchment an introductory remark on total land area, human population, dominant land cover types, climatic conditions and the number of institutions of learning. Additionally, a table provides basic information on Water Resource User Association (WRUA) for those sub-catchments in which they have been established. The information contained in these tables were collected from the WRUAs and include; history of formation and registration, membership, management, water resources, characteristics of user conflicts and resolution measures and competences, and main challenges in water resource management.

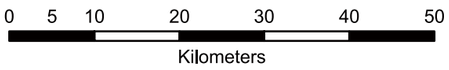
# Upper Ewaso Ngiro Basin: Subcatchments

| No | Name | Area Sq Km | Perimeter Km |
|---|---|---|---|
| 1 | Ewaso Narok | 1,839 | 320 |
| 2 | Pesi | 589 | 245 |
| 3 | Mutara | 489 | 235 |
| 4 | Sugorai | 399 | 229 |
| 5 | Segera | 313 | 148 |
| 6 | Engare Ngobet | 359 | 155 |
| 7 | Ewaso Ngiro East | 433 | 141 |
| 8 | Engare Moyok | 243 | 126 |
| 9 | Naro Moru | 167 | 143 |
| 10 | Burguret | 206 | 122 |
| 11 | Rongai | 107 | 103 |
| 12 | Nanyuki | 74 | 111 |
| 13 | Likii | 184 | 115 |
| 14 | Ontoulili | 107 | 116 |
| 15 | Sirimon | 116 | 117 |
| 16 | Timau | 269 | 128 |
| 17 | Sinyai | 793 | 264 |
| 18 | Siakuu | 477 | 184 |
| 19 | Ngare Ndare | 1,013 | 243 |
| 20 | Isiolo | 770 | 256 |
| 21 | Ngare Mara | 941 | 217 |









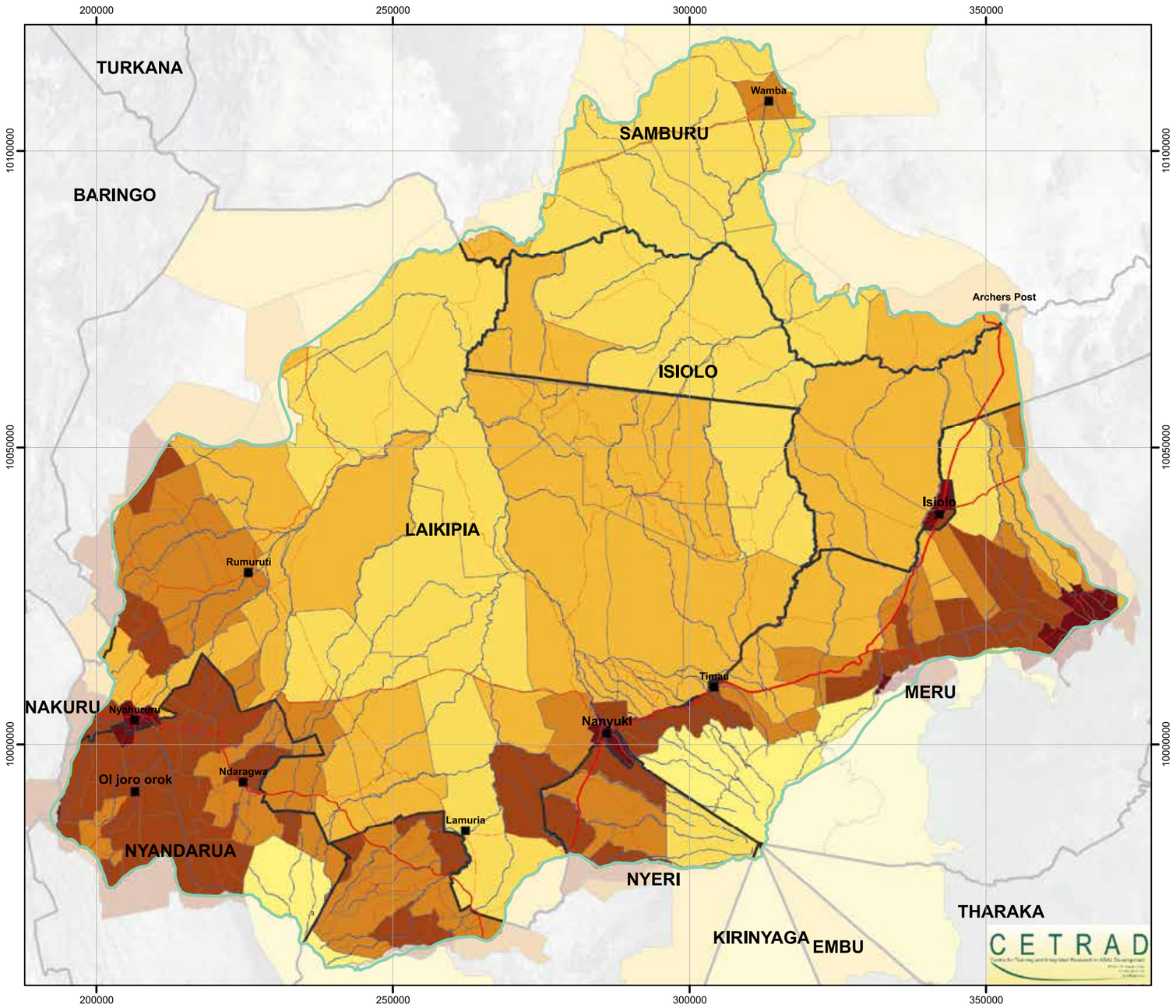
# Upper Ewaso Ngiro Basin: Population Density (1999)

**Population Density**

- 0
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 2525

**Features**

- Towns
- Roads
- Rivers
- Basin Boundary
- Counties
- Wetlands




N
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0 5 10 20 30 40 50
Kilometers

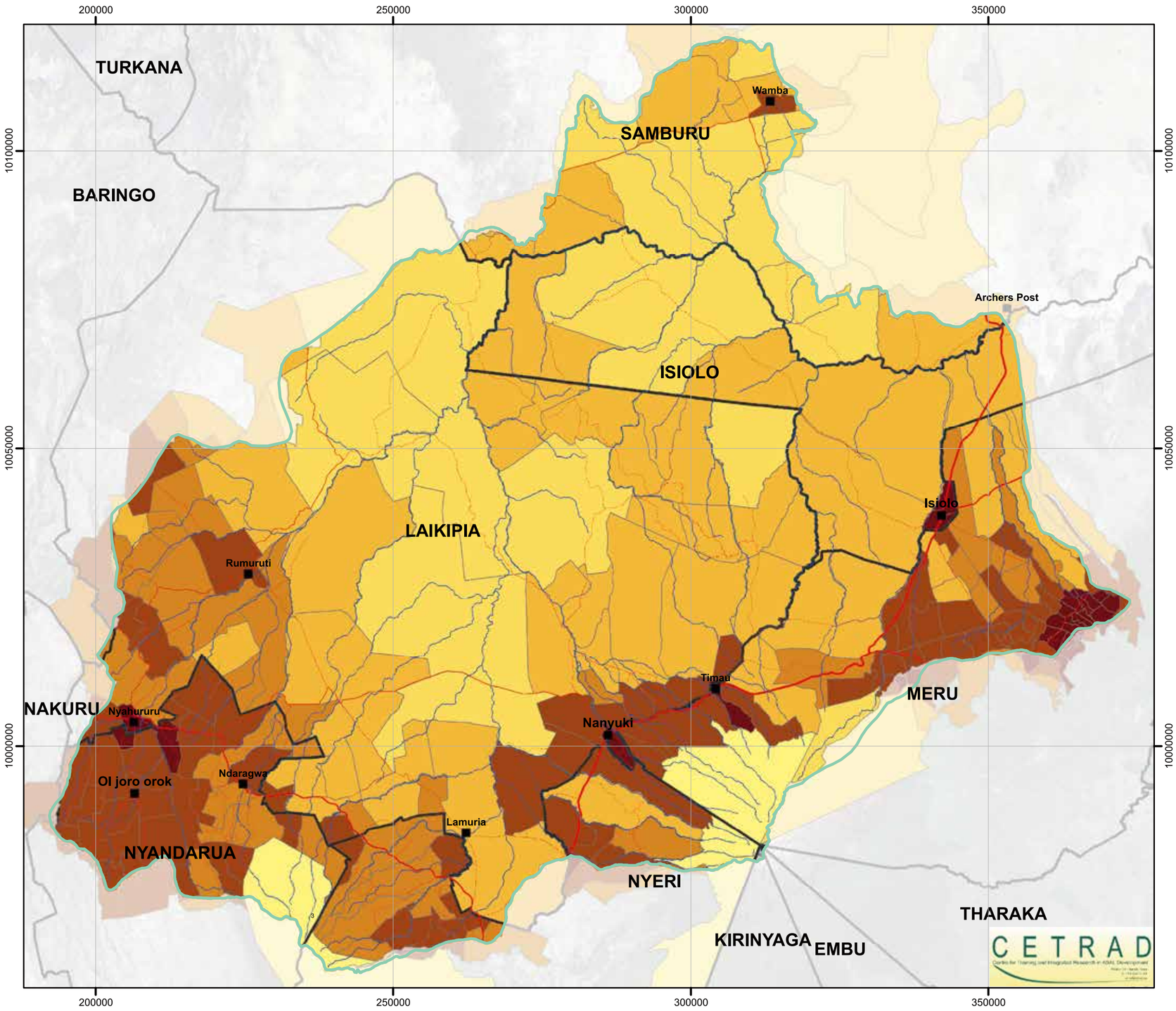
# Upper Ewaso Ngiro Basin: Population Density (2009)

**Population Density**

- 0
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 3605

**Features**

- Towns
- Roads
- Rivers
- Basin Boundary
- Counties
- Wetlands




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0 5 10 20 30 40 50
Kilometers

# Upper Ewaso Ngiro Basin: Water Resources and Abstraction Points (2005)

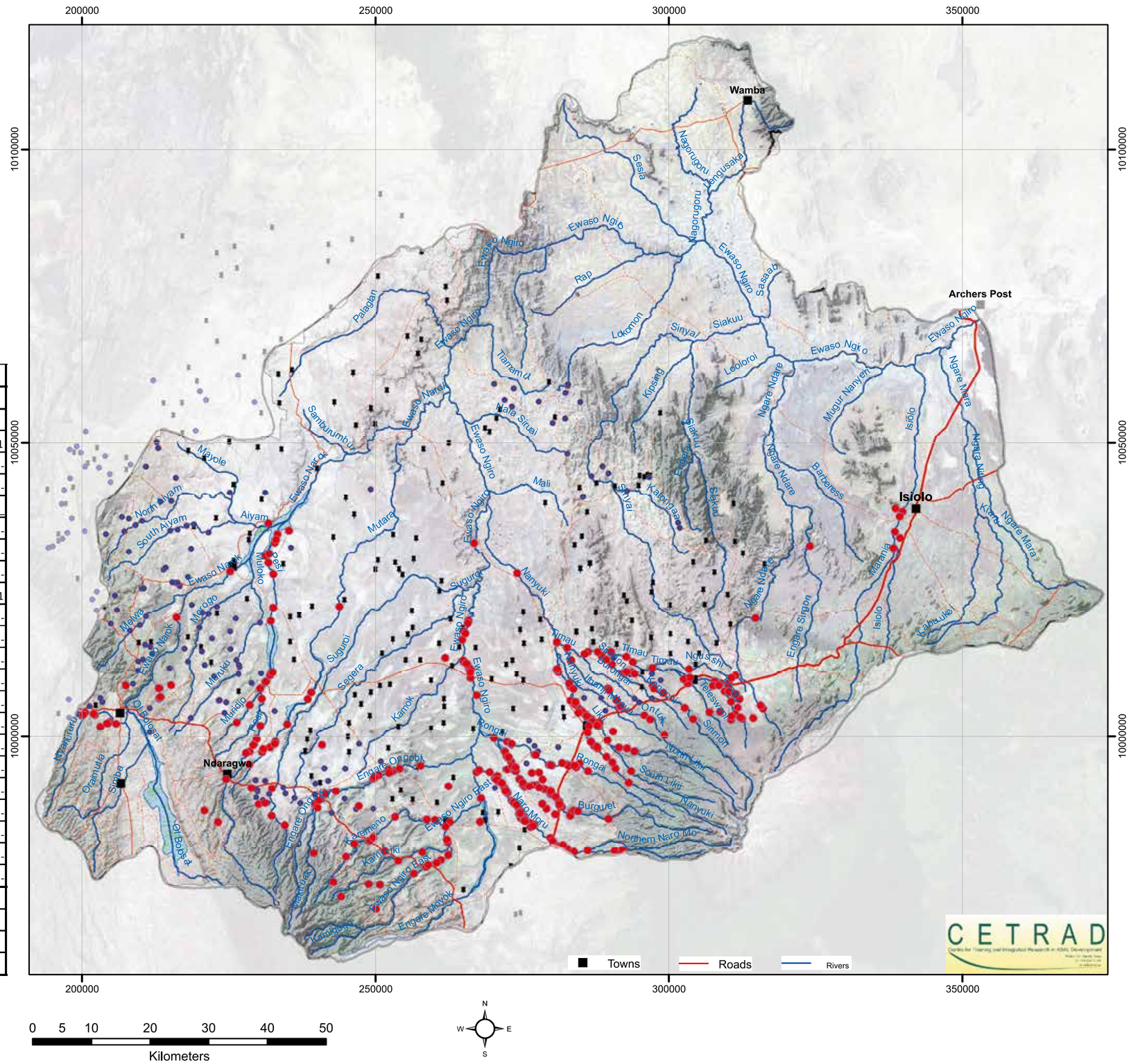
## Abstraction Type

- Rivers
- Dams
- Bore Holes

**Number of Abstraction points from different sources**

| No. | Name | No. of WRUAS | River Abstractions | | Other Abstractions 2013 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2005 | 2013 | BH | SP | WL | DM | PN | ST |
| 1 | Ewaso Narok | 9 | 114 | 204 | 9 | 50 | | 51 | 6 | 31 |
| 2 | Pesi | 1 | 233 | 318 | 2 | - | - | - | - | - |
| 3 | Mutara | 1 | 76 | 187 | 2 | 1 | - | - | - | - |
| 4 | Sugorai | 1 | 45 | 42 | 2 | - | 7 | 17 | 5 | - |
| 5 | Segera | 0 | 3 | - | - | - | - | - | - | - |
| 6 | Engare Ngobet | 1 | 133 | 39 | 5 | - | - | - | - | - |
| 7 | Ewaso Ngiro East | 1 | 310 | 125 | - | - | - | - | - | - |
| 8 | Engare Moyok | 1 | 2 | 76 | - | - | - | 1 | 1 | 1 |
| 9 | Naro Moru | 1 | 66 | 307 | - | - | - | - | - | - |
| 10 | Burguret | 1 | 63 | 185 | - | - | - | - | - | - |
| 11 | Rongai | 1 | 27 | 80 | 4 | 1 | - | 2 | 3 | - |
| 12 | Nanyuki | 1 | 34 | 24 | 2 | - | - | - | - | - |
| 13 | Likii | 1 | 43 | 29 | - | - | - | - | - | - |
| 14 | Ontuolili | 1 | 15 | 13 | 12 | 4 | | 3 | 1 | - |
| 15 | Sirimon | 1 | 19 | 73 | 3 | - | - | - | - | - |
| 16 | Timau | 2 | 77 | 171 | - | - | - | - | - | - |
| 17 | Sinyai | 0 | 0 | - | - | - | - | - | - | - |
| 18 | Siakuu | 0 | 0 | - | - | - | - | - | - | - |
| 19 | Ngare Ndare | 1 | 10 | 5 | 5 | 5 | - | - | - | - |
| 20 | Isiolo | 1 | 12 | 210 | - | 38 | - | - | - | - |
| 21 | Ngare Mara | 2 | 1 | 28 | 2 | 27 | - | - | 1 | - |

| Key | |
|---|---|
| BH - BoreHole | DM - Dam |
| SP - Spring | PN - Pan |
| WL - Well | ST - Streams |



# Upper Ewaso Ngiro Basin: Water Resources and Abstraction Points (2013)

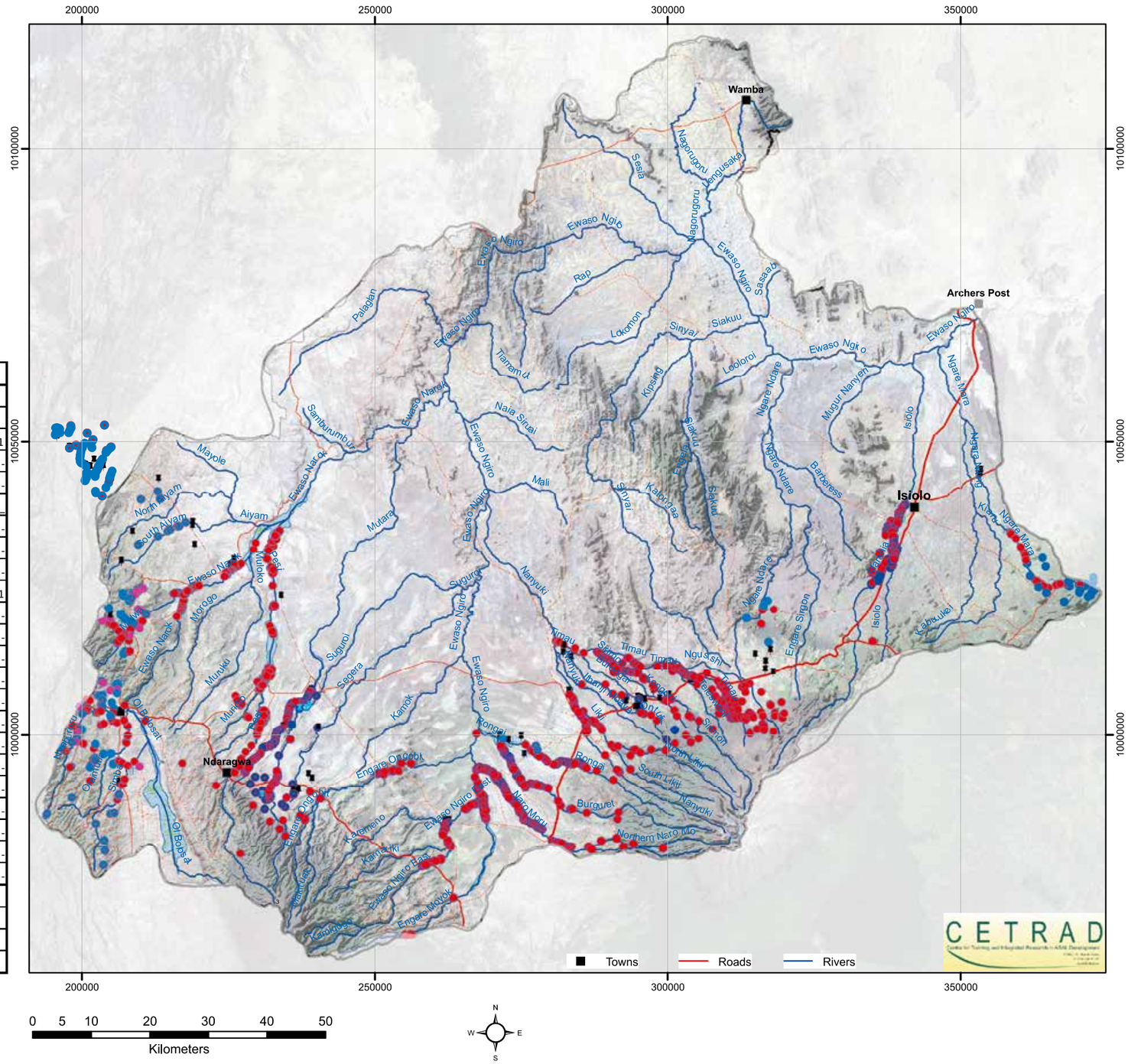
## Abstraction Type

- Rivers
- Stream
- Spring
- Dam
- Pan
- Borehole
- Shallow Well

**Number of Abstraction points from different sources**

| No. | Name | No. of WRUAS | River Abstractions | | Other Abstractions 2013 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2005 | 2013 | BH | SP | WL | DM | PN | ST |
| 1 | Ewaso Narok | 9 | 114 | 204 | 9 | 50 | | 51 | 6 | 31 |
| 2 | Pesi | 1 | 233 | 318 | 2 | - | - | - | - | - |
| 3 | Mutara | 1 | 76 | 187 | 2 | 1 | - | - | - | - |
| 4 | Sugorai | 1 | 45 | 42 | 2 | - | 7 | 17 | 5 | - |
| 5 | Segera | 0 | 3 | - | - | - | - | - | - | - |
| 6 | Engare Ngobet | 1 | 133 | 39 | 5 | - | - | - | - | - |
| 7 | Ewaso Ngiro East | 1 | 310 | 125 | - | - | - | - | - | - |
| 8 | Engare Moyok | 1 | 2 | 76 | - | - | - | 1 | 1 | 1 |
| 9 | Naro Moru | 1 | 66 | 307 | - | - | - | - | - | - |
| 10 | Burguret | 1 | 63 | 185 | - | - | - | - | - | - |
| 11 | Rongai | 1 | 27 | 80 | 4 | 1 | - | 2 | 3 | - |
| 12 | Nanyuki | 1 | 34 | 24 | 2 | - | - | - | - | - |
| 13 | Likii | 1 | 43 | 29 | - | - | - | - | - | - |
| 14 | Ontuolili | 1 | 15 | 13 | 12 | 4 | | 3 | 1 | - |
| 15 | Sirimon | 1 | 19 | 73 | 3 | - | - | - | - | - |
| 16 | Timau | 2 | 77 | 171 | - | - | - | - | - | - |
| 17 | Sinyai | 0 | 0 | - | - | - | - | - | - | - |
| 18 | Siakuu | 0 | 0 | - | - | - | - | - | - | - |
| 19 | Ngare Ndare | 1 | 10 | 5 | 5 | 5 | - | - | - | - |
| 20 | Isiolo | 1 | 12 | 210 | - | 38 | - | - | - | - |
| 21 | Ngare Mara | 2 | 1 | 28 | 2 | 27 | - | - | 1 | - |

| Key | |
|---|---|
| BH - BoreHole | DM - Dam |
| SP - Spring | PN - Pan |
| WL - Well | ST - Streams |

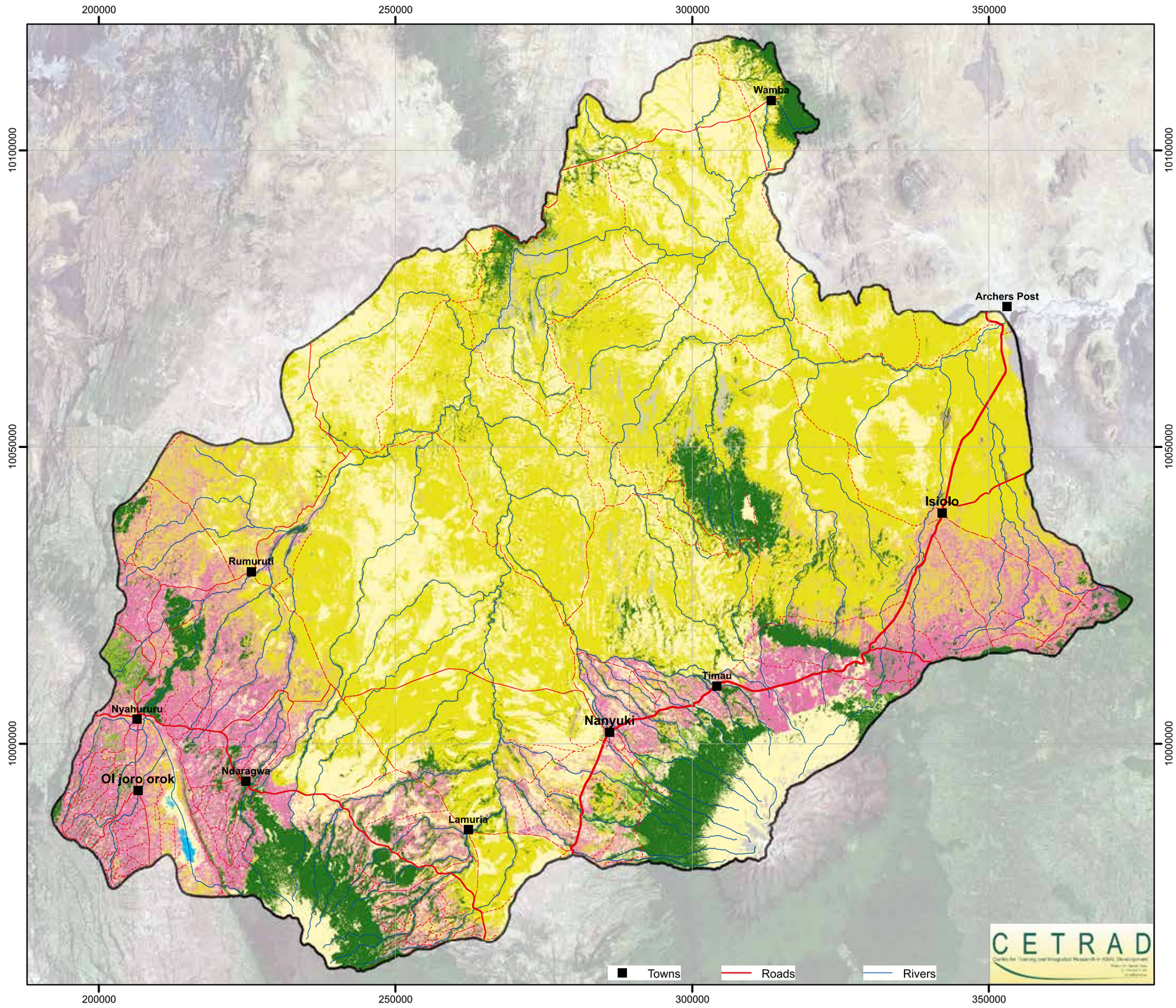


# Upper Ewaso Ngiro Basin: LandCover (1995)

**Landcover (1995)**

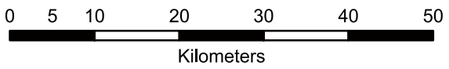
- Natural Forest
- Plantation Forest
- Woody Grassland
- Grassland
- Cropland
- Urban Areas
- Water
- Wastelands Rocks
- Others

| Cover Type | Area Km$^2$ | % Cover |
|---|---|---|
| Natural Forest | 1,529 | 9.95 |
| Plantation Forest | 78 | 0.51 |
| Woody Grassland | 7,121 | 46.35 |
| Grassland | 4,239 | 27.59 |
| Cropland | 2,225 | 14.48 |
| Urban Areas | 4 | 0.03 |
| Water | 18 | 0.12 |
| Wastelands Rocks | 148 | 0.96 |
| Others | 3 | 0.02 |
| **Totals** | **15,364** | **100.00** |







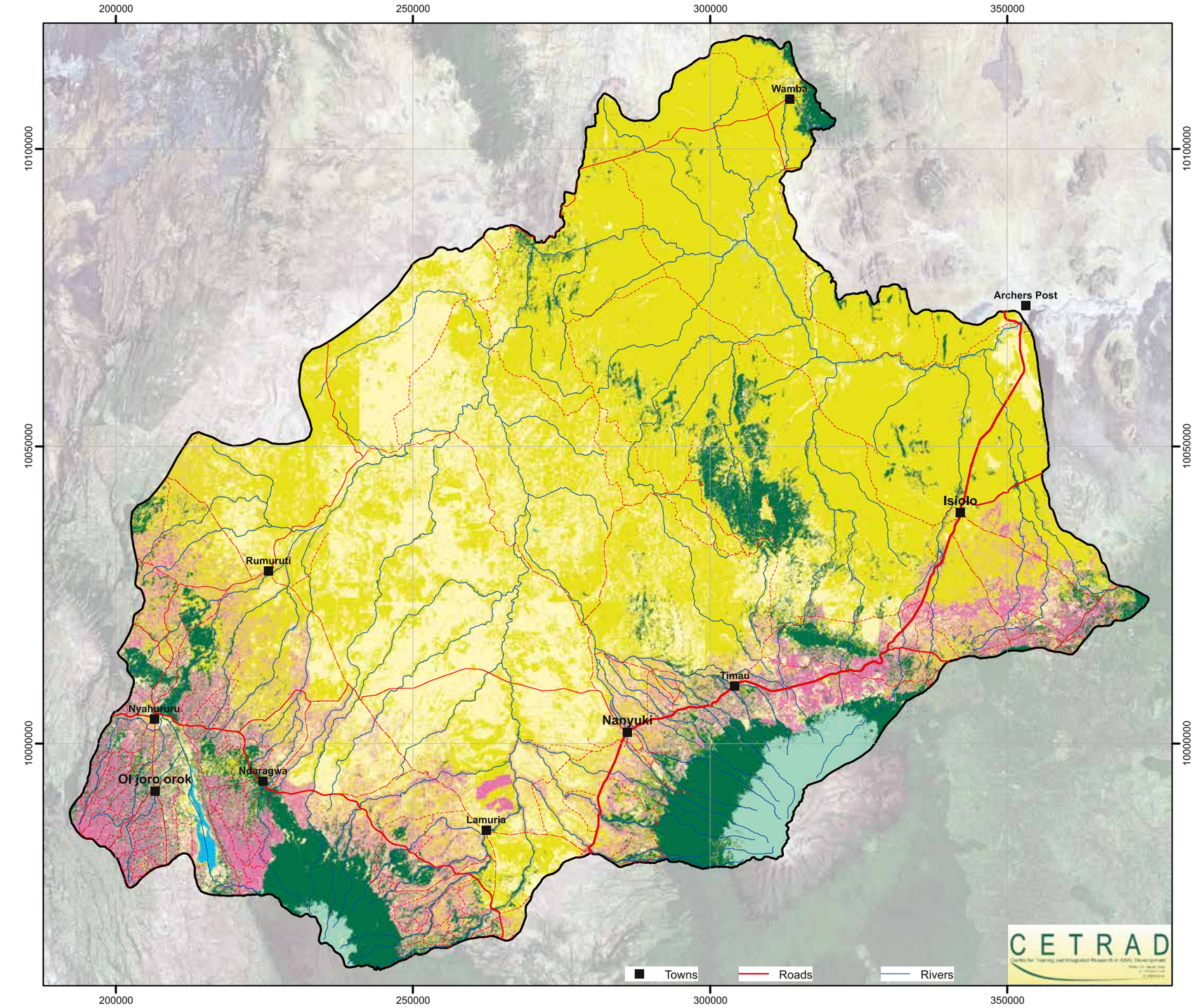


# Upper Ewaso Ngiro Basin: LandCover (2014)

**Landcover (2014)**

- Natural Forest
- Plantation Forest
- Woody Grassland
- Grassland
- Moorland
- Cropland
- Water
- Wastelands Rocks

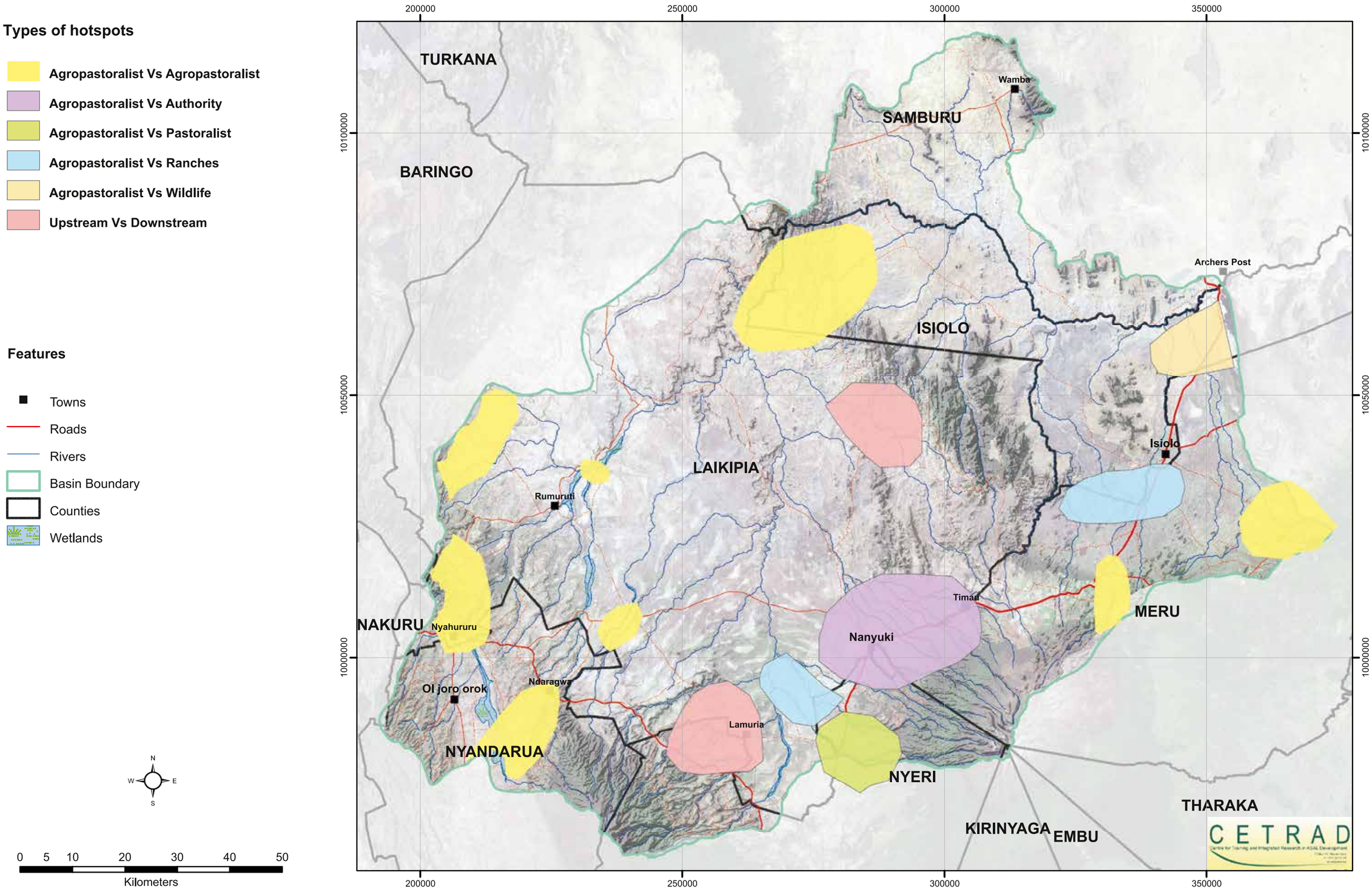
| Cover Type | Area Km$^2$ | % Cover |
|---|---|---|
| Natural Forest | 1,660 | 10.8 |
| Plantation Forests | 54 | 0.35 |
| Woody Grassland | 8,195 | 53.34 |
| Grassland | 3,597 | 23.41 |
| Moorland | 338 | 2.2 |
| Cropland | 1,474 | 9.59 |
| Water | 36 | 0.24 |
| Wastelands Rocks | 10 | 0.07 |
| Others | 0 | 0 |
| **Totals** | **15,364** | **100** |



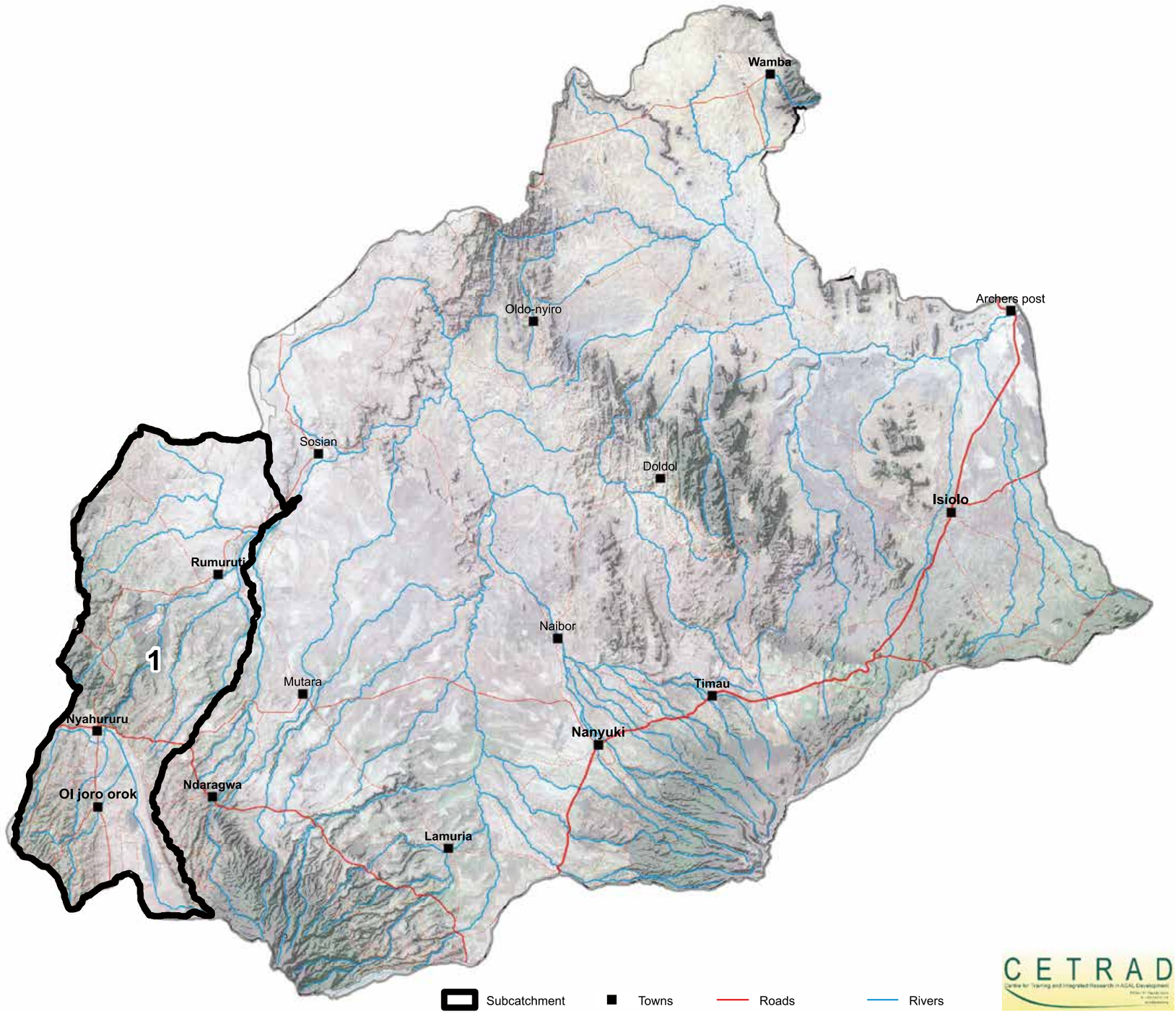

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0 5 10 20 30 40 50
Kilometers

# Water conflict related Hotspots within the basin ( 2012)



# 1 - Ewaso Narok



# EWASO NAROK SUBCATCHMENT
## Fact sheet. Date: July 2014

### Introduction

Ewaso Narok has a total area of 1840 $Km^2$ with a combined population of 355,925 people living within seven sub locations (with an area of 3352 $Km^2$) that are partly or completely within the sub catchment. About 25% of the catchment land is under crops and settlements, 59% under grasslands and a mixture of woodlands, 15% under forest and the remaining 1% under water and moorland.

### Climate

The climate varies from humid toward Nakuru in the south to a mixture of sub and semi humid around Nyahururu town with the remaining areas in the north having semi humid to semi arid type of climate toward Rumuruti.

### Education

There are eighty (80) secondary schools and over 237 primary schools; government sponsored (96), Private (66) and Religious organizations (61), Community (5), County government (8) and NGO/CBO 2.

### Water Resource Users Association Information

### 1. Lower Ewaso Narok

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Lower Ewaso Narok | | | | |
| Contact persons | | Person: Anne Powys -0722397860 | | | | |
| Date of Formation | | 27/10/2010 | | | | |
| Registration details | Social Services | Society | | | | |
| | Attorney General Office | 18/11/2011 | | | | |
| Membership | Members | 600 | | | | |
| | Non Members | Over 10,000 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 24 | 3 | 4 | 23 |
| River water abstractions | | 19 | | | | |
| Main Reason for the formation | | To manage water resources and minimize conflicts between farmers and pastoralist | | | | |
| Objectives | | To conserve and add value to the water resources | | | | |
| Availability of sanctioning system | | yes | | | | |
| Number of large scale (Ranches, Conservancies, Horticulture others ) farms | | 12 Ranches; 14 Conservancies expected as role models/learning centre in natural resource conservation | | | | |
| Sources and Nature of Conflicts | | Illegal abstraction, Farming in the riparian land | | | | |
| Problems Reported to the WRUA | | Shortage of water; Flooding and dams siltation reducing storage capacity | | | | |
| Other unexpressed conflicts | | Land ownership and long process of water abstraction permit issuance | | | | |
| Availability of conflict resolution guidelines | | yes | | | | |
| Availability of conflict resolution skills and implementation | | inadequate skills | | | | |
| Challenges | | Inadequate resources; lack of collaboration with stakeholders | | | | |

| | |
|---|---|
| Cases of conflicts dealt with | Conflict between livestock farmers in relation to using the riparian areas for grazing : Uprooting of riparian pegs |
| Cases of conflicts unresolved and reasons | To allocate land for construction of community cattle dip |
| Other activities the WRUA is engaged in | -Rain water harvesting as an alternative source of water<br>-Conservation of trees along the riparian lands within the river banks<br>-Fish farming and bee keeping projects |
| Achievements | WRUA registration and opening of bank account |
| Hindrances to achieve the goals of the WRUA | Inadequate resources and lack of collaboration with stakeholders |
| Advices to others | To volunteer, commitment, transparency, accountability & collaboration |
| Information and Data Available | - |
| Person(s) Responsible for data | WRUA Executives |
| Methods of Data Collection | Through monthly consultative meetings |
| Information and Data Needs | _ |
| Period of Water Scarcity | Jan- March, Oct.- Dec. |
| How is the problem of water scarcity solved | Withdrawal of permit for other water use to allow water for domestic use only |
| Institutional Support to WRUA | Rural Focus,Year:2011,:Capacity building support<br>LWF, Year:2011, Capacity building support<br>WRMA, Year:2011, Capacity building support |
| Water quality and cause of pollution | Agrochemical pollution and farming along the river banks |
| Existence of Wetlands and their status | Ewaso Narok in Rumuruti utilized for farming and livestock grazing ( 1/3 used by the needy community within Rumuruti) |
| Others comments | - |

# EWASO NAROK SUBCATCHMENT
## Fact sheet. Date: July 2014

### 2. Oraimutia WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Oraimutia WRUA | | | | |
| Contact Address email, chairperson, phone | | OWRU@gmail.com | | | | |
| Date of Formation | | 2008 | | | | |
| Registration details | Social services | Reg. No. 5654 of 11 October 2008 | | | | |
| | Attorney General Office | Pursuing registration | | | | |
| Membership | Members | 120 | | | | |
| | Non members | 0 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 15 | 15 | 0 | 10 |
| River water abstractions | | 2 | | | | |
| Main Reason for formation | | to solve water use conflicts and to manage and conserve the catchment | | | | |
| Objectives | | -to promote cooperation between water users and government agencies e.g. WRMA<br>-to provide a forum for sensitizing residents on the importance of water use and conservation | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 2- horticultural farms/ flower farms<br>2- government institutions | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | - | | | | |
| Sources and Nature of Conflicts | | None | | | | |
| Problems Reported to the WRUA | | None | | | | |
| Unreported/unexpressed conflicts | | None | | | | |
| Availability of conflict resolution guidelines | | OWRUA has a set of guidelines in its constitution to deal with water conflicts | | | | |
| Availability of conflict resolution skills and implementation | | - | | | | |
| Challenges | | inadequate funds | | | | |
| Cases of conflicts dealt with | | None | | | | |
| Cases of conflicts unresolved and reasons | | None | | | | |
| Other activities the WRUA is engaged in | | Encouraging members and community in planting of water friendly trees within the catchment area | | | | |
| Achievements | | -Secured a donor fund from WSTF for capacity building<br>-raised membership to 130 members | | | | |
| Hindrances to achieve the goals of the WRUA | | -inadequate funding<br>-Newly formed WRUA with inadequate resource capacity | | | | |
| Advices to others | | newly formed WRUA | | | | |
| Information and Data Available | | newly formed WRUA | | | | |
| Person Responsible for data Collection | | newly formed WRUA | | | | |
| Methods of Data Collection | | WRUA is at youthful stage | | | | |
| Information and Data Needs | | WRUA is at youthful stage | | | | |
| Period of Water Scarcity | | None | | | | |
| How is the problem of water scarcity solved | | N/A | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | | | | | |
| Water Quality and cause of pollution | | | | | | |
| Existence of Wetlands and their status | | Two (2) wetlands on Oraimutia river and simba rivers | | | | |
| Others | | | | | | |

# EWASO NAROK SUBCATCHMENT

## Fact sheet. Date: July 2014

### 3. Ndivai WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Ndivai WRUA | | | | |
| Contact Address email, chairperson, phone | | P.O Box 192 Nyahururu<br>Jamlick Maina Mwangi; 0725857212 | | | | |
| Date of Formation | | March 2010 | | | | |
| Registration details | Social services | Reg. No. 9552 | | | | |
| | Attorney General Office | Reg. No. 33978 | | | | |
| Membership | Members | 200 | | | | |
| | Non members | 0 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams |
| | | 1 | 15 | 13 | 7 | 14 |
| River water abstractions | | 3 | | | | |
| Main Reason for the formation | | Address water scarcity in the subcatchment | | | | |
| Objectives | | -Address water scarcity issues<br>-put conservation measures in place to increase water flow in the river<br>-Protect water sources | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | None | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | N/A | | | | |
| Sources and Nature of Conflicts | | Water use conflicts between human versus livestock | | | | |
| Problems Reported to the WRUA | | Illegal river water abstraction<br>Planting of blue gum in riparian land<br>Farming along of river banks | | | | |
| Unreported/unexpressed conflicts | | Wildlife/ human conflict | | | | |
| Availability of conflict resolution guidelines | | The WRUA has sensitized the community on proper sharing of the resource | | | | |
| Availability of conflict resolution skills and implementation | | WRMA has continued to equip the WRUA with skills over the same.<br>Implementation is slow as the community within the subcatchment has never had any institution supervising the resource | | | | |
| Challenges | | Newly formed WRUA<br>Lack of skills<br>lack of management skills, low education level and inadequate finance management skills | | | | |
| Cases of conflicts dealt with | | People washing clothes in dams where clean water for domestic water is fetched<br>Destruction of fenced dams and troughs<br>Denial of water by an individual | | | | |
| Cases of conflicts unresolved and reasons | | None | | | | |
| Other activities the WRUA is engaged in | | -tree nursery<br>-Digging of shallow wells in members' farms | | | | |
| Achievements | | -increased number of trees planted every year<br>-enhanced water storage | | | | |
| Hindrances to achieve the goals of the WRUA | | | | | | |
| Advices to others | | Transparency and accountability | | | | |
| Information and Data Available | | List of water sources, Maps | | | | |
| Person Responsible for data Collection | | Secretary | | | | |
| Methods of Data Collection | | Consultative meetings, scouting, reports from community | | | | |
| Information and Data Needs | | Computers, Camera, training | | | | |
| Period of Water Scarcity | | Commonly from November to end march | | | | |
| How is the problem of water scarcity solved | | equitable distribution of water<br>Protection of the water sources | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | WSTF 2011<br>Financial support | | | | |
| cause of pollution | | Slaughterhouse | | | | |
| Existence of Wetlands and their status | | There are wetlands in the subcatchment<br>The wetlands are endangered if unprotected immediately | | | | |
| Others | | | | | | |

## 4. Nyahururu WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Nyahururu WRUA | | | | |
| Contact Address email, chairperson, phone | | nyahururuwrua@yahoo.com;<br>Chairman-0721879706 | | | | |
| Date of Formation | | 14 July 2010 | | | | |
| Registration details | Social services | 8 November 2011 Reg. No.35942 | | | | |
| | Attorney General Office | | | | | |
| Membership | Members | 250 | | | | |
| | Non members | 10,000 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 11 | 30 | 2000 | 10 |
| River water abstractions | | 56 | | | | |
| Main Reason for the formation | | Protection and conservation of Nyahururu River catchment | | | | |
| Objectives | | Promote and exercise the sustainable use of water for approved purpose | | | | |
| Availability of sanctioning system | | none | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | N/A | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | N/A | | | | |
| Sources and Nature of Conflicts | | -pollution<br>-encroachment<br>-over abstraction<br>-human /livestock/wildlife conflicts | | | | |
| Problems Reported to the WRUA | | Encroachment of dam reserves<br>Water pollution issues | | | | |
| Unreported/unexpressed conflicts | | Illegal abstractors. Human/wildlife/livestock conflicts. Catchment destruction | | | | |
| Availability of conflict resolution guidelines | | Information dissemination. Continuous capacity building. Formation of conflict resolution committee | | | | |
| Availability of conflict resolution skills and implementation | | | | | | |
| Challenges | | Inadequate personnel and skills<br>Inadequate resources and backing from collaborators<br>Invasive weeds covering dams (2 large dams;17 acres) | | | | |
| Cases of conflicts dealt with | | Formation of conflict resolution committee to handle springs pollution<br>Demarcation of encroached dam reserves | | | | |
| Cases of conflicts unresolved and reasons | | Catchment destruction<br>Illegal abstractors<br>Unresolved conflicts is due to poor enforcement | | | | |
| Other activities the WRUA is engaged in | | SCMP development and implementation<br>water conservation and sustainable use<br>Catchment rehabilitation and protection | | | | |
| Achievements | | Catchment rehabilitations<br>Conflict management<br>Raising WRUA membership | | | | |
| Hindrances to achieve the goals of the WRUA | | Lack of funds. Lack of operational office equipments. Lack of training for personnel | | | | |
| Advices to others | | Information dissemination is the best tool for healthy and strong WRUA | | | | |
| Information and Data Available | | Registered Members. Reports. Information manuals | | | | |
| Person Responsible for data Collection | | Secretary | | | | |
| Methods of Data Collection | | Write ups | | | | |
| Information and Data Needs | | Weekly report magazines. Trainings/awareness materials. Exposure/exchange programmes. Fund raising strategies | | | | |
| Period of Water Scarcity | | Jan-April | | | | |
| How is the problem of water scarcity solved | | N/A | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | Laikipia Wildlife Forum<br>Preparation of SCMP. 30, 000 indigenous tree seedlings | | | | |
| Water Quality and cause of pollution | | Waste dumping, overflow from toilets, poor sewage system and car wash | | | | |
| Existence of Wetlands and their status | | Kwa Muchemi<br>Gwa Kahuno<br>National pencil<br>Kwa Nganatha | | | | |
| Others | | | | | | |

# EWASO NAROK SUBCATCHMENT
## Fact sheet. Date: July 2014

### 5. Kinamba WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Kinamba WRUA | | | | |
| Contact Address email, chairperson, phone | | P.O BOX 439 Kinamba,<br>0723808726, 0734613517 | | | | |
| Date of Formation | | 29 September 2010 | | | | |
| Registration details | Social services | N/A | | | | |
| | Attorney General Office | An association, No 35855-28 Date: October 2011 | | | | |
| Membership details | Members | 35 | | | | |
| | Non members | 21,385 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pan |
| | | 1 | 10 | 9 | 56 | 12 |
| River water abstractions | | 9 | | | | |
| Main Reason for the formation | | To improve the quality and quantity of water | | | | |
| Objectives | | • Promote controlled legal water use activities<br>• Promote water development practices to improve quantity and quality<br>• Promote soil and water conservation for environmental and ecological sustainability | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 1 (One) conservancy and many small scale horticultural farms | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Ordinary members | | | | |
| Sources and Nature of Conflicts | | Resource use – human wildlife conflict and pastoralists /farmers conflict | | | | |
| Problems Reported to the WRUA | | None | | | | |
| Unreported/unexpressed conflicts | | Deaths caused by wild animals. Water pollution by agrochemicals. Soil erosion | | | | |
| Availability of conflict resolution guidelines | | None | | | | |
| Availability of conflict resolution skills and implementation | | Minimal | | | | |
| Challenges | | Lack of conflict resolution guidelines and implementation skills<br>Lack of knowledge for implementation of water regulations and the water service charter<br>lack of finances | | | | |
| Cases of conflicts dealt with | | None | | | | |
| Cases of conflicts unresolved and reasons | | None | | | | |
| Other activities the WRUA is engaged in | | Awareness creation<br>SCMP development<br>Mobilization of members | | | | |
| Achievements | | Development of SCMP<br>Registration of over one hundred members | | | | |
| Hindrances to achieve the goals of the WRUA | | Lack of finances and appropriate skills | | | | |
| Advices to others | | To collaborate with WRMA for guidance concerning the water resource | | | | |
| Information and Data Available | | None | | | | |
| Person Responsible for data Collection | | Unidentified | | | | |
| Methods of Data Collection | | N/A | | | | |
| Information and Data Needs | | N/A | | | | |
| Period of Water Scarcity | | Six months (Jan-March, July- Sept.) | | | | |
| How is the problem of water scarcity solved | | By Rain water harvesting and water storage.<br>By digging shallow wells | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | WRMA 2010 Legal advice on recruitment, registration, capacity building<br>LWF - Facilitation, training & SCMP development<br>Rural focus - Facilitation, training & SCMP development | | | | |
| Water Quality and cause of pollution | | Agrichemical pollution and soil erosion<br>Poor quality water | | | | |
| Existence of Wetlands and their status | | Three in number, unprotected wetlands | | | | |
| Others | | The WRUA has no permanent rivers, the people rely on dams, springs, boreholes and shallow wells | | | | |

# EWASO NAROK SUBCATCHMENT
## Fact sheet. Date: July 2014

### 6. Equator **WRUA**

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Equator WRUA | | | | |
| Contact Address email, chairperson, phone | | P.O BOX 395 Nyahururu ;<br>chairman-0714472599, Secretary-0705808123, Tresurer-0712745096 | | | | |
| Date of Formation | | 25 May 2006 | | | | |
| Registration details | Social services | Reg No. 6266 Date: 22 June 2006 | | | | |
| | Attorney General Office | Reg No. 56416 Date: 2 September 2010 | | | | |
| Membership details | Members | 207 | | | | |
| | Non members | 25,000 | | | | |
| Water resources | | River | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 5 | 50 | 200 | 10 |
| River water abstractions | | 3 | | | | |
| Main Reason for the formation | | Protection of the water catchment | | | | |
| Objectives | | • access quality water<br>• Increase crop production<br>• Increase livestock production<br>• Eradicate poverty | | | | |
| Availability of sanctioning system | | none | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Suera Horticultural farm | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | none | | | | |
| Sources and Nature of Conflicts | | -Horticulture irrigation<br>-illegal Water abstraction | | | | |
| Problems Reported to the WRUA | | • Exotic tree planting at riparian areas or wetlands<br>• Dam land reserve encroachment<br>• Illegal water abstraction<br>• Wetland destruction<br>• Dam pollution | | | | |
| Unreported/unexpressed conflicts | | Digging of small water pans. Planting of blue gums | | | | |
| Availability of conflict resolution guidelines | | yes | | | | |
| Availability of conflict resolution skills and implementation | | Chief barazas, Seminars. Water catchment inspections. WRUA stakeholders involvement | | | | |
| Challenges | | None to all | | | | |
| Cases of conflicts dealt with | | • Land surveying<br>• Exotic tree planting<br>• Wetland destruction<br>• Wetland encroachment | | | | |
| Cases of conflicts unresolved and reasons | | Some of the wetlands and water riparian have not been surveyed due to lack of funds | | | | |
| Other activities the WRUA is engaged in | | Advice to local community on resource conservation<br>Protection of rivers/dams/springs<br>protection of riparian land<br>Protection of spill ways | | | | |
| Achievements | | Build three spillways<br>Holds seminars to WRUA members and local community | | | | |
| Hindrances to achieve the goals of the WRUA | | Lack of funds for seminars. Unskilled staff for training. Land grabbing | | | | |
| Advices to others | | Join WRUAs<br>Protect wetlands/swamps/ riparian land<br>Remove exotic trees (blue gums) | | | | |
| Information and Data Available | | - | | | | |
| Person Responsible for data Collection | | WRUA members/WRMA members/GOK/stakeholders | | | | |
| Methods of Data Collection | | Consultative meeting with the community members. GOK/stakeholders | | | | |
| Information and Data Needs | | Data collected on the catchment. Research | | | | |
| Period of Water Scarcity | | 3 years | | | | |
| How is the problem of water scarcity solved | | Controlling illegal abstractors. Protecting dams and springs. Protecting wetlands/springs | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | WSTF – 2011 sh. 556,700<br>Financial support - Ol Kalou CDF 2009- sh.400,000 ; Ol Kalou CDF 2010- sh.200,000 | | | | |
| Water Quality and cause of pollution | | Latrines; Soil Erosion; Air pollution | | | | |
| Existence of Wetlands and their status | | Gathanji wetlands, Gatimu wetlands, Pondo Wetlands<br>Boiman Wetlands | | | | |
| Others | | We need urgent funding to protect wetlands/ dams /rivers | | | | |

## 7. Muhotetu WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Muhotetu WRUA | | | | |
| Contact Address email, chairperson, phone | | P.o Box 244 Nyahururu | | | | |
| Date of Formation | | 11 August 2010 | | | | |
| Registration details | Social services | L/W/RMT/318 | | | | |
| | Attorney General office | SOC/61070 | | | | |
| Membership details | members | 3 | | | | |
| | Non members | Many not known | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 4 | 13 | 1 | 14 |
| River water abstractions | | 0 | | | | |
| Main Reason for the formation | | Conservation of the water resources through IWRM and improving lives of the Mohotetu community | | | | |
| Objectives | | 1)To promote water quality and quantity<br>2)To provide a forum to discuss, prevent and resolve water conflicts<br>3) To promote legal water use | | | | |
| Availability of sanctioning system | | none | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | N/A | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | N/A | | | | |
| Sources and Nature of Conflicts | | -illegal abstraction<br>- Ignorance on water Act 2002, selfishness etc. | | | | |
| Problems Reported to the WRUA | | Inadequate water<br>destruction of spring eyes<br>Illegal abstraction<br>Water pollution | | | | |
| Unreported/unexpressed conflicts | | Poor water harvesting methodologies & storage facilities | | | | |
| Availability of conflict resolution guidelines | | yes | | | | |
| Availability of conflict resolution skills and implementation | | Mobilization/ sensitisation, training of community & WRUA members on various aspects of governance and water resource management | | | | |
| Challenges | | Lack of funds<br>Inadequate water<br>Poor communication | | | | |
| Cases of conflicts dealt with | | Illegal water abstraction | | | | |
| Cases of conflicts unresolved and reasons | | Destruction of spring eyes due to lack of protection of water resources Catchment areas | | | | |
| Other activities the WRUA is engaged in | | Plant appropriate trees and other vegetation at the catchment areas | | | | |
| Achievements | | Identification of water resource catchments<br>Conflict management | | | | |
| Hindrances to achieve the goals of the WRUA | | Poor communication, Lack of funds, ignorance | | | | |
| Advices to others | | - | | | | |
| Information and Data Available | | Muhotetu WRUA SCMP | | | | |
| Person Responsible for data Collection | | Management committee | | | | |
| Methods of Data Collection | | By visiting the sub-catchment area | | | | |
| Information and Data Needs | | To enable the WRUA to achieve their objectives and goals | | | | |
| Period of Water Scarcity | | Nov – April | | | | |
| How is the problem of water scarcity solved | | Water rationing, Improve water storage facilities | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | None | | | | |
| Water Quality and cause of pollution | | Poor. Due to siltation and poor cultivation methods | | | | |
| Existence of Wetlands and their status | | Poorly conserved | | | | |
| Others | | Pegging of water catchment areas | | | | |

## 8. Melwa WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Melwa WRAU | | | | |
| Contact Address email, chairperson, phone | | Meclip2011@gmail.com ;<br>Chairman- Bernard Kamawira 0728293411 | | | | |
| Date of Formation | | March 2011 | | | | |
| Registration details | Social services | N/A | | | | |
| | Attorney General office | Association; 18 August 2011 | | | | |
| Membership details | members | 140 | | | | |
| | Non members | >1000 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 10 | 30 | many | 15 |
| River water abstractions | | 0 | | | | |
| Main Reason for the formation | | To promote and regulate sustainable use of water resources | | | | |
| Objectives | | To promote controlled and legal water use activities within Melwa river ecosystem | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | None | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | None | | | | |
| Sources and Nature of Conflicts | | -Contamination of water by livestock and people<br>- Encroachment of water sources and riparian | | | | |
| Problems Reported to the WRUA | | Contamination of water by livestock and people through poor sanitation<br>Interference of water point | | | | |
| Unreported/unexpressed conflicts | | Over abstraction of water during dry season. Destruction of catchment forest | | | | |
| Availability of conflict resolution guidelines | | None | | | | |
| Availability of conflict resolution skills and implementation | | None | | | | |
| Challenges | | Lack of financial resources<br>consumes time and hostility of parties<br>Lack of resources | | | | |
| Cases of conflicts dealt with | | None | | | | |
| Cases of conflicts unresolved and reasons | | Six cases<br>due to lack of resources to address the cause of conflict | | | | |
| Other activities the WRUA is engaged in | | None | | | | |
| Achievements | | Mobilization of village water management committees.<br>Awareness creation on water management | | | | |
| Hindrances to achieve the goals of the WRUA | | Limited funds | | | | |
| Advices to others | | Utilise committed persons within the community<br>To be persistent in mobilising the water users | | | | |
| Information and Data Available | | Membership records. Registration documents. Map of the ecosystem. Minutes of the meetings. Financial records | | | | |
| Person Responsible for data Collection | | Jointly done by the management committee | | | | |
| Methods of Data Collection | | - | | | | |
| Information and Data Needs | | Water harvesting technologies. Water testing methods. Sustainable water use in irrigation | | | | |
| Period of Water Scarcity | | Jan - March | | | | |
| How is the problem of water scarcity solved | | Water storage. Reduced use of water for irrigation | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | Sensitization workshops by WRMA for the formation of the WRUA in 2011 and January 2012<br>No funds availed to the WRUA so far | | | | |
| Water Quality and cause of pollution | | Quality of water is poor due to livestock and human activities | | | | |
| Existence of Wetlands and their status | | Wetlands are found in sections of the Melwa river ecosystem. There is a lot of encroachment by people | | | | |
| Others | | None | | | | |

# EWASO NAROK SUBCATCHMENT

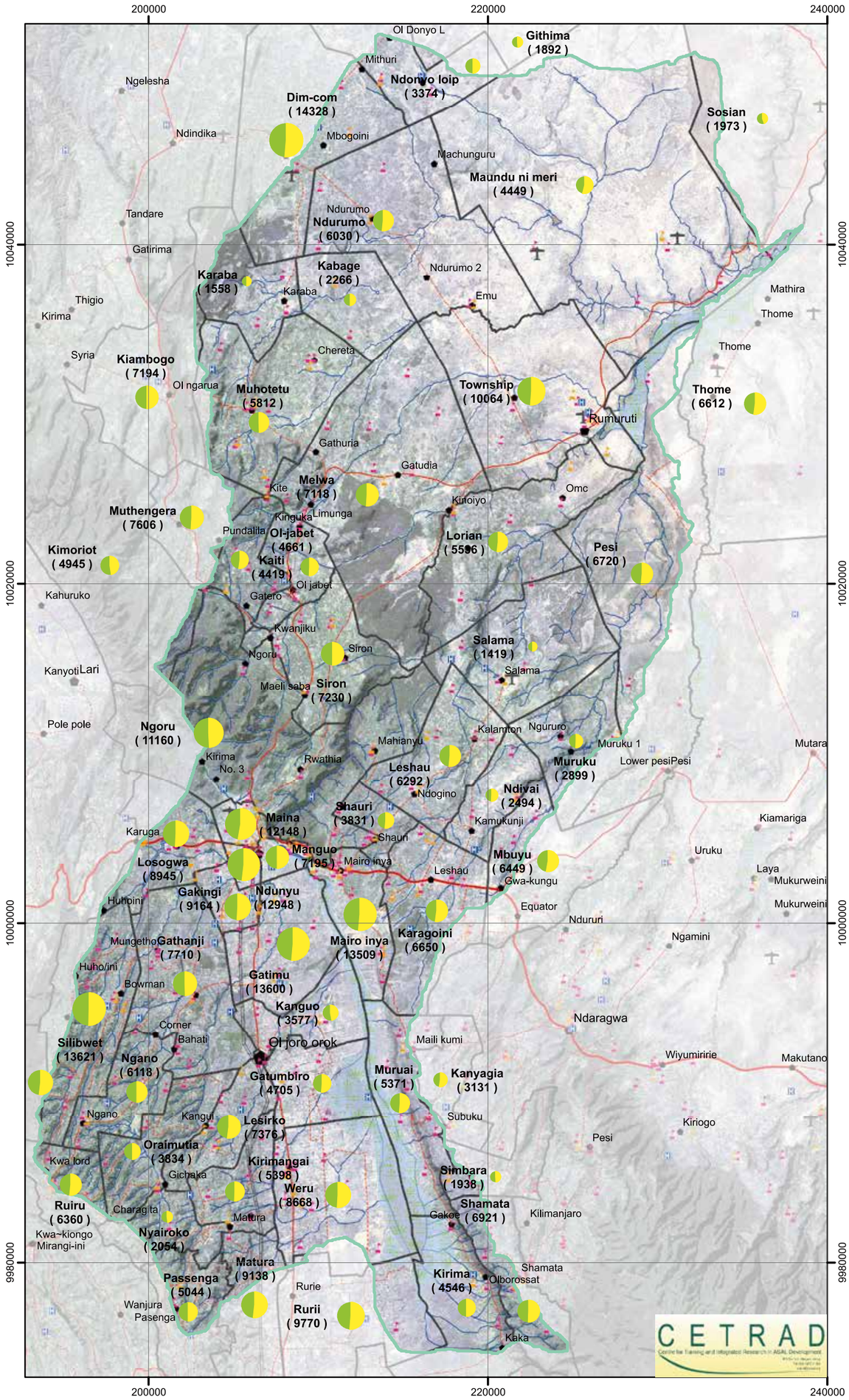
## Fact sheet. Date: July 2014

### 9. Olmoran WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Olmoran WRUA | | | | |
| Contact Address email, chairperson, phone | | C/o Chief office – Olmoran<br>Moses Kiplagat - 0716367569 | | | | |
| Date of Formation | | 17 June 2011 | | | | |
| Registration details | Social services | | | | | |
| | Attorney General office | | | | | |
| Membership details | members | 30 | | | | |
| | Non members | 0 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 0 | 9 | 0 | 0 | 10 |
| River Abstractions | | Not known | | | | |
| Main Reason for the formation | | Water shortage | | | | |
| Objectives | | -To increase water shortage<br>-To reduce pollution<br>-To curb conflicts | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | - | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | - | | | | |
| Sources and Nature of Conflicts | | -human- wildlife conflicts<br>-Farmers –pastoralists conflicts | | | | |
| Problems Reported to the WRUA | | None | | | | |
| Unreported/unexpressed conflicts | | Not known | | | | |
| Availability of conflict resolution guidelines | | None | | | | |
| Availability of conflict resolution skills and implementation | | None | | | | |
| Challenges | | -lack of skill<br>-lack of knowhow and young WRUA<br>-low coverage and membership | | | | |
| Cases of conflicts dealt with | | None | | | | |
| Cases of conflicts unresolved and reasons | | None | | | | |
| Other activities the WRUA is engaged in | | -mobilizing and awareness creation | | | | |
| Achievements | | Mobilization and formation of WRUA | | | | |
| Hindrances to achieve the goals of the WRUA | | High illiteracy level of the community | | | | |
| Advices to others | | Water is a finite resource manage it well | | | | |
| Information and Data Available | | None | | | | |
| Person Responsible for data Collection | | None | | | | |
| Methods of Data Collection | | Not outlined- indigenous knowledge available | | | | |
| Information and Data Needs | | High | | | | |
| Period of Water Scarcity | | Jan, Feb and part of March, Oct, Nov and December | | | | |
| How is the problem of water scarcity solved | | NO solution as per now | | | | |
| Institutional Support to WRUA<br><br>(Name, Year, Type of support, Amount of support) | | WRMA, LWF and Rural Focus helped in mobilizing and capacity building. June 2011 | | | | |
| Water Quality and cause of pollution | | Soil erosion and direct watering- Dams are very polluted | | | | |
| Existence of Wetlands and their status | | None | | | | |
| Others | | The sub catchment has no river and the water shortage is severe | | | | |

# Population Numbers (2009) and Socio Infrastructure

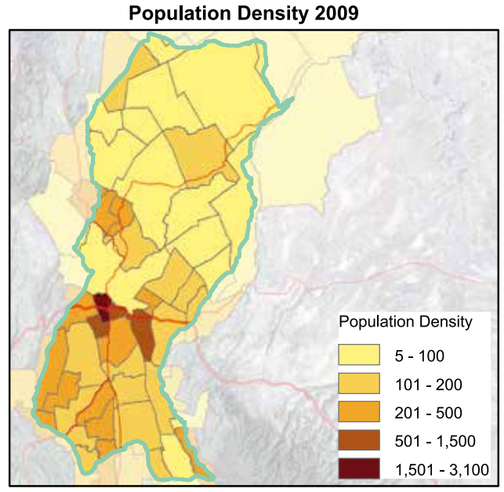
1




## Population Numbers 2009

| Sub Location | Area Km ² | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Dim-com | 86 | 6,968 | 7,360 | 14,328 | 166 | 3,655 |
| Gakingi | 10 | 4,501 | 4,663 | 9,164 | 910 | 2,718 |
| Gathanji | 56 | 3,909 | 3,801 | 7,710 | 137 | 1,831 |
| Gatimu | 39 | 6,584 | 7,016 | 13,600 | 351 | 3,675 |
| Gatumbiro | 28 | 2,283 | 2,422 | 4,705 | 169 | 1,174 |
| Githima | 59 | 968 | 924 | 1,892 | 32 | 411 |
| Kabage | 30 | 1,134 | 1,132 | 2,266 | 76 | 544 |
| Kaiti | 19 | 2,133 | 2,286 | 4,419 | 231 | 1,088 |
| Kanguo | 23 | 1,874 | 1,703 | 3,577 | 153 | 909 |
| Kanyagia | 19 | 1,478 | 1,653 | 3,131 | 165 | 797 |
| Karaba | 34 | 783 | 775 | 1,558 | 46 | 379 |
| Karagoini | 48 | 3,162 | 3,488 | 6,650 | 139 | 1,647 |
| Kiambogo | 56 | 3,577 | 3,617 | 7,194 | 129 | 1,695 |
| Kimoriot | 86 | 2,597 | 2,348 | 4,945 | 57 | 1,140 |
| Kirima | 47 | 2,258 | 2,288 | 4,546 | 96 | 1,017 |
| Kirimangai | 22 | 2,658 | 2,740 | 5,398 | 245 | 1,301 |
| Leshau | 39 | 3,033 | 3,259 | 6,292 | 161 | 1,631 |
| Lesirko | 22 | 3,542 | 3,834 | 7,376 | 338 | 1,969 |
| Lorian | 65 | 2,663 | 2,873 | 5,536 | 85 | 1,061 |
| Losogwa | 33 | 4,391 | 4,554 | 8,945 | 274 | 2,186 |
| Maina | 7 | 5,736 | 6,412 | 12,148 | 1,756 | 3,240 |
| Mairo inya | 25 | 6,547 | 6,962 | 13,509 | 530 | 3,642 |
| Manguo | 6 | 3,616 | 3,579 | 7,195 | 1,126 | 2,688 |
| Matura | 35 | 4,432 | 4,706 | 9,138 | 259 | 2,175 |
| Maundu ni meri | 267 | 2,048 | 2,401 | 4,449 | 17 | 956 |
| Mbuyu | 50 | 3,059 | 3,390 | 6,449 | 130 | 1,713 |
| Melwa | 129 | 3,487 | 3,631 | 7,118 | 55 | 1,719 |
| Muhotetu | 68 | 2,925 | 2,887 | 5,812 | 85 | 1,474 |
| Muruai | 39 | 2,629 | 2,742 | 5,371 | 139 | 1,291 |
| Muruku | 36 | 1,427 | 1,472 | 2,899 | 80 | 709 |
| Muthengera | 28 | 3,735 | 3,871 | 7,606 | 269 | 1,865 |
| Ndivai | 20 | 1,213 | 1,281 | 2,494 | 126 | 621 |
| Ndonyo loip | 63 | 1,688 | 1,686 | 3,374 | 53 | 781 |
| Ndunyu | 4 | 6,242 | 6,706 | 12,948 | 3,091 | 3,862 |
| Ndurumo | 89 | 2,895 | 3,135 | 6,030 | 68 | 1,437 |
| Ngano | 25 | 3,048 | 3,070 | 6,118 | 241 | 1,518 |
| Ngoru | 139 | 5,669 | 5,491 | 11,160 | 81 | 2,655 |
| Nyairoko | 19 | 1,052 | 1,002 | 2,054 | 106 | 557 |
| Ol-jabet | 19 | 2,293 | 2,368 | 4,661 | 249 | 1,242 |
| Oraimutia | 30 | 1,918 | 1,916 | 3,834 | 130 | 944 |
| Passenga | 36 | 2,521 | 2,523 | 5,044 | 142 | 1,286 |
| Pesi | 134 | 3,286 | 3,434 | 6,720 | 50 | 1,644 |
| Rugongo | 78 | 3,950 | 4,205 | 8,155 | 105 | 1,855 |
| Ruiru | 24 | 3,083 | 3,277 | 6,360 | 268 | 1,389 |
| Rurii | 56 | 4,784 | 4,986 | 9,770 | 173 | 2,416 |
| Salama | 56 | 699 | 720 | 1,419 | 25 | 365 |
| Shamata | 31 | 3,444 | 3,477 | 6,921 | 225 | 1,745 |
| Shauri | 11 | 1,857 | 1,974 | 3,831 | 350 | 943 |
| Silibwet | 52 | 6,764 | 6,857 | 13,621 | 260 | 3,265 |
| Simbara | 22 | 998 | 940 | 1,938 | 88 | 522 |
| Siron | 41 | 3,603 | 3,627 | 7,230 | 178 | 1,738 |
| Sosian | 41 | 1,098 | 875 | 1,973 | 5 | 528 |
| Thome | 330 | 3,174 | 3,438 | 6,612 | 20 | 1,507 |
| Township | 88 | 4,937 | 5,127 | 10,064 | 114 | 2,430 |
| Weru | 62 | 4,221 | 4,447 | 8,668 | 140 | 2,210 |
| **Totals** | **3,352** | **174,574** | **181,351** | **355,925** | **106** | **89,760** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Ewaso Narok Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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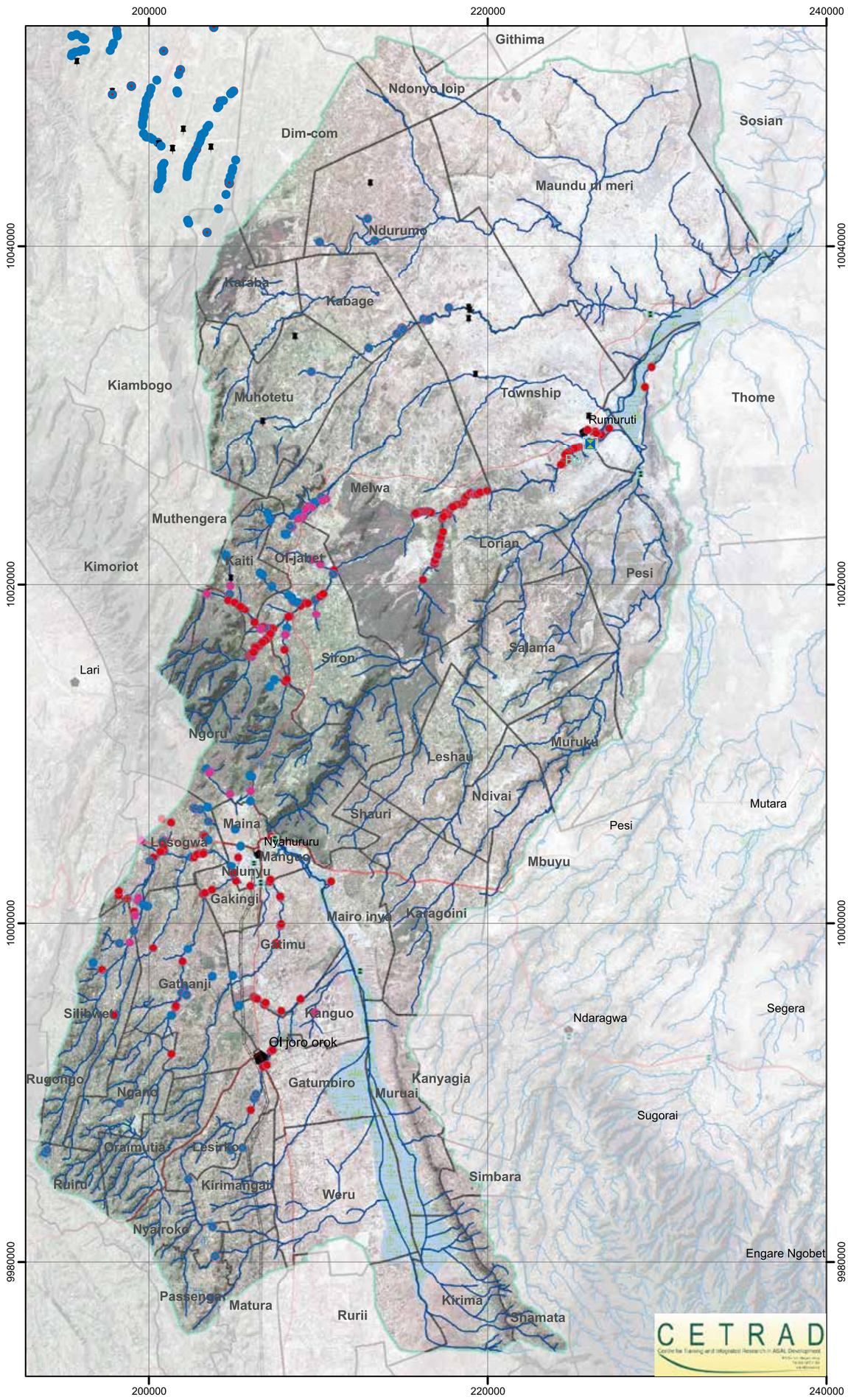
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

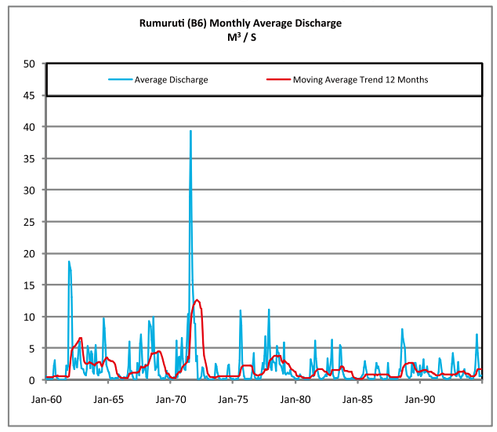
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

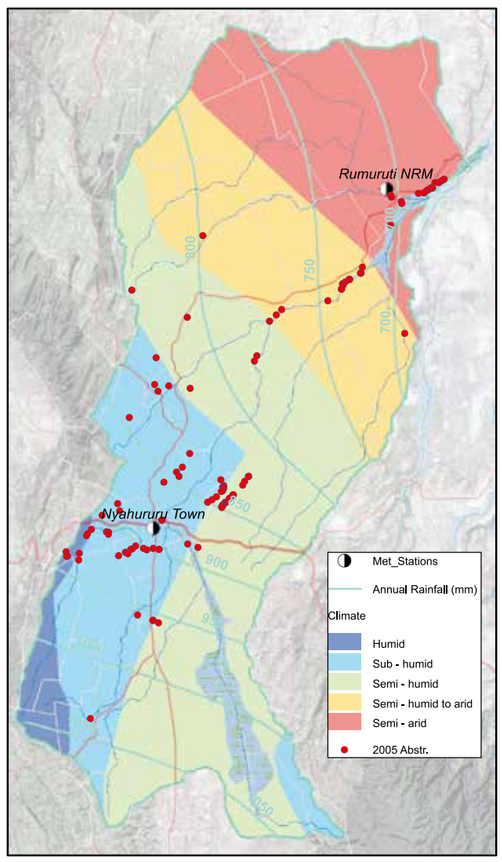





## Water Discharge Trends (B6)




## Agro Climatic Zones and Abstraction Points (2005)




| CLIMATE | Agr Potential | Min Rainfall | Max Rainfall | Area Kms |
|---|---|---|---|---|
| Humid | Very high | 1100 | 2700 | **53** |
| Sub-humid | High | 1000 | 1600 | **367** |
| Semi-humid | high to medium | 800 | 1400 | **680** |
| Semi-humid to Semi-arid | Medium | 600 | 1100 | **376** |
| Semi-arid | Medium to low | 450 | 900 | **360** |

**Abstractions**
- Rivers
- Streams
- Springs
- Dams
- Bore Holes

**Features & Boundaries**
- Rivers
- Ewaso Narok RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

Roads
- A
- B
- C
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Ewaso Narok Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# Land Cover 2014

1

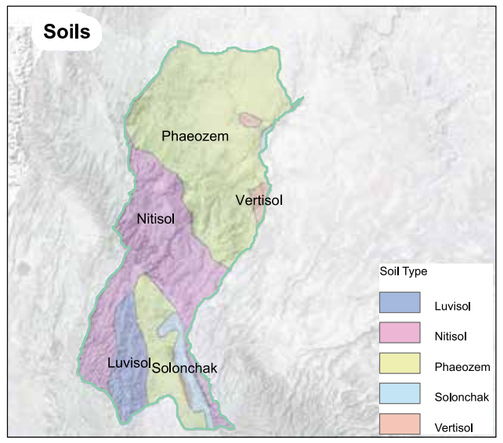
200000 220000 240000

10040000 10020000 10000000 9980000

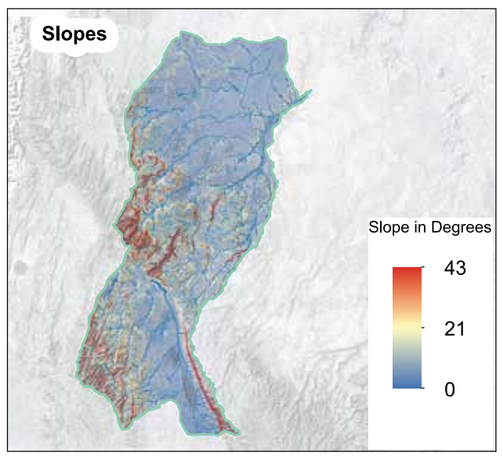
Githima
Ndonyo loip
Dim-com
Sosian
Maundu ni meri
Ndurumo
Kabage
Kiambogo
Muhotetu
Township
Rumuruti
Thome
Muthengera
Lorian
Kimoriot
Kaiti
Ol-jabet
Pesi
Salama
Siron
Lari
Ngoru
Leshau
Muruku
Ndivai
Shauri
Maina
Losogwa
Nyahururu
Manguo
Mbuyu
Ndunyu
Gakingi
Maro inya
Kiragoini
Gatimu
Gathanji
Silibwet
Kanguo
Ndaragwa
Ol joro orok
Rugongo
Ngano
Gatumbiro
Kanyagia
Murual
Oraimutia
Lesirko
Ruiru
Kirimangai
Weru
Simbara
Nyairoko
Passenga
Matura
Rurii
Kirima
Shamata

CETRAD

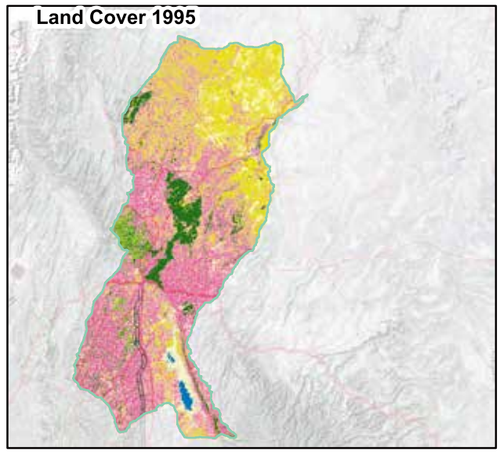
## Soils




## Slopes




## Land Cover 1995



## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 202.70 | 11.05 | 313.46 | 17.08 |
| Woody Grassland | 618.21 | 33.69 | 772.33 | 42.09 |
| Natural Forest | 153.44 | 8.36 | 264.40 | 14.41 |
| Plantation Forest | 32.45 | 1.77 | 2.70 | 0.15 |
| Cropland | 816.79 | 44.51 | 456.34 | 24.87 |
| Wastelands Rocks | 0.00 | 0.00 | _ | _ |
| Water | 10.90 | 0.59 | 25.05 | 1.36 |
| Moorland | _ | _ | 0.84 | 0.05 |
| Urban Areas | 0.63 | 0.03 | _ | _ |
| Others | 0.00 | 0.00 | _ | _ |
| **Totals** | **1,835.12** | **100.00** | **1,835.12** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Ewaso Narok Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
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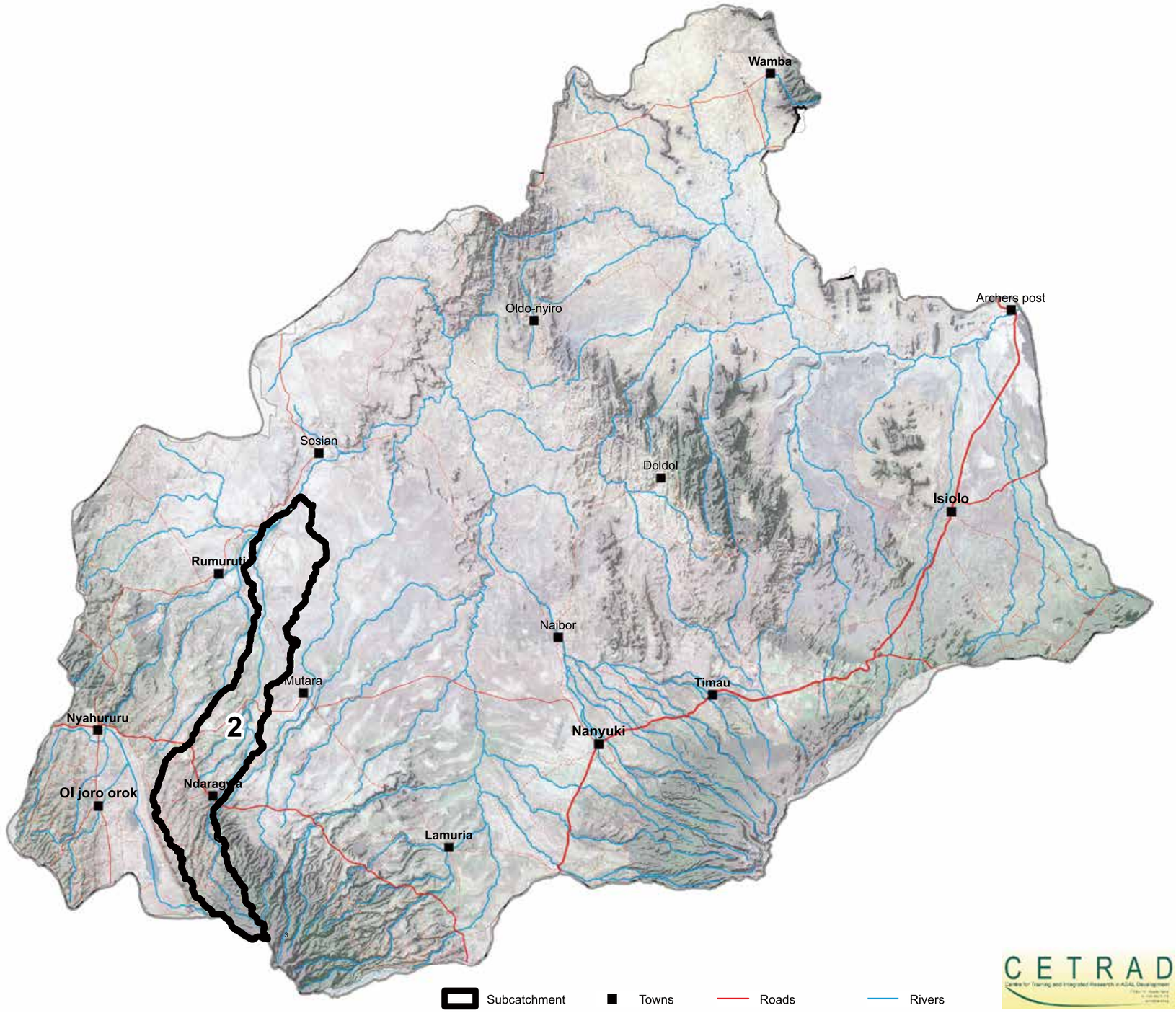
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 2 - Pesi


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
2
Nanyuki
Ndaragwa
Ol joro orok
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# PESI SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Pesi has a total area of 589 $Km^2$ with a combined population of 84,498 people living within twenty sub locations (with an area of 2,165 $Km^2$) that are partly or completely within the sub catchment. About 22% is under crops and settlements, 60% under grasslands and18% is under forest.

### Climate

The climate varies from humid towards Aberdare forest in the south to a mixture of sub and semi humid around Ndaragwa town with the remaining areas in the north having semi humid to semi arid type of climate toward Rumuruti region.

### Education

There are fourteen (14) secondary schools and over 45 primary schools; government sponsored (21), Private (10) and Religious organizations (12), Community (1) and (NGO/CBO (1).

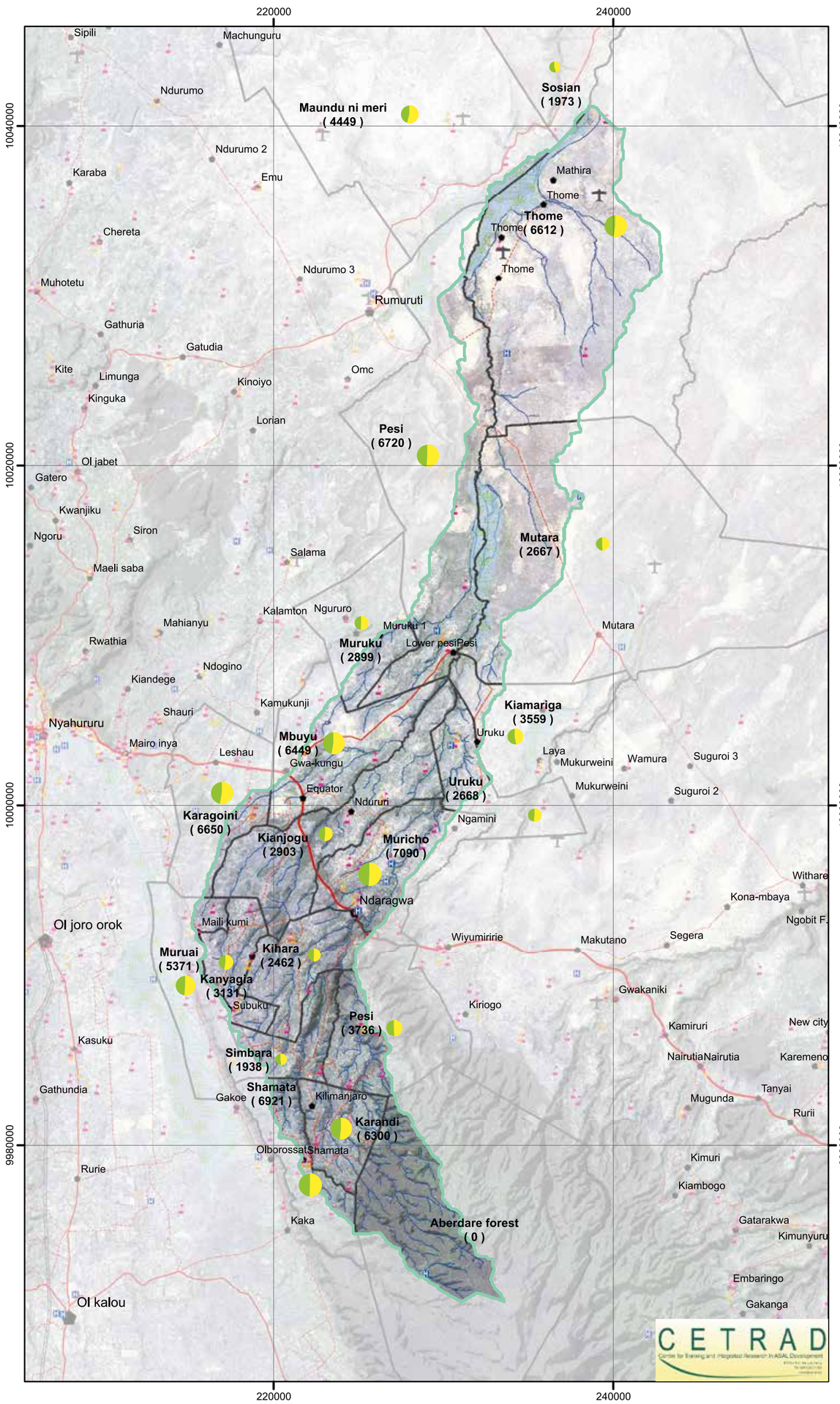
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Pesi WRUA | | | | |
| Contact persons | | Banis W. Maina (0726768350) | | | | |
| Date of Formation | | 2003 | | | | |
| Registration details | Social services | - | | | | |
| | Attorney General office | Reg. No. 23092 Date: 17/12/2003, | | | | |
| Membership details | members | 674 | | | | |
| | Non-members | 900 | | | | |
| Water resources | | Rivers | boreholes | Springs | Wells | Dams/ water pans |
| | | 1 | 10 | 1 | 4 | 20 |
| River Abstractions | | 15 | | | | |
| Main Reason of formation | | Water Scarcity and Human/Animal conflicts | | | | |
| Objectives | | To encourage, promote legal river water and ground water abstraction,<br>Promote efficient and economical use of the water.<br>To conserve and encourage conservation and protection of water quality and quantity, etc. | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 5 Large Scale Ranches,4 Ranches, 1 Ranch and Conservation | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | WRUA members | | | | |
| Sources and Nature of Conflicts | | -Inadequate water resources.<br>-Catchment destruction<br>-water pollution<br>-Lack of capacity building<br>-Infrastructure improvement | | | | |
| Problems Reported to the WRUA | | -Catchment destruction<br>-Water pollution<br>-Over abstraction through furrows | | | | |
| Unreported/unexpressed conflicts | | 0 | | | | |
| Availability of conflict resolution guidelines | | From WRMA/WRUA | | | | |
| Availability of conflict resolution skills and implementation | | WRUA/WRMA | | | | |
| Challenges | | -Lack of capacity building and poor conflict resolution approaches<br>-Lack of storage facilities & dams<br>-Lack of finances, poor communication, vastness of the catchment | | | | |
| Cases of conflicts dealt with | | -Encouraging efficient methods of irrigation by discouraging furrow irrigation<br>-Planting of water friendly trees along the river<br>-Discouraging cutting of the trees in the river | | | | |

| | |
|---|---|
| Cases of conflicts unresolved and reasons | -Catchment destruction: the riparian owners lease out their farms, hence, difficult to manage<br>-Water pollution: spraying of animals along the river<br>-lack of implementation mechanism |
| Other activities the WRUA is engaged in | -Tree nursery<br>-Fish farming |
| Achievements | - united the Pesi river management from upper to lower zone & are working together<br>- planted trees along Pesi river<br>- educate people on proper use of water resources |
| Hindrances to achieve the goals of the WRUA | -Lack of finance & capacity building to our WRUA members |
| Advices to others | -A strong & well managed WRUA can help in making our country a better place to live<br>-Always set goals and try to achieve whatever you wish |
| Information and Data Available | WRUA sub catchment, WRUA constitution & by-laws |
| Person Responsible for data Collection | Secretary |
| Methods of Data Collection | Through sub-zone meetings where sub-committees gather information & forward it to the executive committee |
| Information and Data Needs | Water resource data, water user data & information sharing systems |
| Period of Water Scarcity | Jan - March |
| How is the problem of water scarcity solved | Through block sharing & rationing, discouraging of furrow irrigation method |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | 1. Name: WSTF, Year: 2010, Type of support: Financial, Amount: Ksh. 574,000.<br>2. Name: LWF, Year: 2009, Type of support: Financial Amount: Ksh.1.499m.<br>3. Name; WRMA, Year: 2009-2012, Type of support: Financial & training<br>4.Name: RFL, Year 2009, Type of support: WRUA training<br>5.Name: United Trust, Year: 2010, Type of support: WRUA training |
| Water Quality and cause of pollution | Direct access to river by livestock, disposal of chemical cans, washing of laundry in the river, car washing & cattle spraying near water source |
| Existence of Wetlands and their status | Was there but extinct<br>Status; settled |
| Others | -Dams: need rehabilitation (desilting of old dams & constructing new ones) sites available especially middle zone<br>-Springs: need to be developed in order to serve a wider area to help in minimizing abstraction from Pesi river<br>-Shallow wells: are available & need development<br>-Boreholes: Some are operational (5) while others need rehabilitation & there is inventory & report at SRO.<br>-Water troughs: this can be constructed along the river & dams to prevent direct drinking by animals. |

# Population Numbers (2009) and Socio Infrastructure

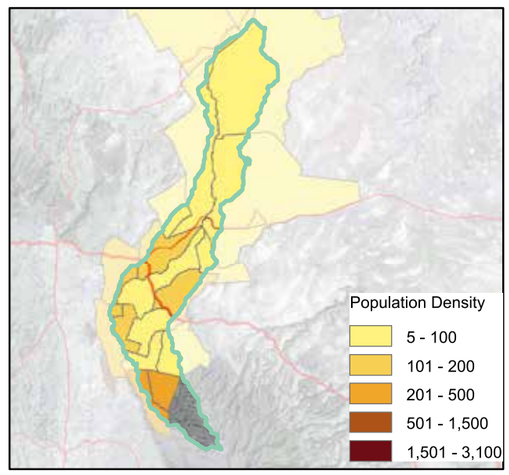





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| forest | 250 | 0 | 0 | 0 | 0 | 0 |
| Kanyagia | 19 | 1,478 | 1,653 | 3,131 | 165 | 797 |
| Karagoini | 48 | 3,162 | 3,488 | 6,650 | 139 | 1,647 |
| Karandi | 22 | 3,068 | 3,232 | 6,300 | 282 | 1,461 |
| Kiamariga | 41 | 1,872 | 1,687 | 3,559 | 87 | 952 |
| Kianjogu | 56 | 1,401 | 1,502 | 2,903 | 52 | 731 |
| Kihara | 32 | 1,219 | 1,243 | 2,462 | 76 | 650 |
| meri | 267 | 2,048 | 2,401 | 4,449 | 17 | 956 |
| Mbuyu | 50 | 3,059 | 3,390 | 6,449 | 130 | 1,713 |
| Muricho | 45 | 3,479 | 3,611 | 7,090 | 159 | 1,927 |
| Muruai | 39 | 2,629 | 2,742 | 5,371 | 139 | 1,291 |
| Muruku | 36 | 1,427 | 1,472 | 2,899 | 80 | 709 |
| Mutara | 252 | 1,365 | 1,302 | 2,667 | 11 | 660 |
| Pesi | 51 | 1,880 | 1,856 | 3,736 | 73 | 1,046 |
| Pesi | 134 | 3,286 | 3,434 | 6,720 | 50 | 1,644 |
| Shamata | 31 | 3,444 | 3,477 | 6,921 | 225 | 1,745 |
| Simbara | 22 | 998 | 940 | 1,938 | 88 | 522 |
| Sosian | 411 | 1,098 | 875 | 1,973 | 5 | 528 |
| Thome | 330 | 3,174 | 3,438 | 6,612 | 20 | 1,507 |
| Uruku | 30 | 1,309 | 1,359 | 2,668 | 89 | 689 |
| **Totals** | **2,165** | **41,396** | **43,102** | **84,498** | **39** | **21,175** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Pesi Subcatchment




1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
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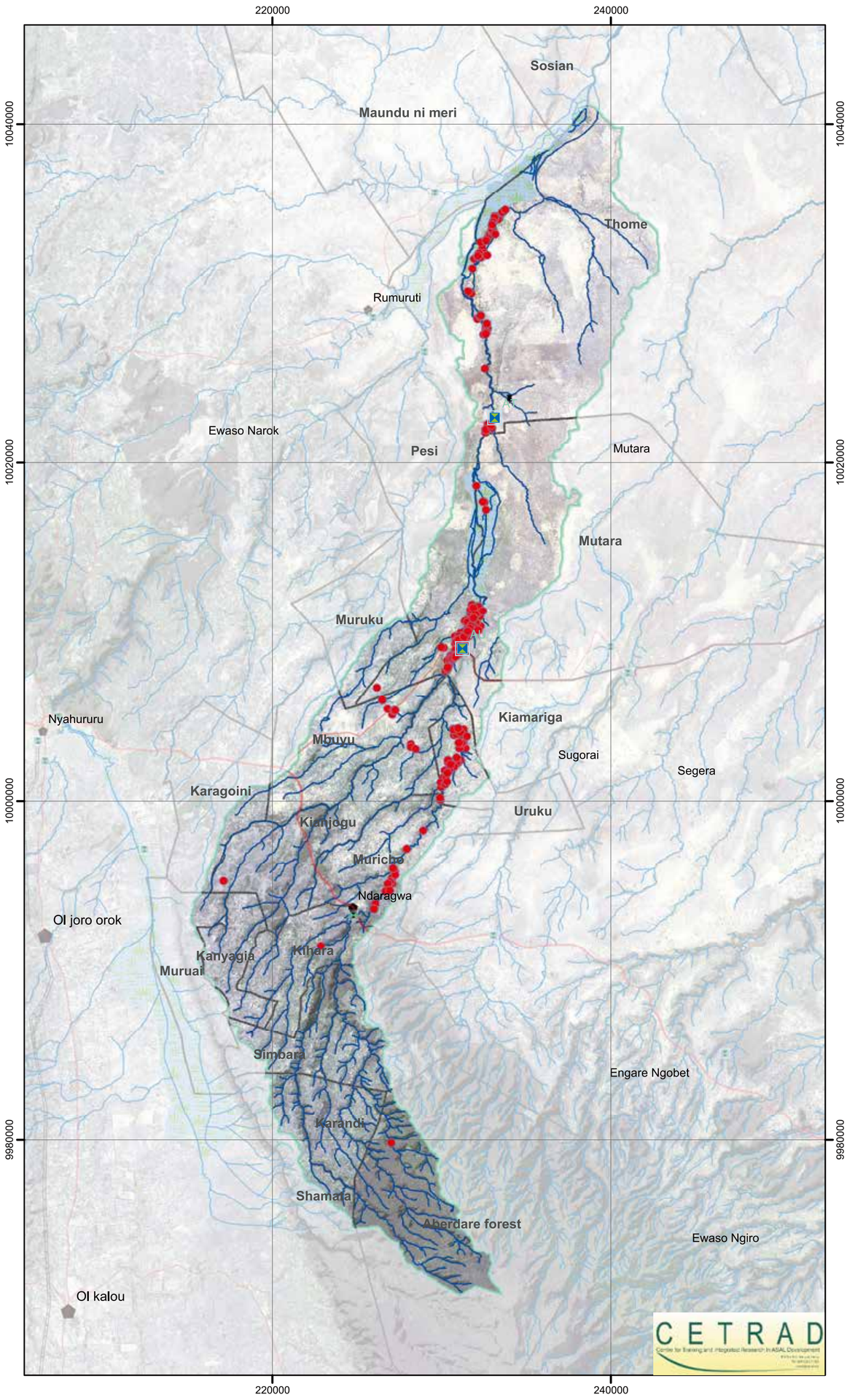
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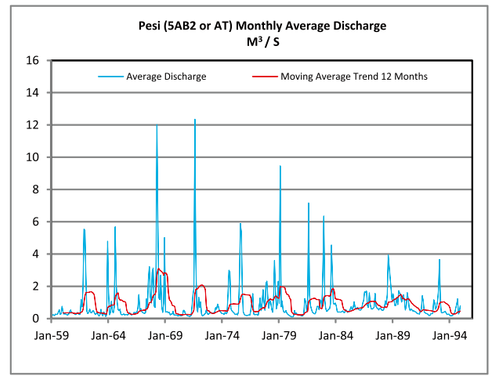
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

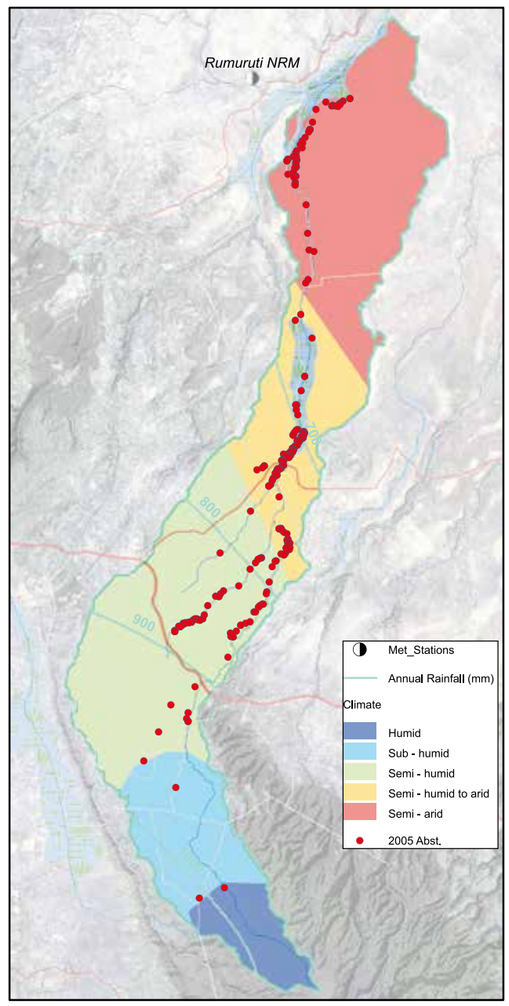





## Water Discharge Trends (AT)




## Agro Climatic Zones and Abstraction Points (2005)




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 37 |
| Sub-humid | High | 1,000 | 1,600 | 73 |
| Semi-humid | High to Medium | 800 | 1,400 | 205 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 96 |
| Semi-arid | Medium to Low | 450 | 900 | 177 |

### Abstractions
- Rivers
- Bore Holes

### Features & Boundaries
- Rivers
- Pesi Gauging Station
- Other Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport
Roads
- A
- B
- C
- Railway Line

### Urban Settlements
- District Hq
- Division Hq

## Pesi Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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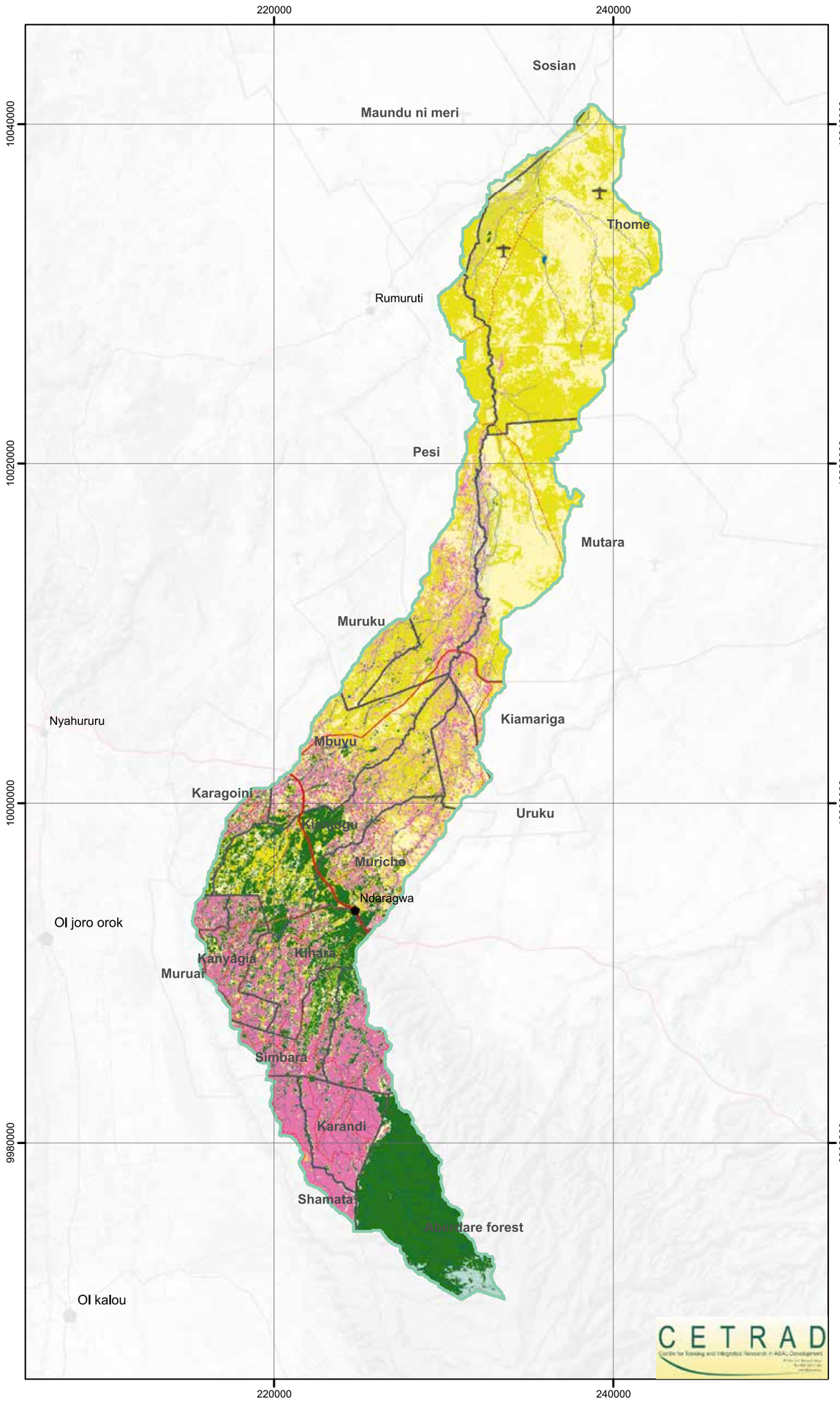
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

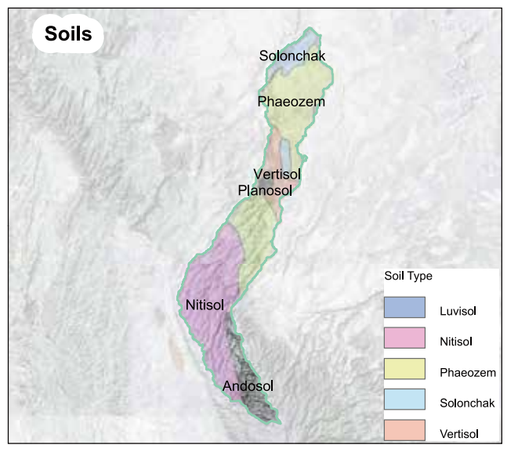
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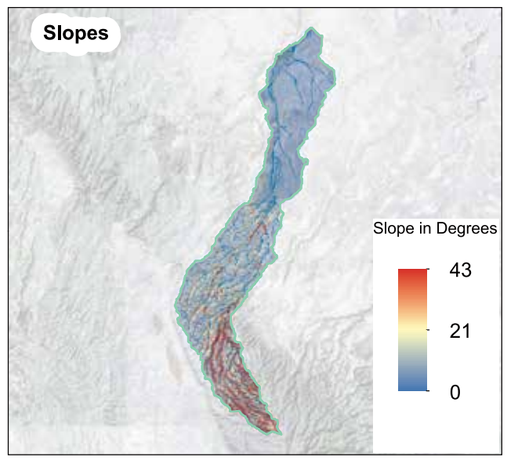
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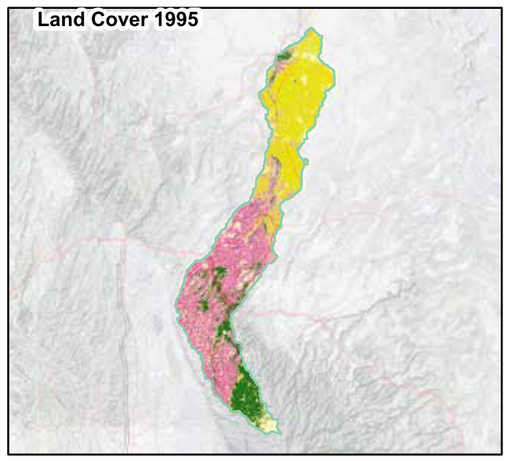
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 75.35 | 12.80 | 140.32 | 23.85 |
| Woody Grassland | 211.25 | 35.90 | 210.46 | 35.77 |
| Natural Forest | 81.63 | 13.87 | 103.06 | 17.51 |
| Planted Forest | | | 3.23 | 0.55 |
| Cropland | 219.74 | 37.34 | 126.67 | 21.53 |
| Moorland | | | 4.35 | 0.74 |
| Wastelands Rocks | 0.01 | 0.00 | | 0.00 |
| Water | 0.46 | 0.08 | 0.34 | 0.06 |
| **Totals** | **588.43** | **100.00** | **588.43** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads
- A
- B
- C
- D
- E

Railway Line

Airfields

## Pesi Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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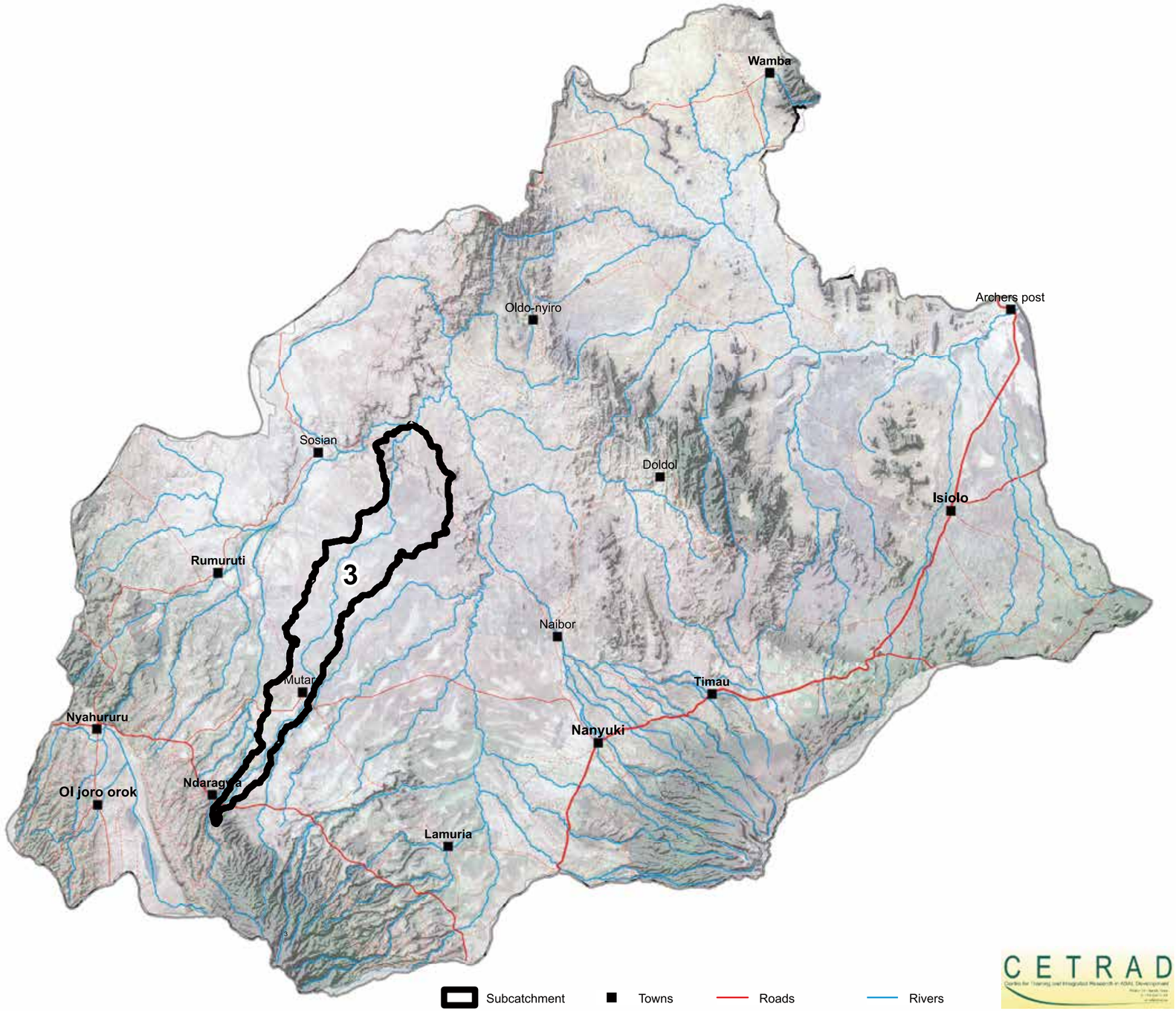
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 3 - Mutara




N
W E
S

0 5 10 20 30 40 50
Kilometers

CETRAD

# MUTARA SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Mutara has a total area of 489 $Km^2$ with a combined population of 43,480 people living within eleven sub locations (with an area of 1,816 $Km^2$) that are partly or completely within the sub catchment. About 4% is under crops and settlements, 94% under grasslands and the remaining 2% of land is under forest, water and moorland.

### Climate

The area is dominated by semi-arid type of climate except for a small portion at the foot of the Aberdares which is semi-humid.

### Education

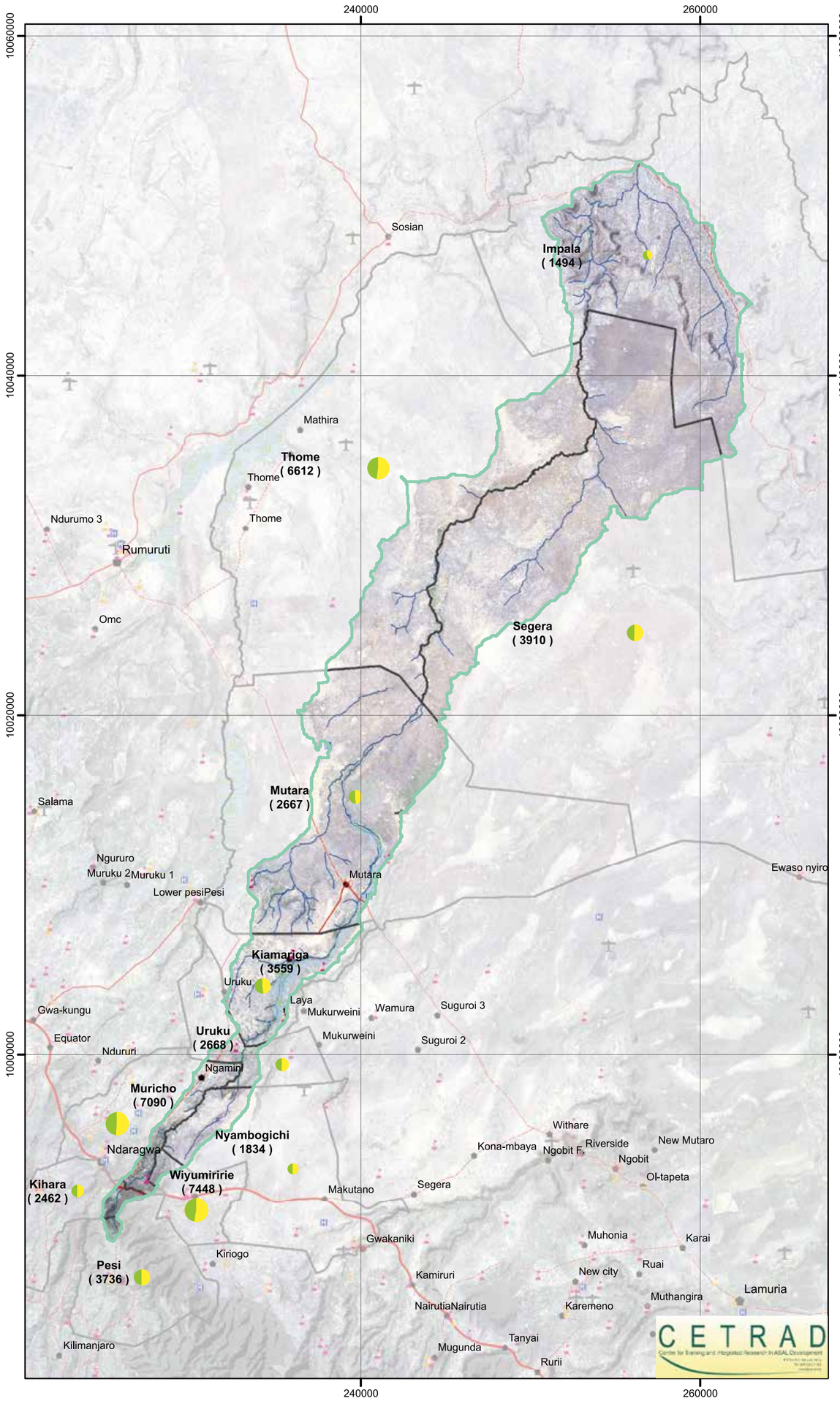
There are about 7 primary schools; government sponsored (3), Private (1) and Religious organizations (3).

### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Mutara WRUA | | | | |
| Contact Address, chairperson, phone | | P.O Box 24 Rumuruti<br>0726585975 | | | | |
| Date of Formation | | 17/02/2006 | | | | |
| Registration details | Social services | - | | | | |
| | Attorney General office | Reg. no.13359 | | | | |
| Membership | Members | 1600 | | | | |
| | Non members | 1000 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 5 | 10 | 5 | 6 |
| River Abstractions | | 254 | | | | |
| Main Reason for the formation | | To resolve human conflict by equitable sharing of the water resource | | | | |
| Objectives | | Promote Equitable sharing of the resources<br>Find other sources of water | | | | |
| Availability of sanctioning system | | - | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 2 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | They provide means of transport when need arises | | | | |
| Sources and Nature of Conflicts | | Human & human conflict (upstream and downstream people)<br>Human & wildlife conflict | | | | |
| Problems Reported to the WRUA | | - Conflicts in the projects<br>- inadequate water supply especially downstream<br>- Cutting of trees within the riparian areas | | | | |
| Unreported/unexpressed conflicts | | Fragmented projects | | | | |
| Availability of conflict resolution guidelines | | It is within WRUA members or if need arises helped by WRMA | | | | |
| Availability of conflict resolution skills and implementation | | inadequate | | | | |

| | |
|---|---|
| Challenges | 1. Lack of understanding on water policies<br>2. The water resource is scarce and hence not enough to everybody<br>3. Lack of co-operation amongst members<br>4. Lack of funds |
| Cases of conflicts dealt with | Human conflict<br>Project conflicts |
| Cases of conflicts unresolved and reasons | Fragmented projects<br>Lack of funds to construct one common intake |
| Other activities the WRUA is engaged in | 1. Farming<br>2. Livestock keeping |
| Achievements | increasing the number of registered members<br>Registering WRUA in the Attorney General office |
| Hindrances to achieve the goals of the WRUA | 1. inadequate funds<br>2. limited water resource |
| Advices to others | To sustain WRUA needs. Total sacrifice |
| Information and Data Available | Abstraction points |
| Person Responsible for data Collection | Nancy/ Beatrice Lydia |
| Methods of Data Collection | Manual |
| Information and Data Needs | Movement facilitation<br>Data collection gadget |
| Period of Water Scarcity | Jan-March every year<br>Sept-Nov every year |
| How is the problem of water scarcity solved | Rationing |
| Institutional Support to WRUA (Name, Year, Type of support, Amount of support) | WSTF 2011, to develop SCMP Kshs. 667,000 |
| Water Quality and cause of pollution | Poor water quality especially downstream<br>Furrow irrigation, spray (pesticide containers), washing of clothes and spraying livestock in the river |
| Existence of Wetlands and their status | Drained wetlands |
| Others | none |

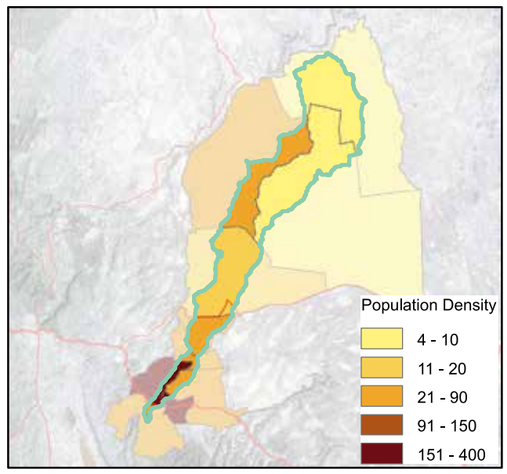
# Population Numbers (2009) and Socio Infrastructure




## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Impala | 348 | 873 | 621 | 1,494 | 4 | 486 |
| Kiamariga | 41 | 1,872 | 1,687 | 3,559 | 87 | 952 |
| Kihara | 32 | 1,219 | 1,243 | 2,462 | 76 | 650 |
| Muricho | 45 | 3,479 | 3,611 | 7,090 | 159 | 1,927 |
| Mutara | 252 | 1,365 | 1,302 | 2,667 | 11 | 660 |
| Nyambogichi | 82 | 945 | 889 | 1,834 | 22 | 501 |
| Pesi | 51 | 1,880 | 1,856 | 3,736 | 73 | 1,046 |
| Segera | 587 | 1,917 | 1,993 | 3,910 | 7 | 981 |
| Thome | 330 | 3,174 | 3,438 | 6,612 | 20 | 1,507 |
| Uruku | 30 | 1,309 | 1,359 | 2,668 | 89 | 689 |
| Wiyumiririe | 19 | 3,572 | 3,876 | 7,448 | 389 | 2,048 |
| **Totals** | **1,816** | **21,605** | **21,875** | **43,480** | **24** | **11,447** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

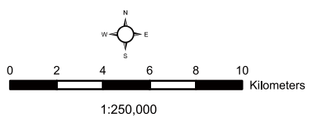
- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Mutara Subcatchment




1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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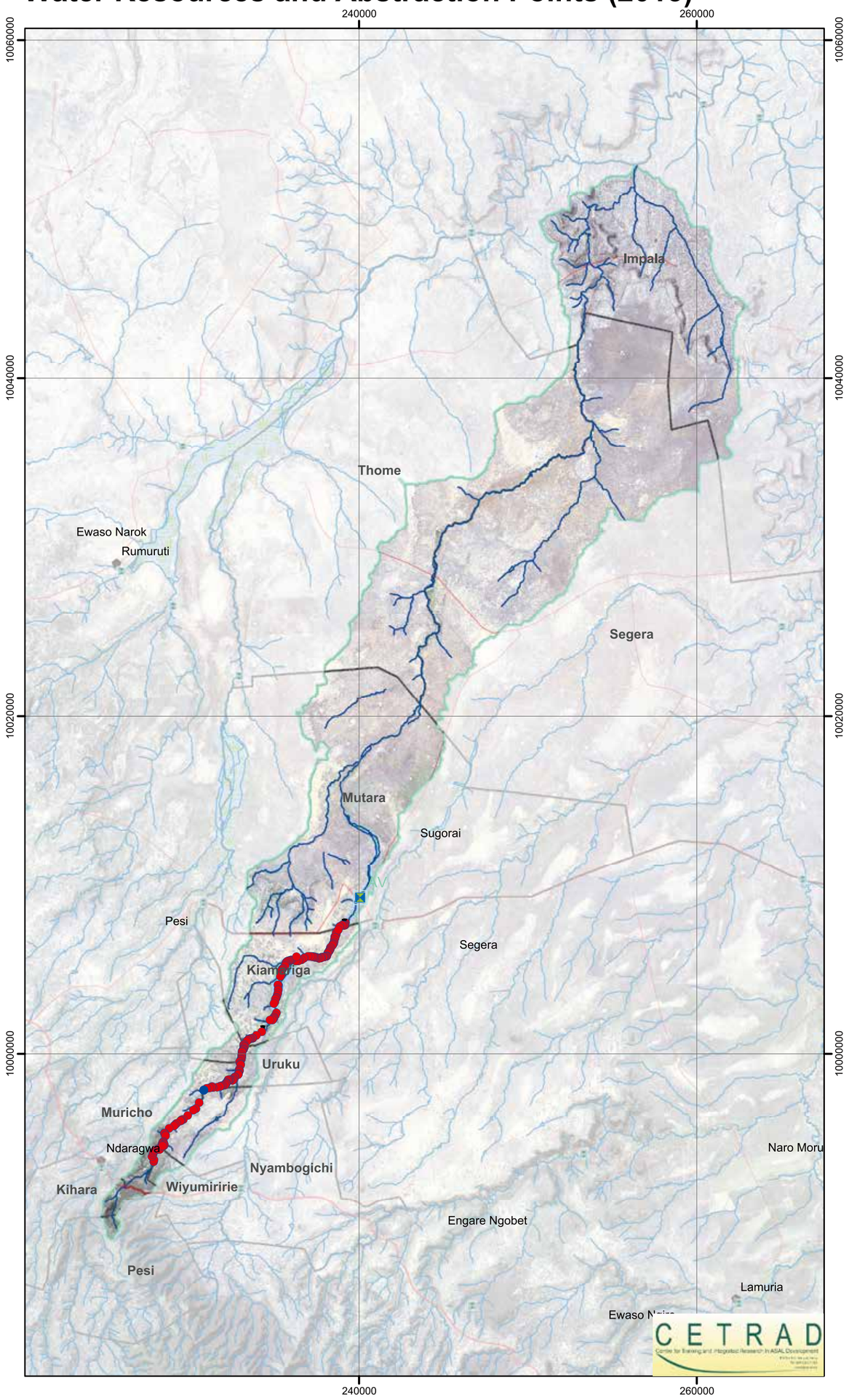
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Demographic data was sourced from KNBS 2009 National Census.

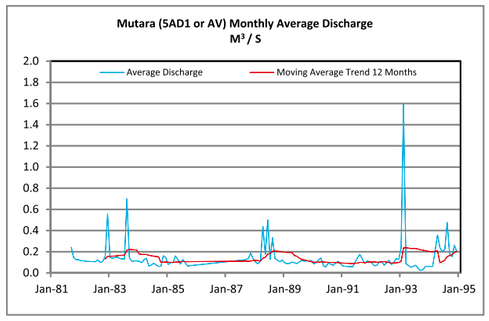
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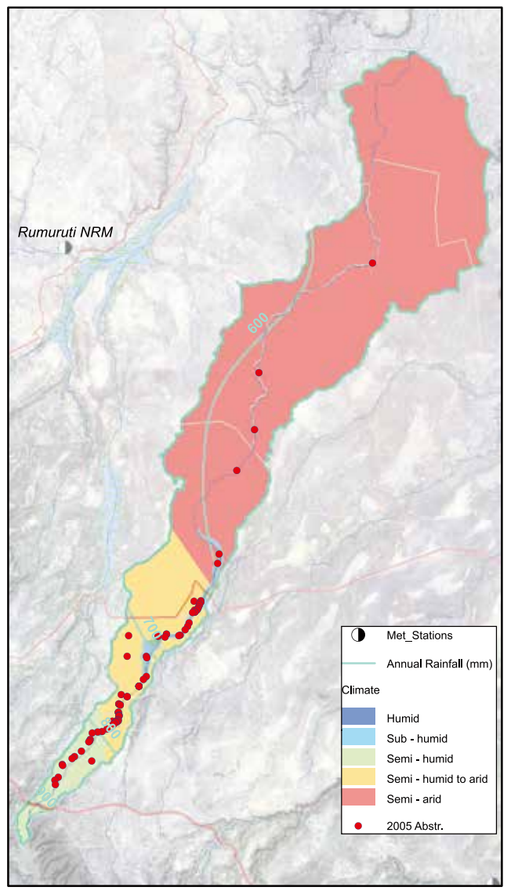
# Water Resources and Abstraction Points (2013)




## Water Discharge Trends (AV)




## Agro Climatic Zones and Abstraction Points (2005)




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Semi-humid | High to Medium | 800 | 1,400 | 24 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 70 |
| Semi-arid | Medium to Low | 450 | 900 | 395 |

**Abstractions**
- Rivers
- Springs
- Bore Holes

**Features & Boundaries**
- Rivers
- Mutara RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

Roads
- A
- B
- C
- D
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Mutara Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
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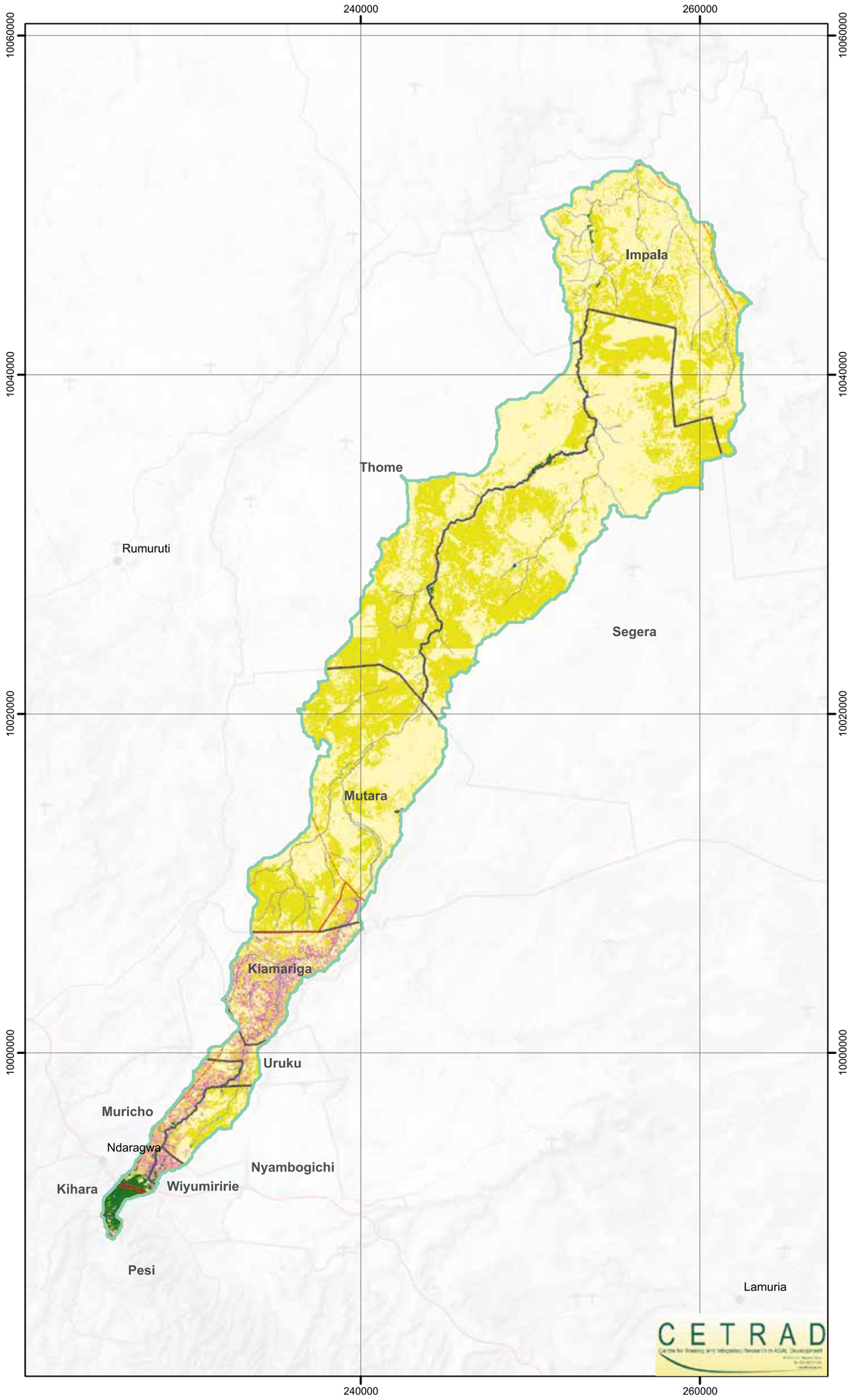
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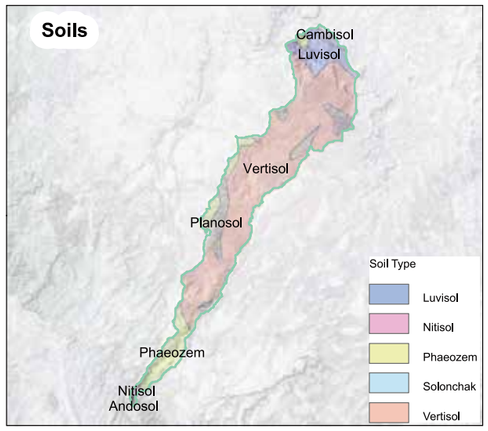
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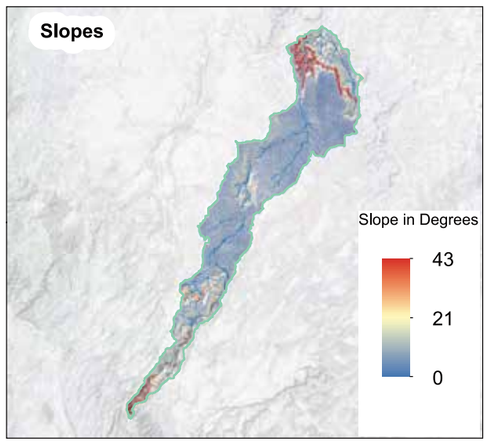
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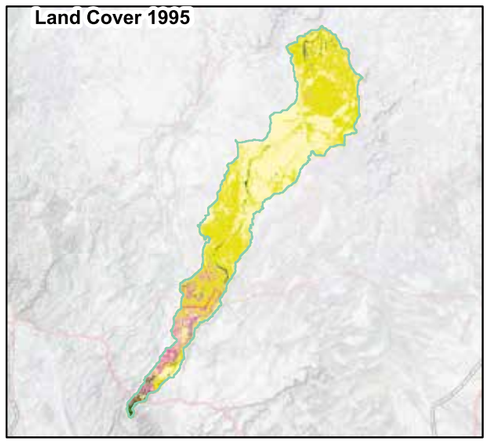
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 193.17 | 39.52 | 253.62 | 51.89 |
| Woody Grassland | 253.98 | 51.96 | 212.40 | 43.46 |
| Natural Forest | 9.61 | 1.97 | 5.27 | 1.08 |
| Planted Forest | _ | _ | 0.12 | 0.02 |
| Cropland | 31.12 | 6.37 | 17.21 | 3.52 |
| Moorland | _ | _ | 0.07 | 0.01 |
| Wastelands Rocks | 0.83 | 0.17 | _ | _ |
| Water | 0.06 | 0.01 | 0.08 | 0.02 |
| **Totals** | **488.77** | **100.00** | **488.77** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Mutara Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
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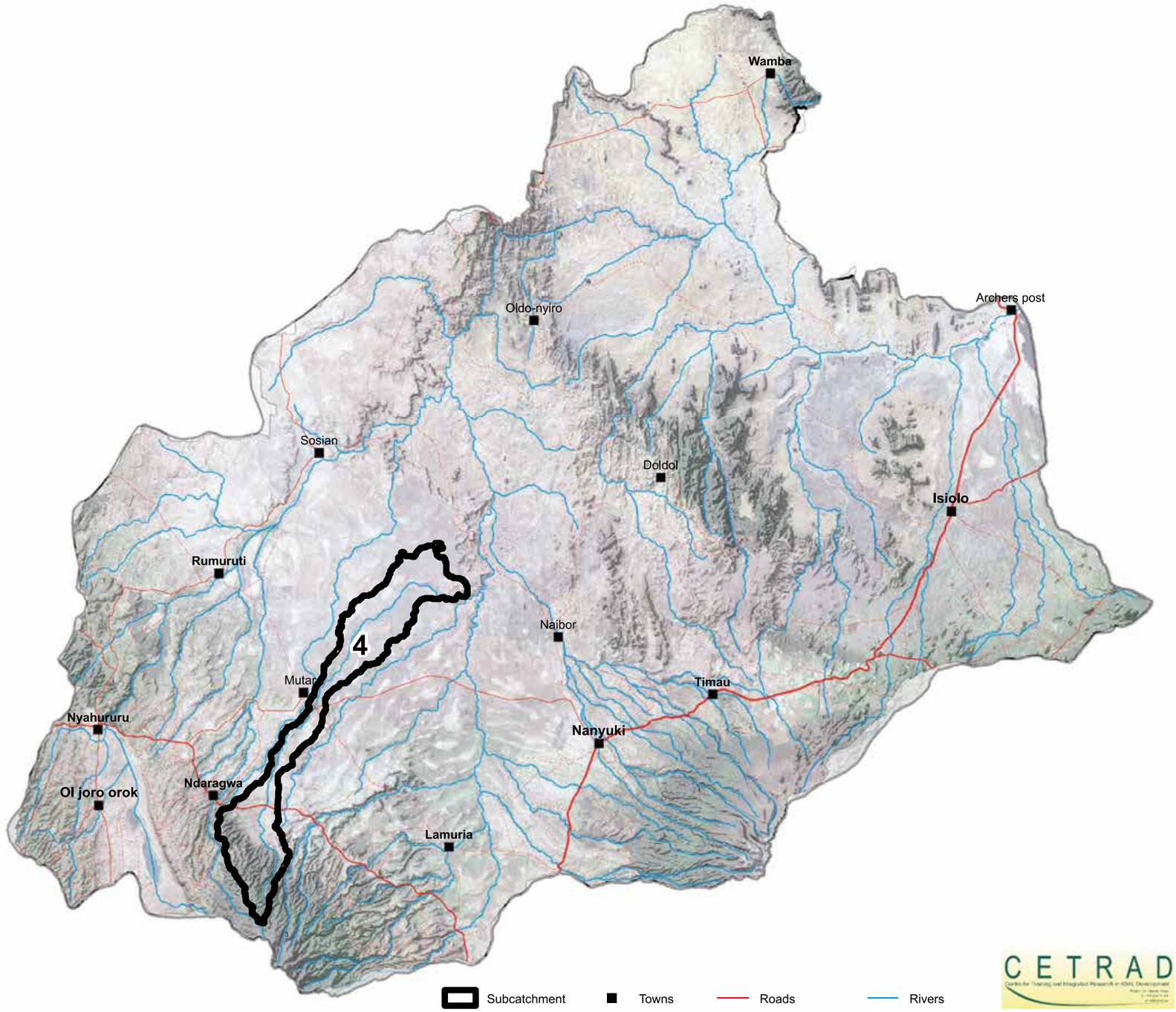
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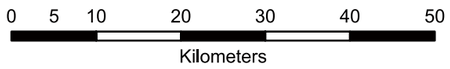
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 4 - Sugorai


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
4
Naibor
Mutar
Timau
Nyahururu
Nanyuki
Ndaragwa
Ol joro orok
Lamuria
Subcatchment
Towns
Roads
Rivers


N
W
E
S


0 5 10 20 30 40 50
Kilometers

# SUGORAI SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Sugorai subcatchment has a total area of 399 $Km^2$ with a combined population of 46,825 people living within fifteen sub locations (with an area of 1,977 $Km^2$) that are partly or completely within the sub catchment. About 71% is under grasslands, 8% under crops and settlements, and the remaining 21% is under forest with traces of moorland (0.05%).

### Climate

The climate varies from humid to a mixture of sub and semi humid around Aberdare forest in the south and a stretch of semi humid to semi arid type of climate downstream.

### Education

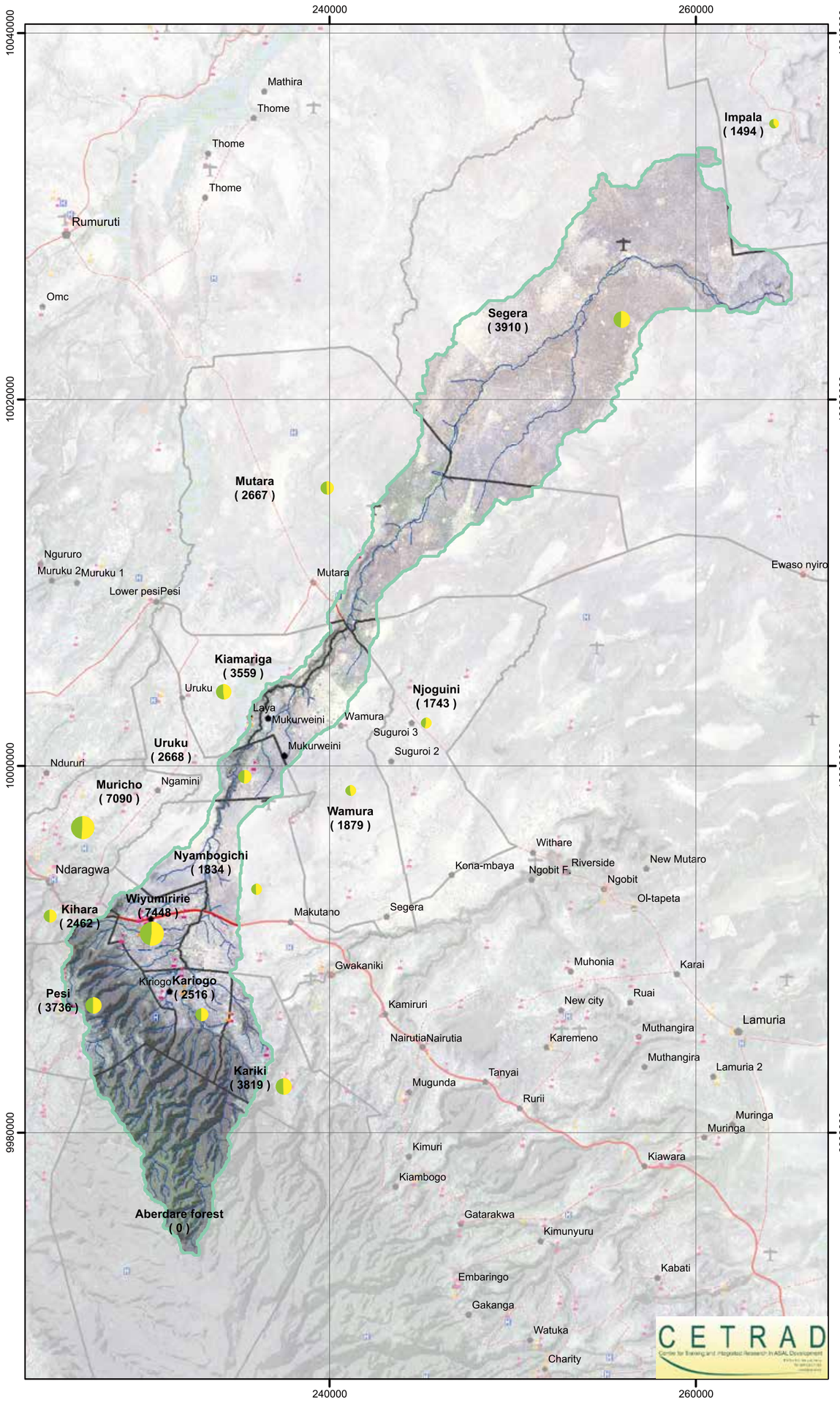
There are four (4) secondary schools and about 14 primary schools; government sponsored (4), Private (6) and Religious organizations (3) and Community (1).

### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Sugorai WRUA | | | | |
| Contact Address email, chairperson, phone | | P. Box 494 Nyahururu<br>Chairman-0727303301<br>Secretary-0727871911 | | | | |
| Date of Formation | | 7/1/2006 | | | | |
| Registration details | Social services | 2006 | | | | |
| | Attorney General office | file soc/55036 Date: 15/07/2010 | | | | |
| Membership details | members | 500 | | | | |
| | Non-members | 2000 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 2 | 4 | 3 | 11 |
| River Abstractions | | 0 | | | | |
| Main Reason of formation | | Water conflict | | | | |
| Objectives | | Equity distribution of every drop of water | | | | |
| Availability of sanctioning system | | All zones | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 8 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | N/A | | | | |
| Sources and Nature of Conflicts | | Abstraction of high volumes in upper zones | | | | |
| Problems Reported to the WRUA | | 10% | | | | |
| Unreported/unexpressed conflicts | | 90% | | | | |
| Availability of conflict resolution guidelines | | Meetings | | | | |
| Availability of conflict resolution skills and implementation | | Capacity building, barazas and government officers | | | | |
| Challenges | | -Transport<br>-Financial resources | | | | |
| Cases of conflicts dealt with | | - | | | | |
| Cases of conflicts unresolved and reasons | | Droughts. Awaits the rain season | | | | |
| Other activities the WRUA is engaged in | | Monitoring the whole catchment | | | | |
| Achievements | | - | | | | |
| Hindrances to achieve the goals of the WRUA | | lack of co-operation by members | | | | |
| Advices to others | | Co-ordination & co-operation is essential | | | | |
| Information and Data Available | | - | | | | |
| Person Responsible for data Collection | | James G. Irungu 0727303301 | | | | |
| Methods of Data Collection | | - | | | | |
| Information and Data Needs | | - | | | | |
| Period of Water Scarcity | | Dec, Jan, Feb & Aug, Sept Oct | | | | |
| How is the problem of water scarcity solved | | Equitable distribution | | | | |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | | Name :WSTF, Year:2010, Type of support: WDC, Amount of support Ksh. 477450 | | | | |
| Water Quality and cause of pollution | | -Livestock & wildlife | | | | |
| Existence of Wetlands and their status | | -Swamps | | | | |
| Others | | | | | | |

# Population Numbers (2009) and Socio Infrastructure

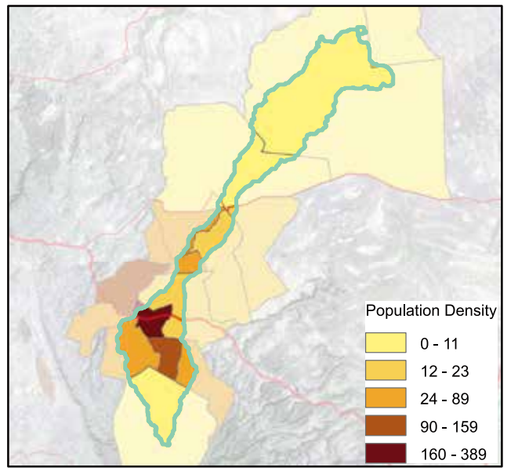





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Aberdare forest | 250 | 0 | 0 | 0 | 0 | 0 |
| Impala | 348 | 873 | 621 | 1,494 | 4 | 486 |
| Kariki | 48 | 1,944 | 1,875 | 3,819 | 79 | 903 |
| Kariogo | 19 | 1,250 | 1,266 | 2,516 | 136 | 641 |
| Kiamariga | 41 | 1,872 | 1,687 | 3,559 | 87 | 952 |
| Kihara | 32 | 1,219 | 1,243 | 2,462 | 76 | 650 |
| Muricho | 45 | 3,479 | 3,611 | 7,090 | 159 | 1,927 |
| Mutara | 252 | 1,365 | 1,302 | 2,667 | 11 | 660 |
| Njoguini | 91 | 825 | 918 | 1,743 | 19 | 478 |
| Nyambogichi | 82 | 945 | 889 | 1,834 | 22 | 501 |
| Pesi | 51 | 1,880 | 1,856 | 3,736 | 73 | 1,046 |
| Segera | 587 | 1,917 | 1,993 | 3,910 | 7 | 981 |
| Uruku | 30 | 1,309 | 1,359 | 2,668 | 89 | 689 |
| Wamura | 83 | 985 | 894 | 1,879 | 23 | 500 |
| Wiyumiririe | 19 | 3,572 | 3,876 | 7,448 | 389 | 2,048 |
| Totals | 1,977 | 23,435 | 23,390 | 46,825 | 24 | 12,462 |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

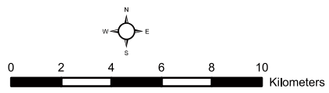
- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Sugorai Subcatchment




1:231,720

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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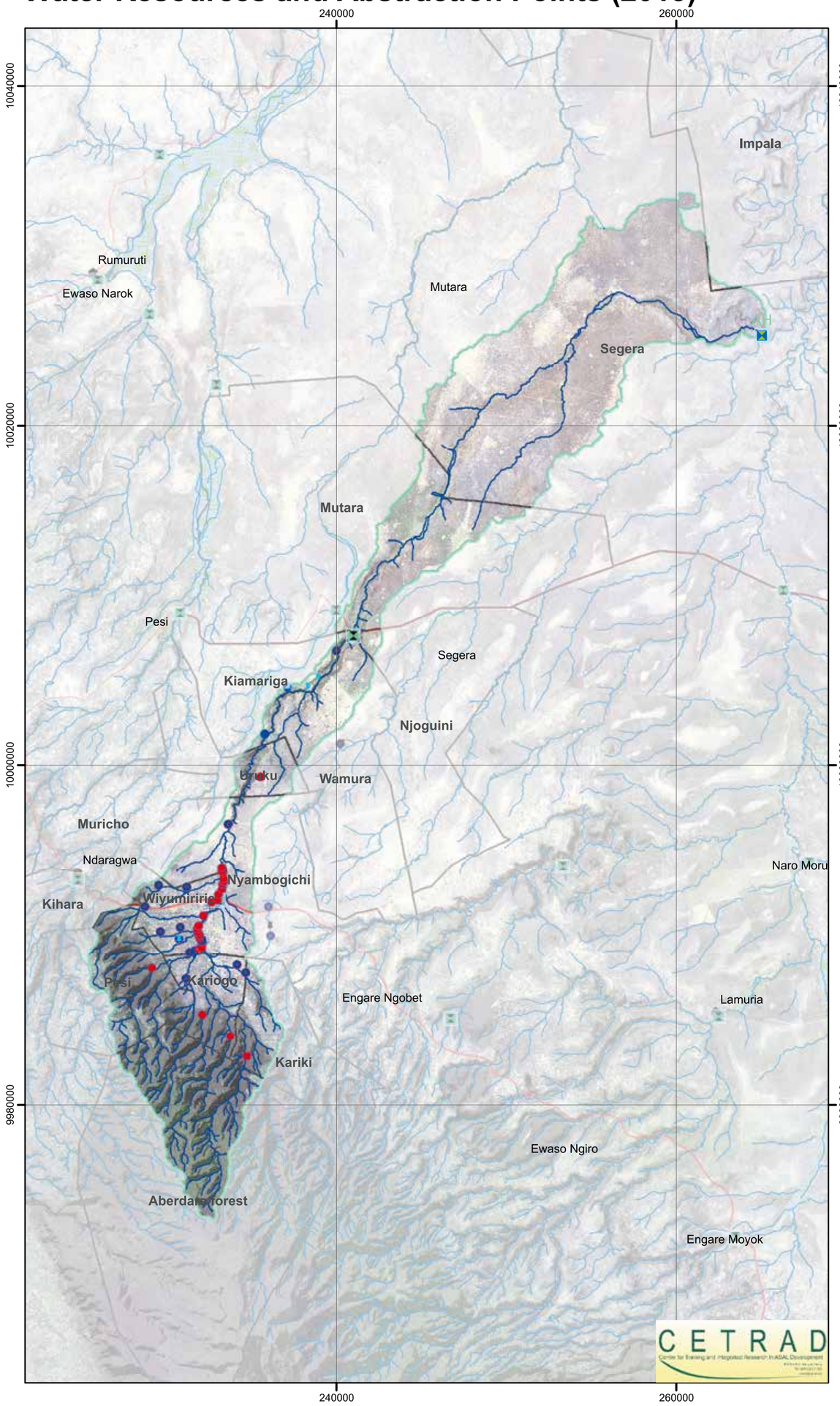
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Demographic data was sourced from KNBS 2009 National Census.

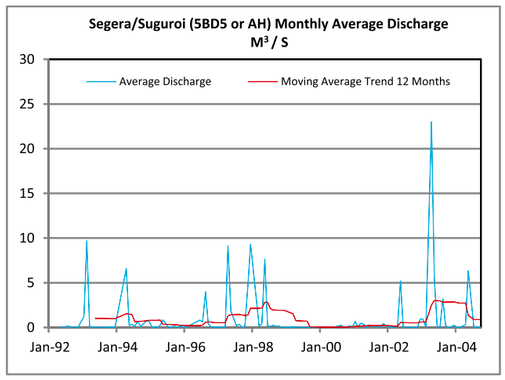
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

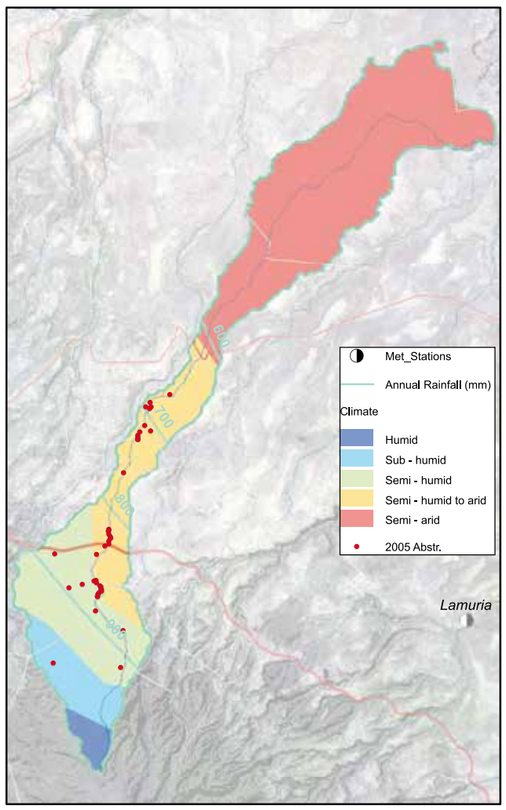
# Water Resources and Abstraction Points (2013)




## Water Discharge Trends (AH)




## Agro Climatic Zones and Abstraction Points (2005)




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 11 |
| Sub-humid | High | 1,000 | 1,600 | 32 |
| Semi-humid | High to Medium | 800 | 1,400 | 78 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 72 |
| Semi-arid | Medium to Low | 450 | 900 | 205 |

### Abstractions
- Rivers
- Spring
- Dam
- Pan
- Borehole
- Shallow Well

### Features & Boundaries
- Rivers
- Sugorai RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

### Transport
- A
- B
- C
- Railway Line

### Urban Settlements
- District Hq
- Division Hq

## Sugorai Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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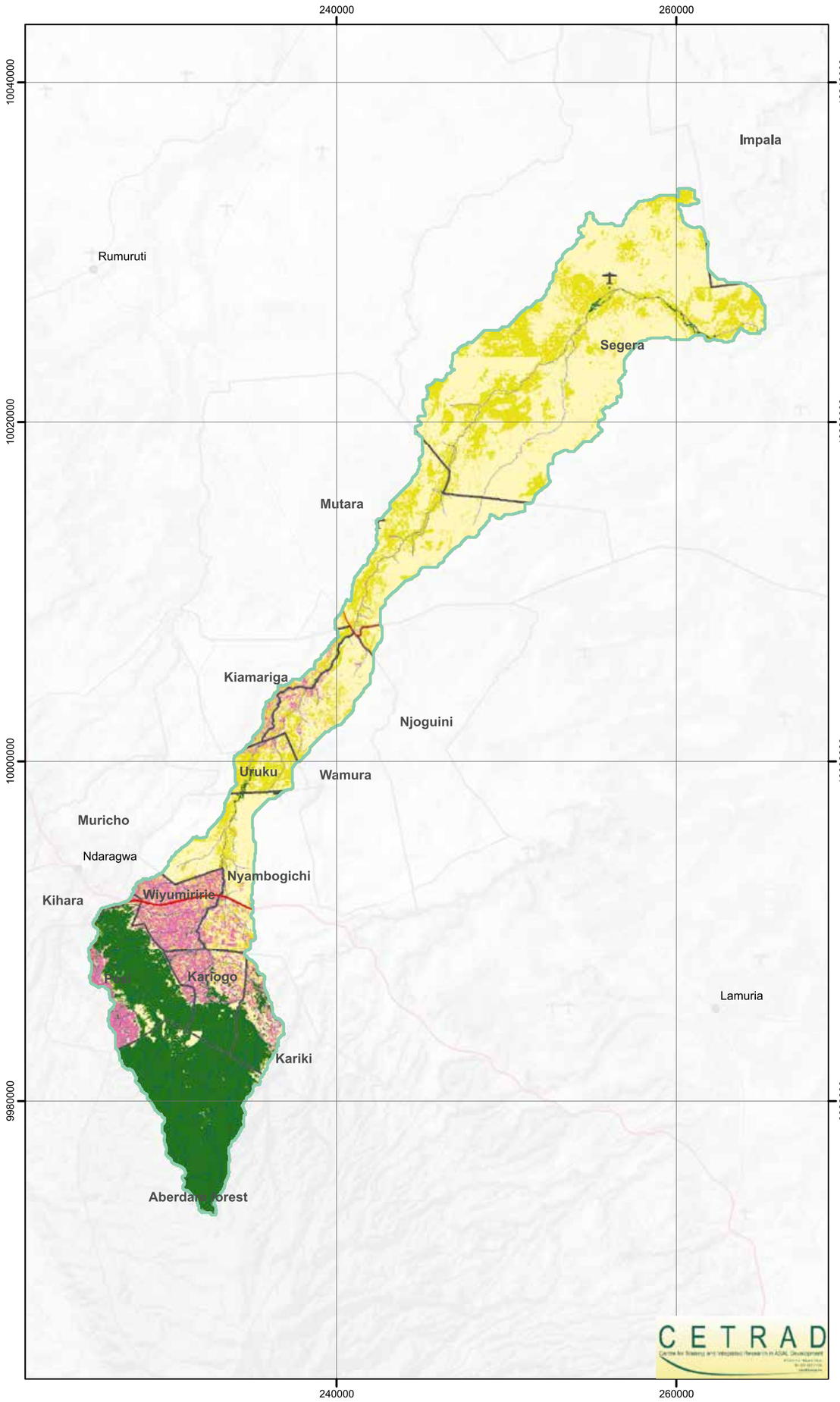
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

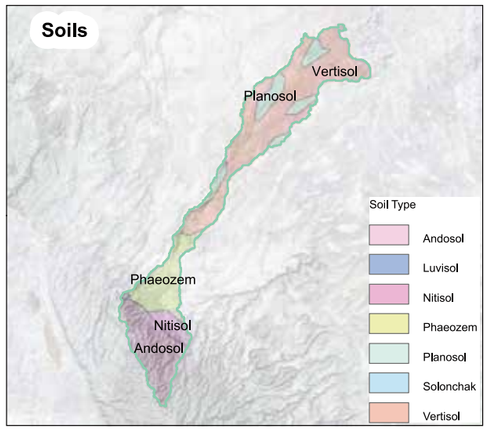
The background image: SRTM 30m.

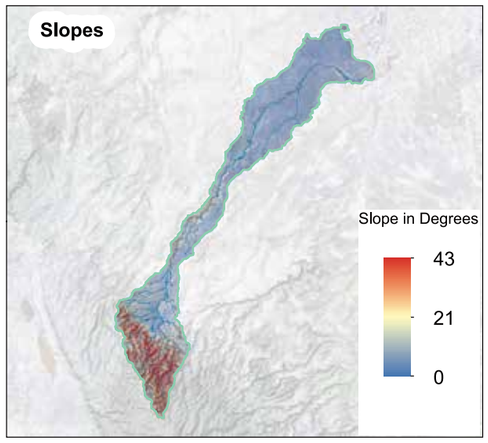
(*) Arid and Semi Arid Lands.

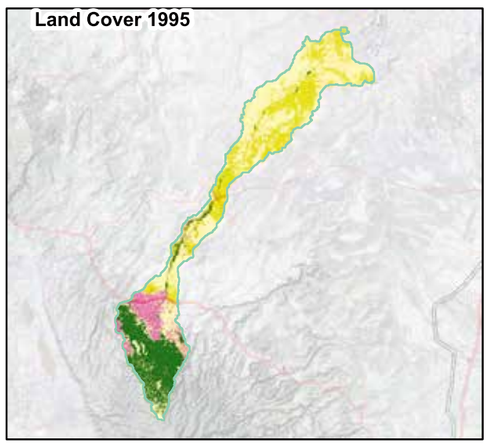
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 170.24 | 42.65 | 190.24 | 47.66 |
| Woody Grassland | 122.15 | 30.60 | 92.68 | 23.22 |
| Natural Forest | 74.98 | 18.79 | 82.75 | 20.73 |
| Planted Forest | | | 0.67 | 0.17 |
| Cropland | 31.69 | 7.94 | 32.60 | 8.17 |
| Moorland | | | 0.18 | 0.05 |
| Wastelands Rocks | 0.02 | 0.01 | 0.00 | 0.00 |
| Water | 0.05 | 0.01 | 0.01 | 0.00 |
| Totals | 399.13 | 100.00 | 399.13 | 100.00 |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Sugorai Subcatchment

N, W, E, S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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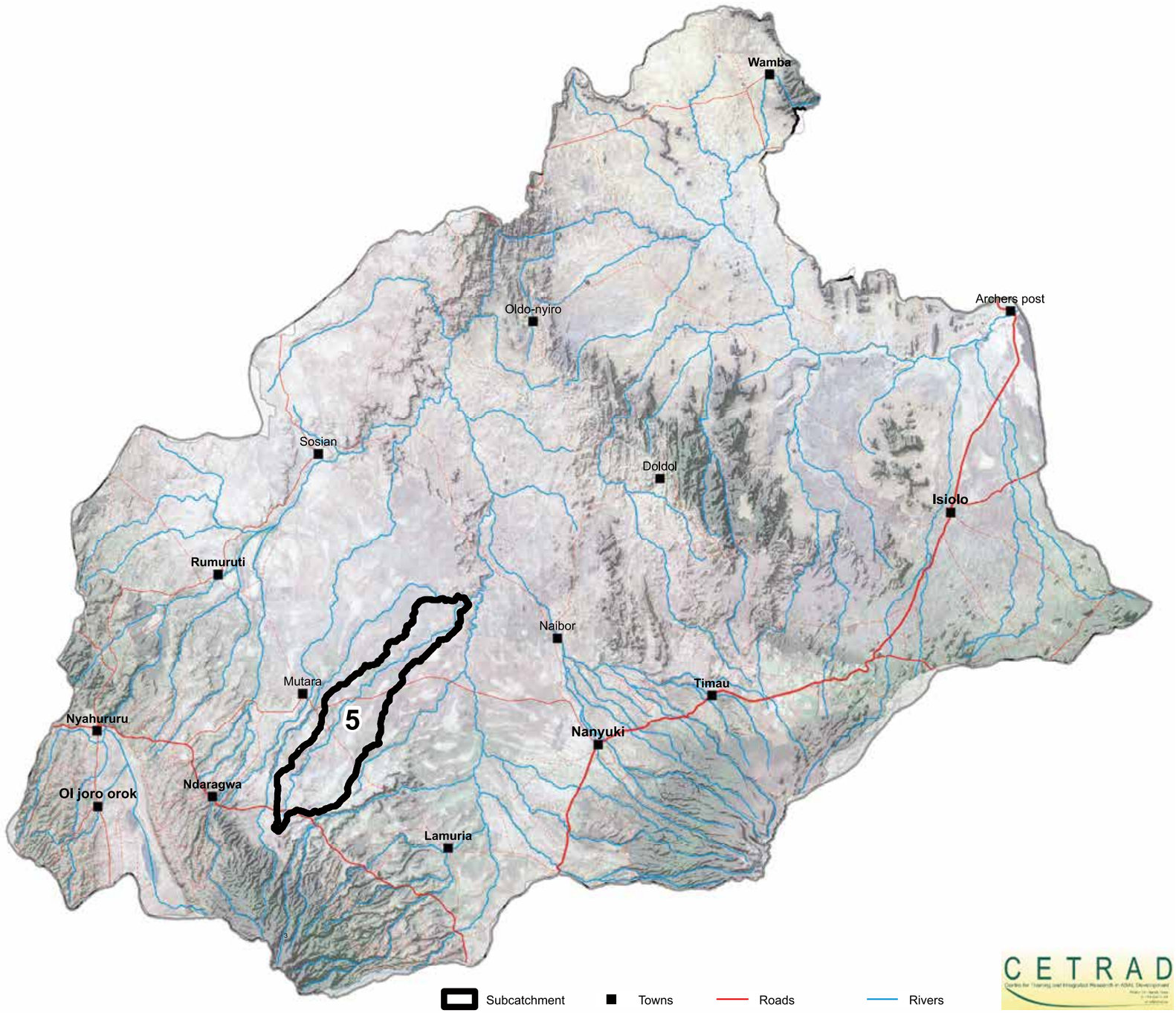
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 5 - Segera


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
5
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# SEGERA SUBCATCHMENT

## Fact sheet. Date: July 2014

**Introduction**

Segera has a total area of 313 $Km^2$ with a combined population of 25,448 people living within ten (10) sub locations (with an area of 1,487$Km^2$) that are partly or completely within the sub catchment. About 5% is under crops and settlements, 94% under grasslands and 1% of the land is under forest and water

**Climate**

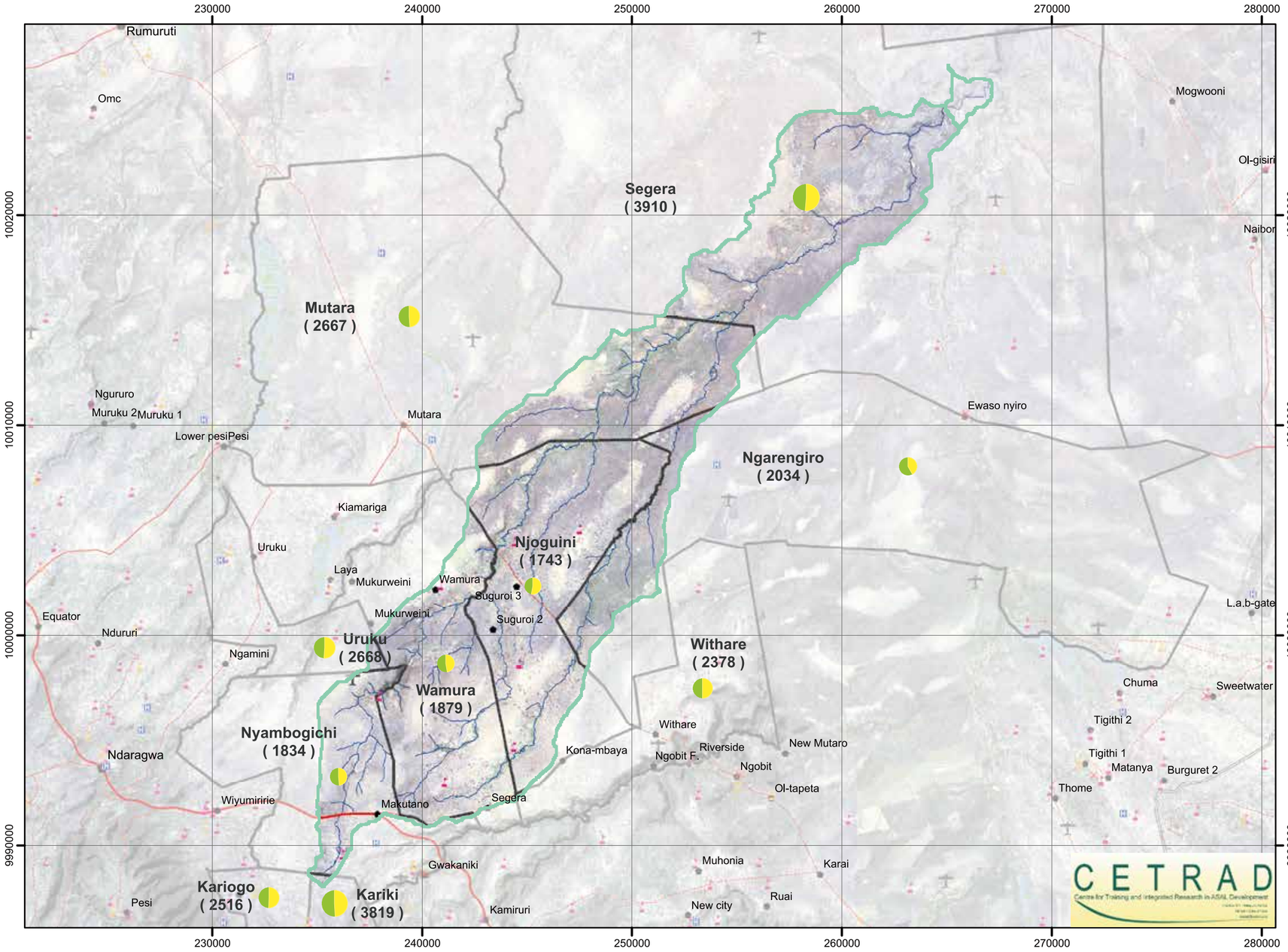
The climate of this sub catchment varies mainly from semi-humid to semi-arid

**Education**

There are 8 primary schools; sponsored by government (1) and Religious organizations (7).

# Population Numbers (2009) and Socio Infrastructure

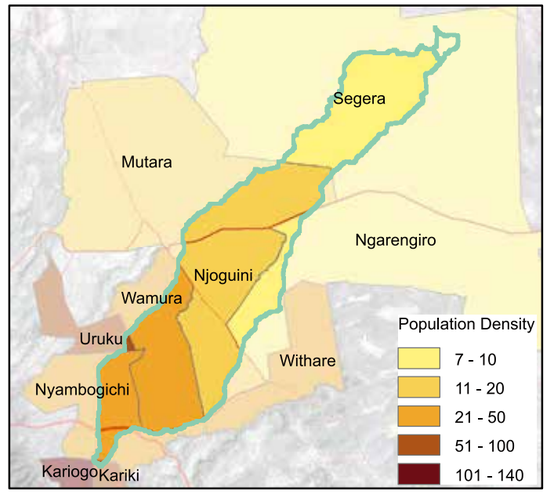





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Kariki | 48 | 1,944 | 1,875 | 3,819 | 79 | 903 |
| Kariogo | 19 | 1,250 | 1,266 | 2,516 | 136 | 641 |
| Mutara | 252 | 1,365 | 1,302 | 2,667 | 11 | 660 |
| Ngarengiro | 233 | 1,187 | 847 | 2,034 | 9 | 824 |
| Njoguini | 91 | 825 | 918 | 1,743 | 19 | 478 |
| hi | 82 | 945 | 889 | 1,834 | 22 | 501 |
| Segera | 587 | 1,917 | 1,993 | 3,910 | 7 | 981 |
| Uruku | 30 | 1,309 | 1,359 | 2,668 | 89 | 689 |
| Wamura | 83 | 985 | 894 | 1,879 | 23 | 500 |
| Withare | 63 | 1,178 | 1,200 | 2,378 | 38 | 662 |
| **Totals** | **1,487** | **12,905** | **12,543** | **25,448** | **17** | **6,839** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Segera Subcatchment

0 1 2 3 4 5 Kilometers

**1:210,137**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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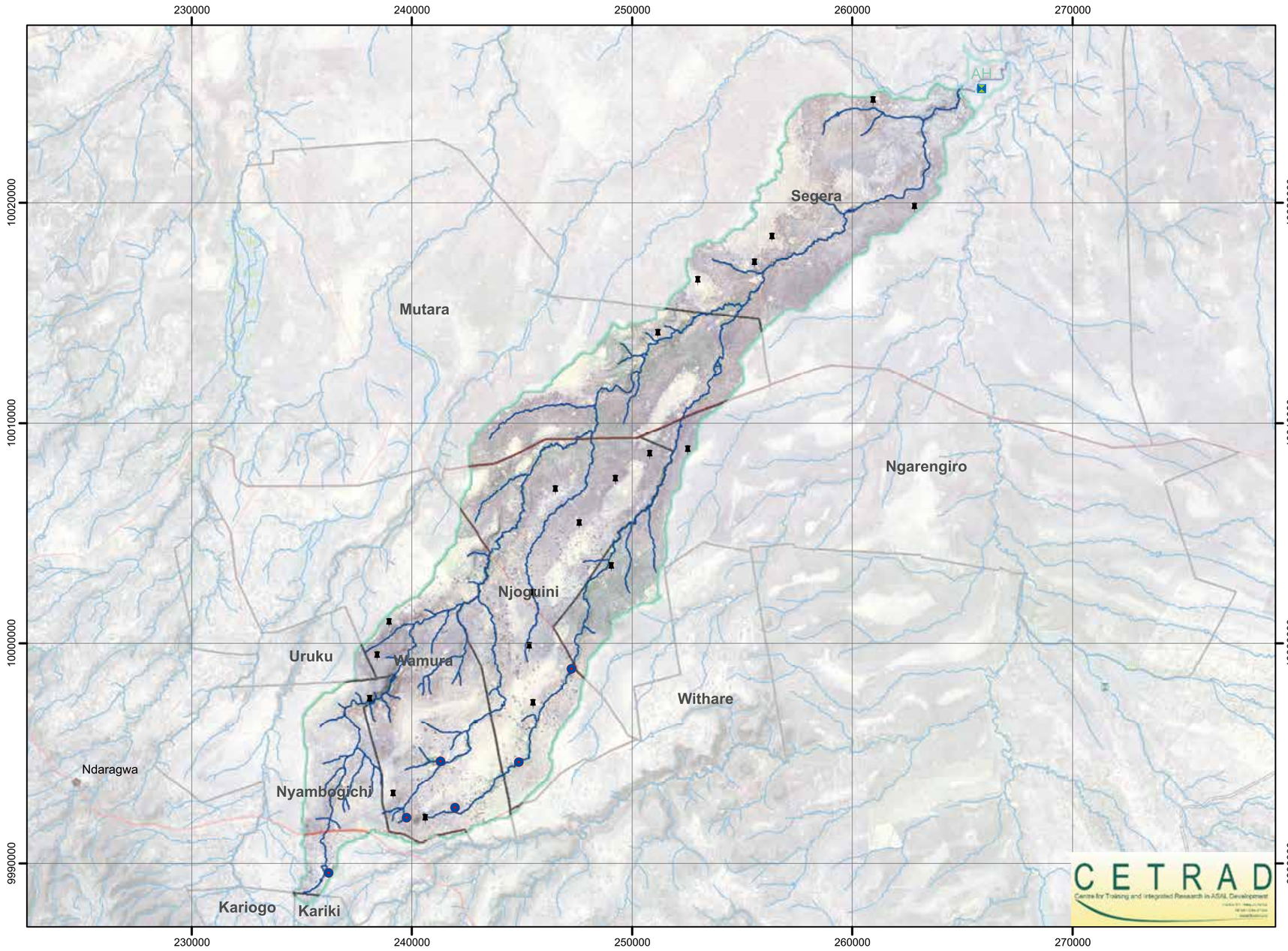
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

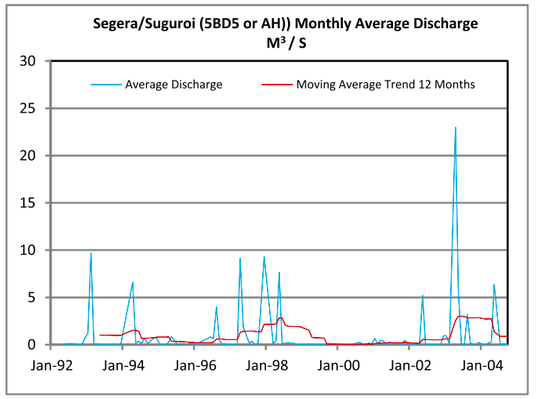
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

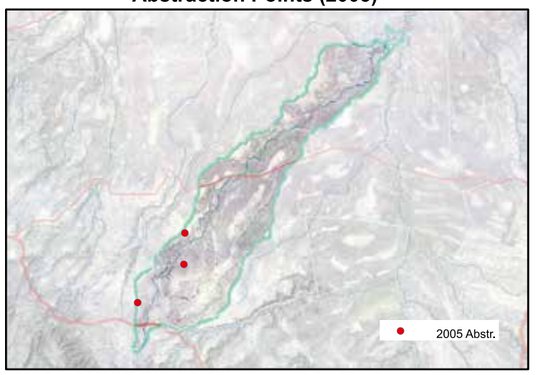




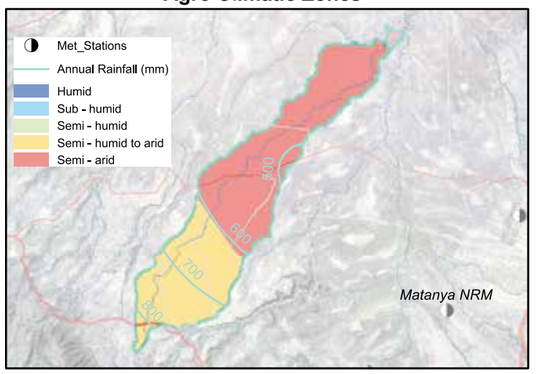

## Water Discharge Trends (AH)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Dams
- Boreholes

### Features & Boundaries

- Rivers
- Segera RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

### Transport

Roads

- A
- B
- C
- D
- E
- Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Segera Subcatchment

0 1 2 3 4 5 Kilometers

1:200,000

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

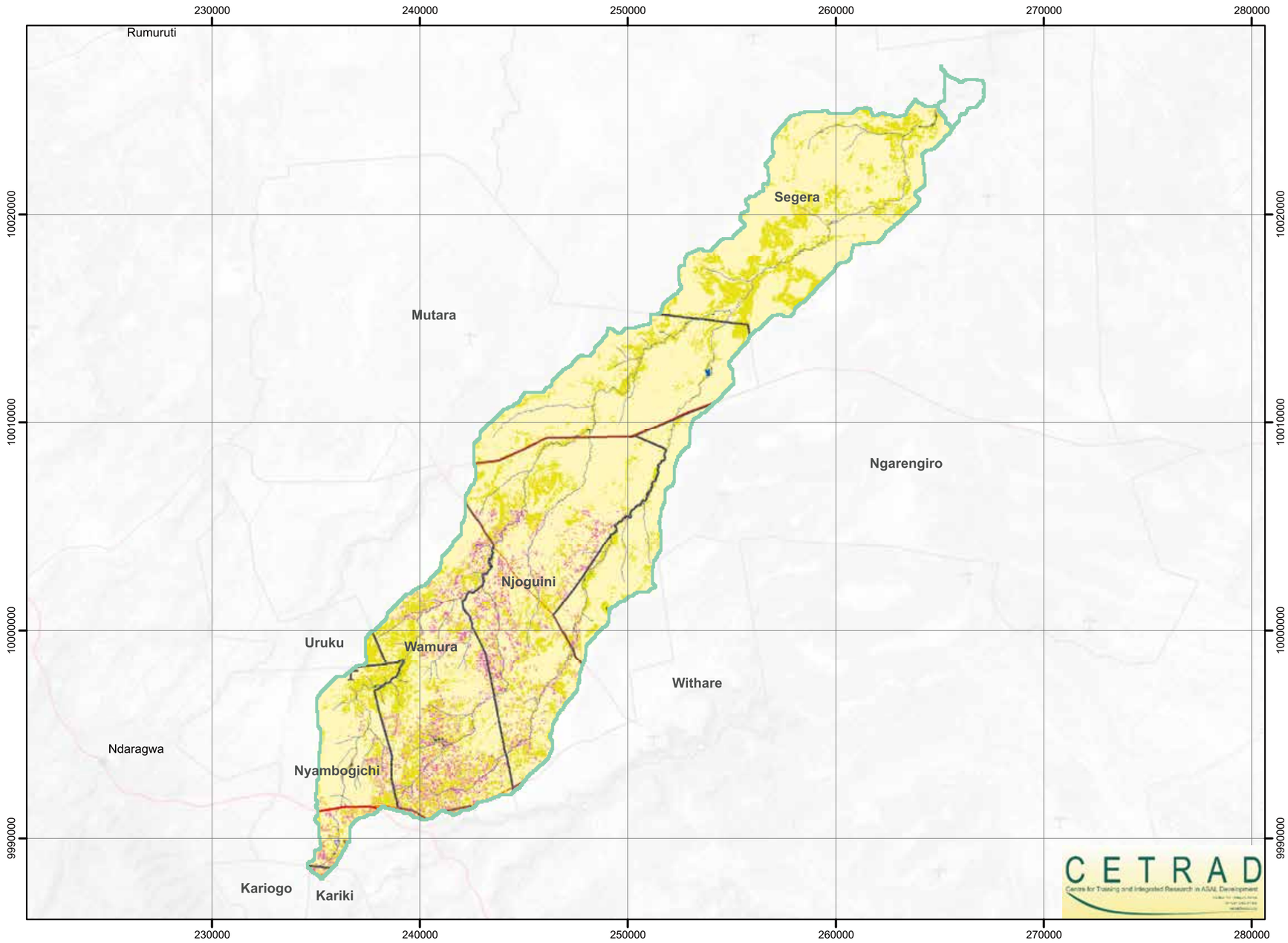
The background image: SRTM 30m.

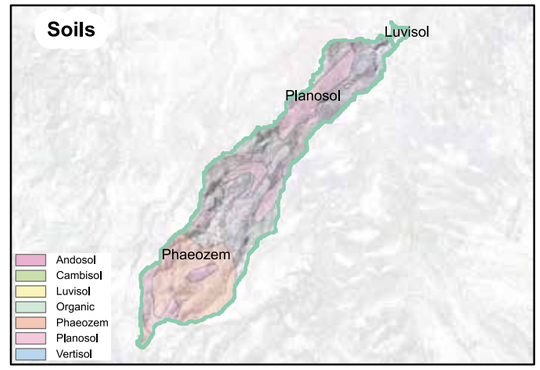
(*) Arid and Semi Arid Lands.

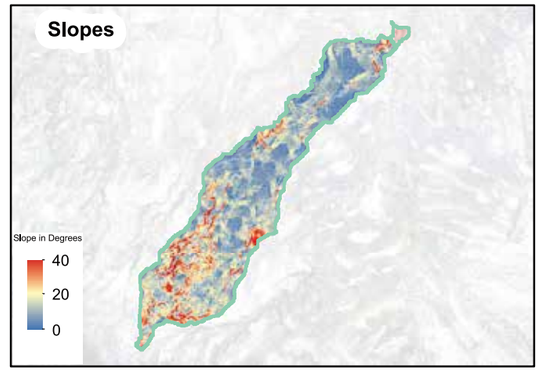
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 125 |
| Semi-arid | Medium to Low | 450 | 900 | 192 |

# Land Cover 2014









## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 147.57 | 46.57 | 221.84 | 70.69 |
| Woody Grassland | 165.33 | 52.18 | 75.15 | 23.95 |
| Natural Forest | 1.82 | 0.57 | 0.23 | 0.07 |
| Cropland | 1.99 | 0.63 | 16.22 | 5.17 |
| Wastelands Rocks | 0.00 | 0.00 | _ | _ |
| Water | 0.14 | 0.04 | 0.40 | 0.13 |
| **Totals** | **316.84** | **100.00** | **313.84** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Segera Subcatchment

0 1 2 3 4 5 Kilometers

1:210,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
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X-Shift: 500,000
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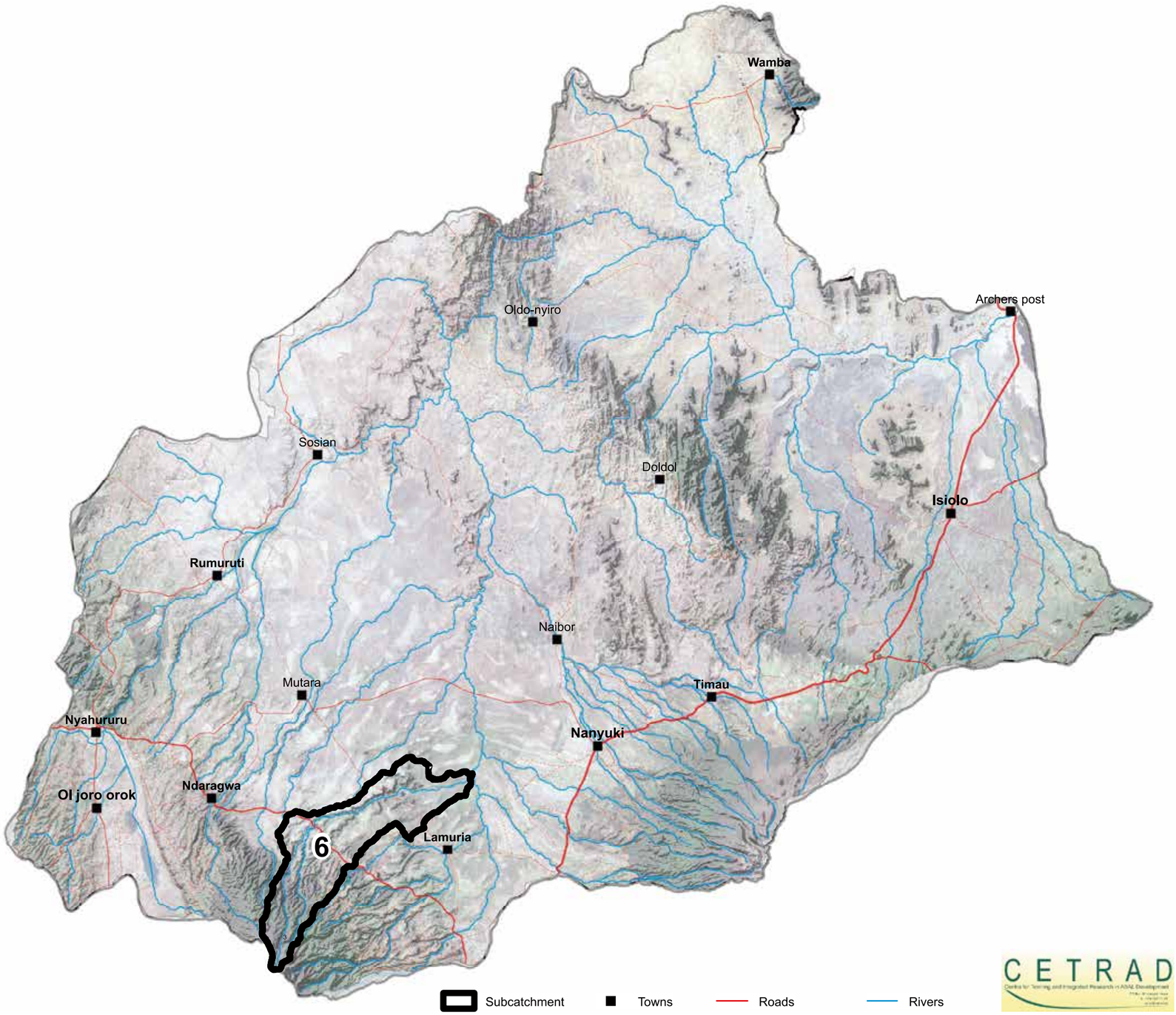
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 6 - Engare Ngobet



# ENGARE NGOBET

## Fact sheet. Date: July 2014

### Introduction

Engare Ngobet has a total area of 359 $Km^2$ with a combined population of 50,210 people living within seven sub locations (with an area of 1,897 $Km^2$) that are partly or completely within the sub catchment. About 22% is under crops and settlements, 47% under grasslands, 25% under forests and the remaining 6% of land is moorland.

### Climate

The climate varies from humid and sub-humid around the Aberdare in the south to semi humid and semi arid northwards to Lamuria.

### Education

There are Six (6) secondary schools and 24 primary schools; government sponsored (4), Private (5), Community (1) and Religious organizations (14).

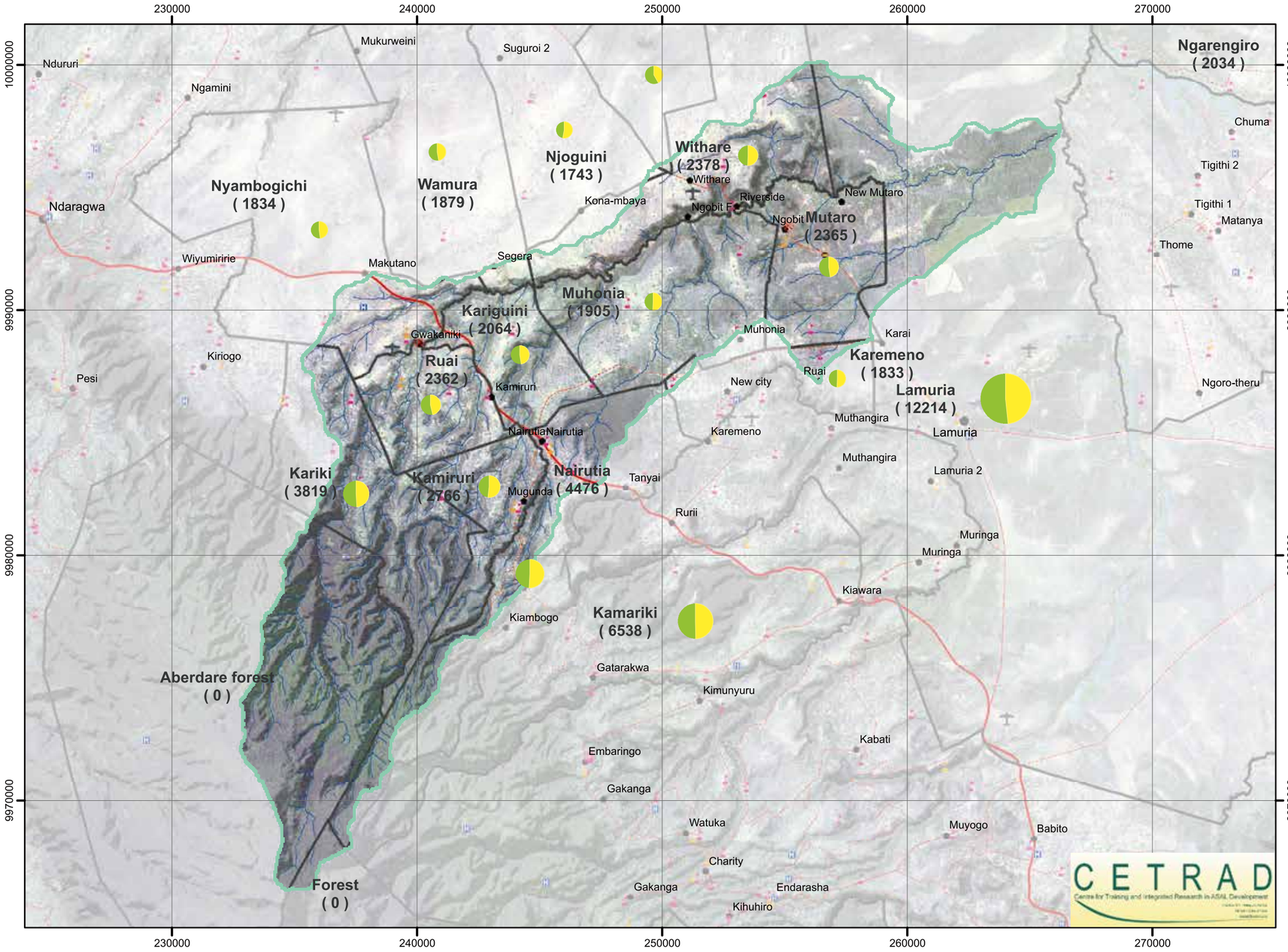
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Engare Ngobit WRUA | | | | |
| Contact Address email, chairperson, phone | | (10140) Mweiga 190 P.O Box<br>0725952391 – Generose Andeso | | | | |
| Date of Formation | | 2008 | | | | |
| Registration details | Social services | Non-profit society | | | | |
| | Attorney General Office | 32931 .Reg. No | | | | |
| Membership | Members | 242 | | | | |
| | Non members | 39758 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/Water pans |
| | | 1 | 10 | 8 | 0 | 10 |
| River water abstractions | | 1 | | | | |
| Main Reason for the formation | | Sensitize the community on sustainable water use | | | | |
| Objectives | | Promote equitable distribution and access to clean water for domestic and economic uses; Promote unity and conflicts resolutions among users | | | | |
| Availability of sanctioning system | | | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Olpajeta conservancy – (1)One | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Registered member of the WRUA | | | | |
| Sources and Nature of Conflicts | | Illegal water abstractions and Rationing during dry season. Conflict between downstream and upstream users | | | | |
| Problems Reported to the WRUA | | Illegal water abstractions<br>Encroachment and tree cutting along riparian areas<br>,Unfair water rationing<br>Law enforcement by WRMA<br>Breakdown of water pumps and boreholes in water projects | | | | |
| Unreported/unexpressed conflicts | | (Illegal abstraction and Lack of master meter (Ngobit wp | | | | |

| | |
|---|---|
| Availability of conflict resolution guidelines | None |
| Availability of conflict resolution skills and implementation | None |
| Challenges | Major challenges include Conflict, Water and WRUA Management |
| Cases of conflicts dealt with | Tree cutting on Mirera spring and Illegal abstraction by riparian members |
| Cases of conflicts unresolved and reasons | None |
| Other activities the WRUA is engaged in | None |
| Achievements | Registration at the Attorney general office<br>(Development of Sub Catchment Management Plan (SCMP<br>(Developed a proposal for funding by Water Service Trust Fund (WSTF |
| Hindrances to achieve the goals of the WRUA | .Inadequate resources<br>Lack of skills needed at this stage |
| Advices to others | WRUA empowers the community in managing their natural resources especially water |
| Information and Data Available | SCMP |
| Person Responsible for data Collection | None |
| Methods of Data Collection | None |
| Information and Data Needs | None |
| Period of Water Scarcity | (Jan - March), (July - Sept) |
| How is the problem of water scarcity solved | Reducing over reliance on river water, dams and boreholes |
| Institutional Support to WRUA Name, Year, Type of support,) (Amount of support | None |
| Water Quality and cause of pollution | Fair. Water pollution caused by human activities along the river |
| Existence of Wetlands and their status | none |
| Others | |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Aberdare forest | 250 | 0 | 0 | 0 | 0 | 0 |
| Forest | 301 | 0 | 0 | 0 | 0 | 0 |
| Kamariki | 88 | 3,285 | 3,253 | 6,538 | 74 | 1,809 |
| Kamiruri | 19 | 1,325 | 1,441 | 2,766 | 144 | 722 |
| Karemeno | 18 | 910 | 923 | 1,833 | 100 | 538 |
| Kariguini | 21 | 1,080 | 984 | 2,064 | 96 | 546 |
| Kariki | 48 | 1,944 | 1,875 | 3,819 | 79 | 903 |
| Lamuria | 441 | 6,308 | 5,906 | 12,214 | 28 | 4,105 |
| Muhonia | 47 | 945 | 960 | 1,905 | 41 | 523 |
| Mutaro | 30 | 1,236 | 1,129 | 2,365 | 80 | 712 |
| Nairutia | 59 | 2,196 | 2,280 | 4,476 | 76 | 1,191 |
| Ngarengiro | 233 | 1,187 | 847 | 2,034 | 9 | 824 |
| Njoguini | 91 | 825 | 918 | 1,743 | 19 | 478 |
| Nyambogichi | 82 | 945 | 889 | 1,834 | 22 | 501 |
| Ruai | 22 | 1,255 | 1,107 | 2,362 | 106 | 601 |
| Wamura | 83 | 985 | 894 | 1,879 | 23 | 500 |
| Withare | 63 | 1,178 | 1,200 | 2,378 | 38 | 662 |
| Totals | 1,897 | 25,604 | 24,606 | 50,210 | 26 | 14,615 |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Engare Ngobet Subcatchment

0 1 2 3 4 5 Kilometers

1:180,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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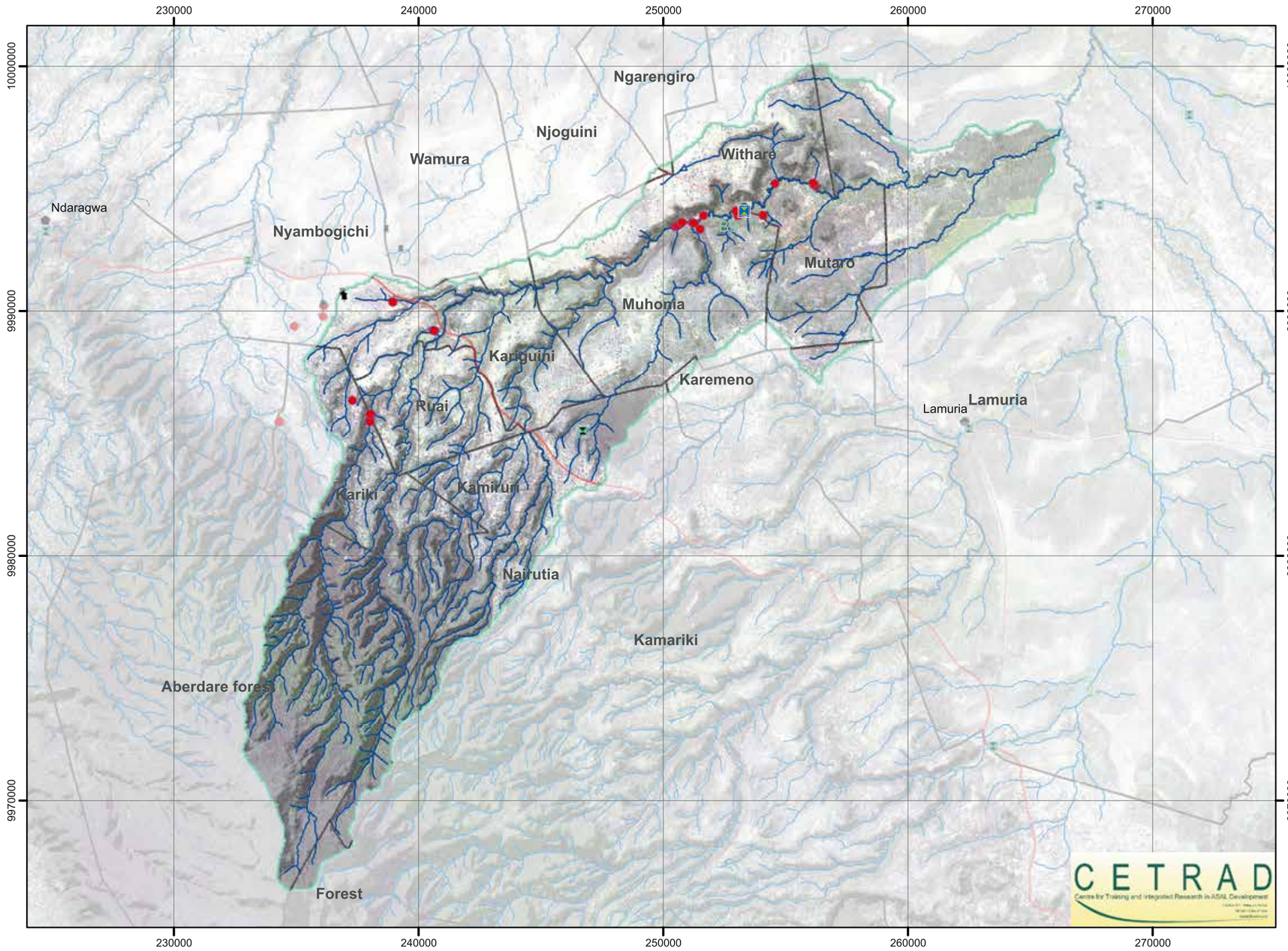
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

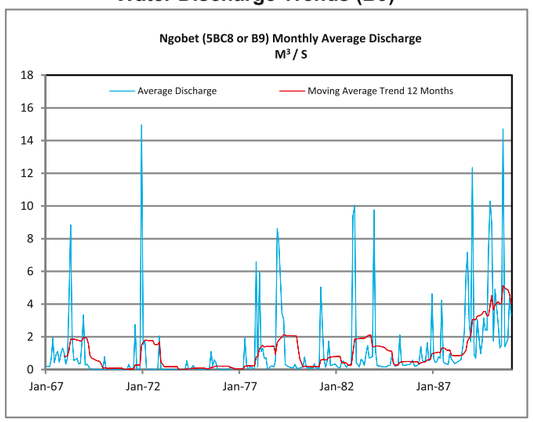
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

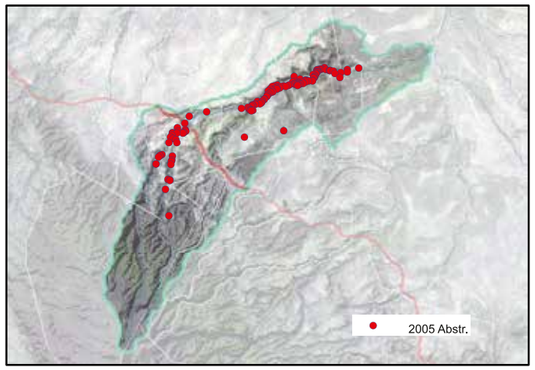




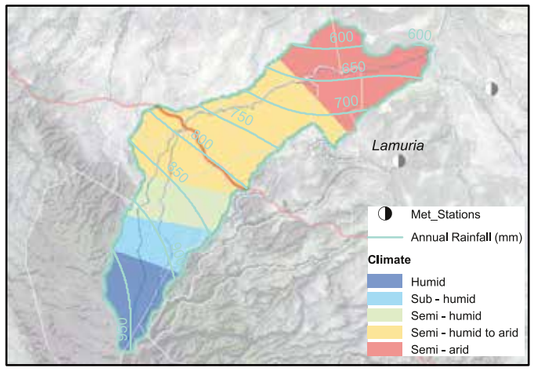

## Water Discharge Trends (B9)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers
- Bore Holes

### Features & Boundaries

- Rivers
- Engare Ngobit RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

### Transport

Roads

- A
- B
- C
- D
- E

Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Engare Ngobet Subcatchment

0 1 2 3 4 5 Kilometers

1:180,000

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

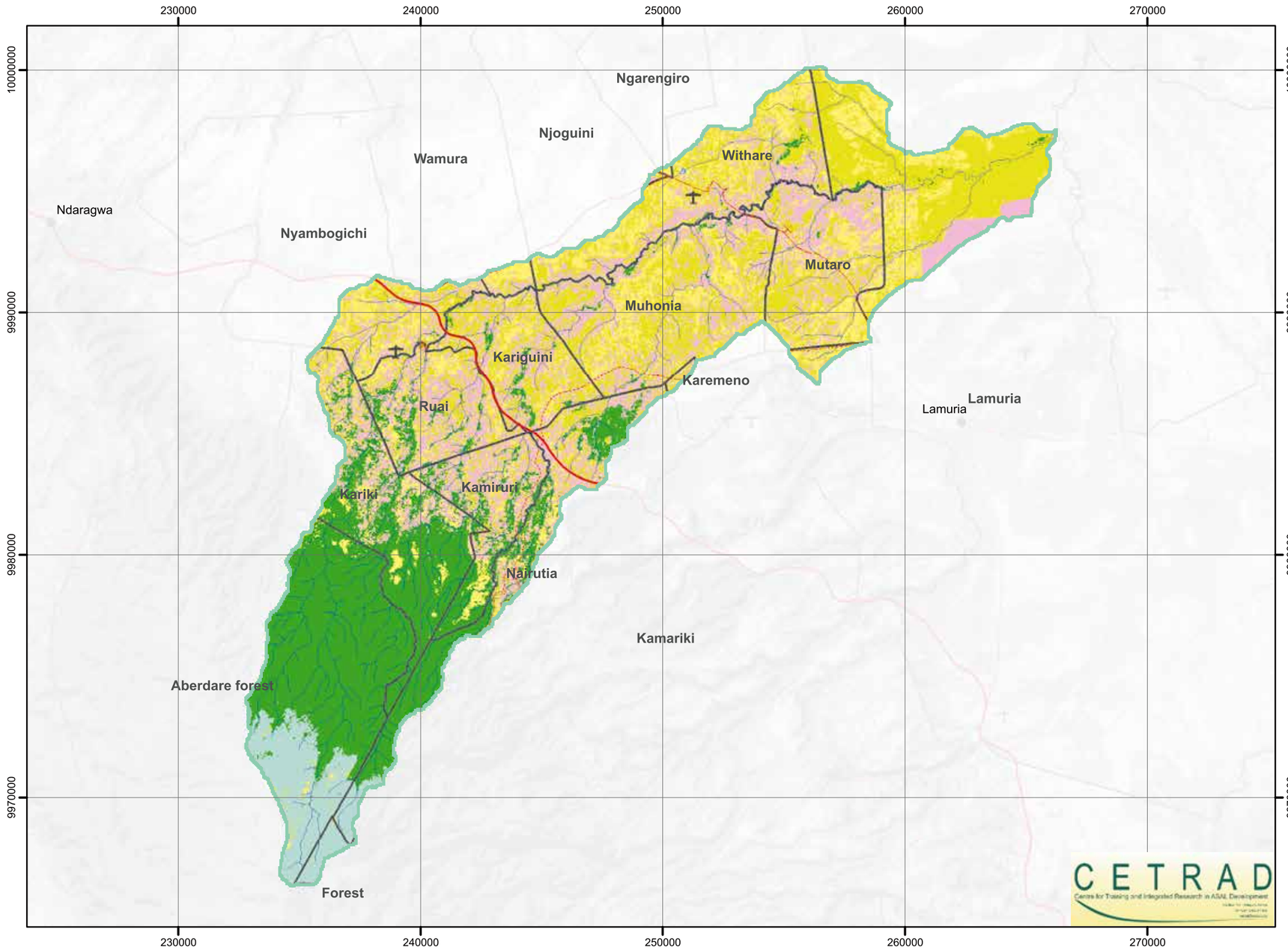
The background image: SRTM 30m.

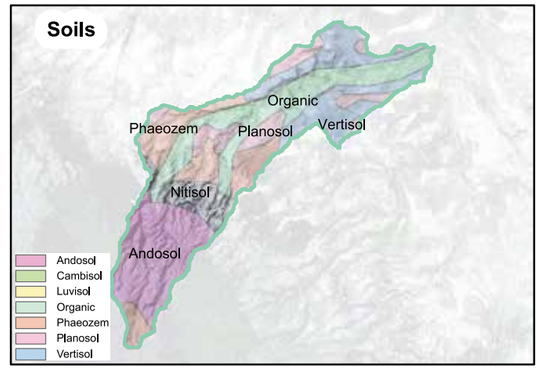
(*) Arid and Semi Arid Lands.

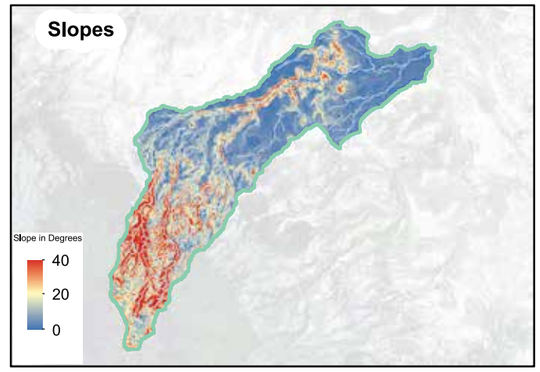
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area Kms |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 43 |
| Sub-humid | High | 1,000 | 1,600 | 37 |
| Semi-humid | High to Medium | 800 | 1,400 | 39 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 153 |
| Semi-arid | Medium to Low | 450 | 900 | 88 |

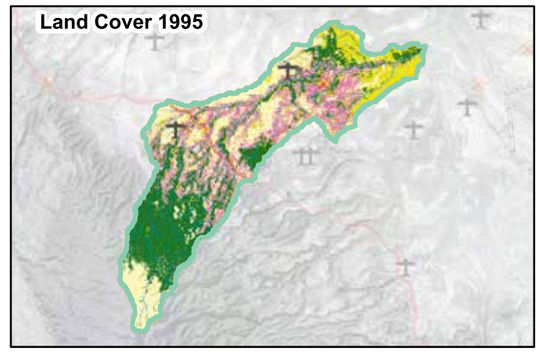
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 98.30 | 27.41 | 57.43 | 16.01 |
| Woody Grassland | 65.42 | 18.24 | 113.60 | 31.67 |
| Natural Forest | 118.83 | 33.13 | 90.91 | 25.34 |
| Planted Forest | _ | _ | 0.51 | 0.14 |
| Cropland | 76.03 | 21.20 | 77.16 | 21.51 |
| Wastelands Rocks | 0.03 | 0.01 | _ | _ |
| Water | 0.09 | 0.03 | 0.00 | 0.00 |
| Moorland | _ | _ | 19.09 | 5.32 |
| Others | _ | _ | 0.00 | 0.00 |
| **Totals** | **358.70** | **100.00** | **358.70** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Engare Ngobet Subcatchment

0 1 2 3 4 5 Kilometers

**1:181,769**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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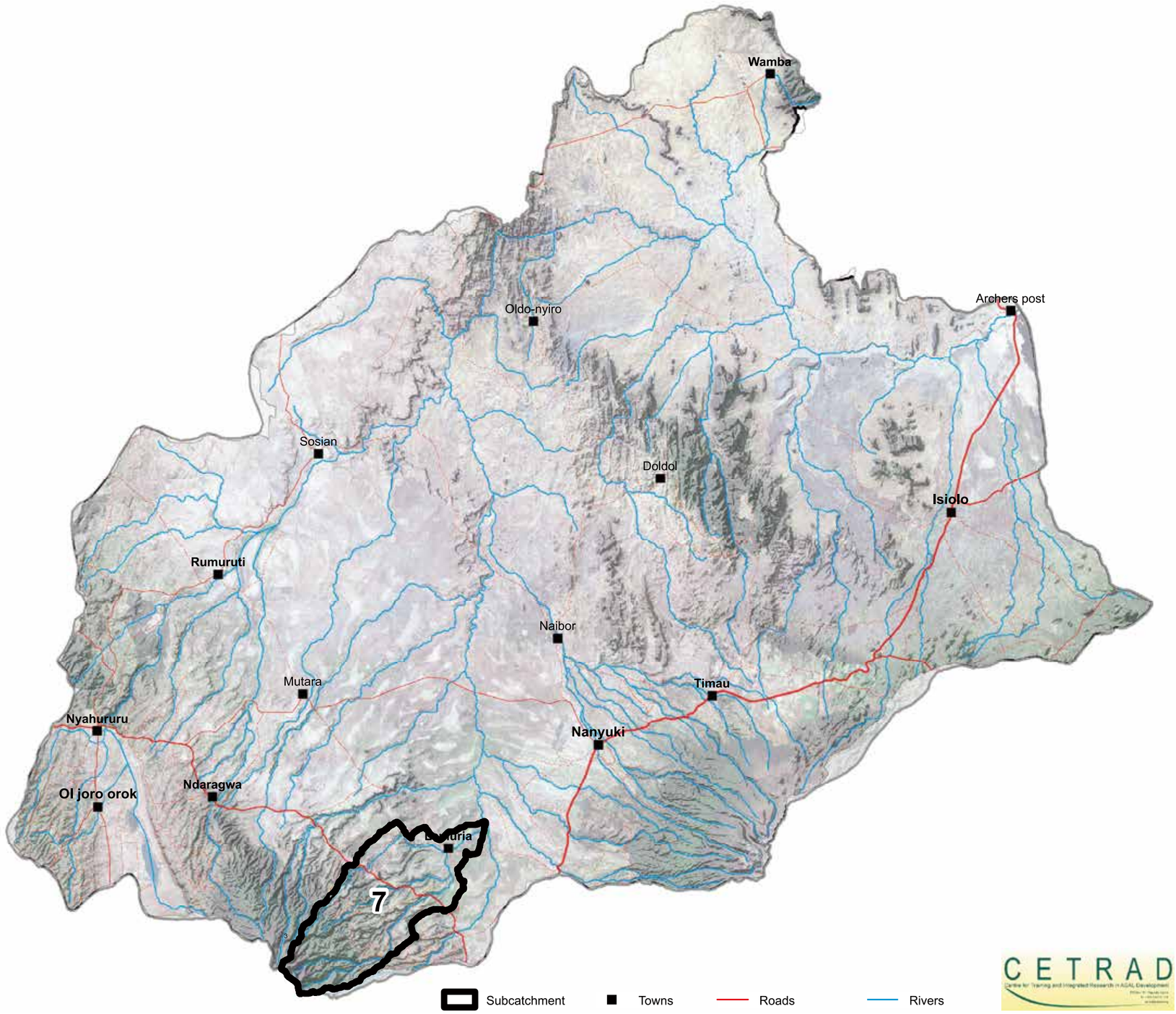
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

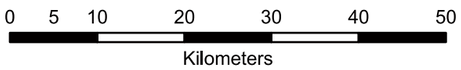
(*) Arid and Semi Arid Lands.

# 7 - Ewaso Ngiro East









# EWASO NGIRO EAST

## Fact sheet. Date: July 2014

**Introduction**

Ewaso Ngiro East has a total area of 433 $Km^2$ with a combined population of 64,930 people living within sixteen sub locations (with an area of 1,257 $Km^2$) that are partly or completely within the sub catchment. About 25% of the area is under crops and settlements, 38% under grasslands, 33% under forest and 4% under moorland.

**Climate**

The climate varies from humid around the Aberdare to sub and semi humid around Ruirii sub location with the remaining areas in the North having semi humid to semi arid type of climate.

**Education**

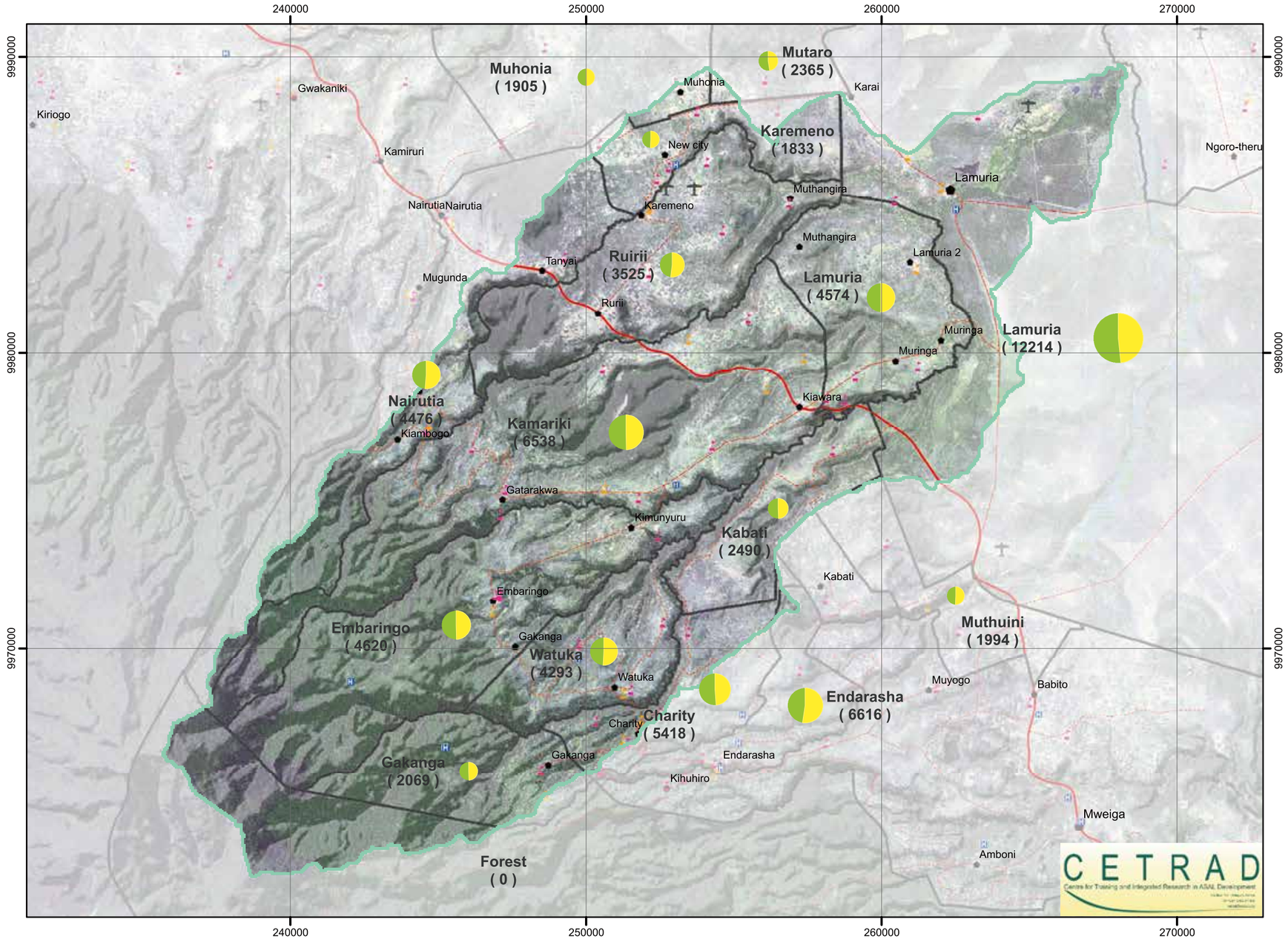
There are fourteen (14) secondary schools and about 44 primary schools; government sponsored (15), Private (15) and Religious organizations (13) and Community (1).

**Water Resource Users Association Information**

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Upper Ewaso Nyiro WRUA | | | | |
| Contact Address email, chairperson, phone | | P.O Box 08 Narumoru<br>0722 900593 | | | | |
| Date of Formation | | 2010 | | | | |
| Registration details | Social services; | 2010 | | | | |
| | Attorney General office | Reg. no. 37682 Date: 21/06/2012 | | | | |
| Membership details | Members | 80 | | | | |
| | Non members | - | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 13 | 2 | - | 3 |
| Rivers abstractions | | 400 | | | | |
| Main Reason of formation | | to promote equitable distribution of water | | | | |
| Objectives | | • Promote controlled and legal water use activities<br>• Promote good management practices<br>• Promote water conservation<br>• Promote catchment conservation | | | | |
| Availability of sanctioning system | | - | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 1. Solio Ranch<br>2. Ol pejeta Conservancies<br>3. Kitawi Farm<br>4. Segera Ranch<br>5. El Karama<br>6. Mpala Ranch | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Support to WRUA and members | | | | |
| Sources and Nature of Conflicts | | Farmers and pastoralist | | | | |
| Problems Reported to the WRUA | | Farmers destroying crops upstream during dry season e.g. 2009 | | | | |
| Unreported/unexpressed conflicts | | Non | | | | |
| Availability of conflict resolution guidelines | | In the WRUA's office | | | | |

| | |
|---|---|
| Availability of conflict resolution skills and implementation | Dialogue |
| Challenges | Lack of knowledge<br>Lack of understanding of water rules and regulation |
| Cases of conflicts dealt with | - |
| Cases of conflicts unresolved and reasons | - |
| Other activities the WRUA is engaged in | Tree planting<br>Riparian protection |
| Achievements | Riparian land has improved |
| Hindrances to achieve the goals of the WRUA | Finance<br>Lack of self-motivation |
| Advices to others | Capacity building |
| Information and Data Available | Abstraction survey done by Rural Focus |
| Person Responsible for data Collection | Rural Focus and members |
| Methods of Data Collection | Using GPS |
| Information and Data Needs | Not known |
| Period of Water Scarcity | During very dry season |
| How is the problem of water scarcity solved | Water rationing |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Rural Focus<br>CETRAD<br>L.W.F |
| Water Quality and cause of pollution | Pesticide Cans |
| Existence of Wetlands and their status | Kamariki<br>Not in good condition |
| Others | |

# Population Numbers (2009) and Socio Infrastructure




## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Watuka | 24 | 2,124 | 2,169 | 4,293 | 180 | 1,126 |
| Lamuria | 32 | 2,292 | 2,282 | 4,574 | 142 | 1,366 |
| Embaringo | 63 | 2,335 | 2,285 | 4,620 | 74 | 1,217 |
| Kamariki | 88 | 3,285 | 3,253 | 6,538 | 74 | 1,809 |
| Charity | 22 | 2,769 | 2,649 | 5,418 | 247 | 1,456 |
| Gakanga | 23 | 1,050 | 1,019 | 2,069 | 88 | 569 |
| Endarasha | 17 | 3,143 | 3,473 | 6,616 | 399 | 1,907 |
| Kabati | 28 | 1,262 | 1,228 | 2,490 | 88 | 701 |
| Muthuini | 20 | 986 | 1,008 | 1,994 | 101 | 571 |
| Karemeno | 18 | 910 | 923 | 1,833 | 100 | 538 |
| Ruirii | 44 | 1,705 | 1,820 | 3,525 | 80 | 993 |
| Nairutia | 59 | 2,196 | 2,280 | 4,476 | 76 | 1,191 |
| Forest | 301 | 0 | 0 | 0 | 0 | 0 |
| Lamuria | 441 | 6,308 | 5,906 | 12,214 | 28 | 4,105 |
| Muhonia | 47 | 945 | 960 | 1,905 | 41 | 523 |
| Mutaro | 30 | 1,236 | 1,129 | 2,365 | 80 | 712 |
| **Totals** | **1,257** | **32,546** | **32,384** | **64,930** | **52** | **18,784** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Ewaso Ngiro East Subcatchment

0 1 2 3 4 5 Kilometers

1:147,494

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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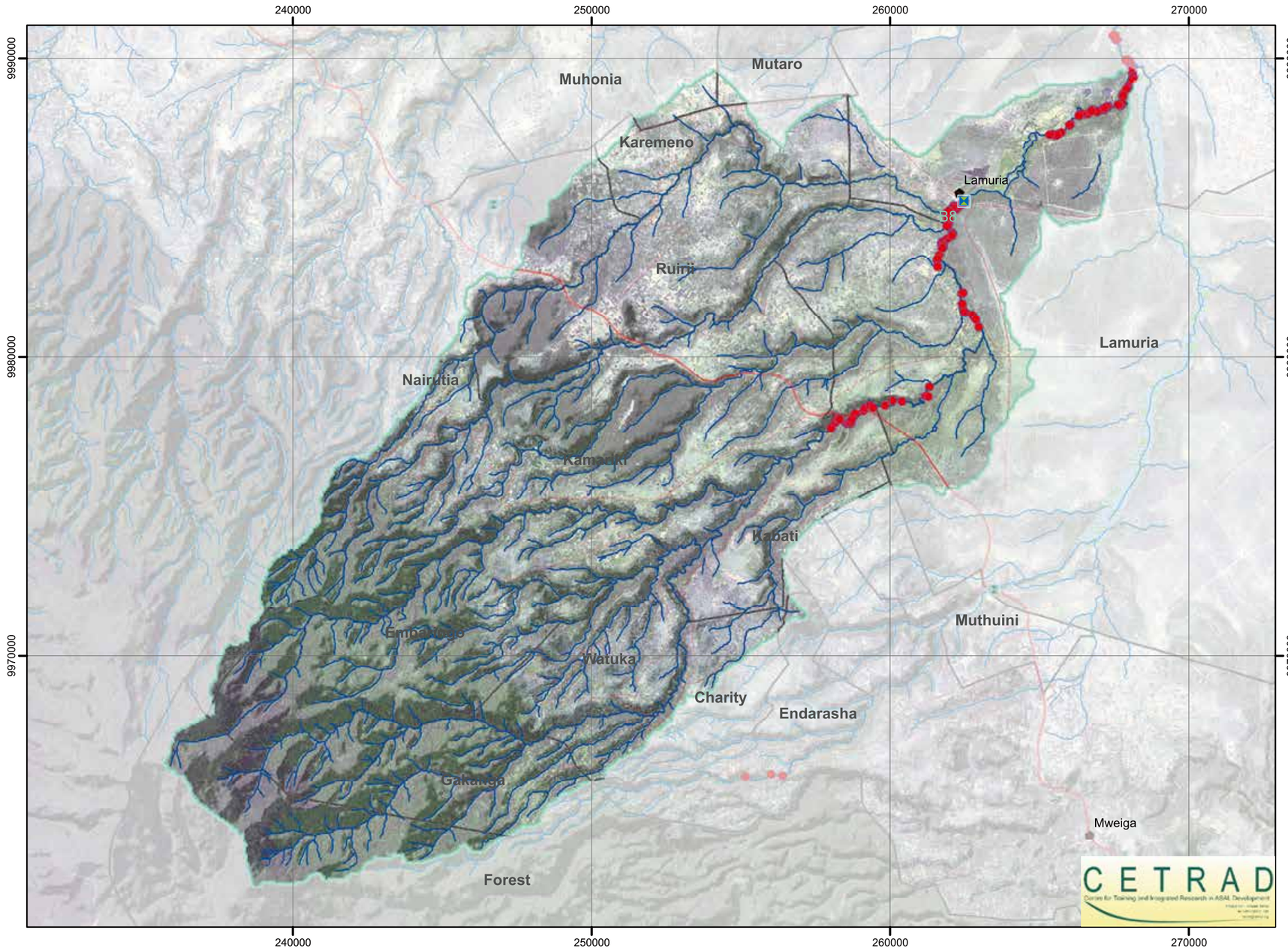
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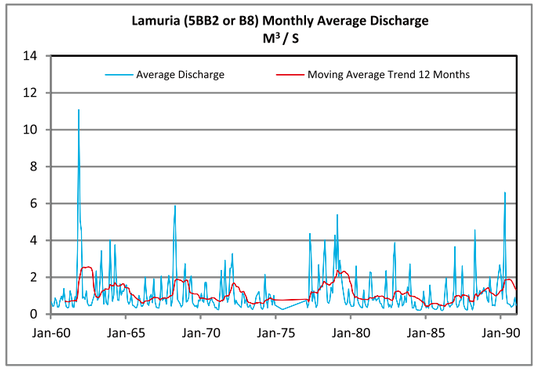
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

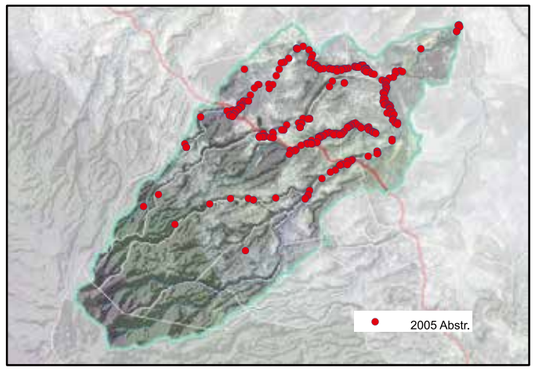




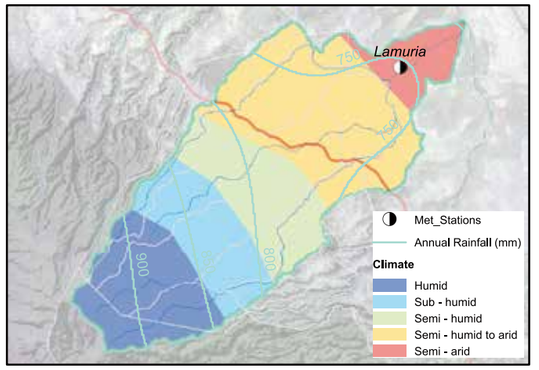

## Water Discharge Trends (B8)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers
- Dams

### Features & Boundaries

- Rivers
- Ewaso Ngiro E. RGS
- Other RGS
- Sublocations
- Subcatchment
- Wetlands

### Transport

**Roads**

- A
- B
- C
- D
- E
- Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Ewaso Ngiro East Subcatchment

0 1 2 3 4 5 Kilometers

**1:147,527**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

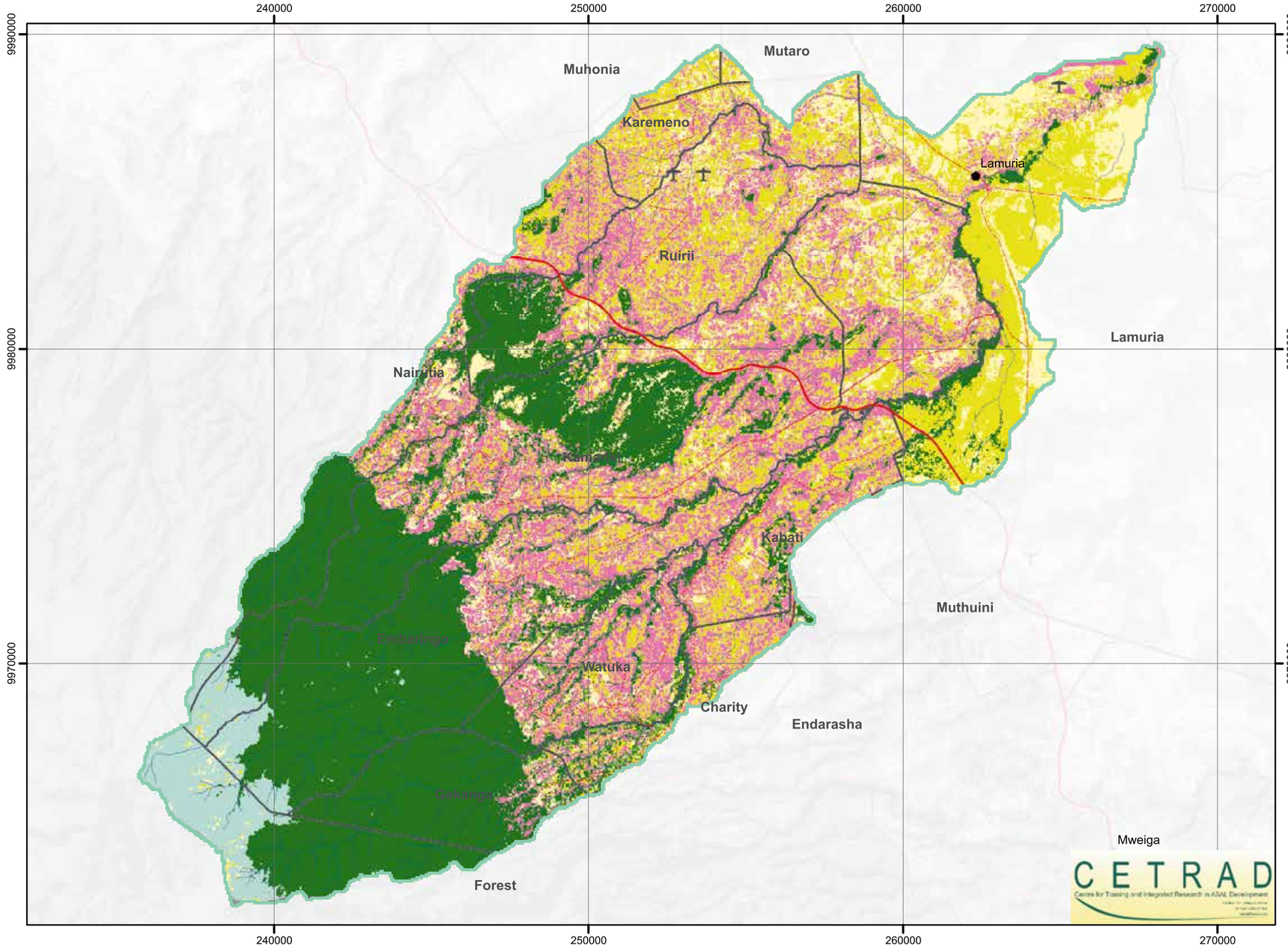
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

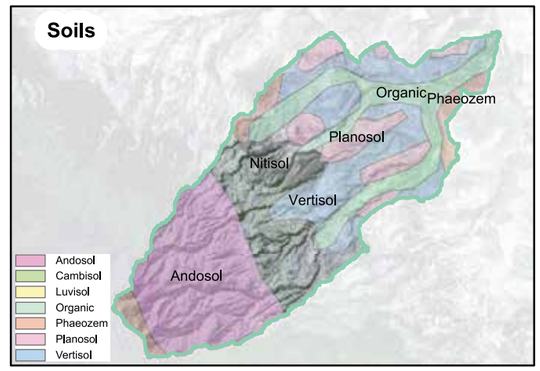
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area Kms |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 89 |
| Sub-humid | High | 1,000 | 1,600 | 72 |
| Semi-humid | High to Medium | 800 | 1,400 | 82 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 156 |
| Semi-arid | Medium toLow | 450 | 900 | 34 |

# Land Cover 2014

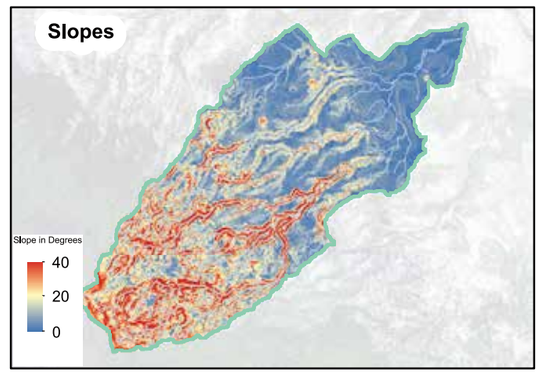




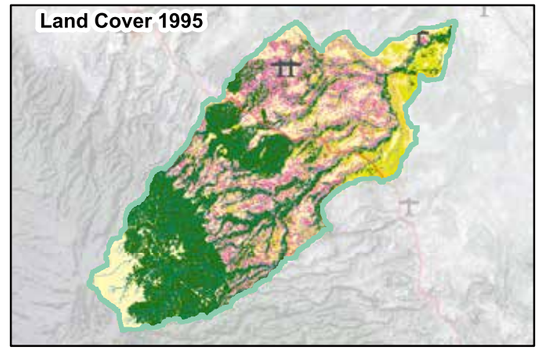

## Soils




## Slopes




## Land Cover 1995



### Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 90.90 | 21.01 | 52.97 | 12.25 |
| Woody Grassland | 73.70 | 17.04 | 111.45 | 25.76 |
| Natural Forest | 176.36 | 40.77 | 141.30 | 32.67 |
| Planted Forest | _ | _ | 2.84 | 0.66 |
| Cropland | 91.57 | 21.17 | 106.08 | 24.52 |
| Moorland | _ | _ | 17.91 | 4.14 |
| Wastelands Rocks | 0.02 | 0.00 | _ | _ |
| Water | 0.03 | 0.01 | 0.01 | 0.00 |
| Others | _ | _ | 0.01 | 0.00 |
| **Totals** | **432.57** | **100.00** | **432.57** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Ewaso NgiroE Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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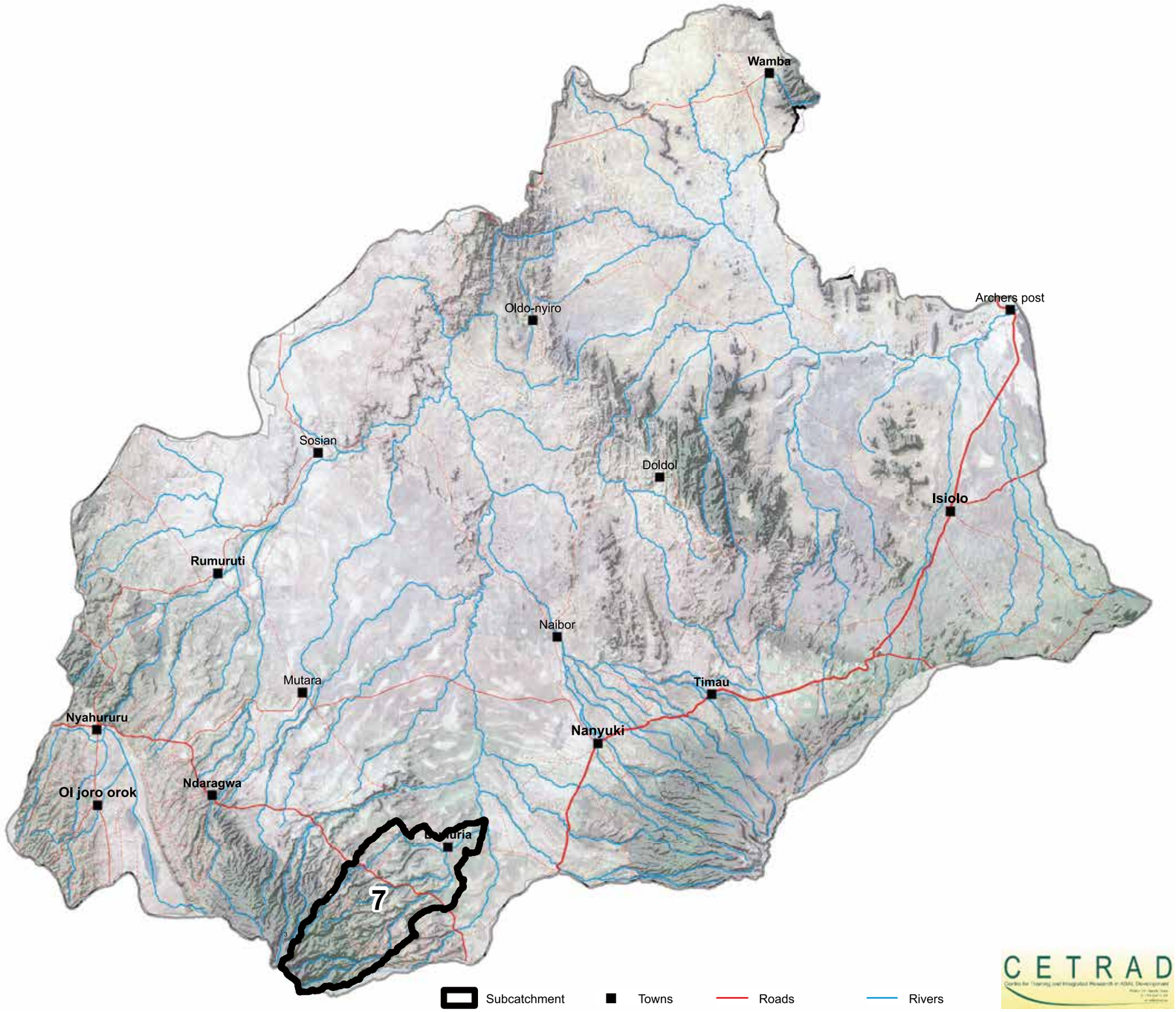
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 8 - Engare Moyok









# ENGARE MOYOK SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

This sub catchment has a total area of 243 $Km^2$ with a combined population of 58,517 people living within ten sub locations (with an area of 752 $Km^2$) that are partly or completely within the sub catchment. About 11% of the sub catchment is under crops and settlements, 78% under grasslands and the remaining 16% of land is under forest with traces of water and moorland.

### Climate

The climate varies from sub humid to semi humid at the southern part near Aberdare forest and semi humid to semi arid type of climate across the grasslands.

### Education

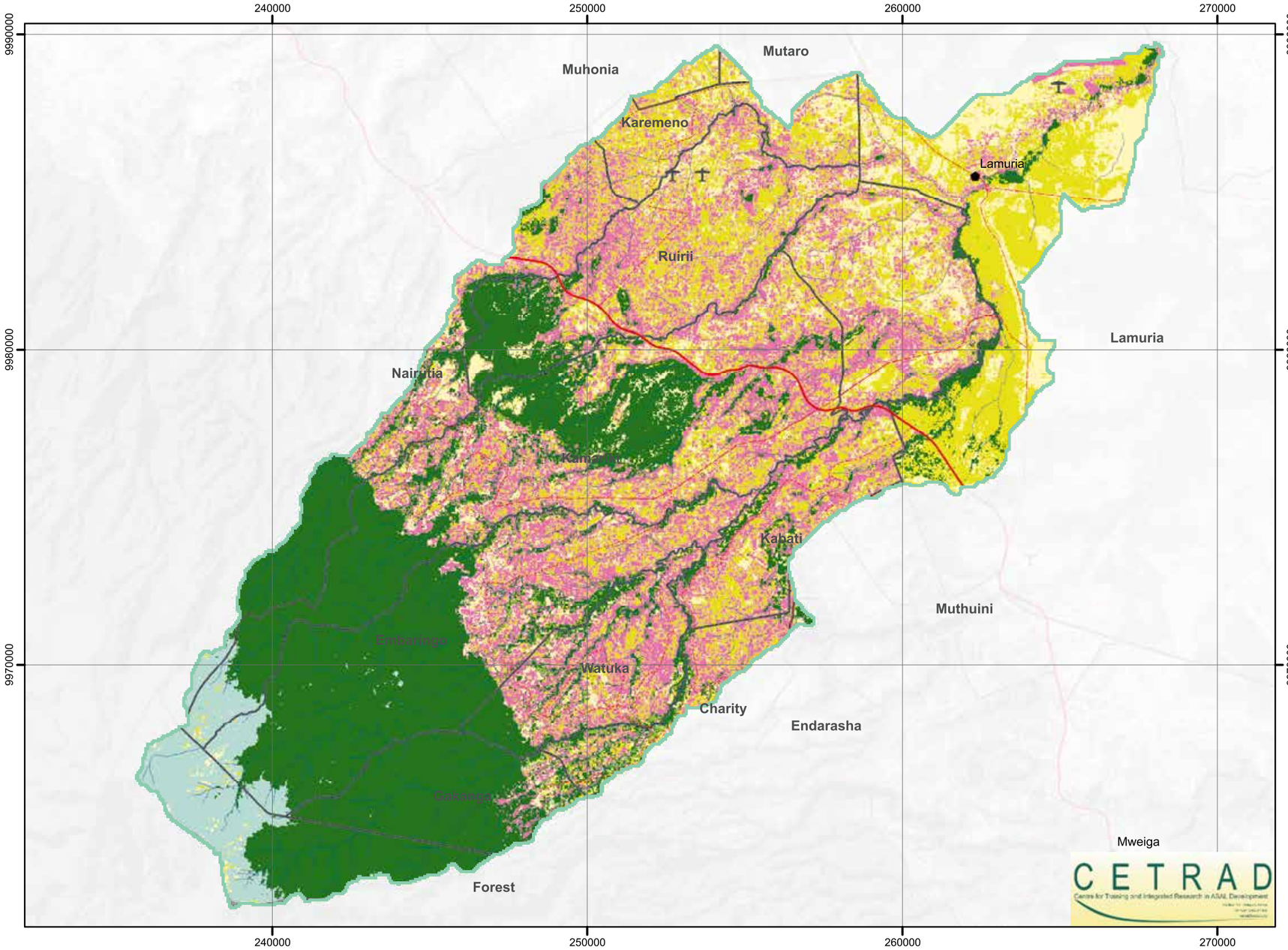
There is one (1) secondary school and over 14 primary schools; government sponsored (6), Private (3) and Religious organizations (5).

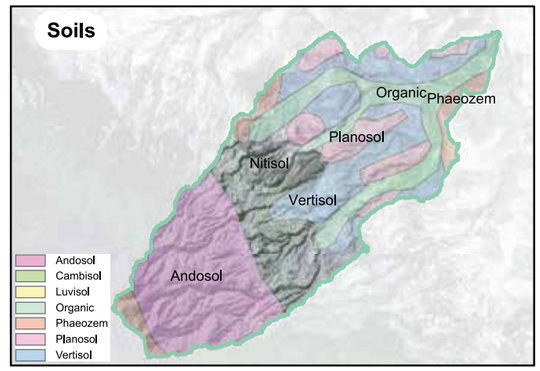
### Water Resource Users Association Information

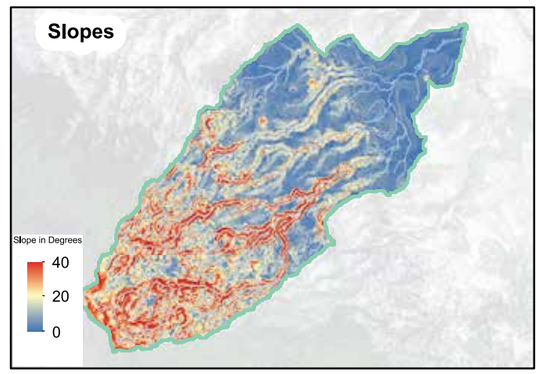
| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Moyok WRUA | | | | |
| Contact person | | Stephen Mwaura;<br>Phone: 072900018472. | | | | |
| Date of Formation | | - | | | | |
| Registration details | Socio services; | Date: 1/9/2006<br>Reg.No:7603 | | | | |
| | Attorney General Office | Date: 25/11/2010<br>Reg. No; file soc/57319 | | | | |
| Membership | Members | - | | | | |
| | Non-members | - | | | | |
| | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| Water resources | | 1 | 5 | 0 | 0 | 0 |
| River water abstractions | | Not known | | | | |
| Main Reason for WRUA formation | | Sustainable water resource management | | | | |
| Objectives | | The primary objectives include: To solve conflicts related to water use and to educate members on proper water utilization strategies | | | | |
| Availability of sanctioning system | | _ | | | | |
| Number of large scale (Ranches, Conservancies, Horticulture others ) farms | | 5 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | None | | | | |
| Sources and nature of conflicts | | Water shortages causing inequitable sharing of available water. Conflicts between upstream and downstream water users arise | | | | |
| Problems Reported to the WRUA | | Water pumps used for abstraction taken by the authority (WRMA) and people prosecuted | | | | |
| Unreported/unexpressed conflicts | | _ | | | | |
| Availability of conflict resolution guidelines | | none | | | | |
| Availability of conflict resolution skills and implementation | | None | | | | |
| Challenges | | Water shortage – rationing, Many people do not register with WRUAs as members | | | | |
| Cases of conflicts dealt with | | none | | | | |
| Cases of conflicts unresolved and reasons | | _ | | | | |
| Other activities the WRUA is engaged in | | Water rationing during dry season | | | | |
| Achievements | | People have been sensitized on rights to access to water | | | | |
| Hindrances to achieve the goals of the WRUA | | inadequate resources | | | | |
| Advices to others | | proper water utilization | | | | |
| Information and Data Available | | None | | | | |
| Person Responsible for data Collection | | None | | | | |
| Methods of Data Collection | | None | | | | |
| Information and Data Needs | | To know the river water level flow at all times | | | | |
| Period of Water Scarcity | | Jan -may, June-Oct. | | | | |
| How is the problem of water scarcity solved | | Not Solved | | | | |
| Institutional Support to WRUA | | Year: 2011,<br>Type of support: Funds | | | | |
| Water Quality and cause of pollution | | Wild animals pollute water while drinking direct from the river | | | | |
| Existence of Wetlands and their status | | Solio conservancy | | | | |
| Others | | | | | | |

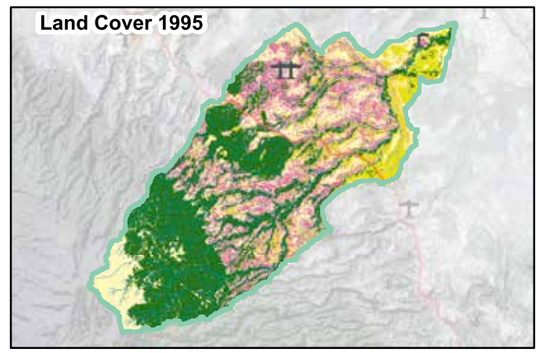
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 90.90 | 21.01 | 52.97 | 12.25 |
| Woody Grassland | 73.70 | 17.04 | 111.45 | 25.76 |
| Natural Forest | 176.36 | 40.77 | 141.30 | 32.67 |
| Planted Forest | _ | _ | 2.84 | 0.66 |
| Cropland | 91.57 | 21.17 | 106.08 | 24.52 |
| Moorland | _ | _ | 17.91 | 4.14 |
| Wastelands Rocks | 0.02 | 0.00 | _ | _ |
| Water | 0.03 | 0.01 | 0.01 | 0.00 |
| Others | _ | _ | 0.01 | 0.00 |
| **Totals** | **432.57** | **100.00** | **432.57** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

### Ewaso NgiroE Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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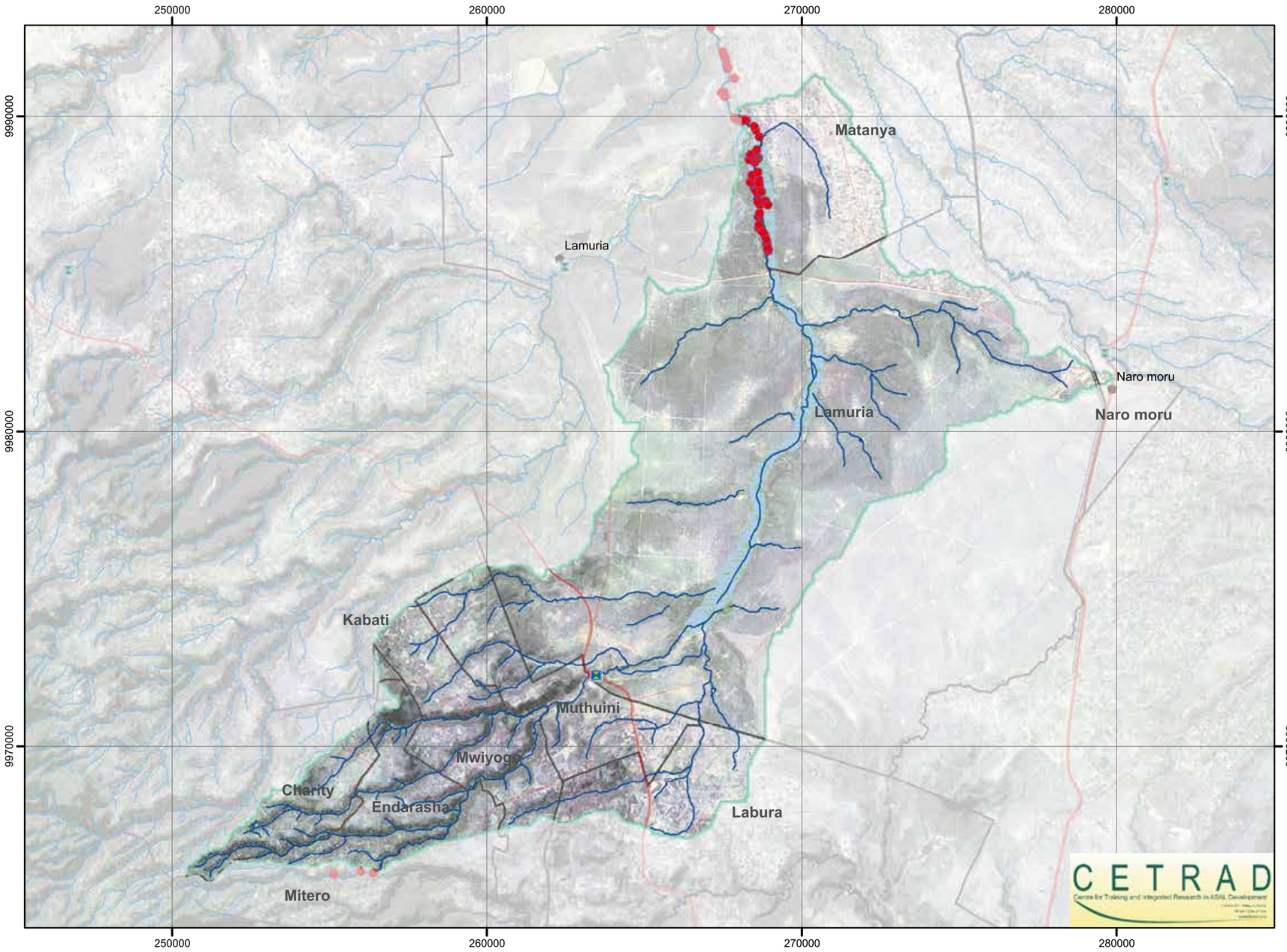
Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

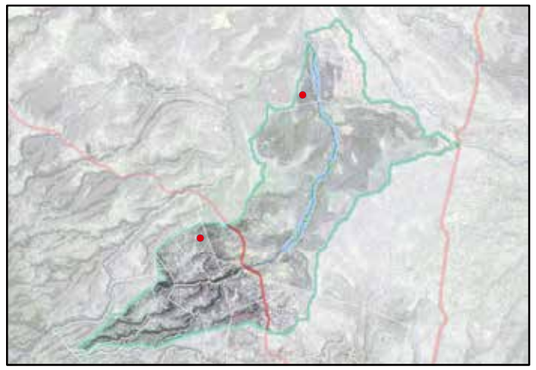
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

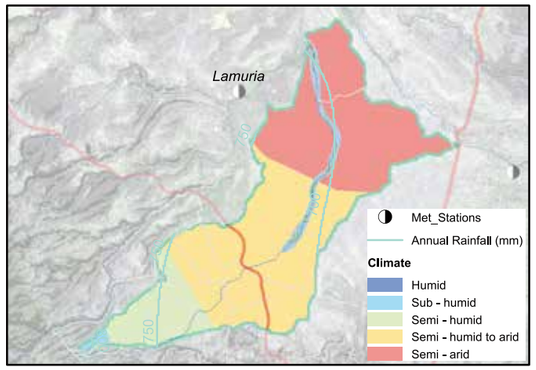





**Abstraction Points (2005)**



**Agro Climatic Zones**




**Abstractions**

- Rivers
- Springs
- dam
- pan

**Features & Boundaries**

- Rivers
- Engare Moyok RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

**Roads**

- A
- B
- C
- D
- E
- Railway Line

**Urban Settlements**

- District Hq
- Division Hq

## Engare Moyok Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

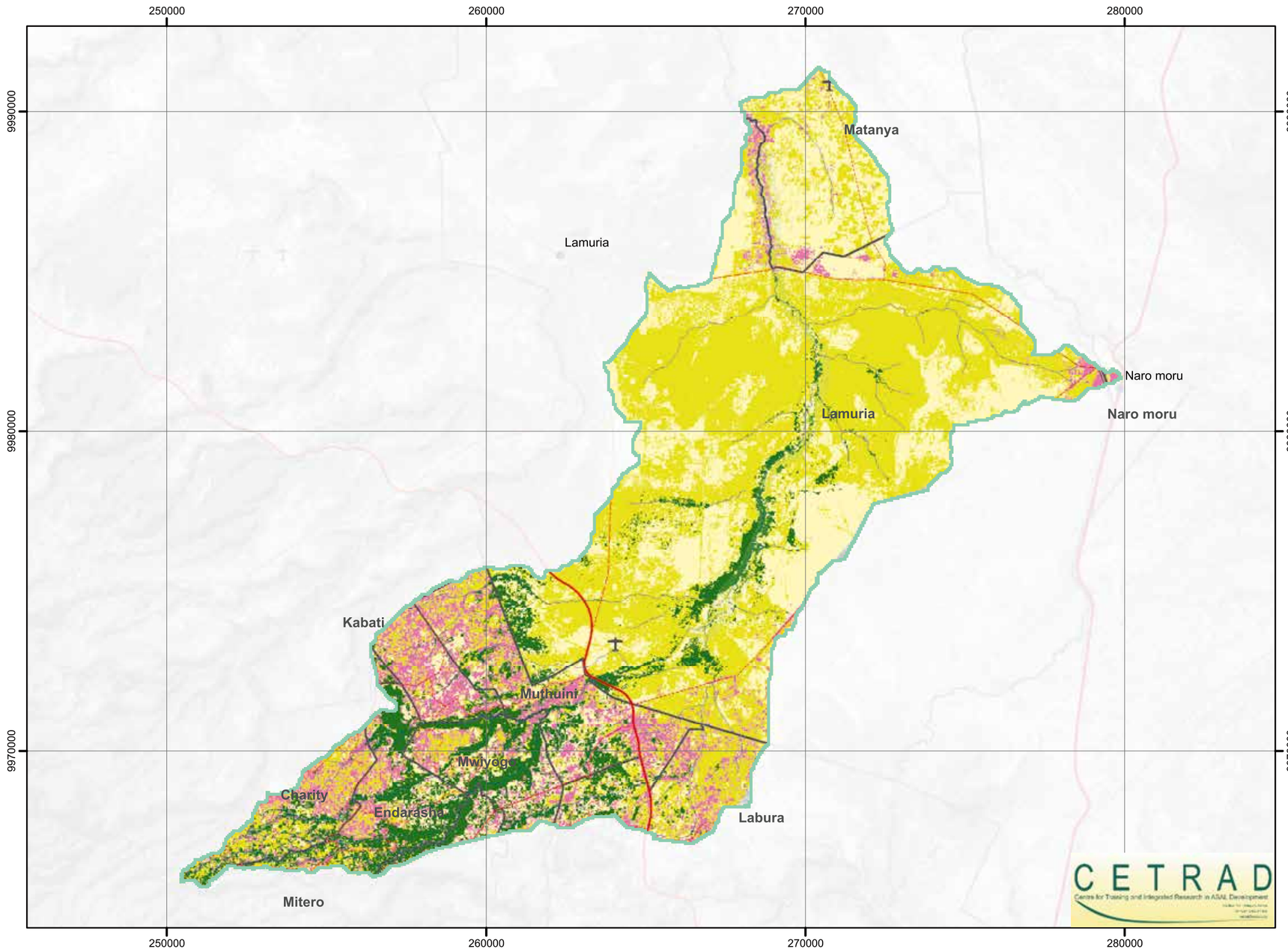
The background image: SRTM 30m.

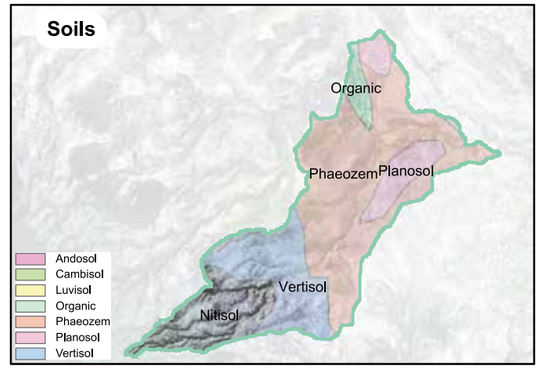
(*) Arid and Semi Arid Lands.

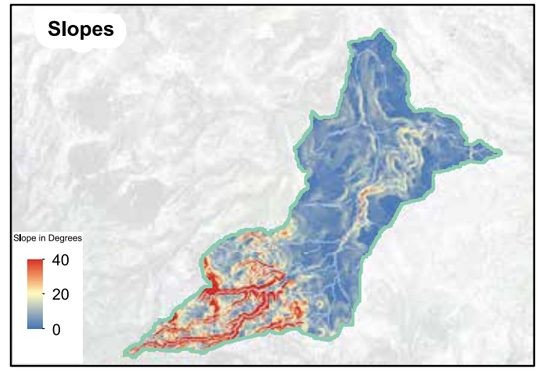
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area Kms |
|---|---|---|---|---|
| Sub-humid | high | 1,000 | 1,600 | 2 |
| Semi-humid | high to medium | 800 | 1,400 | 31 |
| Semi-humid to Semi-arid | medium | 600 | 1,100 | 112 |
| Semi-arid | medium to low | 450 | 900 | 97 |

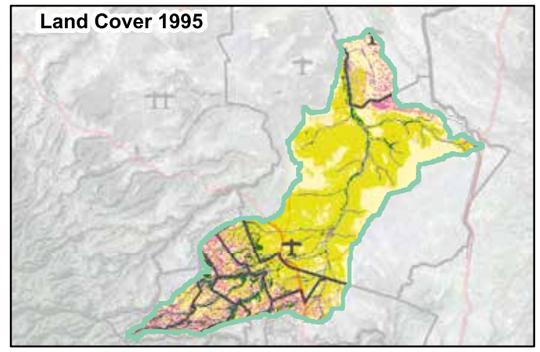
# Land Cover 2014






**Landcover Change**

| | | 1995 | | 2014 |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 65.85 | 27.19 | 70.08 | 28.94 |
| Woody Grassland | 129.18 | 53.34 | 118.18 | 48.80 |
| Natural Forest | 13.97 | 5.77 | 26.73 | 11.04 |
| Planted Forest | _ | _ | 0.32 | 0.13 |
| Moorland | _ | _ | 0.06 | 0.03 |
| Cropland | 33.16 | 13.69 | 26.78 | 11.06 |
| Water | 0.02 | 0.01 | 0.02 | 0.01 |
| Others | _ | _ | 0.00 | 0.00 |
| **Totals** | **242.18** | **100.00** | **242.18** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Engare Moyok Subcatchment

0 1 2 3 4 5 Kilometers

**1:137,778**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
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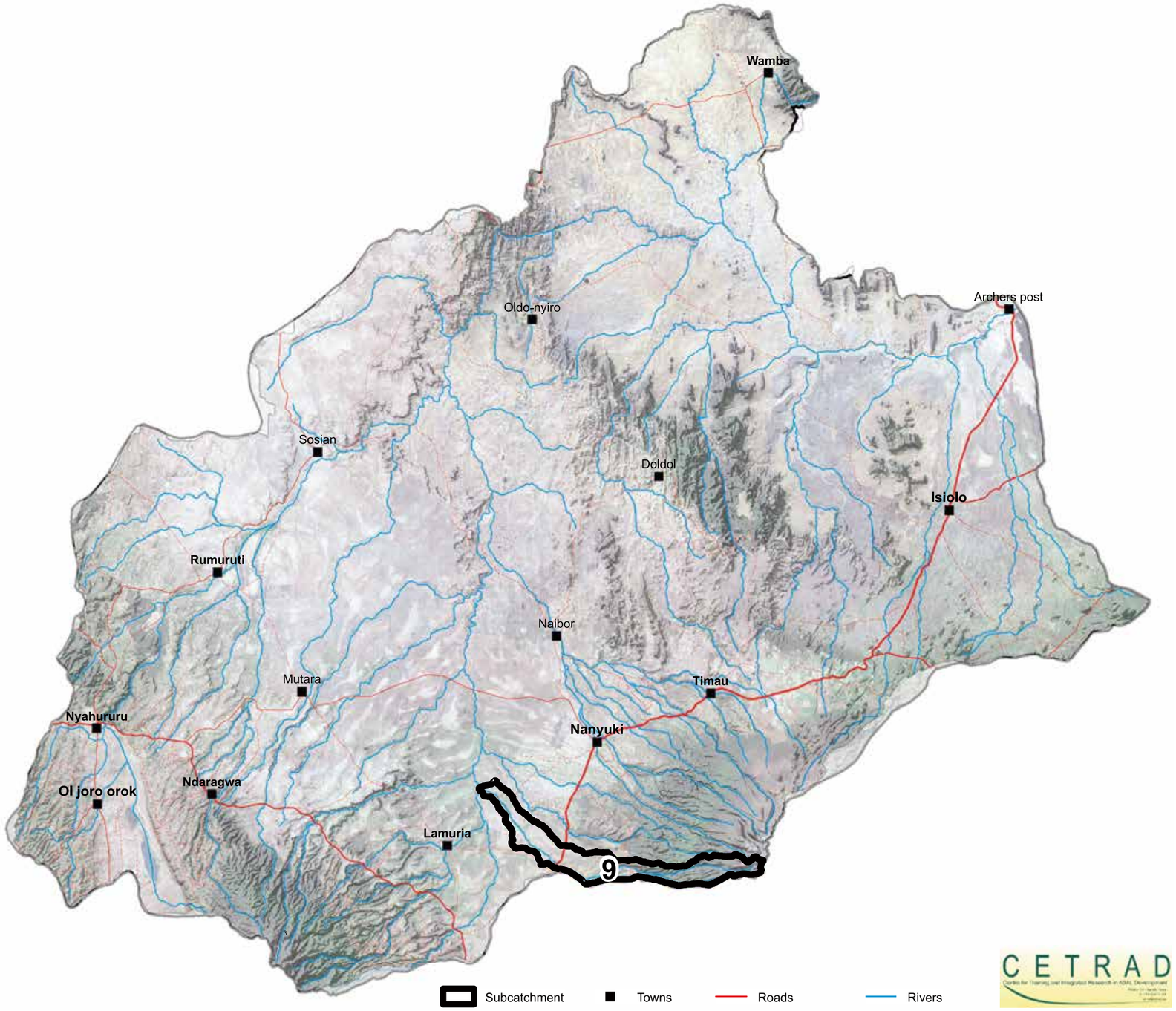
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 9 - Naro Moru


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ndaragwa
Ol joro orok
Lamuria
9
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# NARO MORU SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Naro Moru has a total area of 167 $Km^2$ with a combined population of 61,914 people living within fourteen (14) sub locations (with an area of 1,691$Km^2$) that are partly or completely within the sub catchment. About 12% is under crops and settlements, 44% under grasslands, 26% under forest and the remaining 18% is under moorland.

### Climate

The climate of this sub catchment varies mainly from humid to semi-humid with a small portion around Matanya being semi-arid because of its location whereby a bigger part of it falls on the slopes of the mountain.

### Education

There are Six (6) secondary schools and over 19 primary schools; government sponsored (10), Private (4), NGO (1) and Religious organizations (4).

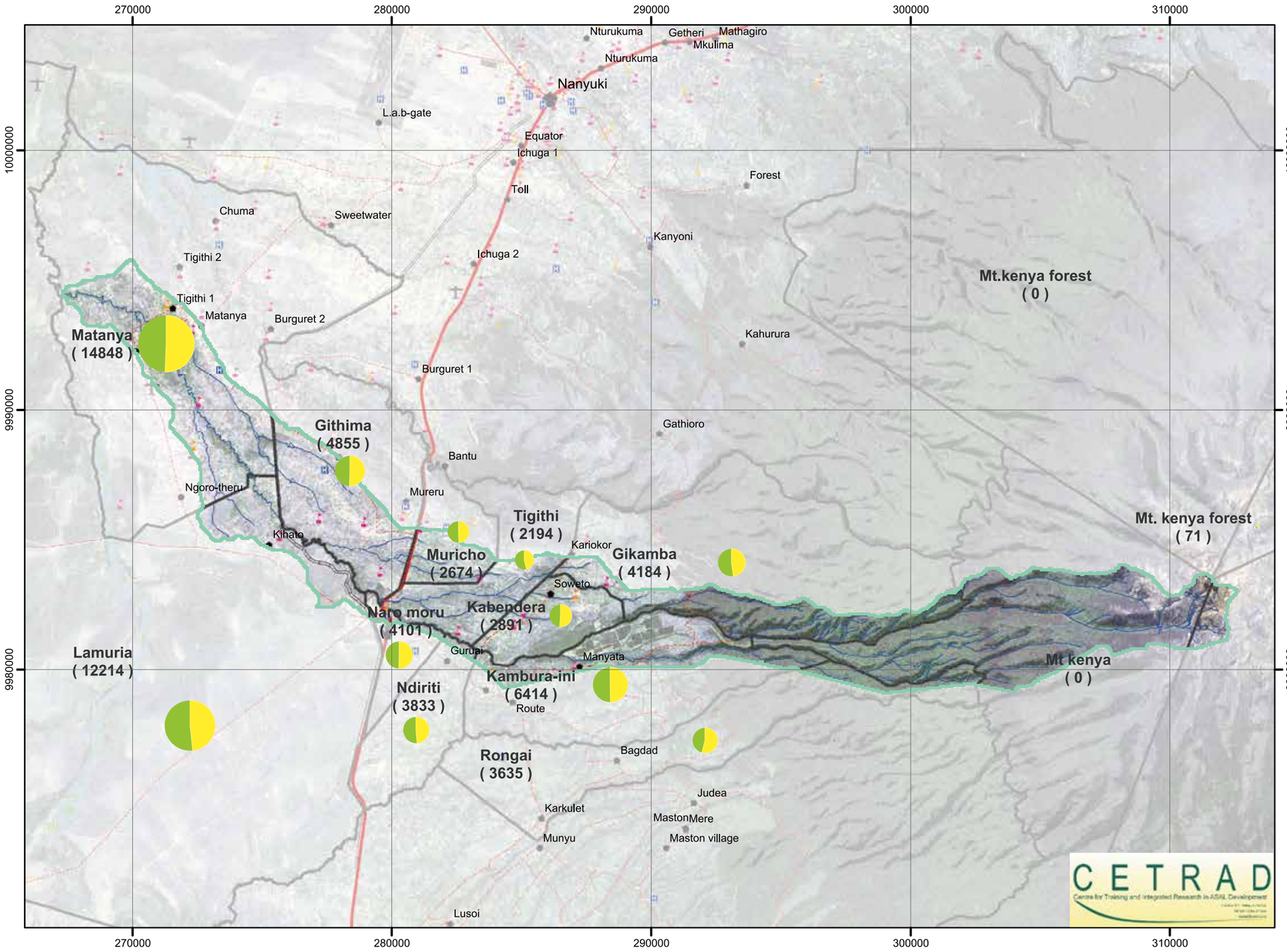
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Naru Moru WRUA | | | | |
| Contact Address email, chairperson, phone | | Chairman - Julius Mwaniki – 0723463033<br>Secretary – Ephraim Kahenya – 0724636059<br>Treasurer – Grace Wanjiru - 0726795759 | | | | |
| Date of Formation | | 1999 | | | | |
| Registration details | Social services | Date : July 2003 | | | | |
| | Attorney General office | Certificate No: 27625 Date: 07/06/2007 | | | | |
| Membership details | members | 160 | | | | |
| | Non members | 152 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/ water pans |
| | | 1 | 6 | 2 | N/A | 3 |
| River Abstractions | | 312 | | | | |
| Main Reason of formation | | Conflict resolution during low river flows | | | | |
| Objectives | | - Promote legal abstraction, efficient and proper use of water.<br>- Promote soil and water conservation.<br>- Conserve water quality.<br>- Promote situation in which available water is reasonably shared between environment, wildlife, livestock and all the communities according to following priority ranking: domestic, livestock, environment, wildlife and fishes, irrigation, recreation, manufacturing industry, others.<br>- Provide a forum to discuss, prevent and resolve conflicts.<br>- Promote dialogue in regard to water policy and enforcement of water Act. New abstractions have to be approved.<br>- Transparent and fair management practices. | | | | |
| Availability of sanctioning system | | Yes: By-laws | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Horticulture farm – AAA Growers (chest nut farms) | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Participate in WRUA Management and contribute funds to support the WRUA project expenses | | | | |
| Sources and Nature of Conflicts | | Low river flow that leads to inadequate water supply to downstream users. | | | | |
| Problems Reported to the WRUA | | Cutting down of indigenous trees in riparian land reserve.<br>Over abstraction of the river. | | | | |

| | |
|---|---|
| Unreported/unexpressed conflicts | - |
| Availability of conflict resolution guidelines | WRUA management meets regularly to discuss issues arising i.e. they have to meet every first Tuesday of every month |
| Availability of conflict resolution skills and implementation | No major conflicts since WRUA is dynamic and efficient in management of the resources |
| Challenges | WRUA management is a challenge due to vastness of the catchment |
| Cases of conflicts dealt with | In 2009 there was major conflict due to over abstraction of river water upstream resulting to no flow downstream for almost a month. It was resolved through a meeting at Naro Moru town between users. |
| Cases of conflicts unresolved and reasons | None |
| Other activities the WRUA is engaged in | No other activities apart from water resource management and implementation of W.S.T.F projects |
| Achievements | - Developed S.C.M.P.<br>- adequate capacity building<br>- Have a well-equipped office in Naro Moru.<br>- Members and non-members understand WRUA activities |
| Hindrances to achieve the goals of the WRUA | Many WRUA non-members making sub catchment management difficult<br>inadequate funding to fund the proposed activities in S.C.M.P |
| Advices to others | - |
| Information and Data Available | abstraction survey – 2011<br>water allocation plan – 2013<br>Have a lot of information and data from CETRAD Research and Training. |
| Person Responsible for data Collection | CETRAD |
| Methods of Data Collection | - |
| Information and Data Needs | - |
| Period of Water Scarcity | - |
| How is the problem of water scarcity solved | Through negotiation meeting between the WRUA management committee |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Water Service Trust Fund - 2011 and 2013.<br>Laikipia Wildlife Forum – 2008 and 2011 |
| Water Quality and cause of pollution | - |
| Existence of Wetlands and their status | No |
| Others | |

# Population Numbers (2009) and Socio Infrastructure

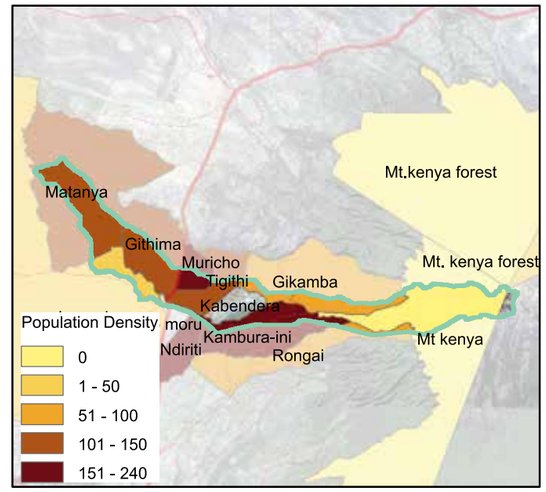





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Gikamba | 66 | 2,183 | 2,001 | 4,184 | 63 | 1,098 |
| Githima | 39 | 2,416 | 2,439 | 4,855 | 124 | 1,363 |
| Kabendera | 11 | 1,419 | 1,472 | 2,891 | 256 | 830 |
| Kambura-ini | 43 | 3,224 | 3,190 | 6,414 | 150 | 1,813 |
| Lamuria | 441 | 6,308 | 5,906 | 12,214 | 28 | 4,105 |
| Matanya | 121 | 7,338 | 7,510 | 14,848 | 123 | 4,095 |
| Mt kenya | 248 | 0 | 0 | 0 | 0 | 0 |
| Mt. kenya forest | 352 | 47 | 24 | 71 | 0 | 30 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Muricho | 11 | 1,353 | 1,321 | 2,674 | 237 | 762 |
| Naro moru | 7 | 2,040 | 2,061 | 4,101 | 625 | 1,661 |
| Ndiriti | 17 | 1,964 | 1,869 | 3,833 | 229 | 1,094 |
| Rongai | 38 | 1,681 | 1,954 | 3,635 | 96 | 989 |
| Tigithi | 21 | 1,175 | 1,019 | 2,194 | 104 | 666 |
| **Totals** | **1,691** | **31,148** | **30,766** | **61,914** | **37** | **18,506** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Naromoru Subcatchment

0 1 2 3 4 5 Kilometers

**1:170,000**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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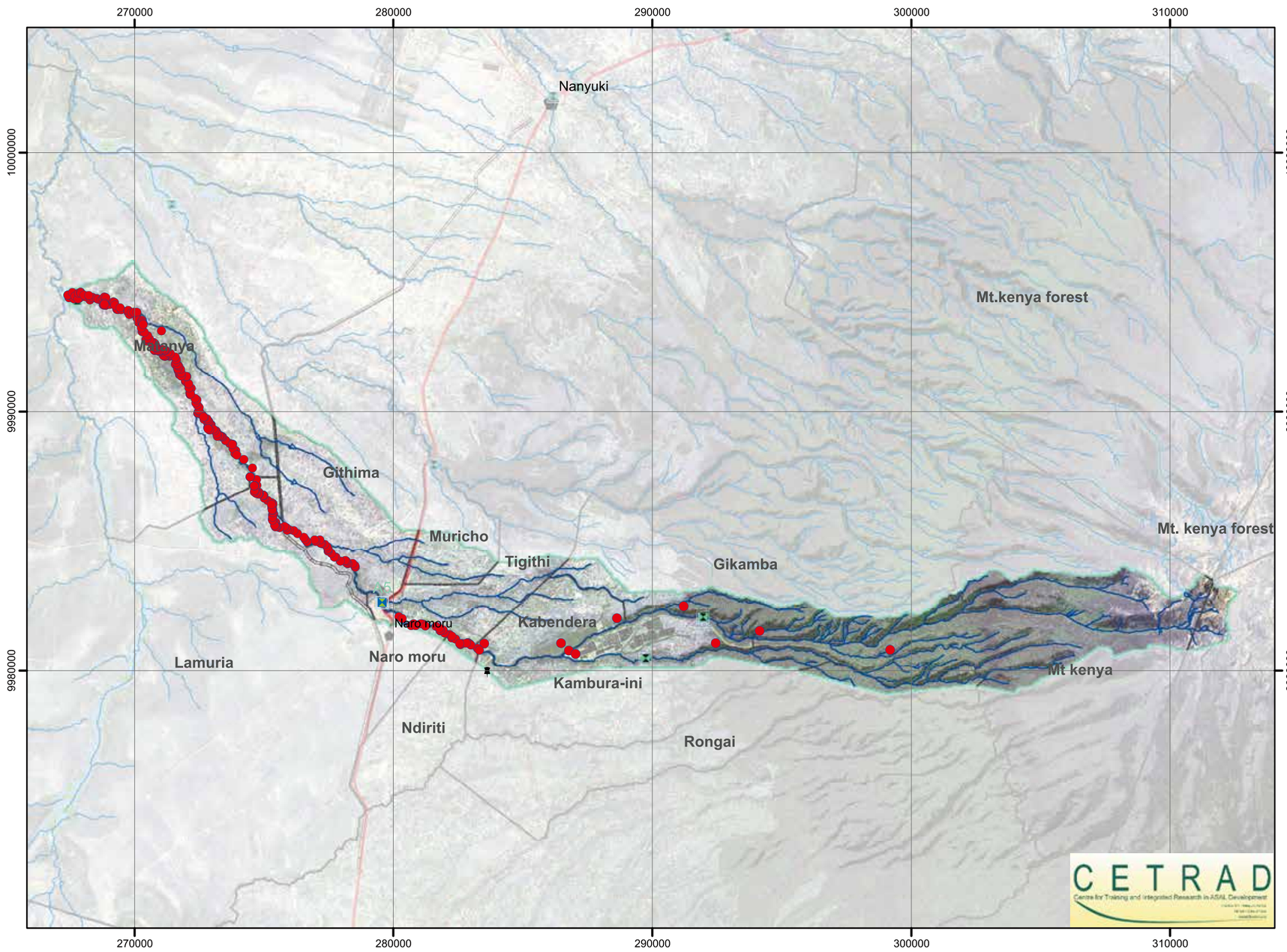
Demographic data was sourced from KNBS 2009 National Census.

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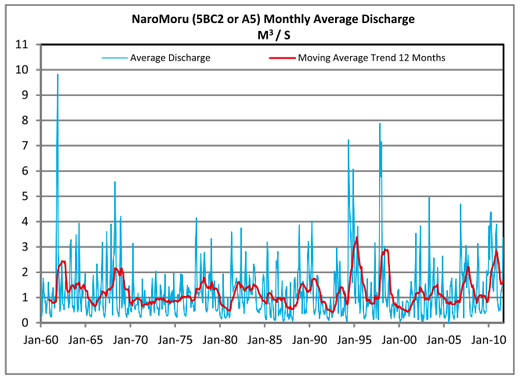
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

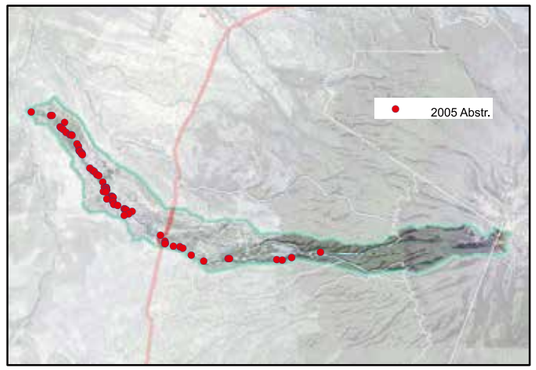




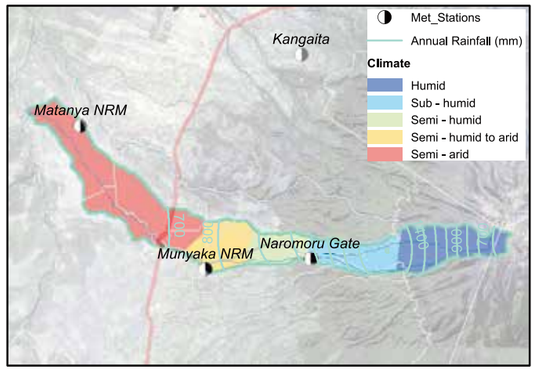

## Water Discharge Trends (A5)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers

### Features & Boundaries

- Rivers
- Naromoru RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

### Transport

**Roads**

- A
- B
- C
- D
- E
- Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Naromoru Subcatchment

0 1 2 3 4 5 Kilometers

**1:170,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

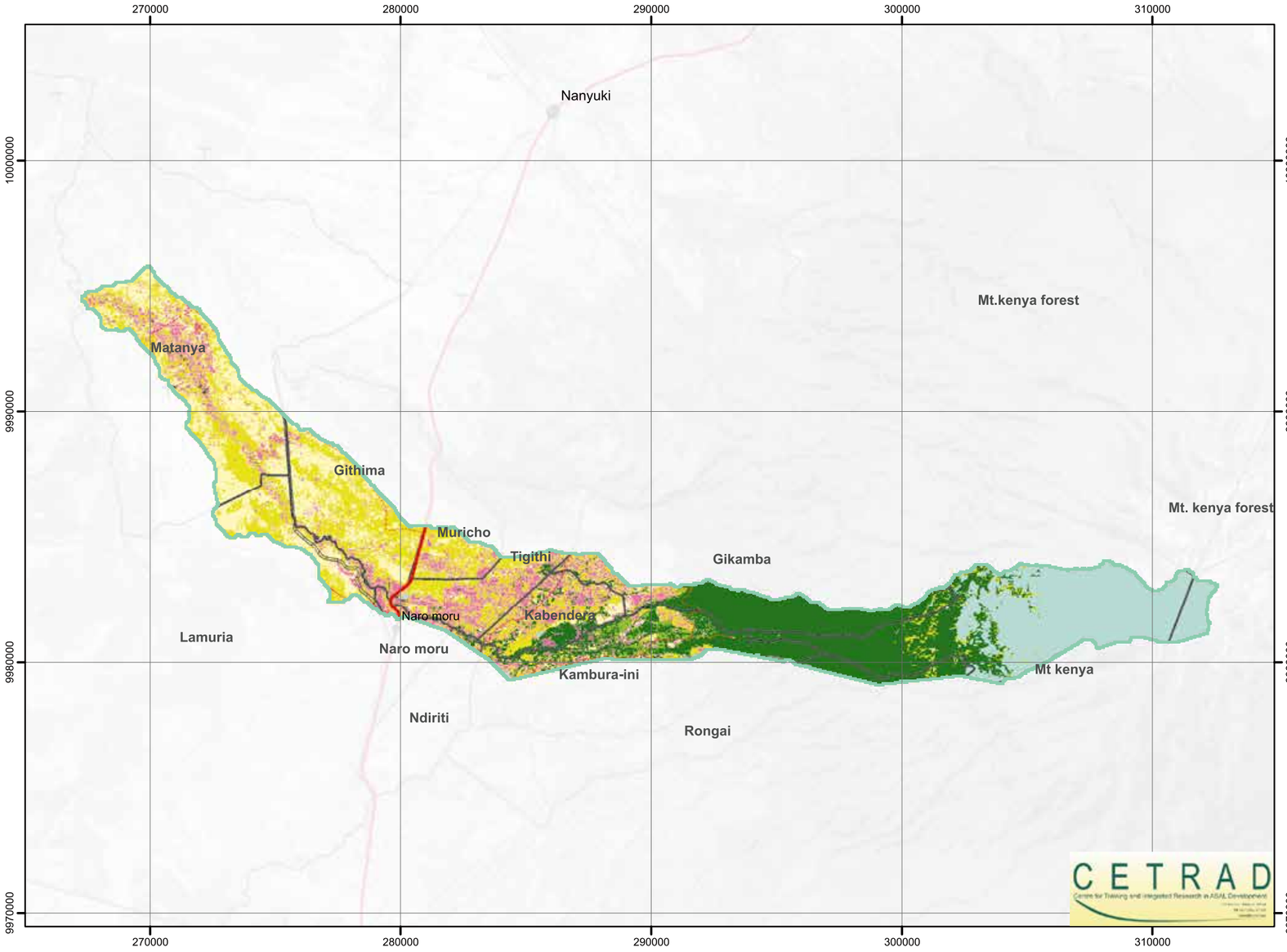
The background image: SRTM 30m.

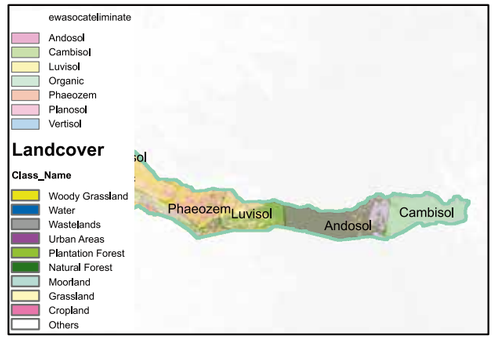
(*) Arid and Semi Arid Lands.

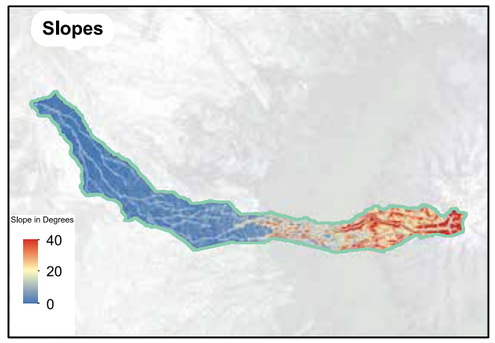
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 34 |
| Sub-humid | High | 1,000 | 1,600 | 24 |
| Semi-humid | Medium | 800 | 1,400 | 16 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 23 |
| Semi-arid | Medium to Low | 450 | 900 | 70 |

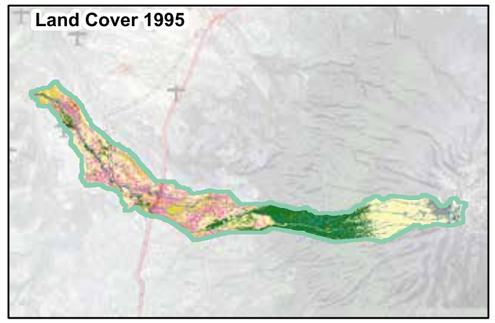
# Land Cover 2014






## Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

## Urban Settlements

- District Hq
- Division Hq

## Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

## Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Naro Moru ubcatchment

0 1 2 3 4 5 Kilometers

1:175,808

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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Landcover information derived from Landsat Images 30m 2014.

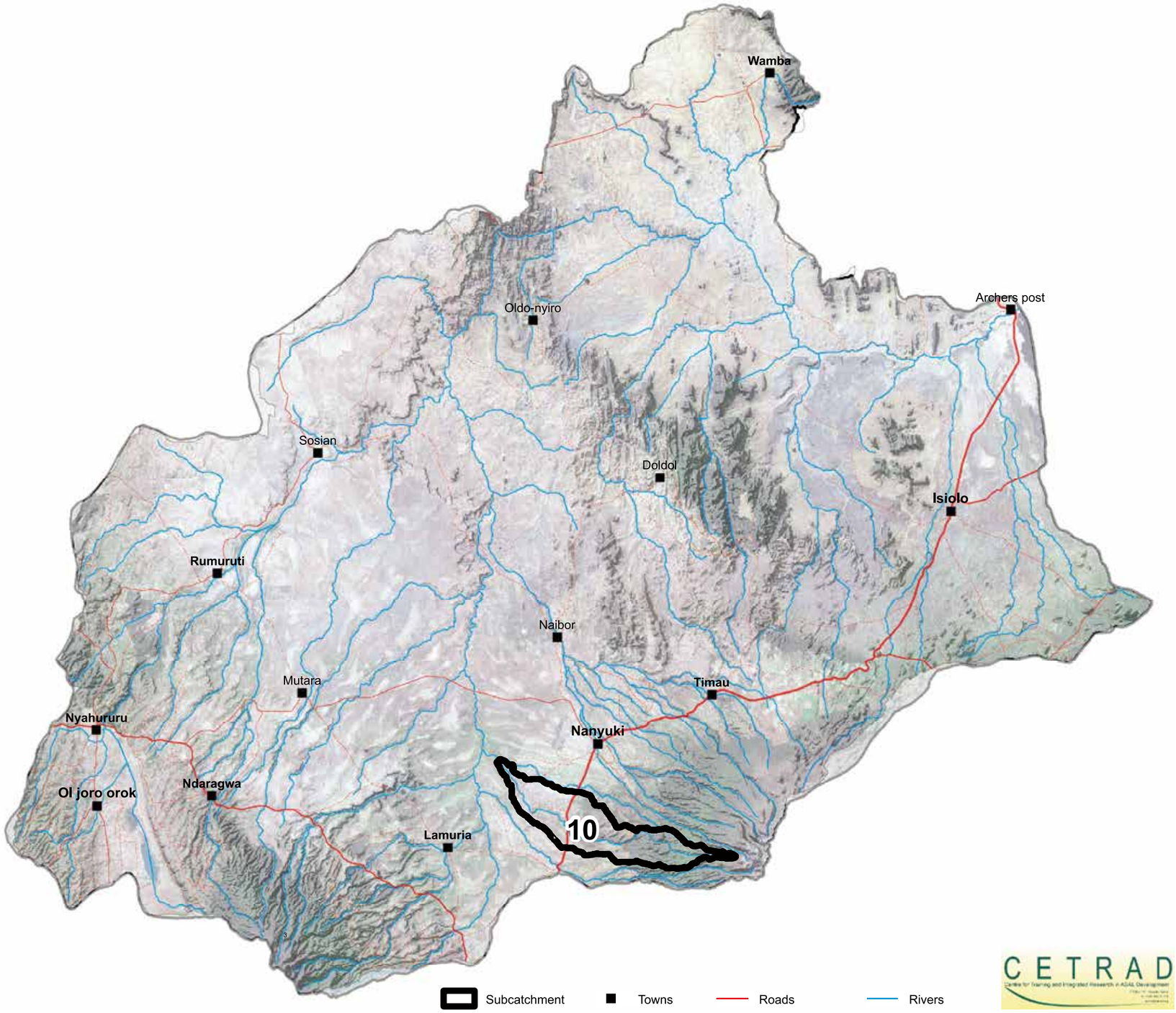
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 65.07 | 39.10 | 29.18 | 17.53 |
| Woody Grassland | 20.93 | 12.57 | 44.56 | 26.77 |
| Natural Forest | 34.08 | 20.48 | 41.39 | 24.87 |
| Plantation Forest | 2.20 | 1.32 | 1.86 | 1.12 |
| Cropland | 37.98 | 22.82 | 20.19 | 12.13 |
| Moorland | _ | _ | 29.26 | 17.58 |
| Wastelands Rocks | 4.88 | 2.93 | _ | _ |
| Water | 0.07 | 0.04 | _ | _ |
| Urban Areas | 0.04 | 0.03 | _ | _ |
| Others | 1.19 | 0.71 | _ | _ |
| **Totals** | **166.44** | **100.00** | **166.44** | **100.00** |

# 10 - Burguret


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
10
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# BURGURET SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Burguret has a total area of 206 $Km^2$ with a combined population of 34,125 people living within seven sub locations (with an area of 625 $Km^2$) that are partly or completely within the sub catchment. About 36% of land is under forest, 46% under grasslands and a mixture of woodlands, 3% under moorland and the remaining 15% under crops, water and settlements.

### Climate

The climate varies from humid up in the mountains to a mixture of sub and semi humid in the forested areas with the remaining areas having semi humid to semi-arid type of climate.

### Education

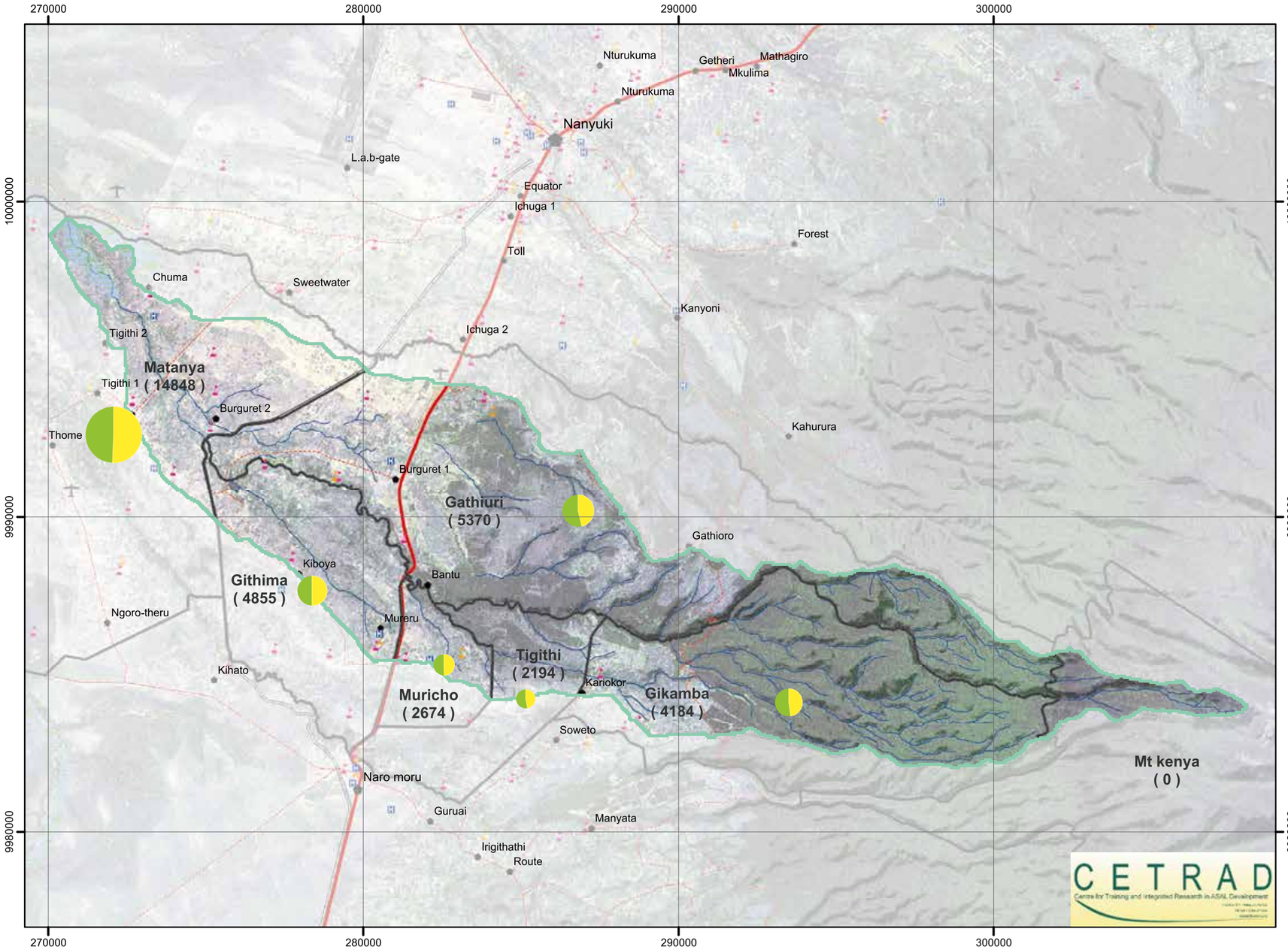
There are four secondary schools which include; Naromoru Boys, Mureru, Burguret and Gakawa Mixed. The catchment area has about 16 primary schools; government sponsored (7), Private (6) and Religious organizations (3).

### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name | | Burguret WRUA | | | | |
| Contact persons | | Mr. Stephen Mbau (0722248137)<br>Mr. Justus Muriithi (0727939650) | | | | |
| Date of Formation | | 1998 | | | | |
| Registration details | Social Services | Registered as Community Based Organization | | | | |
| | Attorney General Office | Date: 9/6/2003 | Reg. No: 22444 | | | |
| Membership | Members | 1100 | | | | |
| | Non Members | 60 | | | | |
| Water resources 1 | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 4 | 2 | 3 | 4 | |
| River water abstractions | | 8 | | | | |
| Main Reason for WRUA formation | | To address conflicts pertaining to water use; human conflict and wildlife conflict at downstream | | | | |
| Objectives | | Promote legal water abstraction, efficient and proper water use and sustainable water abstraction, soil and water conservation i.e. conserve water quality and ensure equitable sharing of river water. Create a forum for conflict resolution; promoting dialogue between water users and government. | | | | |
| Availability of sanctioning system | | Yes | | | | |
| Number of large scale (Ranches, Conservancies, Horticulture others ) farms | | 3 (2 large scale farms, 1 conservancy) | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | - | | | | |
| Sources and nature of conflicts | | Over abstraction of river water especially during low flows in the dry season by upstream users depriving the downstream users adequate water supply. | | | | |
| Problems Reported to the WRUA | | Complains reported to WRUA include: illegal water abstraction by small scale farmers for irrigation, over abstraction of water by upstream users, hence, little or no flow for downstream users. Also, the water projects rationing water inequitable. | | | | |
| Other unexpressed conflicts | | Misuse of finances by management and vandalism | | | | |
| Availability of conflict resolution guidelines | | WRUA by-laws drafted by members | | | | |
| Availability of conflict resolution skills and implementation | | Negotiations between representatives, chairman, zone representative and the committee; if they can't solve it they involve the whole WRUA. If the conflict is beyond the WRUA capabilities government officials are involved | | | | |
| Challenges | | Lack or inadequate conflict management skills; some of the members need capacity building on conflict management so to solve conflicts adequately. Inadequate funds to manage the river and to employ scouts to monitor the illegal water abstraction | | | | |
| Cases of conflicts dealt with | | Illegal water abstraction, pollution, vandalism, irrigation issues | | | | |
| Cases of conflicts unresolved and reasons | | One case and it was addressed by members but later was taken to court and the accused person worn the case | | | | |
| Other activities the WRUA is engaged in | | Capacity building to WRUA members on Water Act 2002, water use, pollution control and conflict management | | | | |
| Achievements | | Conflict resolutions, equitable water supply during the dry season | | | | |
| Hindrances to achieve the goals of the WRUA | | vastness of the subcatchment, poor road network, inadequate resources, inadequate tree seedlings | | | | |
| Advices to others | | - | | | | |
| Information and data Available | | List of members, Water quality, illegal abstractors, Abstractors | | | | |
| Person(s) Responsible for data | | Justus Muriithi | | | | |
| Methods of Data Collection | | inspections, questionnaire | | | | |
| Information and Data Needs | | About water quality, information on river flow levels/discharge, new abstractors, | | | | |
| Period of Water Scarcity | | -- | | | | |
| How is the problem of water scarcity solved | | Rationing | | | | |
| Institutional Support to WRUA | | Name: UNDP – COMPACT, Year: 2004,<br>Type of support: Management,<br>Amount of support Ksh. 3.5M | | | | |
| Water Quality and cause of pollution | | Livestock taking water direct from the river, washing of clothes, car wash & boda boda directly in the river. | | | | |
| Existence of Wetlands and their status | | Marura Wetlands which has been reclaimed and highly settled. | | | | |
| Other Comments | | | | | | |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Gathiuri | 118 | 2,887 | 2,483 | 5,370 | 45 | 1,609 |
| Gikamba | 66 | 2,183 | 2,001 | 4,184 | 63 | 1,098 |
| Githima | 39 | 2,416 | 2,439 | 4,855 | 124 | 1,363 |
| Matanya | 121 | 7,338 | 7,510 | 14,848 | 123 | 4,095 |
| Mt kenya | 248 | 0 | 0 | 0 | 0 | 0 |
| Muricho | 11 | 1,353 | 1,321 | 2,674 | 237 | 762 |
| Tigithi | 21 | 1,175 | 1,019 | 2,194 | 104 | 666 |
| **Totals** | **625** | **17,352** | **16,773** | **34,125** | **55** | **9,593** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Burguret Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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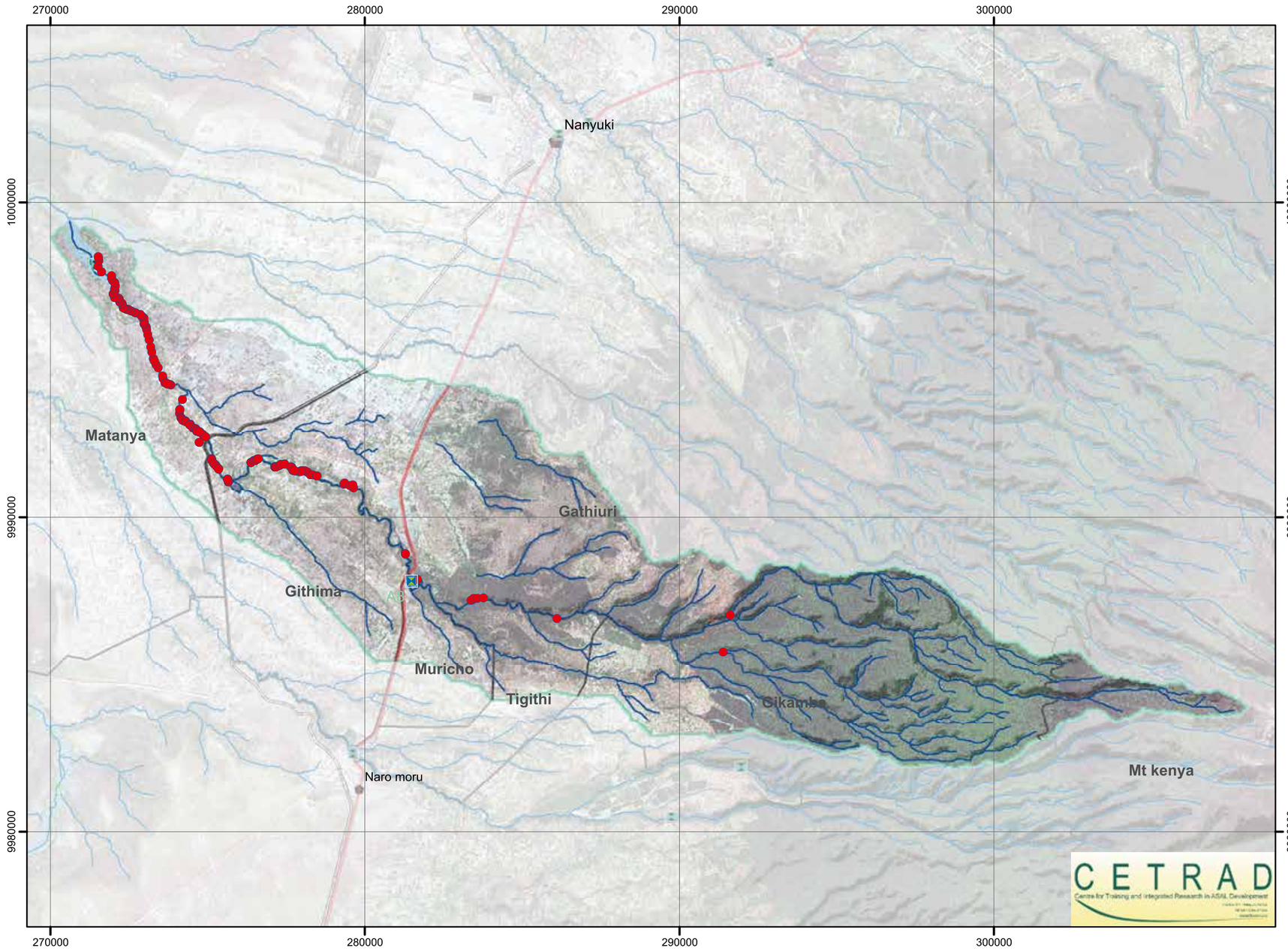
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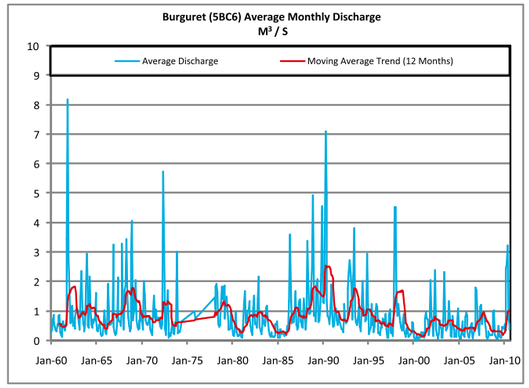
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# Water Resources and Abstraction Points (2013)

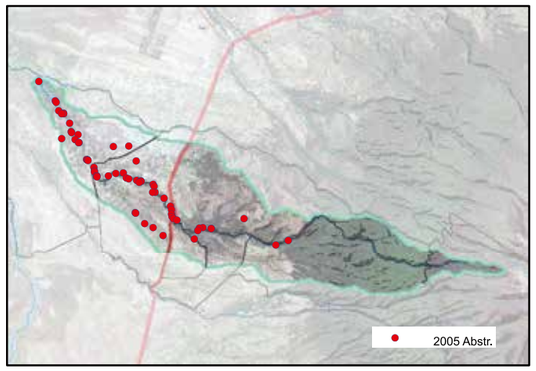




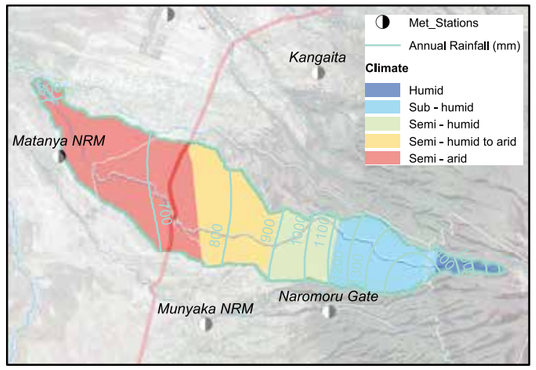

## Water Discharge Trends (A8)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers

### Features & Boundaries

- Rivers
- Burguret Gauging Station
- Other Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport

Roads

- A
- B
- C
- D
- E

Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Burguret Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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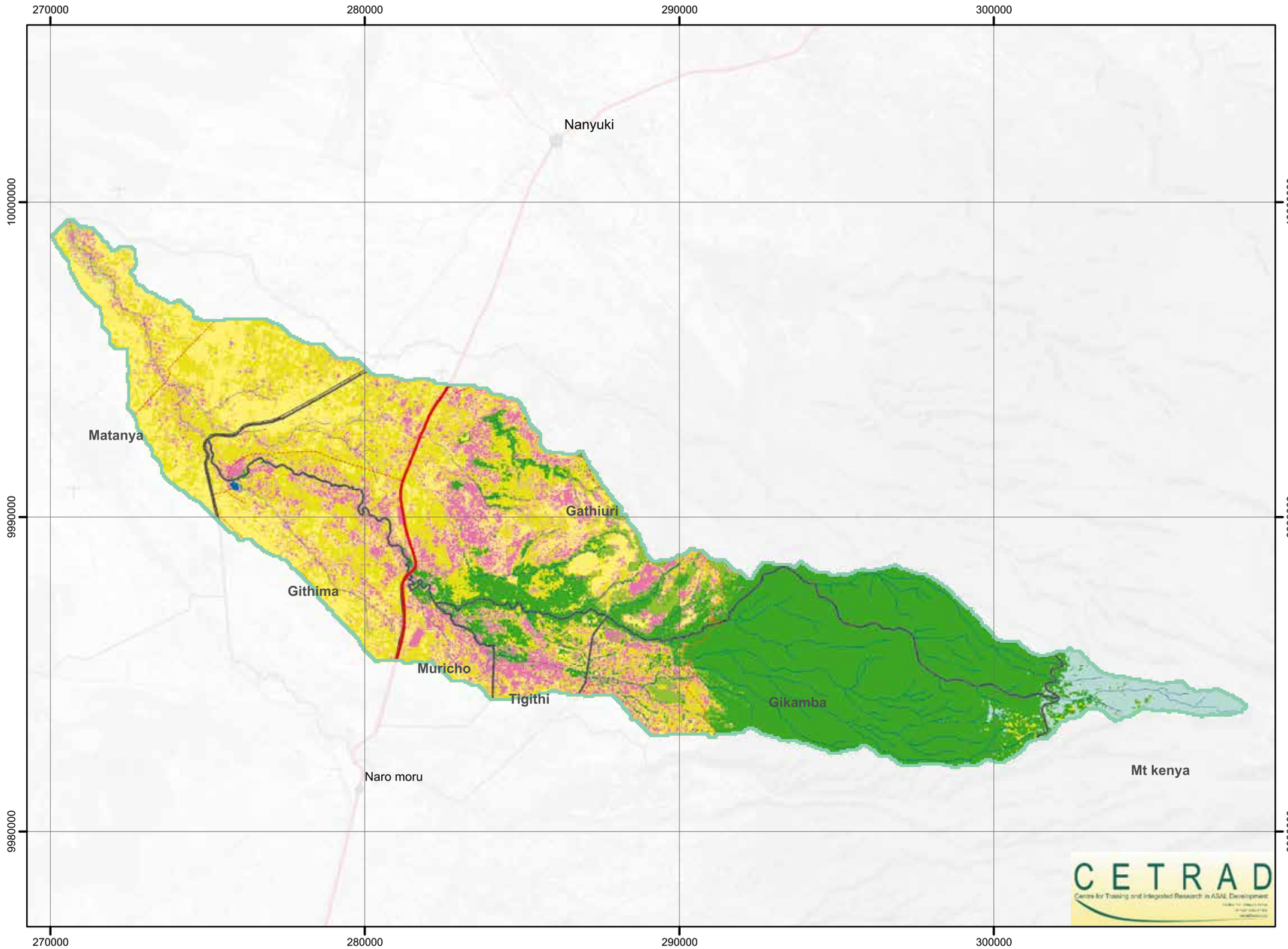
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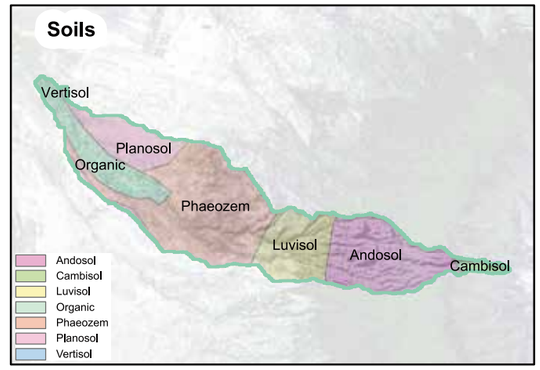
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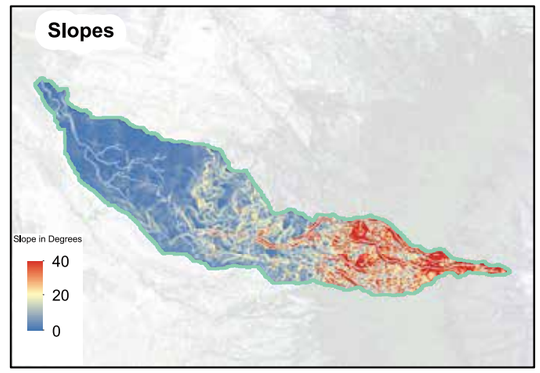
| CLIMATE | Agr Potential | Min Rainfall | Max Rainfall | Area Kms |
|---|---|---|---|---|
| Humid | very high | 1100 | 2700 | 5.7 |
| Sub-humid | high | 1000 | 1600 | 39.8 |
| Semi-humid | high to medium | 800 | 1400 | 27.5 |
| Semi-humid to Semi-arid | medium | 600 | 1100 | 47.2 |
| Semi-arid | medium to low | 450 | 900 | 85.8 |

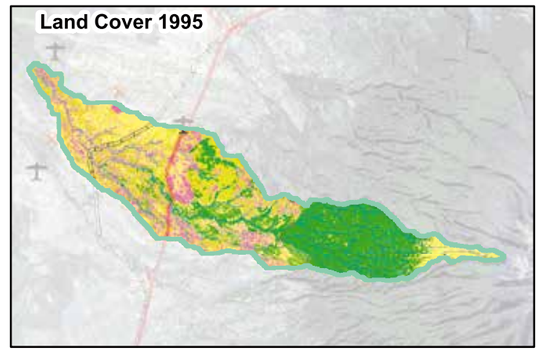
# Land Cover 2014






## Lancover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 49.62 | 24.08 | | |
| Woody Grassland | 47.69 | 23.14 | | |
| Natural Forest | 68.94 | 33.45 | | |
| Plantation Forest | 9.43 | 4.58 | | |
| Cropland | 30.15 | 14.63 | | |
| Wastelands Rocks | 0.11 | 0.05 | | |
| Water | 0.04 | 0.02 | | |
| Urban Areas | 0.10 | 0.05 | | |
| Others | 0.00 | 0.00 | | |
| **Totals** | **206.07** | **100.00** | **0.00** | **0.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Burguret Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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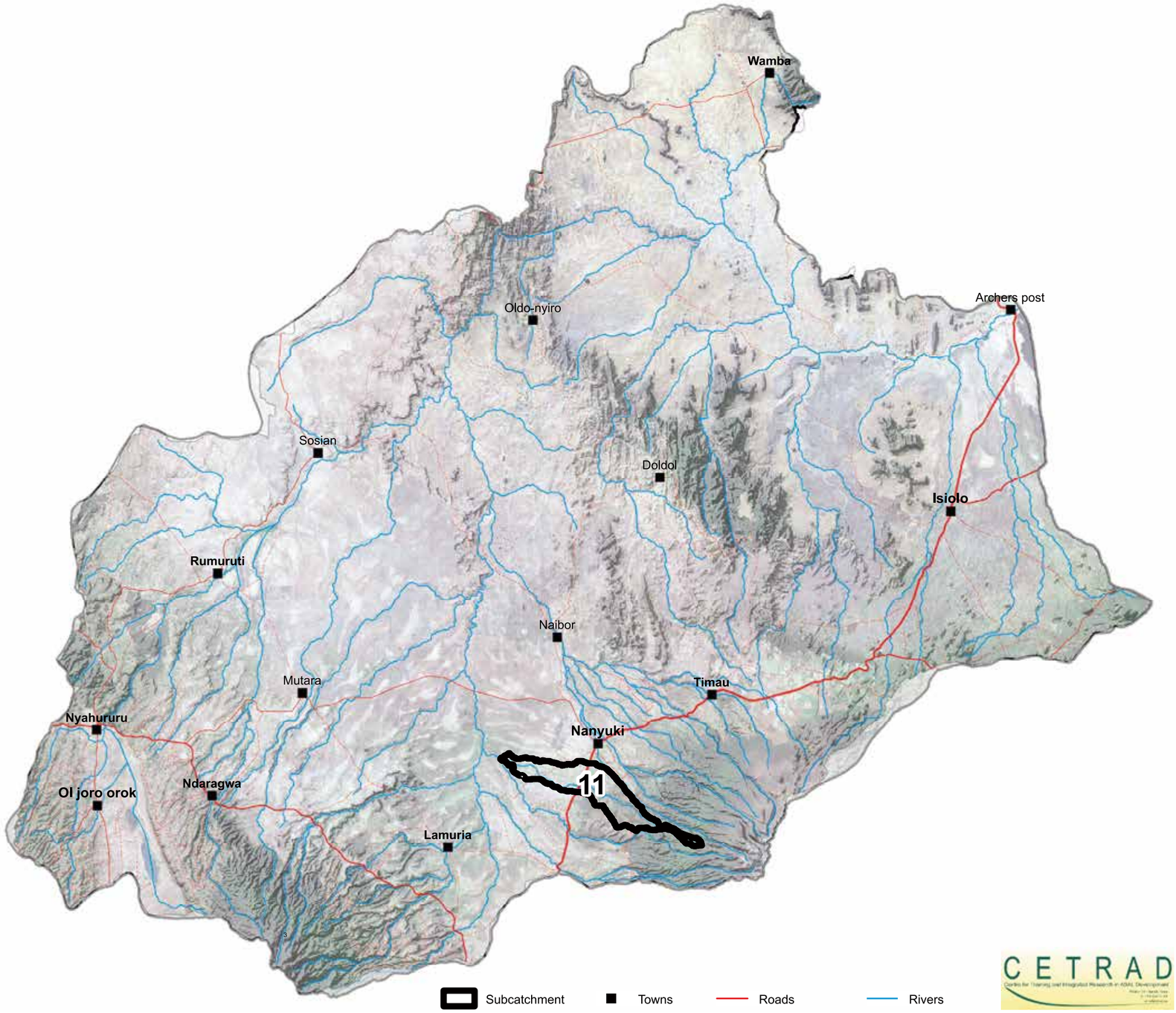
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Landcover information derived from Landsat Images 30m 2012.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 11 - Rongai


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
11
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# RONGAI SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Rongai has a total area of 107Km$^2$ with a combined population of 45,049 people living within six sub locations (with an area of 856 Km$^2$) that are partly or completely within the sub catchment. About 17% of the area is under crops and settlements, 57% under grasslands and the remaining 26% of land is under forest.

### Climate

The climate varies from sub-humid to semi-humid at the slopes of Mt. Kenya and then semi-humid to semi arid down to the grasslands.

### Education

There are two (2) secondary schools and over 11 primary schools; government sponsored (5), Private (1) and Religious organizations (5).

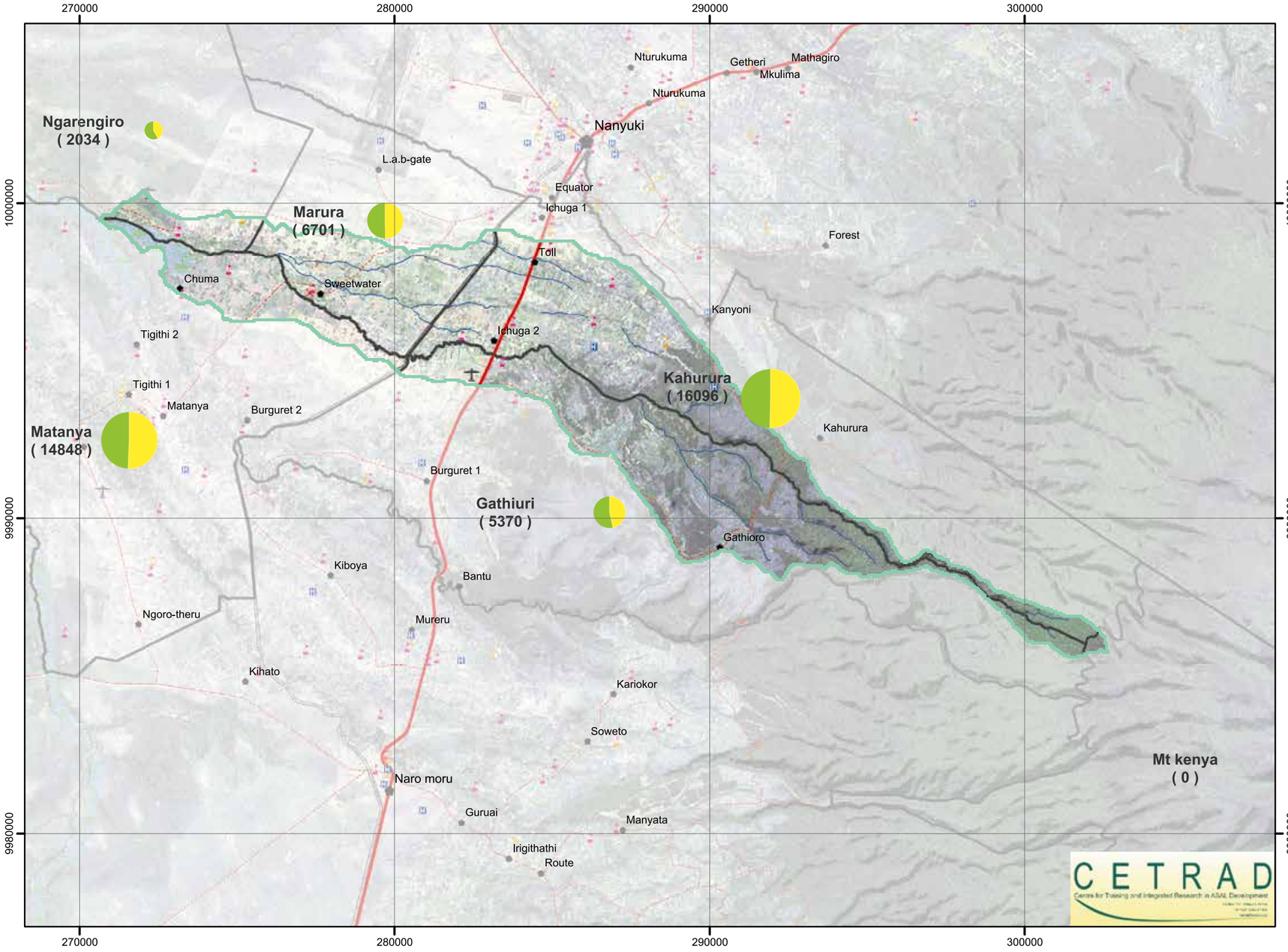
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Rongai WRUA | | | | |
| Contact person | | Joseph Mathenge Mureithi<br>Phone: 0724884915<br>Email: josephmathenge57@yahoo.com | | | | |
| Date of Formation | | 2003 | | | | |
| Registration details | Social services | Reg. No: NJI/REG/CD/A13466 Date: 17/05/2006 | | | | |
| | Attorney General office | Reg. No:34474 Date: 14/06/2011 | | | | |
| Membership details | members | 200 | | | | |
| | Non-members | 100 | | | | |
| Water resources | | Rivers | Boreholes | springs | wells | Dams/water pans |
| | | 1 | 5 | 1 | 2 | 2 |
| River abstractions | | 83 | | | | |
| Main Reason of formation | | To solve water related conflicts during dry seasons | | | | |
| Objectives | | Provide a forum to solve conflicts, protection of water catchment areas, address water shortages and ensure sharing of water equitably | | | | |
| Availability of sanctioning system | | None | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 0 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | 0 | | | | |
| Sources and Nature of Conflicts | | Not sharing of water equitably by downstream and upstream people<br>Increase of water users mainly farmers | | | | |
| Problems Reported to the WRUA | | -Illegal abstraction: Pumping water using hidden pipes underground<br>-Illegal farrows done by downstream people<br>-Cutting trees along riparian land<br>-Planting eucalyptus trees on the river banks<br>-Farming in the riparian land<br>-Forest destruction in the mountain where the river originates | | | | |
| Unreported/unexpressed conflicts | | Pastoralist coming to graze their cattle upstream. Illegal water diversion, increased population | | | | |
| Availability of conflict resolution guidelines | | WRUA, WRMA, ADMIN | | | | |
| Availability of conflict resolution skills and implementation | | WRUA, WRMA, ADMIN | | | | |

| | |
|---|---|
| Challenges | Inadequate funds and skills |
| Cases of conflicts dealt with | -Illegal abstraction<br>-Dialogue between water users & WRUA<br>-Creating tree nurseries and planting water friendly trees<br>-Storage improvement i.e. dams |
| Cases of conflicts unresolved and reasons | -Closing of farrows downstream because people are not co-operating<br>-Illegal abstraction: Using water pumps during the nights because there are no personnel/scouts and funds |
| Other activities the WRUA is engaged in | -Planting indigenous trees along the river banks<br>-promotion of alternative water sources: boreholes & dams, water ponds, rainwater harvesting<br>-Promote soil and water conservation<br>-Capacity building to water users |
| Achievements | -Reduction of water conflicts<br>-Registration of the WRUA at registrar<br>-Preparation of sub catchment management plan |
| Hindrances to achieve the goals of the WRUA | Lack funds for capacity building, Lack of skilled personnel to guide the activities of the association |
| Advices to others | -Register WRUA as an association<br>-Work closely with stakeholders/ WRMA/Admin<br>-Be conversant with new water Act |
| Information and Data Available | Chairperson/ Secretary |
| Person Responsible for data Collection | Management committee |
| Methods of Data Collection | From the community |
| Information and Data Needs | - |
| Period of Water Scarcity | Jan-March, July-Sept. |
| How is the problem of water scarcity solved | -Sharing equitably,<br>-Using alternative water sources e.g. boreholes, dam. |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Name: W.S.T.Fund, Year: 4/3/2011,Type of support: Capacity building/ SCMP preparation Amount Ksh.522000 |
| Water Quality and cause of pollution | -Farming in the forest - shamba system,<br>-overgrazing in the catchment area |
| Existence of Wetlands and their status | - |
| Others | Ways of organizing water pump holders into groups |

# Population Numbers (2009) and Socio Infrastructure

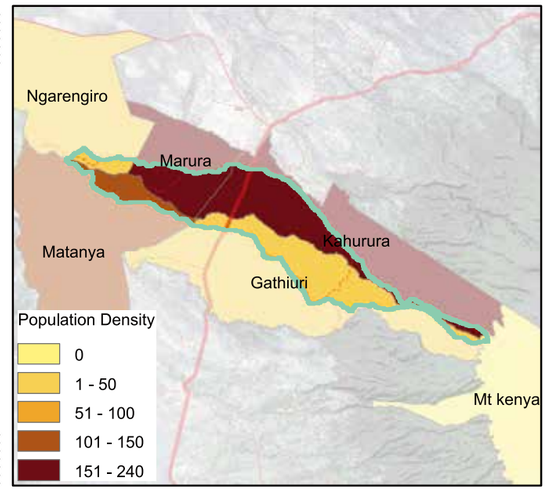





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Gathiuri | 118 | 2,887 | 2,483 | 5,370 | 45 | 1,609 |
| Kahurura | 94 | 7,981 | 8,115 | 16,096 | 171 | 5,125 |
| Marura | 41 | 3,368 | 3,333 | 6,701 | 163 | 1,754 |
| Matanya | 121 | 7,338 | 7,510 | 14,848 | 123 | 4,095 |
| Mt kenya | 248 | 0 | 0 | 0 | 0 | 0 |
| Ngarengiro | 233 | 1,187 | 847 | 2,034 | 9 | 824 |
| **Totals** | **856** | **22,761** | **22,288** | **45,049** | **53** | **13,407** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Rongai Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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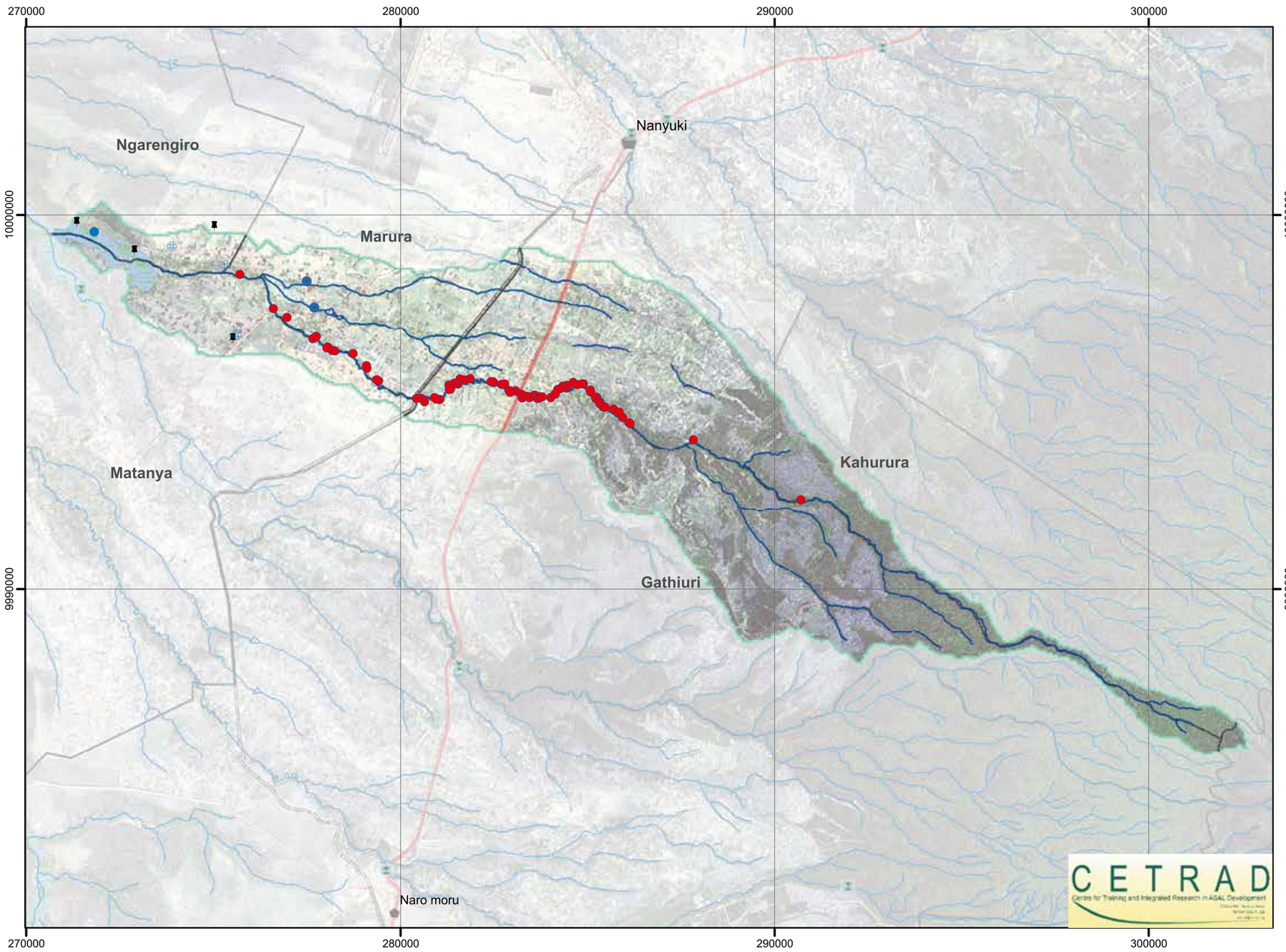
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

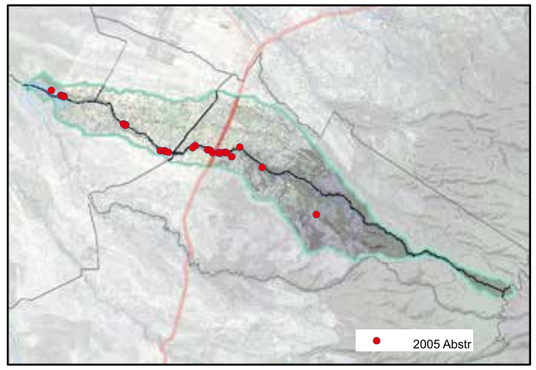
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

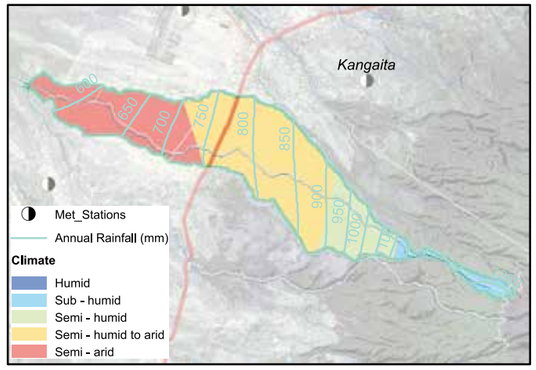





## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions
- Rivers
- Springs
- Dams
- Bore holes
- Pans

### Features & Boundaries
- Rivers
- Rongai Gauging Station
- Other Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport
**Roads**
- A
- B
- C
- D
- E

Railway Line

### Urban Settlements
- District Hq
- Division Hq

## Rongai Subcatchment

0 1 2 3 4 5 Kilometers

**1:120,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

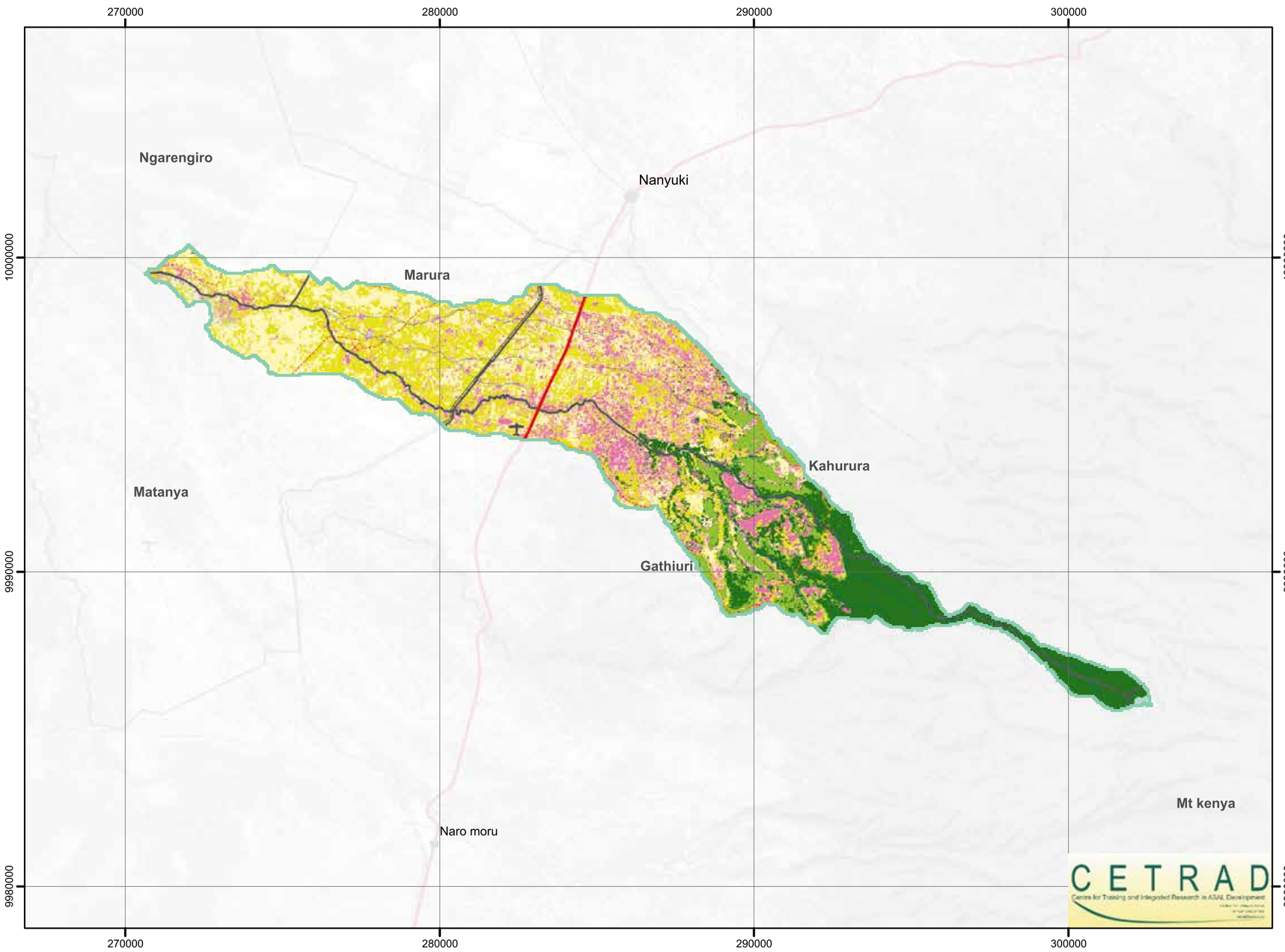
The background image: SRTM 30m.

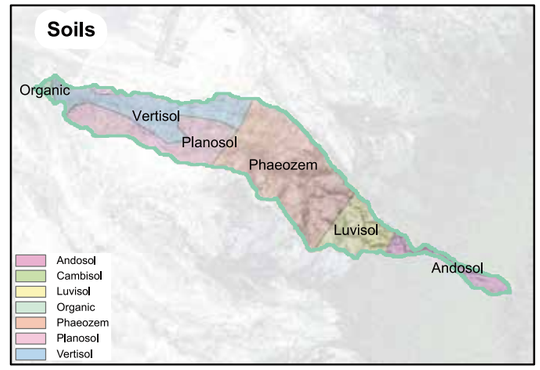
(*) Arid and Semi Arid Lands.

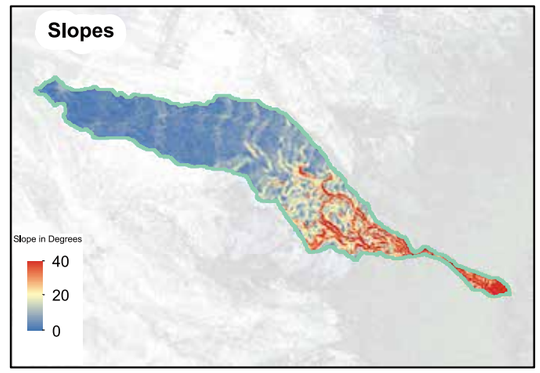
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 0 |
| Sub-humid | High | 1,000 | 1,600 | 6 |
| Semi-humid | High to Medium | 800 | 1,400 | 16 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 52 |
| Semi-arid | Medium to Low | 450 | 900 | 32 |
| | | | | |

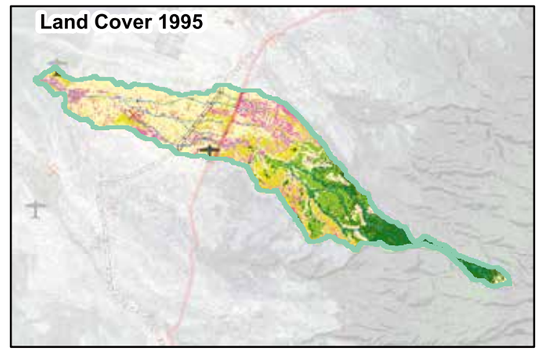
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 41.13 | 38.61 | 24.92 | 23.39 |
| Woody Grassland | 20.22 | 18.98 | 35.29 | 33.13 |
| Natural Forest | 15.86 | 14.89 | 19.83 | 18.61 |
| Plantation Forest | 11.82 | 11.10 | 8.04 | 7.55 |
| Cropland | 17.31 | 16.25 | 18.25 | 17.13 |
| Moorland | _ | _ | 0.20 | 0.19 |
| Wastelands Rocks | 0.05 | 0.05 | _ | _ |
| Water | 0.05 | 0.05 | _ | _ |
| Urban Areas | 0.08 | 0.08 | _ | _ |
| **Totals** | **106.53** | **100.00** | **106.53** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Rongai Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
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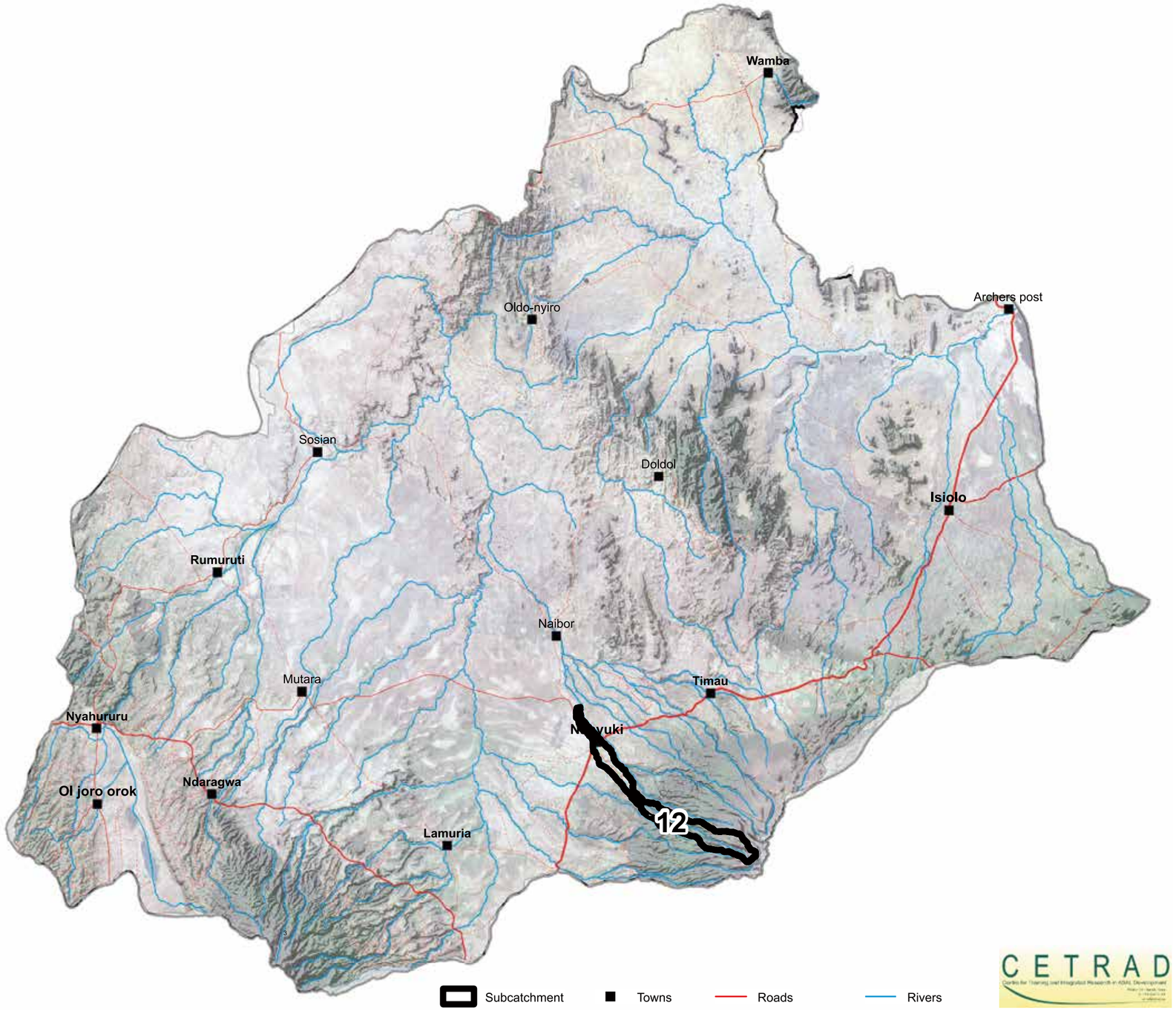
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The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 12 - Nanyuki


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
12
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# NANYUKI SUB CATCHMENT
## Fact sheet. Date: July 2014

### Introduction

Nanyuki sub catchment has a total area of 73.9 $Km^2$ with a combined population of 56,269 people living within seven sub locations (with an area of 721$Km^2$) that are partly or completely within the sub catchment. About 10% of the land is under crops and settlements, 20% under grasslands, 38% under forest and 32% is under moorland.

### Climate

The climate varies from humid to semi-humid near Mt. Kenya and semi-humid to semi-arid around Nanyuki town.

### Education

There are four (4) secondary schools and about 15 primary schools; government sponsored (5), Private (5) and Religious organizations (4), and Community (1)

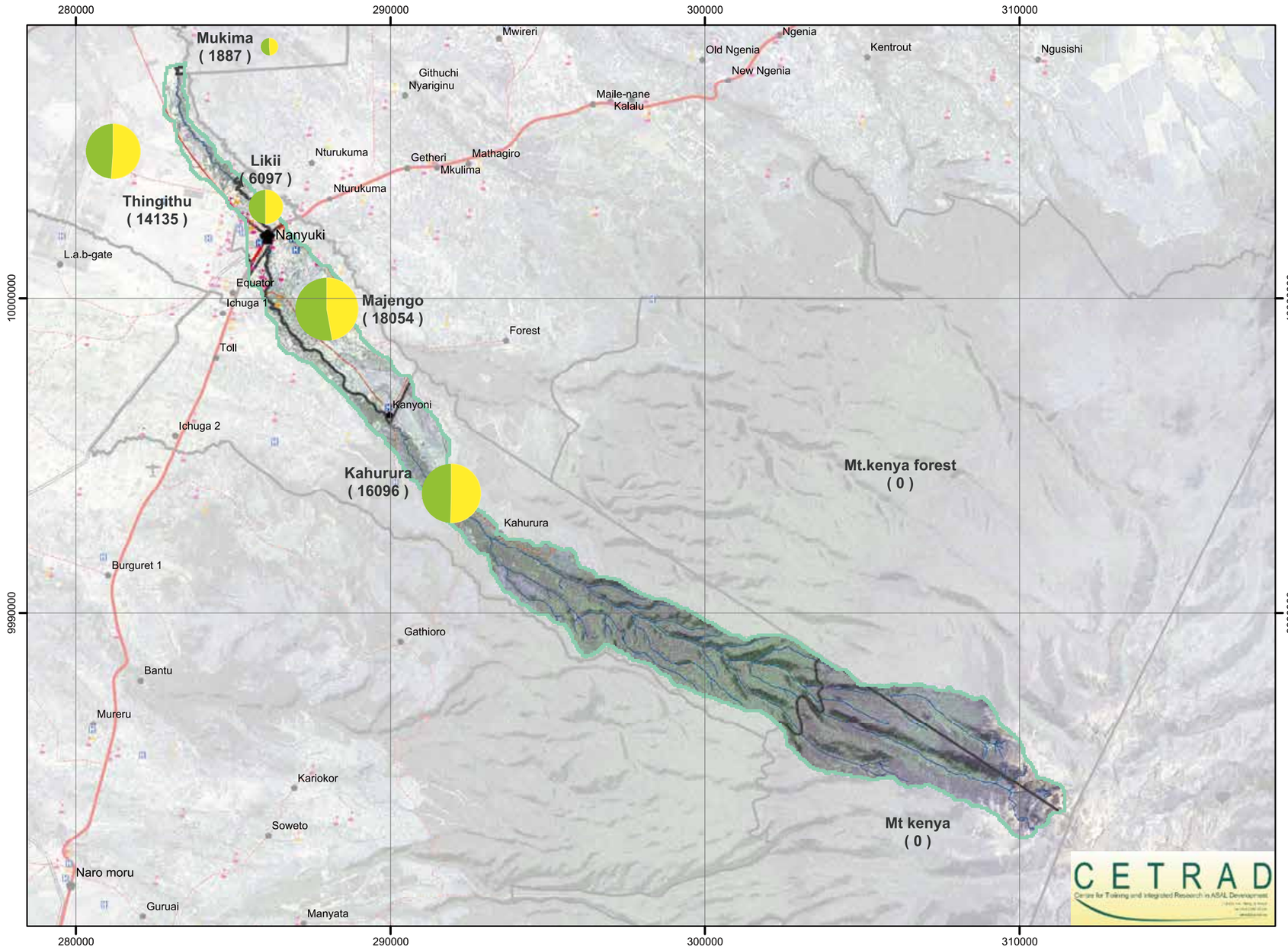
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Nanyuki Water Resources Users Association | | | | |
| Contact Address email, chairperson, phone | | P.O. BOX 138-10400 Nanyuki.<br>Chairman: Robert Myall; Phone NO.: 0735 783 419 | | | | |
| Date of Formation | | 2000 | | | | |
| Registration details | Social services | - | | | | |
| | Attorney General office | REG. NO. 20838 Date: 14 SEPT. 2001. | | | | |
| Membership details | Members | 82 | | | | |
| | Non Members | NA | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| 1 | | 25 | 3 | | 13 | |
| River Abstractions | | 93 | | | | |
| Main Reason of formation | | Conflict resolution on water use | | | | |
| Objectives | | 1). Environmental protection<br>2). Conservation of catchment areas and promotion of flood water harvesting<br>3). Uplift standards of living of people living within the catchment<br>4). Pollution control | | | | |
| Availability of sanctioning system | | Yes, water rationing and at times closure for non-payment of user fee. | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Ranches: 7<br>Conservancies: 3<br>Horticulture farms: 1<br>Other farms: Loruk ltd. | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Ranches and conservancies support with tree seedlings, pollution control, promotion of agricultural production and marketing. | | | | |
| Sources and Nature of Conflicts | | Main source of conflict is water use between upper stream and downstream users. | | | | |
| Problems Reported to the WRUA | | 1). Tree cutting within the riparian<br>2). River pollution<br>3). Blockage of river flow by some abstractors<br>4). Unauthorized abstraction of water | | | | |
| Unreported/unexpressed conflicts | | 1). Furrow to Kariunga dam passes through private land<br>2). Boreholes being close to each other | | | | |
| Availability of conflict resolution guidelines | | Stipulated in the organization's constitution | | | | |
| Availability of conflict resolution skills and implementation | | The organization has received a lot of capacity building through assistance from bodies such as CETRAD, SNV, Rural Focus, LWF and WRMA. | | | | |

| | |
|---|---|
| Challenges | 1). Vested interest and lack of awareness<br>2). During periods of water scarcity some users do not abide to rationing program<br>3). Illiteracy, inadequate capacity |
| Cases of conflicts dealt with | Equitable water use |
| Cases of conflicts unresolved and reasons | The issue of management committee unresolved due to capacity building |
| Other activities the WRUA is engaged in | 1). Pegging of riparian boundaries<br>2). River clean up<br>3). Tree planting on the riparian and on farms<br>4). Promotion of farming as a business<br>5). Construction of water storage facilities e.g. dams and masonry tanks<br>6). Installation of water harvesting tanks |
| Achievements | Improvement of living standards of community; Improvement of river water quality control; Enhancement of environmental control; River pegging |
| Hindrances to achieve the goals of the WRUA | Management committee not cohesive due to wrangling mainly created by members of middle zone |
| Advices to others | Enhance dialogue and promote friendship approach between lower water users and upper on all water related issues.<br>Put a clear and strict vetting process for WRUA members |
| Information and Data Available | Yes |
| Person Responsible for data Collection | WRUAs and WRMA |
| Methods of Data Collection | Field visits, GPS, gauges, meters, control devices. |
| Information and Data Needs | Required for planning purposes |
| Period of Water Scarcity | January to March and July to September |
| How is the problem of water scarcity solved | 1). Engage in water rationing programs<br>2). Encourage rain water roof catchment at farm level (water harvesting).<br>3). Storage of flood flow (dams). |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | SNV: 2006/2007- capacity building Kshs. 1.2million<br>UNDP-SGP/GEF: 2008- pollution control, drip irrigation, water storage Kshs. 1.9m<br>LWF: 2008-strategic catchment management plan<br>LWF: 2010/2011-Environmental conservation Kshs. 350,000<br>WDC/WSTF: 2011/2013-water harvesting tanks, tree planting, pollution control and water balance survey Kshs. 5million<br>CEF/CDTF: 2011/2014-water storage, energy saving devices, catchment protection and improvement of livelihoods Kshs. 27.7 million |
| Water Quality and cause of pollution | Polythenes, oil from car washing, raw sewerage, chemicals from agricultural farm. |
| Existence of Wetlands and their status | Available but encroached |
| Others | - |

# Population Numbers (2009) and Socio Infrastructure

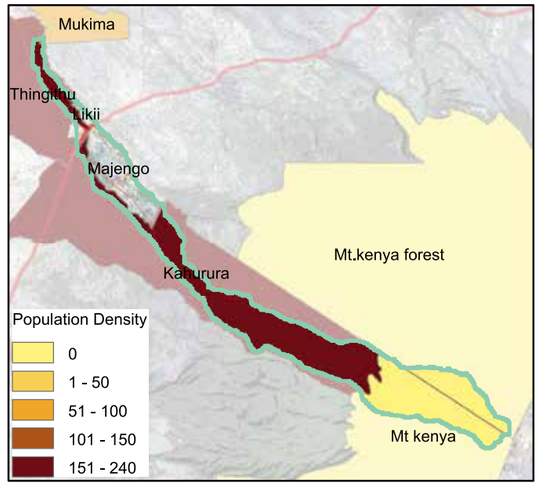





### Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Kahurura | 94 | 7,981 | 8,115 | 16,096 | 171 | 5,125 |
| Likii | 2 | 3,037 | 3,060 | 6,097 | 3,605 | 2,189 |
| Majengo | 16 | 9,537 | 8,517 | 18,054 | 1,148 | 5,391 |
| Mt kenya | 248 | 0 | 0 | 0 | 0 | 0 |
| Mt.kenya | 276 | 0 | 0 | 0 | 0 | 0 |
| Mukima | 22 | 965 | 922 | 1,887 | 87 | 477 |
| Thingithu | 62 | 6,935 | 7,200 | 14,135 | 227 | 4,200 |
| **Totals** | **721** | **28,455** | **27,814** | **56,269** | **78** | **17,382** |

### Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
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- Railway Line
- Airfields

## Nanyuki Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
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| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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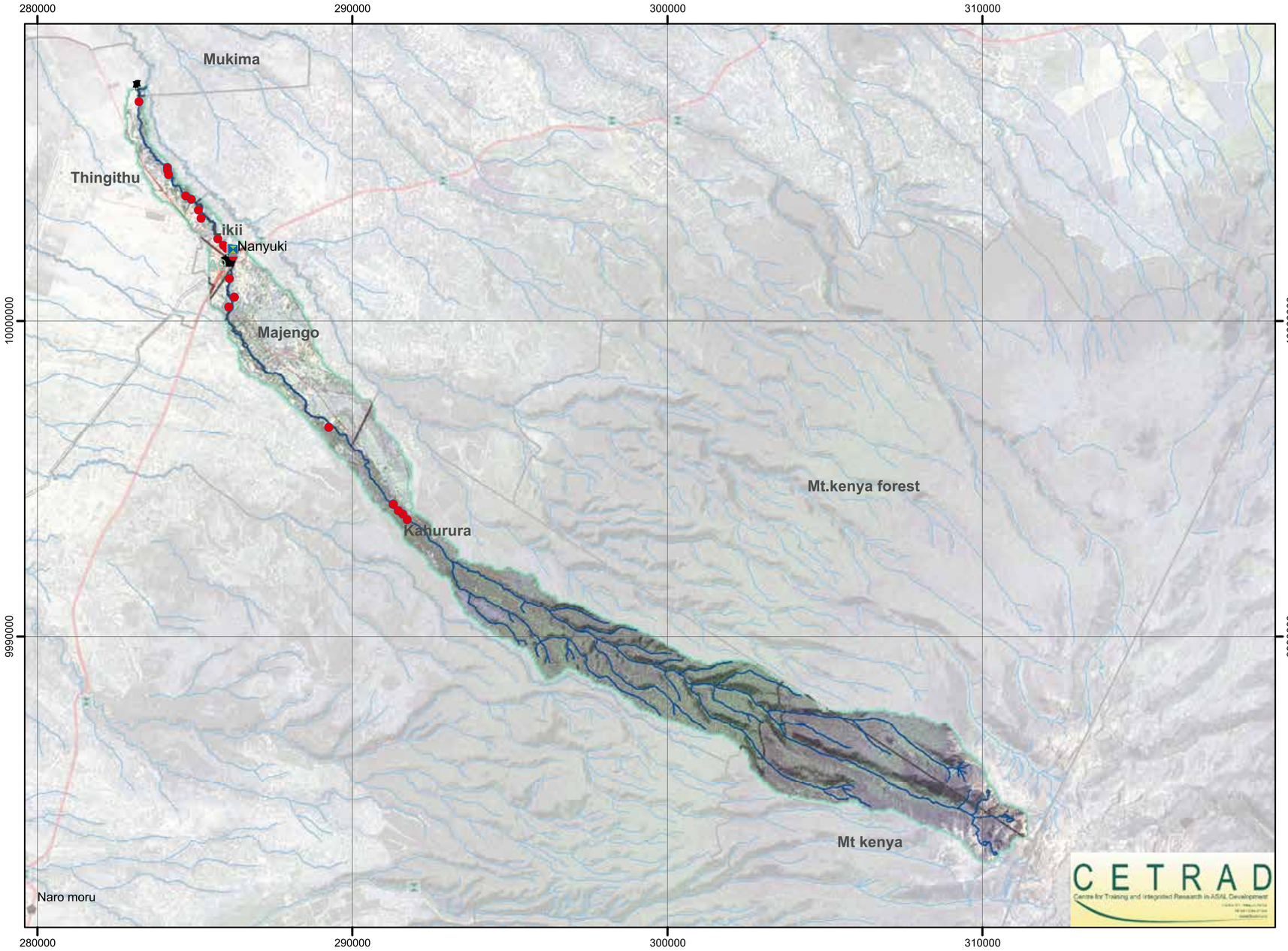
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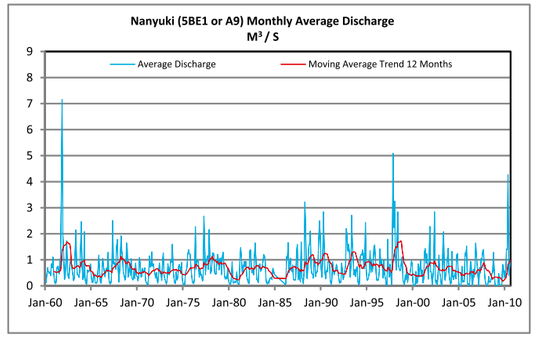
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

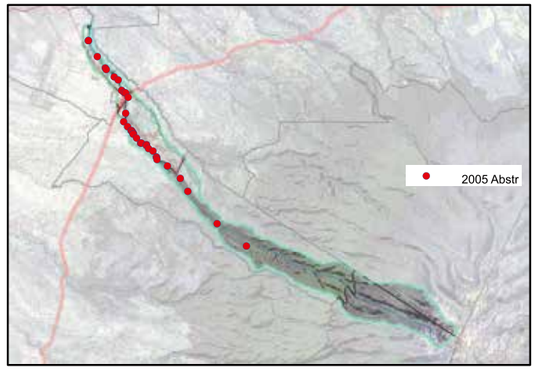




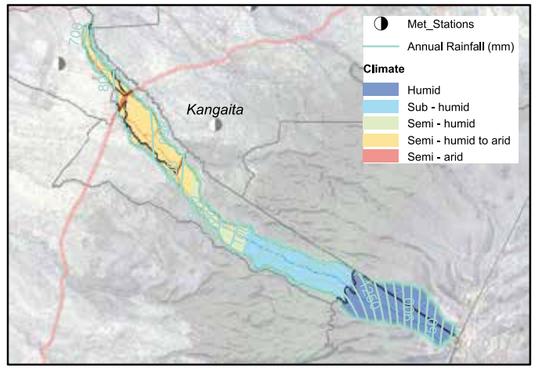

## Water Discharge Trends (A9)




## Abstraction Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers
- Bore Holes

### Features & Boundaries

- Rivers
- Nanyuki Gauging Station
- Othe Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport

Roads
- A
- B
- C
- D
- E

Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Nanyuki Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
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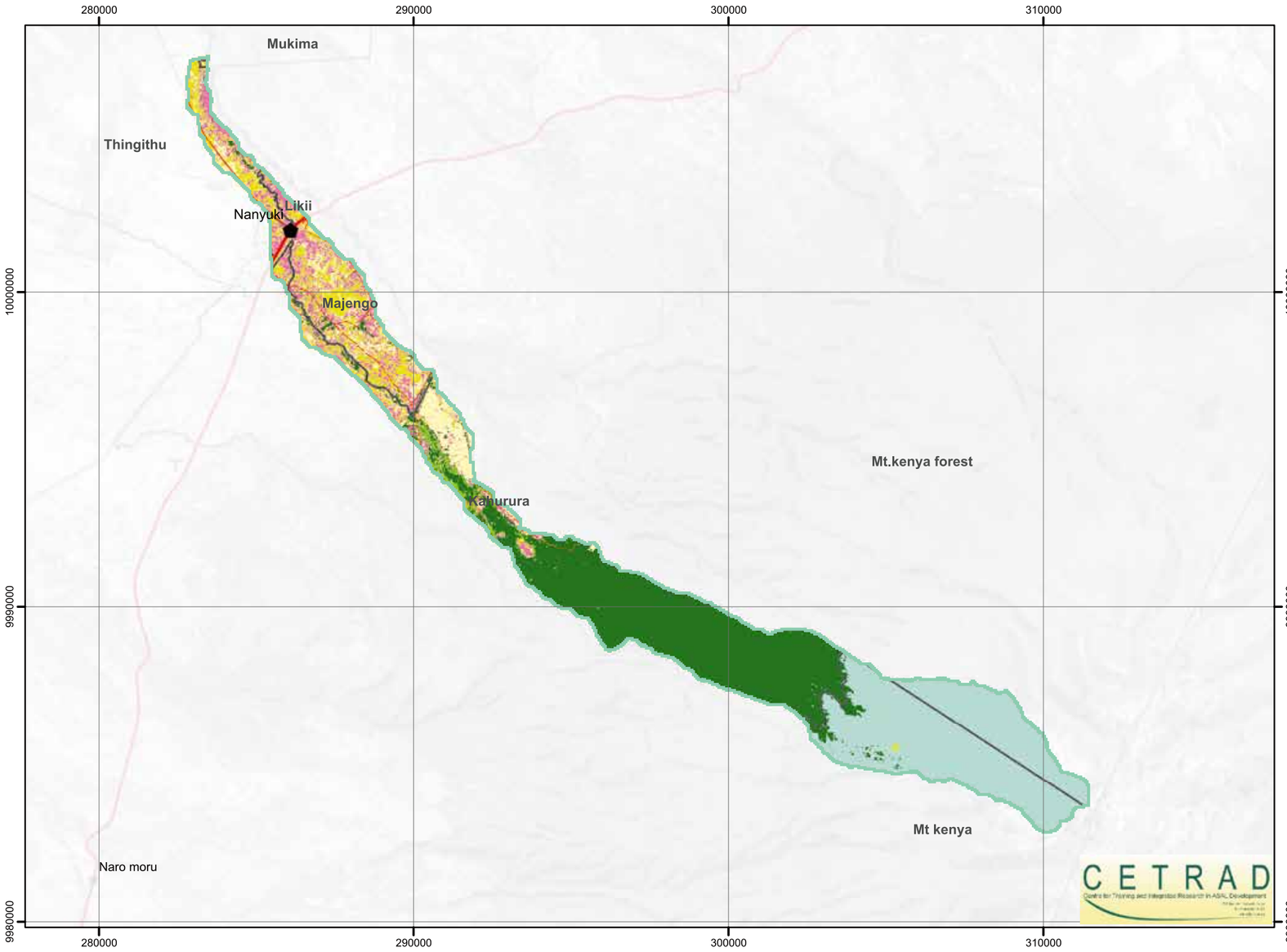
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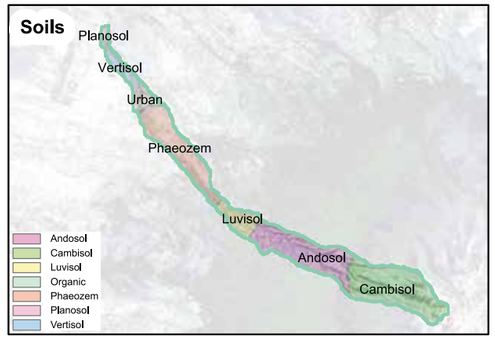
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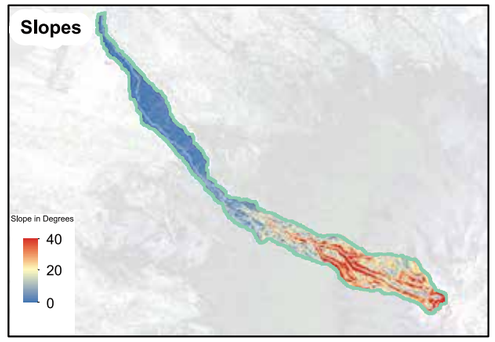
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
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| Sub-humid | High | 1,000 | 1,600 | 20 |
| Semi-humid | High to Medium | 800 | 1,400 | 8 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 22 |

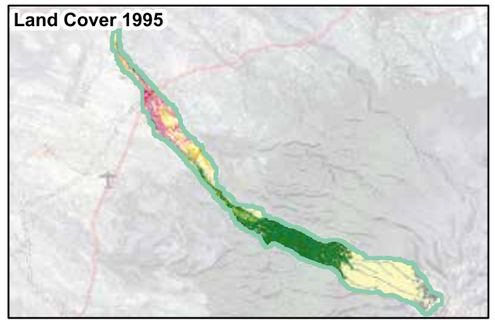
# Land Cover 2014






**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Nanyuki Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

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Landcover information derived from Landsat Images 30m 2014.

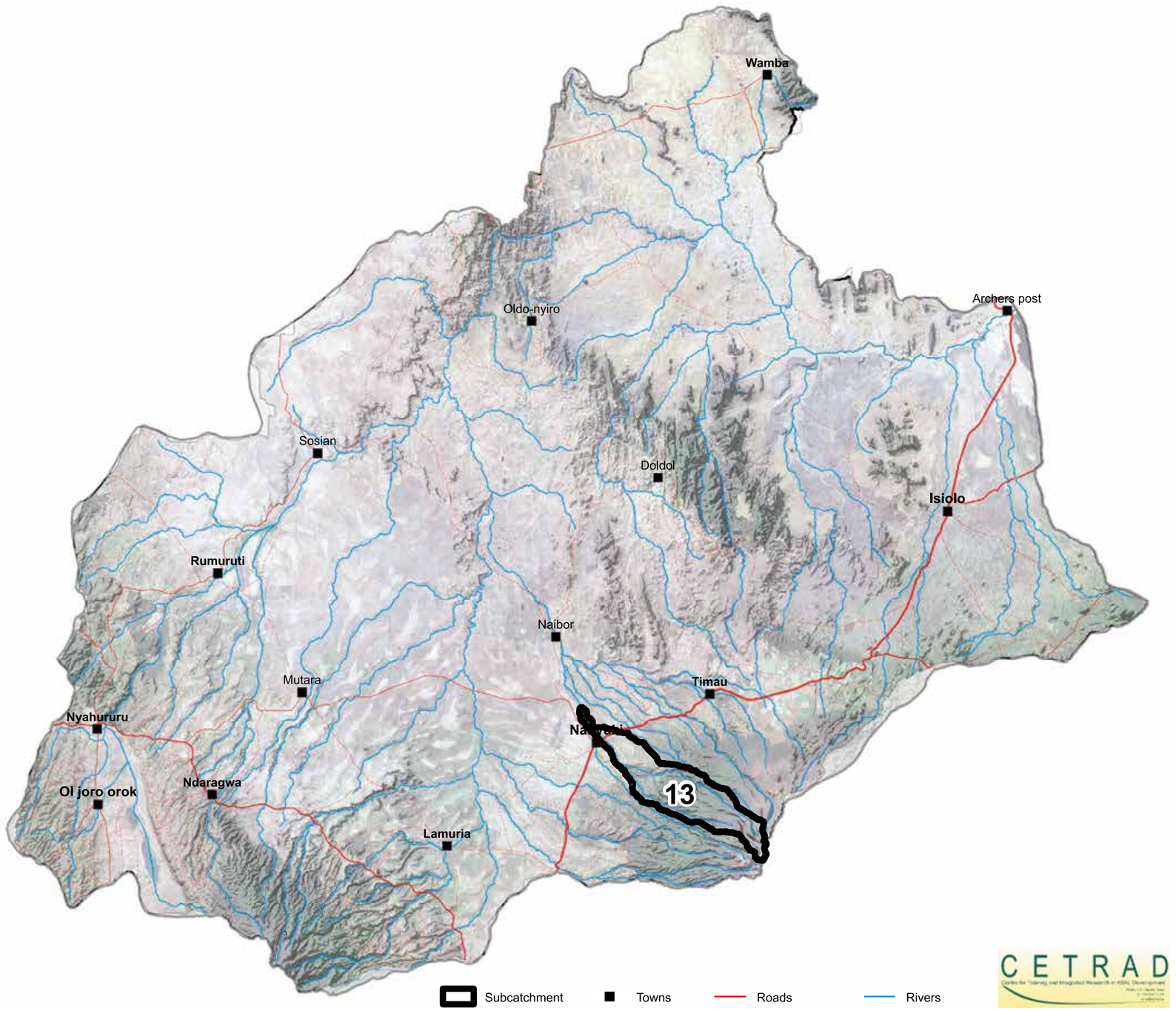
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(*) Arid and Semi Arid Lands.

**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 33.10 | 44.81 | 5.61 | 7.60 |
| Woody Grassland | 3.71 | 5.02 | 8.89 | 12.04 |
| Natural Forest | 22.06 | 29.87 | 26.88 | 36.39 |
| Plantation Forest | 2.89 | 3.92 | 1.46 | 1.98 |
| Moorland | _ | _ | 23.61 | 31.97 |
| Cropland | 8.24 | 11.15 | 7.41 | 10.03 |
| Wastelands Rocks | 2.96 | 4.01 | _ | _ |
| Water | 0.01 | 0.02 | _ | _ |
| Urban Areas | 0.60 | 0.81 | _ | _ |
| Others | 0.30 | 0.40 | _ | _ |
| **Totals** | **73.86** | **100.00** | **73.86** | **100.00** |

# 13 - Likii


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Ol joro orok
Ndaragwa
Lamuria
13
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# LIKII SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Likii has a total area of 184 $Km^2$ with a combined population of 77,654 people living within twelve sub locations (with an area of 1,204 $Km^2$) that are partly or completely within the sub catchment. About 10% of the area is under crops and settlements, 15% under grasslands, 51% of land is under forest and the remaining 24% is under moorland.

### Climate

The climate of this sub catchment varies mainly from humid to semi-humid with a small portion having semi-humid to arid because of its location whereby a bigger part of it falls on the slopes of the mountain.

### Education

There are four (4) secondary schools and over 19 primary schools; government sponsored (10), Private (6) and Religious organizations (3)

### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | LIKII WATER RESOURCES USERS ASSOCIATION | | | | |
| Contact Address email, chairperson, phone | | P. O. BOX 1076-1O4OO NANYUKI, E-Mail Address likiirwua@yahoo.com<br>Martin Muriuki (Interim Chairman)<br>Executive officer James Mwangi 0726971228 | | | | |
| Date of Formation | | 2001 | | | | |
| Registration details | Socio services | N/A | | | | |
| | Attorney General office | Registered as an Association on Reg. Certificate No. 2415 Date: 27 May 2002 | | | | |
| Membership | members | 19 | | | | |
| | Non members | 9 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 8 | 5 | 1 | 7 |
| River abstractions | | 17 | | | | |
| Main Reason of formation | | To enhance equitable distribution of water resources amongst all the water users in respect to their basic water needs and rights | | | | |
| Objectives | | (a) To promote legal water abstraction, efficient and proper use of the abstracted water from all the water bodies within the Likii Sub-catchment that includes but not limited to the following,<br>i. Likii River and its tributaries<br>ii. Dams and Water pans<br>iii. Boreholes and shallow wells<br>iv. Springs<br>(b) To promote sustainable use, management and development of water resources within the Likii Sub-catchment.<br>(c) To promote soil and water conservation practices within the Likii Sub-catchment<br>To conserve the water quality and quantity of the Likii River and its tributaries, public dams, water pans, boreholes, shallow wells and springs.<br>(d) To promote a situation in which the available water resources within the Likii Sub-catchment is reasonably shared between the environment, wildlife, livestock and all the communities who rely on the water resources in a manner that recognises the following priority ranking of water use namely,<br>i. Domestic<br>ii. Livestock<br>iii. Environment, wildlife and fisheries<br>iv. Irrigation<br>v. Recreation<br>vi. Manufacturing Industry<br>vii. Other uses as contained in the Water Act.<br>(e) To provide a forum to discuss, prevent and resolve water resource use conflicts<br>(f) To promote dialogue between the water users and the Government in regard to water policy, rules and regulation in respect to all the issues related to the water resources within Likii sub-catchment<br>(g) To promote a situation in which all modifications to the existing water diversion or abstraction infrastructures and any new water works must be approved by the Management Committee before being considered by the relevant Authority.<br>(h) To develop a sustainable Association that is responsible for the management of the water resources within Likii sub-catchment, through transparent and fair management practices. | | | | |
| Availability of sanctioning system | | Management committee (Available ) | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Two (3) Likii River Farm Ltd, Countrywide Connections Ltd , Mt Kenya wildlife conservancy | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Assisted during the initial formation and registration of the Association and financial support (salary) for the Executive Officer for the first two years. They provide transport during activities e.g. tree planting and other field visits. Else they participate like any other member. | | | | |
| Sources and Nature of Conflicts | | Water apportionment, Sabotage (breaking locking devices and accessing water illegally) of water rationing programme by some members leading to inadequate flow for downstream users. | | | | |
| Problems Reported to the WRUA | | Water pollution within the informal settlements of Likii and Kangaita villages<br>Cutting down of River line forest | | | | |
| Unreported/unexpressed conflicts | | Leadership conflicts amongst the community water schemes | | | | |
| Availability of conflict resolution guidelines | | Conflict resolution guideline available. Likii WRUA is guided by the Constitution and bylaws to resolve most of the water related conflicts. | | | | |
| Availability of conflict resolution skills and implementation | | Limited skills amongst the WRUA Management Organ | | | | |

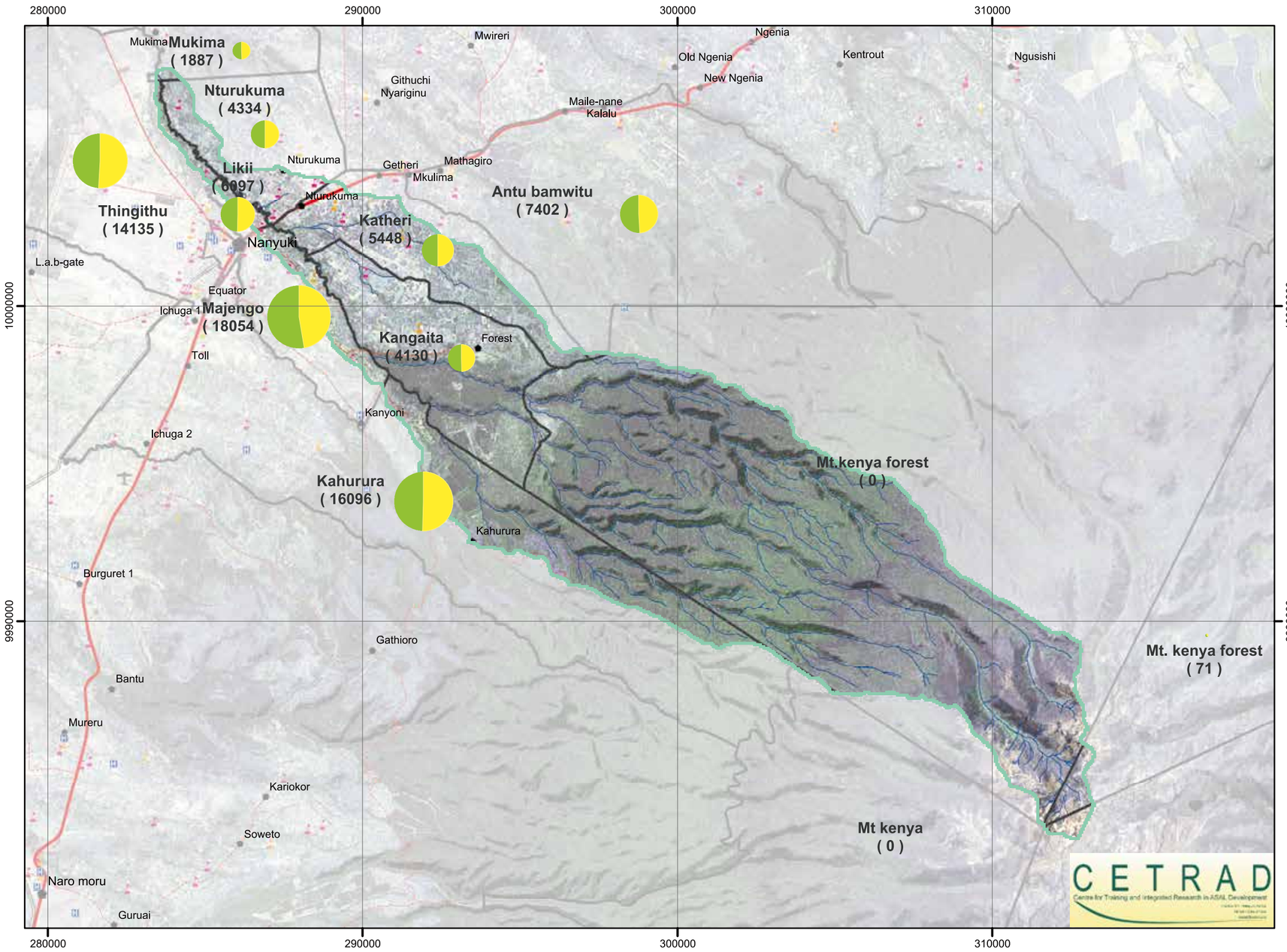
# LIKII SUBCATCHMENT

## Fact sheet. Date: July 2014

| | |
|---|---|
| Challenges | Lack of clear guidelines from WRMA regarding permit holders and WRUA roles in the water resources management<br>Lack of human and financial resources to patrol the River system<br>Inadequate capacity and skill amongst the Management Committee on WRUA/CBO management |
| Cases of conflicts dealt with | None |
| Cases of conflicts unresolved and reasons | N/A |
| Other activities the WRUA is engaged in | Catchment and riparian land rehabilitation through tree planting<br>Promotion of energy efficient stoves<br>Promotion of bio gas technologies<br>Promotion of drip irrigation technology<br>Pollution control<br>Proposed fish farming for income generation |
| Achievements | Over 20,000 indigenous tree seedlings planted within stretch 2.5kms along the riparian area<br>Over 10,000 exotic tree seedlings planted at household level<br>Likii water resources operates two bank accounts<br>Flow measuring and regulating devices installed in over 85% of the abstraction points<br>Five (5) year sub catchment management plan developed<br>Awareness on pollution raised through erection of ten (10) concrete sign posts<br>Over one thousand (1000) energy efficient stoves installed within the household<br>Five clothe washing stands constructed within the informal settlements adjacent to Likii River<br>Acquisition of one (1) motor bike for river patrol and field visit.<br>Have Registered With Kenya Revenue Authority (KRA) and Attorney General office (AG)<br>Acquired a two acre plot of land and construction of WRUA office is ongoing. Currently we have a fully operational office in a rented house<br>Have employed full time Executive officer and a care taker for the WRUA farm. |
| Hindrances to achieve the goals of the WRUA | Lack of adequate financial resources<br>Lack of adequate capacity and skills within the Management Committee |
| Advices to others | Awareness creation amongst the WRUA members<br>Employment of a technical Manager to help in the running of the Association<br>Adherence to the WRUA Constitution and Bylaws<br>Compliance to all the GoK regulations including the water Act 2002 and subsequent rules and regulations |
| Information and Data Available | List of members<br>Intake details including GPS position.<br>Minutes for Meetings<br>Financial records<br>Abstraction report<br>Sub-catchment management plan<br>Photos on all the WRUA field activities and catchment area<br>Baseline and EIA reports |
| Person Responsible for data Collection | Executive Officer |
| Methods of Data Collection | Field visits, members interviews and need assessment |
| Information and Data Needs | Detailed sub-catchment maps<br>Abstraction quantities (WRMA)<br>Water quantity available and quality<br>Water demand data<br>Land use and forest cover<br>Baseline data that includes human and livestock population<br>Analysis for potential sites for water reservoir, storage or dams |
| Period of Water Scarcity | January, March-Mid April, Mid June-July, September-Mid October |
| How is the problem of water scarcity solved | Through water rationing at the River and project levels<br>Water storage at household levels |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | UNDP/GEF/COMPACT Mt. Kenya Initiative: Year 2008: financial support: Amount KShs 3.44m<br>Laikipia Wildlife Forum: Year 2008: development of sub-catchment plan: Amount Kshs 500,000<br>Laikipia wildlife Forum: Year 2010: Financial support: Amount 1.56m<br>WDC (Water Service Trust Fund): Year 2011: Financial support: Amount Kshs 1,99m<br>CDTF/CEF: Year 2012: Financial support: Approved budget KShs 27,874, 606 |
| Water Quality and cause of pollution | Relatively clean; however discharge of grey water and solid waste into the River within the informal settlements of the Likii and Kangaita villages<br>Cloths washing in the River |
| Existence of Wetlands and their status | N/A |
| Others | Limitation in reaching all riparian members , portable pump owners into the WRUA |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Antu bamwitu | 66 | 3,758 | 3,644 | 7,402 | 112 | 2,273 |
| Kahurura | 94 | 7,981 | 8,115 | 16,096 | 171 | 5,125 |
| Kangaita | 26 | 2,076 | 2,054 | 4,130 | 162 | 1,188 |
| Katheri | 22 | 2,732 | 2,716 | 5,448 | 251 | 1,598 |
| Likii | 2 | 3,037 | 3,060 | 6,097 | 3,605 | 2,189 |
| Majengo | 16 | 9,537 | 8,517 | 18,054 | 1,148 | 5,391 |
| Mt kenya | 248 | 0 | 0 | 0 | 0 | 0 |
| Mt. kenya forest | 352 | 47 | 24 | 71 | 0 | 30 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Mukima | 22 | 965 | 922 | 1,887 | 87 | 477 |
| Nturukuma | 19 | 2,177 | 2,157 | 4,334 | 233 | 1,213 |
| Thingithu | 62 | 6,935 | 7,200 | 14,135 | 227 | 4,200 |
| **Totals** | **1,204** | **39,245** | **38,409** | **77,654** | **64** | **23,684** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

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## Likii Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
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Meridian of Origin: 39° East of Greenwich
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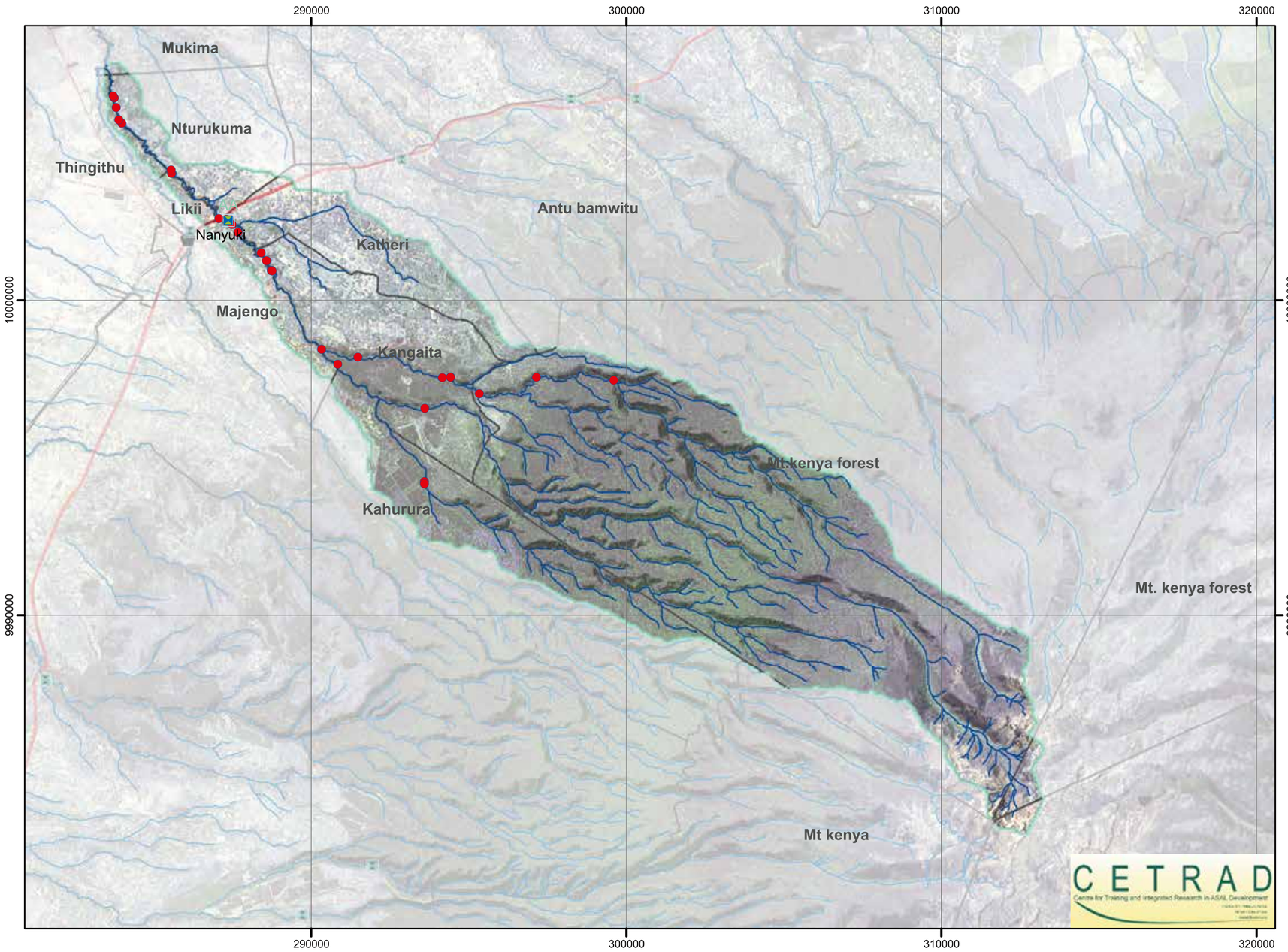
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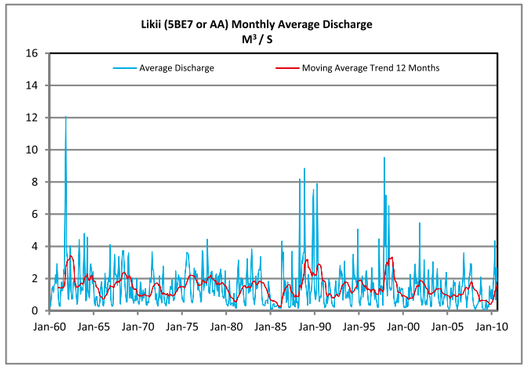
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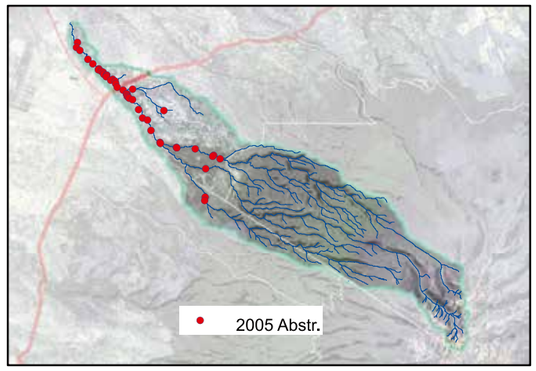




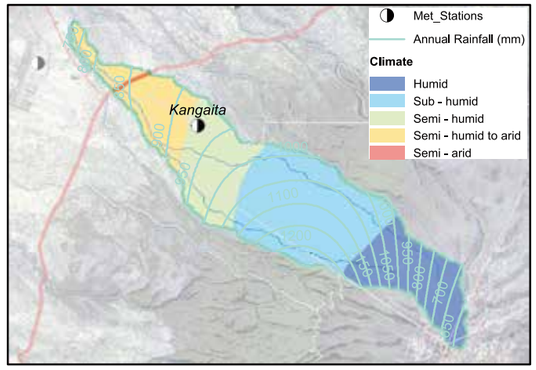

## Water Discharge Trends (AA)




## Abstraction 2005




## Agro Climatic Zones




### Abstractions

- Rivers

### Features & Boundaries

- Rivers
- Likii RGS
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| | |
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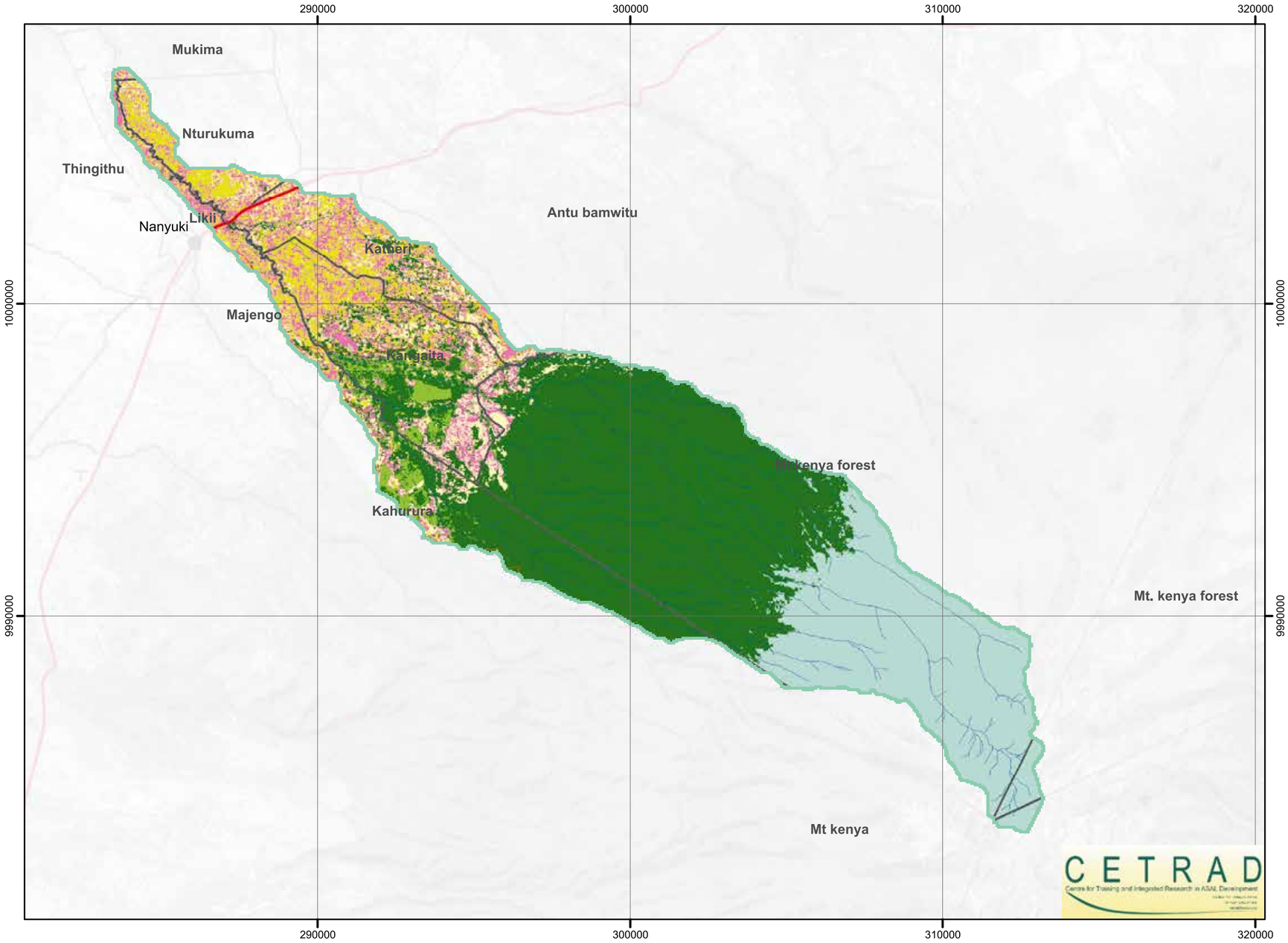
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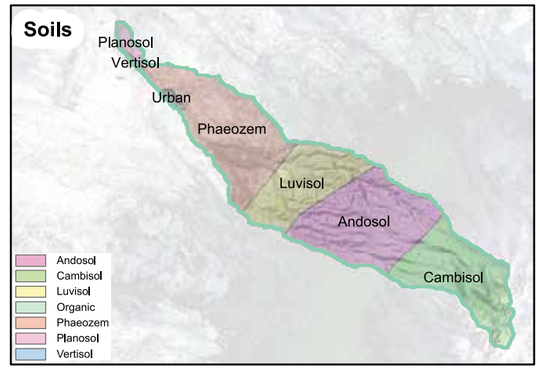
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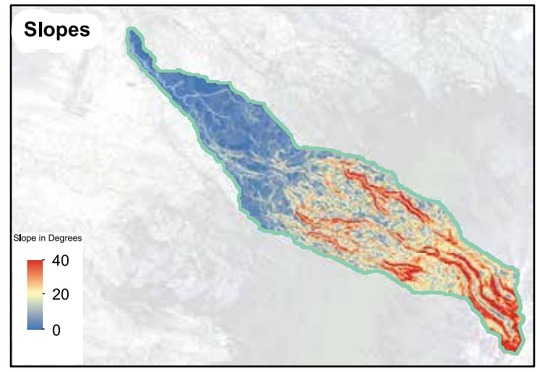
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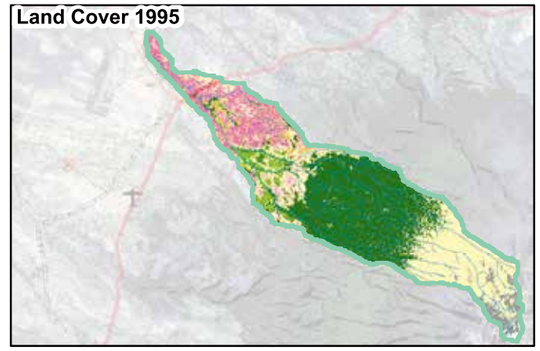
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**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Likii Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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Landcover information derived from Landsat Images 30m 2014.

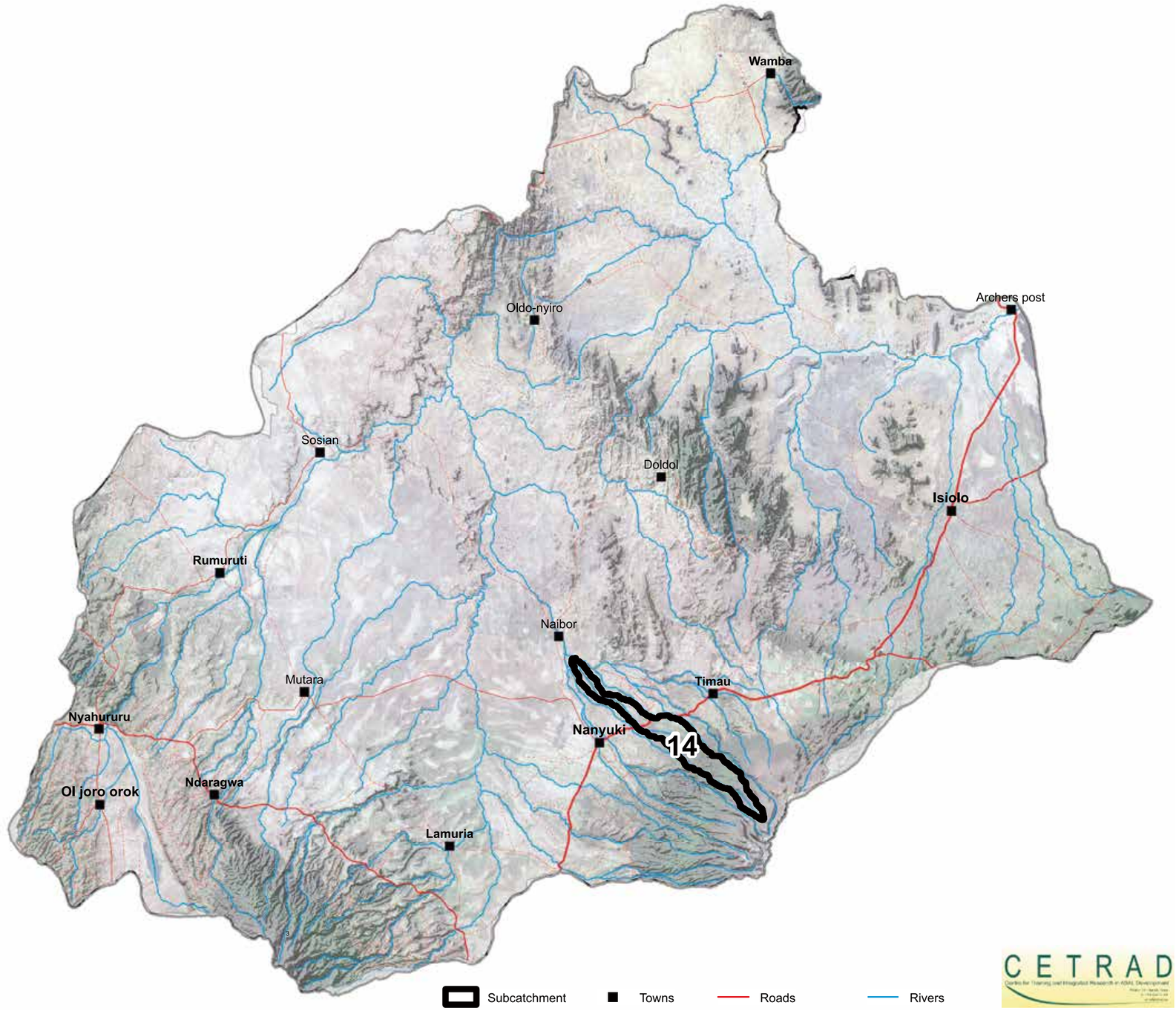
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 61.85 | 33.69 | 10.93 | 5.95 |
| Woody Grassland | 7.11 | 3.87 | 17.19 | 9.36 |
| Natural Forest | 73.55 | 40.06 | 89.23 | 48.60 |
| Plantation Forest | 7.69 | 4.19 | 4.92 | 2.68 |
| Cropland | 26.07 | 14.20 | 18.28 | 9.96 |
| Moorland | _ | _ | 43.04 | 23.44 |
| Wastelands Rocks | 6.36 | 3.46 | _ | _ |
| Water | 0.01 | 0.01 | _ | _ |
| Others | 0.95 | 0.52 | 0.01 | 0.01 |
| **Totals** | **183.60** | **100.00** | **183.60** | **100.00** |

# 14 - Ontulili


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
14
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# ONTULILI SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Ontulili has a total area of 107Km$^2$ with a combined population of 22,823 people living within six sub locations (with an area of 462 Km$^2$) that are partly or completely within the sub catchment. About 17% is under crops and settlements, 27% under grasslands, 44% under forest and12% is under moorland.

### Climate

The climate varies from humid to semi-humid on the mountain slopes and semi humid to semi arid on the lowlands.

### Education

There are three secondary schools and over six (6) primary schools; government sponsored (2), Religious organizations (2) and Community (2).

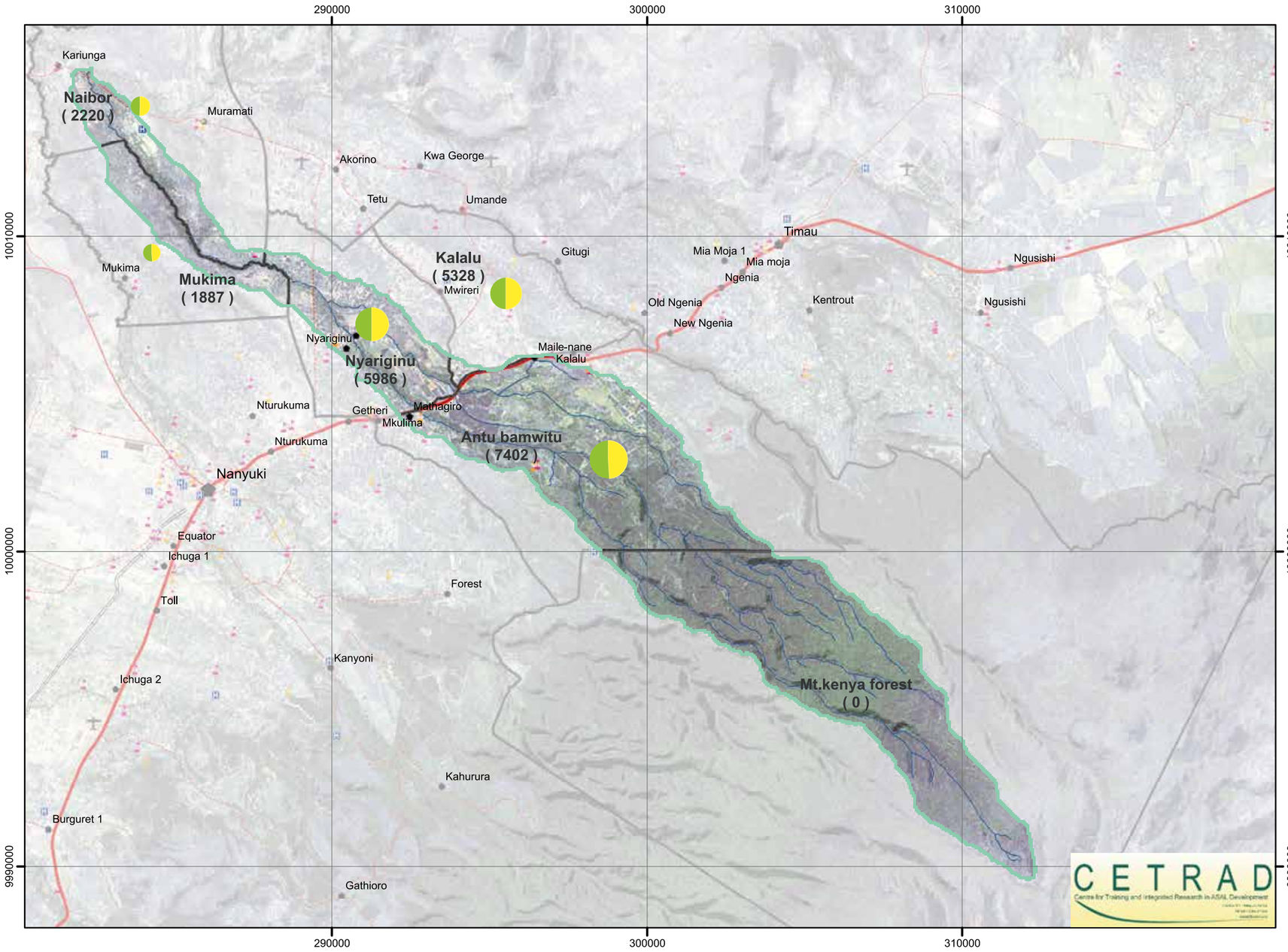
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Ontulili WRUA | | | | |
| Contact Address email, chairperson, phone | | Silas Mwithimbu ( Alias Mathagro)<br>Phone:0728093408 | | | | |
| Date of Formation | | 2008 | | | | |
| Registration details | Social services | N/A | | | | |
| | Attorney General office | Reg. No.26122 Date:15/12/2008 | | | | |
| Membership details | Members | 400 | | | | |
| | Non members | 30 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 15 | 3 | 2 | 12 |
| River Abstractions | | 50 | | | | |
| Main Reason for the formation | | To conserve and protect the river | | | | |
| Objectives | | -Rehabilitate the river<br>-Conserve the environment<br>-Protect and control pollution | | | | |
| Availability of sanctioning system | | Yes | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 9 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | None | | | | |
| Sources and Nature of Conflicts | | -Low flows of river during dry seasons<br>-Distribution of water unfairly | | | | |
| Problems Reported to the WRUA | | scarcity of water during dry season | | | | |
| Unreported/unexpressed conflicts | | Water pollution. Unfair water distribution in some areas | | | | |
| Availability of conflict resolution guidelines | | Yes. The management is trained | | | | |
| Availability of conflict resolution skills and implementation | | - Water rationing fairly.<br>-Sensitization of members.<br>-Training leaders managing the water projects. | | | | |
| Challenges | | -Lack of cooperation amongst WRUA members<br>-Lack of funds<br>-Lack of active participation | | | | |

| | |
|---|---|
| Cases of conflicts dealt with | Water rationing |
| Cases of conflicts unresolved and reasons | -Water pollution<br>-Water abstraction by non members near riparian areas because of being adamant and refusing to cooperate<br>-Destruction of catchment |
| Other activities the WRUA is engaged in | -Afforestation; tree planting<br>-Conserve catchment<br>-Baseline surveys |
| Achievements | -Memorandum of understanding with every member<br>-Operational active WRUA membership |
| Hindrances to achieve the goals of the WRUA | -Lack of finances.<br>-Lack of cooperation amongst members |
| Advices to others | - |
| Information and Data Available | Yes |
| Person Responsible for data Collection | None |
| Methods of Data Collection | None |
| Information and Data Needs | Highly needed |
| Period of Water Scarcity | 3 months |
| How is the problem of water scarcity solved | Rationing fairly |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | -Name: WTF, Year: 2009, Type of support: Seminars. pegging of the river riparian, Amount of support Ksh.770600<br>-Name: Rural Focus, Year: 2005, Type of support: Survey. Guide on registration<br>-Name: LWF, Type of support: Seminars and tree seedlings |
| Water Quality and cause of pollution | -Washing clothes along the river.<br>-Soil erosion.<br>-Watering points for cows and sheep |
| Existence of Wetlands and their status | -Ontulili swamp<br>-Status: Good condition |
| Others | |

# Population Numbers (2009) and Socio Infrastructure






### Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Antu bamwitu | 66 | 3,758 | 3,644 | 7,402 | 112 | 2,273 |
| Kalalu | 22 | 2,671 | 2,657 | 5,328 | 244 | 1,540 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Mukima | 22 | 965 | 922 | 1,887 | 87 | 477 |
| Naibor | 50 | 1,089 | 1,131 | 2,220 | 45 | 560 |
| Nyariginu | 26 | 2,976 | 3,010 | 5,986 | 227 | 1,608 |
| **Totals** | **462** | **11,459** | **11,364** | **22,823** | **49** | **6,458** |

### Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Ontulili Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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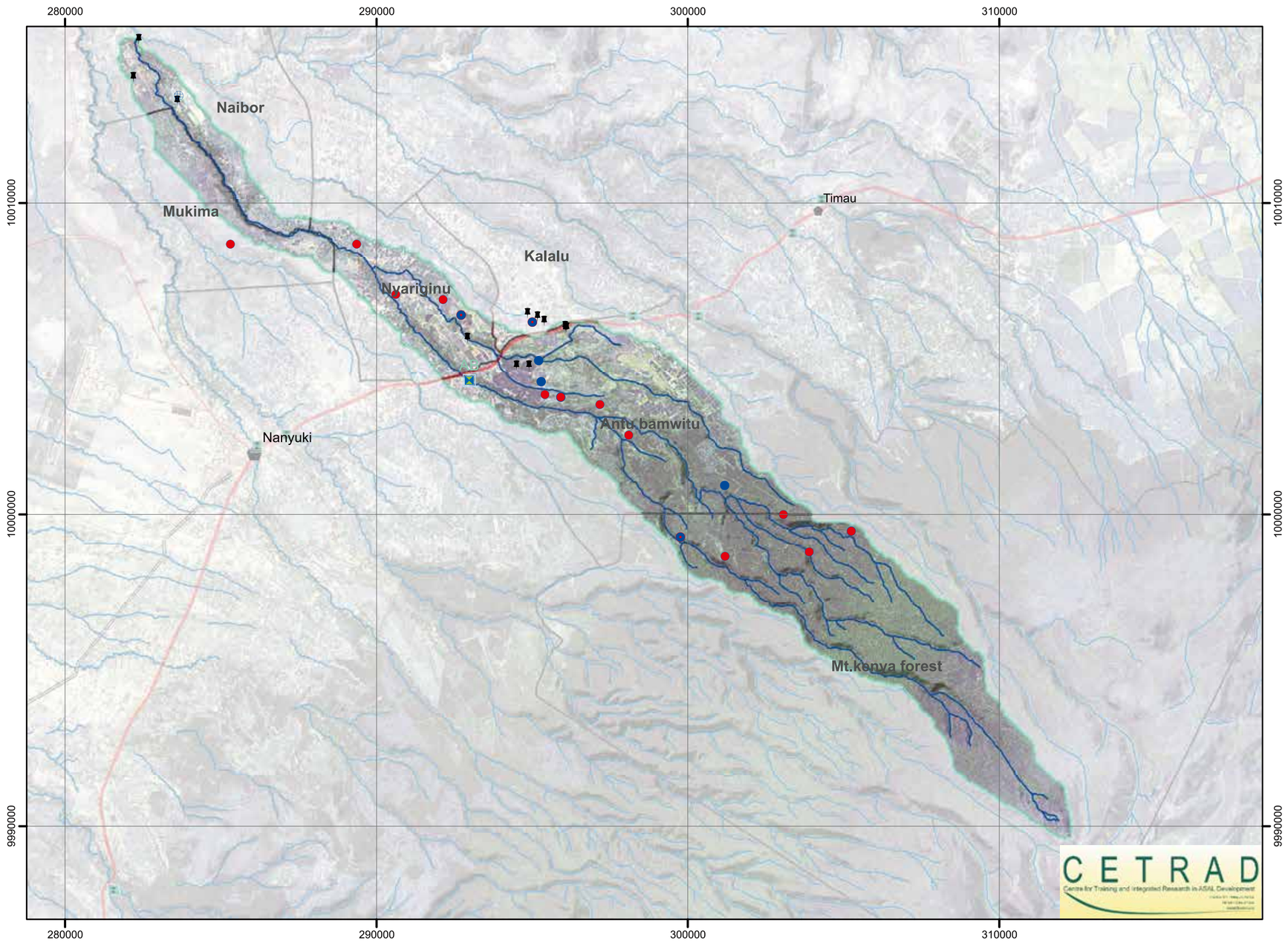
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

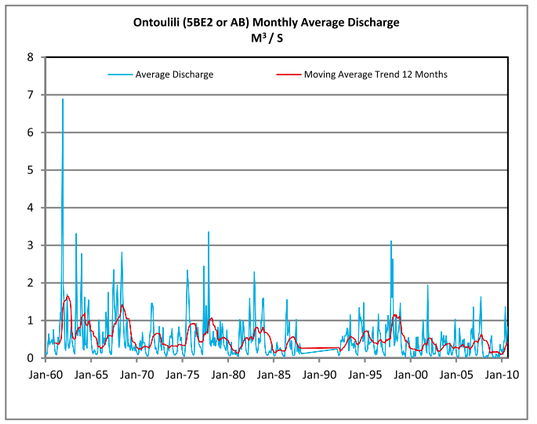
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

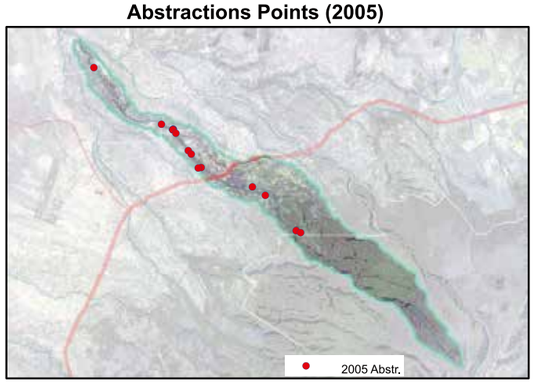




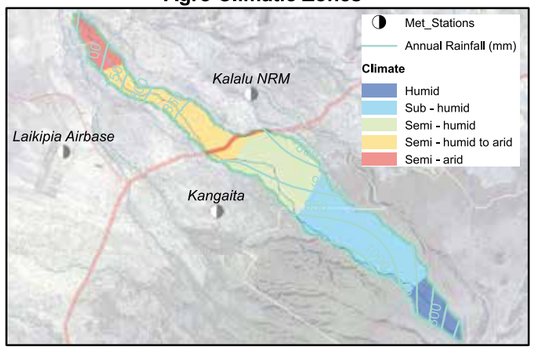

## Water Discharge Trends (AB)




## Abstractions Points (2005)




## Agro Climatic Zones




### Abstractions

- Rivers
- Springs
- Dams
- Bore Holes
- Pans

### Features & Boundaries

- Rivers
- Ontulili Gauging Station
- Other Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport

**Roads**

- A
- B
- C
- D
- E
- Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Ontulili Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

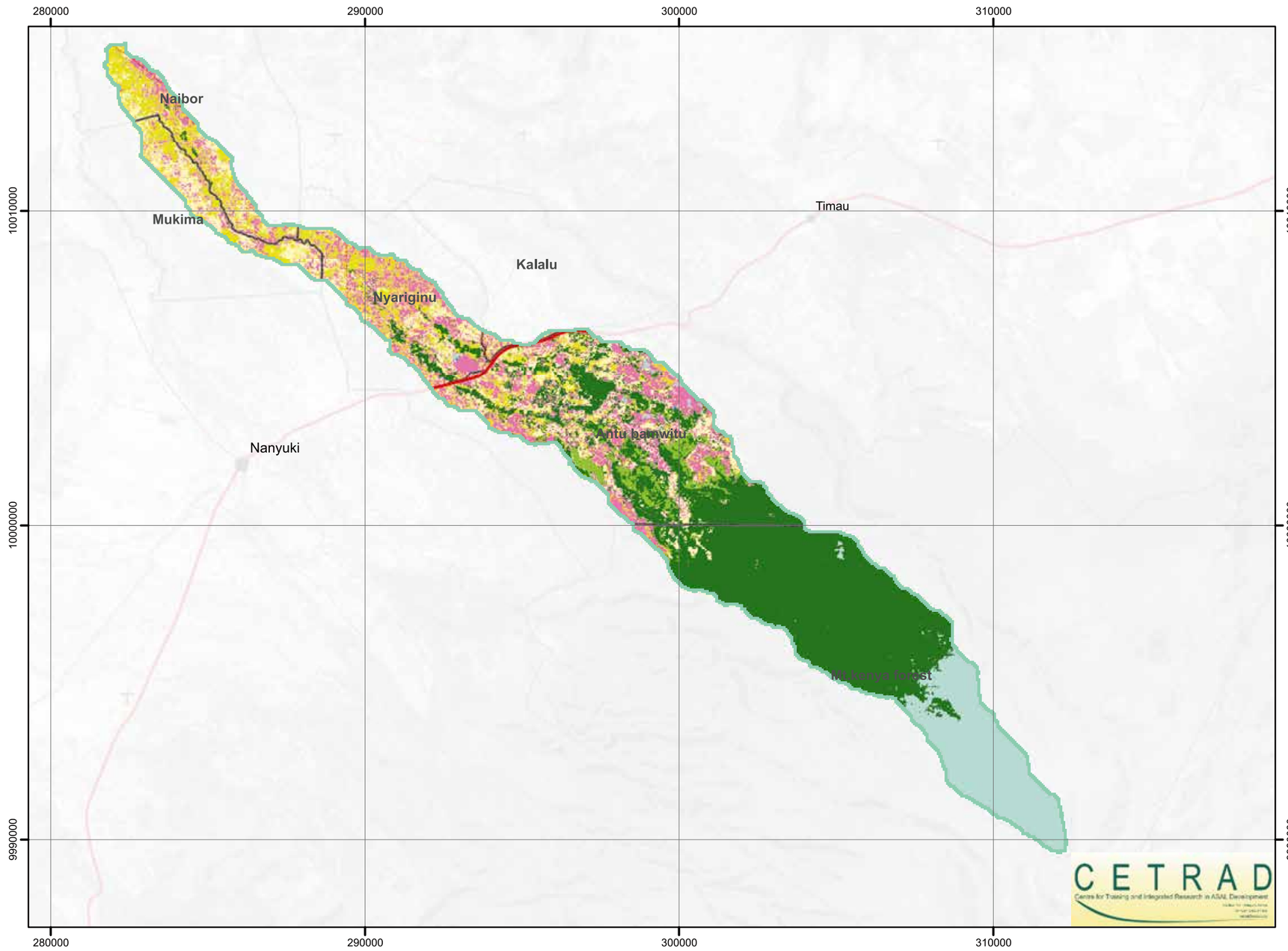
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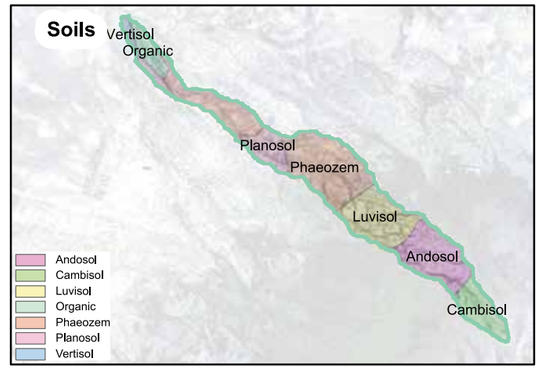
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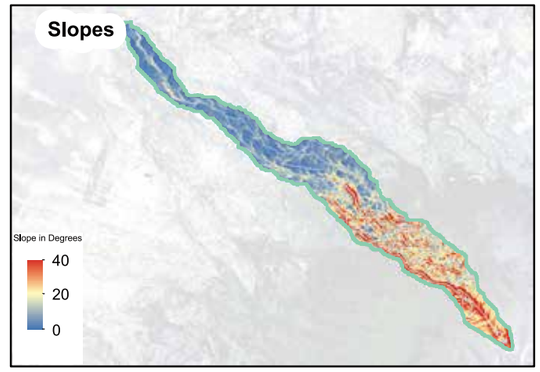
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 10 |
| Sub-humid | High | 1,000 | 1,600 | 39 |
| Semi-humid | High to Medium | 800 | 1,400 | 26 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 24 |
| Semi-arid | Medium to Low | 450 | 900 | 8 |

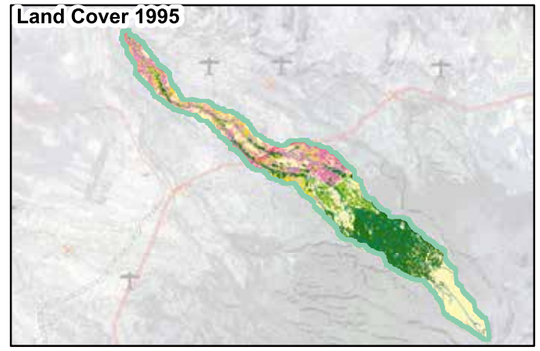
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 35.35 | 33.06 | 13.09 | 12.24 |
| Woody Grassland | 12.84 | 12.01 | 15.60 | 14.59 |
| Natural Forest | 32.04 | 29.97 | 42.86 | 40.09 |
| Plantation Forest | 5.42 | 5.07 | 3.74 | 3.50 |
| Cropland | 20.82 | 19.48 | 17.97 | 16.82 |
| Moorland | | | 13.63 | 12.75 |
| Wastelands Rocks | 0.43 | 0.41 | | 0.00 |
| Water | 0.01 | 0.01 | 0.01 | 0.01 |
| Others | | | 0.01 | 0.01 |
| **Totals** | **106.91** | **100.00** | **106.91** | **100.00** |

## Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

## Urban Settlements

- District Hq
- Division Hq

## Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

## Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Ontulili Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
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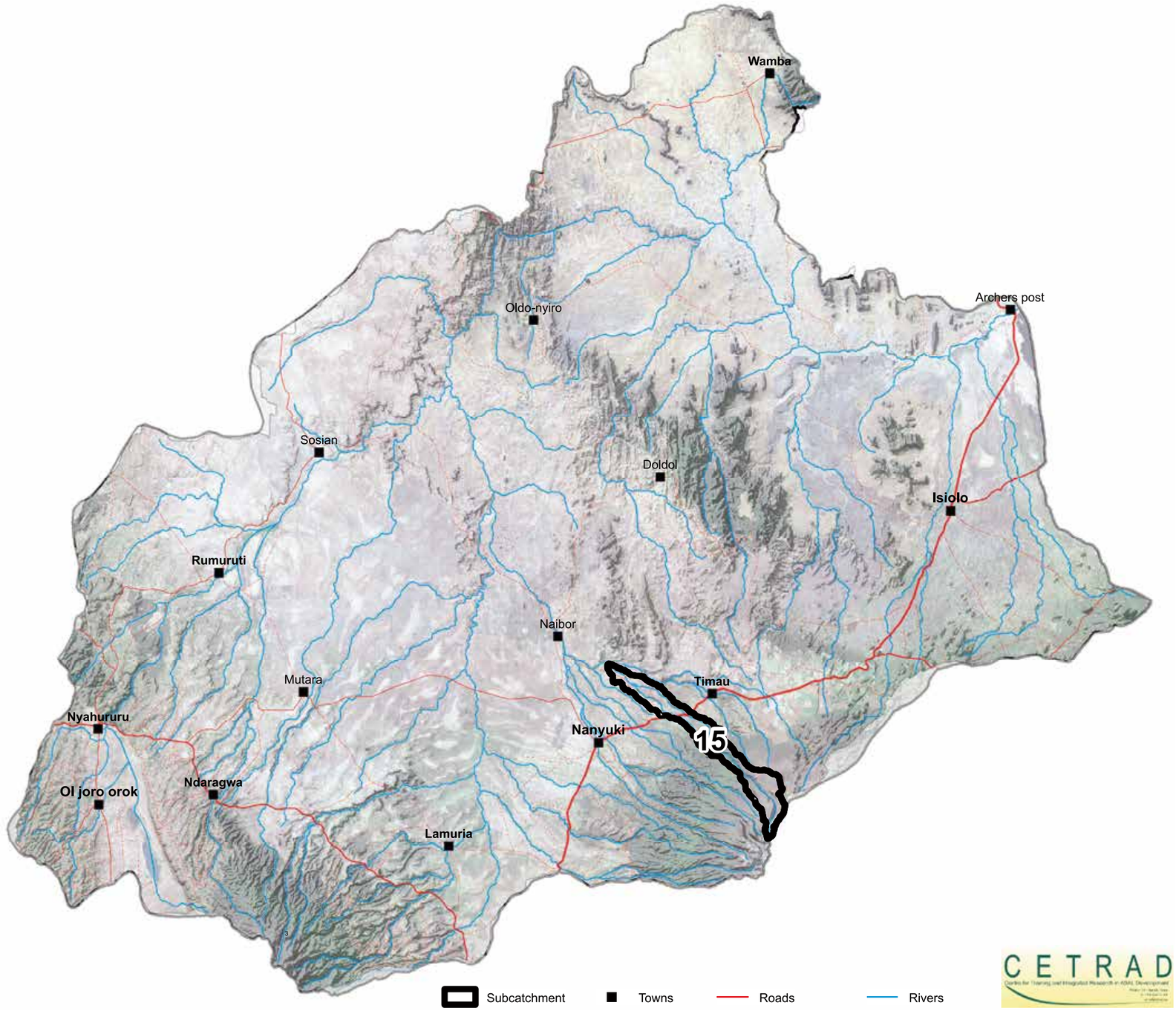
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 15 - Sirimon


Wamba
Oldo-nyiro
Archers post
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
15
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# SIRIMON SUBCATCHMENT
## Fact sheet. Date: July 2014

### Introduction

Sirimon sub catchment has a total area of 116 $Km^2$ with a combined population of 36,229 people living within eight sub locations (with an area of 1,060$Km^2$) that are partly or completely within the sub catchment. About 15% is under crops and settlements, 24% under grasslands, 25% of land is under forest and the remaining 36% is covered by moorland.

### Climate

The climate varies from humid to semi-humid near Mt. Kenya and semi-humid to semi-arid around Kalalu.

### Education

There are two (2) secondary schools and about 16 primary schools; government sponsored (7), Private (1) and Religious organizations (5), Community (1) and Local Authority (2).

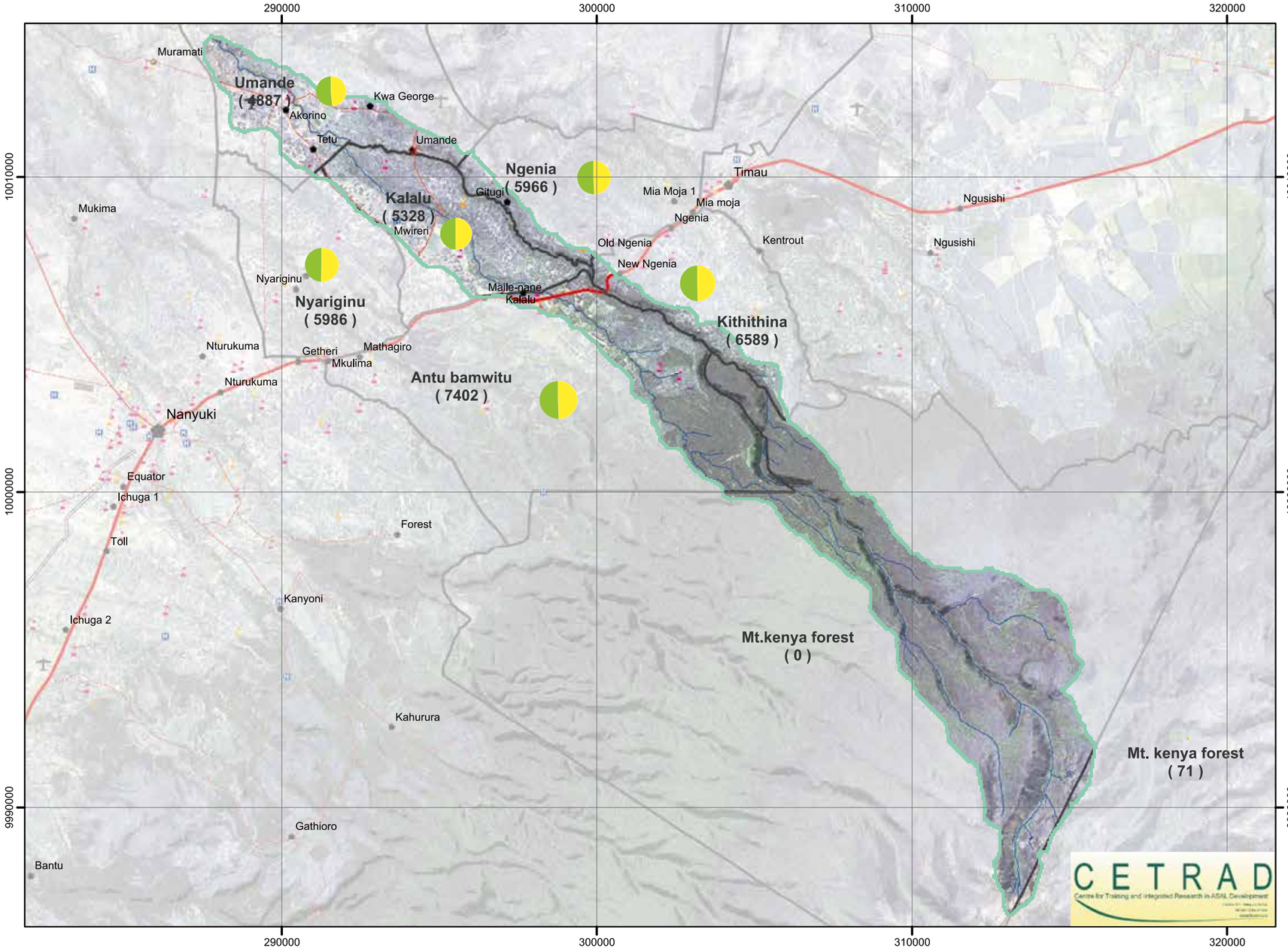
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Sirimon WRUA | | | | |
| Contact Address email, chairperson, phone | | David G. Mungania<br>Phone: 0722765592 | | | | |
| Date of Formation | | 2004 | | | | |
| Registration details | Social services | 2004 | | | | |
| | Attorney General office | Reg No.26912 Year: 2006 | | | | |
| Membership details | members | 4 | | | | |
| | Non members | 110 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 5 | 2 | 13 | 7 |
| Rivers Abstractions | | 150 | | | | |
| Main Reason of formation | | Conservation of the water resource. Solve water conflicts. Share the water resource equitably. Control pollution. Control soil erosion. Rehabilitate riparian areas | | | | |
| Objectives | | -Management of the resource<br>-Sharing water Equitably<br>-Environment conservation ( by planting trees)<br>-Improve water storage | | | | |
| Availability of sanctioning system | | When there is water scarcity we do rationing and minimize water wastage | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 4 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | None | | | | |
| Sources and Nature of Conflicts | | -During drought season<br>-Cutting trees on the riparian areas<br>-Illegal abstractors<br>-None payment to WRUA and water use charges mostly by illegal abstractors | | | | |
| Problems Reported to the WRUA | | -Cutting trees on riparian area<br>-Pollution | | | | |
| Unreported/unexpressed conflicts | | -Illegal abstraction.<br>-None payment of permit fees | | | | |
| Availability of conflict resolution guidelines | | Capacity building to the committee | | | | |
| Availability of conflict resolution skills and implementation | | WRUA management committee | | | | |

| | |
|---|---|
| Challenges | -Lack of information and funds<br>-Non employment of qualified personnel.<br>-No means of transport e.g. motorbike |
| Cases of conflicts dealt with | Rationing |
| Cases of conflicts unresolved and reasons | Illegal abstraction |
| Other activities the WRUA is engaged in | -Planting trees on Riparian area<br>-Encouraging community to do water storage<br>-Rehabilitation of available water pans to increase water<br>-Capacity building on water use |
| Achievements | Low |
| Hindrances to achieve the goals of the WRUA | Little support by the stakeholders and GOK |
| Advices to others | - |
| Information and Data Available | From WRMA,CETRAD, RURAL FUCUS, LWF |
| Person Responsible for data Collection | Any of the committee members |
| Methods of Data Collection | Minutes |
| Information and Data Needs | |
| Period of Water Scarcity | Dec-April, |
| How is the problem of water scarcity solved | Water rationing and monitoring |
| Institutional Support to WRUA (Name, Year, Type of support, Amount of support) | Name: LWF, Year 2009-2011, Type of support: Capacity building, visits to other developing WRUAs. Tree planting on riparian .General conservation of resource, Amount of support: Ksh.1.4M<br><br>Name: WDC, year:2011,Type of support: Resource conservation, Amount of support Ksh.534, 000 |
| Water Quality and cause of pollution | Pollution caused by poor farming methodologies. Cloth washing in the river. |
| Existence of Wetlands and their status | Present<br>Status: Poor |
| Others | -Most of the people on the ground are not aware of what is required to be done to save and to stop environmental degradation<br>-Water storage should be done in large by the GOK to save the rivers and assist in small irrigation farmers for food security<br>-WRUAs should be empowered and financed to enable them work effectively with the community<br>-WRUAs should be monitored for efficiency |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Antu bamwitu | 66 | 3,758 | 3,644 | 7,402 | 112 | 2,273 |
| Kalalu | 22 | 2,671 | 2,657 | 5,328 | 244 | 1,540 |
| Kithithina | 23 | 3,324 | 3,265 | 6,589 | 288 | 1,754 |
| Mt. kenya forest | 352 | 47 | 24 | 71 | 0 | 30 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Ngenia | 54 | 3,009 | 2,957 | 5,966 | 111 | 1,713 |
| Nyariginu | 26 | 2,976 | 3,010 | 5,986 | 227 | 1,608 |
| Umande | 241 | 2,521 | 2,366 | 4,887 | 20 | 1,308 |
| **Totals** | **1,060** | **18,306** | **17,923** | **36,229** | **34** | **10,226** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

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## Sirimon Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

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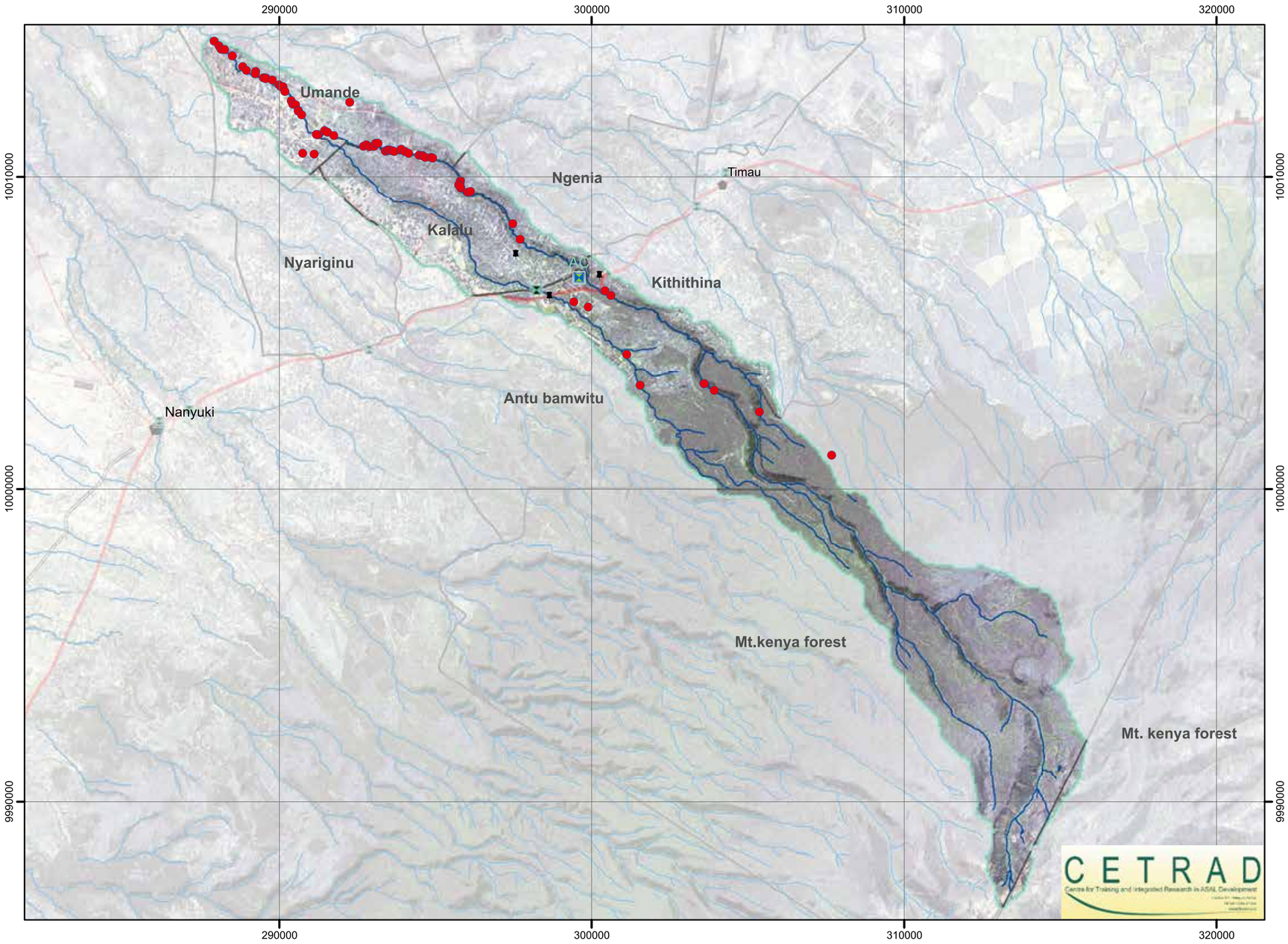
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

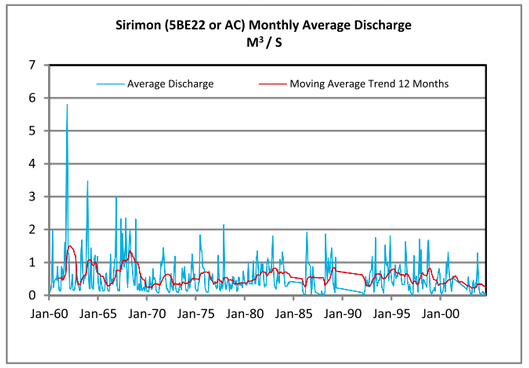
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)

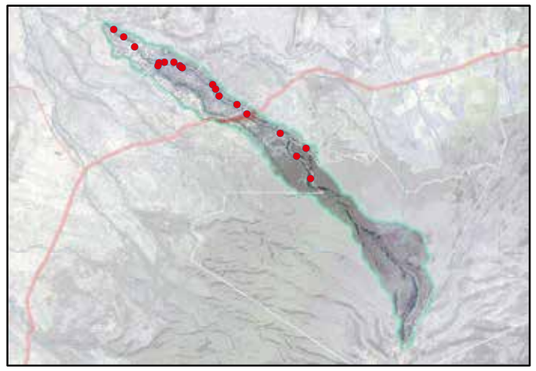




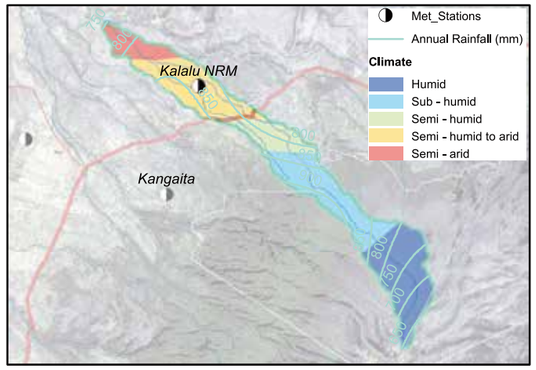

## Water Discharge Trends (AC)




## Abstraction Points (2005)



## Agro Climatic Zones




### Abstractions

- River
- Borehole

### Features & Boundaries

- Rivers
- Sirimon Gauging Station
- Other Gauging Stations
- Subcatchment
- Sublocations
- Wetlands

### Transport

Roads

- A
- B
- C
- D
- E
- Railway Line

### Urban Settlements

- District Hq
- Division Hq

## Sirimon Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

This map was prepared by the Centre for Training and Integrated Research in ASAL(*) Development (CETRAD) in July 2014.

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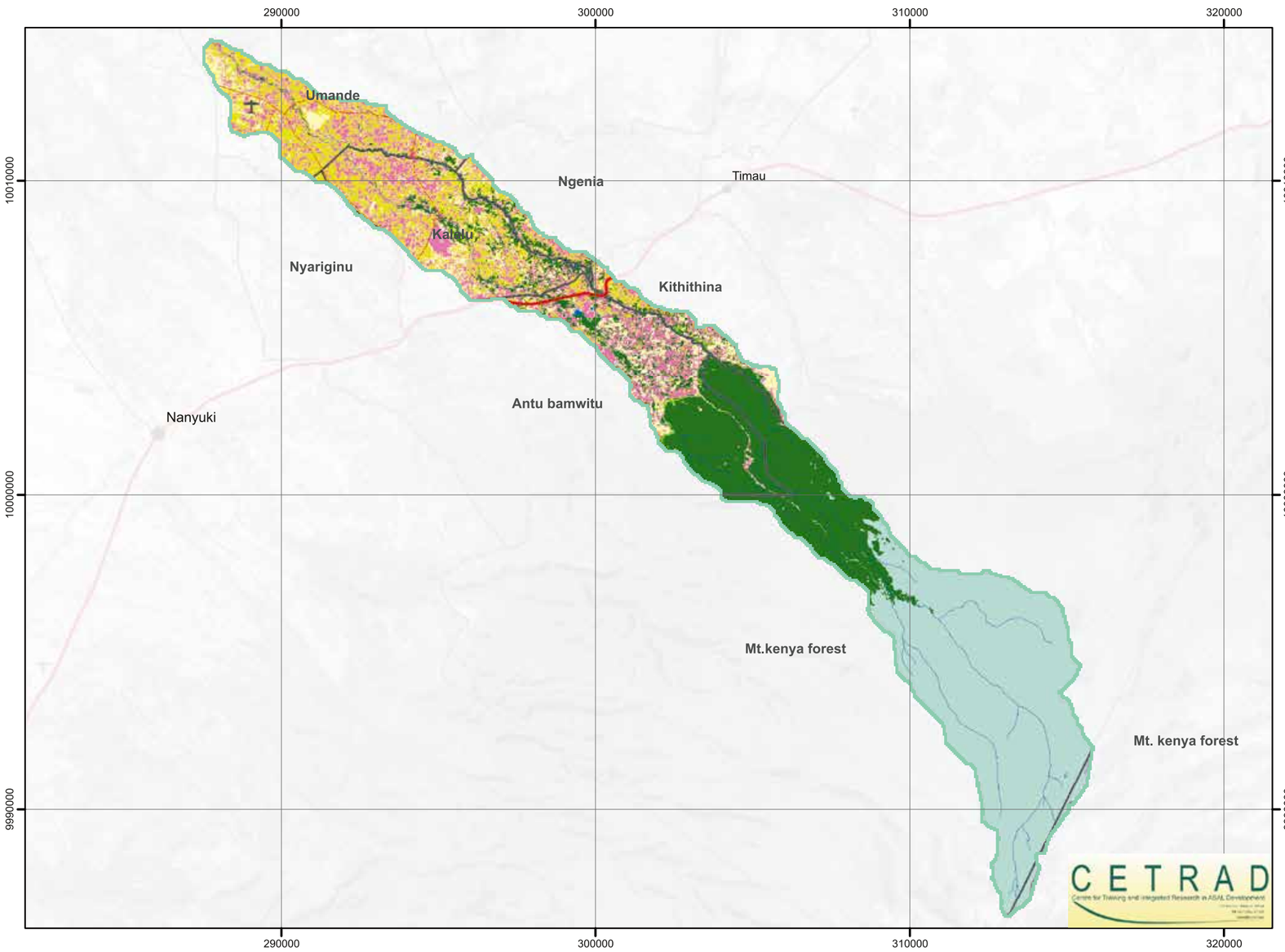
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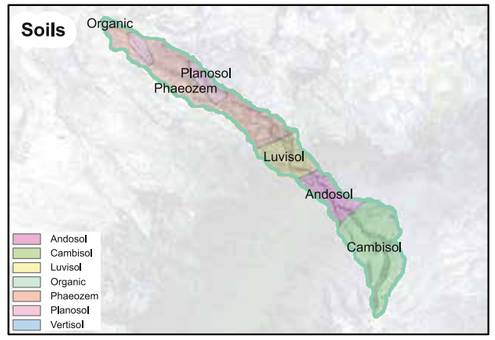
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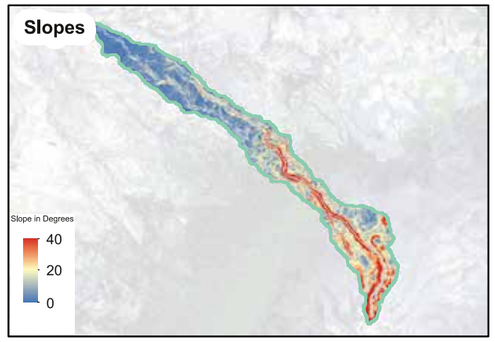
| CLIMATE | Agr Potential | Min Rainfall | Max Rainfall | Area Kms |
|---|---|---|---|---|
| humid | very high | 1100 | 2700 | 231.1 |
| sub-humid | high | 1000 | 1600 | 437.6 |
| semi-humid to semi-arid | medium | 600 | 1100 | 360.9 |
| semi-humid | high to medium | 800 | 1400 | 1558.3 |
| semi-humid to semi-arid | medium | 600 | 1100 | 1521.0 |
| semi-arid | medium to low | 450 | 900 | 6146.0 |

# Land Cover 2014









## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 56.21 | 48.75 | 8.65 | 7.50 |
| Woody Grassland | 10.52 | 9.12 | 18.92 | 16.41 |
| Natural Forest | 25.13 | 21.79 | 28.36 | 24.60 |
| Plantation Forest | 0.13 | 0.11 | 0.59 | 0.51 |
| Cropland | 19.30 | 16.74 | 16.90 | 14.66 |
| Moorland | _ | _ | 41.83 | 36.28 |
| Wastelands Rocks | 3.96 | 3.43 | _ | _ |
| Water | 0.01 | 0.01 | 0.05 | 0.04 |
| Others | 0.05 | 0.04 | _ | _ |
| **Totals** | **115.30** | **100.00** | **115.30** | **100.00** |

### Land Cover (2014)
- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements
- District Hq
- Division Hq

### Others
- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport
- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Sirimon Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
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Datum: Arc 1960
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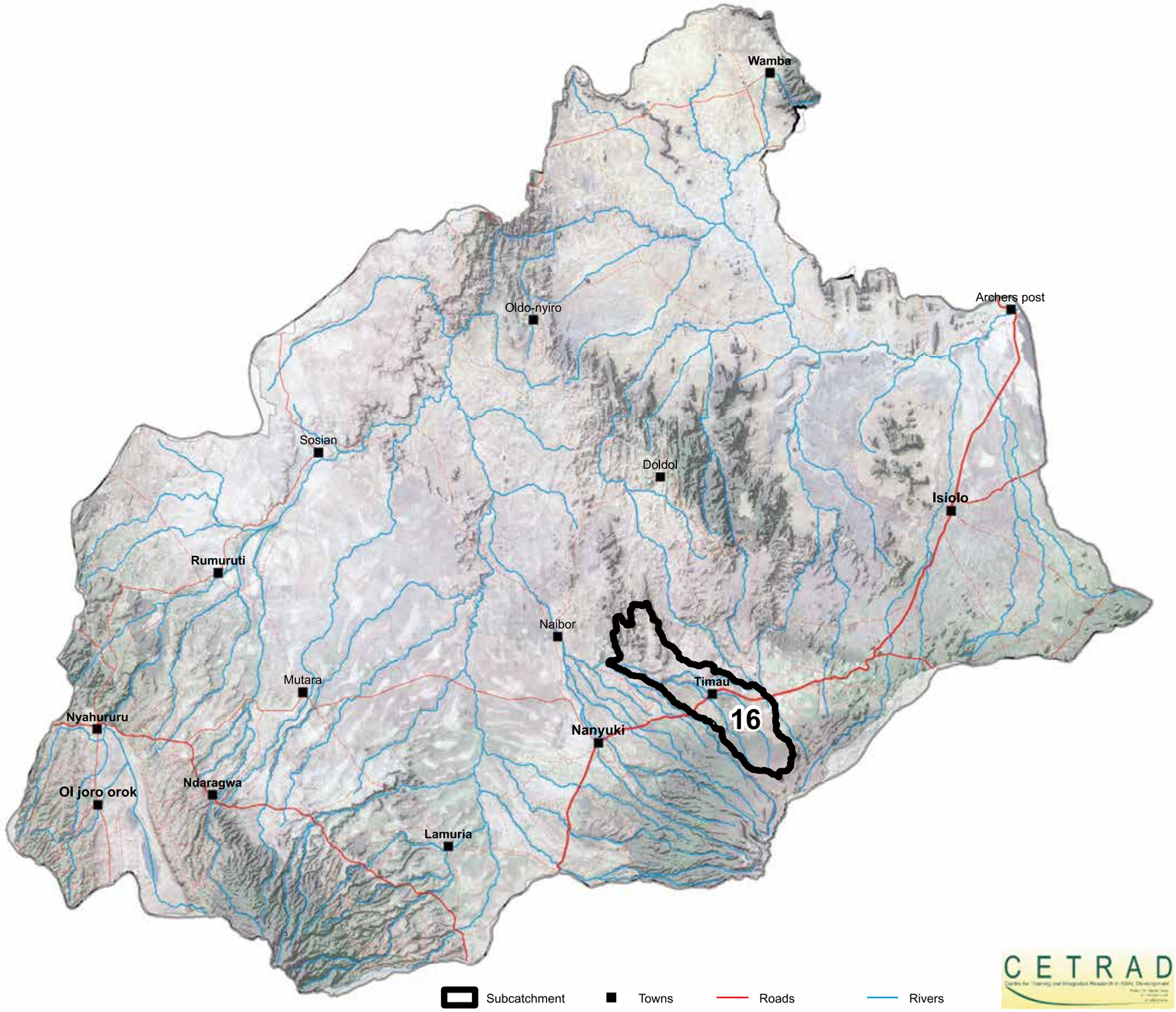
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Landcover information derived from Landsat Images 30m 2014.

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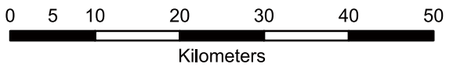
(*) Arid and Semi Arid Lands.

# 16 - Timau










CETRAD

# TIMAU SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Timau has a total area of 269 $Km^2$ with a combined population of 42,362 people living within eight sub locations (with an area of 1,018 $Km^2$) that are partly or completely within the sub catchment. About 20% under crops and settlements, 51% under grasslands, 11% under moorland and the remaining 18% of land is under forest.

### Climate

The climate varies from humid towards Mt. Kenya in the south east to a mixture of sub and semi humid around Timau town with the remaining areas in the North West having semi humid to semi arid type of climate.

### Education

There are six (6) secondary schools and about 36 primary schools; government sponsored (15), Private (12), Religious organizations (7) and Local Authority (2).

### Water Resource Users Association Information

### Ngusishi WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Ngusishi WRUA | | | | |
| Contact Address email, chairperson, phone | | Mr. Murithi Muturi- chairperson -0722172287<br>Mercy Kendi-NWRUA manager- 0724597472<br>Margret Kinanu- NWRUA manager-0726604420 | | | | |
| Date of Formation | | 1997 | | | | |
| Registration details | Social services | Registrar of societies Reg. No 22204 Date 24 March 2003 | | | | |
| | Attorney General office | 24th March 2003 | | | | |
| Membership | members | 16 | | | | |
| | Non members | 0 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 20 | 6 | 3 | 11 |
| River abstractions | | 4 | | | | |
| Main Reason of formation | | To solve conflict between the upper community farmers and the lower community ranchers | | | | |
| Objectives | | • To promote equitable sharing of the river water<br>• Promote legal water abstraction, provide forum for discussion and prevention of water conflicts<br>• Conservation of water catchment areas, ensure efficient and proper water use and sustainable abstraction<br>• Promoting dialogue between water users and government | | | | |
| Availability of sanctioning system | | Yes; elected chairman. By our by-laws and within the authority of the WRUA can enact it. We have controlling devices to control the water system | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | Ranches: 4, Conservation: None, Horticulture: 7 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Funding, Donations, Running of day to day activities in the office and field, Assist WRUA with expertise on certain areas. Assist with procurement of goods and services | | | | |
| Sources and Nature of Conflicts | | • Low flows in the dry season<br>• Prolonged drought or lack of rains<br>• Ignorance by few members<br>• Illegal abstraction | | | | |
| Problems Reported to the WRUA | | Illegal abstraction in the river<br>Large horticulture farms pumping water in their dam at night<br>Small scale farmers using pumps<br>Small scale farmers clearing bushes and cutting trees in the riparian lands<br>Blocking of pipes by small scale farmers | | | | |
| Unreported/unexpressed conflicts | | Vandalising of project property e.g. metal materials. Theft e.g. office motorbike was stolen from the office. Politics | | | | |
| Availability of conflict resolution guidelines | | Yes; by-laws and constitution drafted by members. Capacity building to communities which continues. Involvement of government officers. Arresting and suing in court of law. | | | | |

| | |
|---|---|
| Availability of conflict resolution skills and implementation | mobilising of communities in barazas. Involving experts through government agencies. Use of by-laws and constitution drafted by members |
| Challenges | Ignorance, lack of experts, Tribalism, Politics, Administrative boundaries, Finance, Illegal abstractors, Insufficient water throughout the year |
| Cases of conflicts dealt with | New boreholes within the catchment, Shallow well.<br>River pegging, illegal water abstraction, Pollution |
| Cases of conflicts unresolved and reasons | Cases in court of illegal abstraction due to weak laws governing WRUAs<br>River pegging due to lack of cooperation between land owners and WRUAs |
| Other activities the WRUA is engaged in | Fish rearing and engage in social works e.g. planting trees with flowers and forests<br>Assisting small scale farmers with drip kits<br>Assisting HIV positive affected/ infected people within the catchment e.g. buying water storage tank for them<br>initiating community tree nurseries for income generation |
| Achievements | Built a self-regulating weir, installation of measuring devices in all intakes,<br>Able to rent an office within Timau centre, employed seven people permanent, acquired a vehicle to run daily activities, Equipped the WRUA office with computers and laptops |
| Hindrances to achieve the goals of the WRUA | Ignorance by some members. Politics. Lack of finance. Prolonged drought |
| Advices to others | E-mail & website are very important for easier communication<br>WRUAs with offices are very easy to locate and have managers to run the day to day activities of the WRUA to avoid burdening of executive committee |
| Information and Data Available | Check on our website www.ngusishi.com or e-mail.Info@ngusishi.com |
| Person Responsible for data Collection | Chairman, managers, river scouts, project committees |
| Methods of Data Collection | Fieldwork, consultation of members, water sampling, use of GPS |
| Information and Data Needs | Meteorological data. River gauging equipment, Cadastral map of the catchment. Hydrological and geological survey |
| Period of Water Scarcity | Jan -April, August- Sept. |
| How is the problem of water scarcity solved | Rationing. Large farm to stop river abstraction into the dam. Sensitize communities on efficient way of water use. |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | WSTF – 2010 – Funds -3.8 M<br>LWF – 2010 - Financial support - 3 M<br>AL puckett - 2008-2011 - Financial support - 3.2 M<br>Ol-Donyo farm & Lolomarik farm – 2008 - Financial support - Each 750000<br>Batian flowers – 2011 - Office equipment - 50000 |
| Water Quality and cause of pollution | Untreated raw sewer from Ngusishi market |
| Existence of Wetlands and their status | Very few |
| Others | • unprotected, non-portable water for consumption<br>• With measuring devices, it is very easier to know water flow from the rivers and equitable distribution of water is achieved<br>• Inter community visits are very important to the WRUA members so that they can learn the importance of river flow around the year. Upper stream to downstream users<br>• Small scale farmers to be assisted in construction of small pans to store water which is becoming economical because they rear fish to sustain food in their home and also it is an income generating project |

# TIMAU SUBCATCHMENT

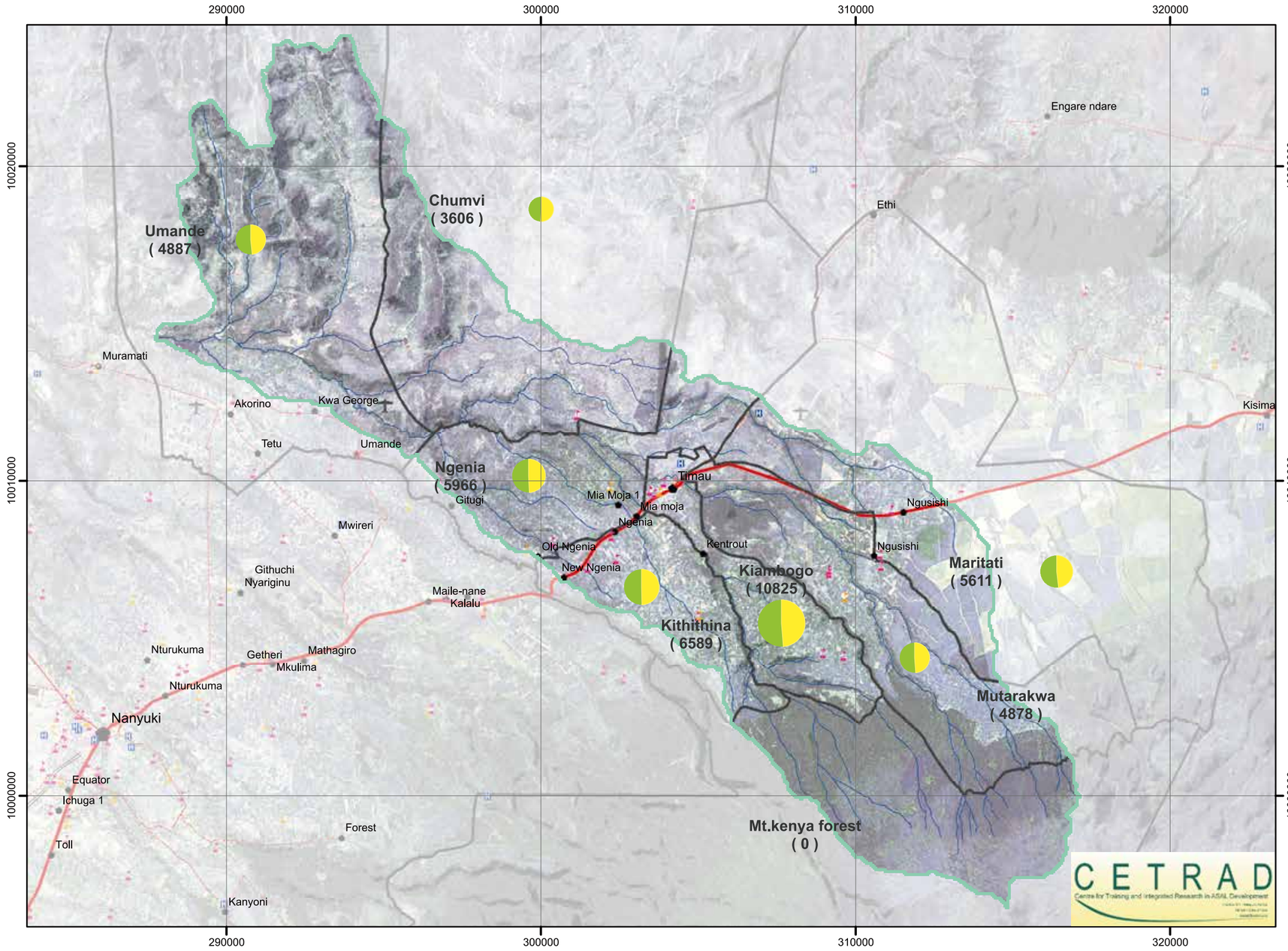
## Fact sheet. Date: July 2014

**Teleswani WRUA**

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Teleswani WRUA | | | | |
| Contact Address email, chairperson, phone | | 0722311612 | | | | |
| Date of Formation | | 2003 | | | | |
| Registration details | Social services | - | | | | |
| | Attorney General office | Reg.no. 23831 | | | | |
| Membership | members | 52 | | | | |
| | Non members | 0 | | | | |
| water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pan |
| | | 1 | 1 | many | many | 2 |
| River abstractions | | 50 | | | | |
| Main Reason of formation | | To regulate the river flow and resolve conflicts arising from the use of the resource | | | | |
| Objectives | | To promote good water management | | | | |
| Availability of sanctioning system | | Yes | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | One horticultural farm | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | None | | | | |
| Sources and Nature of Conflicts | | -inadequate water supply during the dry season. Not violent | | | | |
| Problems Reported to the WRUA | | -inadequate water supply(during dry season)<br>-cutting down of indigenous trees within the riparian areas | | | | |
| Unreported/unexpressed conflicts | | Abstractions points built close to each other have conflicts during the dry season due to water shortage | | | | |
| Availability of conflict resolution guidelines | | Yes | | | | |
| Availability of conflict resolution skills and implementation | | Conflict resolution and implementation remain a challenge to the WRUA | | | | |
| Challenges | | -Illiteracy of the members i.e. in relation to WRUA activities<br>-WRUA management lacks funds and skilled personnel | | | | |
| Cases of conflicts dealt with | | -Mwiguni- kithithina Umoja,-martin water projects<br>-Kanja- Mukuria water projects<br>-Maligari- maigene- Patrick water project | | | | |
| Cases of conflicts unresolved and reasons | | Nuhu water project refusal to ration water | | | | |
| Other activities the WRUA is engaged in | | Planting of trees in the riparian area | | | | |
| Achievements | | -Planted 16,500 indigenous trees<br>-Installed 10 measuring devices<br>-installed 10 controlling devices | | | | |
| Hindrances to achieve the goals of the WRUA | | Lack of awareness of the WRUA's responsibilities and unwillingness by members | | | | |
| Advices to others | | Have WRUA members informed on various activities and the responsibility of WRUA | | | | |
| Information and Data Available | | None | | | | |
| Person Responsible for data Collection | | None | | | | |
| Methods of Data Collection | | None | | | | |
| Information and Data Needs | | - | | | | |
| Period of Water Scarcity | | January - April | | | | |
| How is the problem of water scarcity solved | | By rationing | | | | |
| Institutional Support to WRUA<br><br>(Name, Year, Type of support, Amount of support) | | LWF- 2009 Indigenous seedlings, Measuring & controlling devices<br><br>WDC- Training, marking the riparian land, tree seedlings ( Indigenous -465000) | | | | |
| Water Quality and cause of pollution | | Upper Teleswani is good. Lower Teleswani polluted mainly by dumping at Maili Moja center | | | | |
| Existence of Wetlands and their status | | Yes- most of which are planted with Eucalyptus | | | | |
| Others | | | | | | |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Chumvi | 241 | 1,774 | 1,832 | 3,606 | 15 | 710 |
| Kiambogo | 18 | 5,553 | 5,272 | 10,825 | 588 | 3,613 |
| Kithithina | 23 | 3,324 | 3,265 | 6,589 | 288 | 1,754 |
| Maritati | 117 | 2,919 | 2,692 | 5,611 | 48 | 2,129 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Mutarakwa | 47 | 2,498 | 2,380 | 4,878 | 103 | 1,740 |
| Ngenia | 54 | 3,009 | 2,957 | 5,966 | 111 | 1,713 |
| Umande | 241 | 2,521 | 2,366 | 4,887 | 20 | 1,308 |
| **Totals** | **1,018** | **21,598** | **20,764** | **42,362** | **42** | **12,967** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Timau Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

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UTM Grid: 5 kilometres
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Meridian of Origin: 39° East of Greenwich
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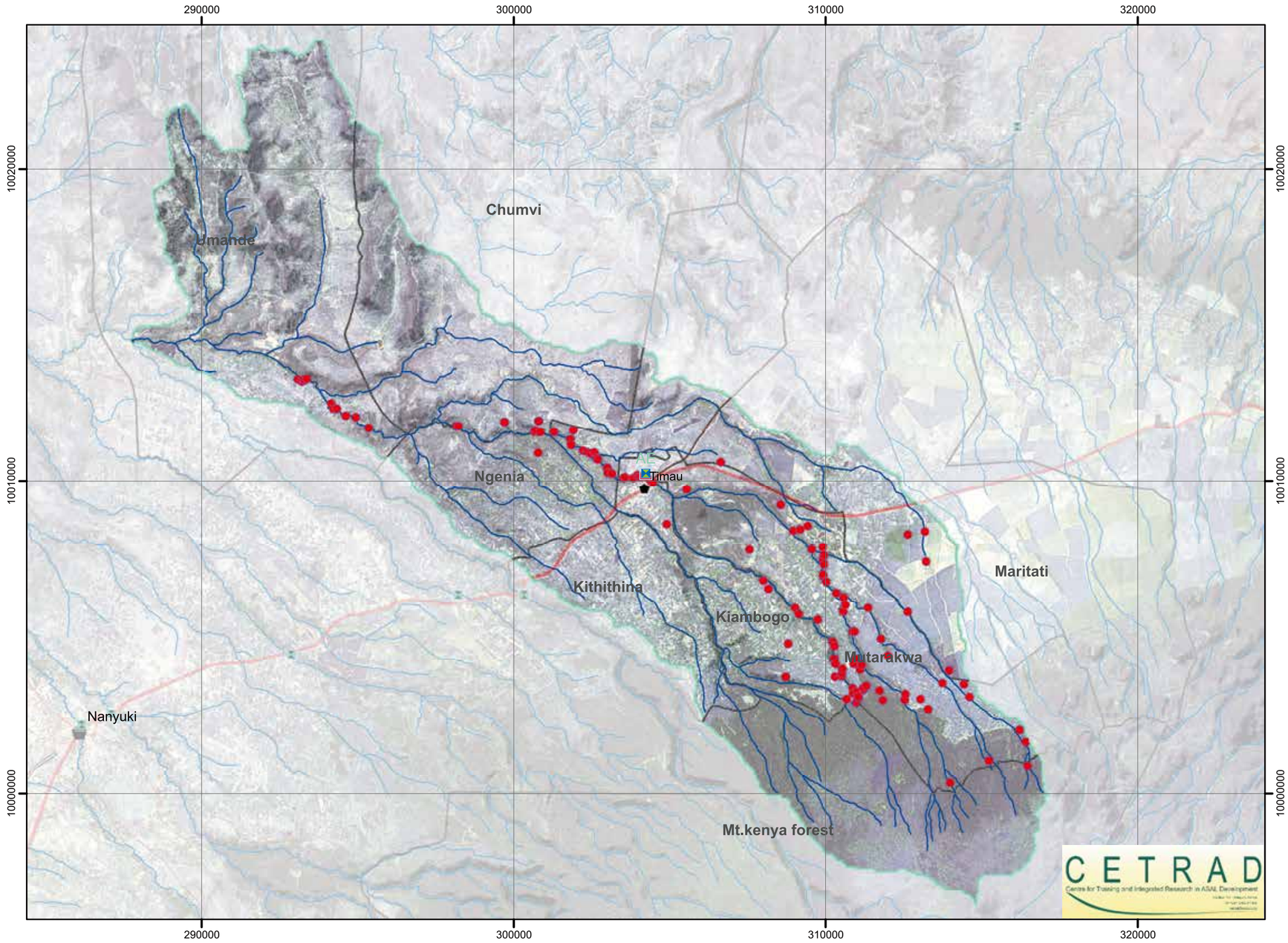
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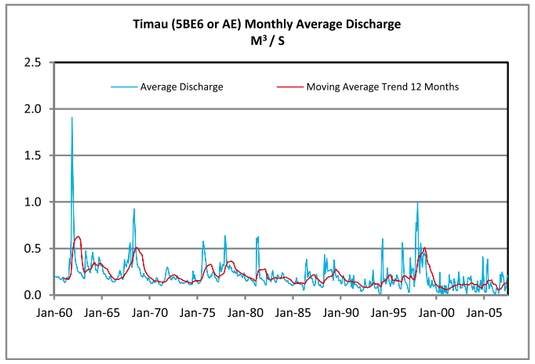
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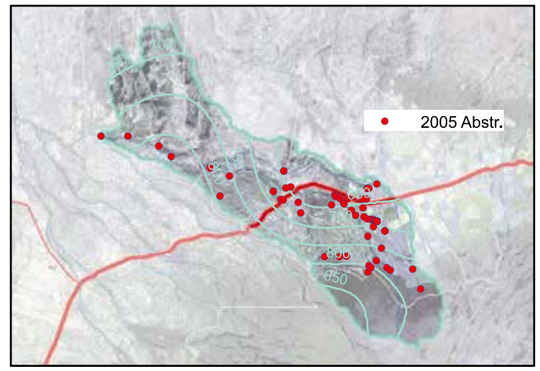




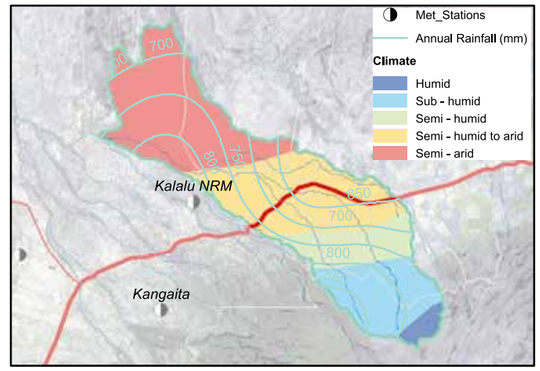

## Water Discharge Trends (AE)




## Abstraction Points (2005)




## Agro Climatic Zones




**Abstractions**

- Rivers

**Features & Boundaries**

- Rivers
- Timau RGS
- Other RGS
- Sublocations
- Subcatchment
- Wetlands

**Transport**

Roads

- A
- B
- C
- D
- E
- Railway Line

**Urban Settlements**

- District Hq
- Division Hq

## Timau Subcatchment

0 1 2 3 4 5 Kilometers

**1:140,000**

| | |
|---|---|
| Projection: | Universal Transverse Mercator |
| UTM Grid: | 5 kilometres |
| UTM Zone: | 37 |
| Meridian of Origin: | 39° East of Greenwich |
| Latitude of Origin: | Equator |
| Datum: | Arc 1960 |
| Reference Ellipsoid: | Clarke 1880 |
| X-Shift: | 500,000 |
| Y-Shift: | 10,000,000 |

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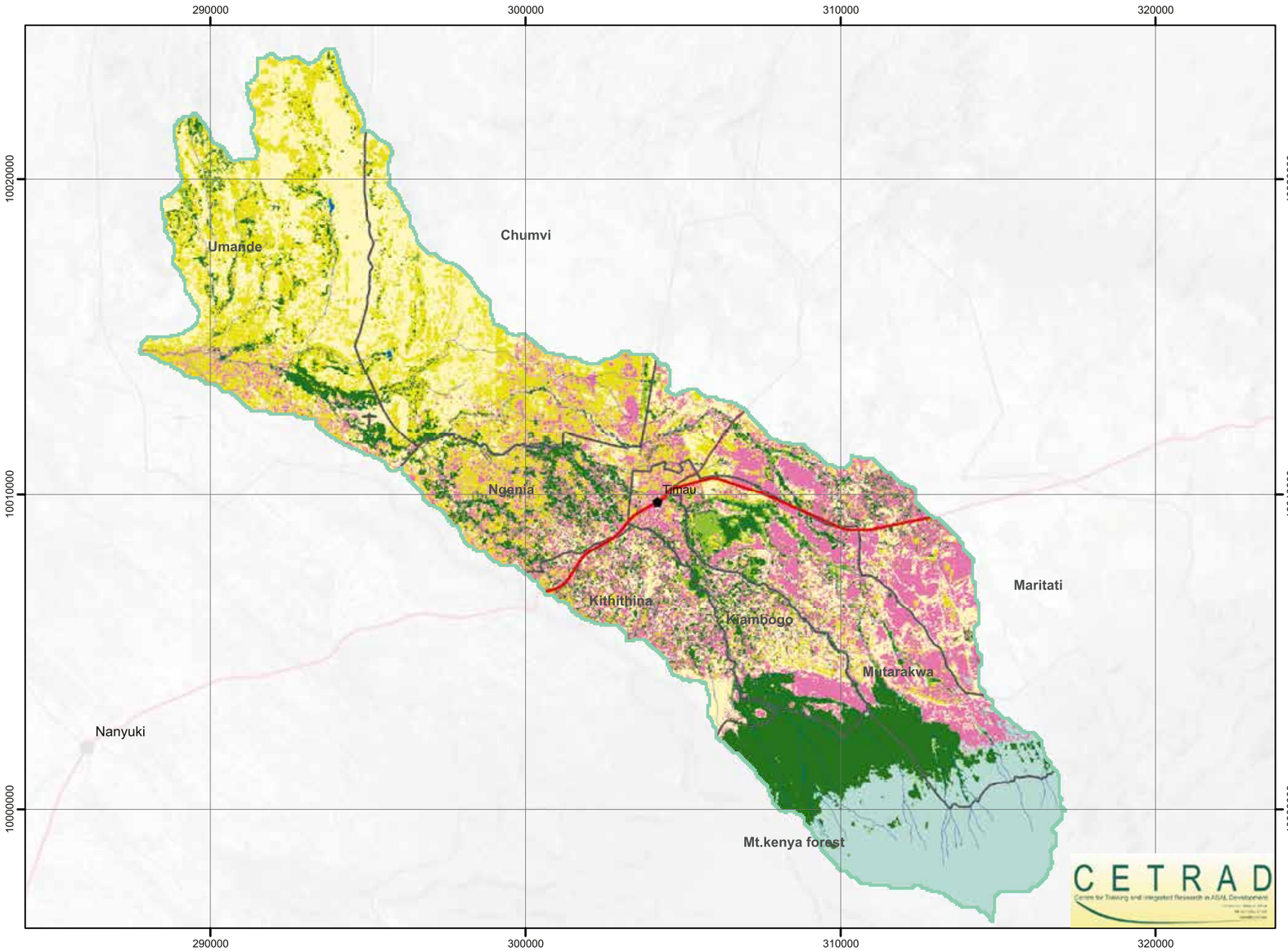
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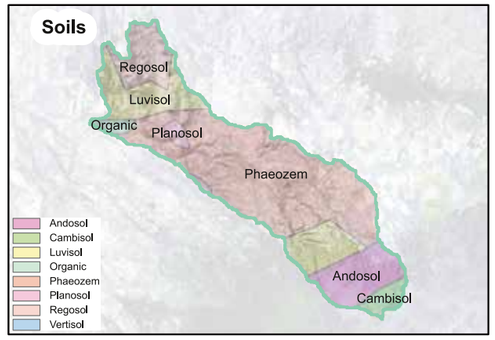
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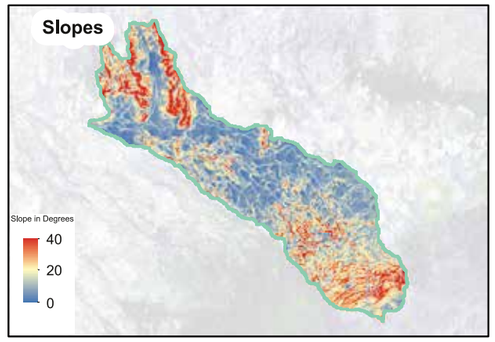
| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area Km² |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 8 |
| Sub-humid | High | 1,000 | 1,600 | 47 |
| Semi-humid | High to Medium | 800 | 1,400 | 33 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 83 |
| Semi-arid | Medium to Low | 450 | 900 | 98 |

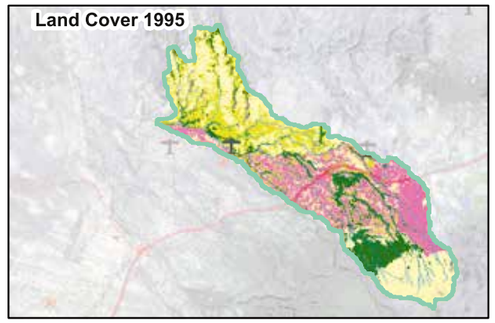
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 94.89 | 35.32 | 73.84 | 27.49 |
| Woody Grassland | 64.24 | 23.92 | 63.46 | 23.62 |
| Natural Forest | 38.79 | 14.44 | 44.48 | 16.56 |
| Planted Forest | _ | _ | 4.54 | 1.69 |
| Cropland | 68.51 | 25.50 | 52.67 | 19.61 |
| Moorland | _ | _ | 29.57 | 11.01 |
| Wastelands Rocks | 2.00 | 0.74 | _ | _ |
| Water | 0.19 | 0.07 | 0.07 | 0.03 |
| **Totals** | **268.63** | **100.00** | **268.63** | **100.00** |

**Land Cover (2014)**
- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**
- District Hq
- Division Hq

**Others**
- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**
- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Timau Subcatchment

0 1 2 3 4 5 Kilometers

1:140,000

Projection: Universal Transverse Mercator
UTM Grid: 5 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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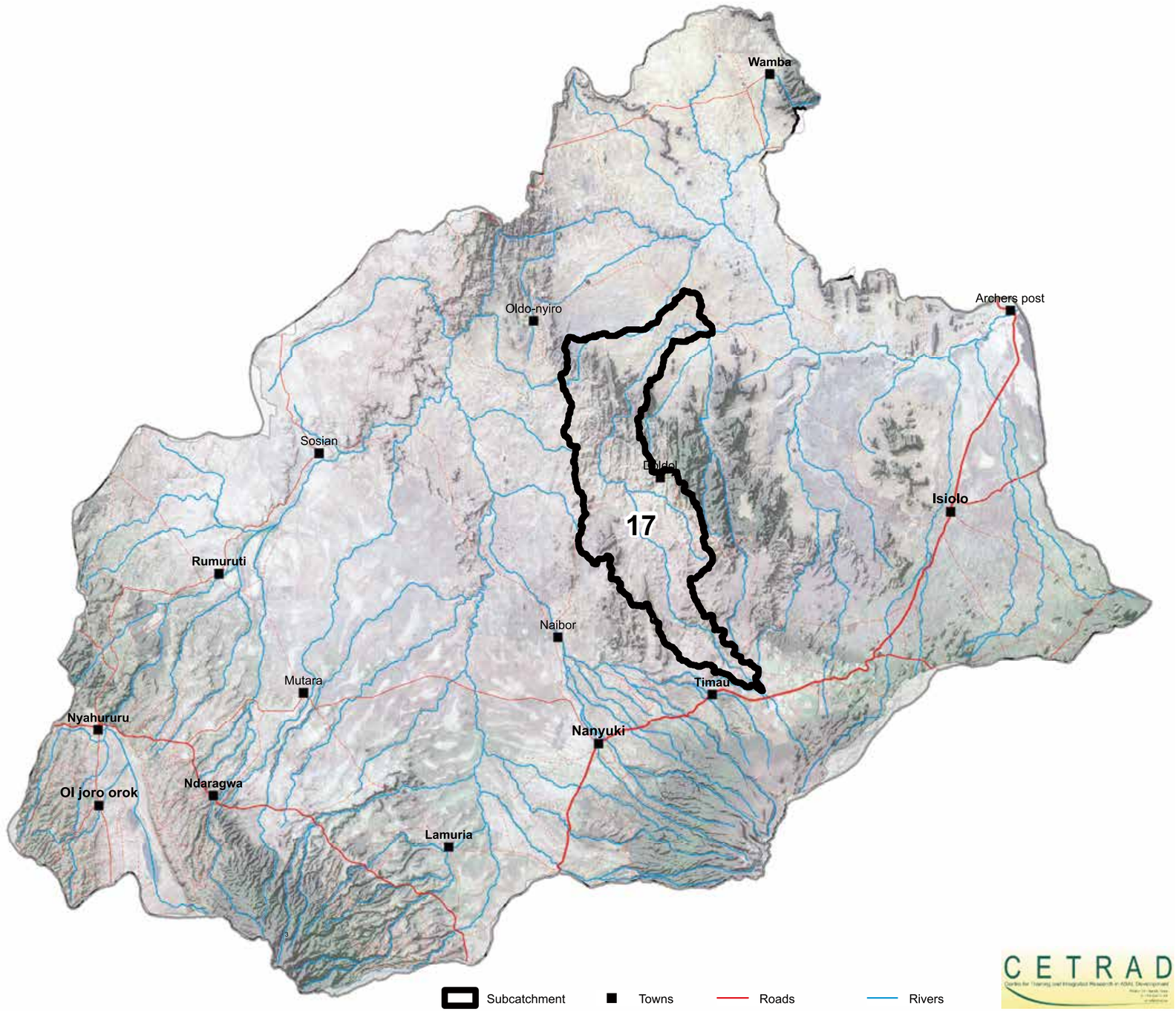
Linear features on this map are all part of CETRAD's comprehensive spatial database, which covers the Upper Ewaso Ngiro Basin, Laikipia, Mwingi and Makueni Districts, Nakuru Municipality, Kenya national data sets as well as other areas.

Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 17 - Sinyai


Wamba
Oldo-nyiro
Archers post
Sosian
Isiolo
17
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# SINYAI SUBCATCHMENT

## Fact sheet. Date: July 2014

**Introduction**

Sinyai has a total area of 793 $Km^2$ with a combined population of 54,530 people living within twelve (16) sub locations (with an area of 2,828$Km^2$) that are partly or completely within the sub catchment. About 96% is under grasslands, 3% of land is under forest and the remaining 1% under crops and settlements.

**Climate**

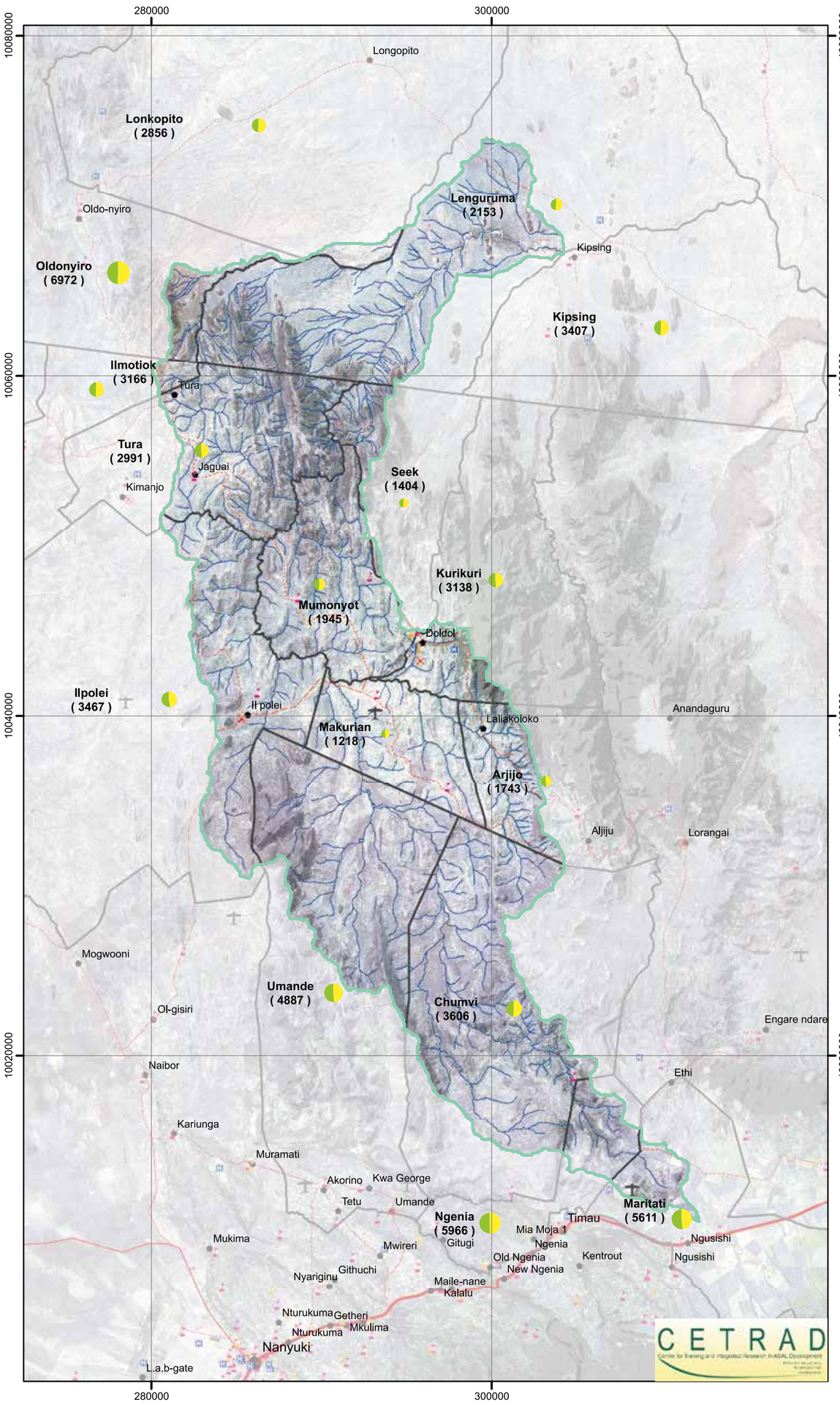
The climate of this sub catchment varies mainly from semi-humid to semi arid

**Education**

There are two (2) secondary schools and five (8) primary schools; sponsored by government (5) and Religious organizations (3).

# Population Numbers (2009) and Socio Infrastructure

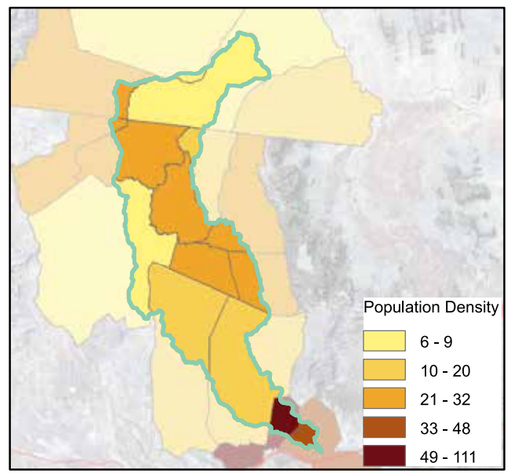





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Arjijo | 77 | 918 | 825 | 1,743 | 23 | 272 |
| Chumvi | 241 | 1,774 | 1,832 | 3,606 | 15 | 710 |
| Ilmotiok | 100 | 1,558 | 1,608 | 3,166 | 32 | 473 |
| Ilpolei | 384 | 1,819 | 1,648 | 3,467 | 9 | 793 |
| Kipsing | 205 | 1,665 | 1,742 | 3,407 | 17 | 745 |
| Kurikuri | 133 | 1,633 | 1,505 | 3,138 | 24 | 705 |
| Lenguruma | 336 | 1,031 | 1,122 | 2,153 | 6 | 473 |
| Lonkopito | 366 | 1,406 | 1,450 | 2,856 | 8 | 587 |
| Makurian | 54 | 605 | 613 | 1,218 | 23 | 223 |
| Maritati | 117 | 2,919 | 2,692 | 5,611 | 48 | 2,129 |
| Mumonyot | 76 | 958 | 987 | 1,945 | 26 | 350 |
| Ngenia | 54 | 3,009 | 2,957 | 5,966 | 111 | 1,713 |
| Oldonyiro | 255 | 3,444 | 3,528 | 6,972 | 27 | 1,348 |
| Seek | 72 | 694 | 710 | 1,404 | 20 | 265 |
| Tura | 118 | 1,562 | 1,429 | 2,991 | 25 | 478 |
| Umande | 241 | 2,521 | 2,366 | 4,887 | 20 | 1,308 |
| **Totals** | **2,828** | **27,516** | **27,014** | **54,530** | **19** | **12,572** |

## Population Density 2009




### Population & Sex Ratio
- Female
- Male

### Urban Settlements
- District Hq
- Division Hq
- Others

### Socio Infrastructure
- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others
- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport
Roads
- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Sinyai Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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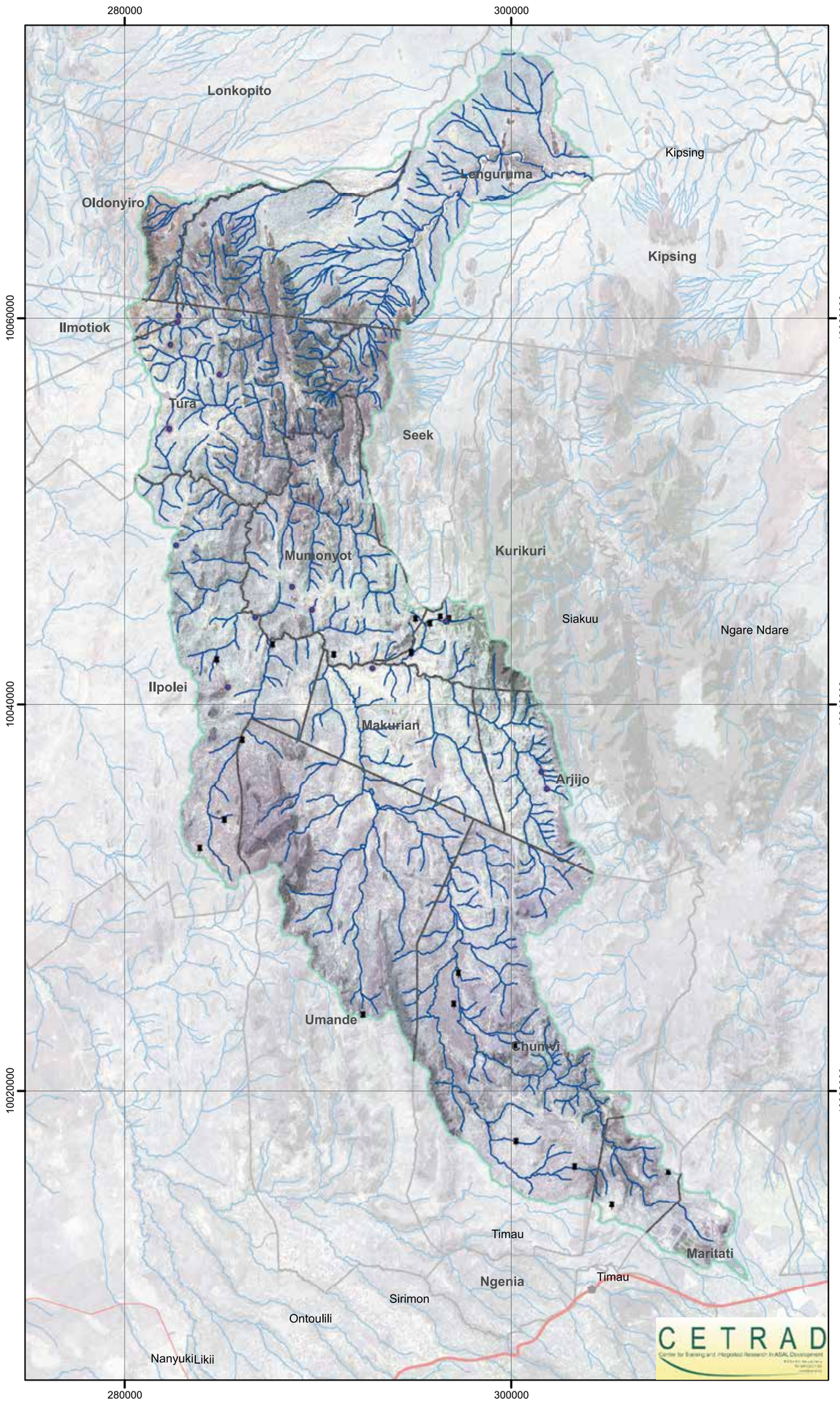
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

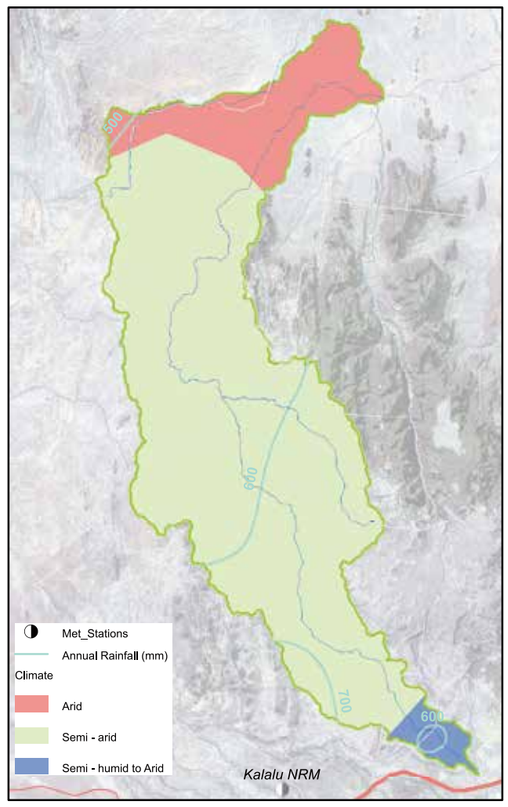
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)






## Agro Climatic Zones




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 22 |
| Semi-arid | Medium to Low | 450 | 900 | 651 |
| Arid | Low | 300 | 550 | 121 |

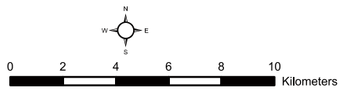
### Abstractions
- Dams
- Bore Holes

### Features & Boundaries
- Rivers
- Sinyai RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

### Transport
Roads
- A
- B
- C
- Railway Line

### Urban Settlements
- **District Hq**
- **Division Hq**

## Sinyai Subcatchment




1:220,016

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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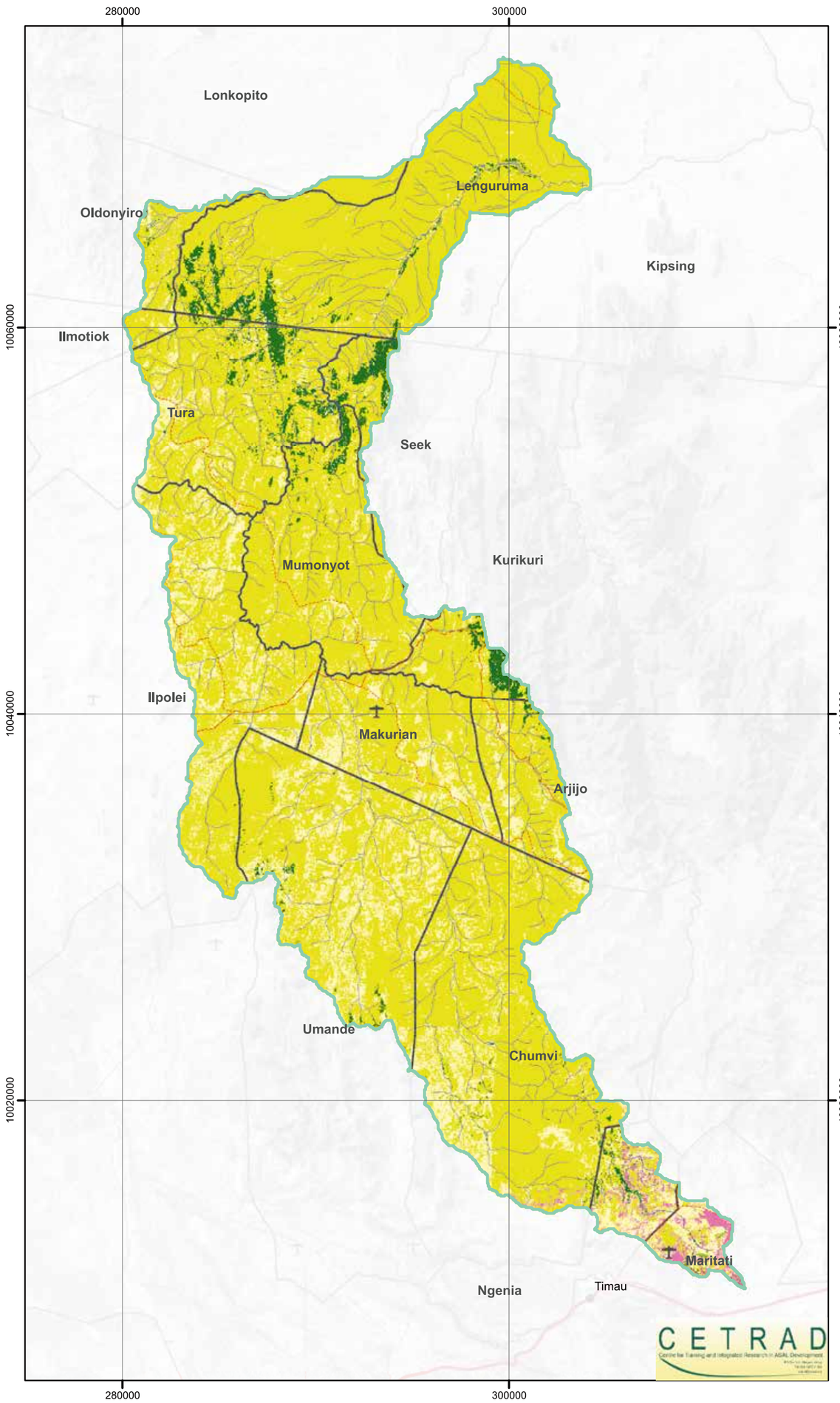
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

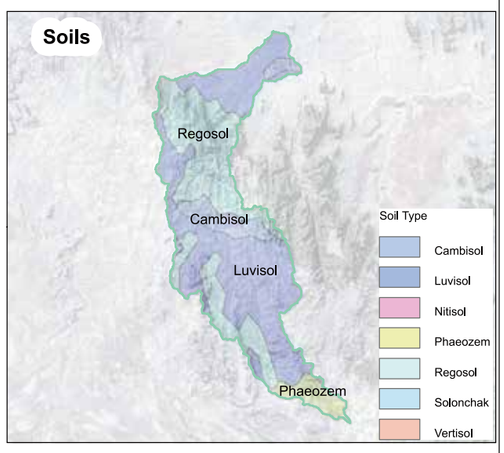
The background image: SRTM 30m.

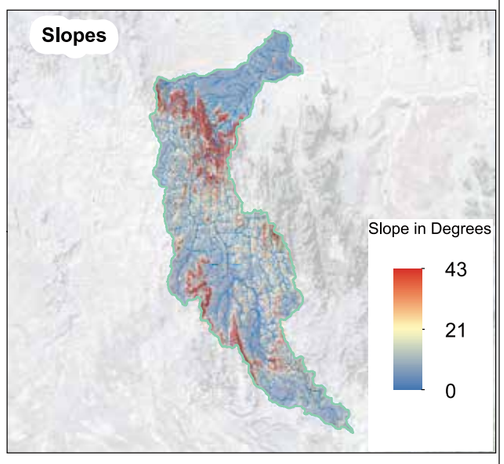
(*) Arid and Semi Arid Lands.

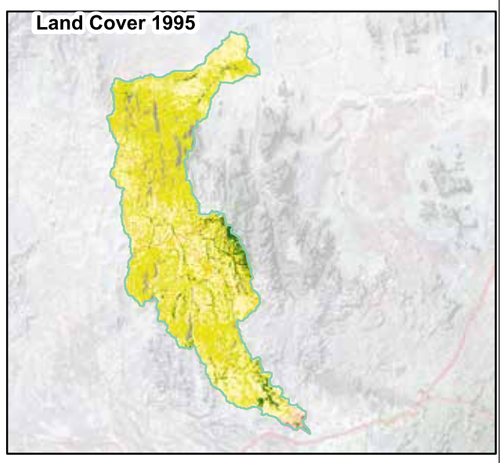
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 255.83 | 32.25 | 123.65 | 15.59 |
| Woody Grassland | 477.51 | 60.19 | 637.23 | 80.32 |
| Natural Forest | 28.19 | 3.55 | 23.87 | 3.01 |
| Planted Forest | | | 0.37 | 0.05 |
| Cropland | 3.96 | 0.50 | 7.57 | 0.95 |
| Wastelands Rocks | 27.64 | 3.48 | 0.42 | 0.05 |
| Moorland | | | 0.05 | 0.01 |
| Water | 0.20 | 0.03 | 0.15 | 0.02 |
| Others | | | 0.01 | 0.00 |
| **Totals** | **793.32** | **100.00** | **793.32** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads

- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Sinyai Subcatchment

0 2 4 6 8 10 Kilometers

1:219,798

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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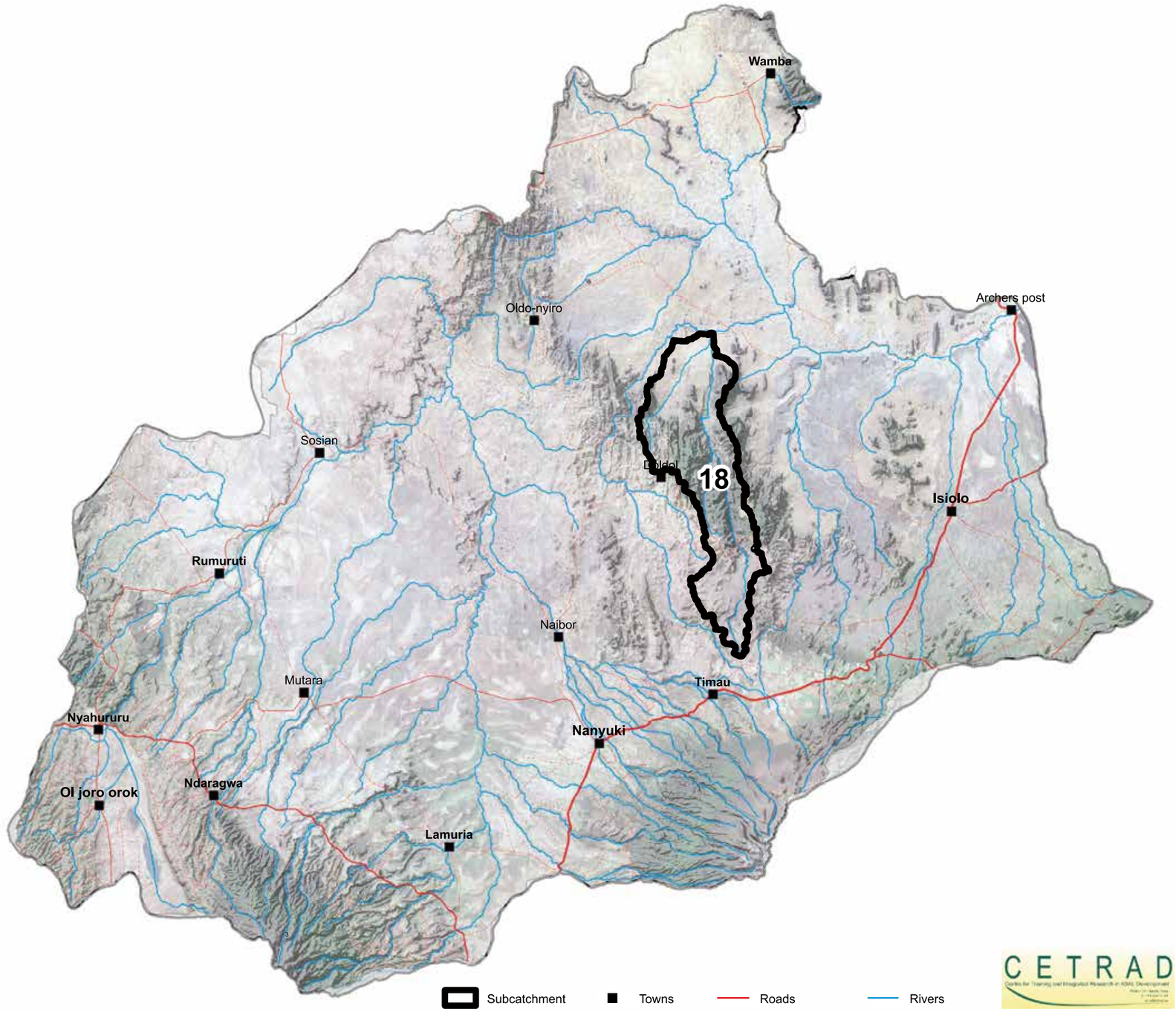
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 18 - Siakuu


Wamba
Oldo-nyiro
Archers post
Sosian
Eldol
18
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# SIAKUU SUBCATCHMENT

## Fact sheet. Date: July 2014

**Introduction**

Siakuu has a total area of 477 $Km^2$ with a combined population of 33,321 people living within twelve (12) sub locations (with an area of 1,691$Km^2$) that are partly or completely within the sub catchment. About 71% is under grasslands, 28% under forest and the remaining 1% under crops and water.

**Climate**

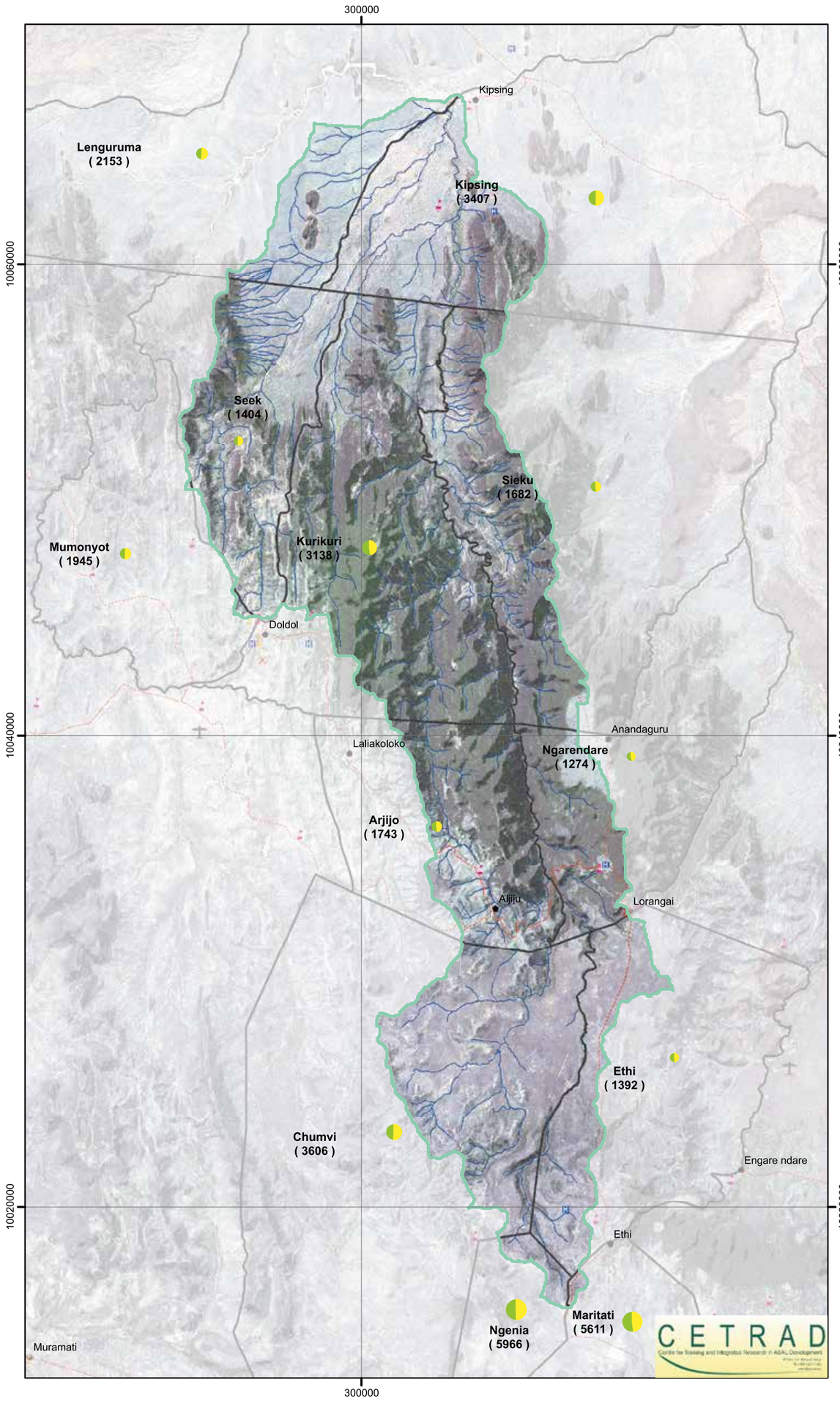
The climate of this sub catchment varies mainly from semi-humid to semi arid

**Education**

There are 5 primary schools; government sponsored (1) and Religious organizations (4).

# Population Numbers (2009) and Socio Infrastructure

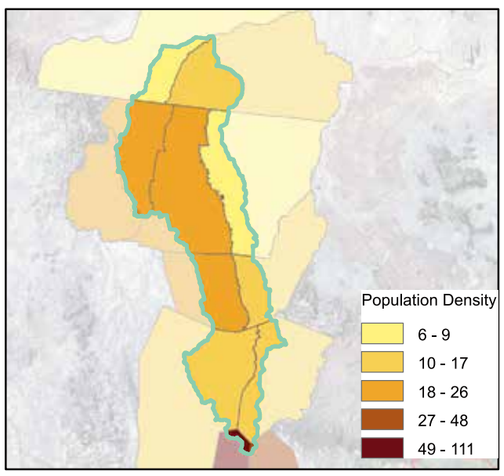





**Population Numbers 2009**

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Arjijo | 77 | 918 | 825 | 1,743 | 23 | 272 |
| Chumvi | 241 | 1,774 | 1,832 | 3,606 | 15 | 710 |
| Ethi | 107 | 712 | 680 | 1,392 | 13 | 382 |
| Kipsing | 205 | 1,665 | 1,742 | 3,407 | 17 | 745 |
| Kurikuri | 133 | 1,633 | 1,505 | 3,138 | 24 | 705 |
| Lenguruma | 336 | 1,031 | 1,122 | 2,153 | 6 | 473 |
| Maritati | 117 | 2,919 | 2,692 | 5,611 | 48 | 2,129 |
| Mumonyot | 76 | 958 | 987 | 1,945 | 26 | 350 |
| Ngarendare | 90 | 682 | 592 | 1,274 | 14 | 250 |
| Ngenia | 54 | 3,009 | 2,957 | 5,966 | 111 | 1,713 |
| Seek | 72 | 694 | 710 | 1,404 | 20 | 265 |
| Sieku | 184 | 871 | 811 | 1,682 | 9 | 354 |
| **Totals** | **1,691** | **16,866** | **16,455** | **33,321** | **20** | **8,348** |

**Population Density 2009**




**Population & Sex Ratio**

- Female
- Male

**Urban Settlements**

- District Hq
- Division Hq
- Others

**Socio Infrastructure**

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Siakuu Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:180,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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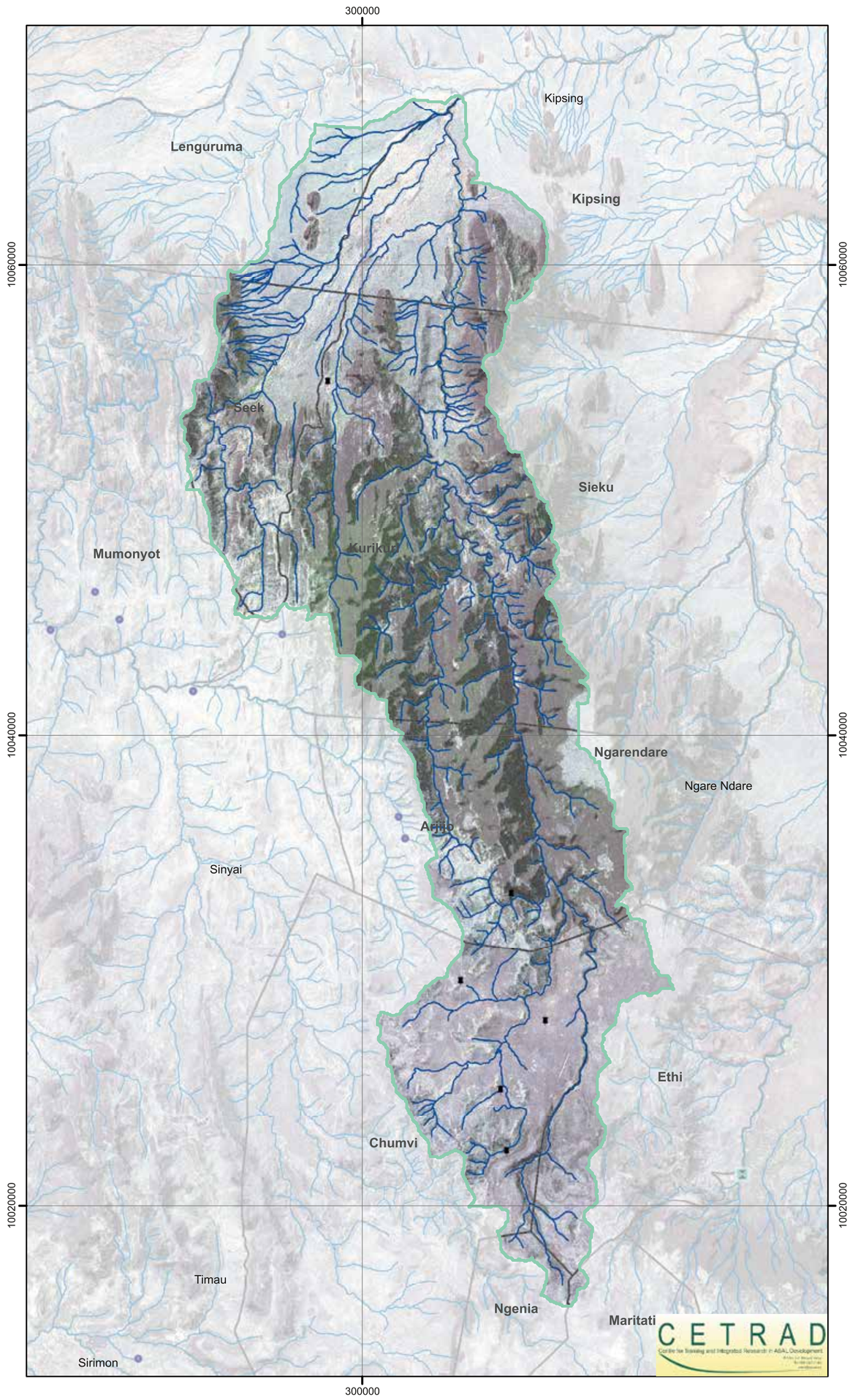
Demographic data was sourced from KNBS 2009 National Census.

The background image: SRTM 30m.

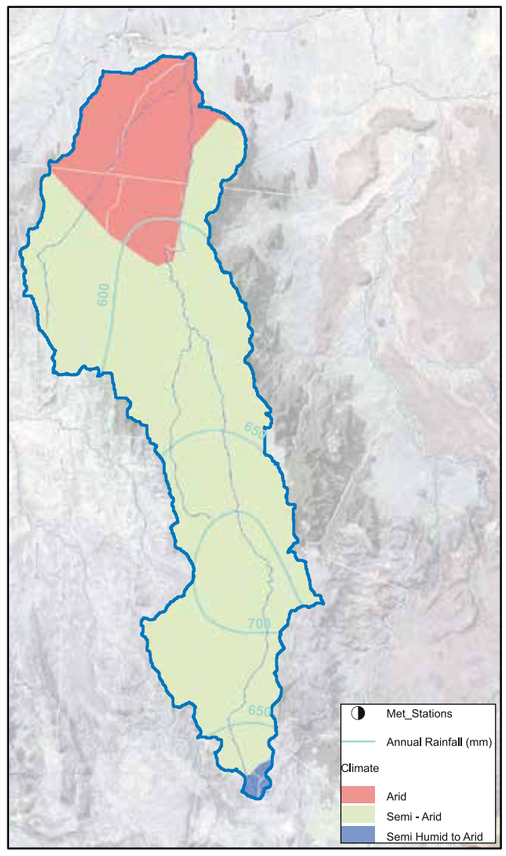
(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)






## Agro Climatic Zones




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 3 |
| Semi-arid | Medium to Low | 450 | 900 | 375 |
| Arid | Low | 300 | 550 | 98 |

**Abstractions**
- Dams
- Bore Holes

**Features & Boundaries**
- Rivers
- Siakuu RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

Roads
- A
- B
- C
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Siakuu Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:180,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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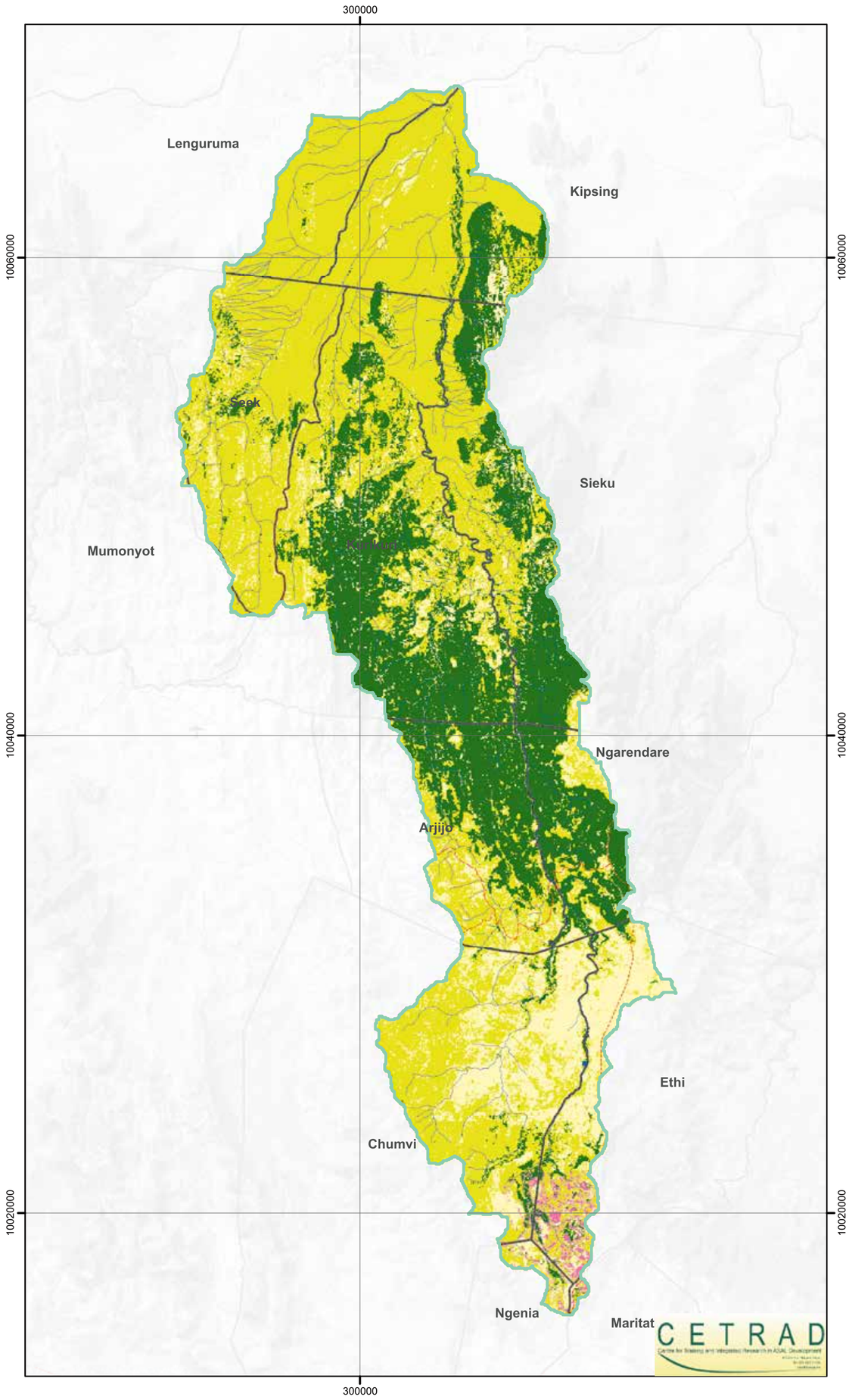
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

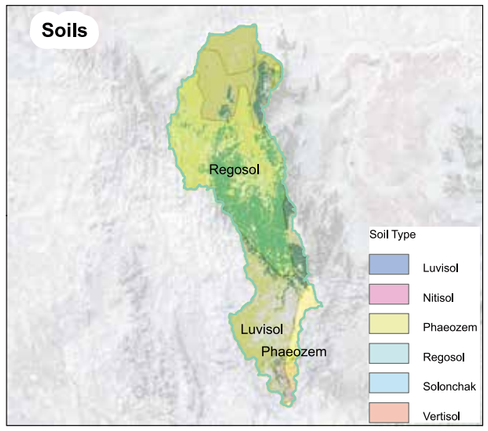
The background image: SRTM 30m.

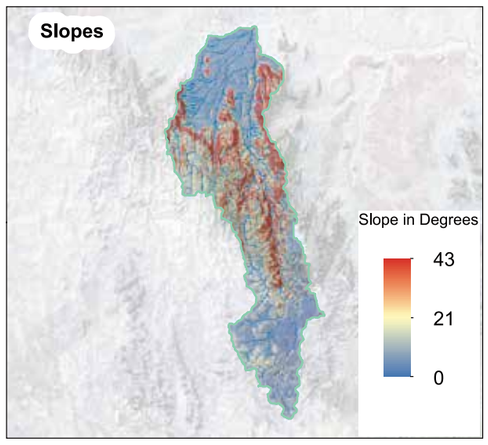
(*) Arid and Semi Arid Lands.

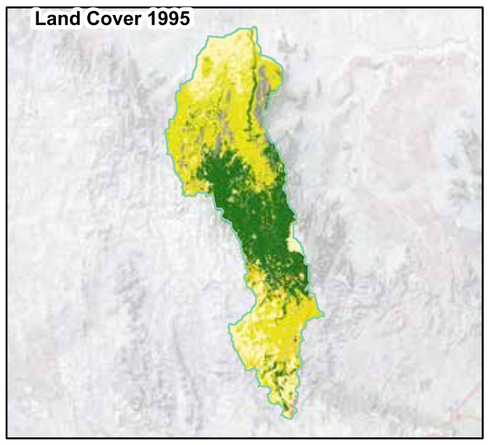
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 93.54 | 19.63 | 76.08 | 15.96 |
| Woody Grassland | 215.33 | 45.19 | 262.54 | 55.09 |
| Natural Forest | 139.32 | 29.23 | 133.38 | 27.99 |
| Planted Forest | | | 0.10 | 0.02 |
| Cropland | 2.48 | 0.52 | 4.28 | 0.90 |
| Wastelands Rocks | 25.65 | 5.38 | 0.03 | 0.01 |
| Water | 0.23 | 0.05 | 0.10 | 0.03 |
| Others | | | 0.05 | 0.01 |
| **Totals** | **476.56** | **100.00** | **476.56** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Siakuu Subcatchment

0 2 4 6 8 10 Kilometers

1:177 390 ,

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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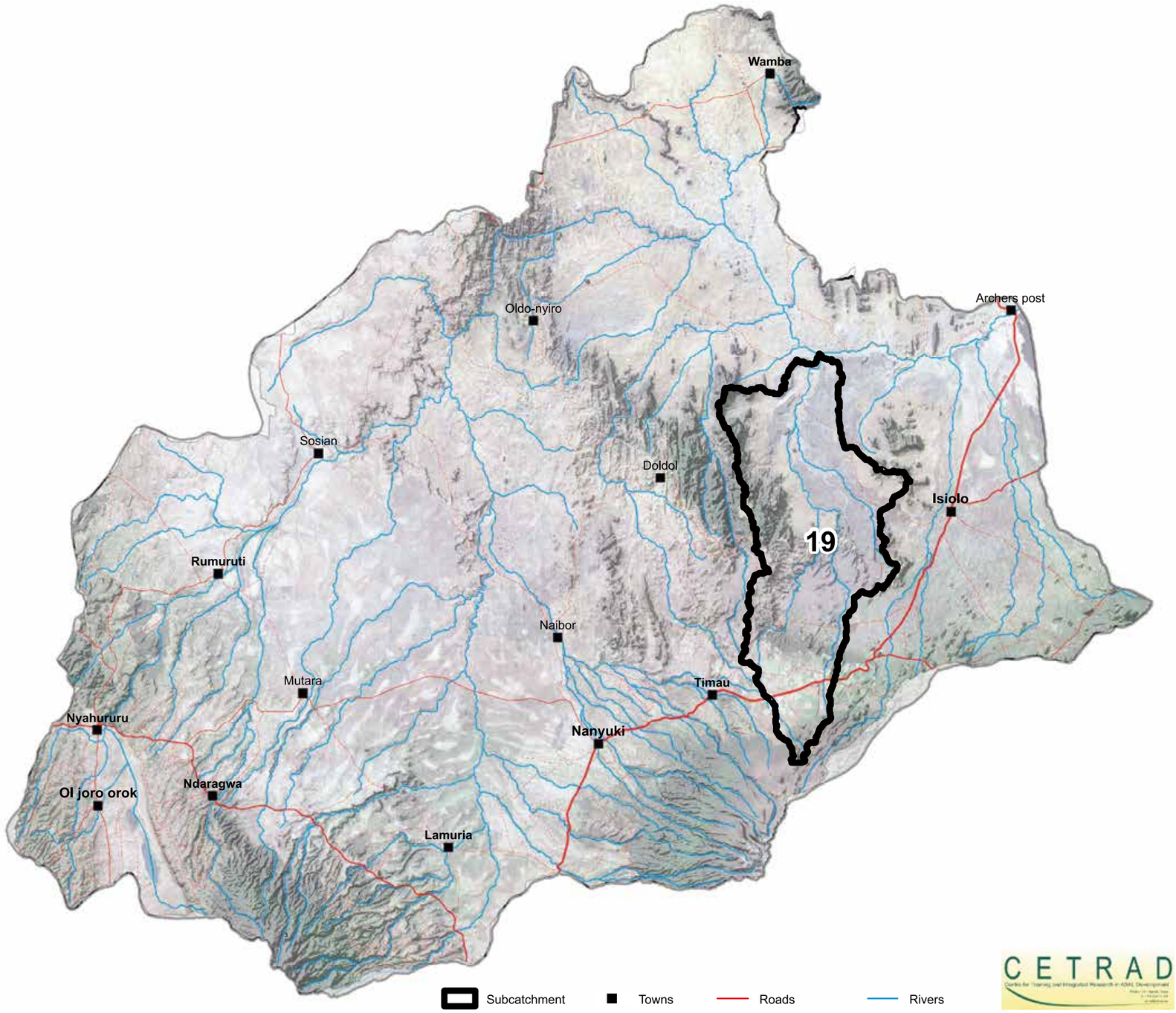
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 19 - Ngare Ndare




N
W E
S

0 5 10 20 30 40 50
Kilometers

Subcatchment  Towns  Roads  Rivers

CETRAD

# NGARE NDARE SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Ngare Ndare has a total area of 1,013 $Km^2$ with a combined population of 52,242 people living within seventeen sub locations (with an area of 2,757 $Km^2$) that are partly or completely within the sub catchment. About 7% is under crops and settlements, 75% under grasslands, 15% under forest and 3% under moorland, water and wastelands rocks.

### Climate

The climate in this sub-catchment varies from humid at the foot of Mt. Kenya in the south to arid and semi-arid, which covers over 80% of the area.

### Education

There are two (2) secondary schools and about 28 primary schools; government sponsored (10), Private (2) and Religious organizations (13), Community (1) and Local Authority (2).

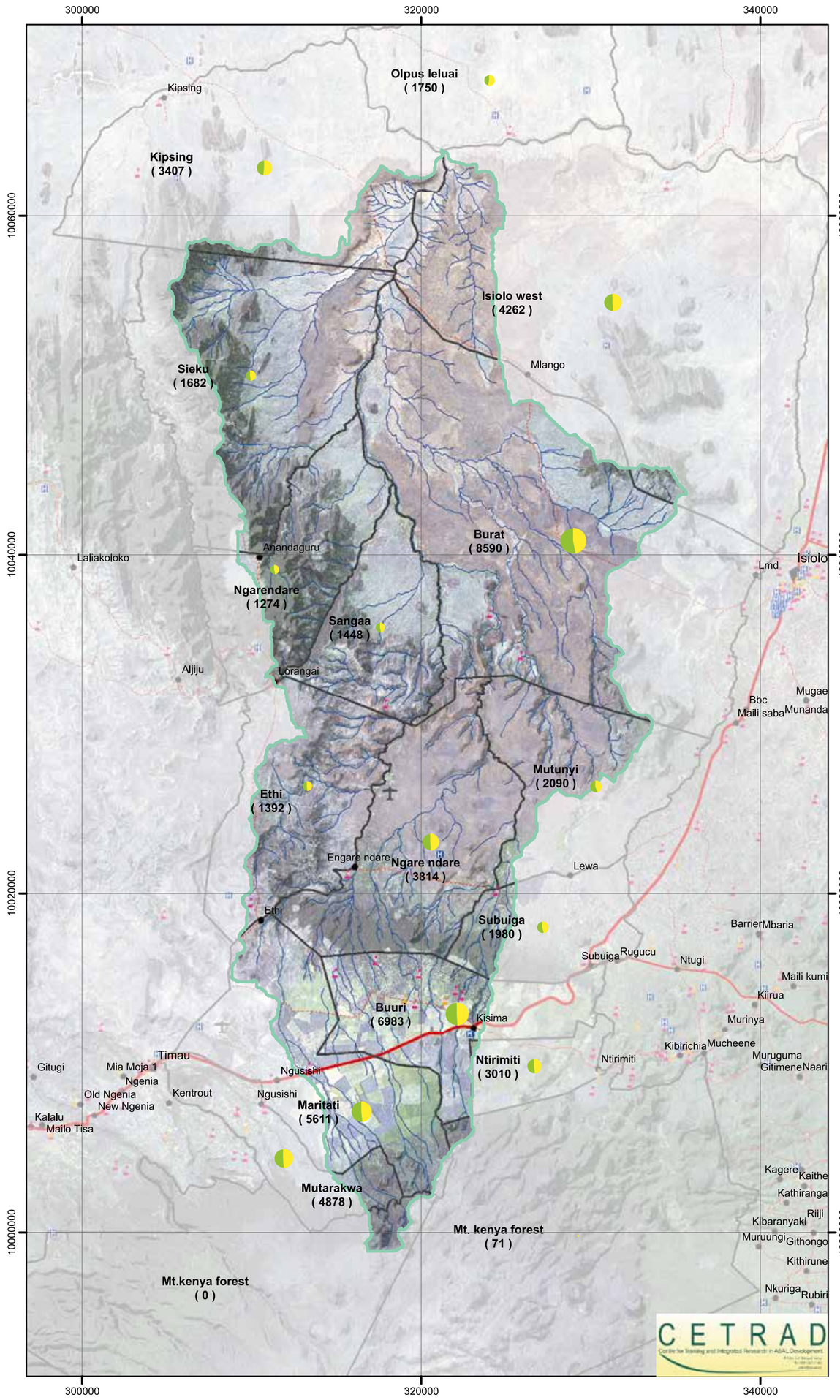
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Ngare Ndare WRUA | | | | |
| Contact Address email, chairperson, phone | | John Harris<br>Afriorganic @ mwananch.com | | | | |
| Date of Formation | | 1996 | | | | |
| Registration details | Social services | Registration No. 4787 | | Date: 7/08/2001 | | |
| | Attorney General office | Registration No. 25154 | | Date: 4/11/2004 | | |
| Membership details | members | 17 | | | | |
| | Non members | 10 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 12 | 9 | 1 | 4 |
| River Abstractions | | 12 | | | | |
| Main Reason for the formation | | To solve various water conflicts between water users especially upstream farmers and downstream pastoralists | | | | |
| Objectives | | To promote controlled and legal water use<br>To safeguard reserve flows for downstream domestic requirements<br>To promote education for sustainable development | | | | |
| Availability of sanctioning system | | - | | | | |
| Number of Large Scale (Ranches, Conservancies Horticulture others ) Farms | | Horticulture farms 3<br>Large scale ranches 1 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Funding WRUA activities and operations | | | | |
| Sources and Nature of Conflicts | | Water conflict is experienced when downstream pastoralists do not access water | | | | |
| Problems Reported to the WRUA | | - Illegal abstractions<br>- Unexploited water sources<br>- Catchment degradation | | | | |
| Unreported/unexpressed conflicts | | None | | | | |
| Availability of conflict resolution guidelines | | Conflict management task force has been formed to solve conflict | | | | |
| Availability of conflict resolution skills and implementation | | - | | | | |

| | |
|---|---|
| Challenges | 1. tribalism<br>2. The river has been over abstracted so water rationing is practical<br>3. inadequate funds to pay employees' salaries and transport costs |
| Cases of conflicts dealt with | Downstream people were not accessing enough water and WRUA started water rationing |
| Cases of conflicts unresolved and reasons | None |
| Other activities the WRUA is engaged in | 1. Planting trees in riparian areas<br>2. Doing abstraction survey for all projects<br>3. Encroachment of wetlands |
| Achievements | 60% of trees are planted along riparian<br>Through fencing of wetlands, springs are protected |
| Hindrances to achieve the goals of the WRUA | 1. Inadequate enforcement of WRUA constitution<br>2. Inadequate capacity among committee members |
| Advices to others | All WRUA should protect their catchment and plant trees that are friendly to environment |
| Information and Data Available | Ngare ndare WRUA has a subcatchment plan and abstraction survey booklet for 1998 |
| Person Responsible for data Collection | Executive officer |
| Methods of Data Collection | Through GPS |
| Information and Data Needs | There is need to take data regularly because of illegal abstractors |
| Period of Water Scarcity | Water is usually scarce between august and October |
| How is the problem of water scarcity solved | The problem of water scarcity is done through water rationing in all projects |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Water Service Trust Fund, 2008, Kshs. 498000 |
| Water Quality and cause of pollution | Water quality has been threatened because springs that feed Ngare Ndare river are more encroached , clothe washing in the river is common -cause of pollution |
| Existence of Wetlands and their status | Wetlands exist in Ngare Ndare forest and have been encroached by Ngare Ndare forest trust |
| Others | The other wetlands found in Ngare Ndare village is well protected and it's a source of 3 springs used by community |

# Population Numbers (2009) and Socio Infrastructure






## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Burat | 346 | 4,580 | 4,010 | 8,590 | 25 | 1,640 |
| Buuri | 84 | 3,571 | 3,412 | 6,983 | 83 | 2,051 |
| Ethi | 107 | 712 | 680 | 1,392 | 13 | 382 |
| Isiolo west | 397 | 2,163 | 2,099 | 4,262 | 11 | 1,004 |
| Kipsing | 205 | 1,665 | 1,742 | 3,407 | 17 | 745 |
| Maritati | 117 | 2,919 | 2,692 | 5,611 | 48 | 2,129 |
| Mt. kenya forest | 352 | 47 | 24 | 71 | 0 | 30 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Mutarakwa | 47 | 2,498 | 2,380 | 4,878 | 103 | 1,740 |
| Mutunyi | 99 | 1,175 | 915 | 2,090 | 21 | 695 |
| Ngare ndare | 123 | 1,942 | 1,872 | 3,814 | 31 | 1,066 |
| Ngarendare | 90 | 682 | 592 | 1,274 | 14 | 250 |
| Ntirimiti | 29 | 1,588 | 1,422 | 3,010 | 102 | 841 |
| Olpus leluai | 176 | 809 | 941 | 1,750 | 10 | 335 |
| Sangaa | 68 | 794 | 654 | 1,448 | 21 | 236 |
| Sieku | 184 | 871 | 811 | 1,682 | 9 | 354 |
| Subuiga | 57 | 1,061 | 919 | 1,980 | 34 | 650 |
| **Totals** | **2,757** | **27,077** | **25,165** | **52,242** | **19** | **14,148** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads

- A
- B
- C
- D
- E
- Railway Line
- Airfields

## Ngare Ndare Subcatchment




1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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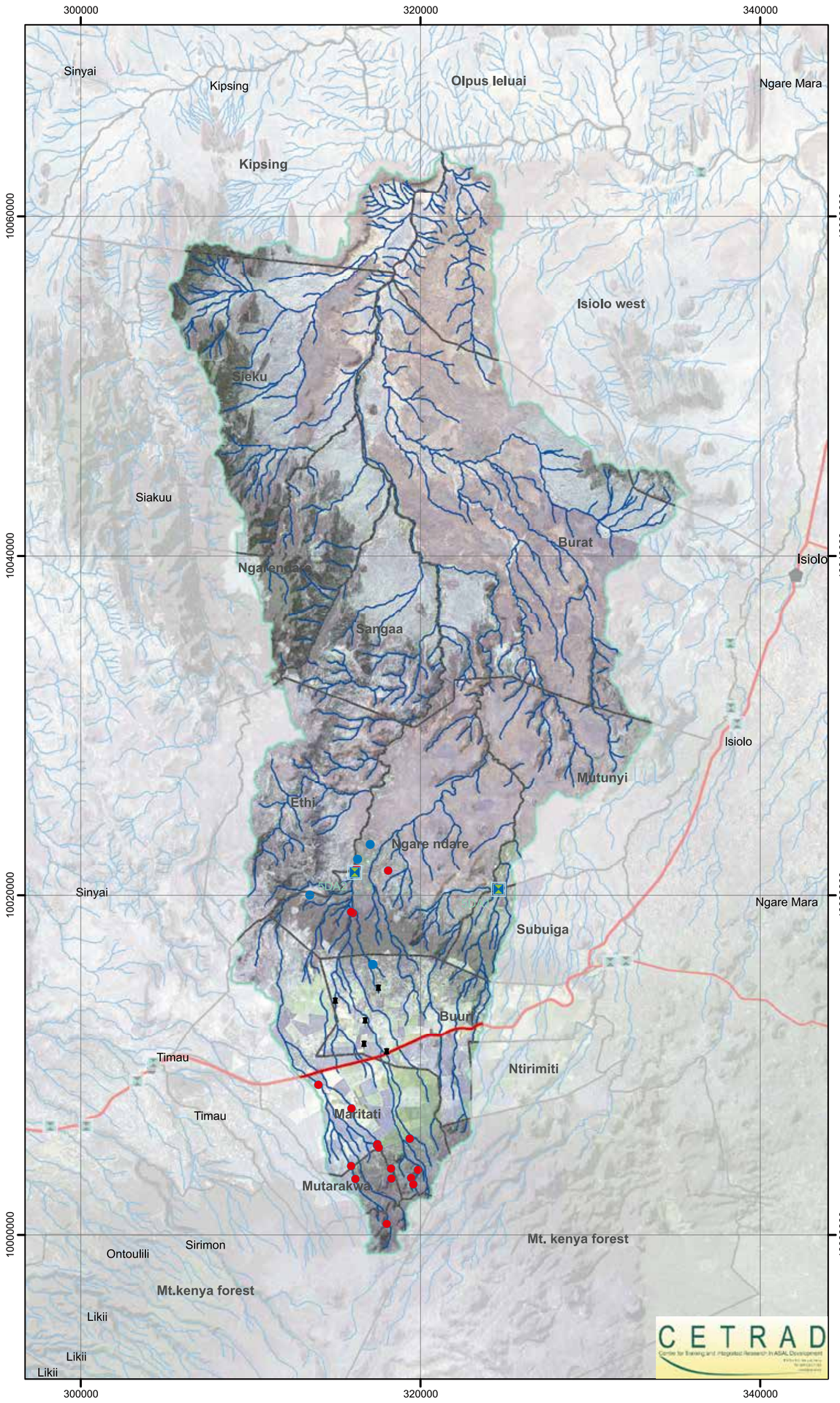
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Demographic data was sourced from KNBS 2009 National Census.

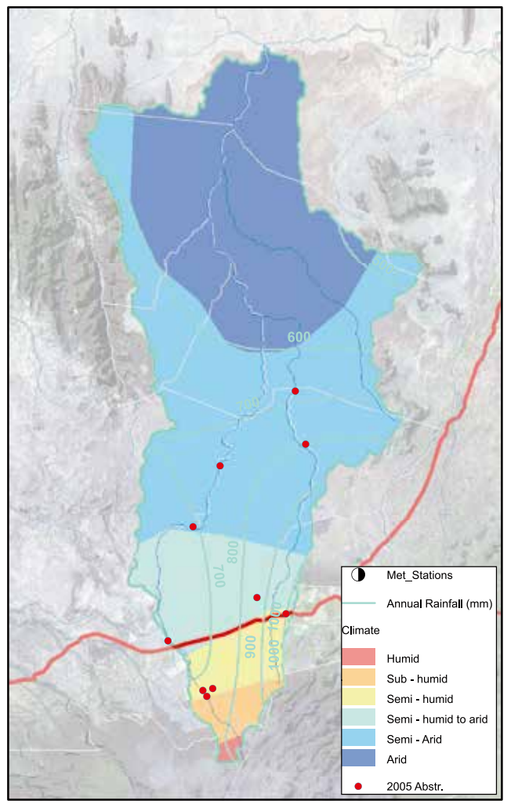
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)




**Agro Climatic Zones and Abstraction points (2005)**




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area $Km^2$ |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 4 |
| Sub-humid | High | 1,000 | 1,600 | 26 |
| Semi-humid | High to Medium | 800 | 1,400 | 48 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 116 |
| Semi-arid | Medium to Low | 450 | 900 | 449 |
| Arid | Low | 300 | 550 | 369 |

**Abstractions**
- Rivers
- Springs
- Bore Holes

**Features & Boundaries**
- Rivers
- Ngarendare RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

Roads
- A
- B
- C
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Ngare Ndare Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
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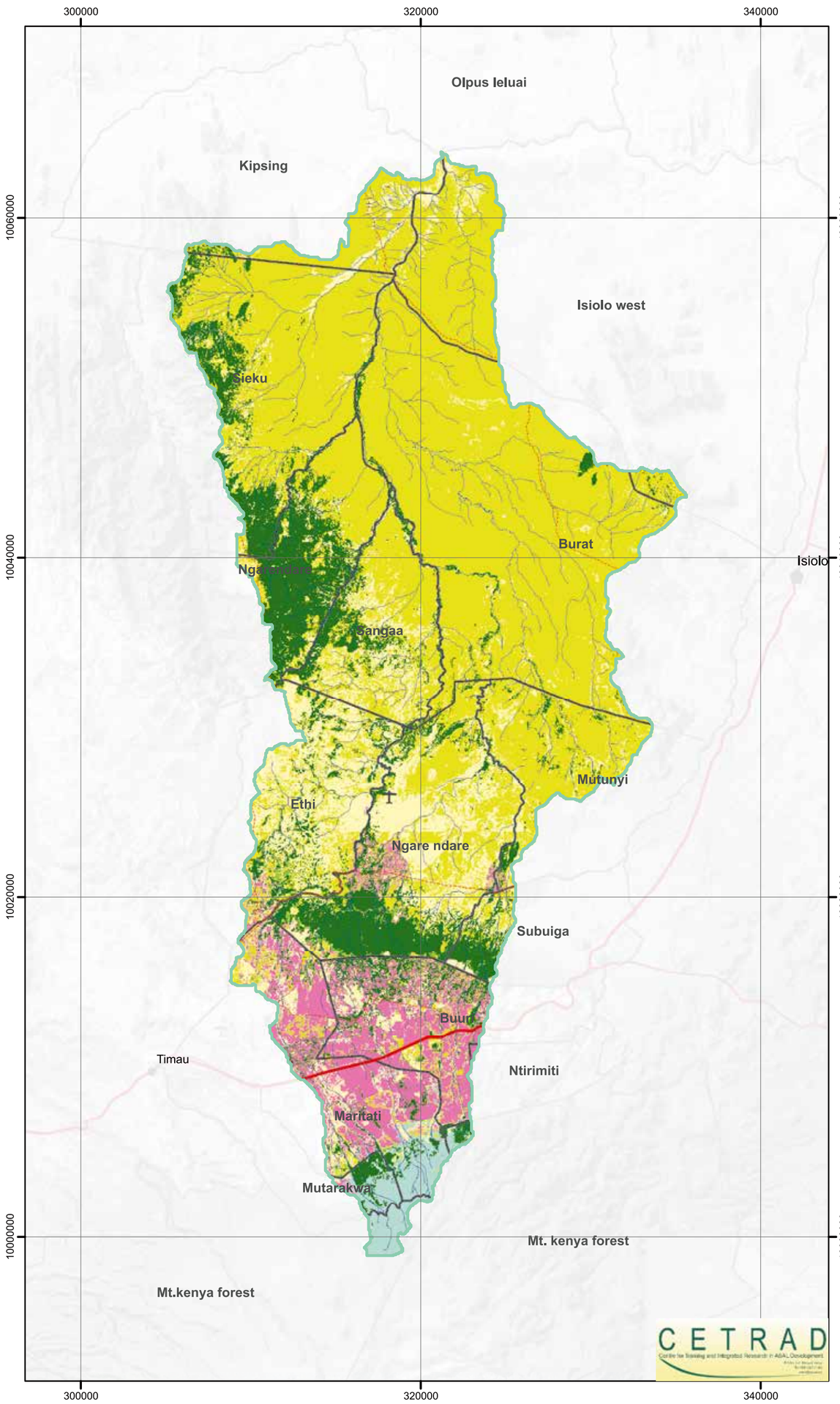
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

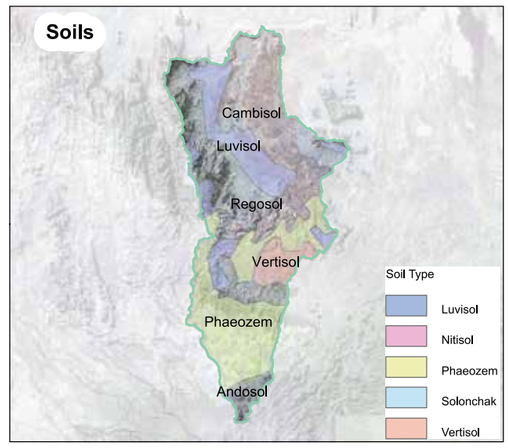
The background image: SRTM 30m.

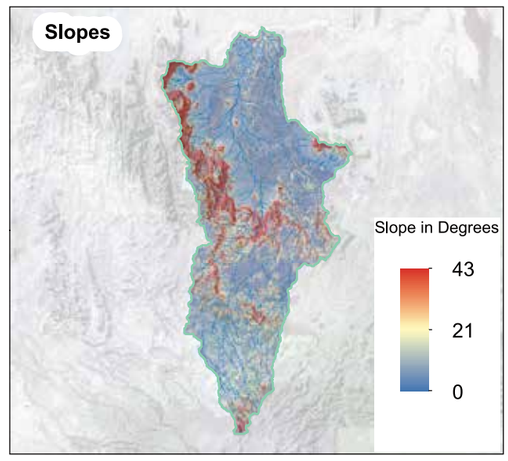
(*) Arid and Semi Arid Lands.

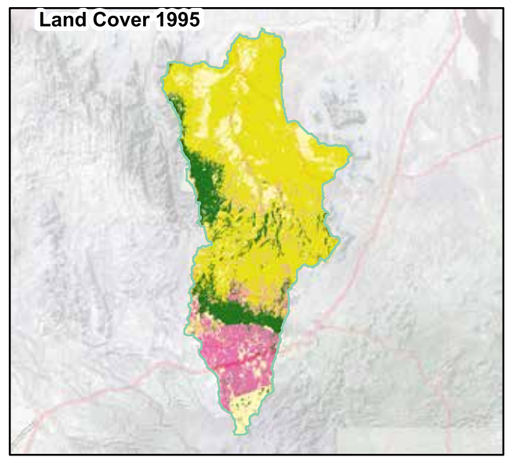
# Land Cover 2014






**Landcover Change**

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 149.35 | 14.75 | 161.09 | 15.91 |
| Woody Grassland | 602.59 | 59.51 | 600.97 | 59.35 |
| Natural Forest | 122.33 | 12.08 | 144.81 | 14.30 |
| Planted Forest | _ | _ | 5.27 | 0.52 |
| Cropland | 134.97 | 13.33 | 77.19 | 7.62 |
| Moorland | _ | _ | 22.16 | 2.19 |
| Wastelands Rocks | 3.21 | 0.32 | 0.44 | 0.04 |
| Water | 0.11 | 0.01 | 0.63 | 0.06 |
| Urban Areas | 0.00 | 0.00 | _ | _ |
| **Totals** | **1,012.56** | **100.00** | **1,012.56** | **100.00** |

**Land Cover (2014)**

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

**Urban Settlements**

- District Hq
- Division Hq

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Ngare Ndare Subcatchment

N, W, E, S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
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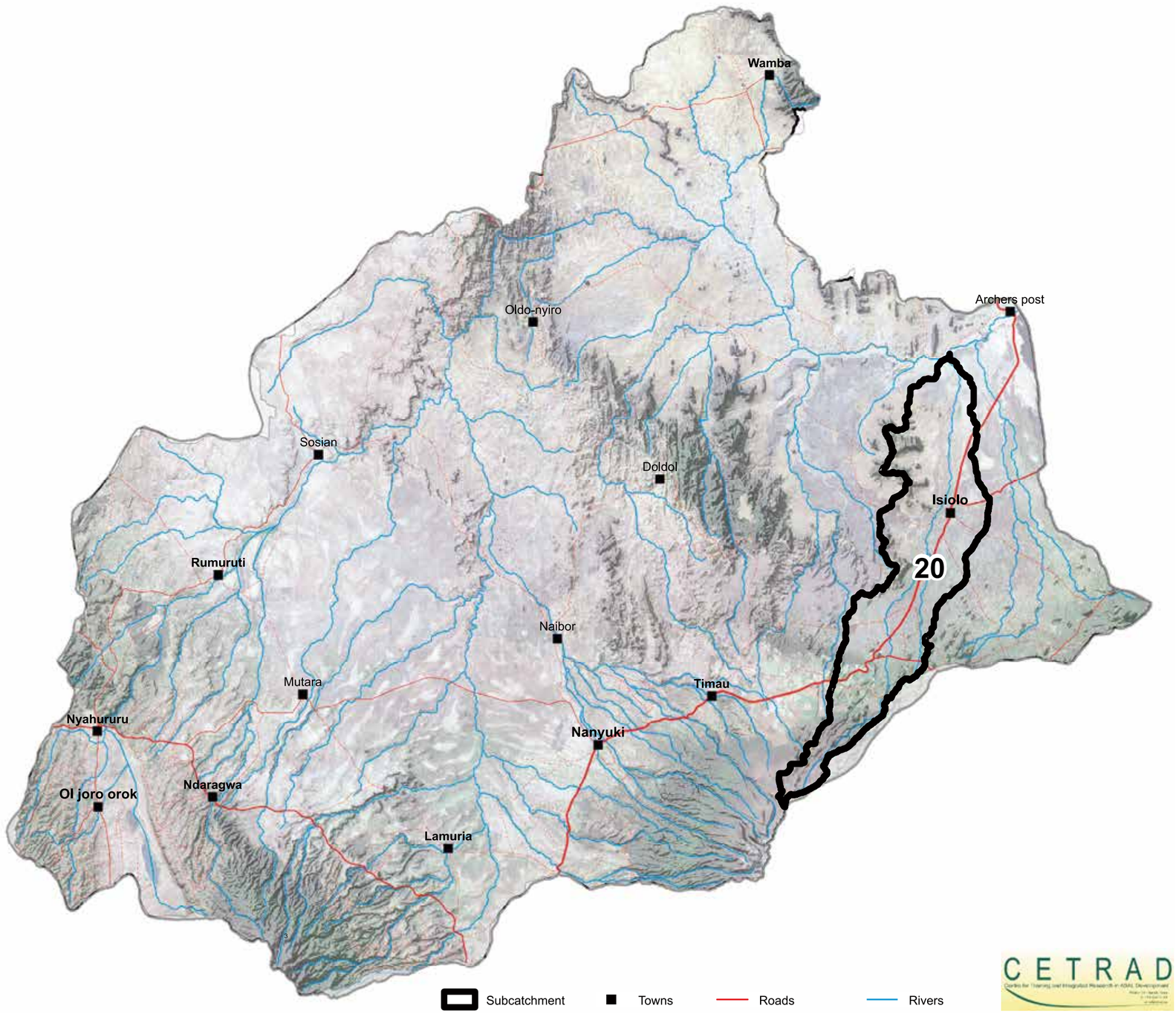
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(*) Arid and Semi Arid Lands.

# 20 - Isiolo


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
20
Rumuruti
Naibor
Mutara
Timau
Nyahururu
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD

# ISIOLO SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Isiolo has a total area of 770 $Km^2$ with a combined population of 136,426 people living within 32 sub locations (with an area of 2,647 $Km^2$) that are partly or completely within the sub catchment. About 13% of the area is under crops and settlements, 70% under grasslands, 8% under forest and 9% under moorland and water.

### Climate

This sub-catchment dominated by Semi arid and arid type of climate except for a small part in the south with a mixture of humid and sub to semi humid near Mt. Kenya.

### Education

There are ten (10) secondary schools and over 120 primary schools; government sponsored (46), Private (30), Religious organizations (40) and Local Authority (4).

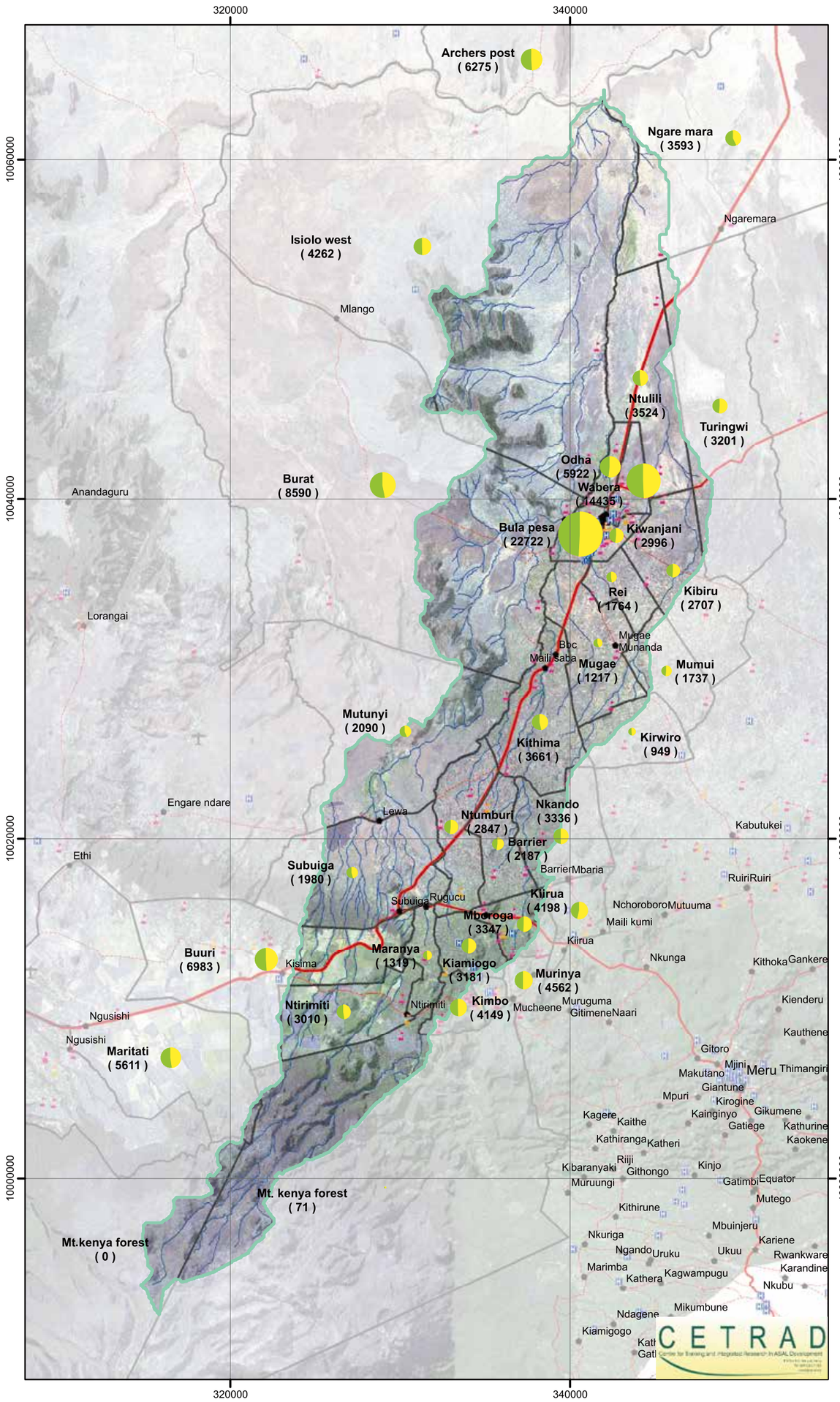
### Water Resource Users Association Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Isiolo WRUA | | | | |
| Contact Address email, chairperson, phone | | Box: 472-60300, Isiolo<br>Person: Secretary<br>Phone: 0722727959/0720 406304 | | | | |
| Date of Formation | | 1999 | | | | |
| Registration details | Social services; | 2003 | | | | |
| | Attorney General office | 2004 | | | | |
| Membership | members | 105 | | | | |
| | Non members | 200 | | | | |
| Water resources | | Rivers | Boreholes | Springs | wells | Dams/water pans |
| | | 1 | 30 | 50 | 15 | 1 |
| Rivers abstractions | | 55 | | | | |
| Main Reason for the formation | | -To utilize the scarce resource equitably<br>-Minimise conflicts | | | | |
| Objectives | | -Catchment conservation, planting of trees along the riparian<br>-Economic use of water and solving water related conflicts<br>-To ensure all users access the water resources | | | | |
| Availability of sanctioning system | | Use of projects and association by-laws | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 2 conservancies ,2 Horticulture farms | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | Ordinary members | | | | |
| Sources and Nature of Conflicts | | -Water use conflicts ( pastoralists & farmers)<br>-Water conflict mostly during dry spells<br>-Destruction of catchment | | | | |
| Problems Reported to the WRUA | | -Pollution (washing cars along the river)<br>-Inadequate water<br>-Water rationing<br>-Destruction of vegetation<br>-Cultivation along river banks<br>-Conflicts within projects leadership | | | | |
| Unreported/unexpressed conflicts | | Inter county ( Meru/ Isiolo) conflicts | | | | |
| Availability of conflict resolution guidelines | | Water Act 2002 guidelines. WRMA rules. Association by-laws | | | | |

| | |
|---|---|
| Availability of conflict resolution skills and implementation | WRUA officials are trained. Visiting all the zones to check in the usage of water and protection practices |
| Challenges | -Most people are ignorant of the law governing water use<br>-Scarcity of the water resource<br>-Lack funds |
| Cases of conflicts dealt with | -Water rationing<br>-Scheduling for pump users<br>-Creation of the awareness on the legal provisions |
| Cases of conflicts unresolved and reasons | -Phase II intakes of Isiolo water & sanitation company<br>-Persistence by other users based on scarcity of water and the insistence by the water services board |
| Other activities the WRUA is engaged in | -Tree planting<br>-Enforcing compliance with water regularities<br>-Surveillance against devegetation along the springs and river line |
| Achievements | -Level of awareness has improved<br>-Regulation of water use has been accepted<br>-Equitable distribution of water has been successful |
| Hindrances to achieve the goals of the WRUA | Lack of funds |
| Advices to others | Conserve catchment area<br>Establishment of tree nurseries |
| Information and Data Available | Baseline survey |
| Person Responsible for data Collection | Consultant |
| Methods of Data Collection | Participatory |
| Information and Data Needs | Necessary for making databases |
| Period of Water Scarcity | Normally Jan, Feb, June - Sept. |
| How is the problem of water scarcity solved | Rationing |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Name: UNDP, Year: 2010, Type of support: Funds, Amount of support Ksh.1.8 M<br>Name: WSTF, Year: 2011, Type of support: Funds, Amount of support Ksh.727100 |
| Water Quality and cause of pollution | Agrochemicals, Soil erosion |
| Existence of Wetlands and their status | At spring sources and along rivers<br>Status: 3 are protected, others not protected due to lack of funds |
| Others | Potential for dams and pans not developed |

# Population Numbers (2009) and Socio Infrastructure

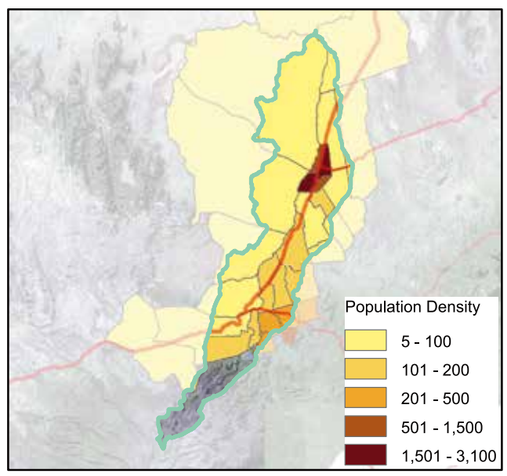





## Population Numbers 2009

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Archers post | 245 | 3,226 | 3,049 | 6,275 | 26 | 1,444 |
| Barrier | 17 | 1,035 | 1,152 | 2,187 | 128 | 594 |
| Bula pesa | 8 | 11,148 | 11,574 | 22,722 | 2,966 | 6,190 |
| Burat | 346 | 4,580 | 4,010 | 8,590 | 25 | 1,640 |
| Buuri | 84 | 3,571 | 3,412 | 6,983 | 83 | 2,051 |
| Isiolo west | 397 | 2,163 | 2,099 | 4,262 | 11 | 1,004 |
| Kiamiogo | 13 | 1,567 | 1,614 | 3,181 | 245 | 846 |
| Kibiru | 43 | 1,326 | 1,381 | 2,707 | 63 | 597 |
| Kiirua | 14 | 1,952 | 2,246 | 4,198 | 310 | 1,287 |
| Kimbo | 9 | 2,101 | 2,048 | 4,149 | 450 | 1,042 |
| Kirwiro | 20 | 489 | 460 | 949 | 47 | 264 |
| Kithima | 34 | 1,960 | 1,701 | 3,661 | 109 | 1,127 |
| Kiwanjani | 4 | 1,458 | 1,538 | 2,996 | 680 | 651 |
| Maranya | 9 | 685 | 634 | 1,319 | 141 | 351 |
| Maritati | 117 | 2,919 | 2,692 | 5,611 | 48 | 2,129 |
| Mboroga | 13 | 1,636 | 1,711 | 3,347 | 258 | 877 |
| Mt. kenya forest | 352 | 47 | 24 | 71 | 0 | 30 |
| Mt.kenya forest | 276 | 0 | 0 | 0 | 0 | 0 |
| Mugae | 32 | 685 | 532 | 1,217 | 38 | 351 |
| Mumui | 20 | 844 | 893 | 1,737 | 88 | 412 |
| Murinya | 7 | 2,268 | 2,294 | 4,562 | 689 | 1,202 |
| Mutunyi | 99 | 1,175 | 915 | 2,090 | 21 | 695 |
| Ngare mara | 185 | 2,070 | 1,523 | 3,593 | 19 | 759 |
| Nkando | 29 | 1,680 | 1,656 | 3,336 | 114 | 903 |
| Ntirimiti | 29 | 1,588 | 1,422 | 3,010 | 102 | 841 |
| Ntulili | 44 | 1,828 | 1,696 | 3,524 | 81 | 673 |
| Ntumburi | 24 | 1,370 | 1,477 | 2,847 | 120 | 760 |
| Odha | 6 | 2,860 | 3,062 | 5,922 | 1,045 | 1,236 |
| Rei | 11 | 921 | 843 | 1,764 | 162 | 434 |
| Subuiga | 57 | 1,061 | 919 | 1,980 | 34 | 650 |
| Turingwi | 95 | 1,556 | 1,645 | 3,201 | 34 | 683 |
| Wabera | 9 | 7,306 | 7,129 | 14,435 | 1,684 | 3,045 |
| **Totals** | **2,647** | **69,075** | **67,351** | **136,426** | **52** | **34,768** |

## Population Density 2009




### Population & Sex Ratio

- Female
- Male

### Urban Settlements

- District Hq
- Division Hq
- Others

### Socio Infrastructure

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Isiolo Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
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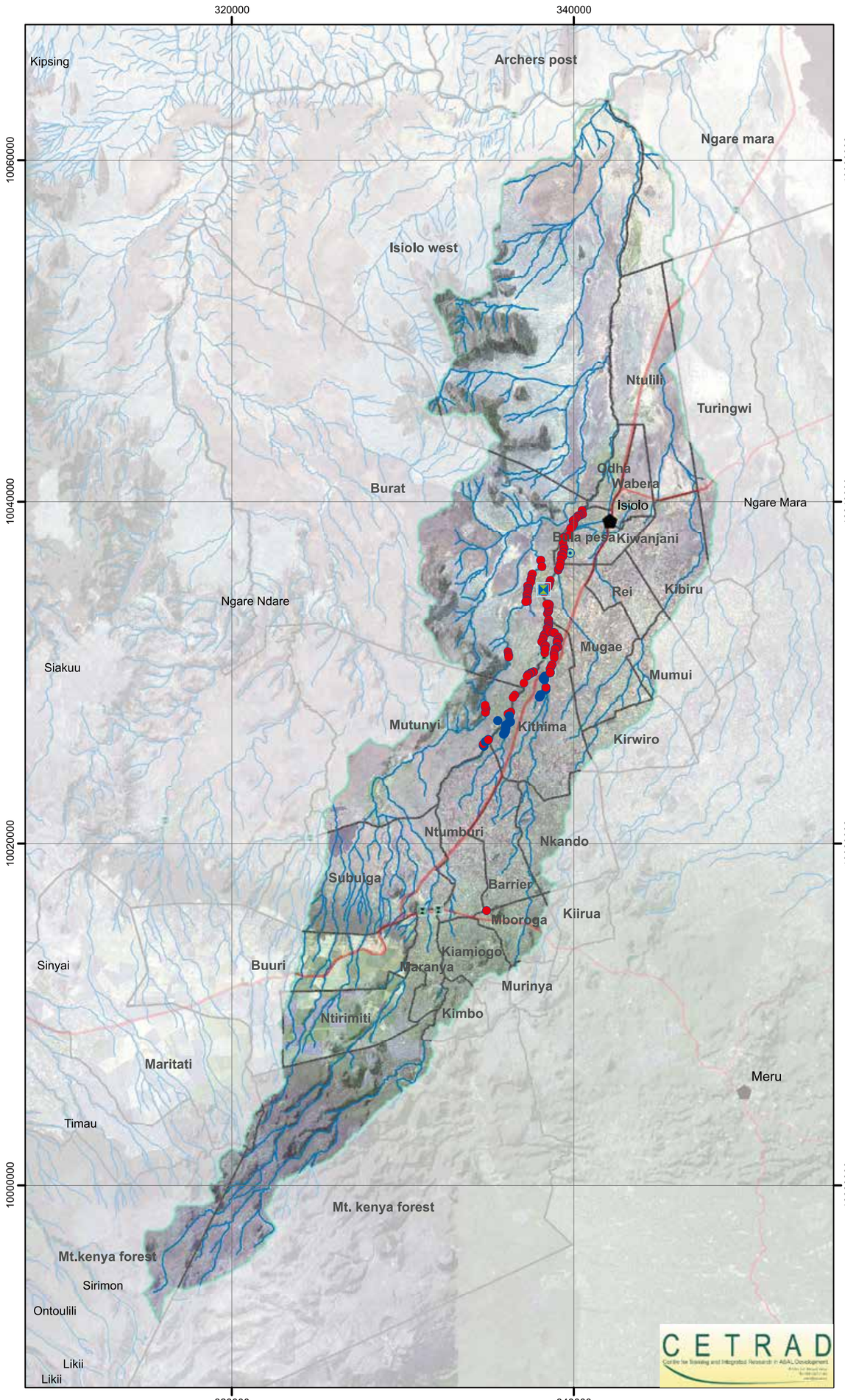
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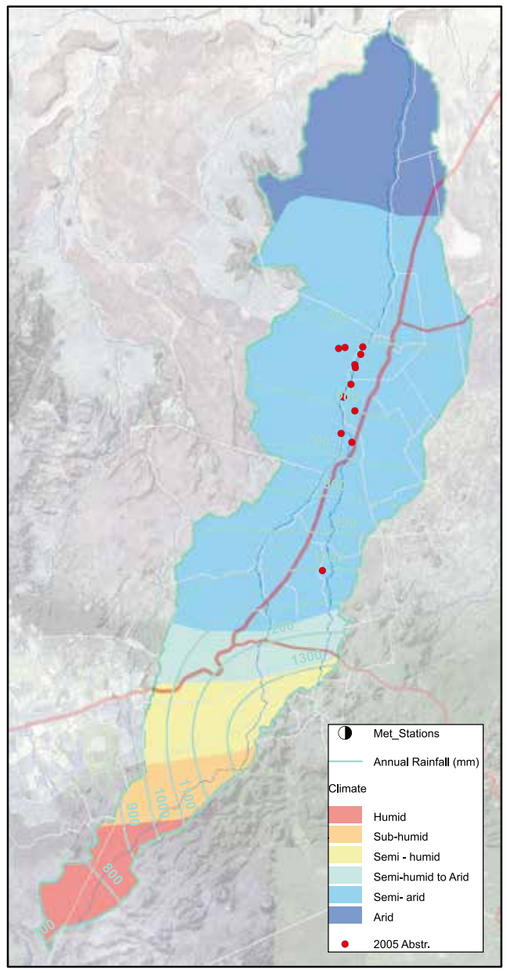
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)




**Agro Climatic Zones and Abstraction Points (2005)**




| CLIMATE | Agr Potential | Min Rainfall | Max Rainfall | Area Kms |
|---|---|---|---|---|
| Humid | Very high | 1100 | 2700 | **53** |
| Sub-humid | High | 1000 | 1600 | **367** |
| Semi-humid | high to medium | 800 | 1400 | **680** |
| Semi-humid to Semi-arid | Medium | 600 | 1100 | **376** |
| Semi-arid | Medium to low | 450 | 900 | **360** |

**Abstractions**
- River
- Spring
- Water treatment plant

**Features & Boundaries**
- Rivers
- Isiolo RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

**Transport**

Roads
- A
- B
- C
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Isiolo Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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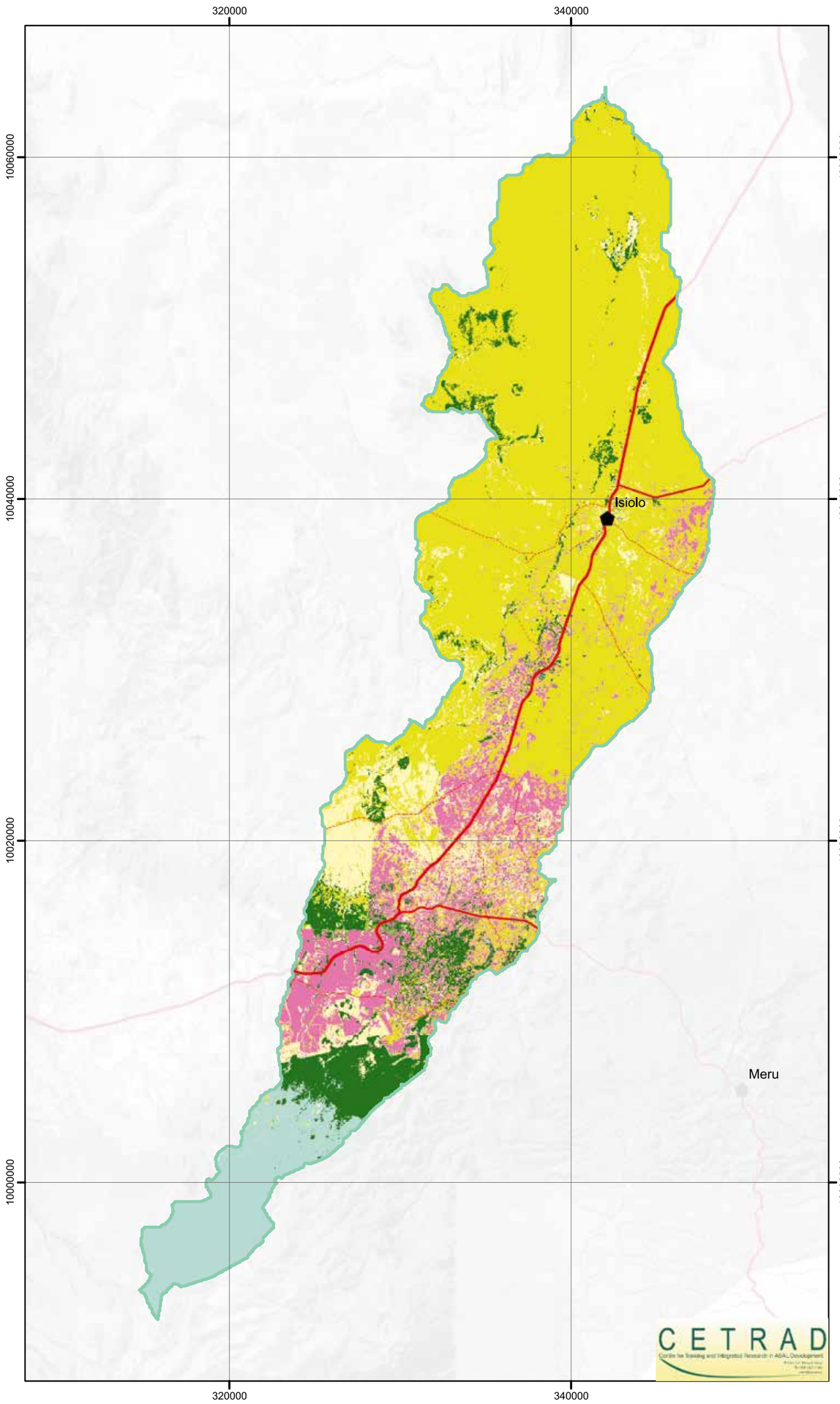
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

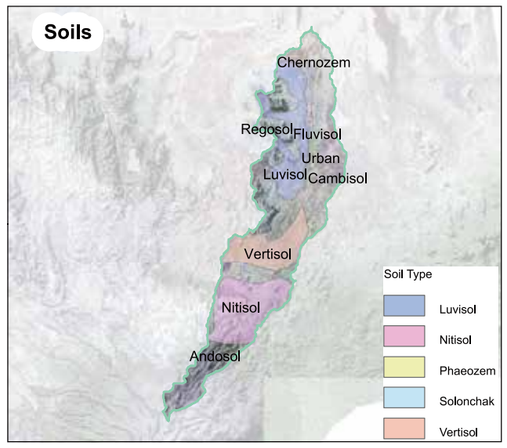
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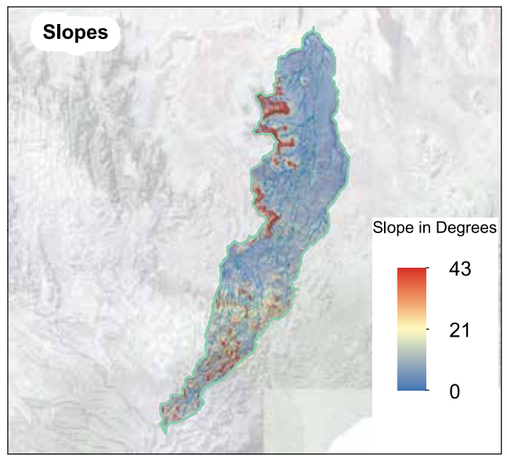
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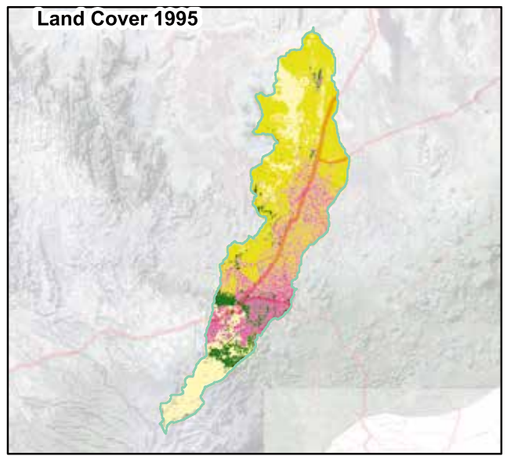
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 150.69 | 19.57 | 76.07 | 9.88 |
| Woody Grassland | 399.65 | 51.90 | 466.66 | 60.60 |
| Natural Forest | 45.75 | 5.94 | 62.92 | 8.17 |
| Plantation Forest | 1.79 | 0.23 | 1.86 | 0.24 |
| Cropland | 168.05 | 21.82 | 100.28 | 13.02 |
| Wastelands Rocks | 3.84 | 0.50 | 0.05 | 0.01 |
| Water | 0.02 | 0.00 | 0.46 | 0.06 |
| Moorland | _ | _ | 61.70 | 8.01 |
| Urban Areas | 0.22 | 0.03 | _ | _ |
| Others | 0.00 | 0.00 | 0.01 | 0.00 |
| **Totals** | **770.01** | **100.00** | **770.01** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads

- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Isiolo Subcatchment

0 2 4 6 8 10 Kilometers

1:248,588

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
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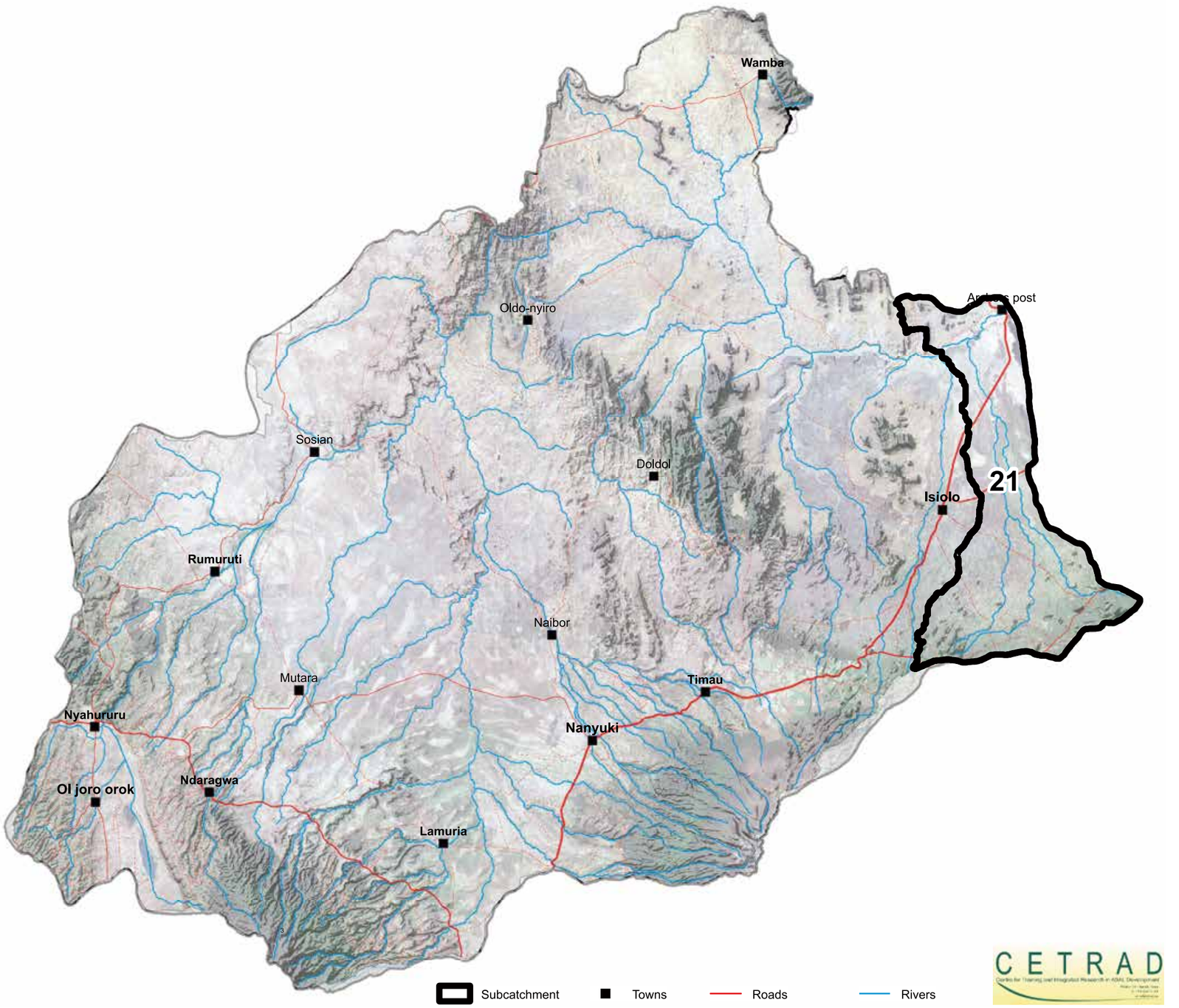
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# 21 - Ngare Mara



# NGARE MARA SUBCATCHMENT

## Fact sheet. Date: July 2014

### Introduction

Ngare Mara has a total area of 941 $Km^2$ with a combined population of 222,218 people living within 30 sub locations (with an area of 1,991$Km^2$) that are partly or completely within the sub catchment. About 19% is under crops and settlements, 72% under grasslands and the remaining 8% of land is under forest, wasteland rocks, moorland and water.

### Climate

This sub-catchment dominated by Semi arid and arid type of climate except for a small part in the south with a mixture of humid and sub to semi humid.

### Education

There are twenty nine (29) secondary schools and over 215 primary schools; sponsored by government (69), Private (18), Religious organizations (124) and Local Authority (4).

### Water Resource Users Association Information

### 1. Likiundu WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Likiundu WRUA | | | | |
| Contact Address email, chairperson, phone | | P.O Box 651 Maua<br>Joseph M. Kibaki -0722460650; Email- jmkibaki@gmail.com | | | | |
| Date of Formation | | 10 December 2009 | | | | |
| Registration details | Social services | | | | | |
| | Attorney General office | | | | | |
| Membership details | Members | 49 | | | | |
| | Non members | 37 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 29 | 29 | 5 | 5 |
| River Abstractions | | 78 | | | | |
| Main Reason for the formation | | Water scarcity | | | | |
| Objectives | | To promote legal water abstraction, efficient and proper use of abstracted water | | | | |
| Availability of sanctioning system | | Requires improvement | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | None | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | N/A | | | | |
| Sources and Nature of Conflicts | | Inadequate water resource, lack of control device, inadequate knowledge on resource usage | | | | |
| Problems Reported to the WRUA | | Mariange water project<br>Munyariku water project<br>Animal - human conflict<br>Furrow irrigation<br>Cutting down indigenous trees along the riparian | | | | |
| Unreported/unexpressed conflicts | | Removal of stones from the river bends for ballast | | | | |
| Availability of conflict resolution guidelines | | Water policy in place | | | | |
| Availability of conflict resolution skills and implementation | | Not adequate | | | | |
| Challenges | | • Inadequate knowledge/ skills in water management<br>• Inadequate water<br>• minimal participation from other stakeholders | | | | |

| | |
|---|---|
| Cases of conflicts dealt with | • Munyariku Vs Maburua water projects<br>• M'ariange Vs Kiaramu water projects |
| Cases of conflicts unresolved and reasons | • Inadequate skills in water usage<br>• Inadequate water resource<br>• Animal and human conflict |
| Other activities the WRUA is engaged in | • Creation of awareness to our members<br>• Promoting ways of improving water quantity and quality<br>• Identifying possible site for reservoir, dams<br>• Conservation of the catchment area |
| Achievements | • List of abstractors<br>• Prepared SCAMP<br>• WRUA registration with AG |
| Hindrances to achieve the goals of the WRUA | Financial constraints |
| Advices to others | • Work with all the stakeholders<br>• Identify the resource use |
| Information and Data Available | SCMP. List of members. List of abstractors. Constitution |
| Person Responsible for data Collection | Executive committee |
| Methods of Data Collection | Public baraza, committee members information |
| Information and Data Needs | To provide necessary information for planning |
| Period of Water Scarcity | 9 months |
| How is the problem of water scarcity solved | Public barazas, seminars |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Preparation of SCMP by GTZ in 2010 |
| Water Quality and cause of pollution | Quality- dirty due to Run off from the bare hill tops<br>Effluent discharge from the coffee factories |
| Existence of Wetlands and their status | exist<br>state: pathetic |
| Others | Public barazas, seminars |

# NGARE MARA SUBCATCHMENT
## Fact sheet. Date: July 2014

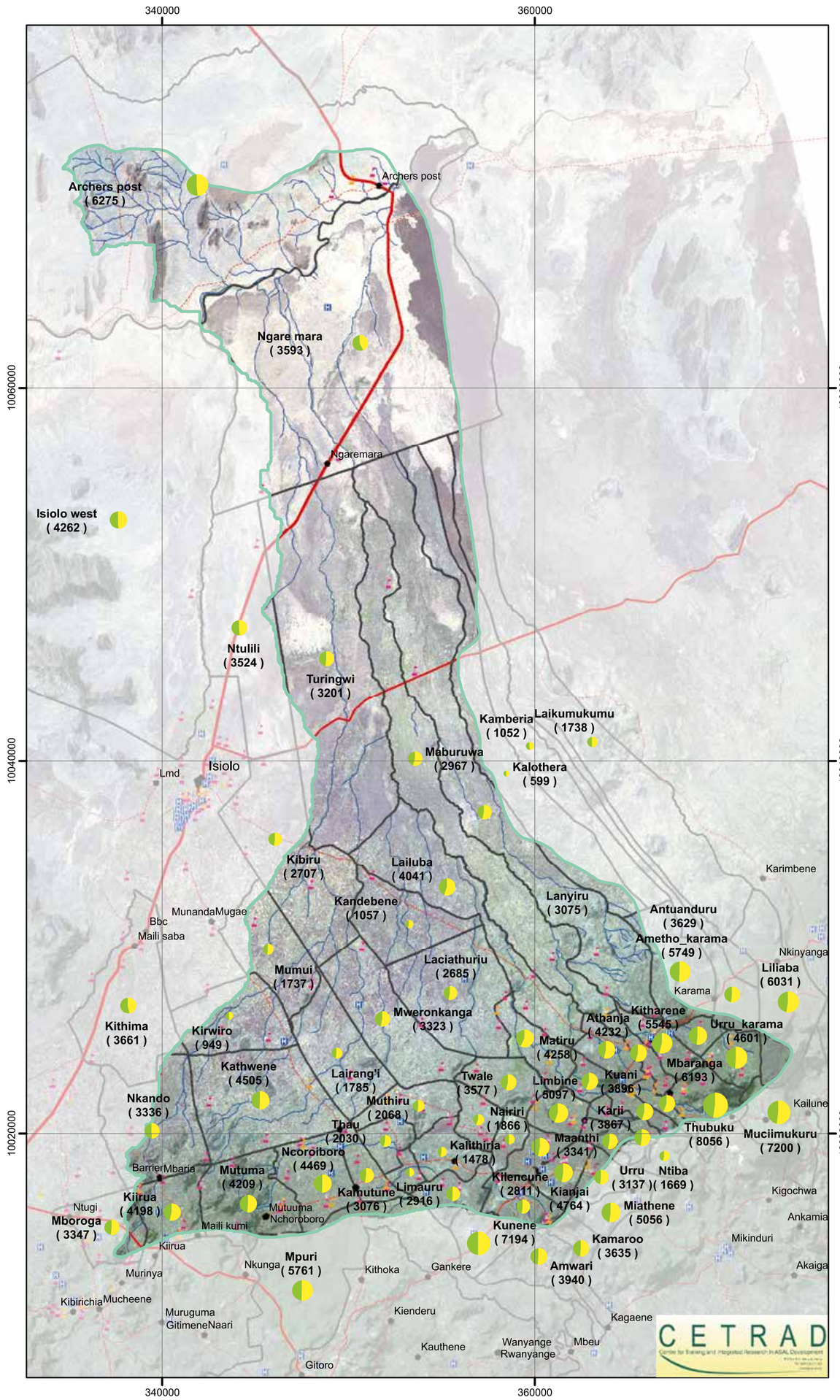
### 2. Liliaba WRUA

| | | | | | | |
|---|---|---|---|---|---|---|
| Name of WRUA | | Liliaba WRUA | | | | |
| Contact Address email, chairperson, phone | | Isaiah Ntombura ( chairperson)<br>Phone: 0729616256<br>P.O Box 281 Maua | | | | |
| Date of Formation | | 15/12/2006 - 18/12/2008 | | | | |
| Registration details | Social services | CD/154/2008 | | | | |
| | Attorney General office | Reg. No: 35971 Date: 10/11/2011 | | | | |
| Membership details | members | 4 | | | | |
| | Non members | 6 | | | | |
| Water resources | | Rivers | Boreholes | Springs | Wells | Dams/water pans |
| | | 1 | 3 | 15 | 2 | 2 |
| River Abstractions | | 6 | | | | |
| Main Reason for the formation | | • Represent interests of water user.<br>• Mobilization of water users and participation in decision making during new applications of permits | | | | |
| Objectives | | -To promote legal water abstraction<br>-Promote good management practices to make efficient and sustainable use of water resource<br>-Promote water conservation practices to ensure sufficient water reserve that meet unprojected demands | | | | |
| Availability of sanctioning system | | - | | | | |
| Number of Large Scale (, Ranches, Conservancies Horticulture others ) Farms | | 0 | | | | |
| Role of (Ranches, Conservancies Horticulture others) farms if any to the WRUA | | 0 | | | | |
| Sources and Nature of Conflicts | | Water scarcity | | | | |
| Problems Reported to the WRUA | | -Mismanagement of water projects<br>-Misappropriation of some project funds by management committee<br>-Illegal water abstraction for irrigation activities leaving no water for downstream users | | | | |
| Unreported/unexpressed conflicts | | Pollution of rivers by human activities and livestock | | | | |
| Availability of conflict resolution guidelines | | WRUA conduct monitoring of water resources.<br>Ensure rationing program is adhered to during spells | | | | |
| Availability of conflict resolution skills and implementation | | -Mobilization and awareness creation for the users and the general public on water Act 2002.<br>-Dissemination of information through Barazas.<br>-Conflict resolution committee | | | | |

| | |
|---|---|
| Challenges | -Inadequate funds<br>-Low water quantity and quality |
| Cases of conflicts dealt with | Five cases of conflicts dealt with and resolved |
| Cases of conflicts unresolved and reasons | Two cases are yet to be resolved - Both projects pending elections of new committee |
| Other activities the WRUA is engaged in | -Water use monitoring<br>-Pollution monitoring<br>-Water resource monitoring<br>-Improvements to water use efficiency |
| Achievements | -WRUA committee members were funded and carried out sensitization seminars<br>-Registration of the WRUA with AG/ SS |
| Hindrances to achieve the goals of the WRUA | -Lack of community sensitization |
| Advices to others | All stakeholders and NGO's to support WRUAs and be conversant with the water Act 2002 |
| Information and Data Available | -Membership register<br>-SCMP.<br>-List of abstractors |
| Person Responsible for data Collection | -Management committee |
| Methods of Data Collection | -visits and questions to users |
| Information and Data Needs | -Abstraction record.<br>-River flow patterns by seasons |
| Period of Water Scarcity | Jan-March, June-Oct. |
| How is the problem of water scarcity solved | -Planting water friendly trees in riparian areas.<br>-Sensitization meetings.<br>-Water rationing |
| Institutional Support to WRUA<br>(Name, Year, Type of support, Amount of support) | Name: WDC through WSTF, Year: 2011, Type of support: Funds, Amount of support Ksh. 535, 000 |
| Water Quality and cause of pollution | Low water quality due to pollution and destruction of subcatchment ecosystem |
| Existence of Wetlands and their status | Ndiemwije, Lilaiba, Kilibiuri, Muromuuba, Kathima, Mangoya, Likiau, Luaine, Kithiene |
| Others | |

# Population Numbers (2009) and Socio Infrastructure

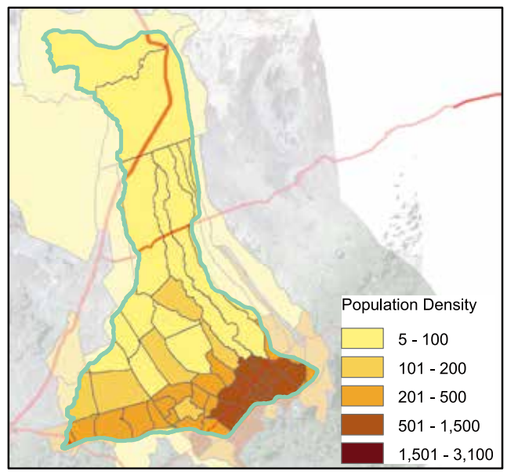





**Population Numbers 2009**

| Sub Location | Area Km2 | Male | Female | Totals | Density | House Holds |
|---|---|---|---|---|---|---|
| Ametho_kara | 18 | 2,814 | 2,935 | 5,749 | 314 | 1,103 |
| Amwari | 12 | 1,908 | 2,032 | 3,940 | 319 | 856 |
| Antuanduru | 16 | 1,759 | 1,870 | 3,629 | 227 | 799 |
| Archers post | 245 | 3,226 | 3,049 | 6,275 | 26 | 1,444 |
| Athanja | 7 | 1,960 | 2,272 | 4,232 | 585 | 887 |
| Athing'a | 5 | 1,826 | 2,170 | 3,996 | 868 | 848 |
| Irotia | 3 | 1,750 | 2,165 | 3,915 | 1,141 | 794 |
| Isiolo west | 397 | 2,163 | 2,099 | 4,262 | 11 | 1,004 |
| Kalithiria | 9 | 688 | 790 | 1,478 | 171 | 335 |
| Kalothera | 45 | 317 | 282 | 599 | 13 | 140 |
| Kamaroo | 7 | 1,781 | 1,854 | 3,635 | 521 | 808 |
| Kamberia | 31 | 544 | 508 | 1,052 | 33 | 197 |
| Kamutune | 7 | 1,466 | 1,610 | 3,076 | 456 | 808 |
| Kandebene | 18 | 493 | 564 | 1,057 | 59 | 226 |
| Karii | 5 | 1,837 | 2,030 | 3,867 | 748 | 802 |
| Kathwene | 37 | 2,216 | 2,289 | 4,505 | 123 | 1,231 |
| Kianjai | 6 | 2,287 | 2,477 | 4,764 | 749 | 1,102 |
| Kibiru | 43 | 1,326 | 1,381 | 2,707 | 63 | 597 |
| Kiirua | 14 | 1,952 | 2,246 | 4,198 | 310 | 1,287 |
| Kilencune | 9 | 1,346 | 1,465 | 2,811 | 299 | 680 |
| Kirwiro | 20 | 489 | 460 | 949 | 47 | 264 |
| Kitharene | 7 | 2,563 | 2,982 | 5,545 | 813 | 1,219 |
| Kithima | 34 | 1,960 | 1,701 | 3,661 | 109 | 1,127 |
| Kuani | 5 | 1,710 | 2,186 | 3,896 | 859 | 859 |
| Kunene | 8 | 3,582 | 3,612 | 7,194 | 926 | 1,644 |
| Laciathuriu | 31 | 1,251 | 1,434 | 2,685 | 88 | 562 |
| Laikumukumu | 67 | 861 | 877 | 1,738 | 26 | 341 |
| Lailuba | 36 | 1,836 | 2,205 | 4,041 | 112 | 821 |
| Lairang'i | 21 | 861 | 924 | 1,785 | 86 | 418 |
| Lanyiru | 84 | 1,423 | 1,652 | 3,075 | 37 | 653 |

**Population Density 2009**




**Population & Sex Ratio**

- Female
- Male

**Urban Settlements**

- District Hq
- Division Hq
- Others

**Socio Infrastructure**

- Primary Schools
- Secondary Schools
- Health Facilities
- Police Posts

**Others**

- Rivers
- Wetlands
- Sublocations
- Subcatchment

**Transport**

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Ngare Mara Subcatchment




1:227,426

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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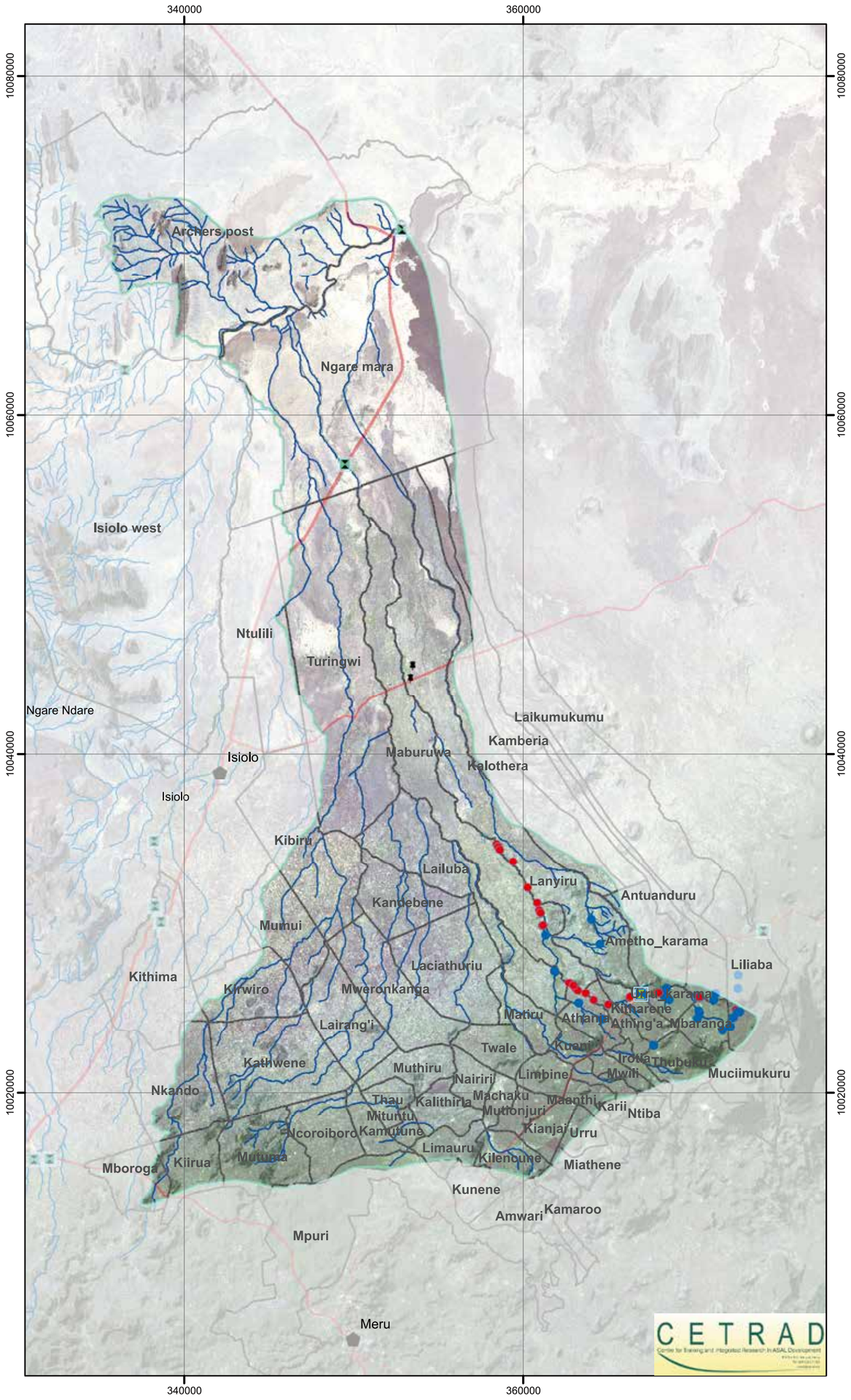
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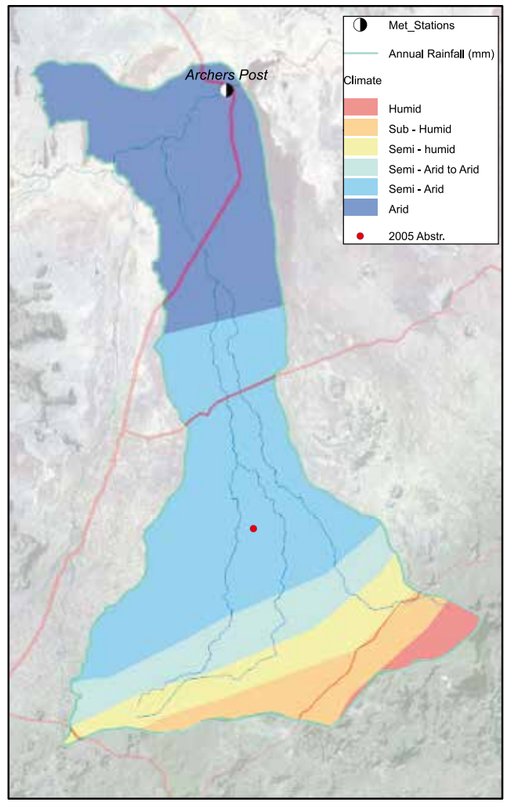
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

# Water Resources and Abstraction Points (2013)




**Agro Climatic Zones and Abstraction Points (2005)**




| Climate | Agriculture Potential | Minimum Rainfall(mm) | Maximum Rainfall(mm) | Area Kms |
|---|---|---|---|---|
| Humid | Very high | 1,100 | 2,700 | 24 |
| Sub-humid | High | 1,000 | 1,600 | 80 |
| Semi-humid to Semi-arid | Medium | 600 | 1,100 | 102 |
| Semi-humid | High to Medium | 800 | 1,400 | 90 |
| Semi-arid | Medium to Low | 450 | 900 | 363 |
| Arid | Low | 300 | 550 | 281 |

**Abstractions**
- river
- spring
- borehole
- pan

**Features & Boundaries**
- Rivers
- Ngare Mara RGS
- Other RGS
- Sublocations
- Subcatchment
- Wetlands

**Transport**

Roads
- A
- B
- C
- Railway Line

**Urban Settlements**
- District Hq
- Division Hq

## Ngare Mara Subcatchment

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
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Datum: Arc 1960
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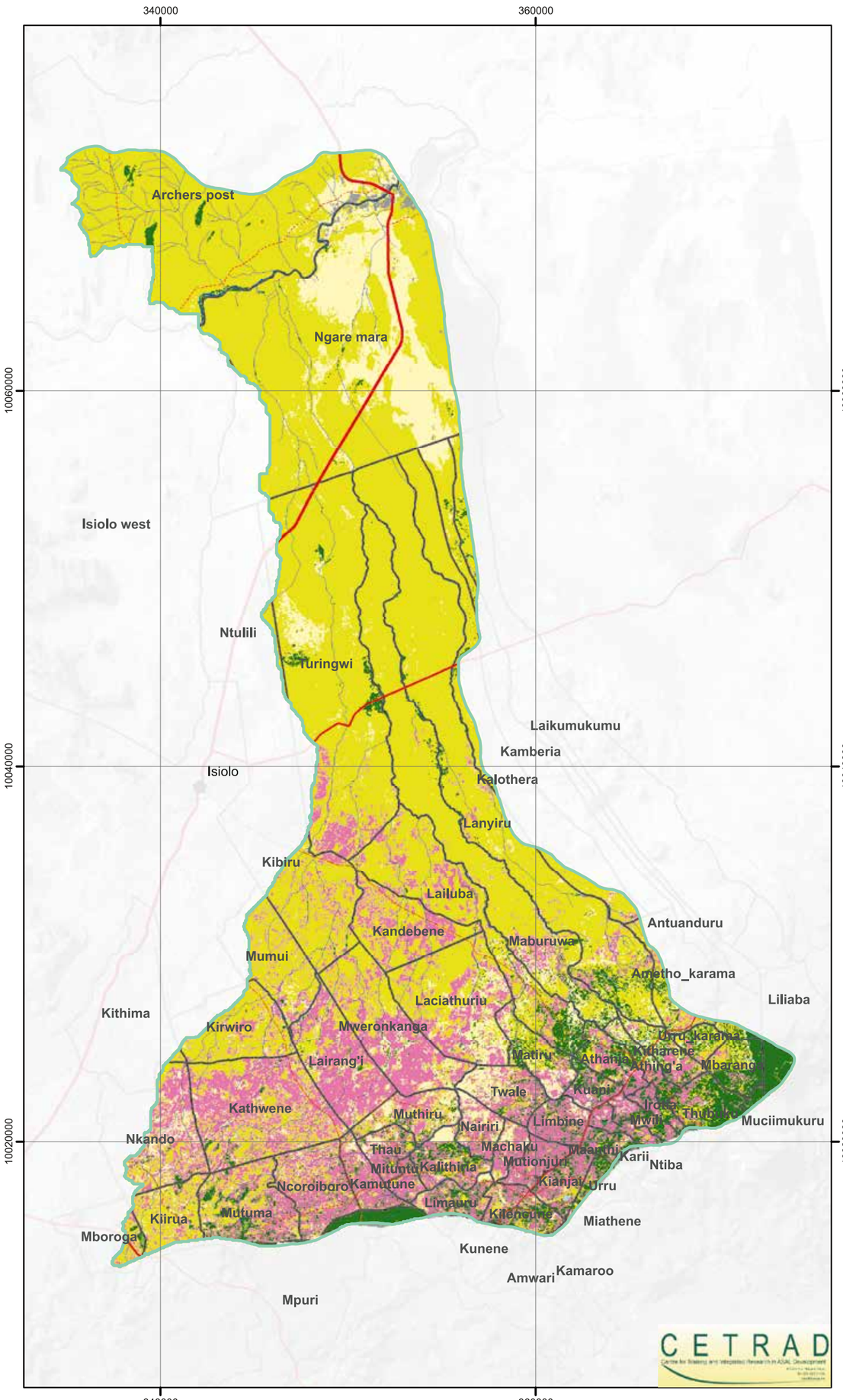
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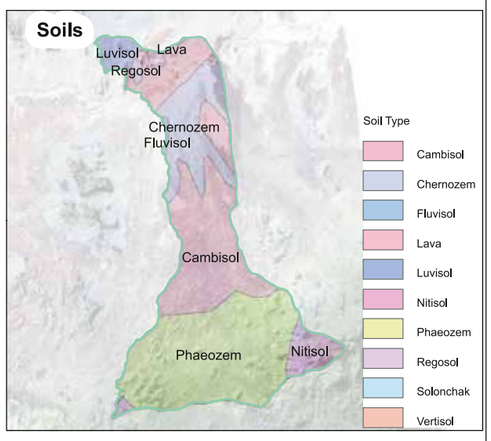
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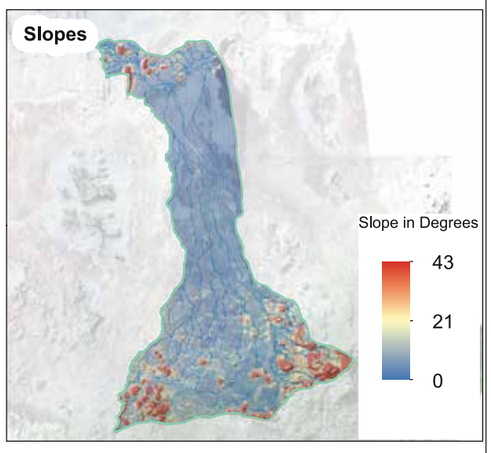
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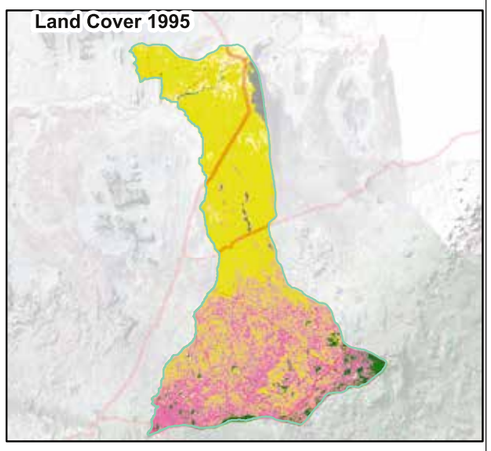
# Land Cover 2014






## Landcover Change

| | 1995 | | 2014 | |
|---|---|---|---|---|
| NAME | Area Km$^2$ | % Cover | Area Km$^2$ | % Cover |
| Grassland | 36.48 | 3.88 | 106.78 | 11.34 |
| Woody Grassland | 550.58 | 58.50 | 573.62 | 60.94 |
| Natural Forest | 37.14 | 3.95 | 74.92 | 7.96 |
| Planted Forest | | | 0.14 | 0.01 |
| Cropland | 305.11 | 32.42 | 181.56 | 19.29 |
| Wastelands Rocks | 11.08 | 1.18 | 2.90 | 0.31 |
| Water | 0.65 | 0.07 | 1.20 | 0.13 |
| Moorland | | | 0.09 | 0.01 |
| Urban Areas | 0.18 | 0.02 | | 0.00 |
| Others | | | 0.00 | 0.00 |
| **Totals** | **941.21** | **100.00** | **941.21** | **100.00** |

### Land Cover (2014)

- Woody Grassland
- Water
- Wastelands
- Urban Areas
- Plantation Forest
- Natural Forest
- Moorland
- Grassland
- Cropland
- Others

### Urban Settlements

- District Hq
- Division Hq

### Others

- Rivers
- Wetlands
- Sublocations
- Subcatchment

### Transport

Roads
- A
- B
- C
- D
- E

- Railway Line
- Airfields

## Ngare Mara Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

1:227,426

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

This map was prepared by the Centre for Training and Integrated Research in ASAL(*) Development (CETRAD) in July 2014.

CETRAD is bilateraly established between the Government of Kenya, through the Ministry of Water & Irrigation and the Swiss Government, through the Centre for Development and Environment of the University of Berne, CETRAD is the regional coordination office for East Africa of the Swiss National Centre of Competence in Research North-South.

CETRAD is based in Nanyuki, Laikipia County, Kenya. It is concerned with designing strategies for sustainable development, promoting land use planning for sustained livelihood and optimal resource use, fostering sustainable resource use and management for improved productivity and developing non-farm economy, infrastructure and services.

Linear features on this map are all part of CETRAD's comprehensive spatial database, which covers the Upper Ewaso Ngiro Basin, Laikipia, Mwingi and Makueni Districts, Nakuru Municipality, Kenya national data sets as well as other areas.

Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.