SUB CATCHMENT DIRECTORY FOR **UPPER EWASO NGIRO** RIVER BASIN

JULY 2014



Revised Edition

C E T R A D

Centre for Training and Integrated Research in ASAL Development

The updated sub catchment directory for upper Ewaso Ngiro river basin is prepared by Centre for Training and Integrated Research in ASAL Development (CETRAD) with the funding from the Swiss Development Corporation (SDC) through the Water and Land Resource Centre (WLRC) Project.

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CETRAD
Centre for Training and Integrated Research in ASAL Development

Imprint

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Buttsons Complex Building,
Off Hospital Road,
P.O. Box 144-10400, Nanyuki, Kenya,
Tel: 0725 348449;
Email:cetrad@cetrad.org

Authors: Evanson C. Njuguna, Dr. Boniface Kiteme and Elizah Peter
Other contributors: Dr. Jeniffer Kinoti
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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

Upper Ewaso Ngiro River Basin

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 was the co-ordinator of the water initiative project and in particular participated in generation of the land cover maps through classification and ground truthing of the satellite images. 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, Dennis Githinji and Edward Thiga, for facilitating travel to the field during data collection campaign. The accountant Jacinta Muchugu and assistant Faith Marete for financial facilitation in all phases of the project

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 commitments.

Evanson C. Njuguna

Project Coordinator & Head, Department of Information and Knowledge Management

CETRAD

Contents

Foreword **3**

Acknowledgement **4**

Introduction **7**

Notes on Sub Catchment Maps **8**

Upper Ewaso Ngiro Basin Maps

Sub Catchments 9

Population Density (1999) 10

Population Density (2009) 11

Water Resources and Abstraction Points (2005) 12

Water Resources and Abstraction Points (2013) 13

Landcover (1995) 14

Landcover (2014) 15

Water conflict related hotspots within the basin 16

Aberdare ranges Sub Catchments

Ewaso Narok 17

Pesi 31

Mutara 37

Sugorai 43

Segera 49

Engare Ngobet 55

Ewaso Ngiro East 61

Engare Moyok 67

Mt. Kenya Sub Catchments

Naro Moru 73

Burguret 79

Rongai 85

Nanyuki 91

Likii 97

Ontoulili 103

Sirimon 109

Timau 115

Sinyai 121

Siakuu 127

Ngare Ndare 133

Isiolo 139

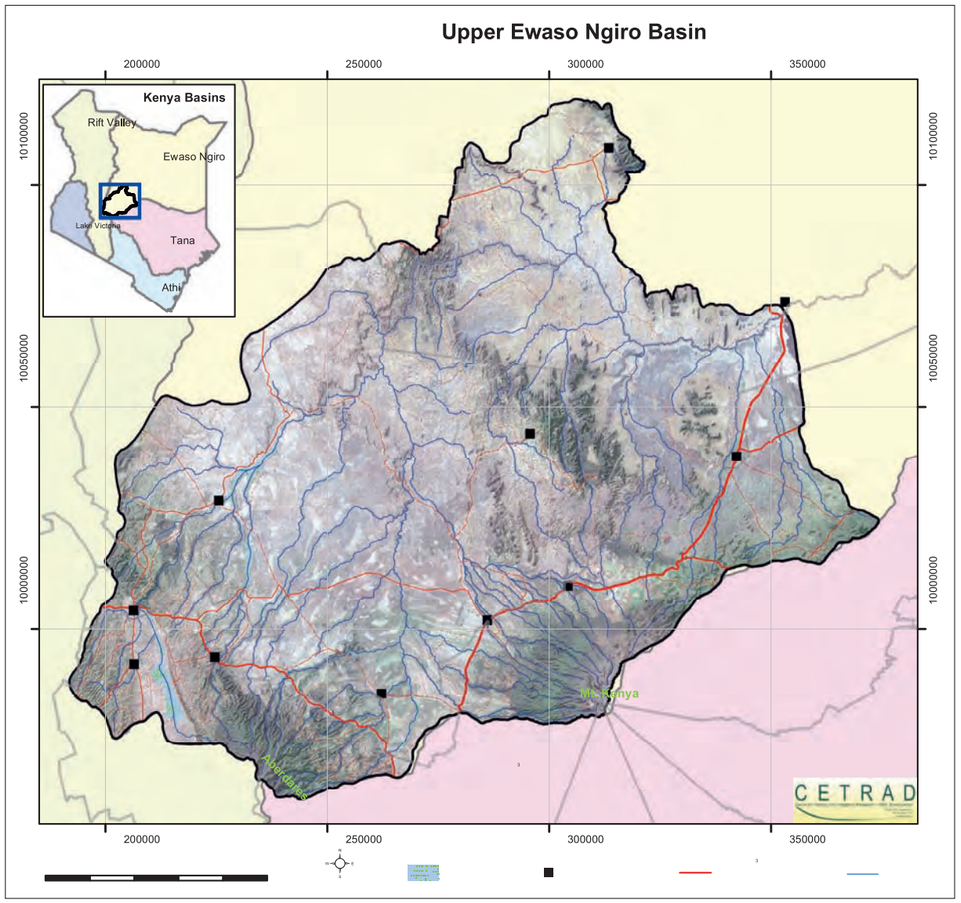
Nyambene Hills Sub Catchments

Ngare Mara 145

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 20th 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.

Upper Ewaso Ngiro River Basin

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.

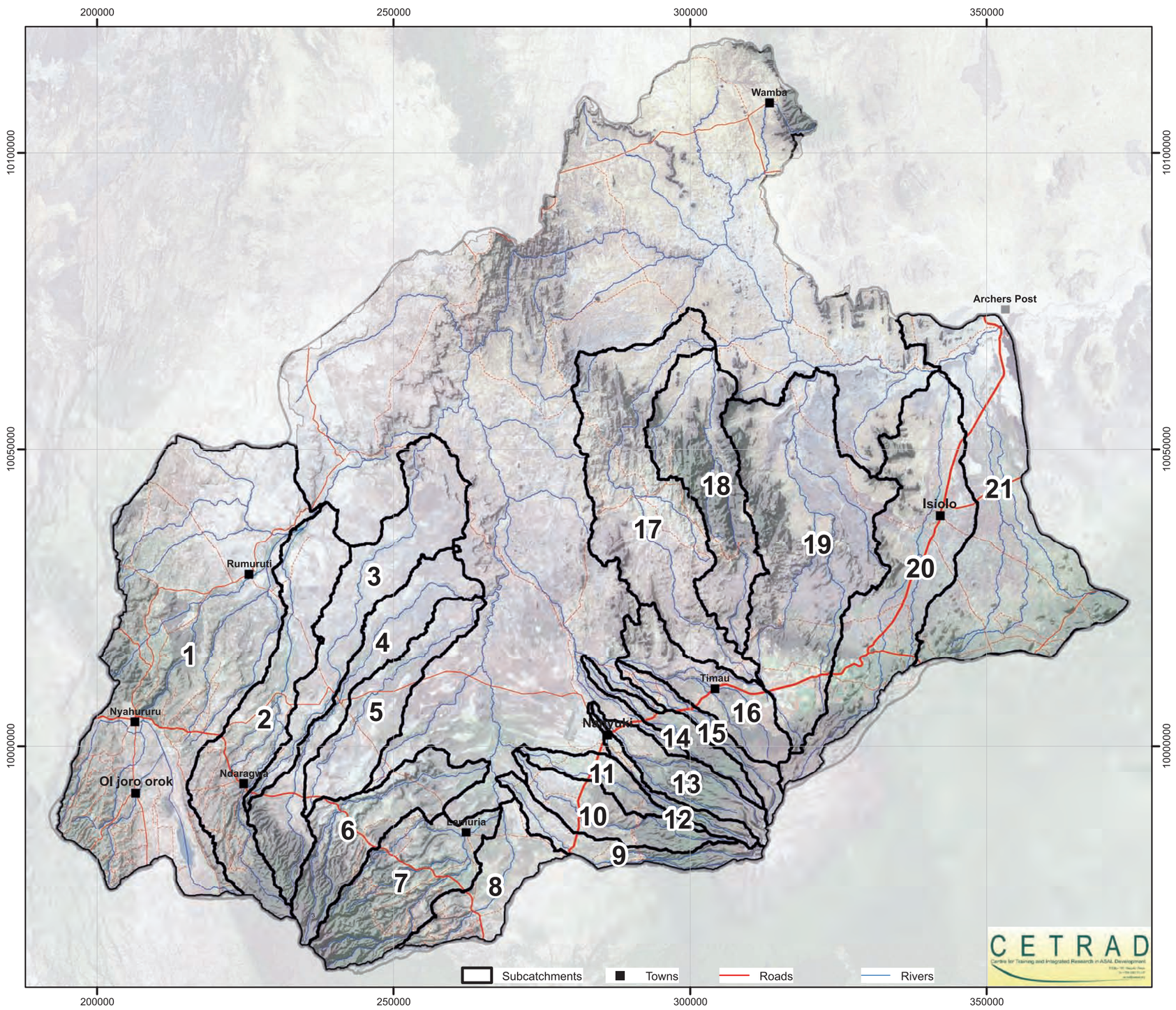
All the map sheets have their own legends, projection information, CETRAD mission and logo and copyright declaration. Therefore, they can be used either as part of the directory, or can be duplicated for separate use in reports and presentations, with proper citation and acknowledgement.

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

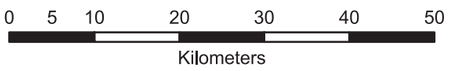
The fact sheets provide for each sub-catchment an introductory remark on total land area, human population, dominant land cover types, climatic conditions and the number of institutions of learning. Additionally, a table provides basic information on Water Resource User Association (WRUA) for those sub-catchments 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







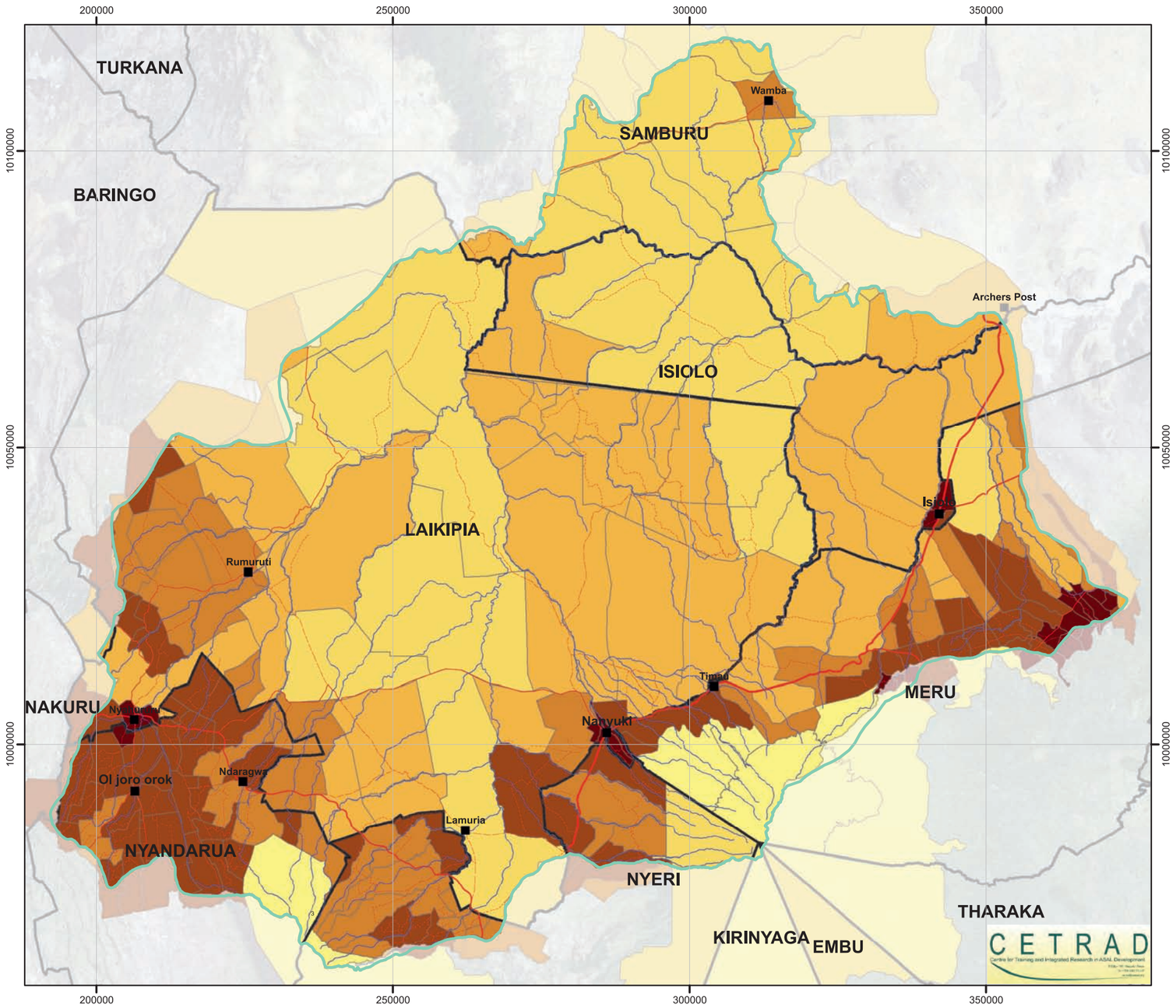
Upper Ewaso Ngiro Basin: Population Density (1999)

Population Density

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

Features

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



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Kilometers

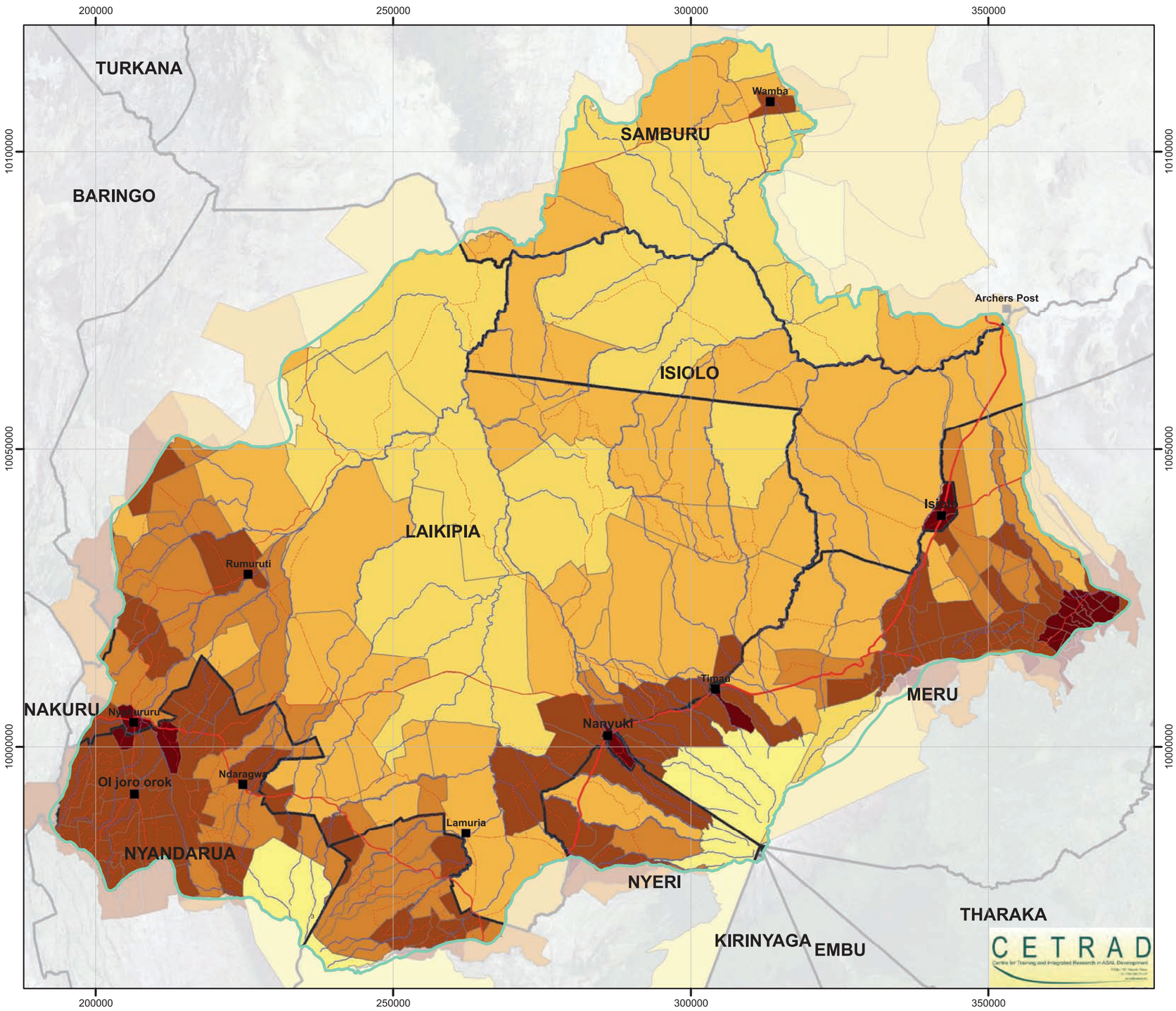
Upper Ewaso Ngiro Basin: Population Density (2009)

Population Density

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

Features

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



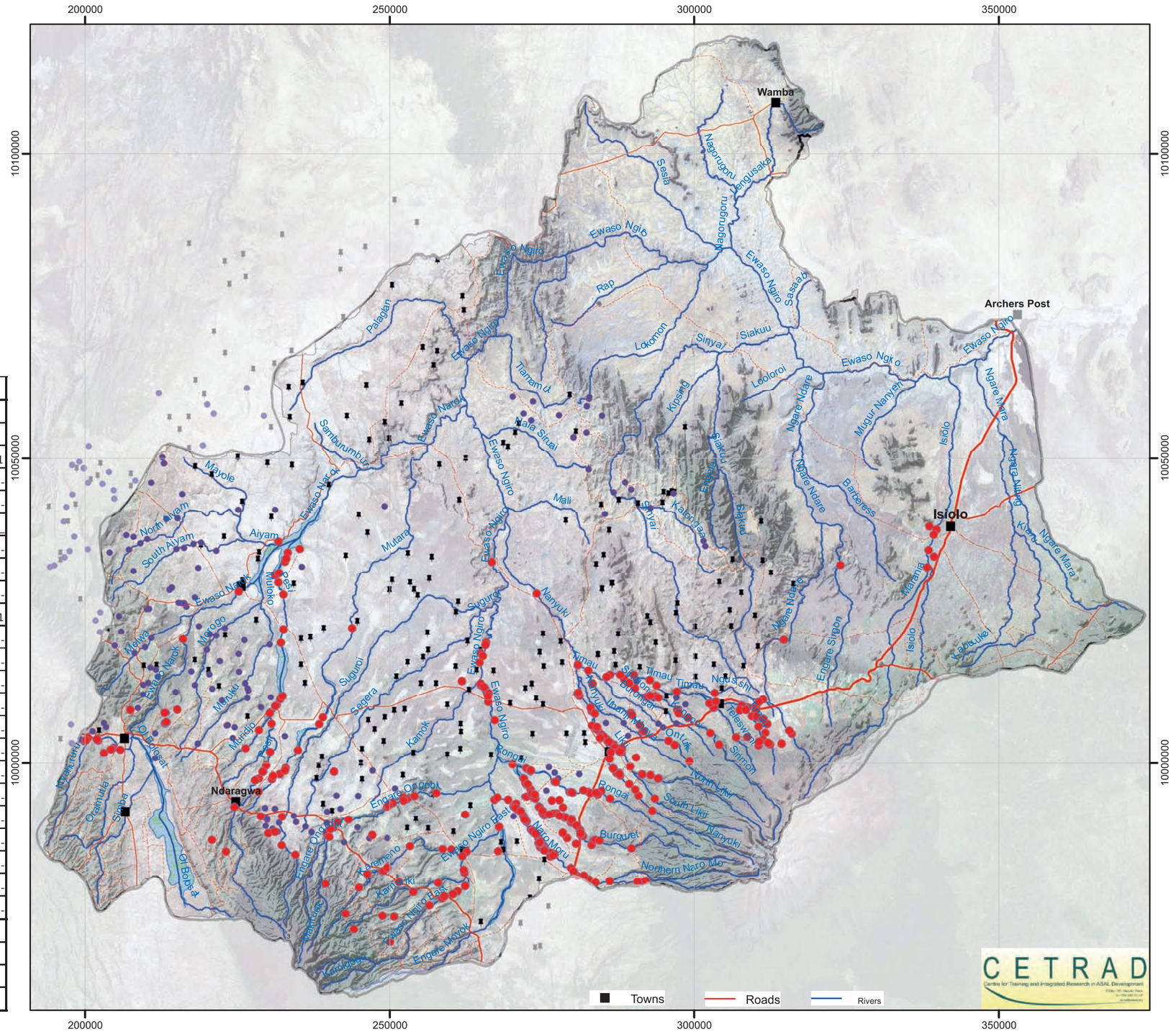
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Upper Ewaso Ngiro Basin: Water Resources and Abstraction Points (2005)

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)

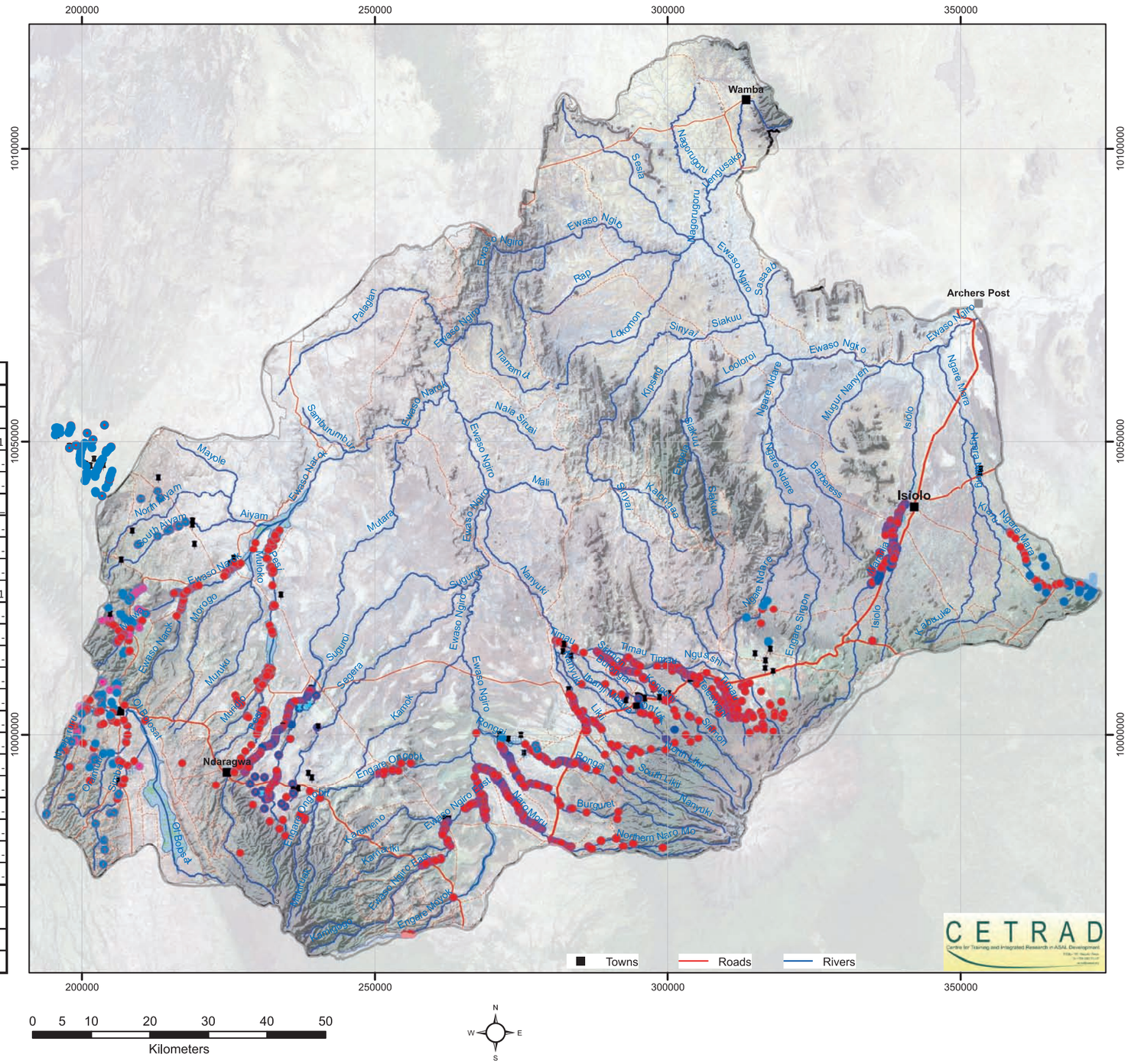
Abstraction Type

- 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

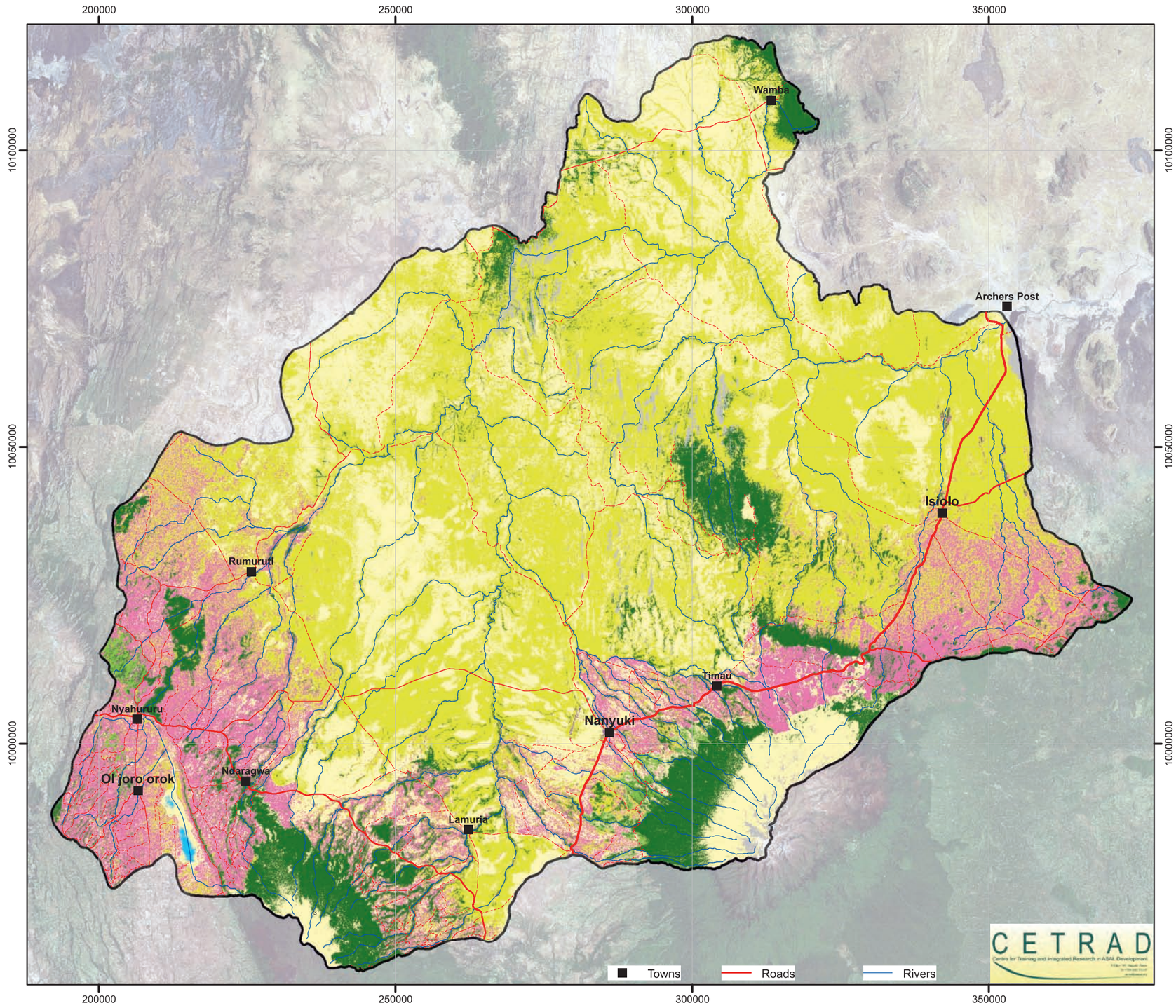


Upper Ewaso Ngiro Basin: LandCover (1995)

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**



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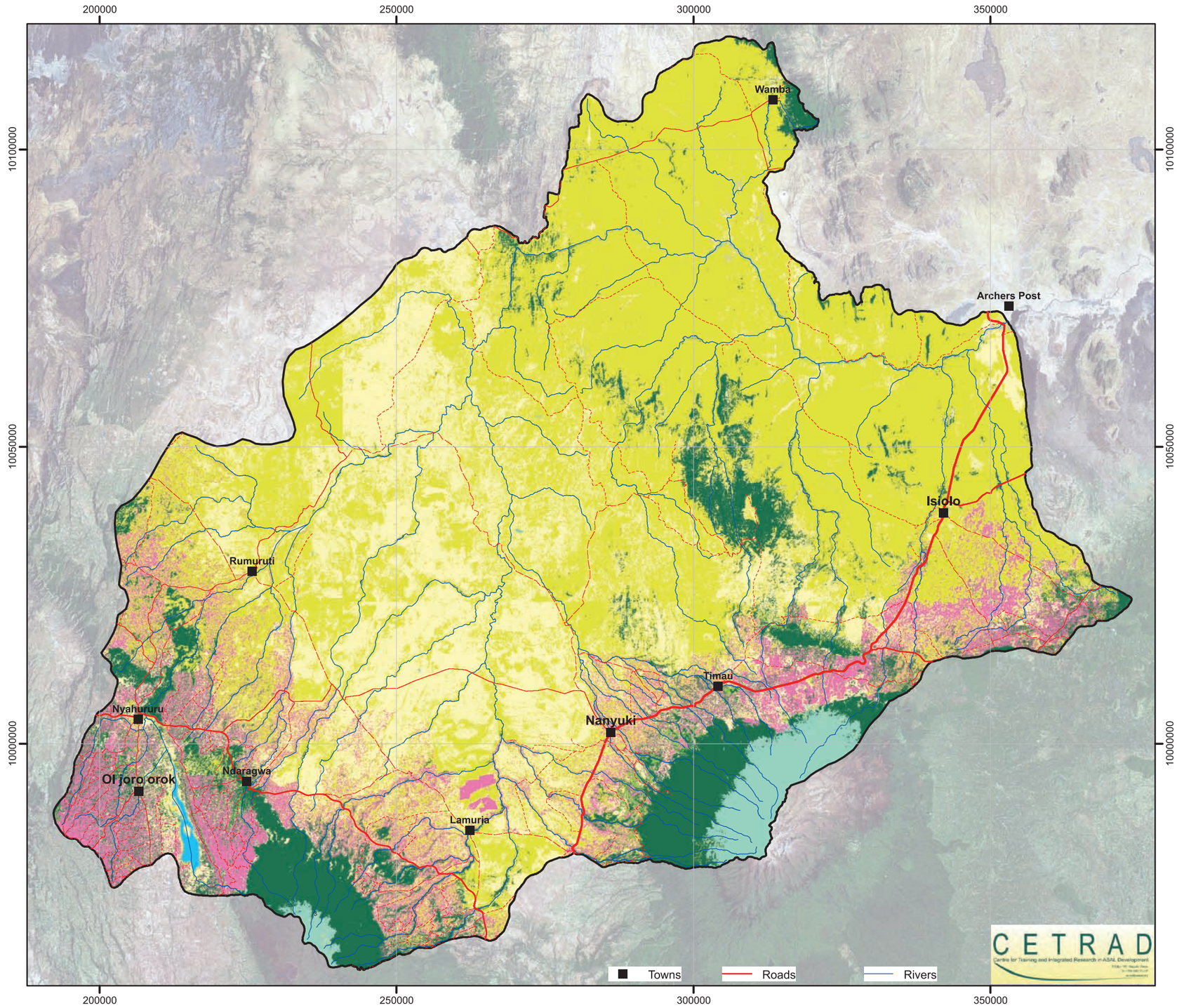
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Upper Ewaso Ngiro Basin: LandCover (2014)

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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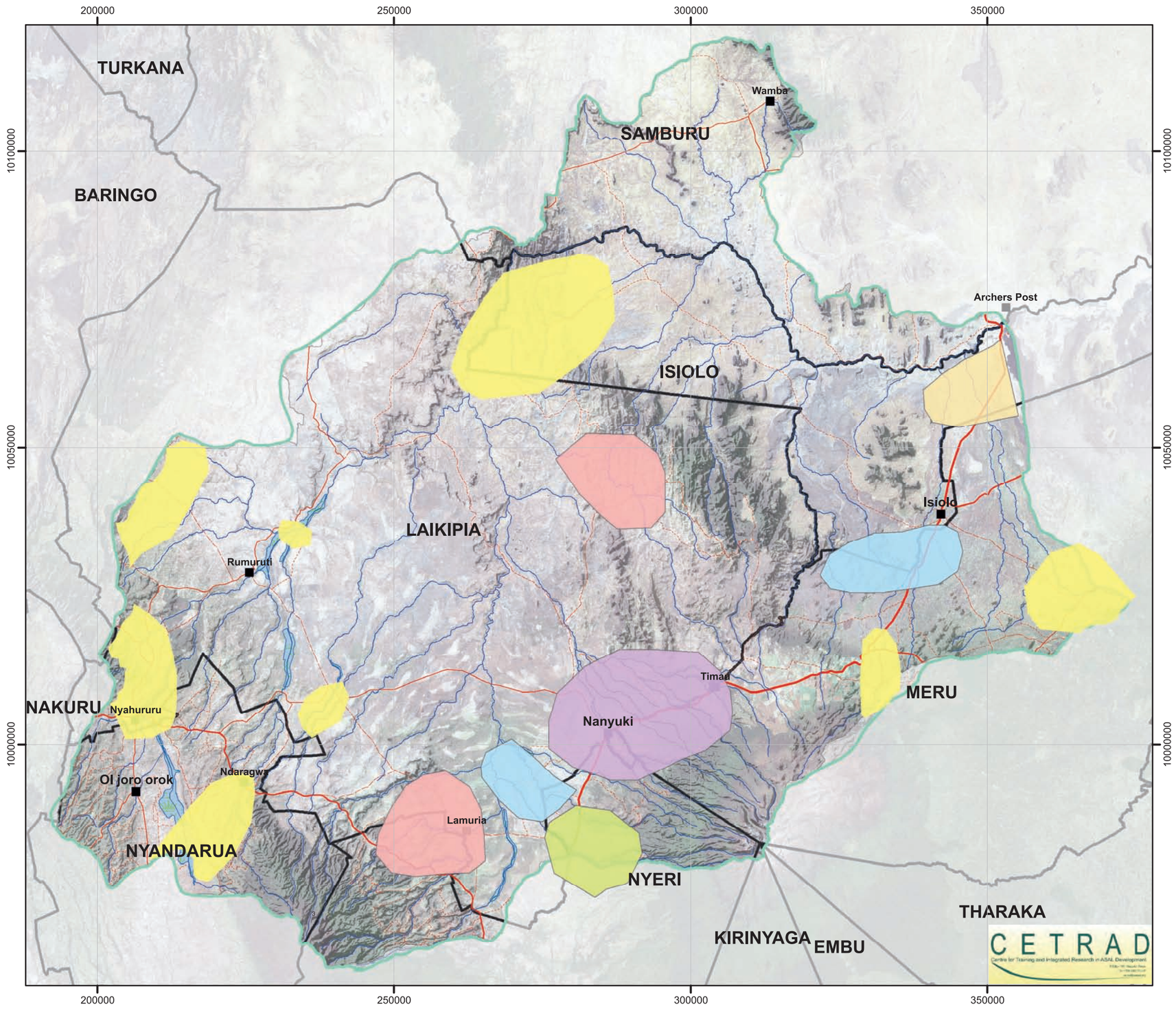
Water conflict related Hotspots within the basin (2012)

Types of hotspots

- Agropastoralist Vs Agropastoralist
- Agropastoralist Vs Authority
- Agropastoralist Vs Pastoralist
- Agropastoralist Vs Ranches
- Agropastoralist Vs Wildlife
- Upstream Vs Downstream

Features

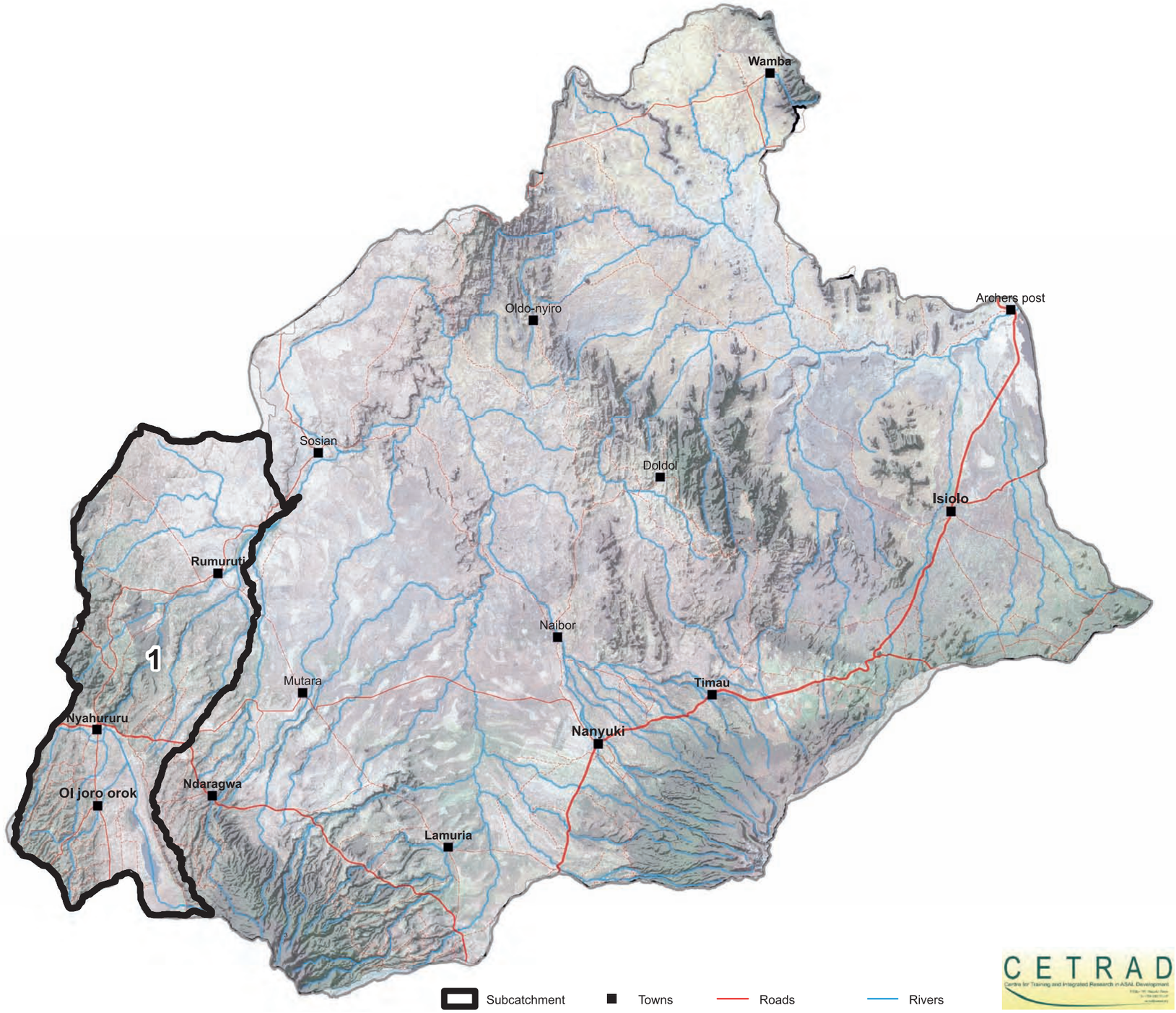
- Towns
- Roads
- Rivers
- Basin Boundary
- Counties
- Wetlands



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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 -Conservation of trees along the riparian lands within the river banks -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 LWF, Year:2011, Capacity building support 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 -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 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 -raised membership to 130 members
Hindrances to achieve the goals of the WRUA	-inadequate funding -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 (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 Jamlick Maina Mwangi; 0725857212				
Date of Formation		March 2010				
	Social services	Reg. No. 9552				
	Attorney General Office	Reg. No. 33978				
	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 -put conservation measures in place to increase water flow in the river -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 Planting of blue gum in riparian land 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. Implementation is slow as the community within the subcatchment has never had any institution supervising the resource				

Challenges	Newly formed WRUA Lack of skills 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 Destruction of fenced dams and troughs Denial of water by an individual
Cases of conflicts unresolved and reasons	None
Other activities the WRUA is engaged in	-tree nursery -Digging of shallow wells in members' farms
Achievements	-increased number of trees planted every year -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 Protection of the water sources
Institutional Support to WRUA (Name, Year, Type of support, Amount of support)	WSTF 2011 Financial support
cause of pollution	Slaughterhouse
Existence of Wetlands and their status	There are wetlands in the subcatchment The wetlands are endangered if unprotected immediately
Others	

EWASO NAROK SUBCATCHMENT

Fact sheet. Date: July 2014

4. Nyahururu WRUA

Name of WRUA		Nyahururu WRUA				
Contact Address email, chairperson, phone		nyahururuwrua@yahoo.com; 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 -encroachment -over abstraction -human /livestock/wildlife conflicts				
Problems Reported to the WRUA		Encroachment of dam reserves 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 Inadequate resources and backing from collaborators Invasive weeds covering dams (2 large dams;17 acres)
Cases of conflicts dealt with	Formation of conflict resolution committee to handle springs pollution Demarcation of encroached dam reserves
Cases of conflicts unresolved and reasons	Catchment destruction Illegal abstractors Unresolved conflicts is due to poor enforcement
Other activities the WRUA is engaged in	SCMP development and implementation water conservation and sustainable use Catchment rehabilitation and protection
Achievements	Catchment rehabilitations Conflict management 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 (Name, Year, Type of support, Amount of support)	Laikipia Wildlife Forum 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 Gwa Kahuno National pencil 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, 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 • Promote water development practices to improve quantity and quality • 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 Lack of knowledge for implementation of water regulations and the water service charter 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 SCMP development Mobilization of members
Achievements	Development of SCMP 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. By digging shallow wells
Institutional Support to WRUA (Name, Year, Type of support, Amount of support)	WRMA 2010 Legal advice on recruitment, registration, capacity building LWF - Facilitation, training & SCMP development Rural focus - Facilitation, training & SCMP development
Water Quality and cause of pollution	Agrichemical pollution and soil erosion 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 ; 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 • Increase crop production • Increase livestock production • 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 -illegal Water abstraction				
Problems Reported to the WRUA		• Exotic tree planting at riparian areas or wetlands • Dam land reserve encroachment • Illegal water abstraction • Wetland destruction • 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 • Exotic tree planting • Wetland destruction • 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 Protection of rivers/dams/springs protection of riparian land Protection of spill ways
Achievements	Build three spillways 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 Protect wetlands/swamps/ riparian land 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 (Name, Year, Type of support, Amount of support)	WSTF – 2011 sh. 556,700 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 Boiman Wetlands
Others	We need urgent funding to protect wetlands/ dams /rivers

EWASO NAROK SUBCATCHMENT

Fact sheet. Date: July 2014

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 2)To provide a forum to discuss, prevent and resolve water conflicts 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 - Ignorance on water Act 2002, selfishness etc.				
Problems Reported to the WRUA		Inadequate water destruction of spring eyes Illegal abstraction 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 Inadequate water 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 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 (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 ; 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 - Encroachment of water sources and riparian				
Problems Reported to the WRUA		Contamination of water by livestock and people through poor sanitation 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 consumes time and hostility of parties Lack of resources
Cases of conflicts dealt with	None
Cases of conflicts unresolved and reasons	Six cases 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. Awareness creation on water management
Hindrances to achieve the goals of the WRUA	Limited funds
Advices to others	Utilise committed persons within the community 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 (Name, Year, Type of support, Amount of support)	Sensitization workshops by WRMA for the formation of the WRUA in 2011 and January 2012 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

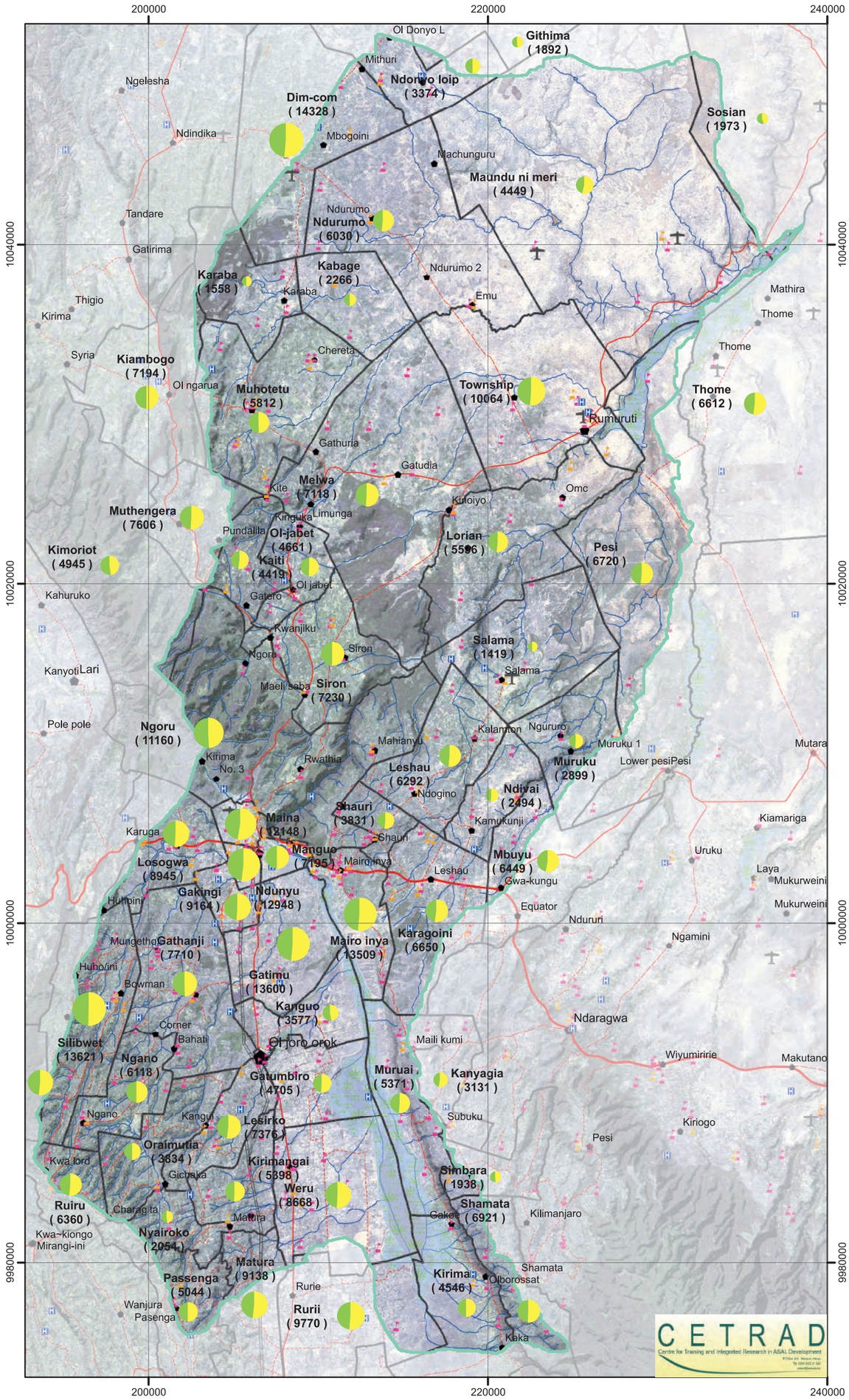
9. Olmoran WRUA

Name of WRUA		Olmoran WRUA				
Contact Address email, chairperson, phone		C/o Chief office – Olmoran 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 -To reduce pollution -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 -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 -lack of knowhow and young WRUA -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 (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

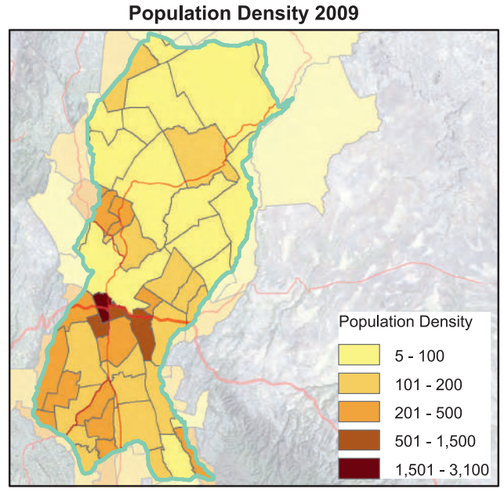
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Population Numbers 2009

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

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.

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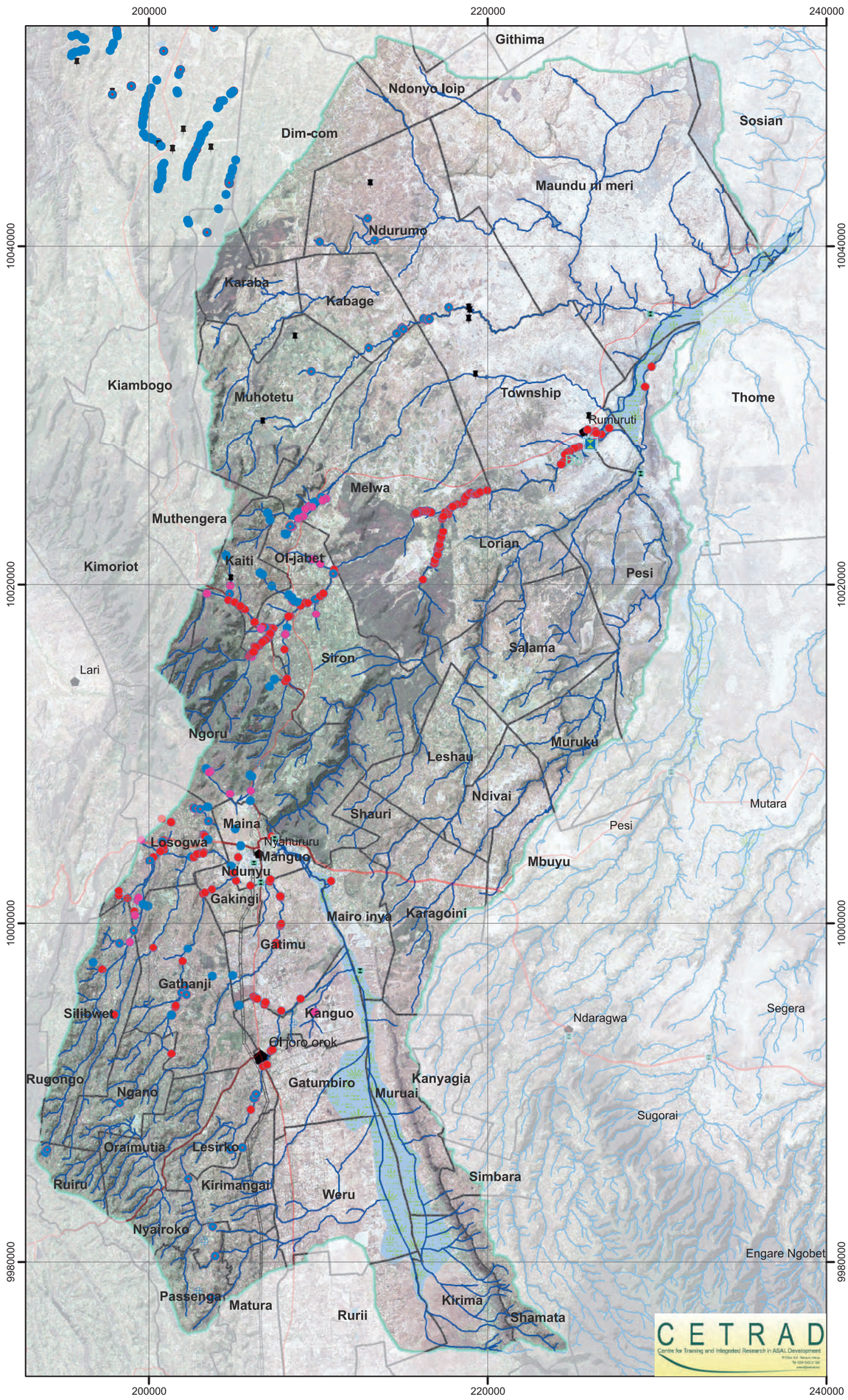
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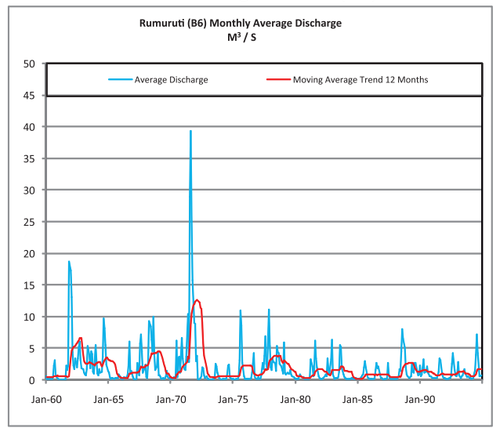
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(*) Arid and Semi Arid Lands.

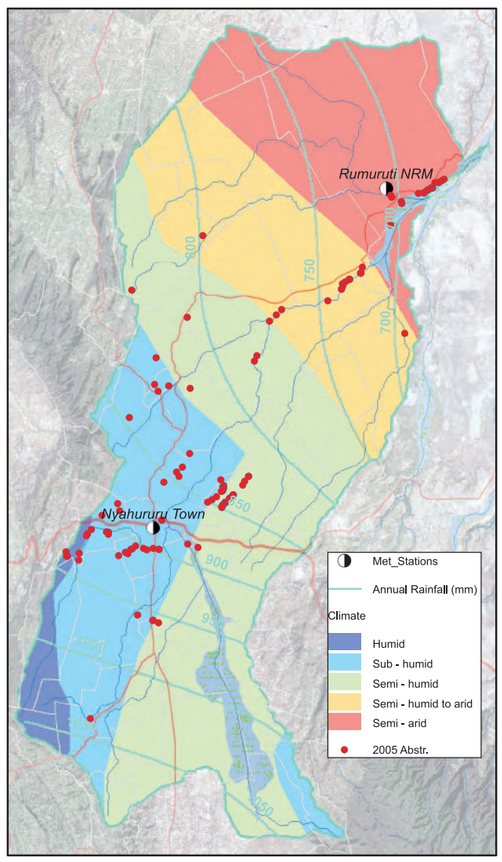
Water Resources and Abstraction Points (2013)



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
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X-Shift: 500,000
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Land Cover 2014

1

200000 220000 240000

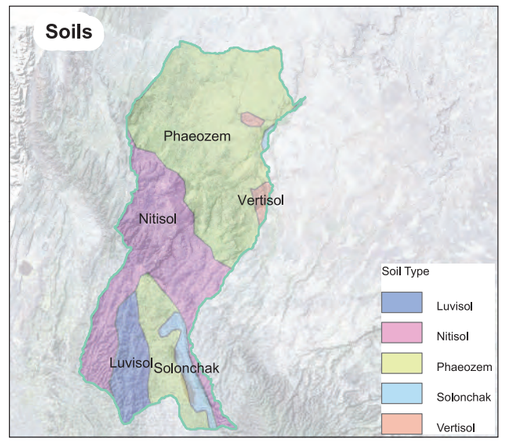
10040000 10020000 10000000 9980000

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

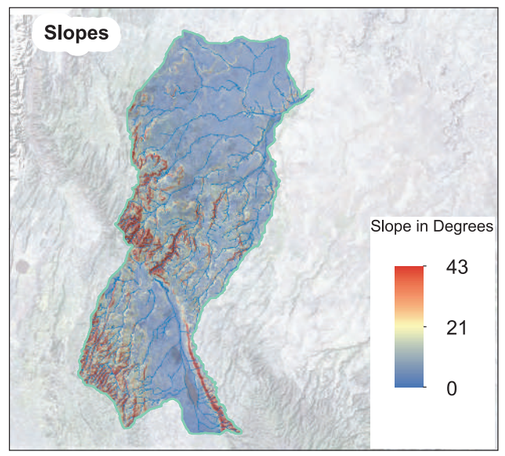
CETRAD
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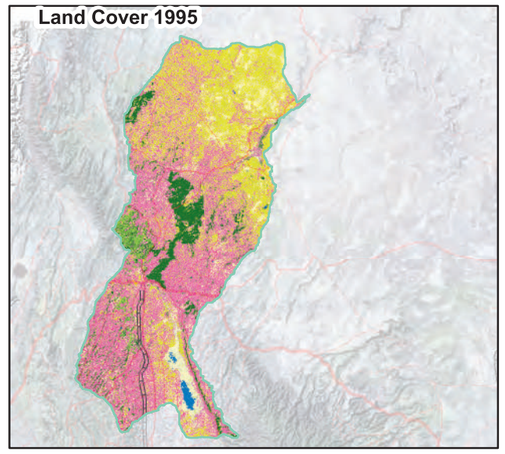
Soils



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
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39° East of Greenwich
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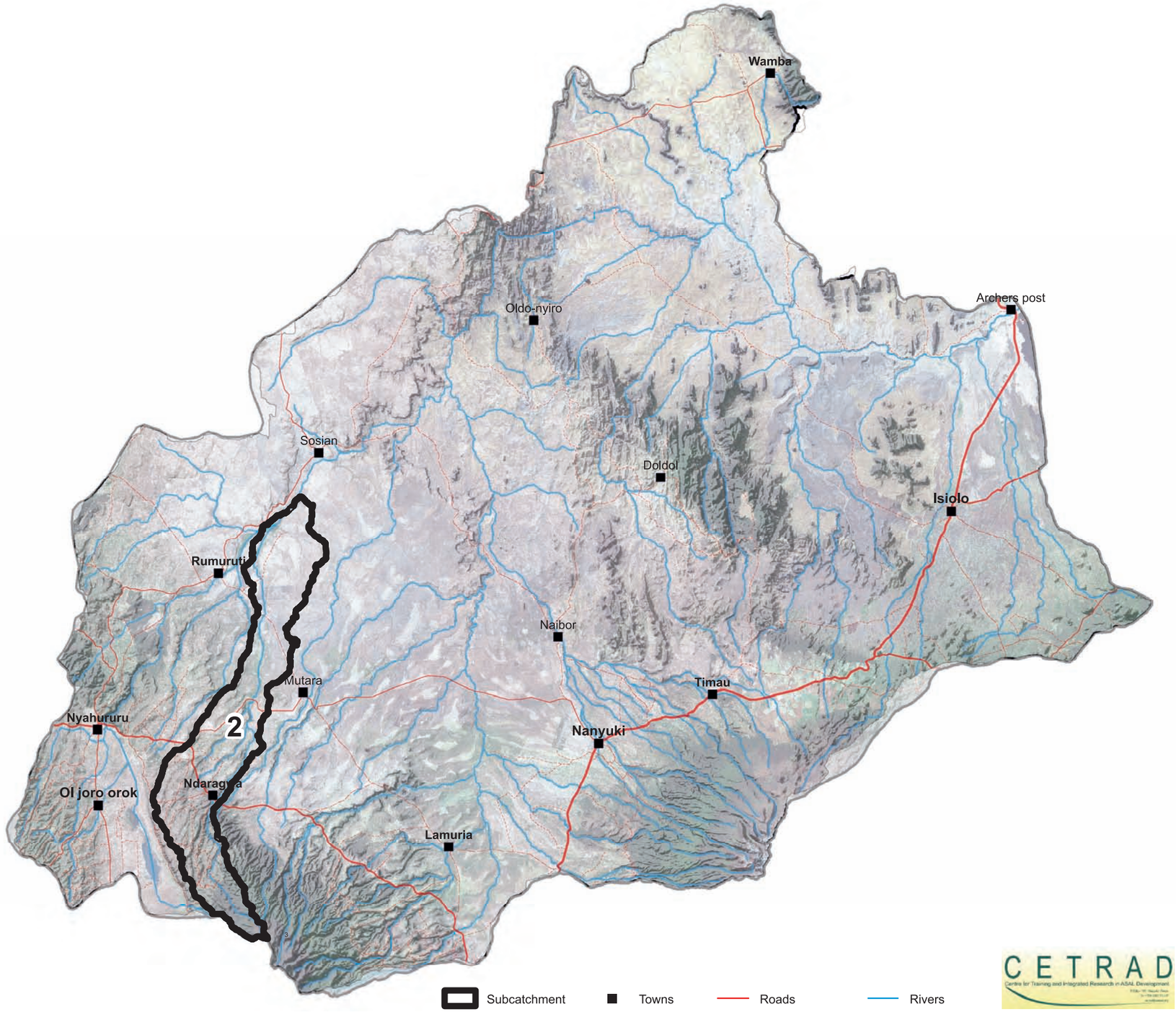
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

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2 - Pesi


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
Nyahururu
2
Nanyuki
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
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Centre for Training and Integrated Research in ASAL Development

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

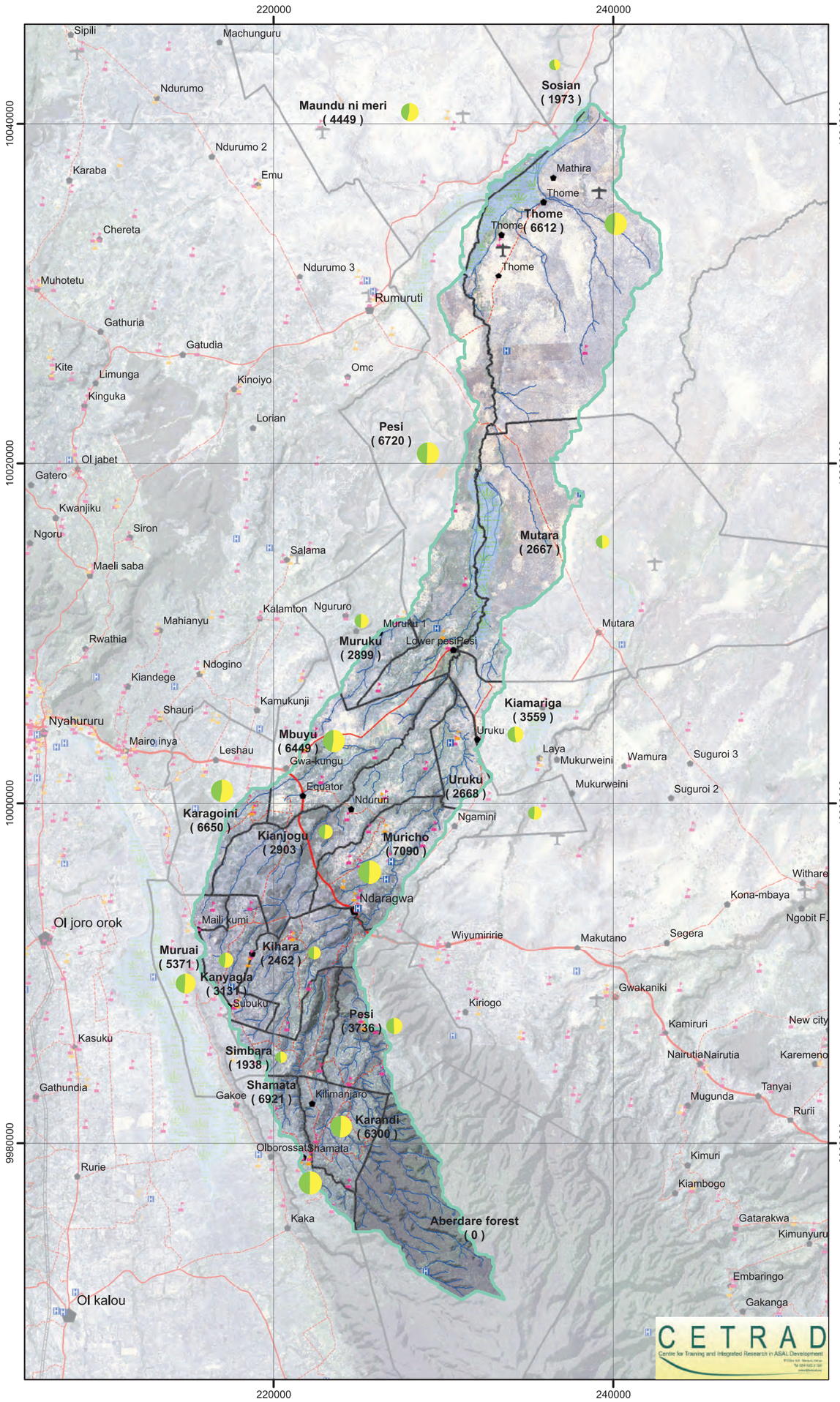
There are fourteen (14) secondary schools and over 45 primary schools; government sponsored (21), Private (10) and Religious organizations (12), Community (1) and (NGO/CBO (1).

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, Promote efficient and economical use of the water. 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. -Catchment destruction -water pollution -Lack of capacity building -Infrastructure improvement				
Problems Reported to the WRUA		-Catchment destruction -Water pollution -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 -Lack of storage facilities & dams -Lack of finances, poor communication, vastness of the catchment				
Cases of conflicts dealt with		-Encouraging efficient methods of irrigation by discouraging furrow irrigation -Planting of water friendly trees along the river -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 -Water pollution: spraying of animals along the river -lack of implementation mechanism
Other activities the WRUA is engaged in	-Tree nursery -Fish farming
Achievements	- united the Pesi river management from upper to lower zone & are working together - planted trees along Pesi river - 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 -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 (Name, Year, Type of support, Amount of support)	1. Name: WSTF, Year: 2010, Type of support: Financial, Amount: Ksh. 574,000. 2. Name: LWF, Year: 2009, Type of support: Financial Amount: Ksh.1.499m. 3. Name; WRMA, Year: 2009-2012, Type of support: Financial & training 4.Name: RFL, Year 2009, Type of support: WRUA training 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 Status; settled
Others	-Dams: need rehabilitation (desilting of old dams & constructing new ones) sites available especially middle zone -Springs: need to be developed in order to serve a wider area to help in minimizing abstraction from Pesi river -Shallow wells: are available & need development -Boreholes: Some are operational (5) while others need rehabilitation & there is inventory & report at SRO. -Water troughs: this can be constructed along the river & dams to prevent direct drinking by animals.

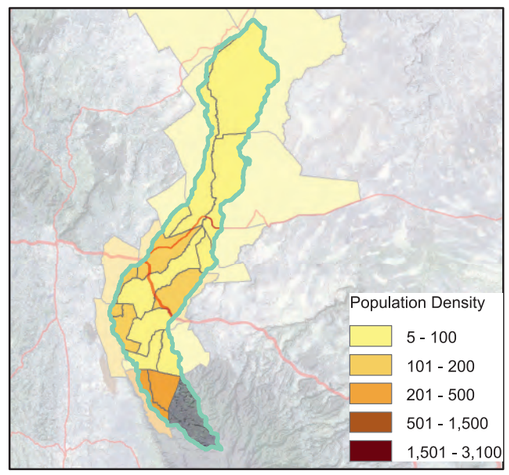
Population Numbers (2009) and Socio Infrastructure



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
Reference Ellipsoid: Clarke 1880
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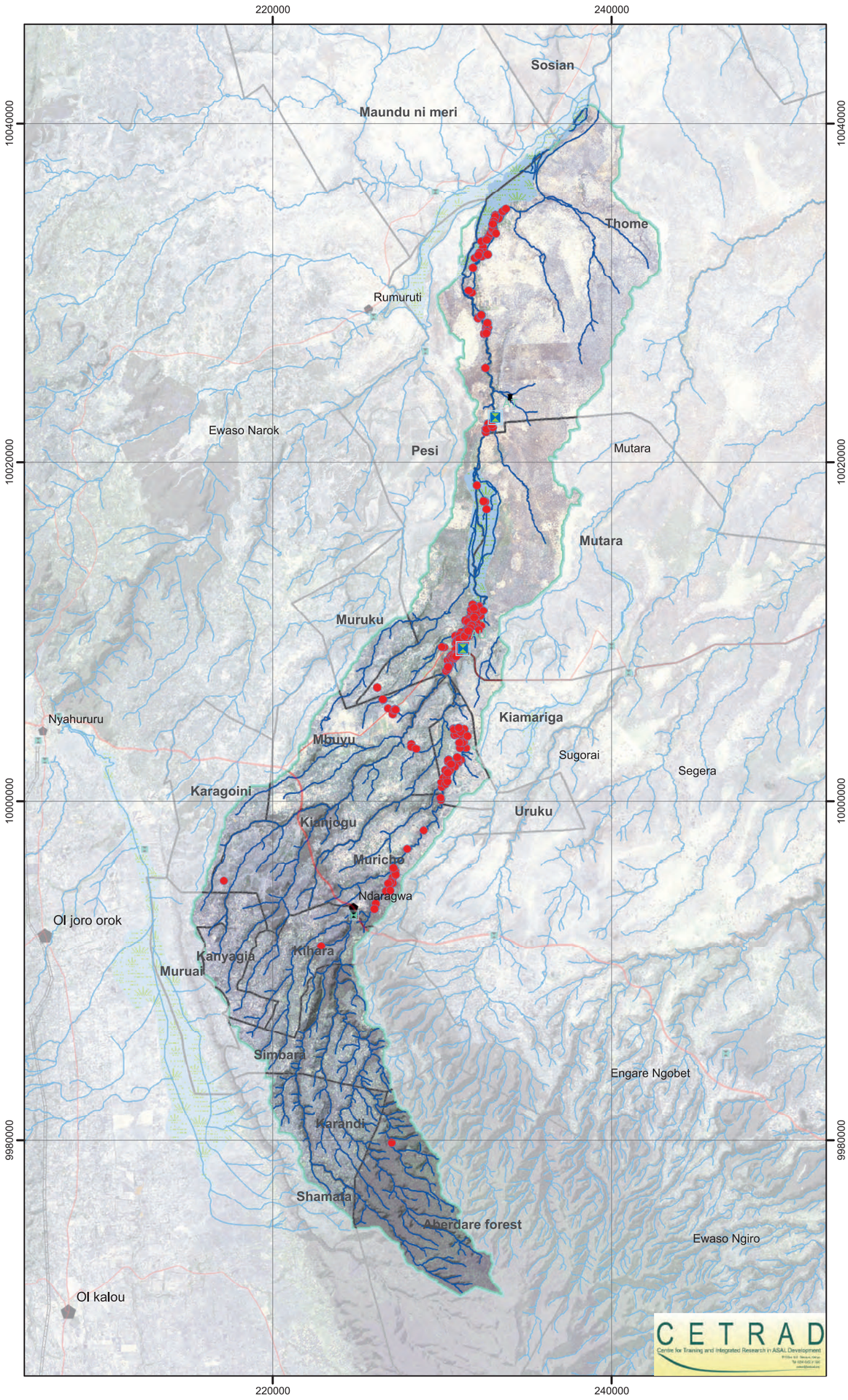
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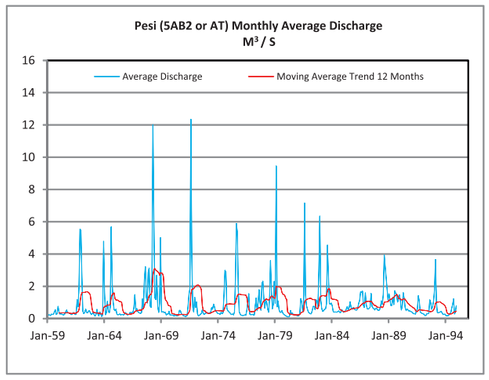
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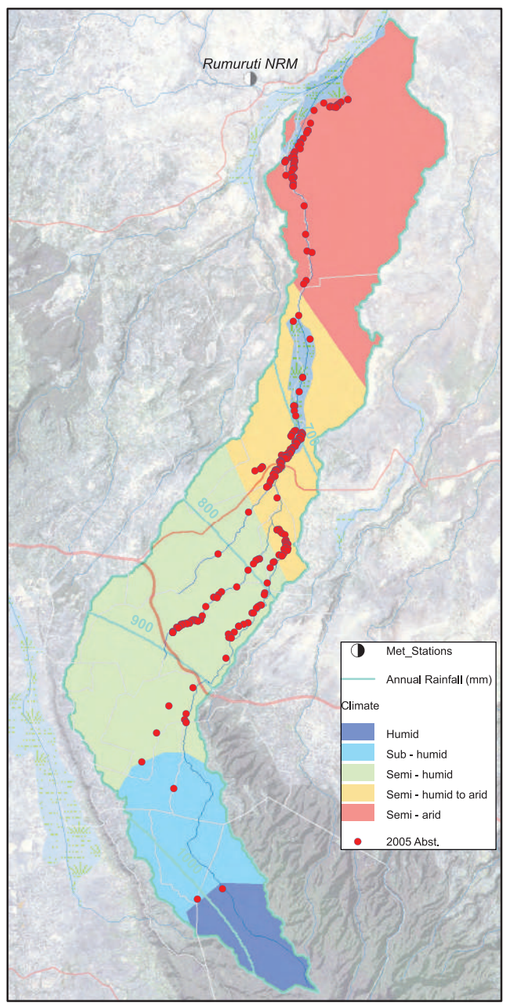
Water Resources and Abstraction Points (2013)



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

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Urban Settlements
- District Hq
- Division Hq

Pesi Subcatchment

N W E S

0 2 4 6 8 10 Kilometers

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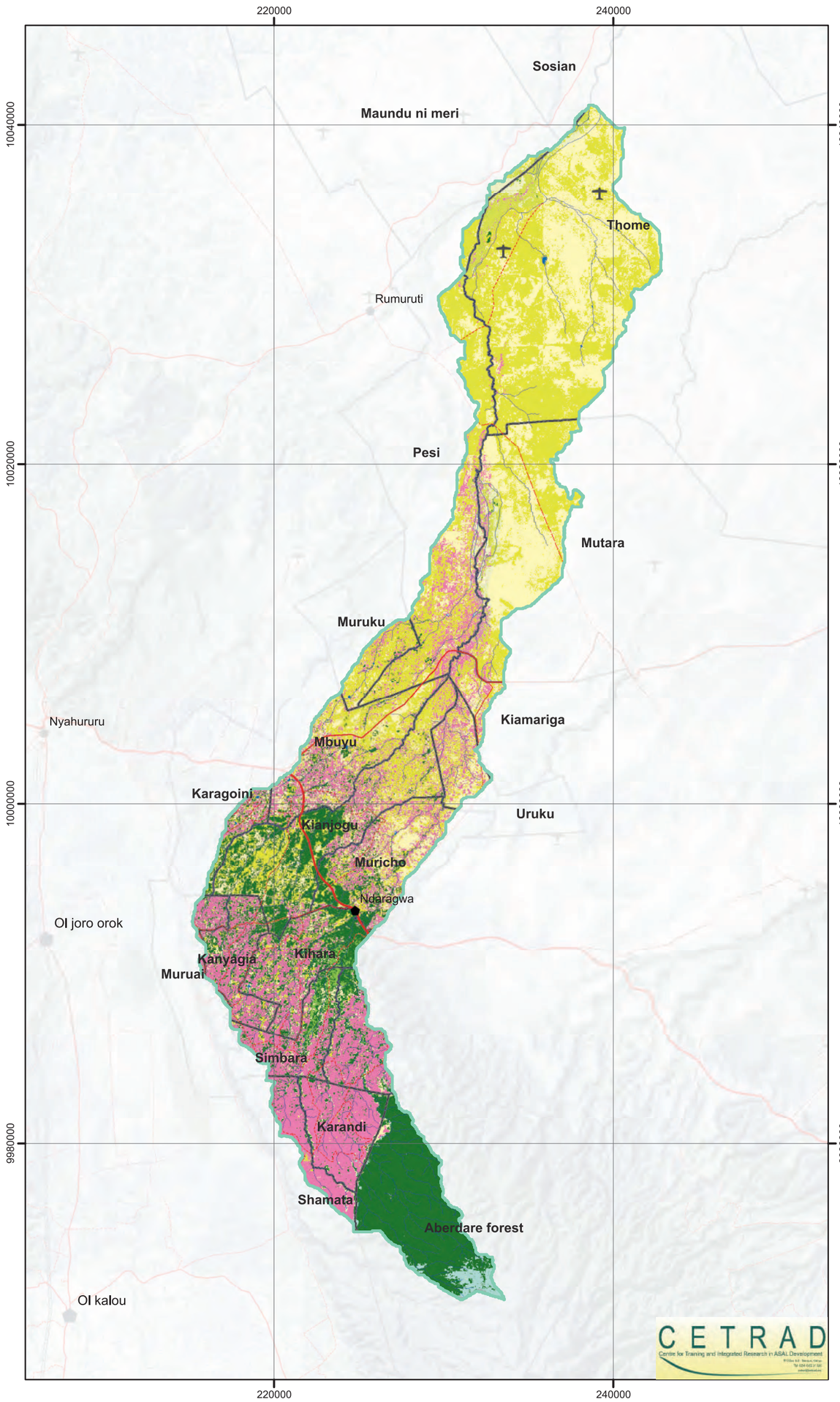
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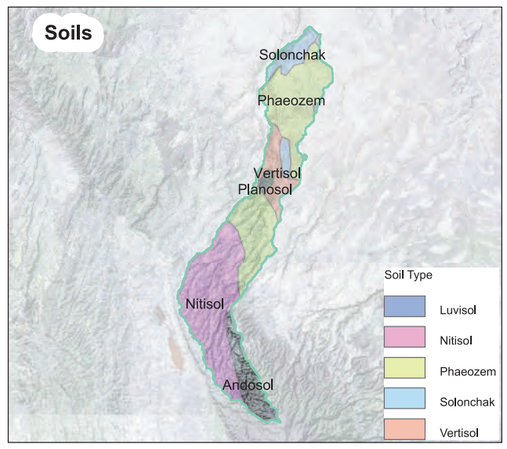
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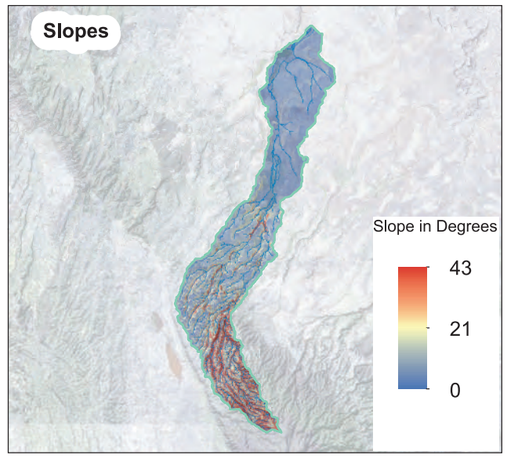
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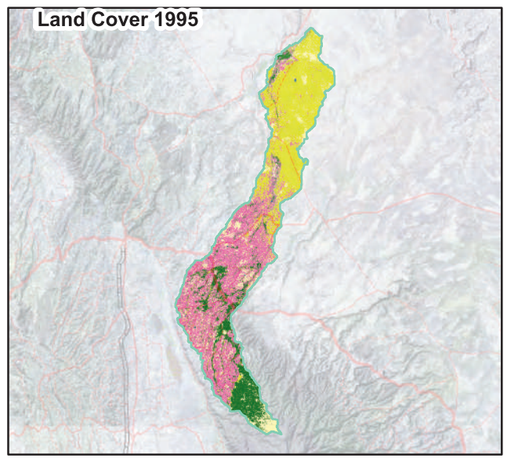
(*) Arid and Semi Arid Lands.

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

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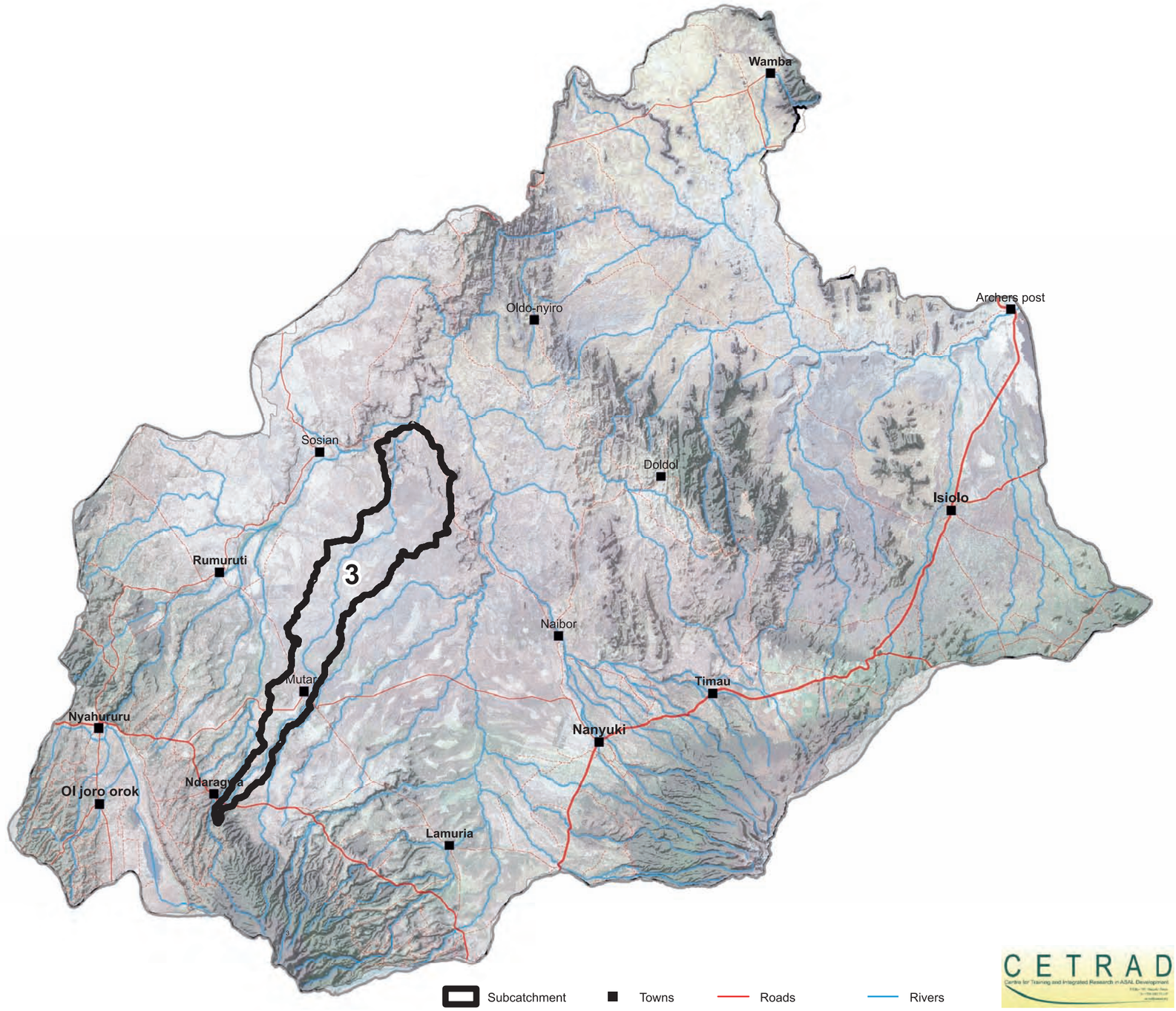
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3 - Mutara


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3
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Mutara
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E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
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

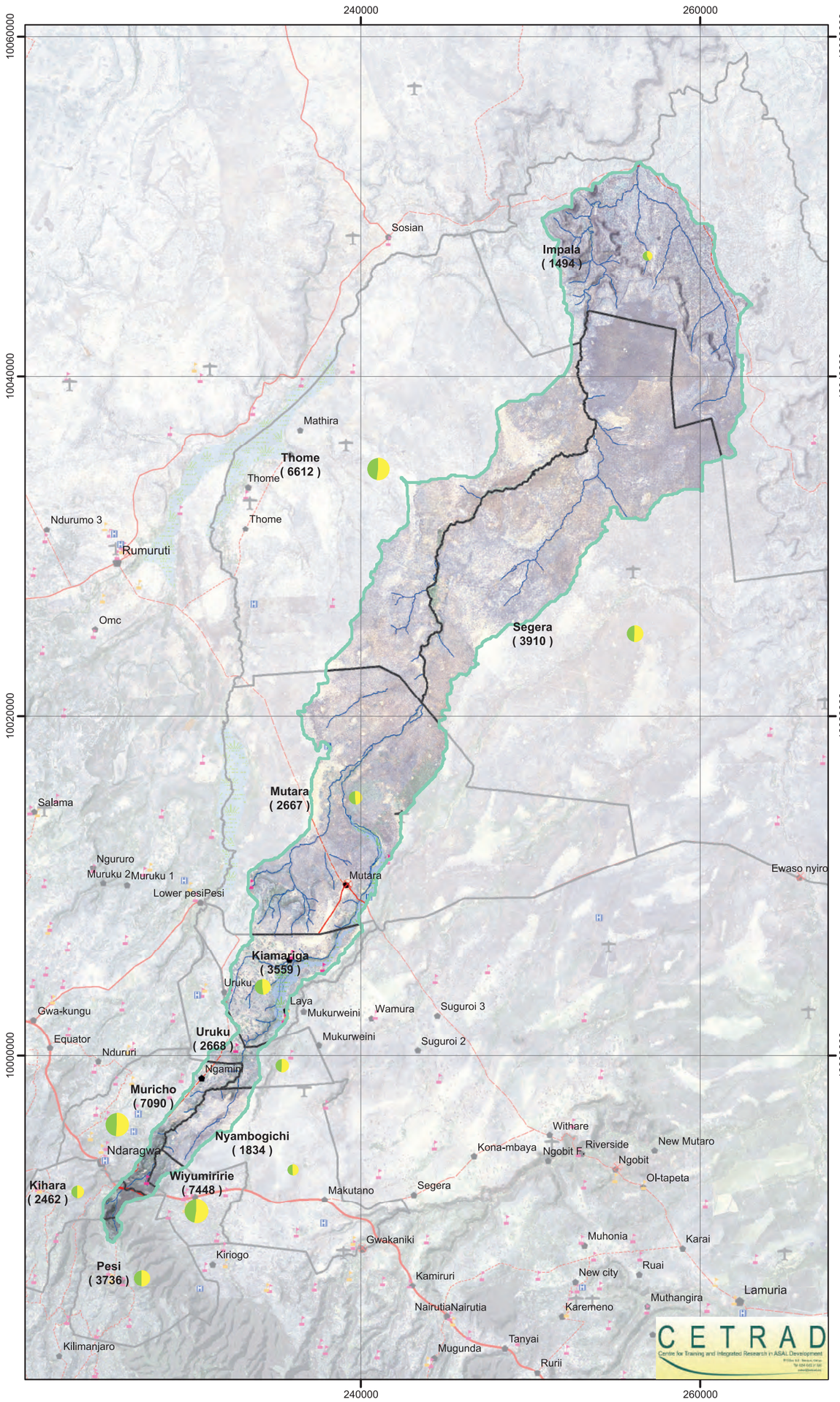
There are about 7 primary schools; government sponsored (3), Private (1) and Religious organizations (3).

Water Resource Users Association Information

Name of WRUA		Mutara WRUA				
Contact Address, chairperson, phone		P.O Box 24 Rumuruti 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 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) Human & wildlife conflict				
Problems Reported to the WRUA		Conflicts in the projects inadequate water supply especially downstream 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 2. The water resource is scarce and hence not enough to everybody 3. Lack of co-operation amongst members 4. Lack of funds
Cases of conflicts dealt with	Human conflict Project conflicts
Cases of conflicts unresolved and reasons	Fragmented projects Lack of funds to construct one common intake
Other activities the WRUA is engaged in	1. Farming 2. Livestock keeping
Achievements	increasing the number of registered members Registering WRUA in the Attorney General office
Hindrances to achieve the goals of the WRUA	1. inadequate funds 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 Data collection gadget
Period of Water Scarcity	Jan-March every year 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 Furrow irrigation, spray (pesticide containers), washing of clothes and spraying livestock in the river
Existence of Wetlands and their status	Drained wetlands
Others	none

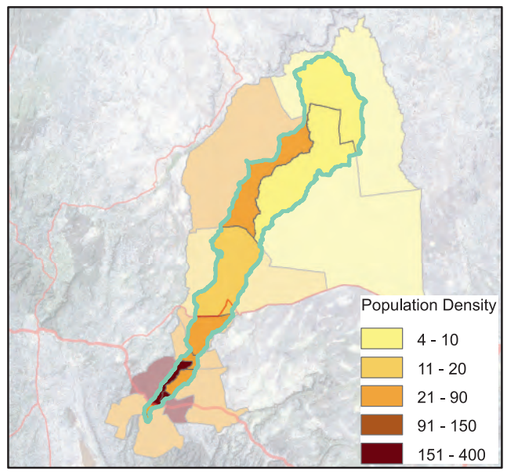
Population Numbers (2009) and Socio Infrastructure



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

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)

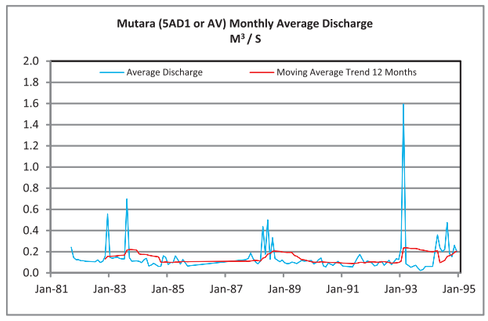
240000 260000

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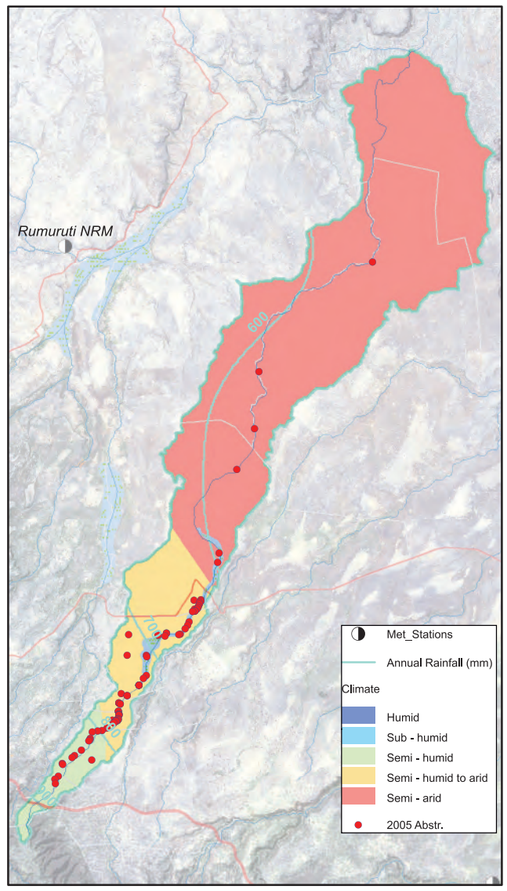
Impala
Thome
Segera
Mutara
Sugorai
Pesi
Kiamariga
Uruku
Muricho
Ndaragwa
Nyambogichi
Kihara
Wiyumiririe
Engare Ngobet
Naro Moru
Lamuria
Ewaso Narok
Rumuruti

CETRAD
Centre for Training and Integrated Research in ASAL Development

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

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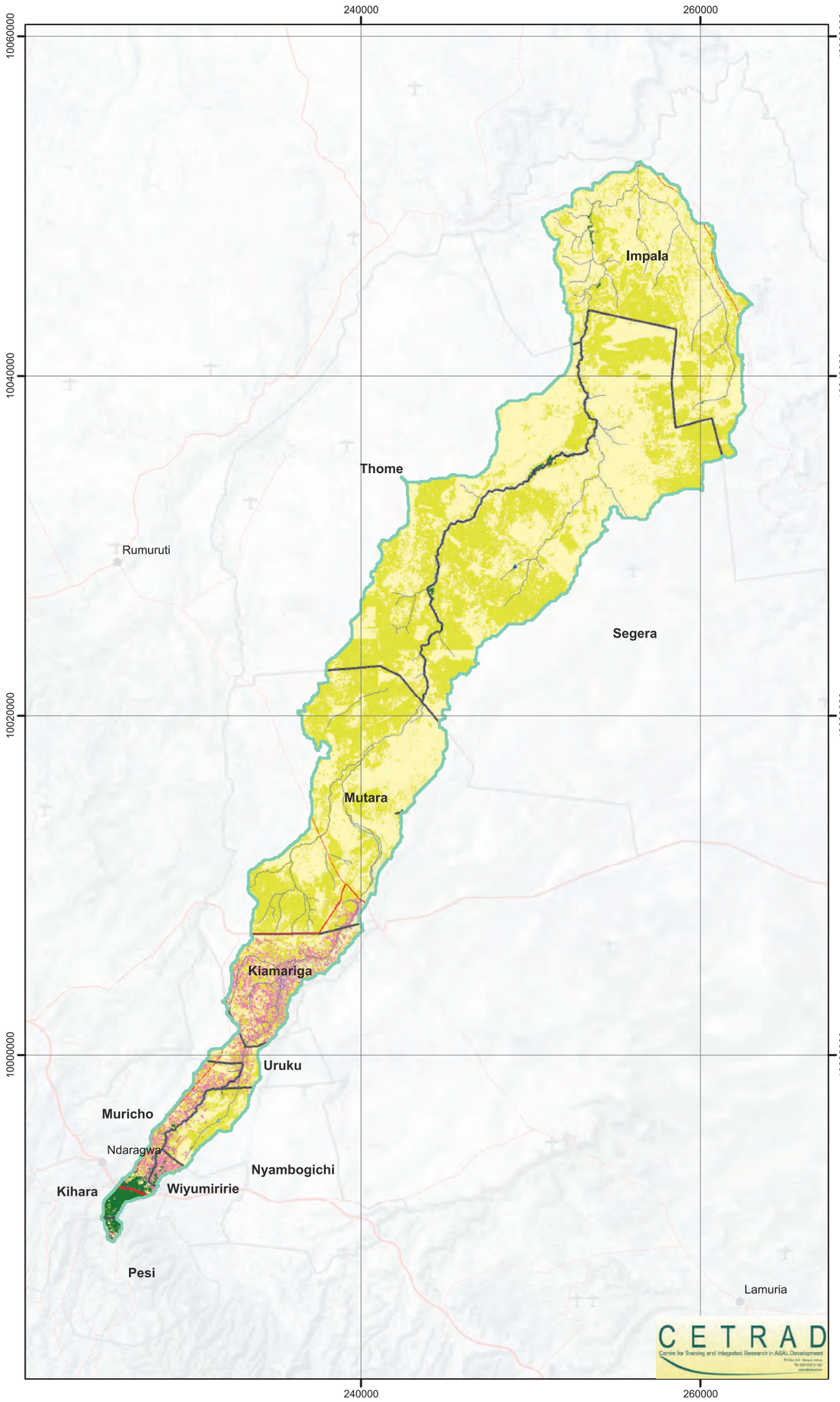
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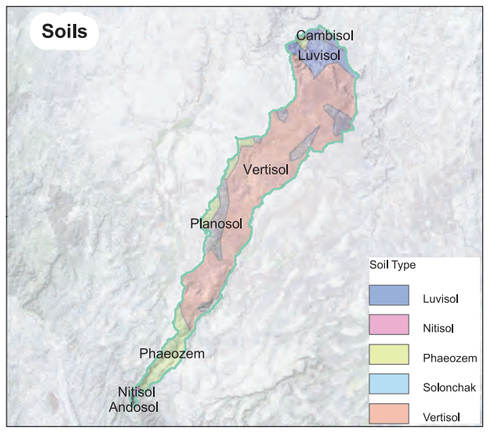
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

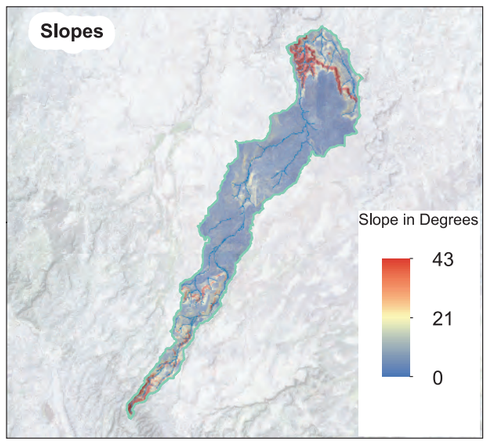
The background image: SRTM 30m.

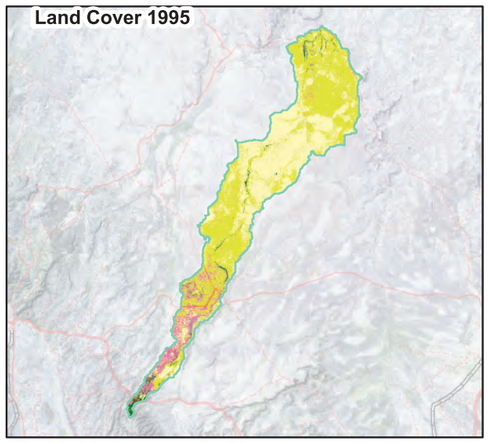
(*) Arid and Semi Arid Lands.

Land Cover 2014









Landcover Change

	1995		2014	
NAME	Area Km^2	% Cover	Area Km^2	% Cover
Grassland	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

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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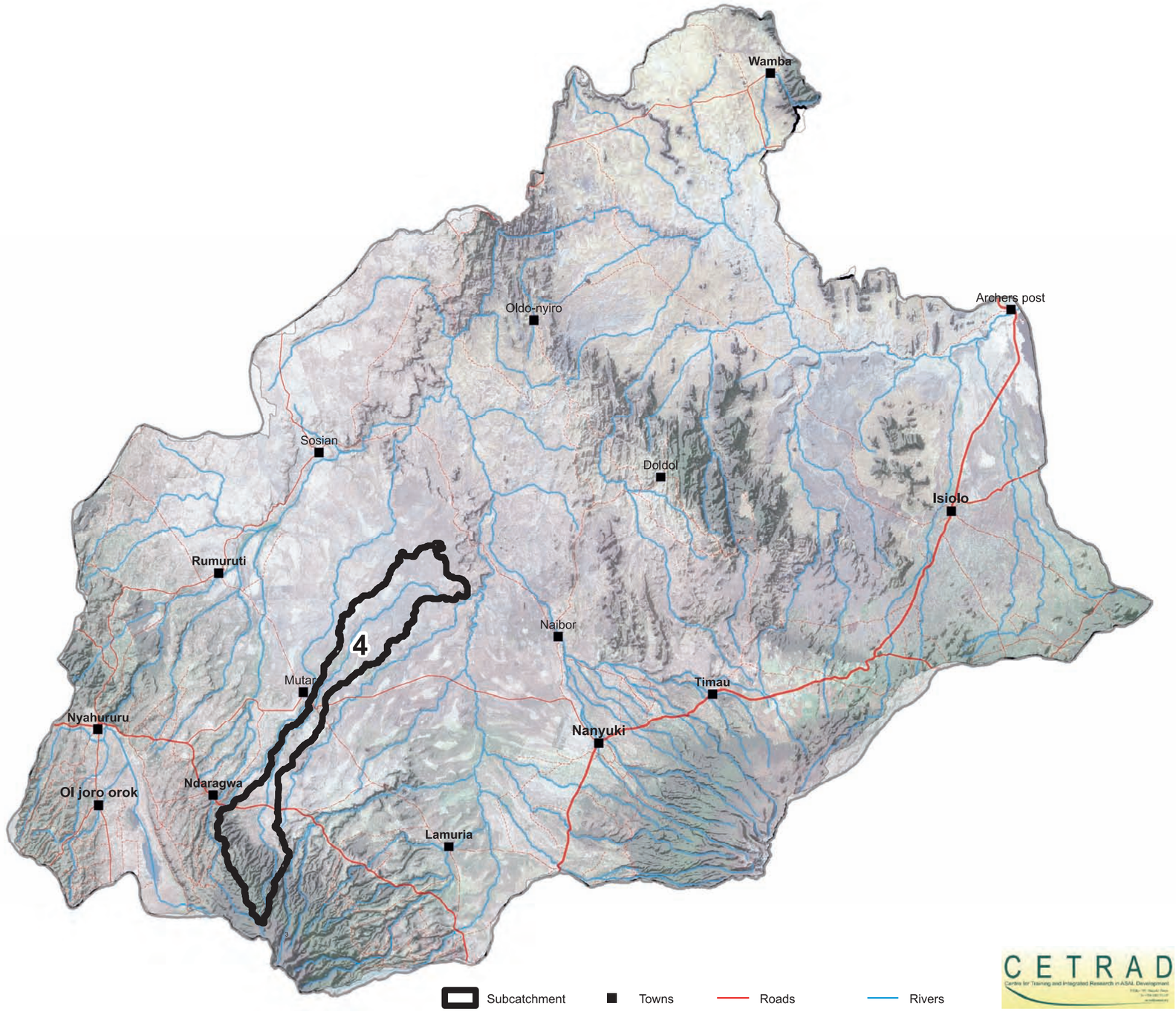
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Landcover information derived from Landsat Images 30m 2014.

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
Ol joro orok
Ndaragwa
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD
Centre for Training and Integrated Research in ASAL Development

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

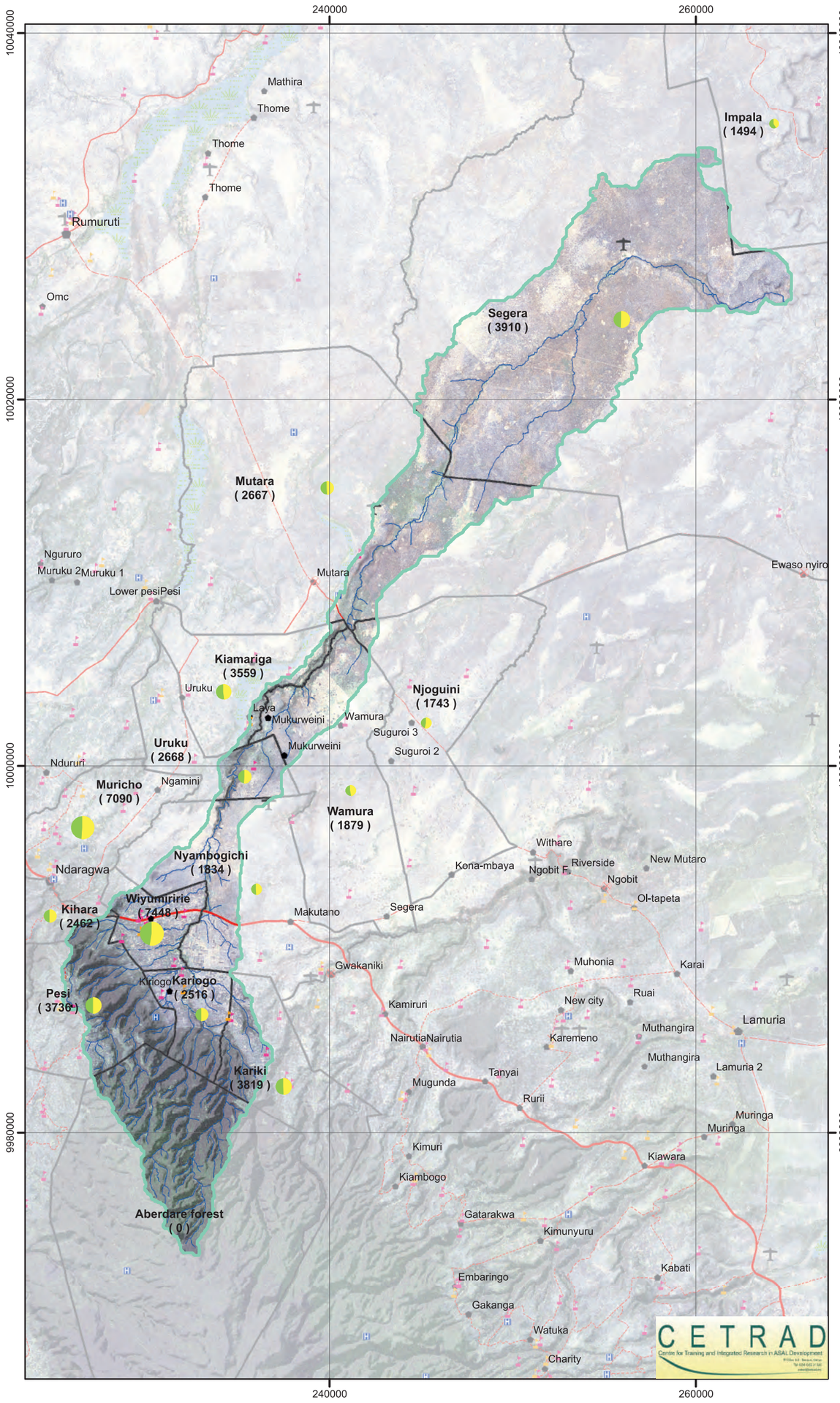
There are four (4) secondary schools and about 14 primary schools; government sponsored (4), Private (6) and Religious organizations (3) and Community (1).

Water Resource Users Association Information

Name of WRUA		Sugorai WRUA				
Contact Address email, chairperson, phone		P. Box 494 Nyahururu Chairman-0727303301 Secretary-0727871911				
Date of Formation		7/1/2006				
Registration details	Social services	2006				
	Attorney General office	file soc/55036 Date: 15/07/2010				
	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 -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 (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	

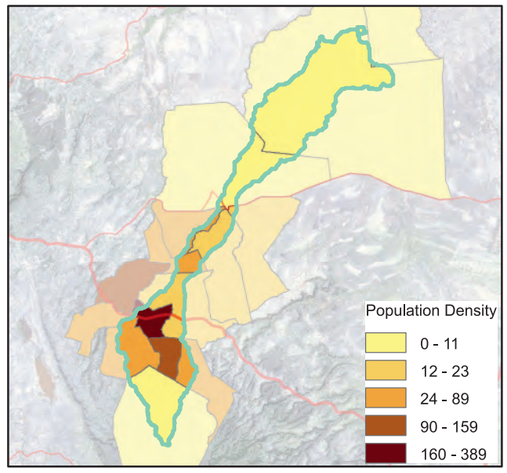
Population Numbers (2009) and Socio Infrastructure



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
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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

0 2 4 6 8 10 Kilometers

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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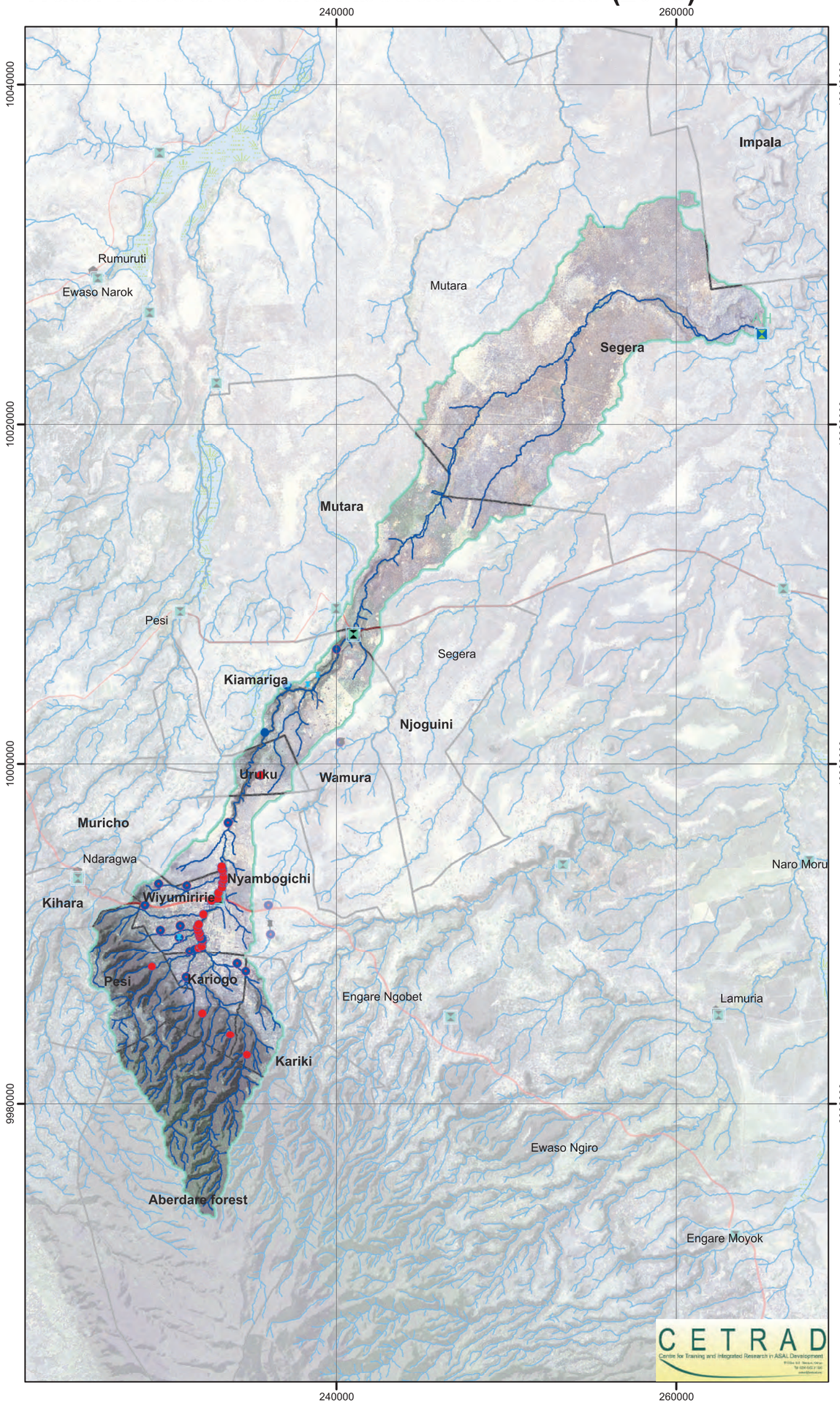
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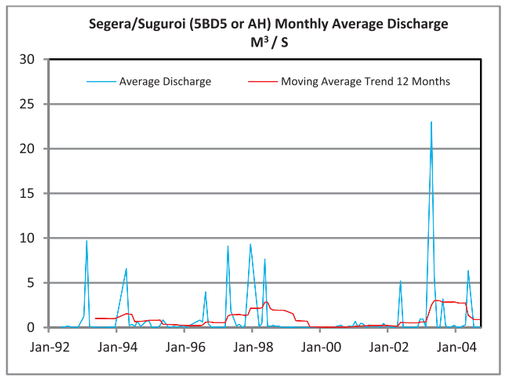
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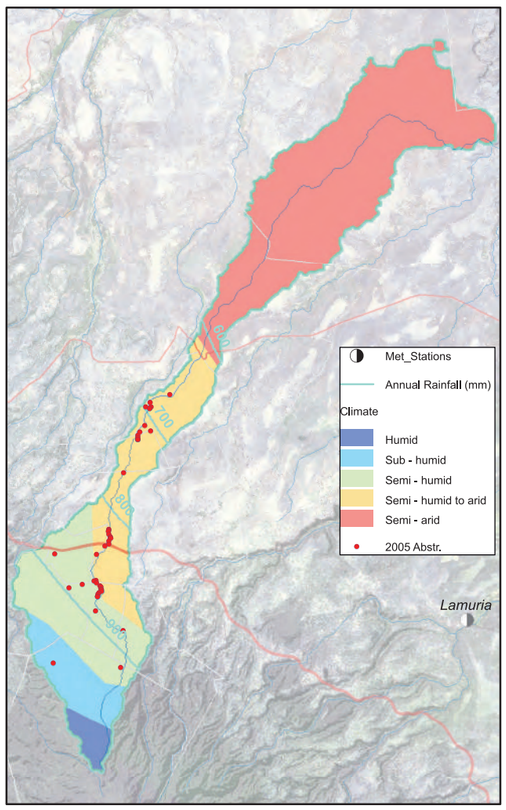
Water Resources and Abstraction Points (2013)



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

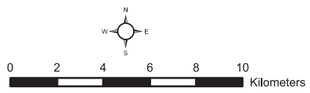
Abstractions
- Rivers
- Spring
- Dam
- Pan
- Borehole
- Shallow Well

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

Transport
- A
- B
- C
- Railway Line

Urban Settlements
- District Hq
- Division Hq

Sugorai Subcatchment



1:250,000

Projection: Universal Transverse Mercator
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Meridian of Origin: 39° East of Greenwich
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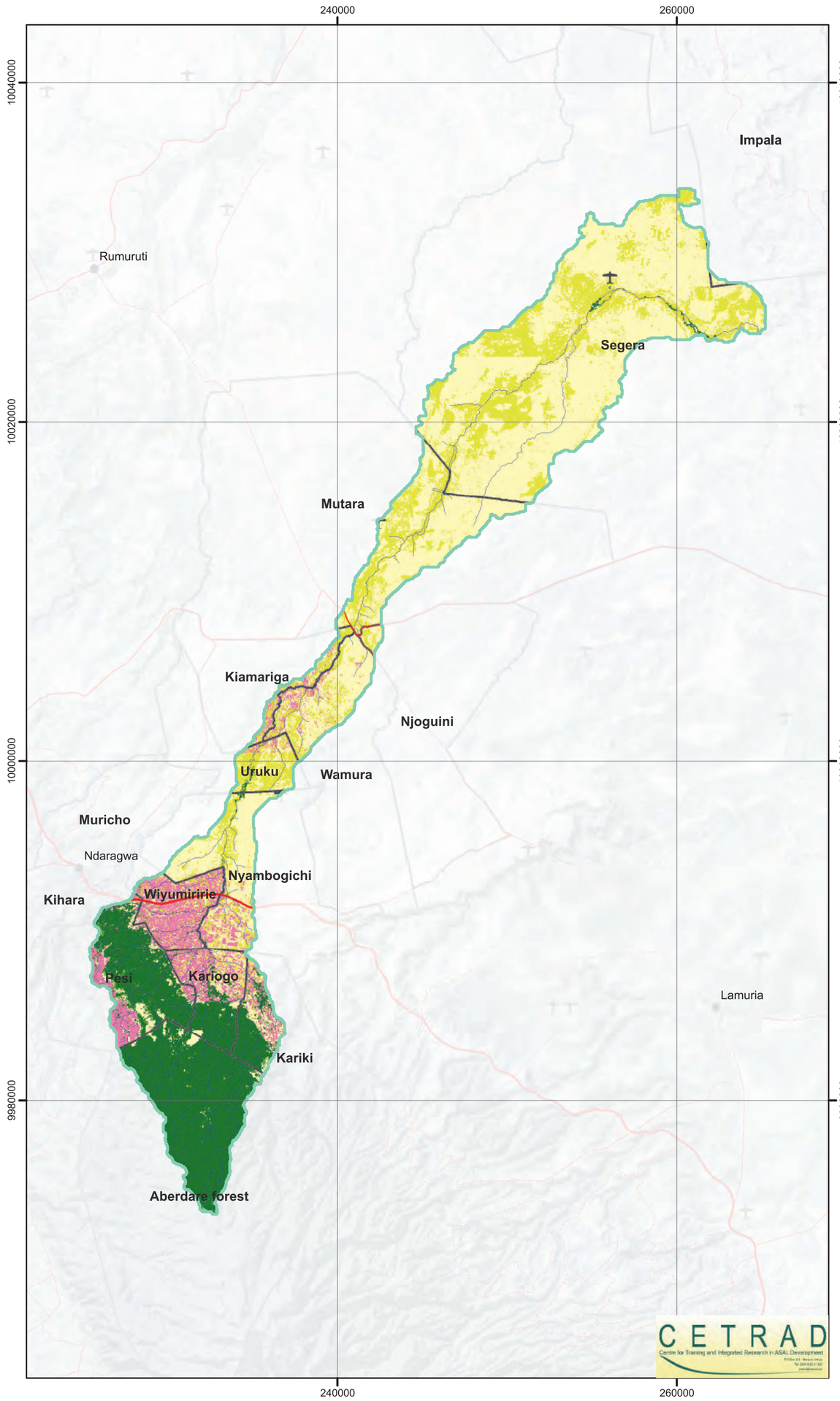
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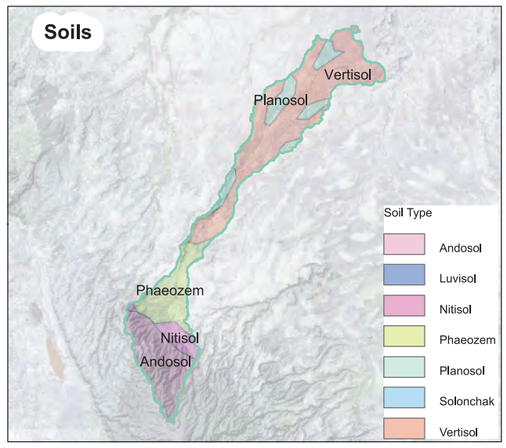
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

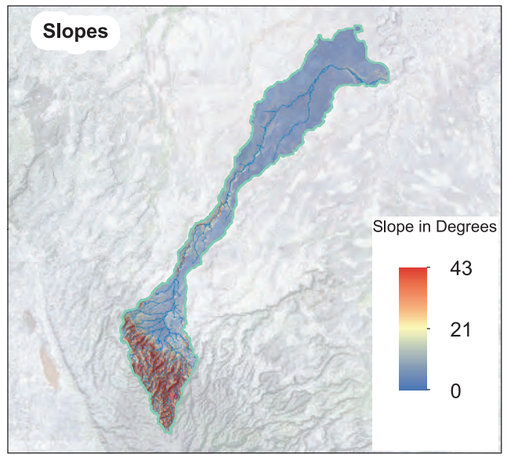
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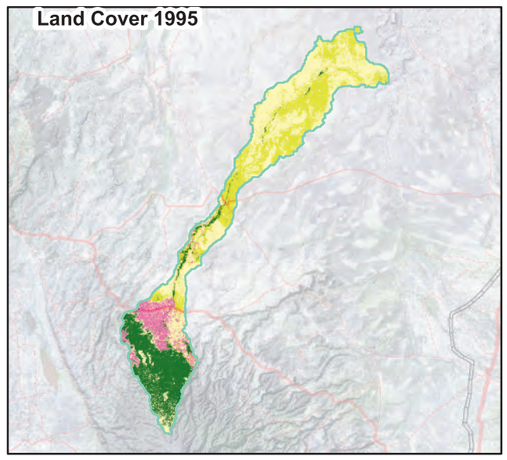
(*) Arid and Semi Arid Lands.

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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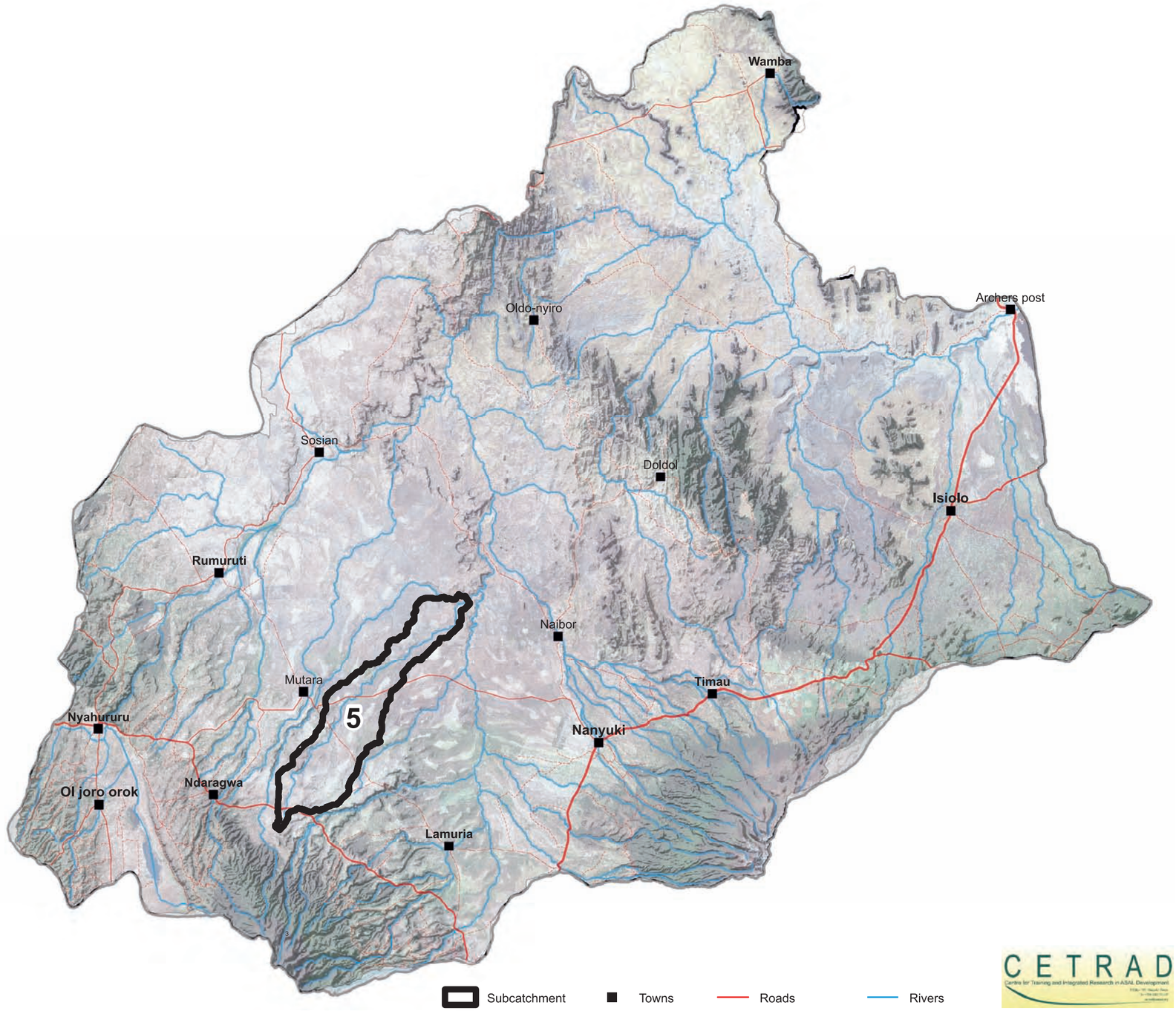
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Landcover information derived from Landsat Images 30m 2014.

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
Ndaragwa
Ol joro orok
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD
Centre for Training and Integrated Research in ASAL Development

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 1,487Km^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

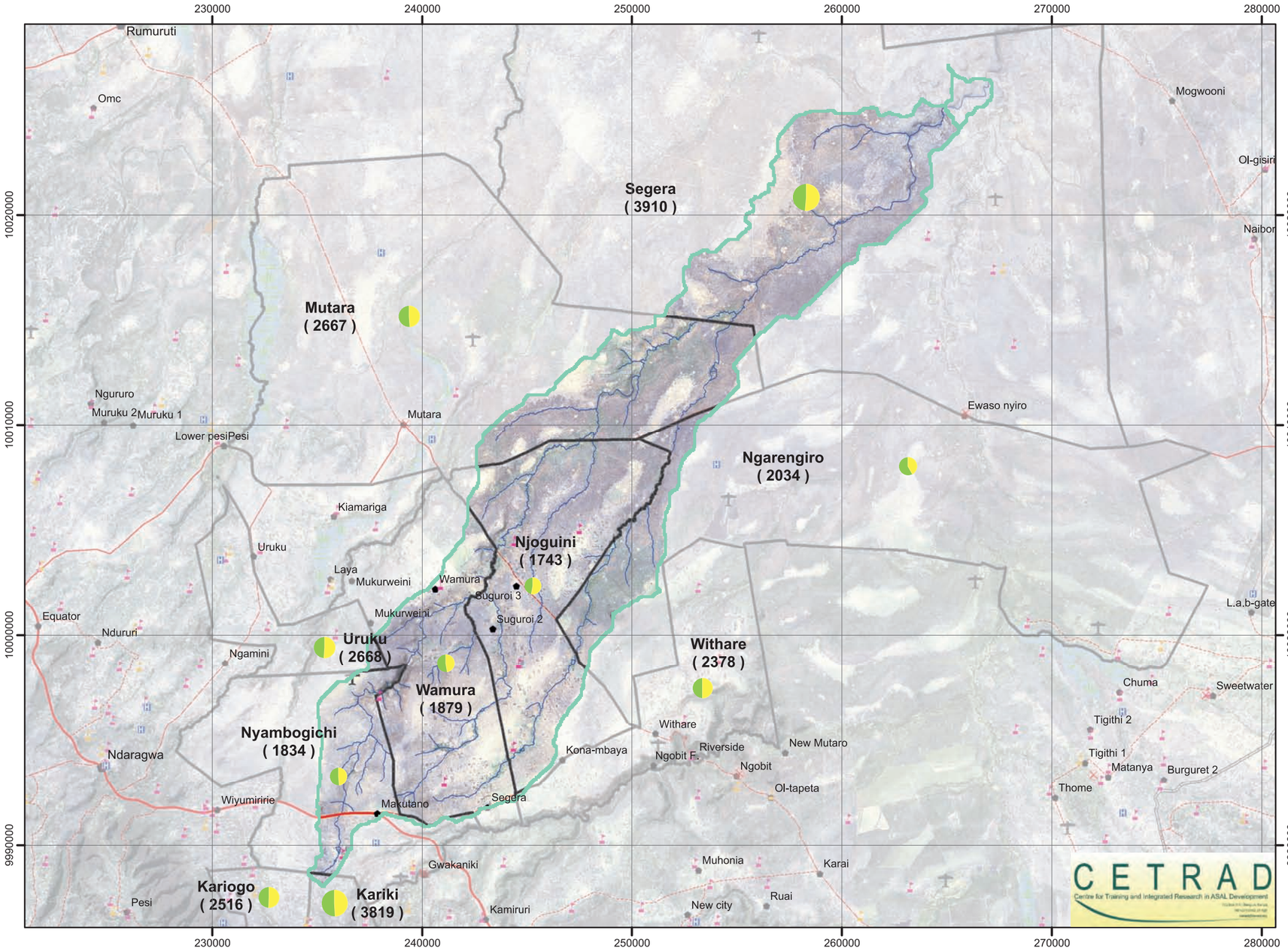
Climate

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).

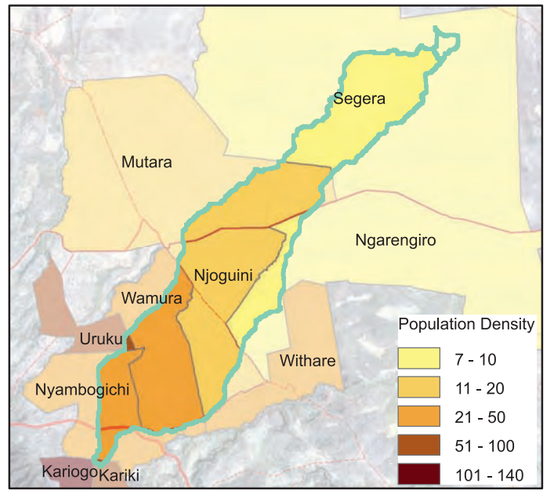
Population Numbers (2009) and Socio Infrastructure



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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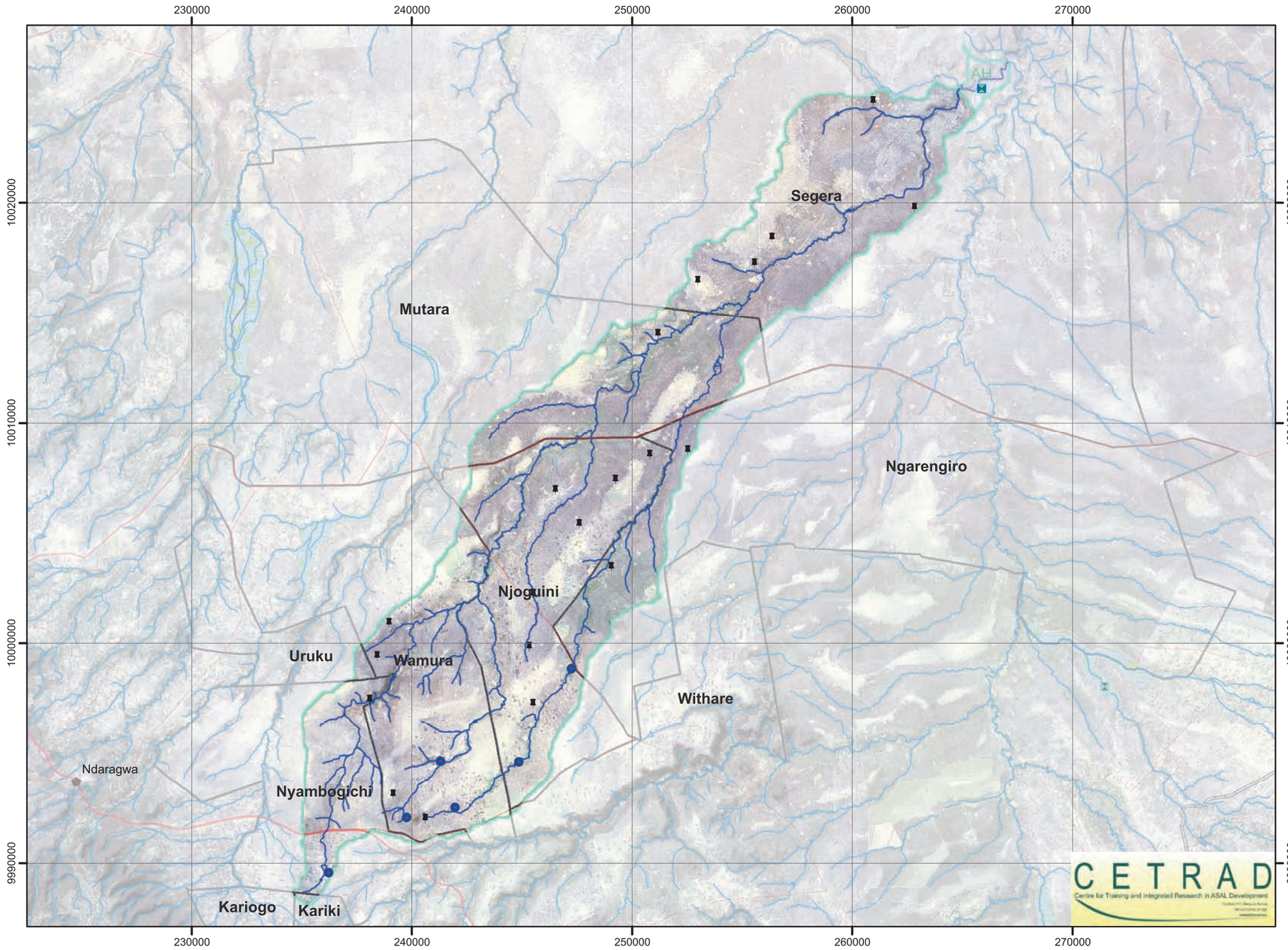
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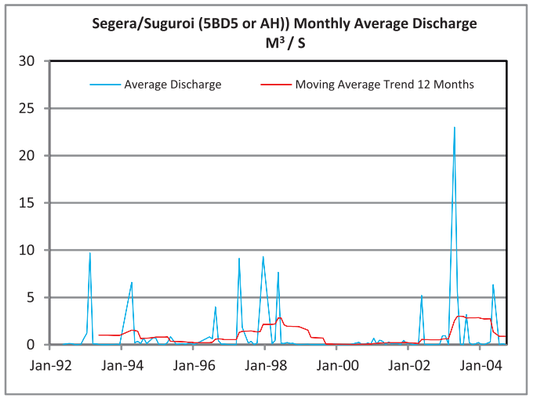
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

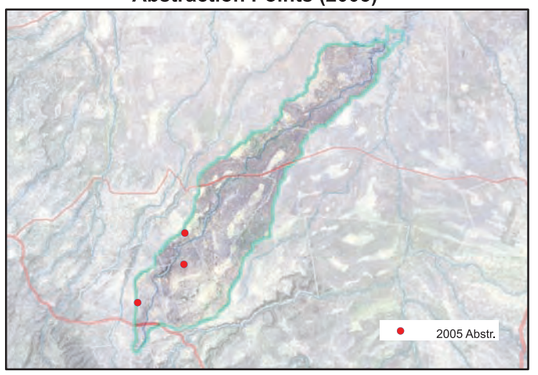
Water Resources and Abstraction Points (2013)



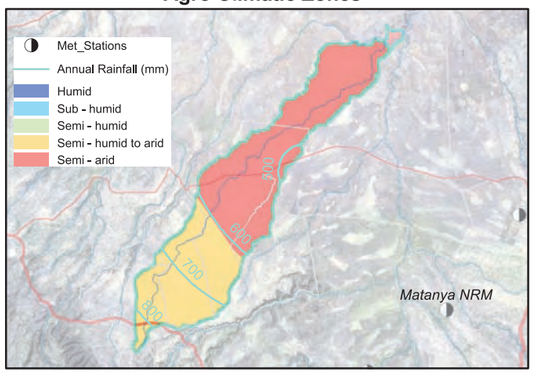
Water Discharge Trends (AH)



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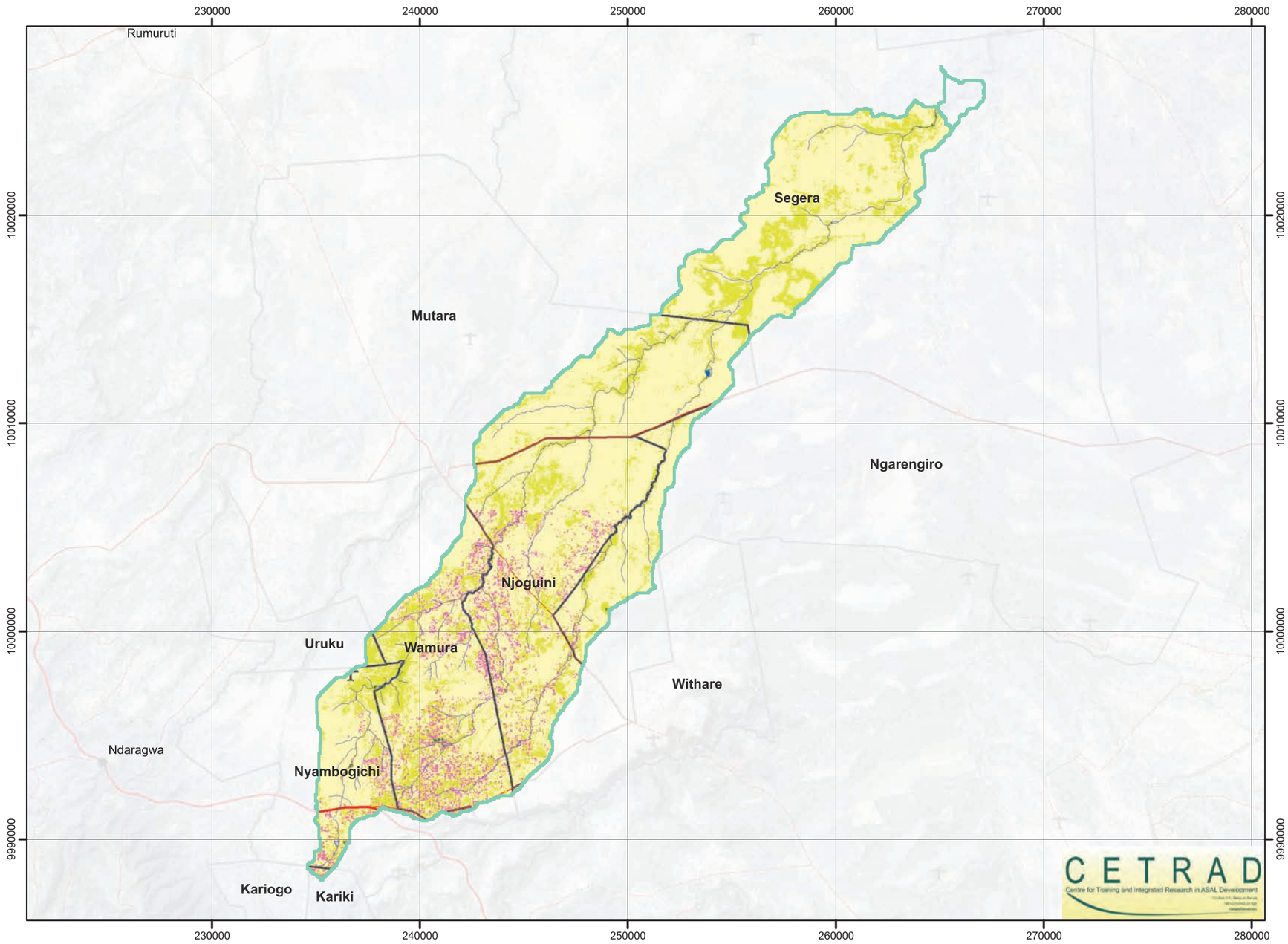
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

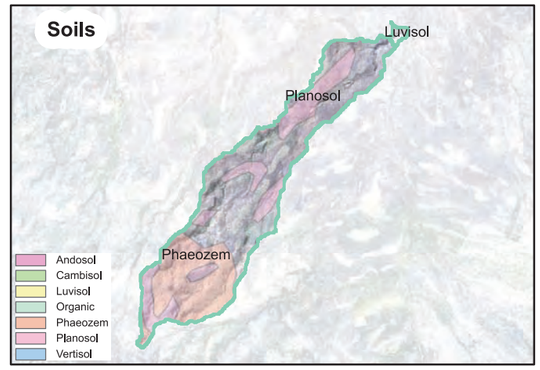
The background image: SRTM 30m.

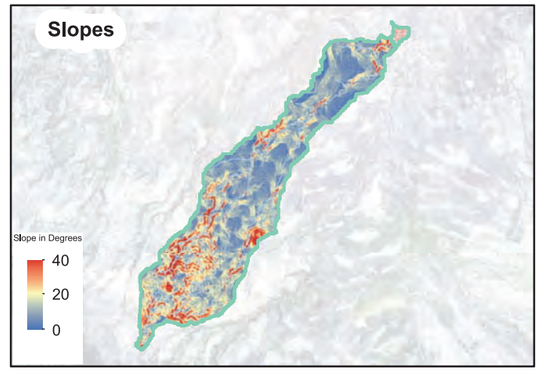
(*) Arid and Semi Arid Lands.

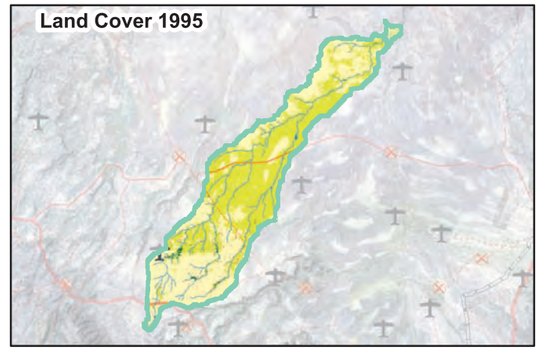
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Semi-humid to Semi-arid	Medium	600	1,100	125
Semi-arid	Medium to Low	450	900	192

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
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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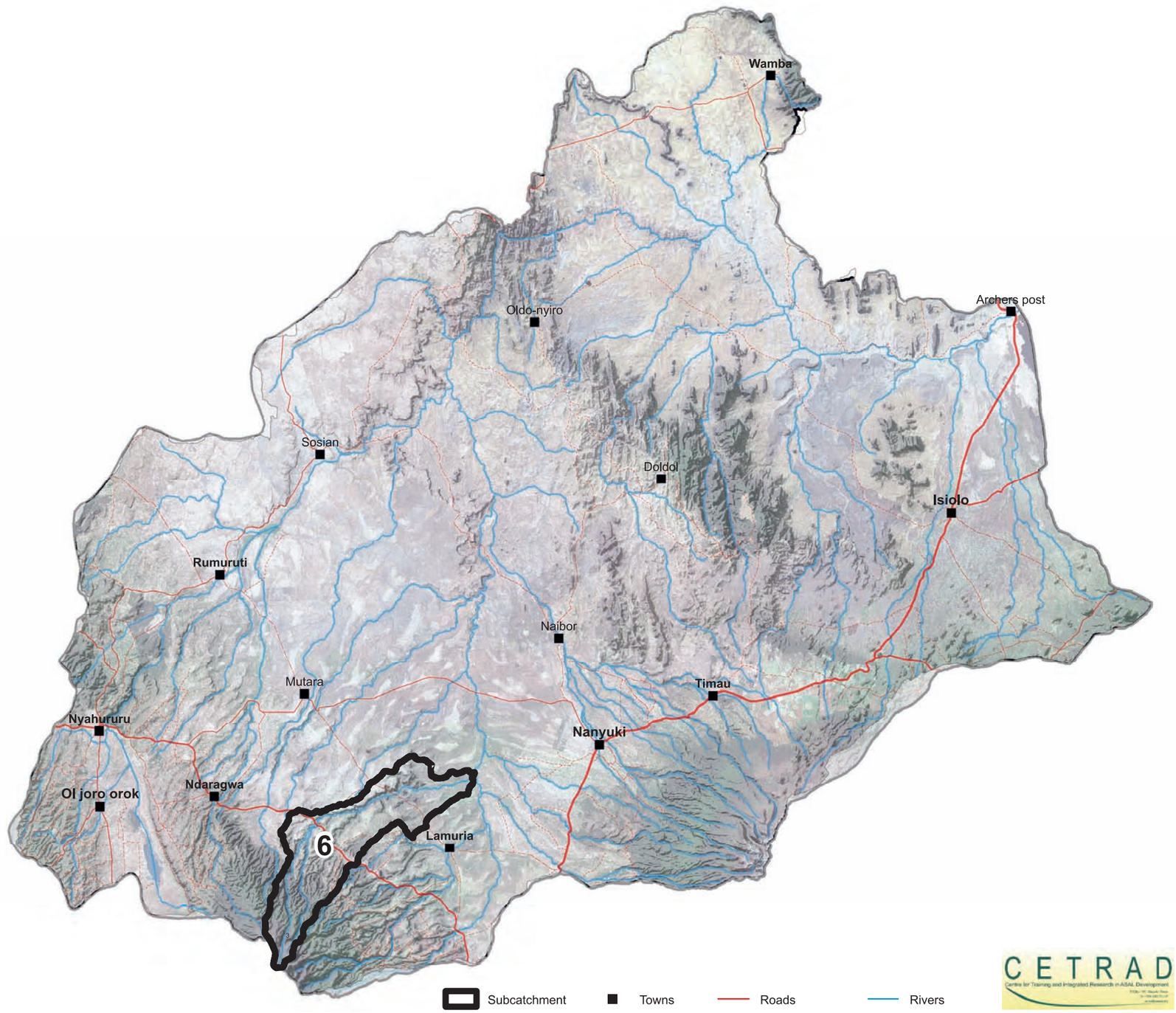
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The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

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

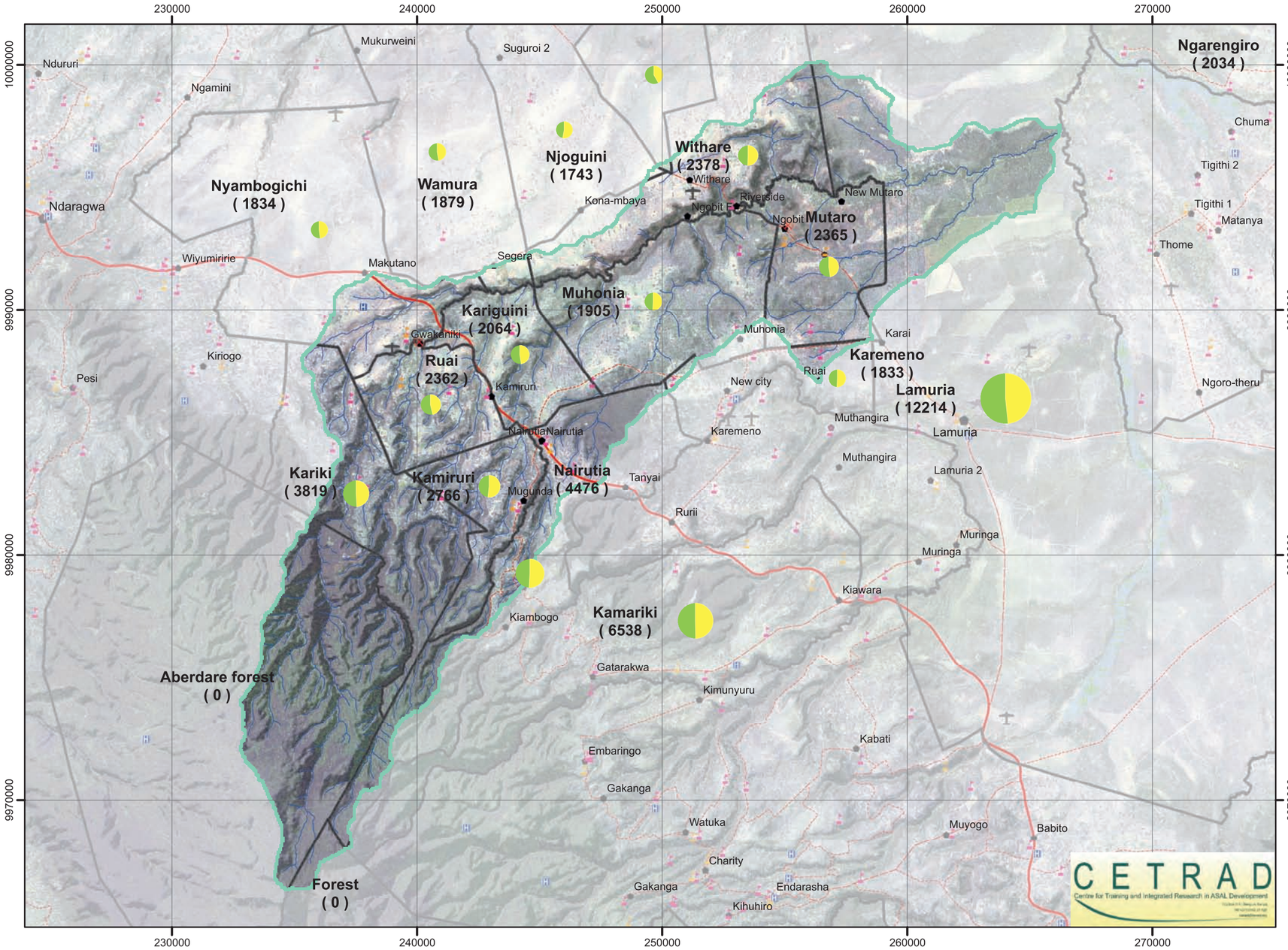
There are Six (6) secondary schools and 24 primary schools; government sponsored (4), Private (5), Community (1) and Religious organizations (14).

Water Resource Users Association Information

Name of WRUA		Engare Ngobit WRUA				
Contact Address email, chairperson, phone		(10140) Mweiga 190 P.O Box 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 Encroachment and tree cutting along riparian areas ,Unfair water rationing Law enforcement by WRMA 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 (Development of Sub Catchment Management Plan (SCMP (Developed a proposal for funding by Water Service Trust Fund (WSTF
Hindrances to achieve the goals of the WRUA	.Inadequate resources 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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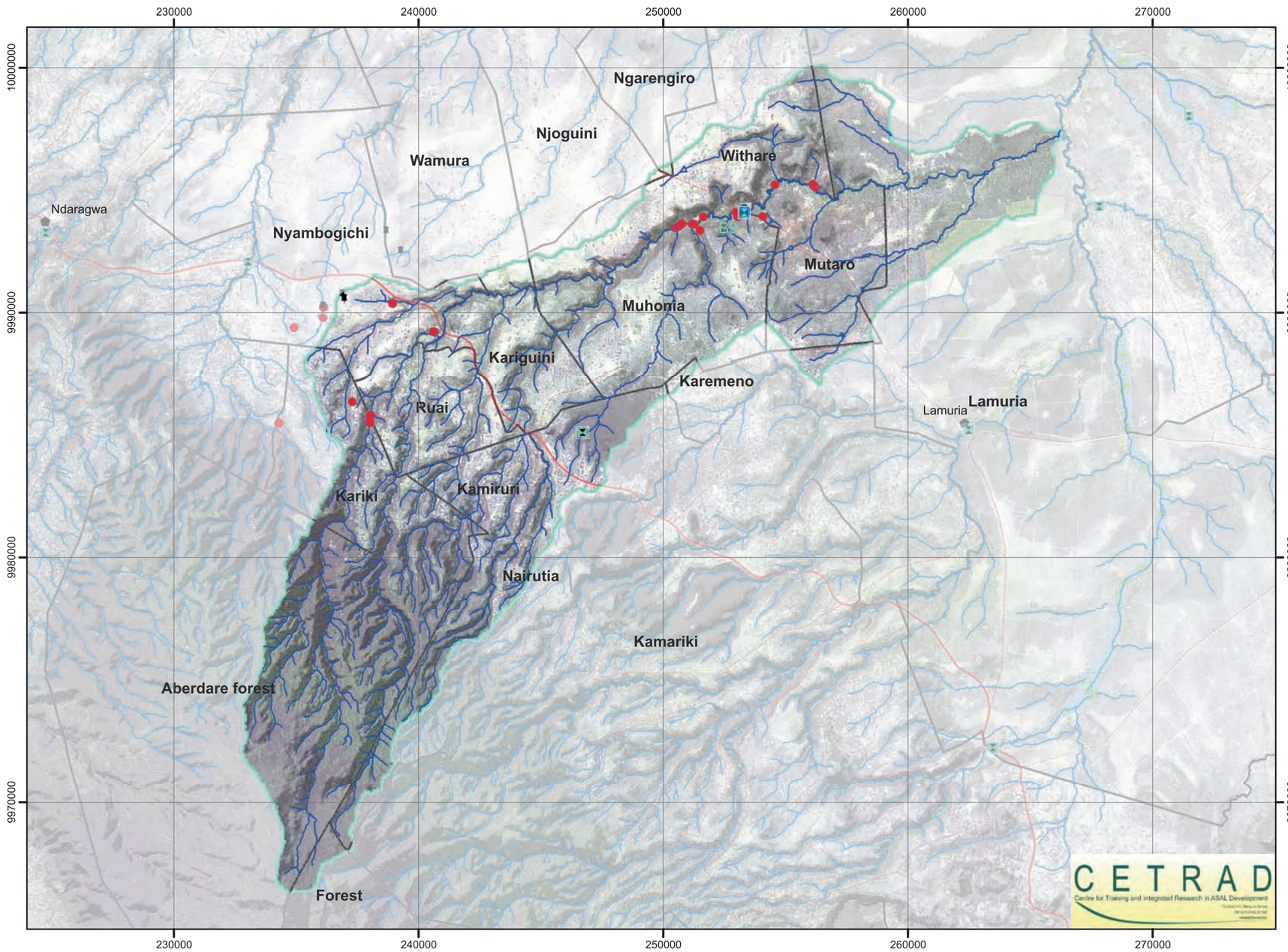
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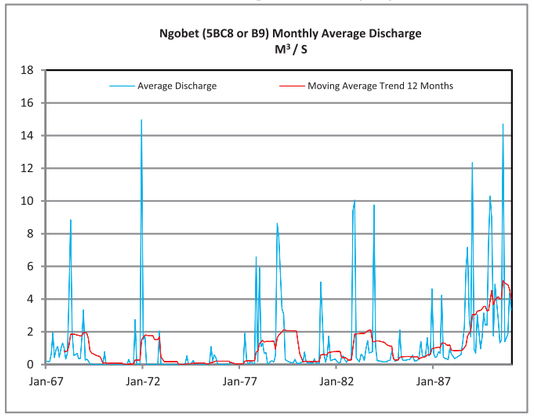
The background image: SRTM 30m.

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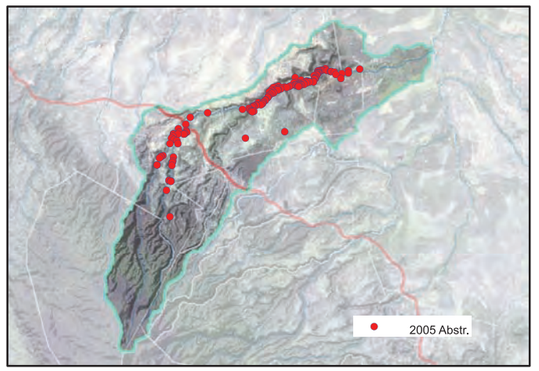
Water Resources and Abstraction Points (2013)



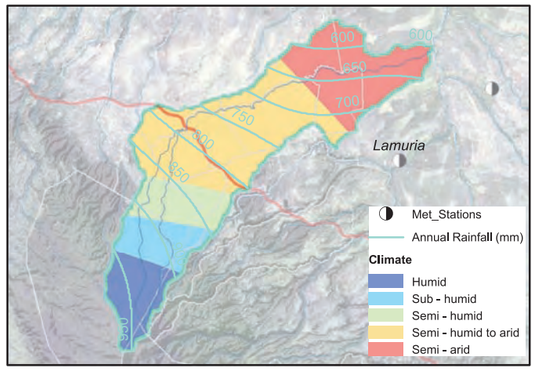
Water Discharge Trends (B9)



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
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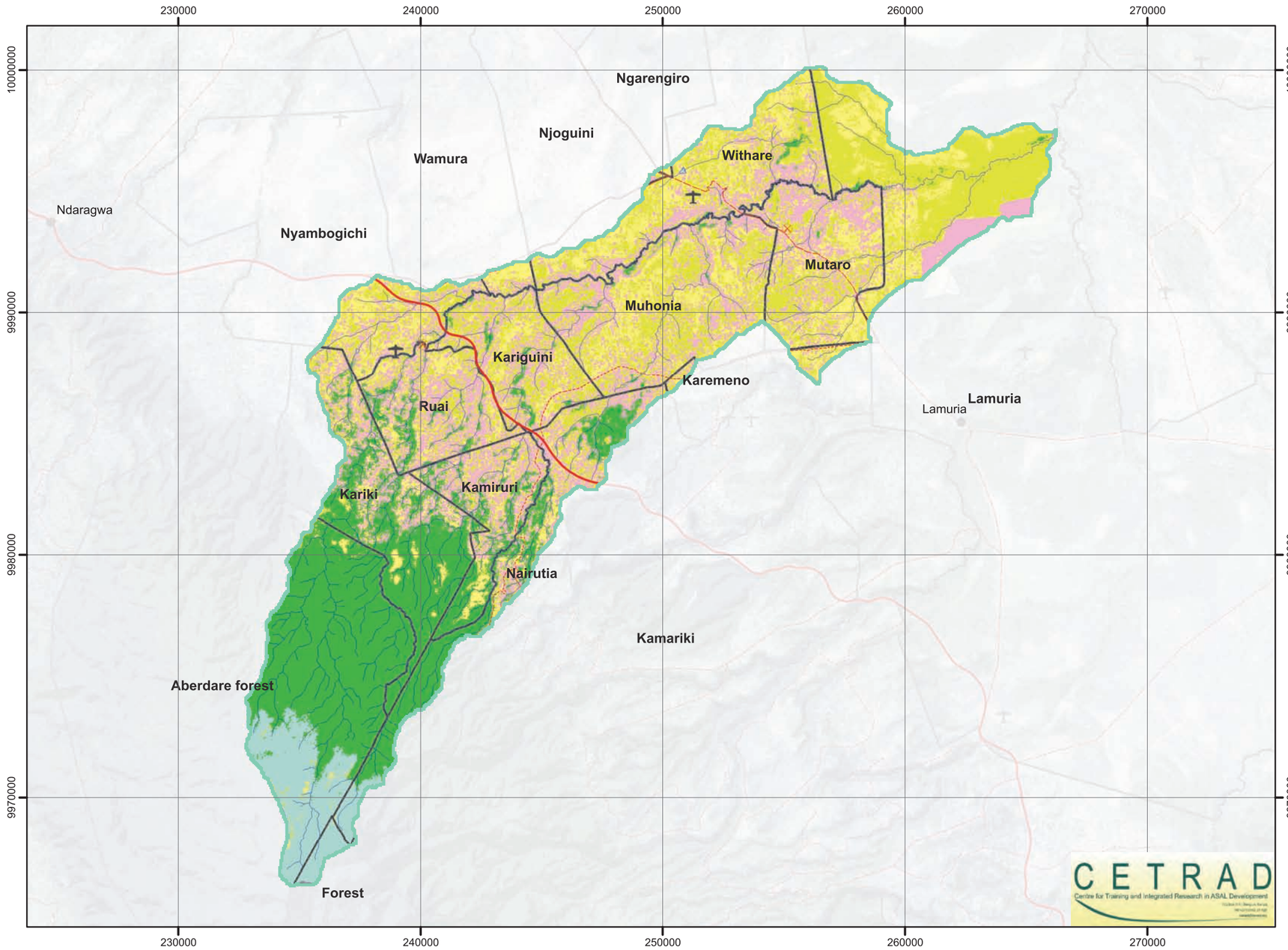
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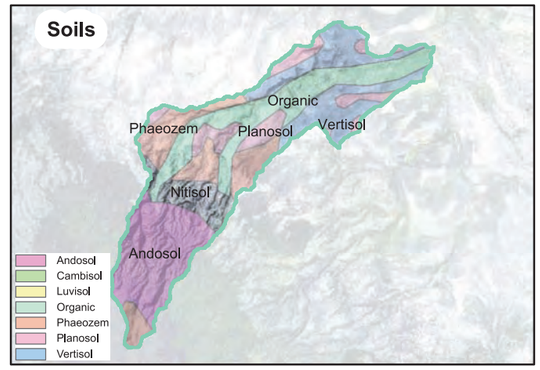
(*) Arid and Semi Arid Lands.

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

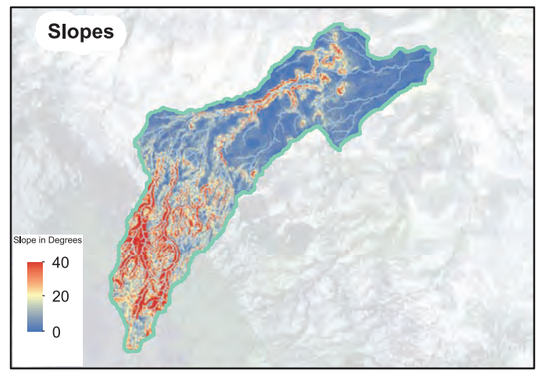
Land Cover 2014



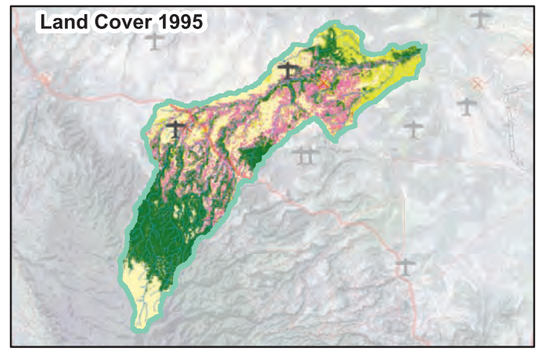
Soils



Slopes



Land Cover 1995



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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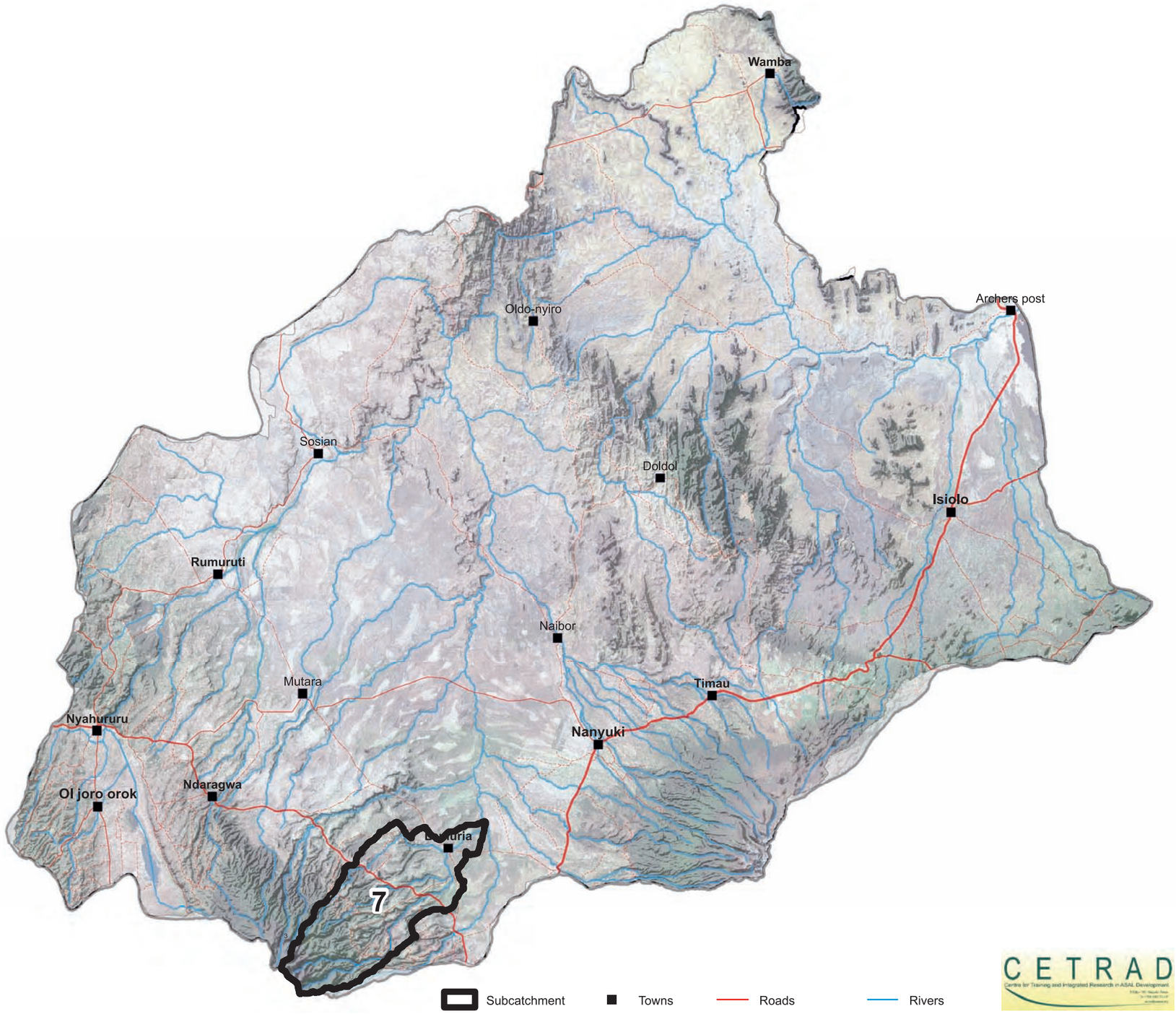
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

7 - Ewaso Ngiro East



CETRAD
Centre for Training and Integrated Research in ASAL Development

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

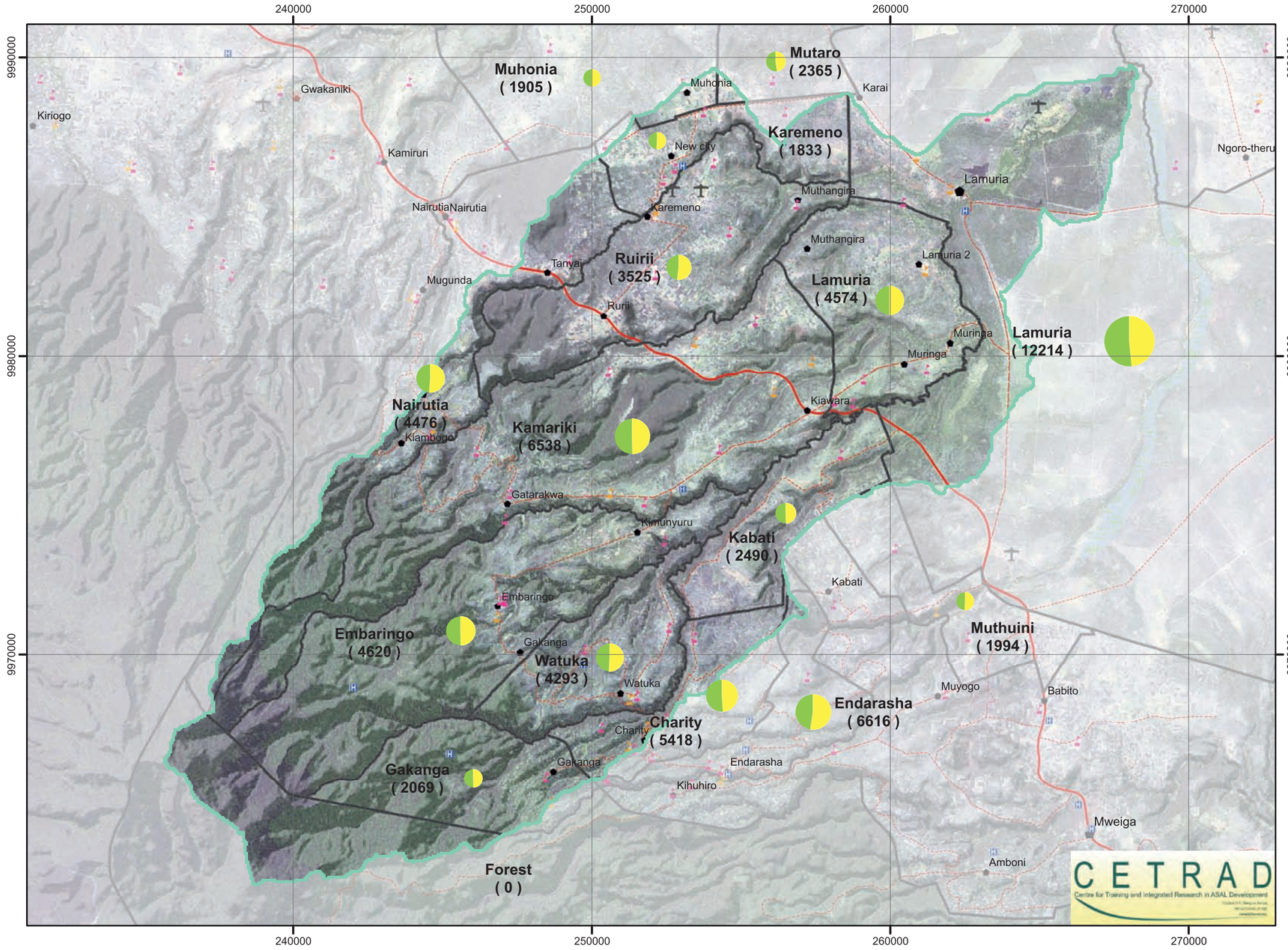
There are fourteen (14) secondary schools and about 44 primary schools; government sponsored (15), Private (15) and Religious organizations (13) and Community (1).

Water Resource Users Association Information

Name of WRUA		Upper Ewaso Nyiro WRUA				
Contact Address email, chairperson, phone		P.O Box 08 Narumoru 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 • Promote good management practices • Promote water conservation • Promote catchment conservation				
Availability of sanctioning system		-				
Number of Large Scale (, Ranches, Conservancies Horticulture others) Farms		1. Solio Ranch 2. Ol pejeta Conservancies 3. Kitawi Farm 4. Segera Ranch 5. El Karama 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 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 Riparian protection
Achievements	Riparian land has improved
Hindrances to achieve the goals of the WRUA	Finance 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 (Name, Year, Type of support, Amount of support)	Rural Focus CETRAD L.W.F
Water Quality and cause of pollution	Pesticide Cans
Existence of Wetlands and their status	Kamariki 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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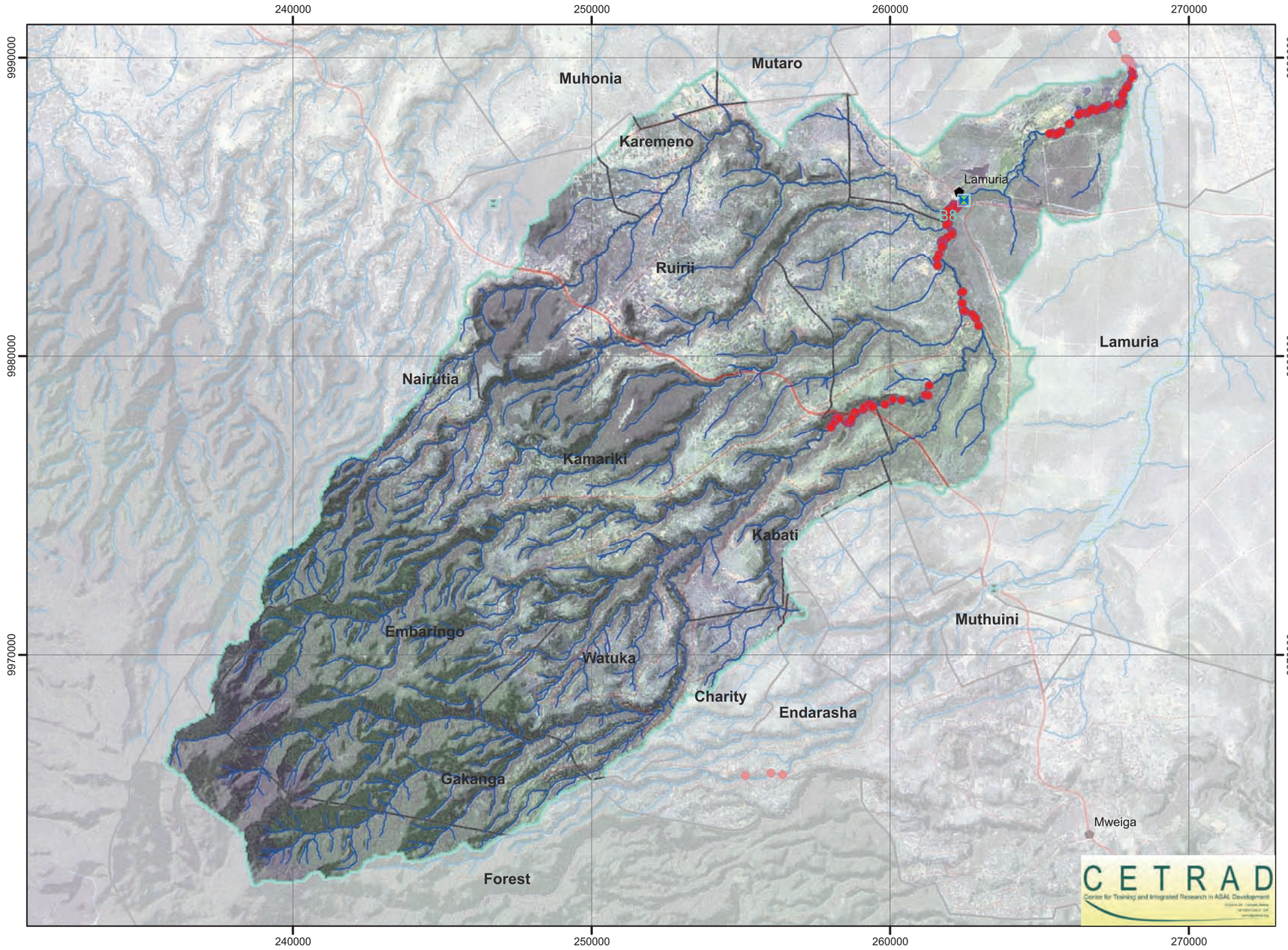
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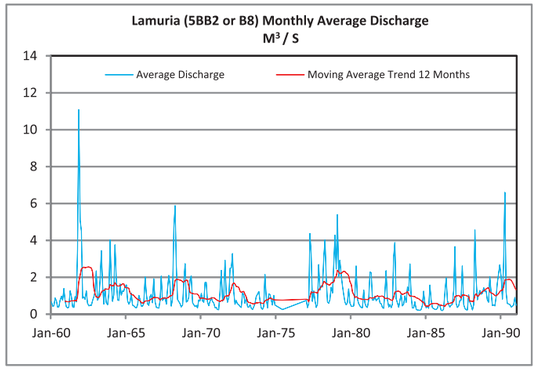
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

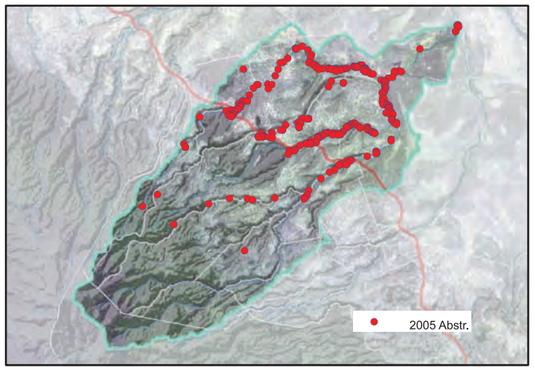
Water Resources and Abstraction Points (2013)



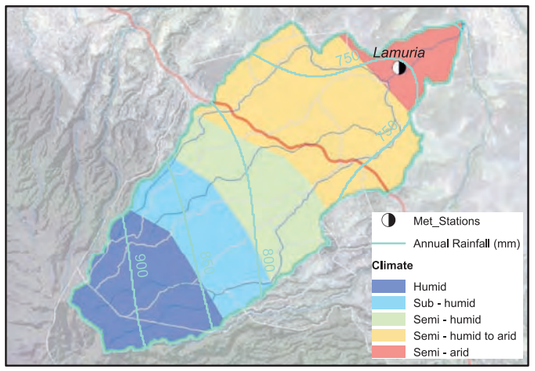
Water Discharge Trends (B8)



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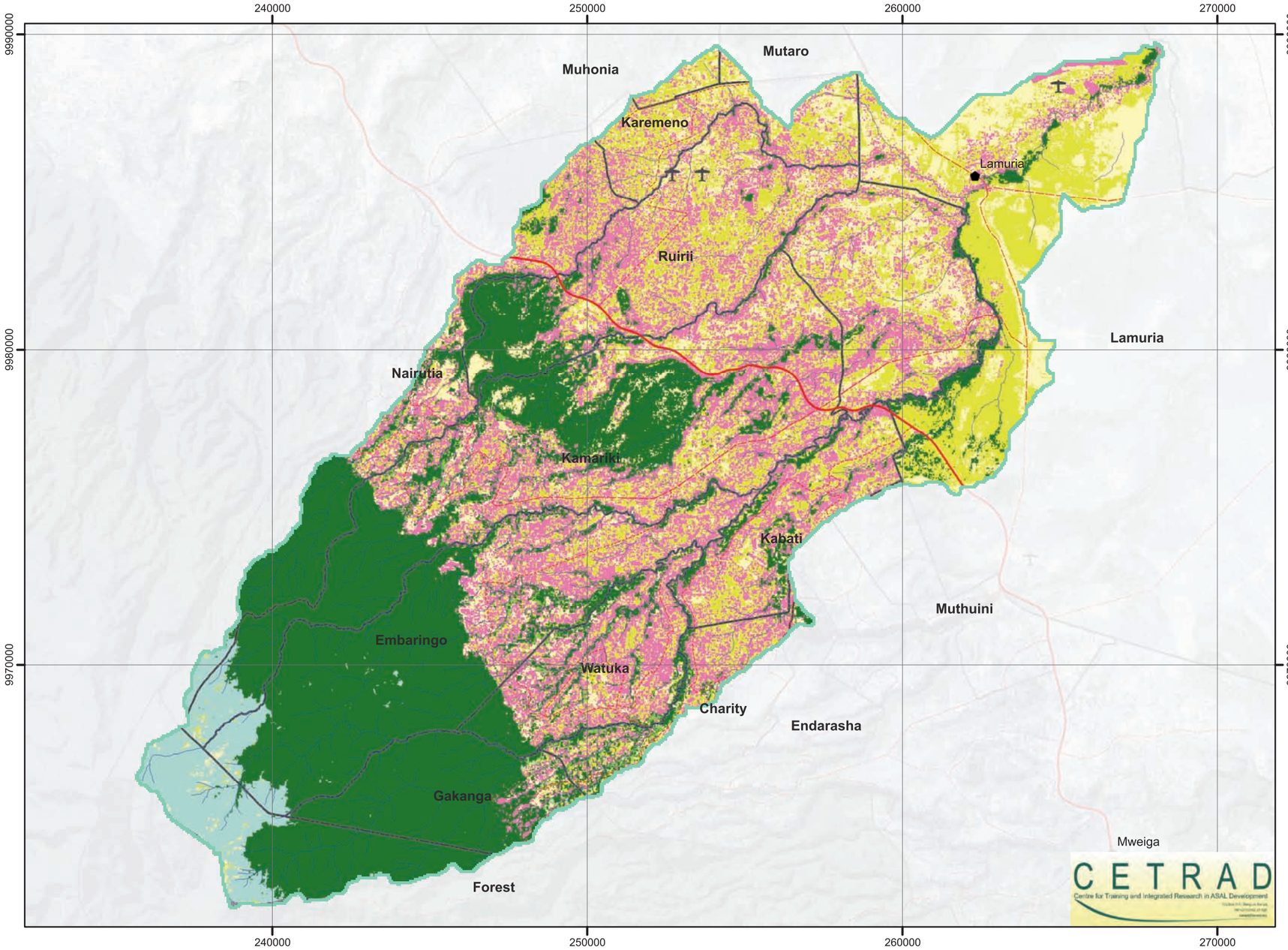
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

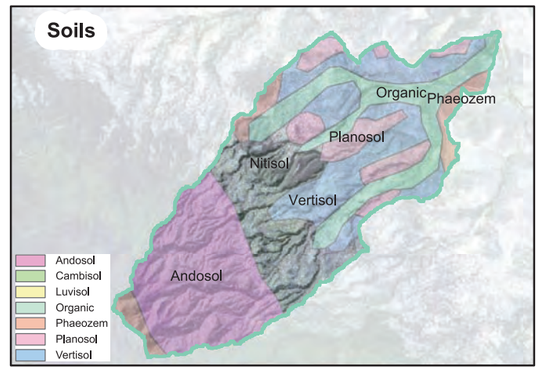
The background image: SRTM 30m.

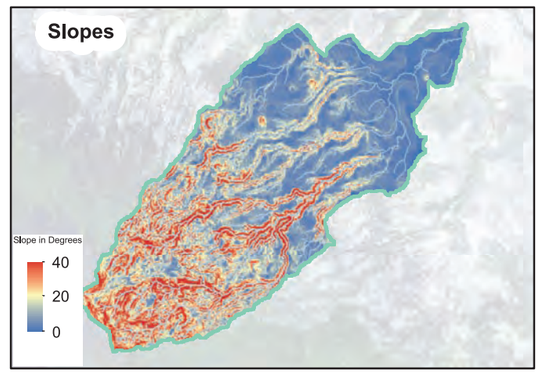
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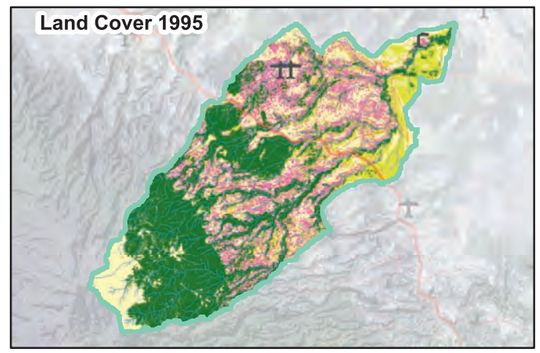
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Kms
Humid	Very high	1,100	2,700	89
Sub-humid	High	1,000	1,600	72
Semi-humid	High to Medium	800	1,400	82
Semi-humid to Semi-arid	Medium	600	1,100	156
Semi-arid	Medium toLow	450	900	34

Land Cover 2014









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.

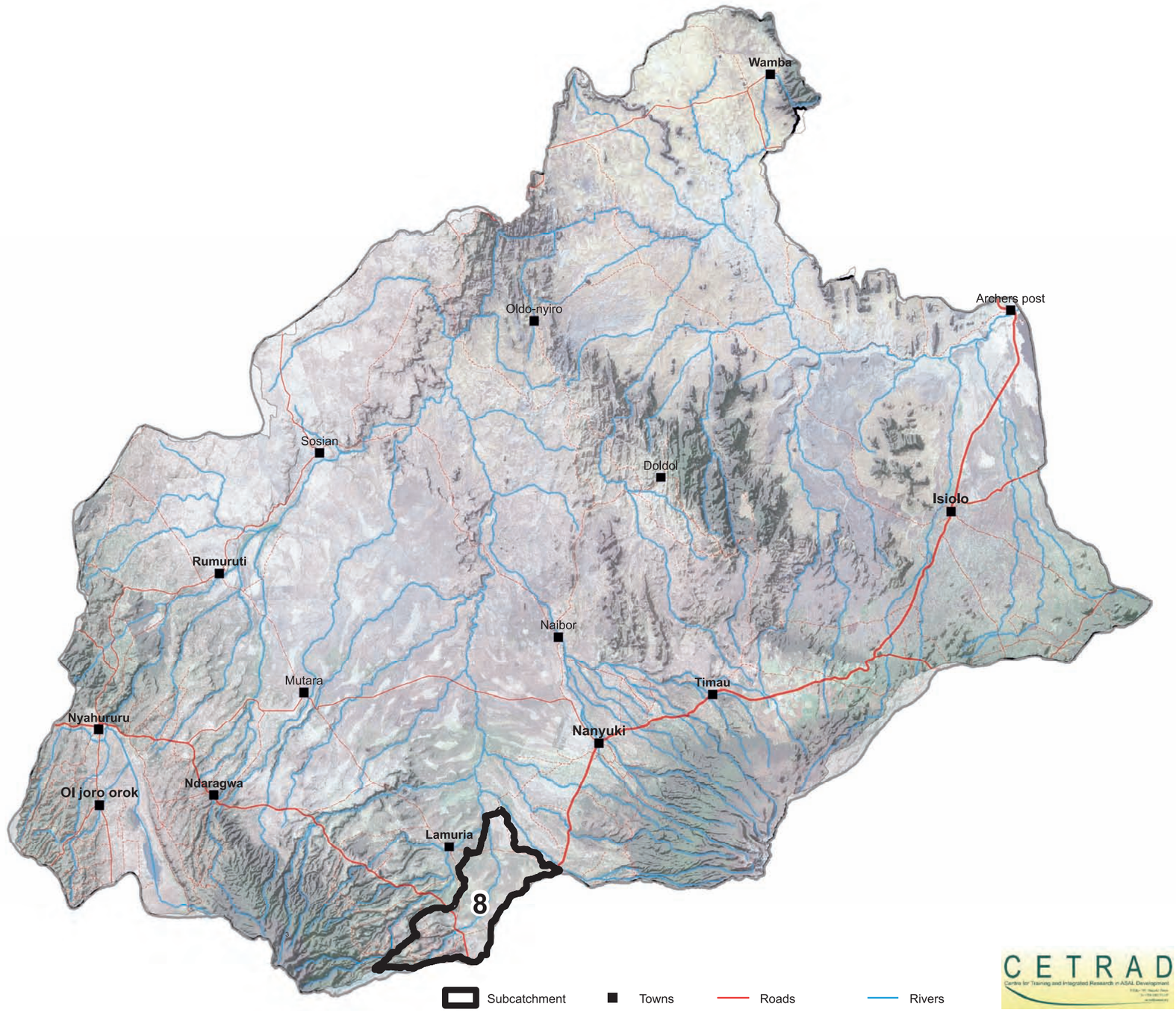
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

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**

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

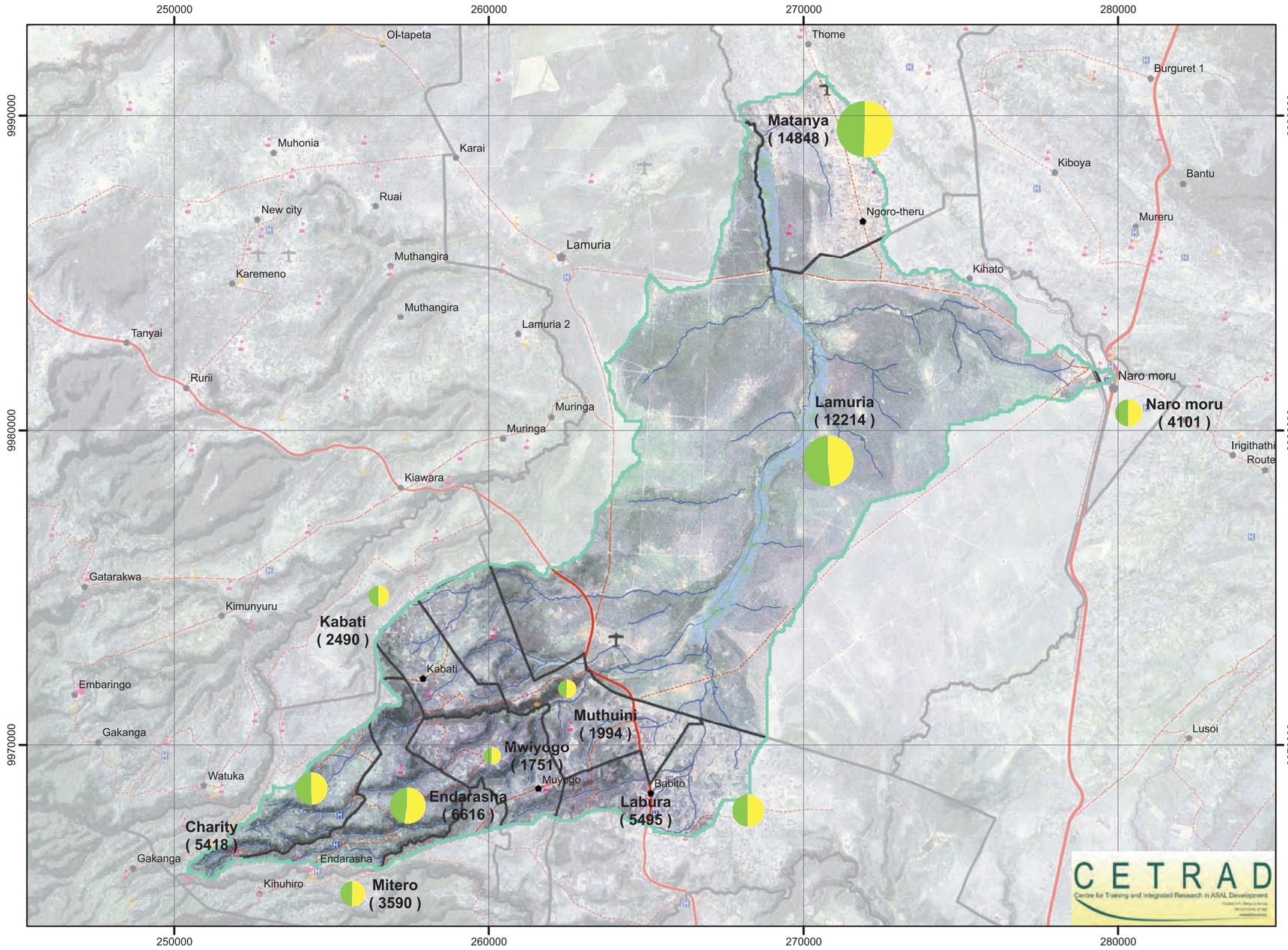
There is one (1) secondary school and over 14 primary schools; government sponsored (6), Private (3) and Religious organizations (5).

Water Resource Users Association Information

Name of WRUA		Moyok WRUA				
Contact person		Stephen Mwaura; Phone: 072900018472.				
Date of Formation		-				
Registration details	Socio services;	Date: 1/9/2006 Reg.No:7603				
	Attorney General Office	Date: 25/11/2010 Reg. No; file soc/57319				
Membership	Members	-				
	Non-members	-				
Water resources		Rivers	Boreholes	Springs	Wells	Dams/water pans
		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, 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	

Population Numbers (2009) and Socio Infrastructure



Population Numbers 2009

Sub Location	Area Km2	Male	Female	Totals	Density	House Holds
Charity	22	2,769	2,649	5,418	247	1,456
Endarasha	17	3,143	3,473	6,616	399	1,907
Kabati	28	1,262	1,228	2,490	88	701
Labura	65	2,744	2,751	5,495	84	1,494
Lamuria	441	6,308	5,906	12,214	28	4,105
Matanya	121	7,338	7,510	14,848	123	4,095
Mitero	15	1,785	1,805	3,590	241	901
Muthuini	20	986	1,008	1,994	101	571
Mwiyogo	16	861	890	1,751	109	471
Naro moru	7	2,040	2,061	4,101	625	1,661
Totals	752	29,236	29,281	58,517	78	17,362

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 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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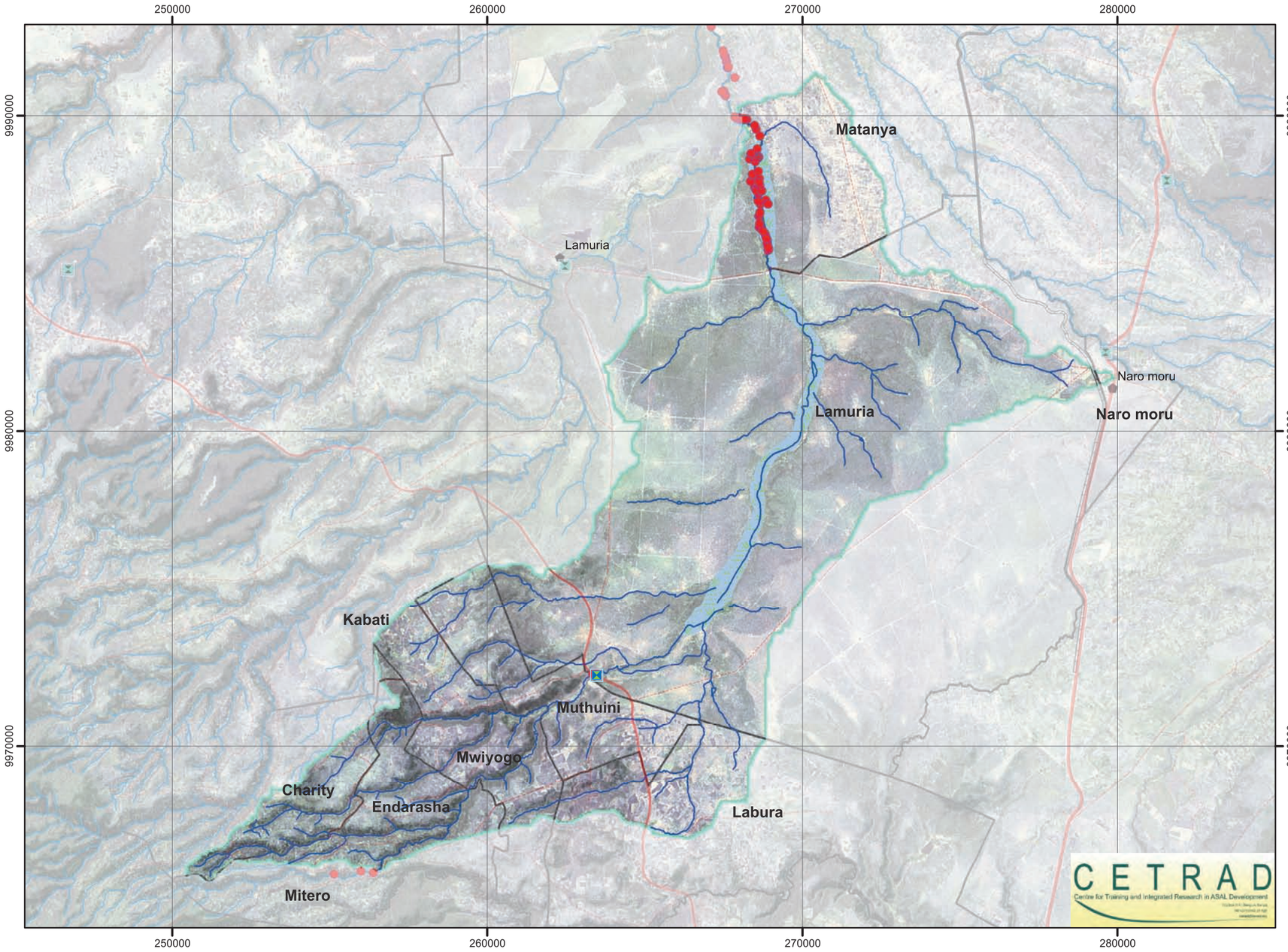
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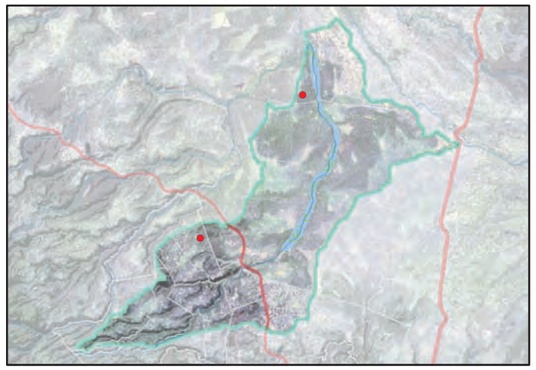
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

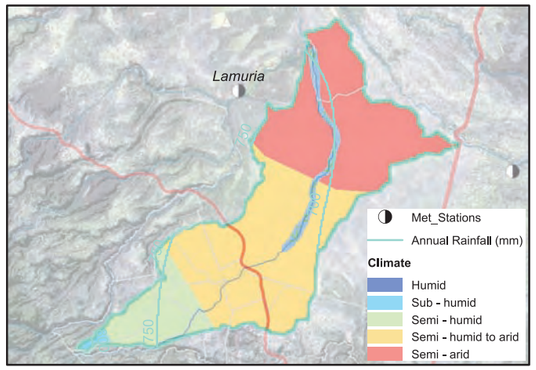
Water Resources and Abstraction Points (2013)



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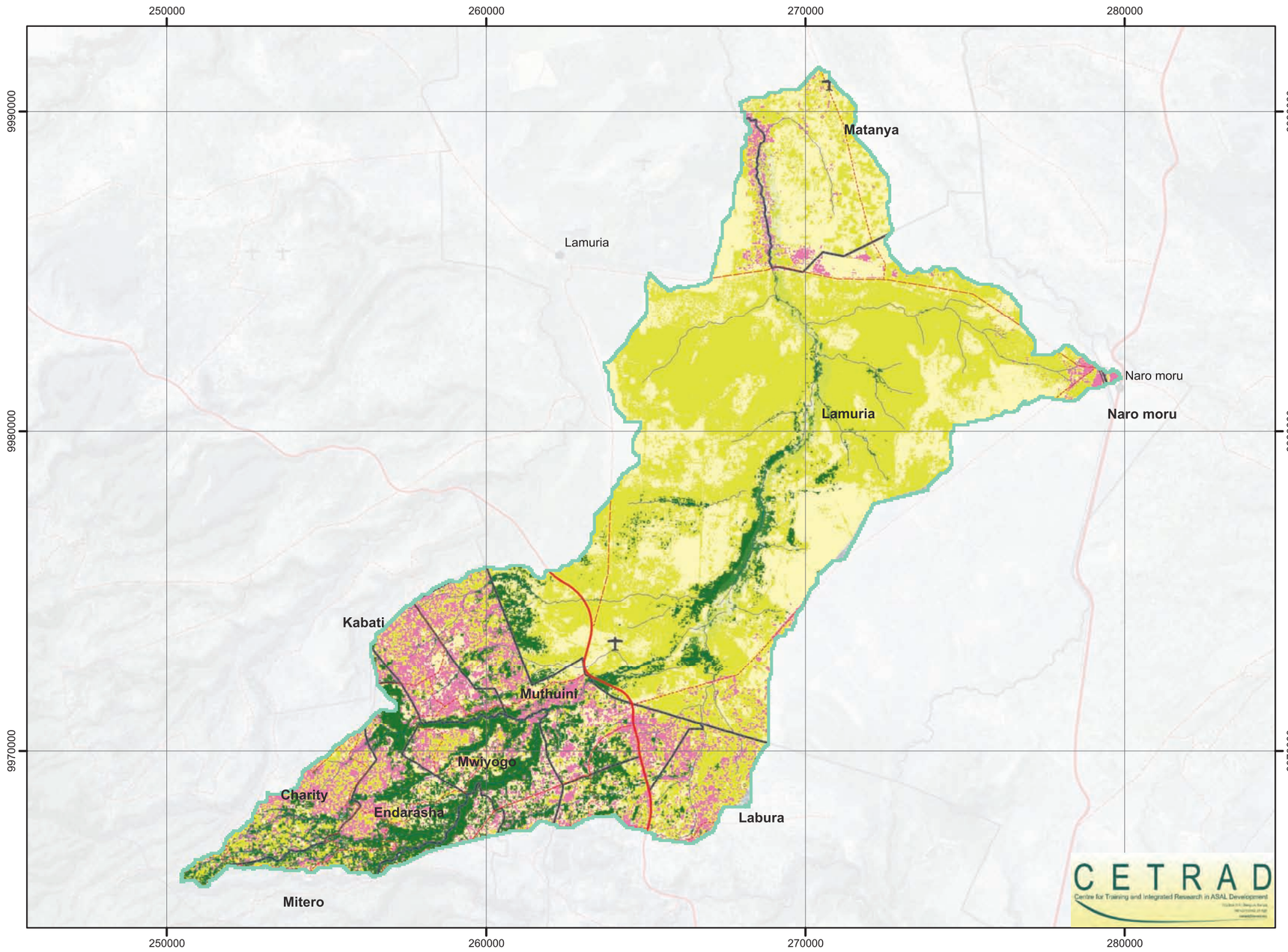
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

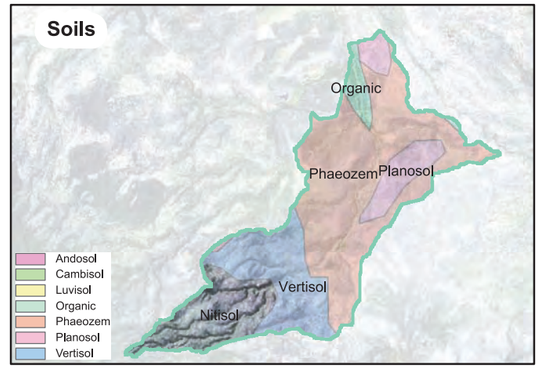
The background image: SRTM 30m.

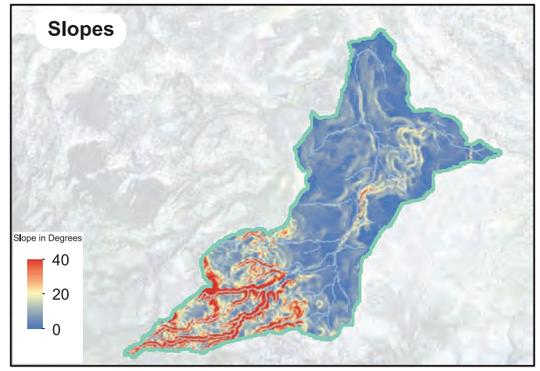
(*) Arid and Semi Arid Lands.

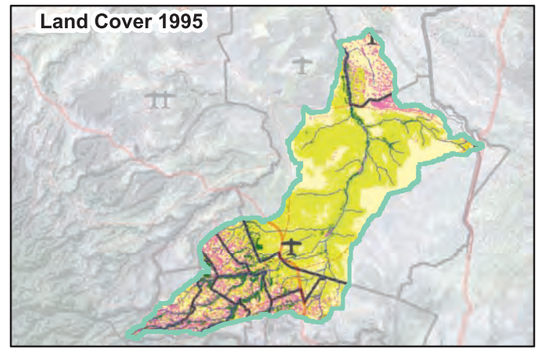
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Kms
Sub-humid	high	1,000	1,600	2
Semi-humid	high to medium	800	1,400	31
Semi-humid to Semi-arid	medium	600	1,100	112
Semi-arid	medium to low	450	900	97

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
Y-Shift: 10,000,000

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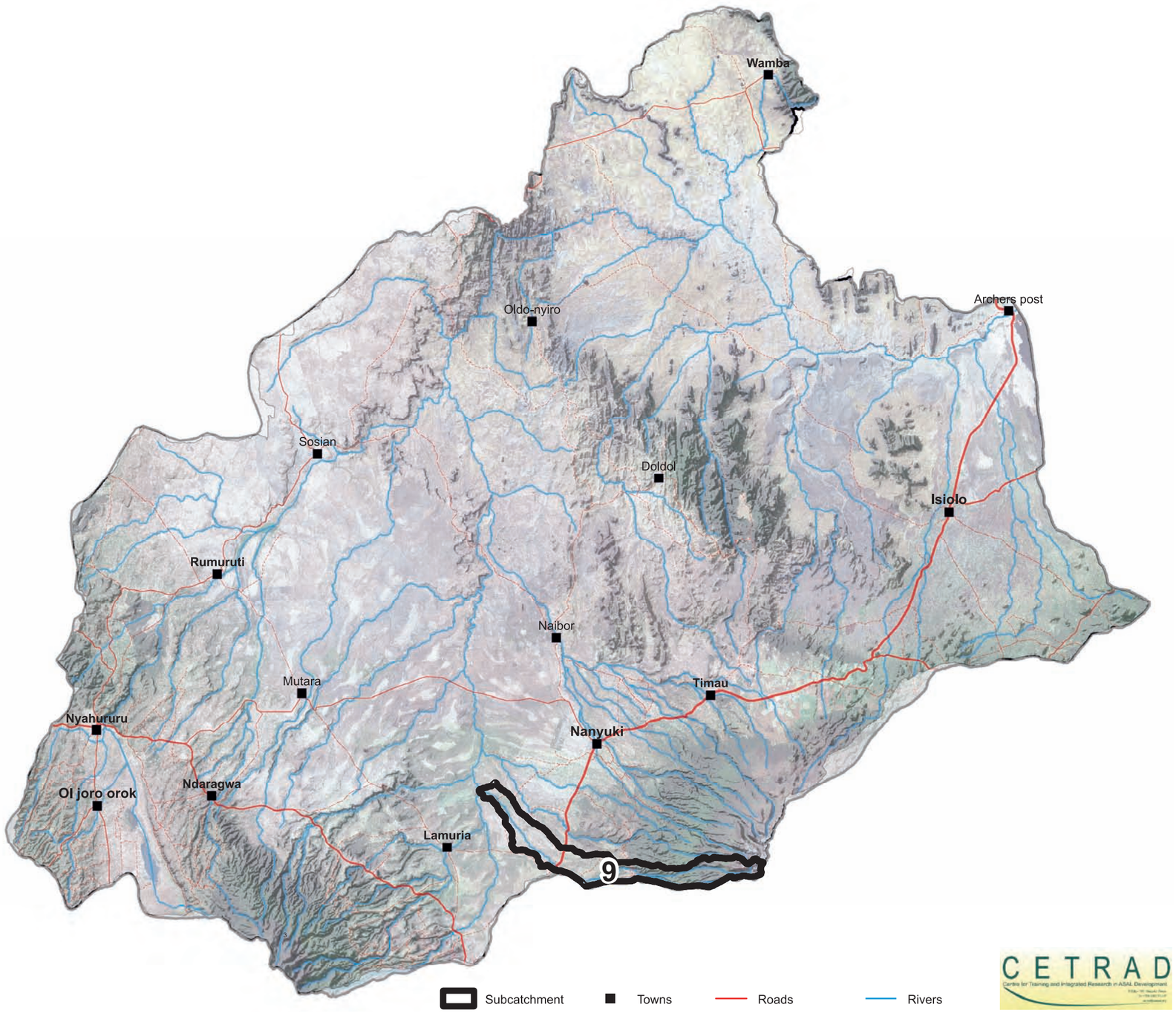
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Landcover information derived from Landsat Images 30m 2014.

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(*) Arid and Semi Arid Lands.

9 - Naro Moru


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

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 1,691Km^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

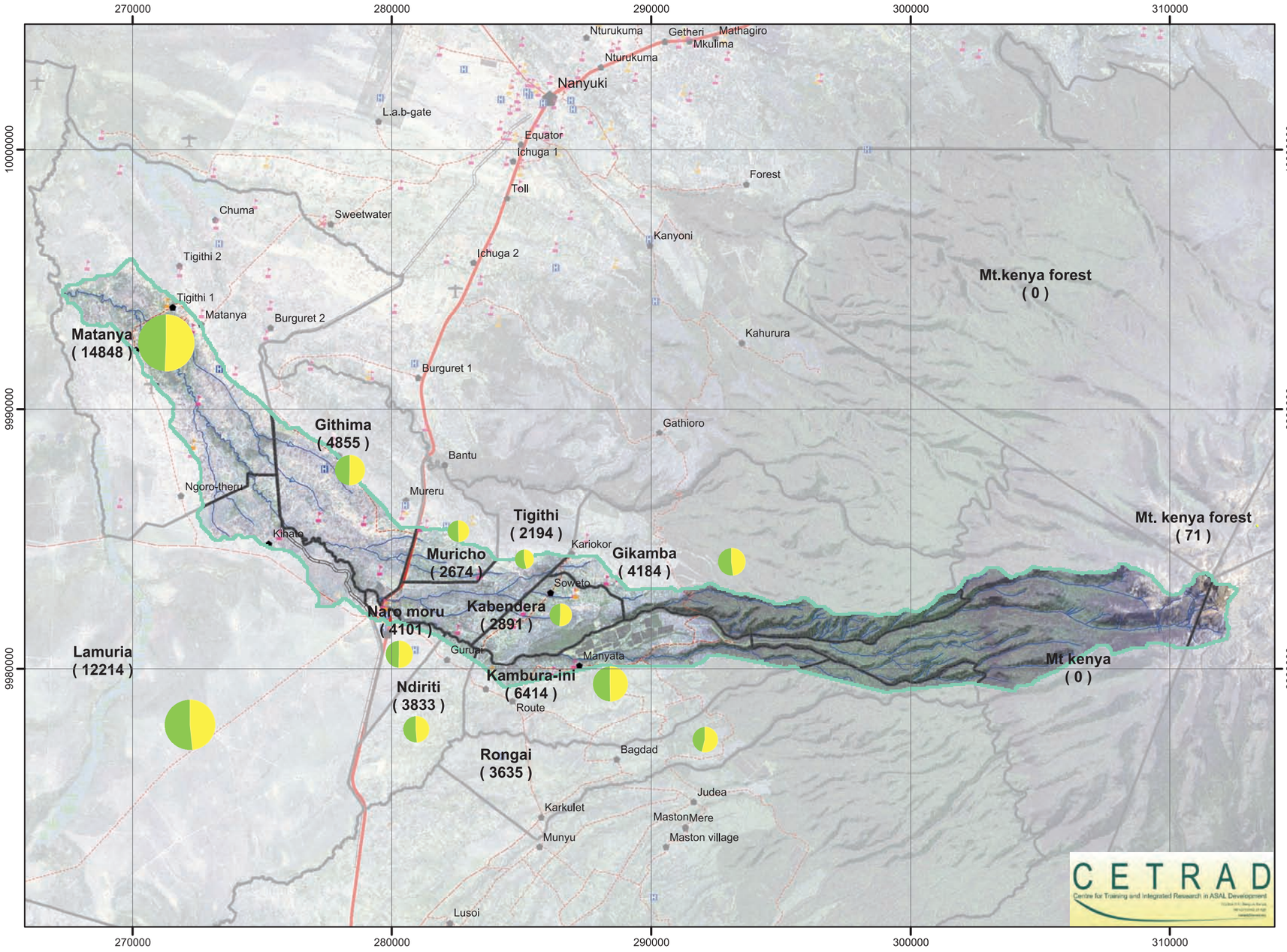
There are Six (6) secondary schools and over 19 primary schools; government sponsored (10), Private (4), NGO (1) and Religious organizations (4).

Water Resource Users Association Information

Name of WRUA		Naru Moru WRUA				
Contact Address email, chairperson, phone		Chairman - Julius Mwaniki – 0723463033 Secretary – Ephraim Kahenya – 0724636059 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. - Promote soil and water conservation. - Conserve water quality. - 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. - Provide a forum to discuss, prevent and resolve conflicts. - Promote dialogue in regard to water policy and enforcement of water Act. New abstractions have to be approved. - 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. 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. - adequate capacity building - Have a well-equipped office in Naro Moru. - Members and non-members understand WRUA activities
Hindrances to achieve the goals of the WRUA	Many WRUA non-members making sub catchment management difficult inadequate funding to fund the proposed activities in S.C.M.P
Advices to others	-
Information and Data Available	abstraction survey – 2011 water allocation plan – 2013 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 (Name, Year, Type of support, Amount of support)	Water Service Trust Fund - 2011 and 2013. Laikipia Wildlife Forum – 2008 and 2011
Water Quality and cause of pollution	-
Existence of Wetlands and their status	No
Others	

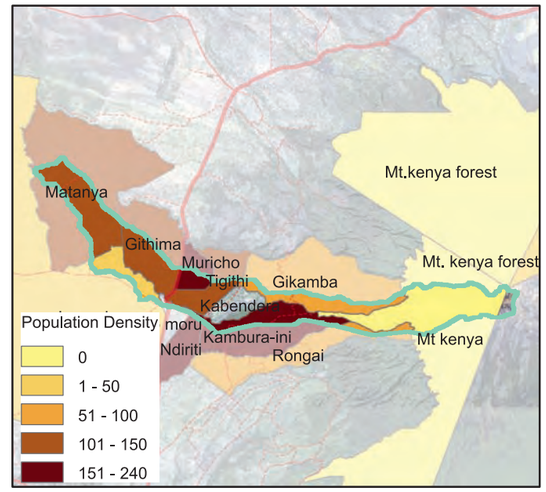
Population Numbers (2009) and Socio Infrastructure



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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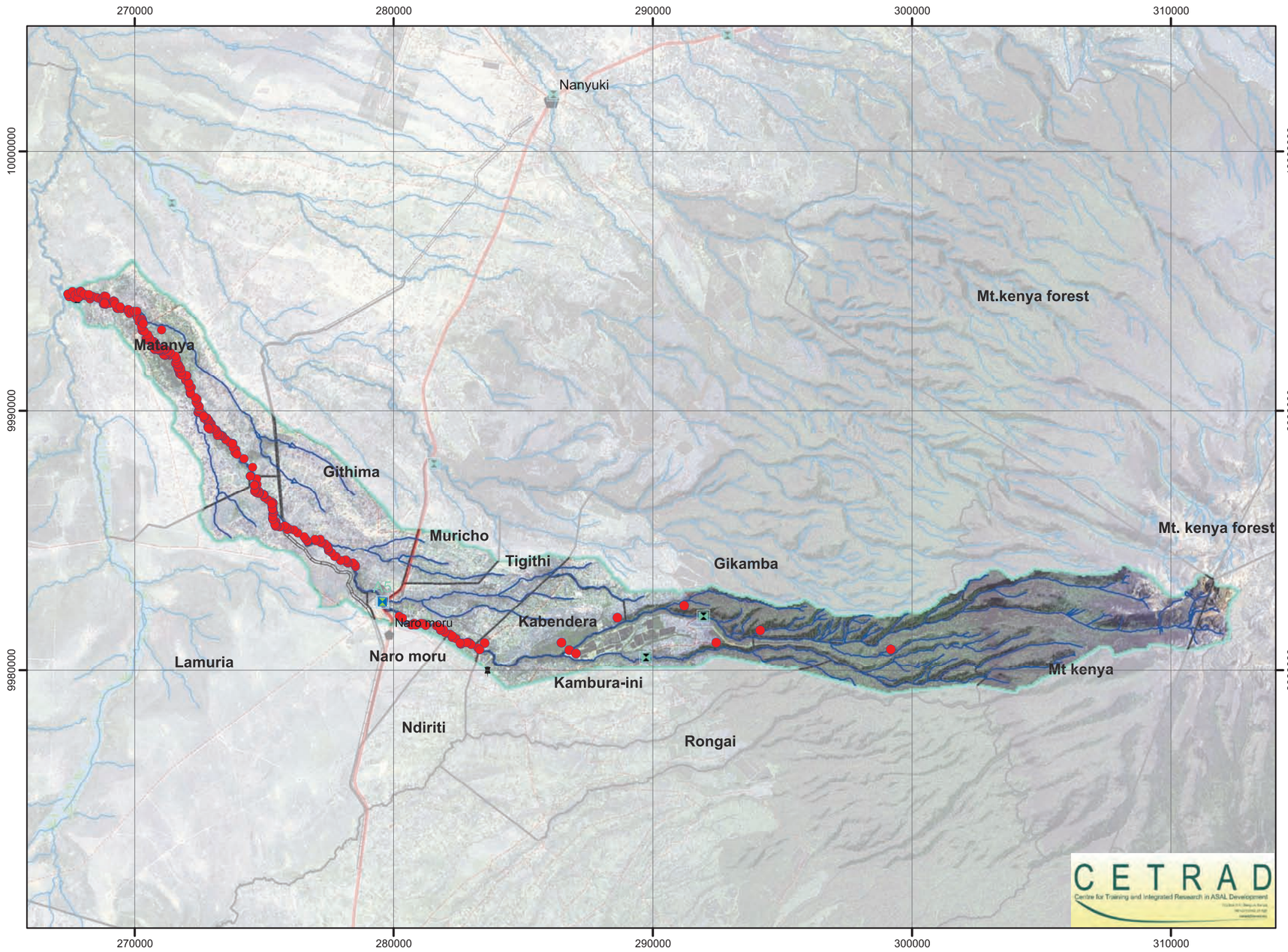
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Demographic data was sourced from KNBS 2009 National Census.

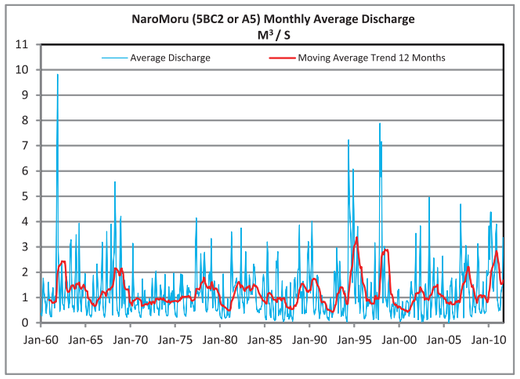
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(*) Arid and Semi Arid Lands.

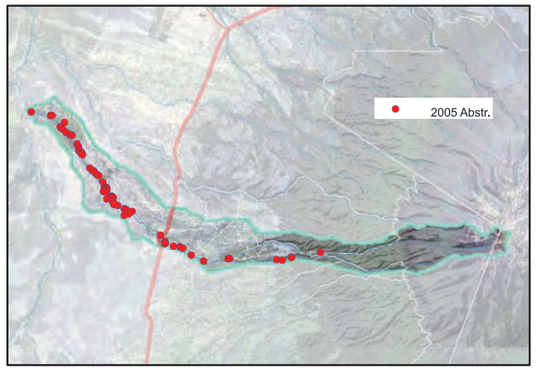
Water Resources and Abstraction Points (2013)



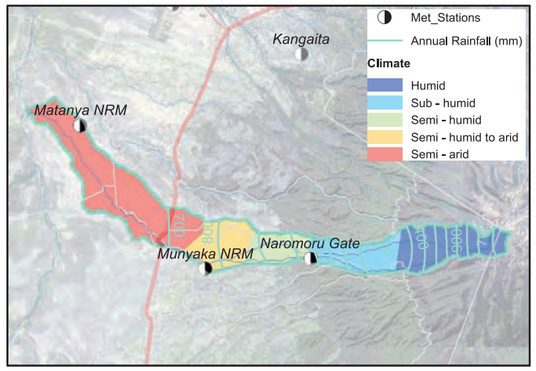
Water Discharge Trends (A5)



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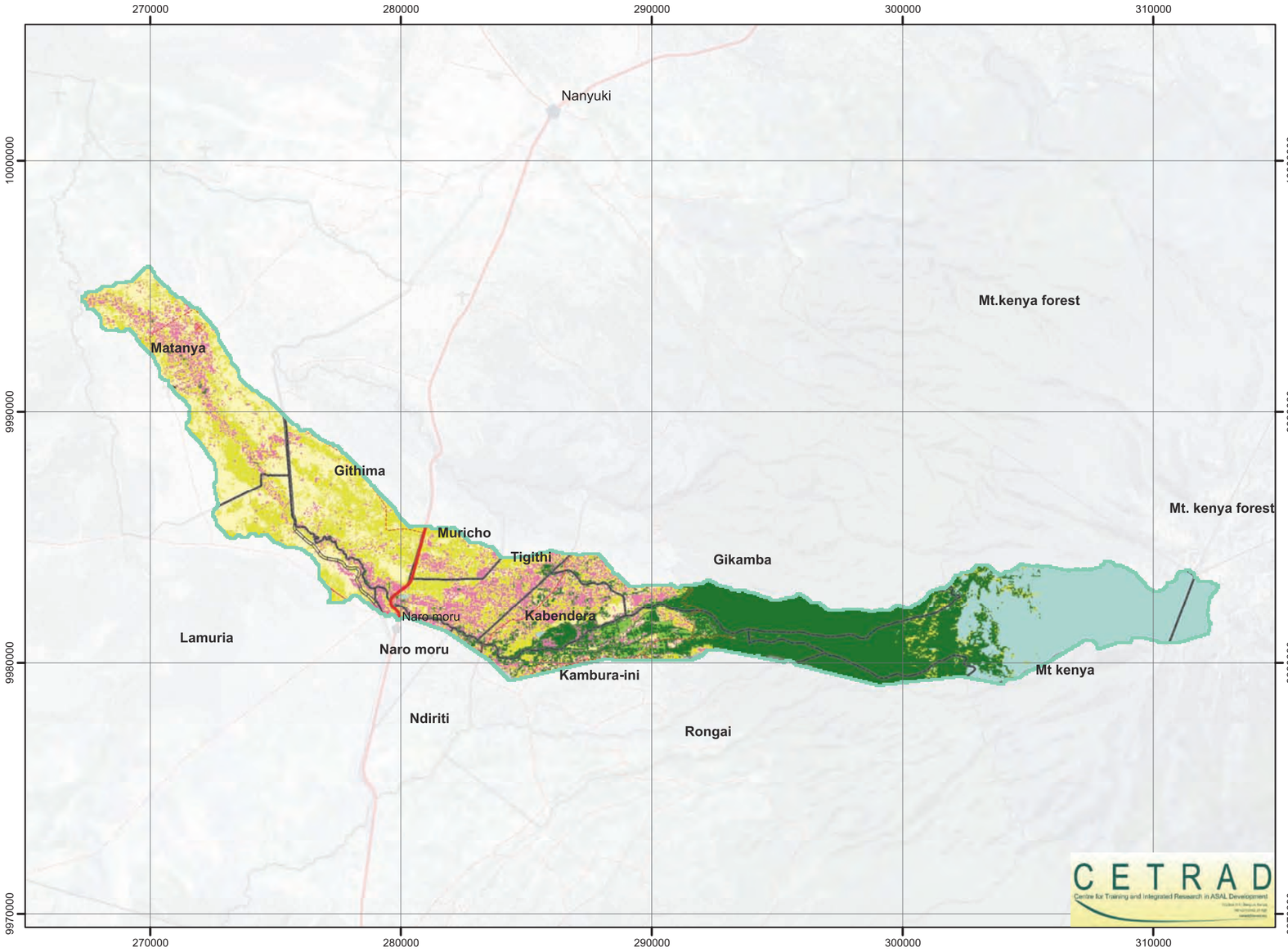
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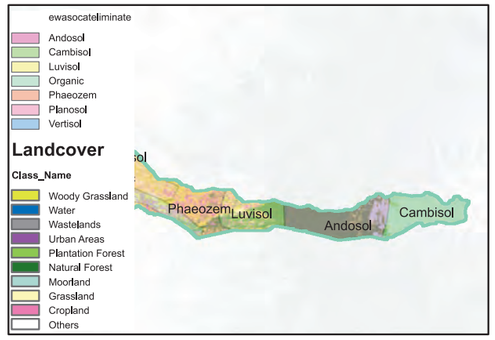
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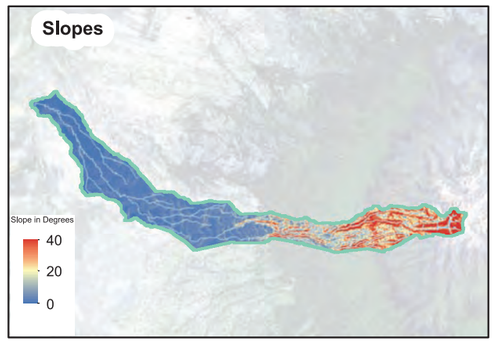
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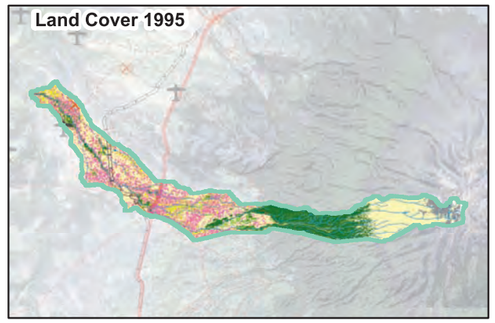
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Humid	Very high	1,100	2,700	34
Sub-humid	High	1,000	1,600	24
Semi-humid	Medium	800	1,400	16
Semi-humid to Semi-arid	Medium	600	1,100	23
Semi-arid	Medium to Low	450	900	70

Land Cover 2014









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**

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

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Naro Moru ubcatchment

0 1 2 3 4 5 Kilometers

1:175,808

Projection: Universal Transverse Mercator
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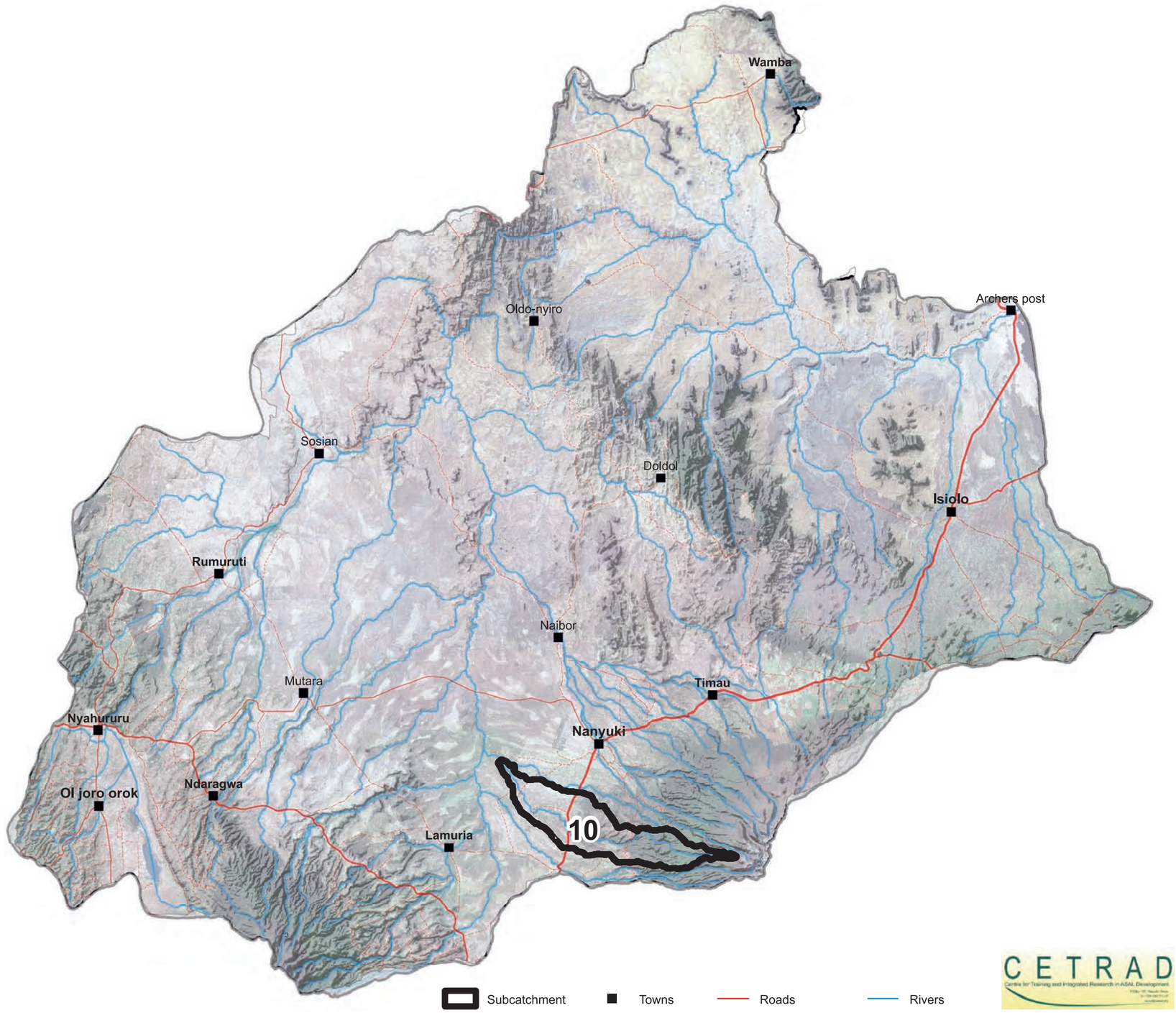
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10 - Burguret


Wamba
Archers post
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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
Centre for Training and Integrated Research in ASAL Development

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

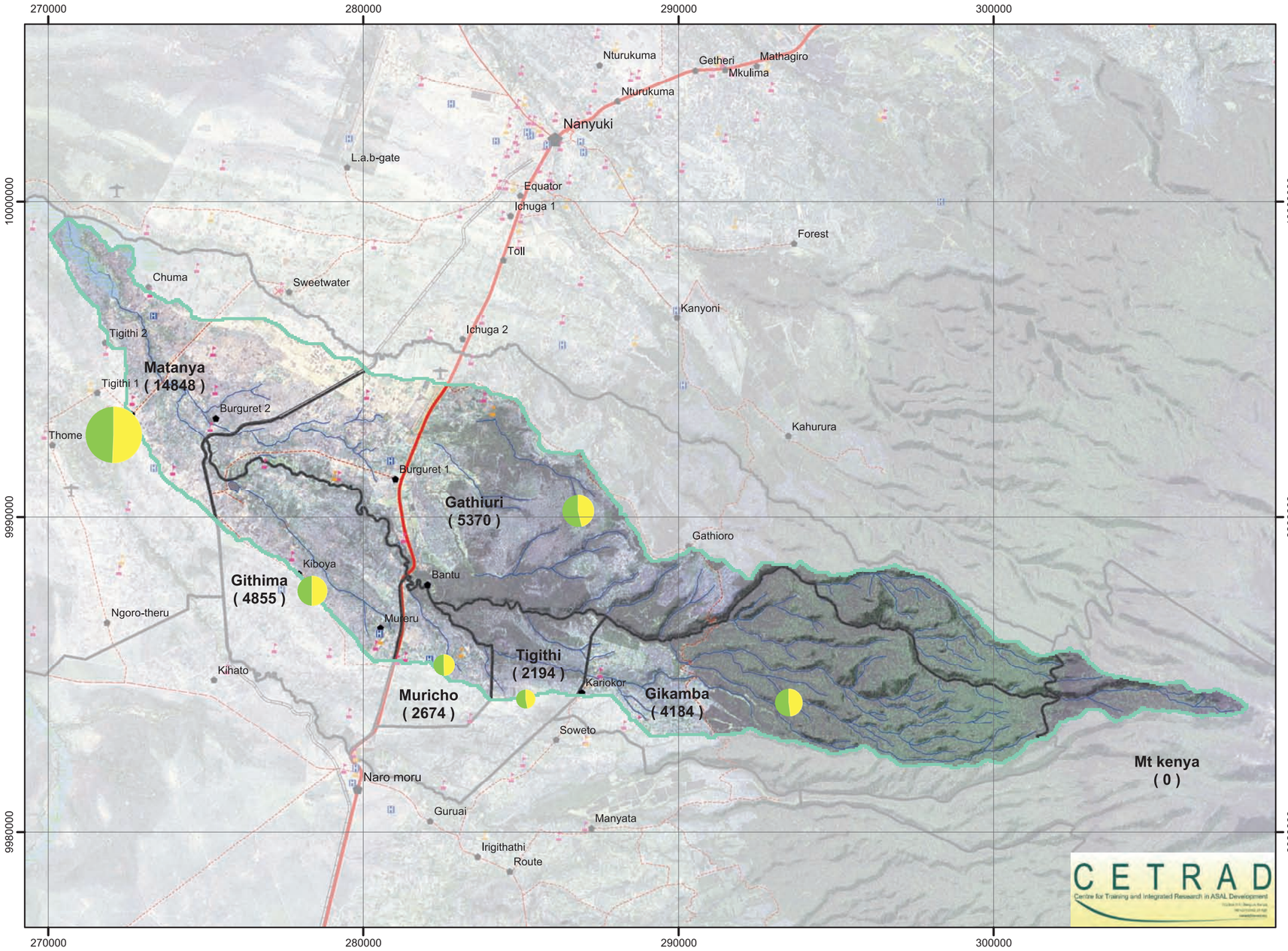
There are four secondary schools which include; Naromoru Boys, Mureru, Burguret and Gakawa Mixed. The catchment area has about 16 primary schools; government sponsored (7), Private (6) and Religious organizations (3).

Water Resource Users Association Information

Name		Burguret WRUA				
Contact persons		Mr. Stephen Mbau (0722248137) 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, Type of support: Management, 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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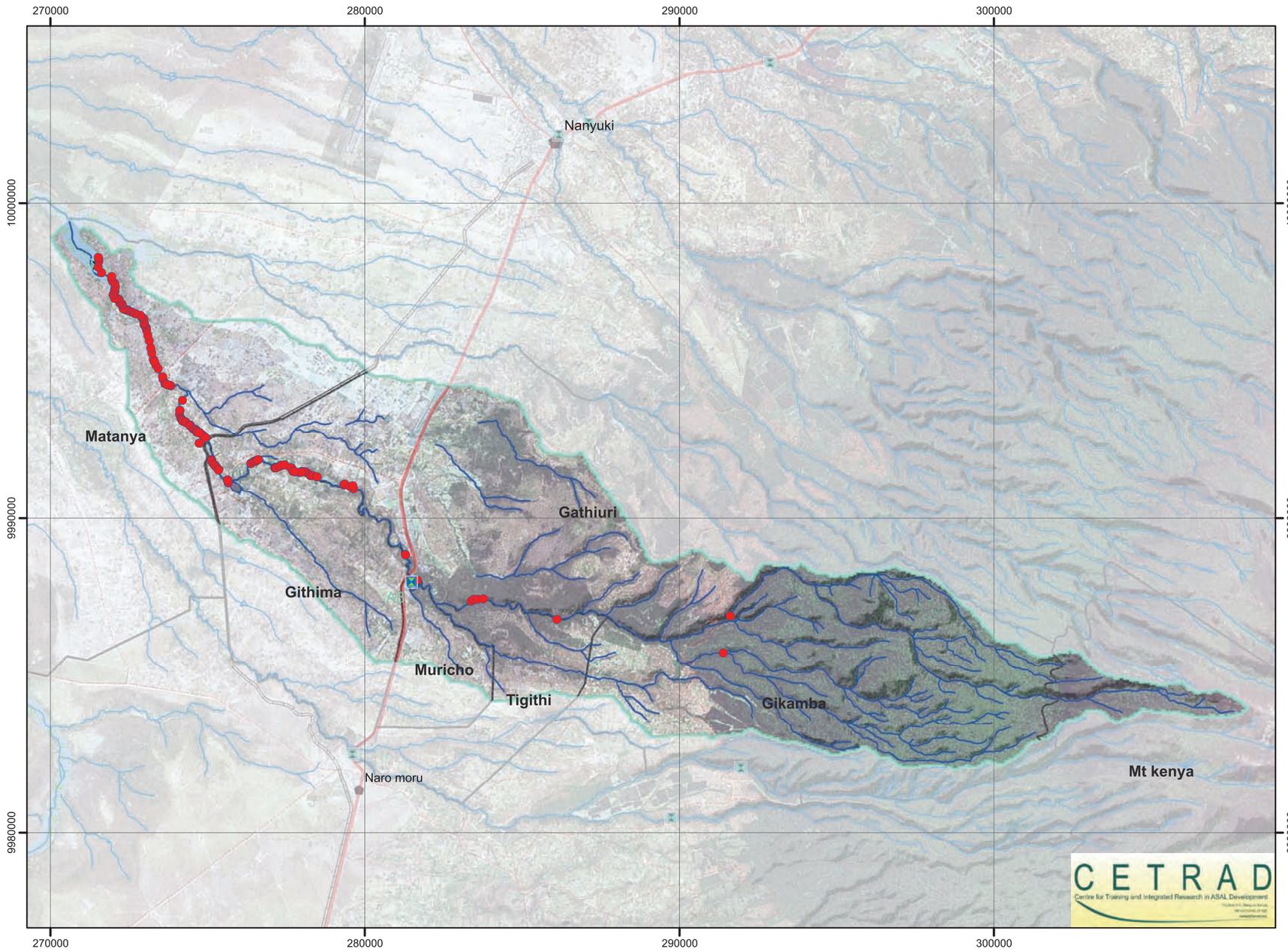
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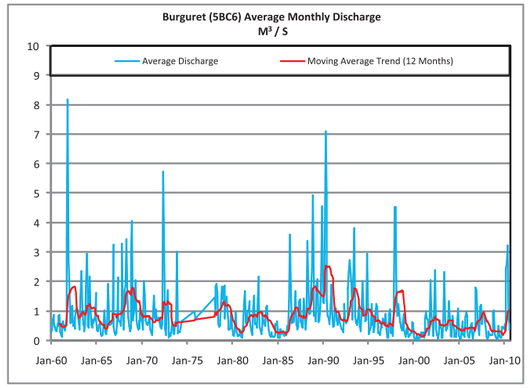
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

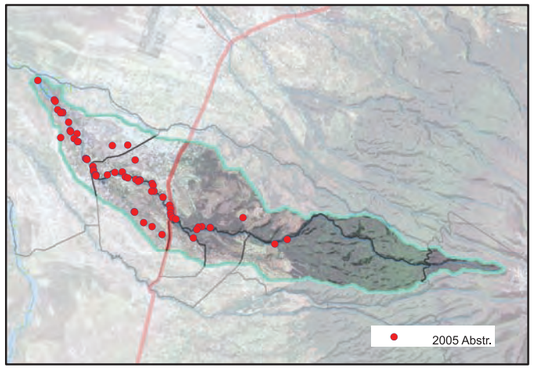
Water Resources and Abstraction Points (2013)



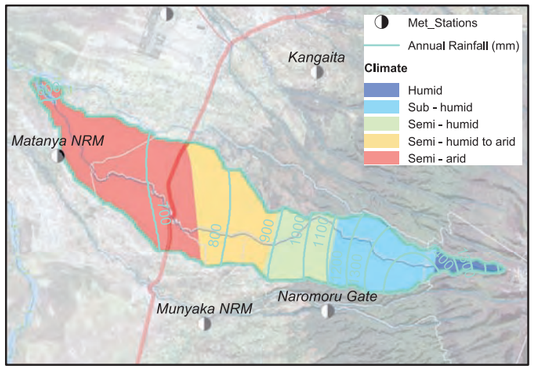
Water Discharge Trends (A8)



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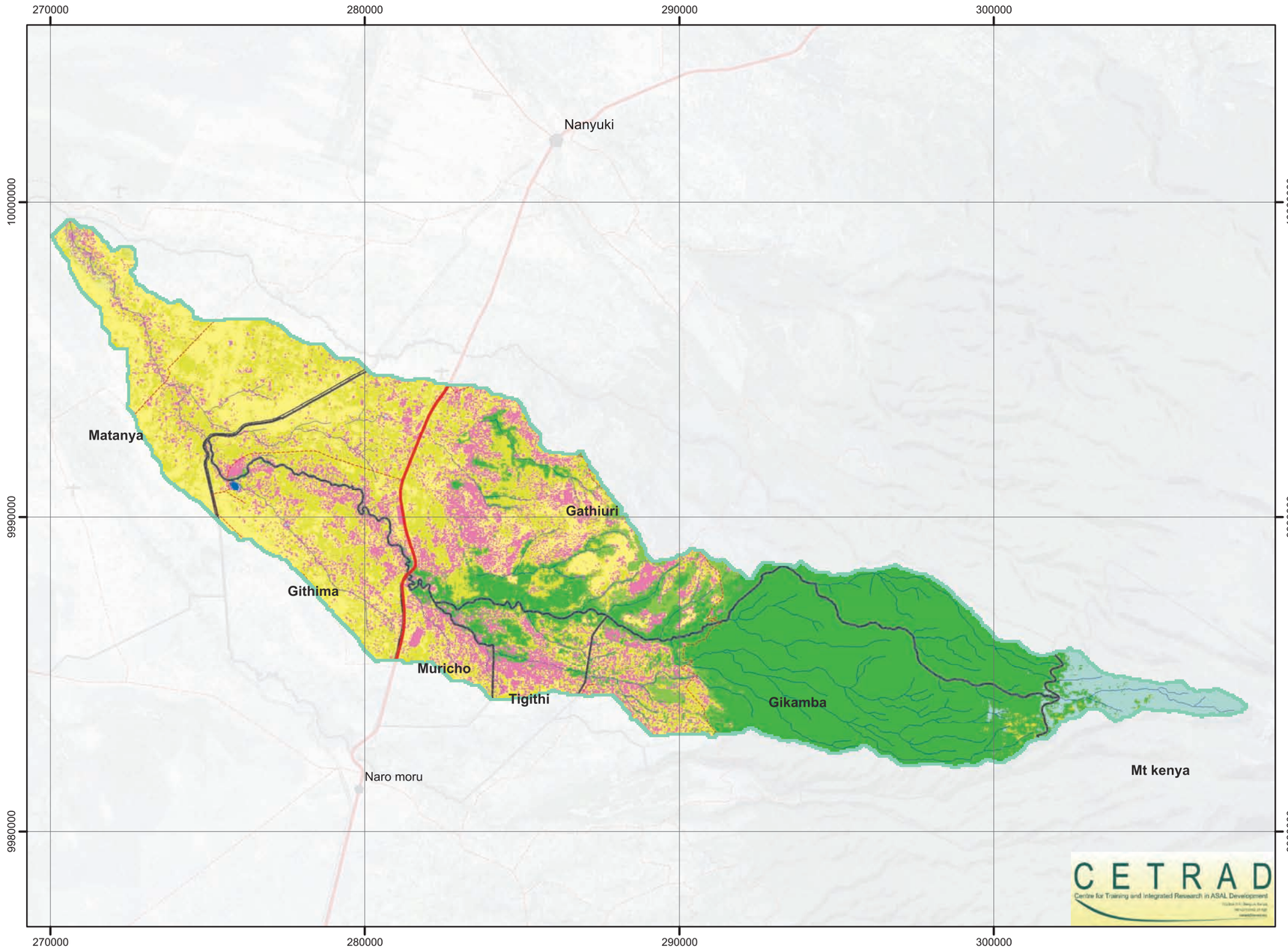
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

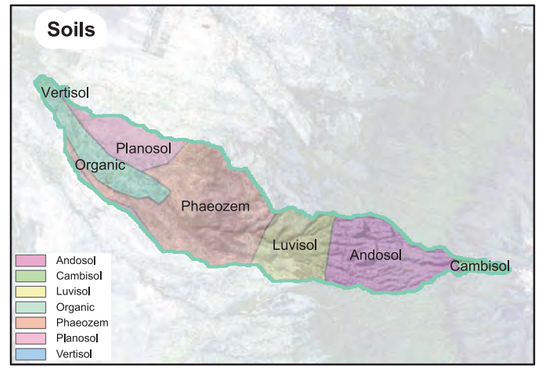
The background image: SRTM 30m.

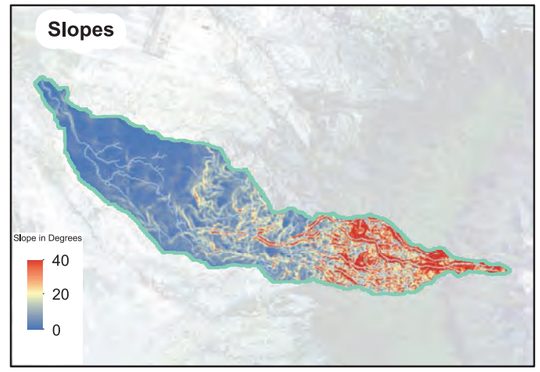
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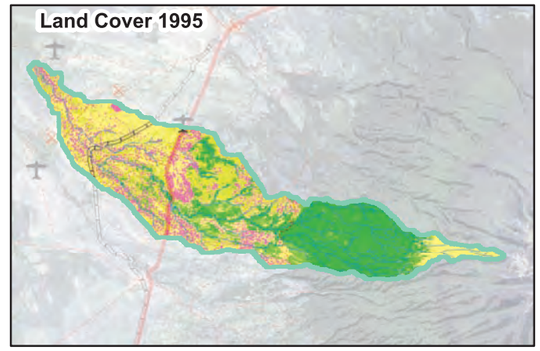
CLIMATE	Agr Potential	Min Rainfall	Max Rainfall	Area Kms
Humid	very high	1100	2700	5.7
Sub-humid	high	1000	1600	39.8
Semi-humid	high to medium	800	1400	27.5
Semi-humid to Semi-arid	medium	600	1100	47.2
Semi-arid	medium to low	450	900	85.8

Land Cover 2014









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
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Landcover information derived from Landsat Images 30m 2012.

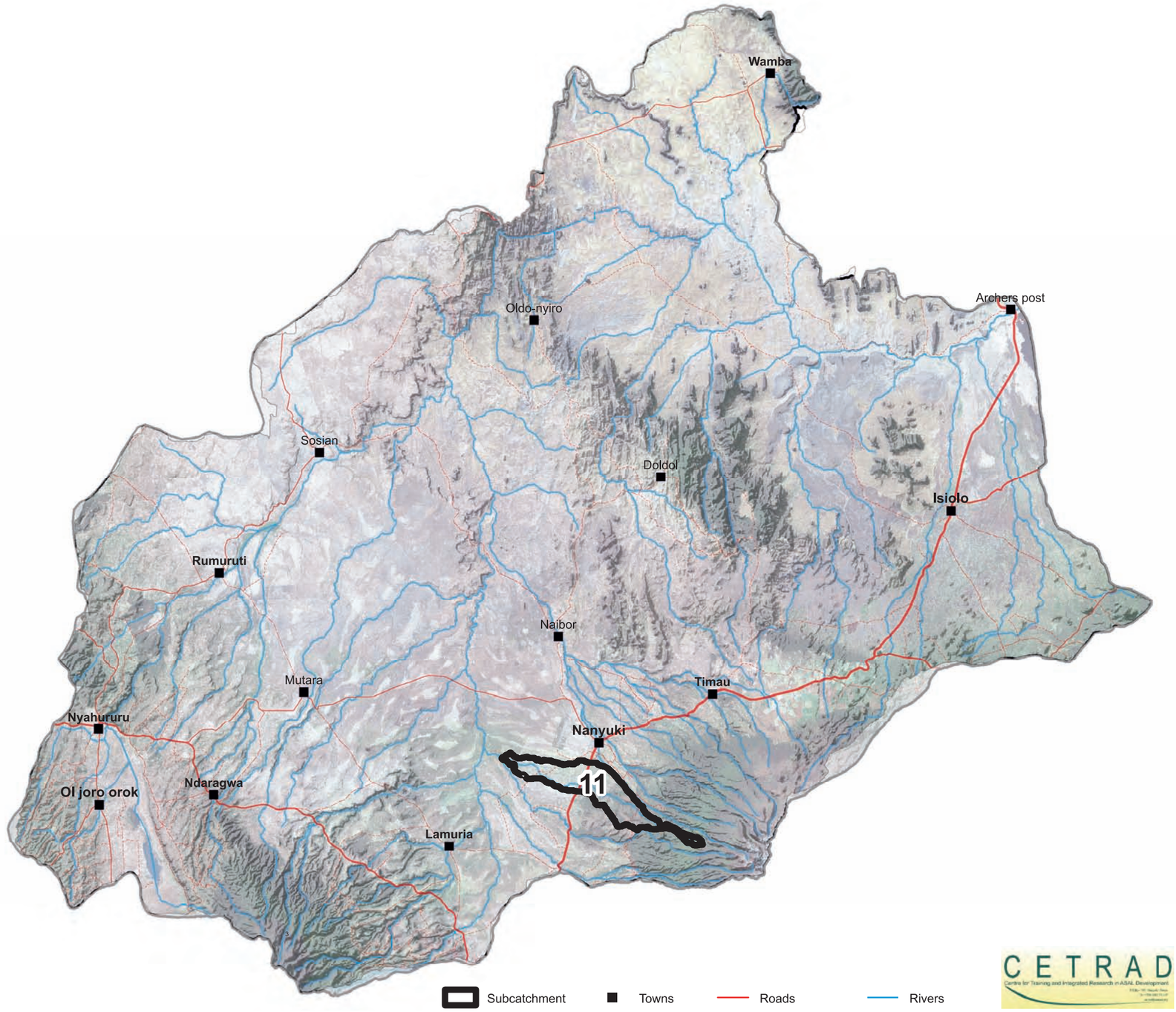
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

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**

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
Centre for Training and Integrated Research in ASAL Development

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

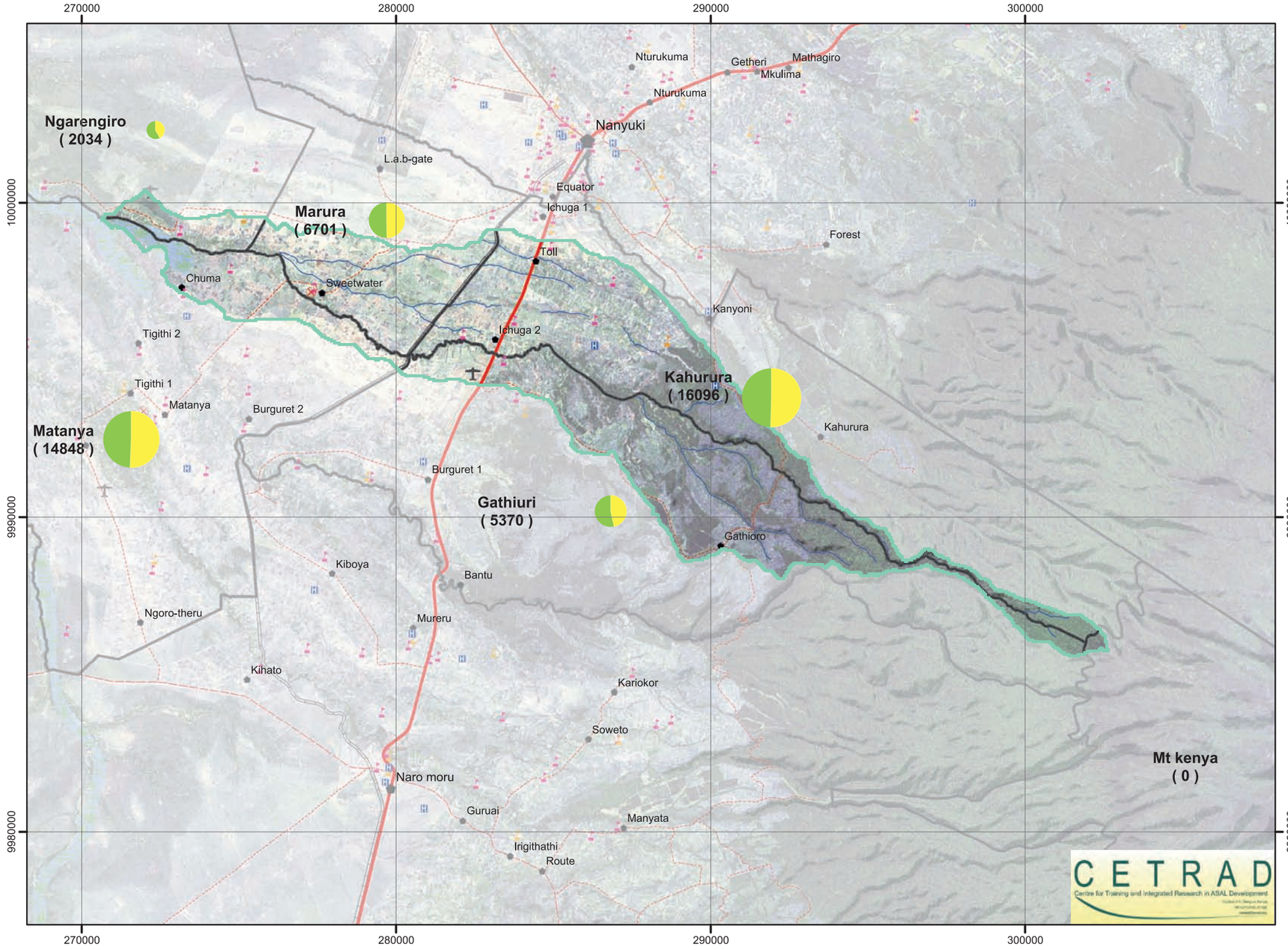
There are two (2) secondary schools and over 11 primary schools; government sponsored (5), Private (1) and Religious organizations (5).

Water Resource Users Association Information

Name of WRUA		Rongai WRUA				
Contact person		Joseph Mathenge Mureithi Phone: 0724884915 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 Increase of water users mainly farmers				
Problems Reported to the WRUA		-Illegal abstraction: Pumping water using hidden pipes underground -Illegal farrows done by downstream people -Cutting trees along riparian land -Planting eucalyptus trees on the river banks -Farming in the riparian land -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 -Dialogue between water users & WRUA -Creating tree nurseries and planting water friendly trees -Storage improvement i.e. dams
Cases of conflicts unresolved and reasons	-Closing of farrows downstream because people are not co-operating -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 -promotion of alternative water sources: boreholes & dams, water ponds, rainwater harvesting -Promote soil and water conservation -Capacity building to water users
Achievements	-Reduction of water conflicts -Registration of the WRUA at registrar -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 -Work closely with stakeholders/ WRMA/Admin -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, -Using alternative water sources e.g. boreholes, dam.
Institutional Support to WRUA (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, -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
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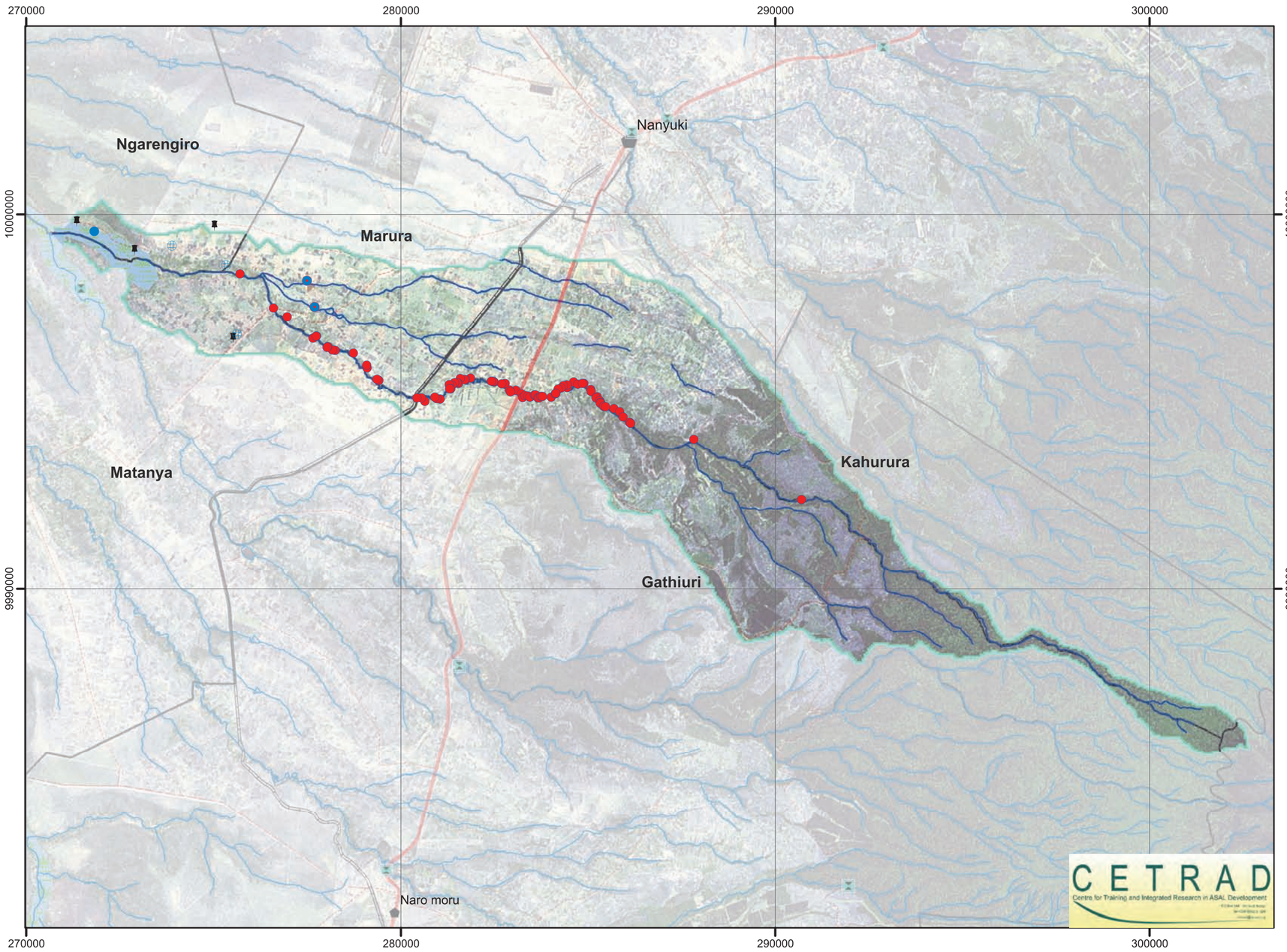
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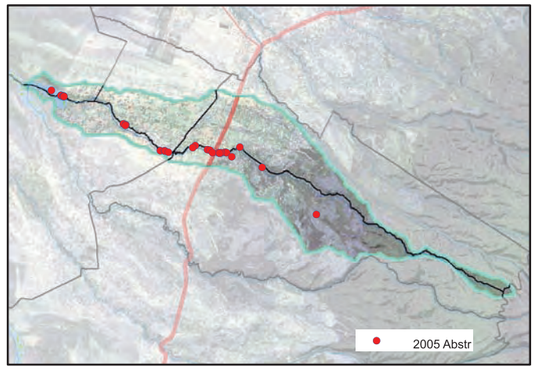
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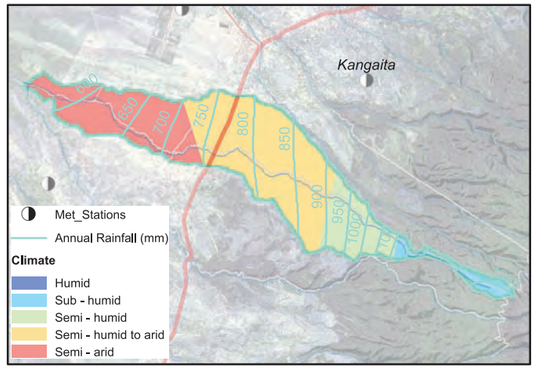
Water Resources and Abstraction Points (2013)



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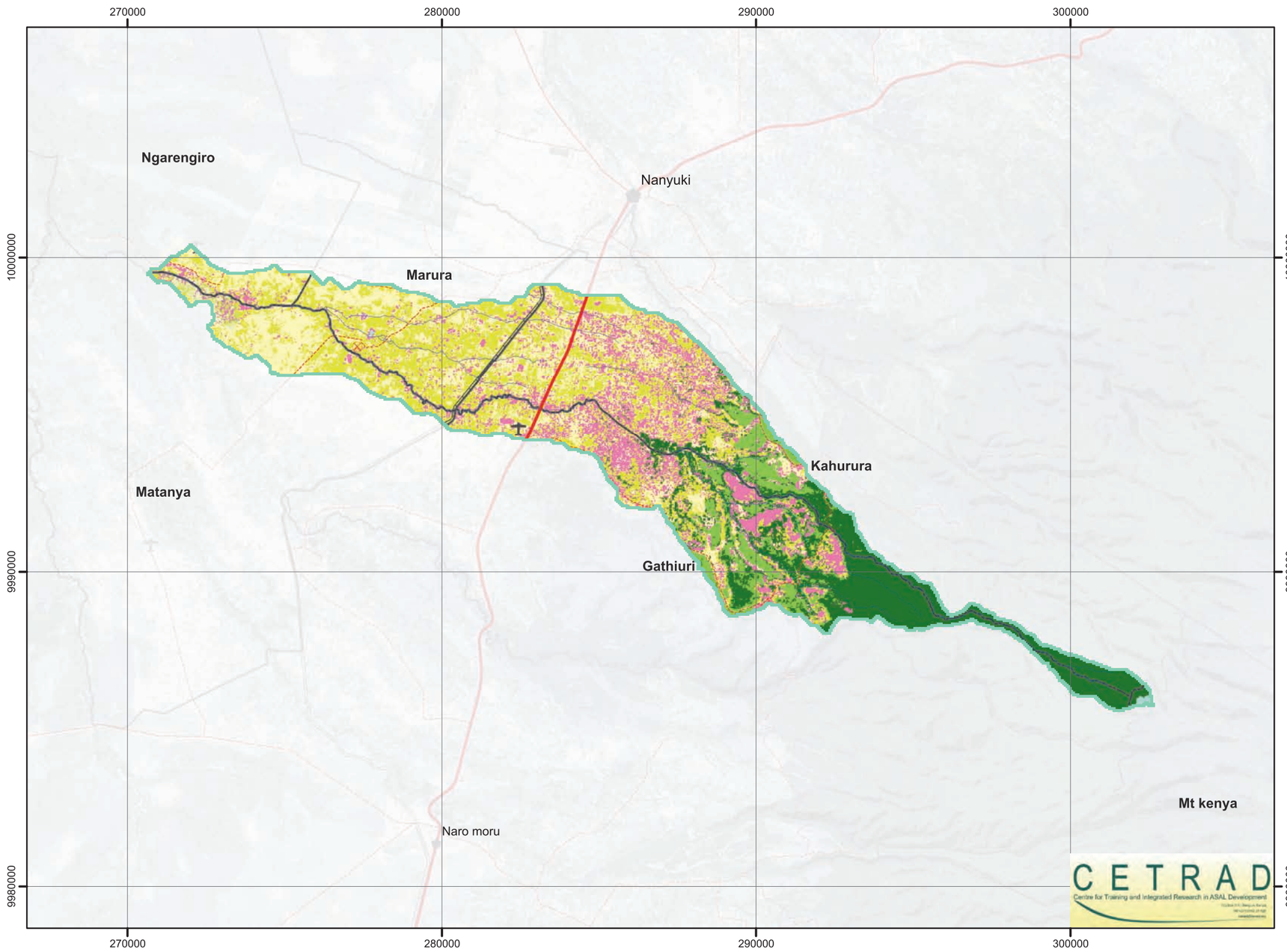
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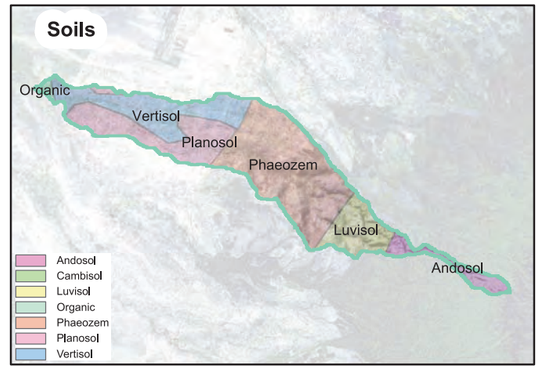
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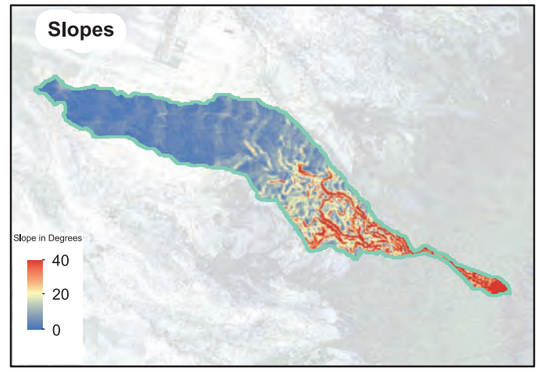
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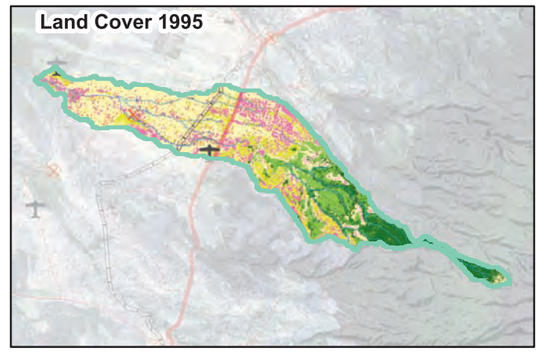
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Humid	Very high	1,100	2,700	0
Sub-humid	High	1,000	1,600	6
Semi-humid	High to Medium	800	1,400	16
Semi-humid to Semi-arid	Medium	600	1,100	52
Semi-arid	Medium to Low	450	900	32

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
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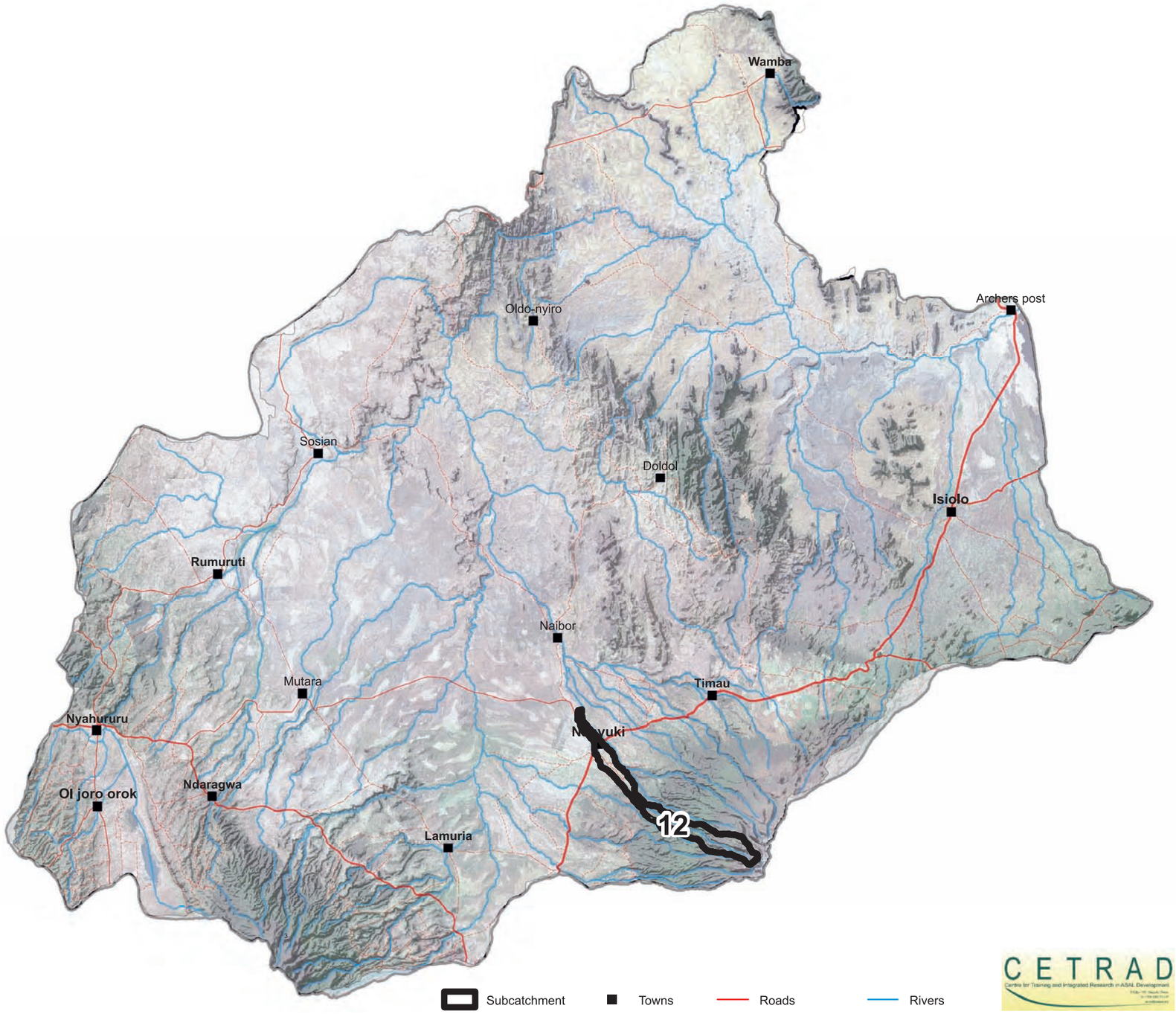
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

12 - Nanyuki


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

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 721Km^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

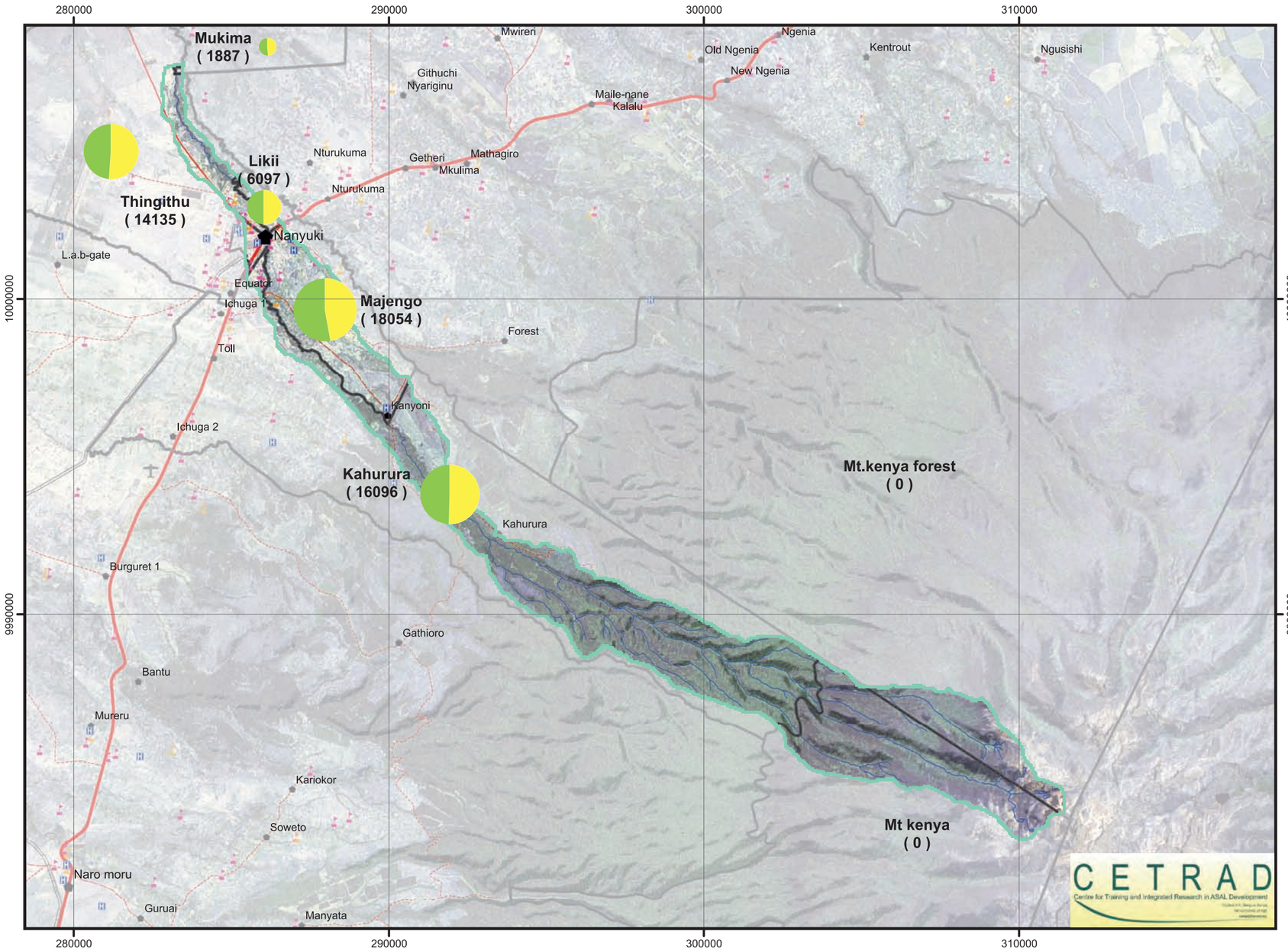
There are four (4) secondary schools and about 15 primary schools; government sponsored (5), Private (5) and Religious organizations (4), and Community (1)

Water Resource Users Association Information

Name of WRUA		Nanyuki Water Resources Users Association				
Contact Address email, chairperson, phone		P.O. BOX 138-10400 Nanyuki. 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 2). Conservation of catchment areas and promotion of flood water harvesting 3). Uplift standards of living of people living within the catchment 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 Conservancies: 3 Horticulture farms: 1 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 2). River pollution 3). Blockage of river flow by some abstractors 4). Unauthorized abstraction of water				
Unreported/unexpressed conflicts		1). Furrow to Kariunga dam passes through private land 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 2). During periods of water scarcity some users do not abide to rationing program 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 2). River clean up 3). Tree planting on the riparian and on farms 4). Promotion of farming as a business 5). Construction of water storage facilities e.g. dams and masonry tanks 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. 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 2). Encourage rain water roof catchment at farm level (water harvesting). 3). Storage of flood flow (dams).
Institutional Support to WRUA (Name, Year, Type of support, Amount of support)	SNV: 2006/2007- capacity building Kshs. 1.2million UNDP-SGP/GEF: 2008- pollution control, drip irrigation, water storage Kshs. 1.9m LWF: 2008-strategic catchment management plan LWF: 2010/2011-Environmental conservation Kshs. 350,000 WDC/WSTF: 2011/2013-water harvesting tanks, tree planting, pollution control and water balance survey Kshs. 5million 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	-

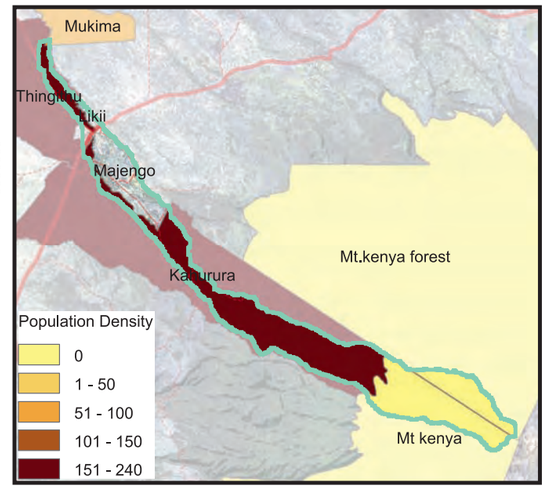
Population Numbers (2009) and Socio Infrastructure



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
- C
- D
- E
- Railway Line
- Airfields

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
Y-Shift:	10,000,000

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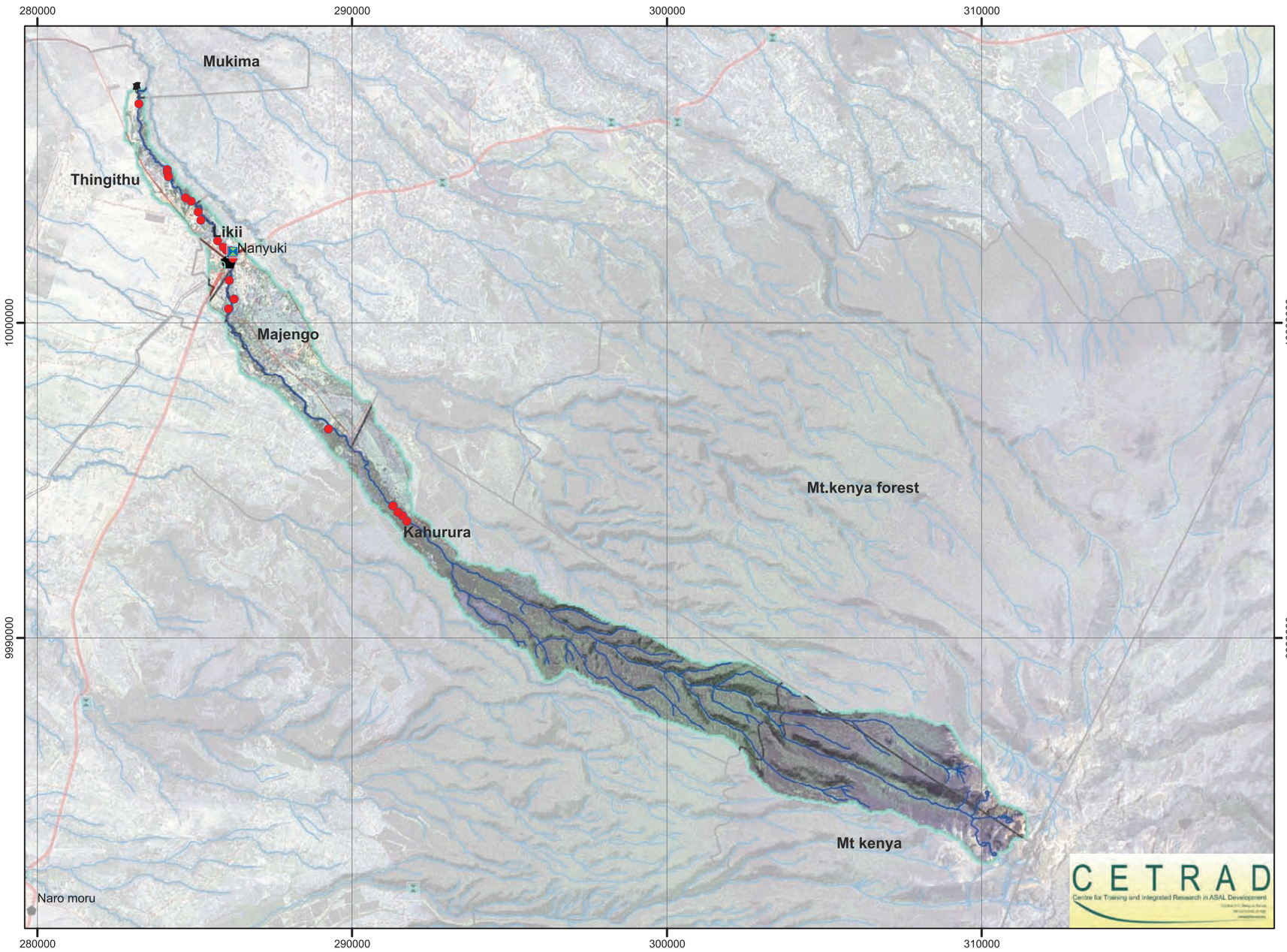
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Demographic data was sourced from KNBS 2009 National Census.

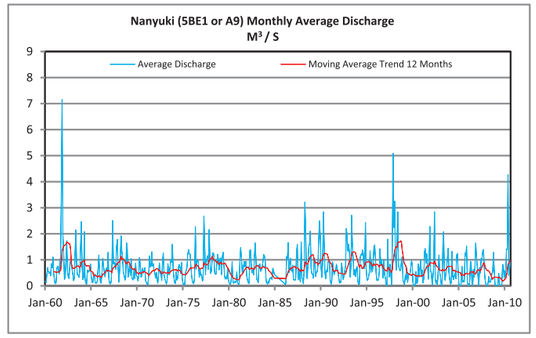
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

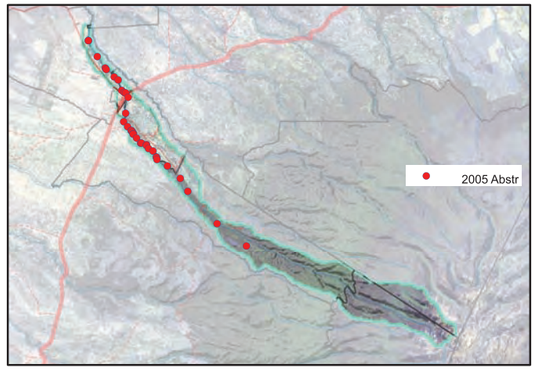
Water Resources and Abstraction Points (2013)



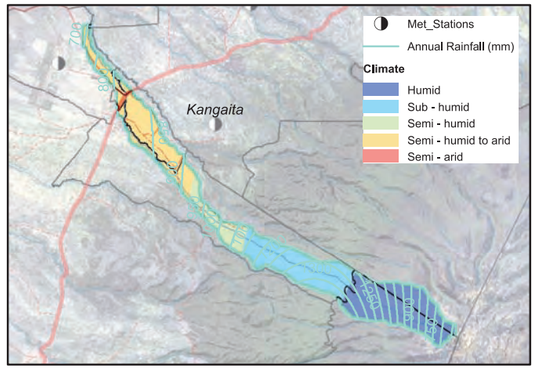
Water Discharge Trends (A9)



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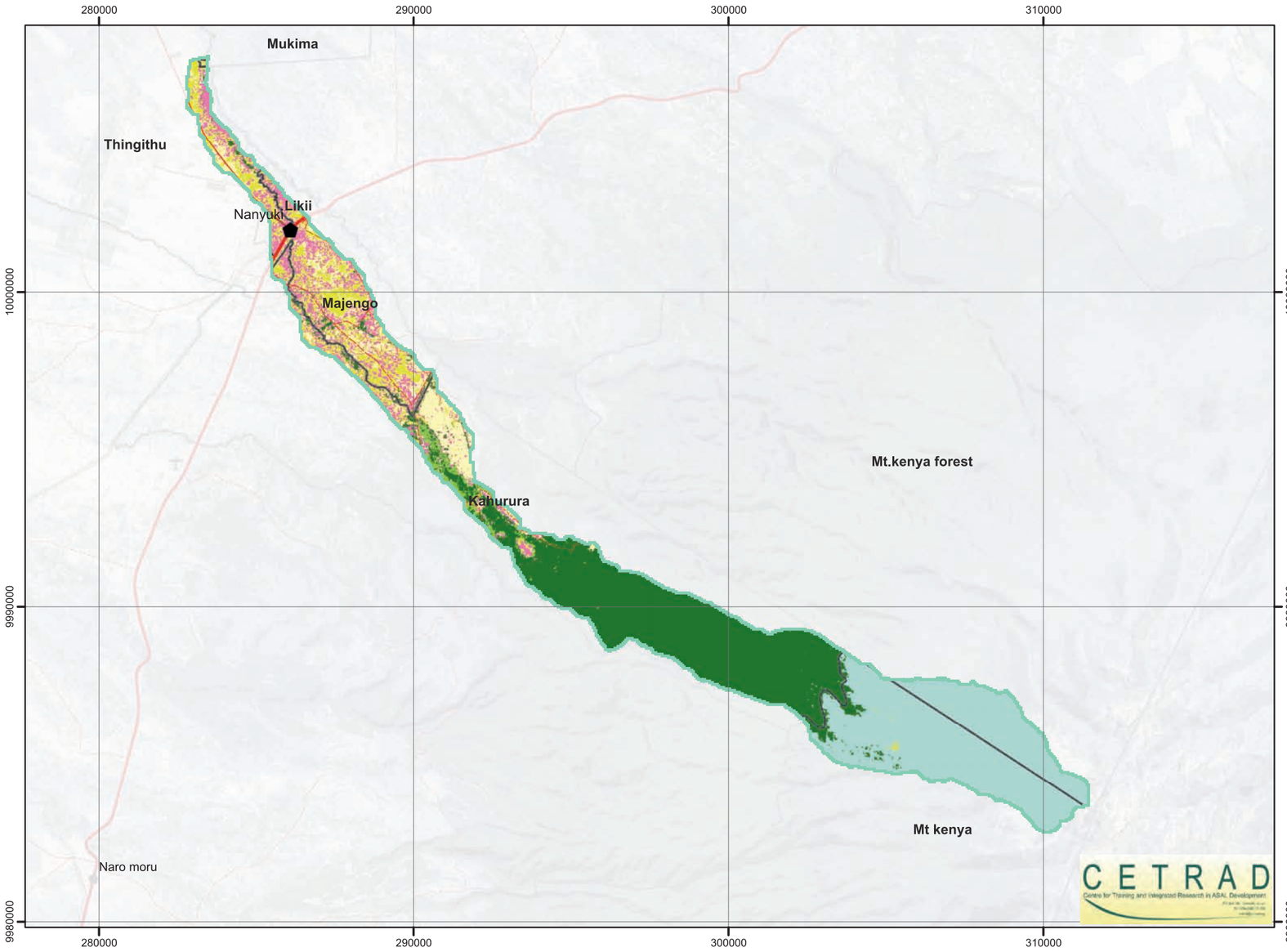
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

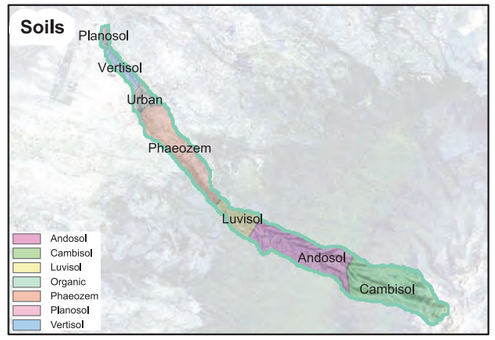
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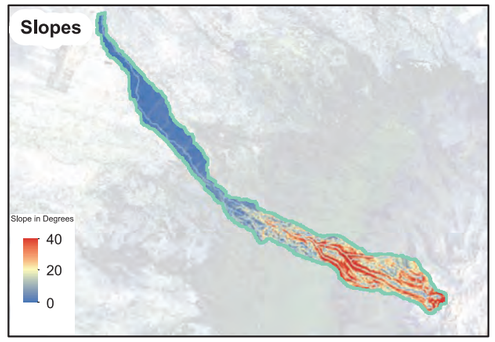
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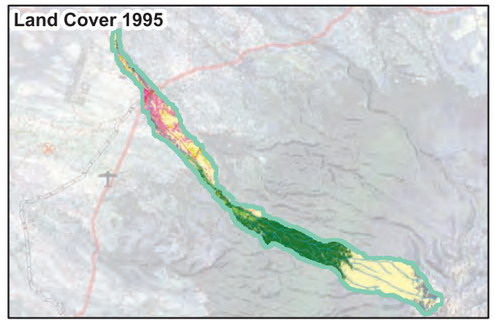
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Humid	Very high	1,100	2,700	25
Sub-humid	High	1,000	1,600	20
Semi-humid	High to Medium	800	1,400	8
Semi-humid to Semi-arid	Medium	600	1,100	22

Land Cover 2014









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**

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
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Nanyuki Subcatchment

0 1 2 3 4 5 Kilometers

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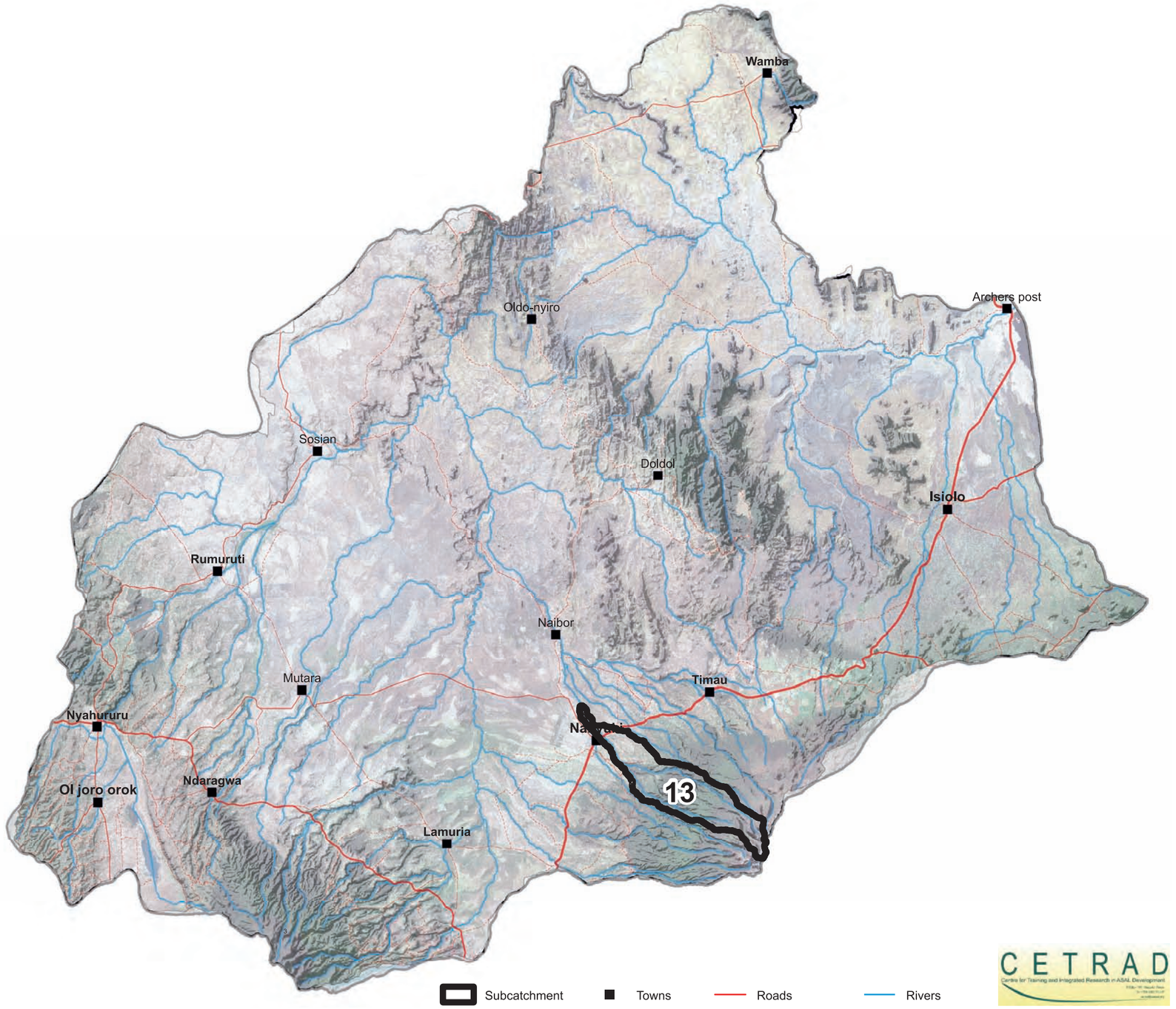
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

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 Martin Muriuki (Interim Chairman) 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, i. Likii River and its tributaries ii. Dams and Water pans iii. Boreholes and shallow wells iv. Springs (b) To promote sustainable use, management and development of water resources within the Likii Sub-catchment. (c) To promote soil and water conservation practices within the Likii Sub-catchment To conserve the water quality and quantity of the Likii River and its tributaries, public dams, water pans, boreholes, shallow wells and springs. (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, i. Domestic ii. Livestock iii. Environment, wildlife and fisheries iv. Irrigation v. Recreation vi. Manufacturing Industry vii. Other uses as contained in the Water Act. (e) To provide a forum to discuss, prevent and resolve water resource use conflicts (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 (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. (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 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
Challenges	Lack of clear guidelines from WRMA regarding permit holders and WRUA roles in the water resources management Lack of human and financial resources to patrol the River system 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 Promotion of energy efficient stoves Promotion of bio gas technologies Promotion of drip irrigation technology Pollution control Proposed fish farming for income generation
Achievements	Over 20,000 indigenous tree seedlings planted within stretch 2.5kms along the riparian area Over 10,000 exotic tree seedlings planted at household level Likii water resources operates two bank accounts Flow measuring and regulating devices installed in over 85% of the abstraction points Five (5) year sub catchment management plan developed Awareness on pollution raised through erection of ten (10) concrete sign posts Over one thousand (1000) energy efficient stoves installed within the household Five clothe washing stands constructed within the informal settlements adjacent to Likii River Acquisition of one (1) motor bike for river patrol and field visit. Have Registered With Kenya Revenue Authority (KRA) and Attorney General office (AG) 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 Have employed full time Executive officer and a care taker for the WRUA farm.

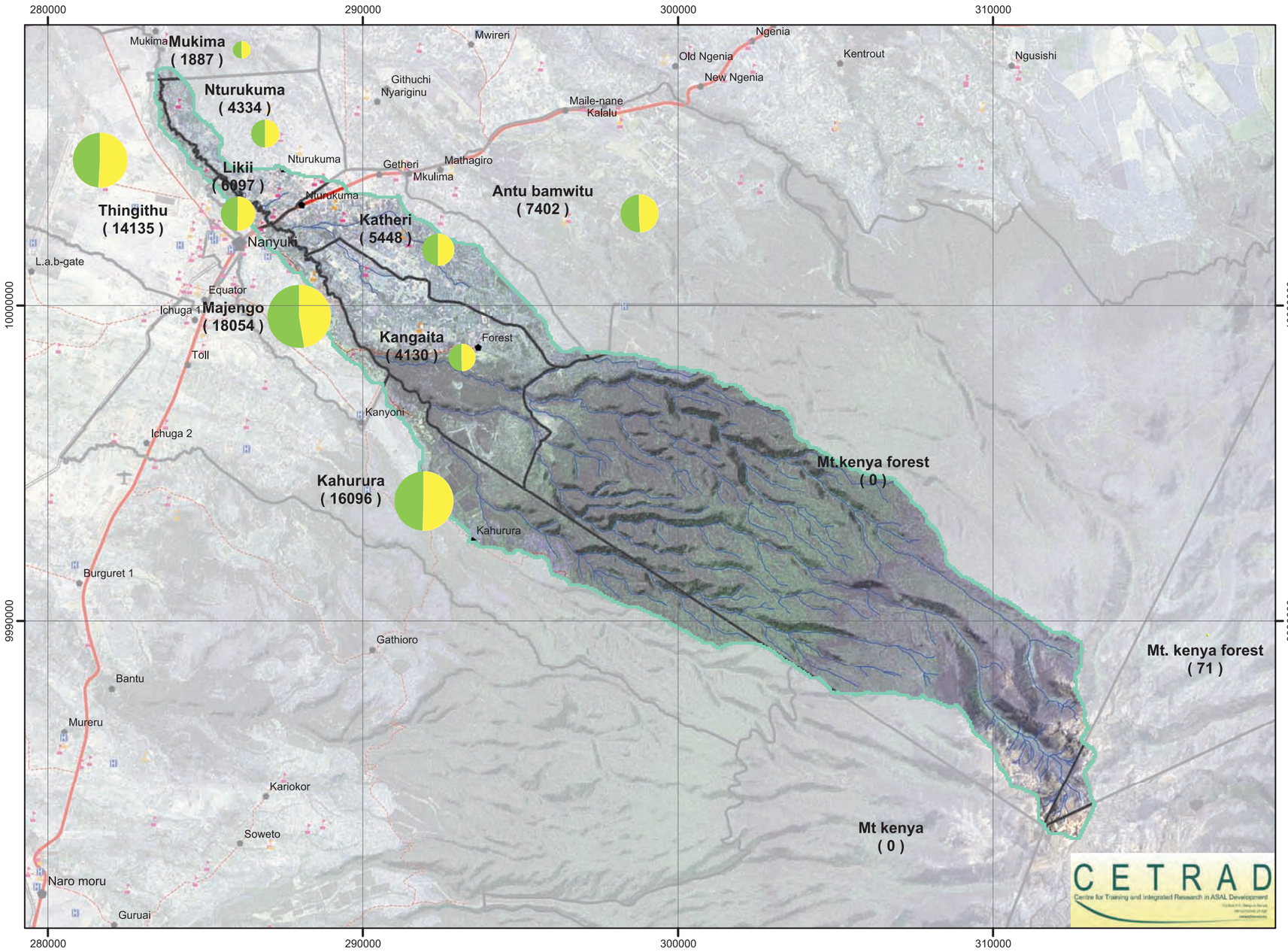
LIKII SUBCATCHMENT

Fact sheet. Date: July 2014

Hindrances to achieve the goals of the WRUA	Lack of adequate financial resources Lack of adequate capacity and skills within the Management Committee
Advices to others	Awareness creation amongst the WRUA members Employment of a technical Manager to help in the running of the Association Adherence to the WRUA Constitution and Bylaws Compliance to all the GoK regulations including the water Act 2002 and subsequent rules and regulations
Information and Data Available	List of members Intake details including GPS position. Minutes for Meetings Financial records Abstraction report Sub-catchment management plan Photos on all the WRUA field activities and catchment area 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 Abstraction quantities (WRMA) Water quantity available and quality Water demand data Land use and forest cover Baseline data that includes human and livestock population 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 Water storage at household levels
Institutional Support to WRUA (Name, Year, Type of support, Amount of support)	UNDP/GEF/COMPACT Mt. Kenya Initiative: Year 2008: financial support: Amount KShs 3.44m Laikipia Wildlife Forum: Year 2008: development of sub-catchment plan: Amount Kshs 500,000 Laikipia wildlife Forum: Year 2010: Financial support: Amount 1.56m WDC (Water Service Trust Fund): Year 2011: Financial support: Amount Kshs 1,99m 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 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
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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

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

Likii Subcatchment

0 1 2 3 4 5 Kilometers

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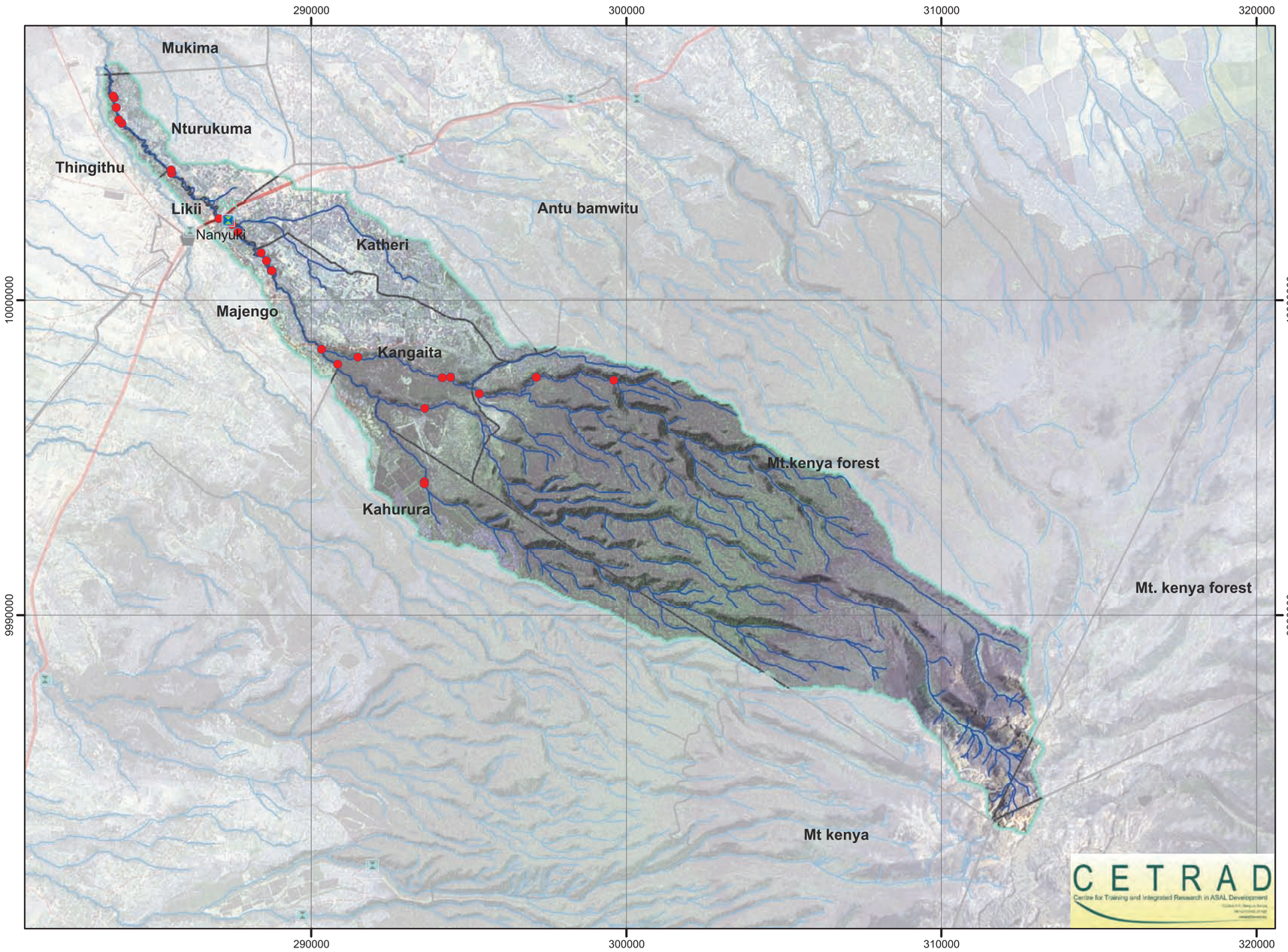
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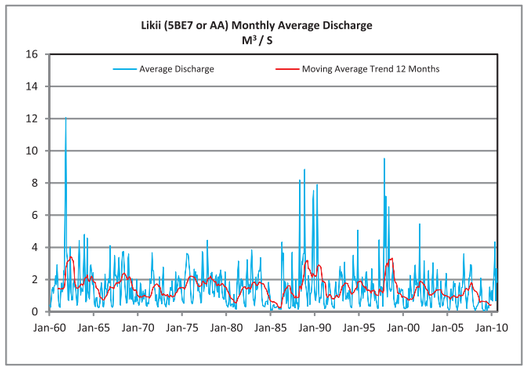
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(*) Arid and Semi Arid Lands.

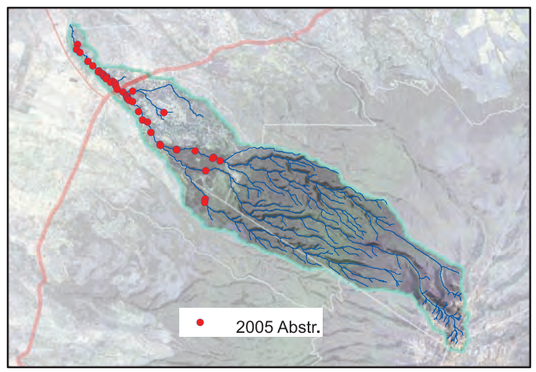
Water Resources and Abstraction Points (2013)



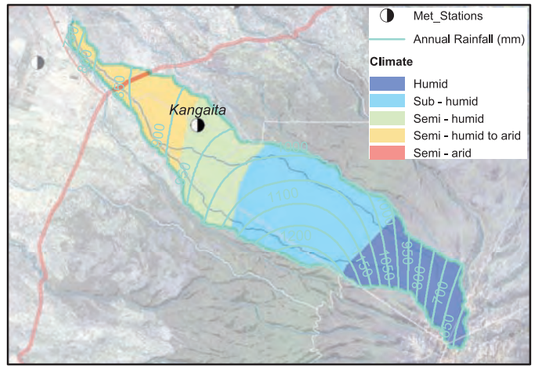
Water Discharge Trends (AA)



Abstraction 2005



Agro Climatic Zones



Abstractions

- Rivers

Features & Boundaries

- Rivers
- Likii RGS
- Other RGS
- Subcatchment
- Sublocations
- Wetlands

Transport

Roads

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

Urban Settlements

- District Hq
- Division Hq

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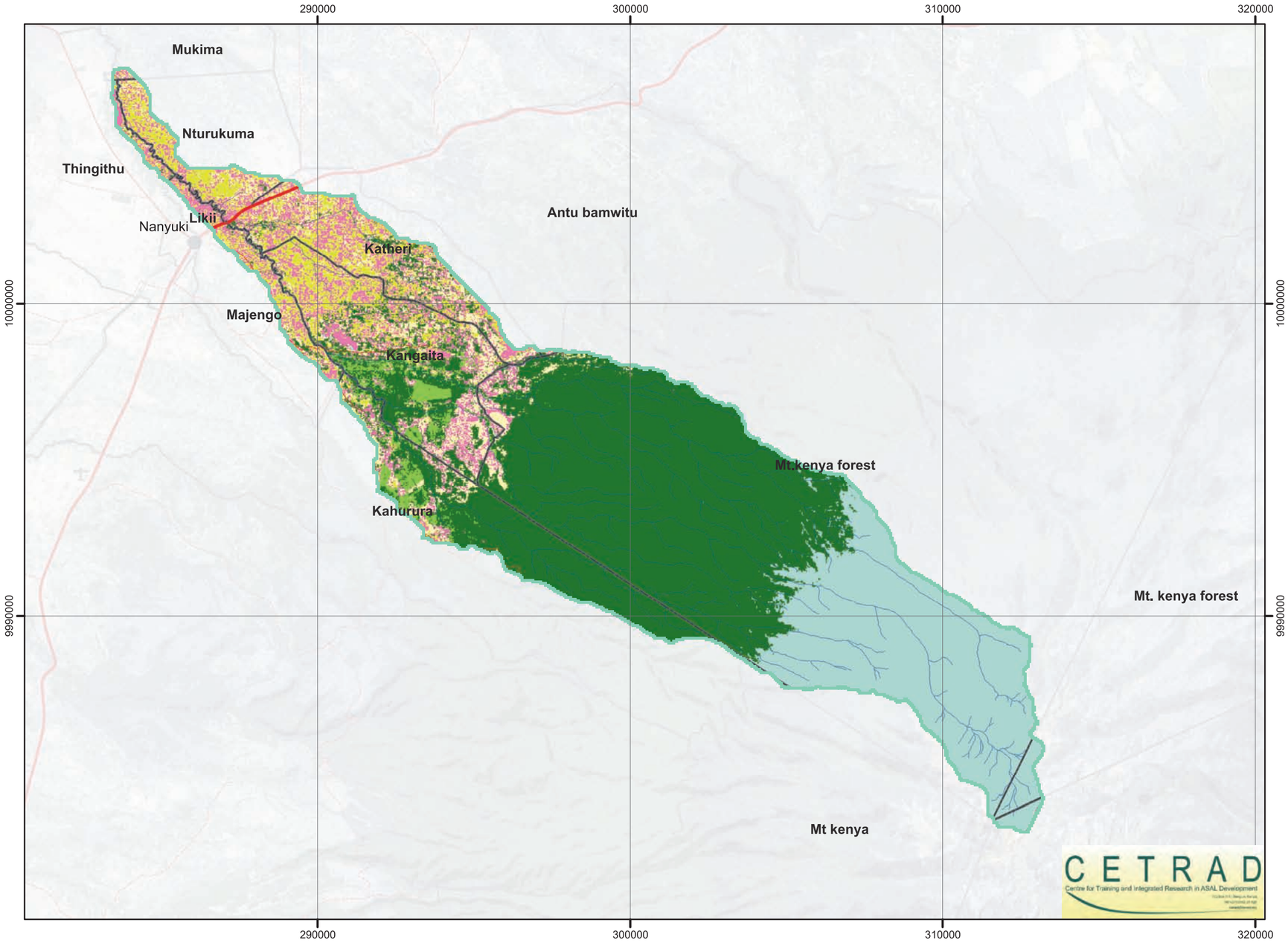
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

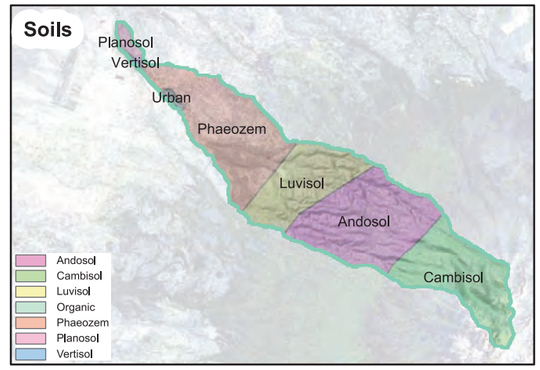
The background image: SRTM 30m.

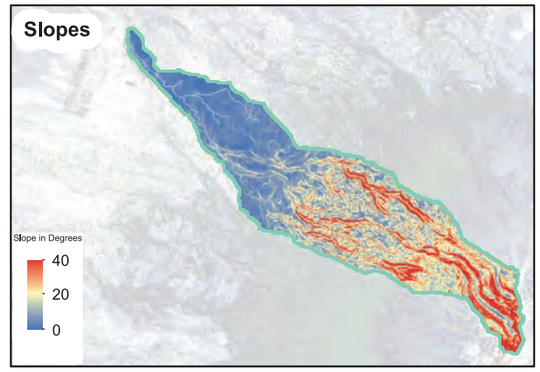
(*) Arid and Semi Arid Lands.

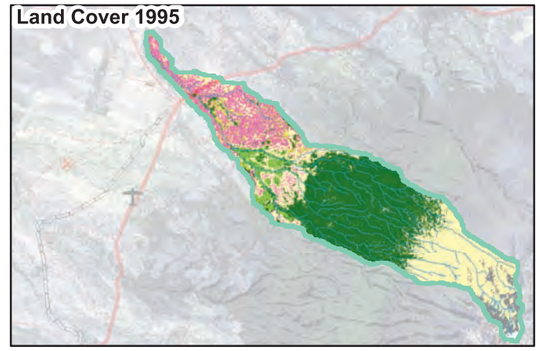
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Humid	Very high	1,100	2,700	41
Sub-humid	High	1,000	1,600	74
Semi-humid	High to Medium	800	1,400	36
Semi-humid to Semi-arid	Medium	600	1,100	32

Land Cover 2014









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**

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

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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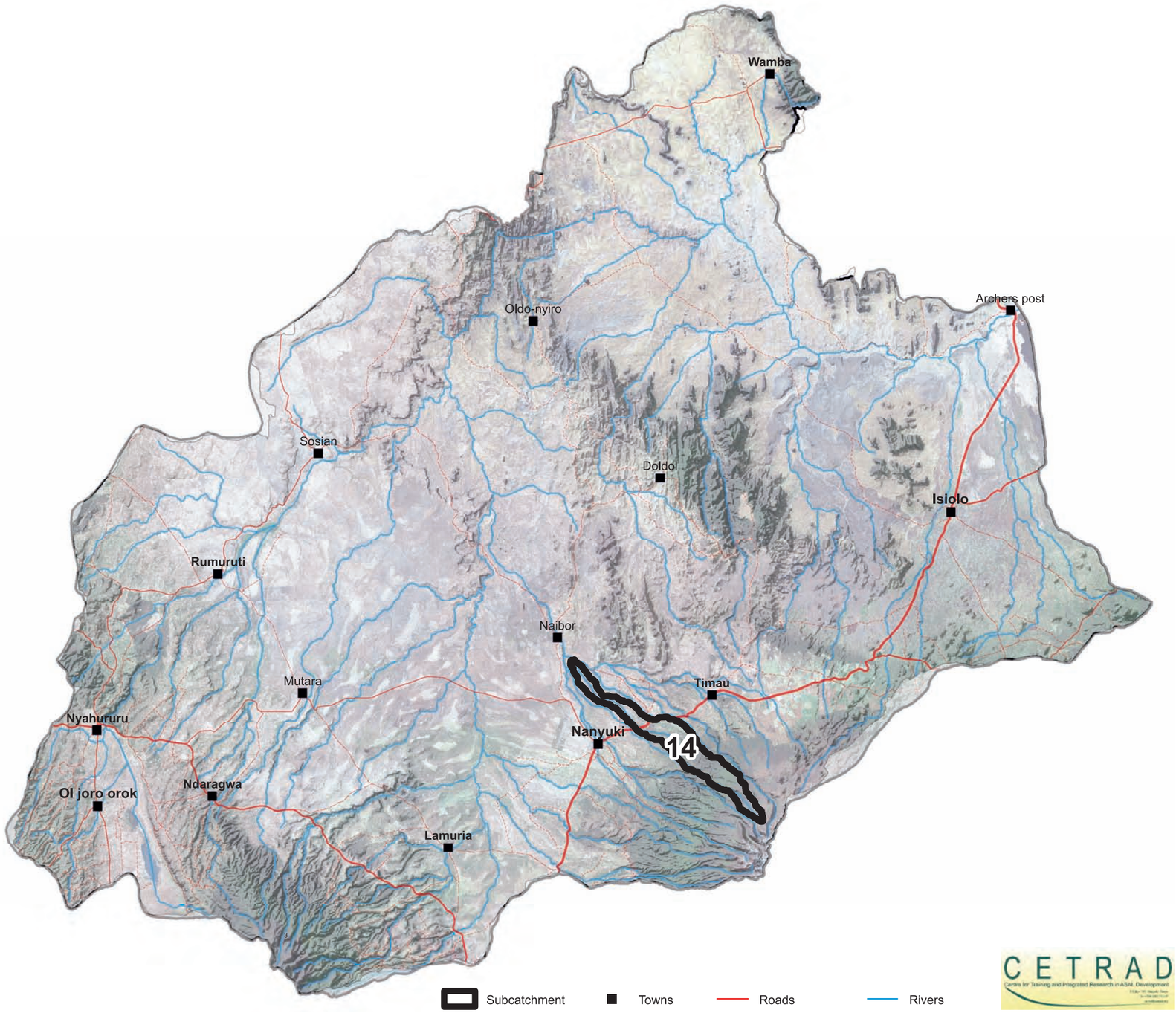
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

14 - Ontulili



N
W E
S

0 5 10 20 30 40 50
Kilometers

Subcatchment
Towns
Roads
Rivers

CETRAD
Centre for Training and Integrated Research in ASAL Development

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

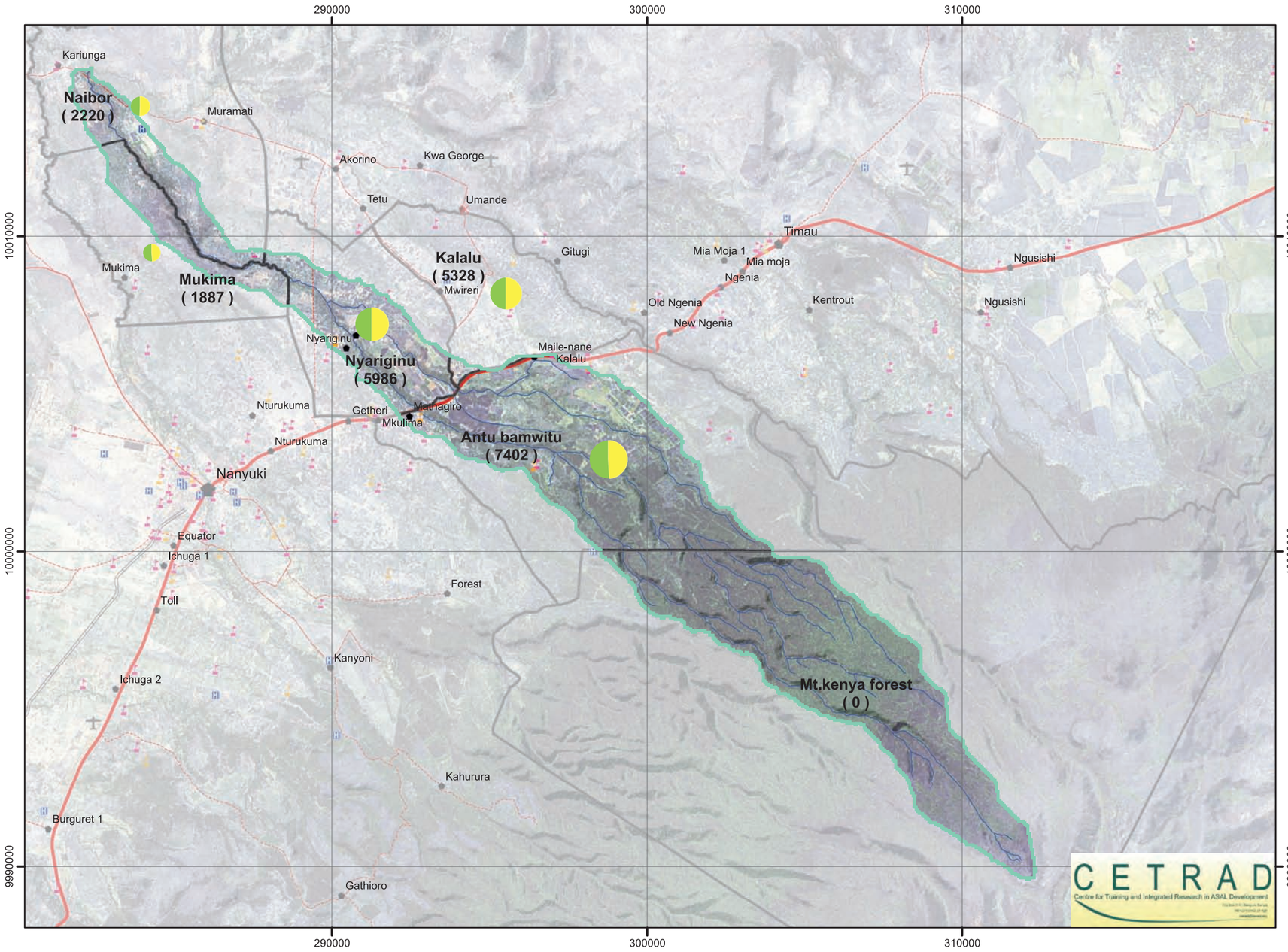
There are three secondary schools and over six (6) primary schools; government sponsored (2), Religious organizations (2) and Community (2).

Water Resource Users Association Information

Name of WRUA		Ontulili WRUA				
Contact Address email, chairperson, phone		Silas Mwithimbu (Alias Mathagro) 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 -Conserve the environment -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 -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. -Sensitization of members. -Training leaders managing the water projects.				
Challenges		-Lack of cooperation amongst WRUA members -Lack of funds -Lack of active participation				

Cases of conflicts dealt with	Water rationing
Cases of conflicts unresolved and reasons	-Water pollution -Water abstraction by non members near riparian areas because of being adamant and refusing to cooperate -Destruction of catchment
Other activities the WRUA is engaged in	-Afforestation; tree planting -Conserve catchment -Baseline surveys
Achievements	-Memorandum of understanding with every member -Operational active WRUA membership
Hindrances to achieve the goals of the WRUA	-Lack of finances. -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 (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 -Name: Rural Focus, Year: 2005, Type of support: Survey. Guide on registration -Name: LWF, Type of support: Seminars and tree seedlings
Water Quality and cause of pollution	-Washing clothes along the river. -Soil erosion. -Watering points for cows and sheep
Existence of Wetlands and their status	-Ontulili swamp -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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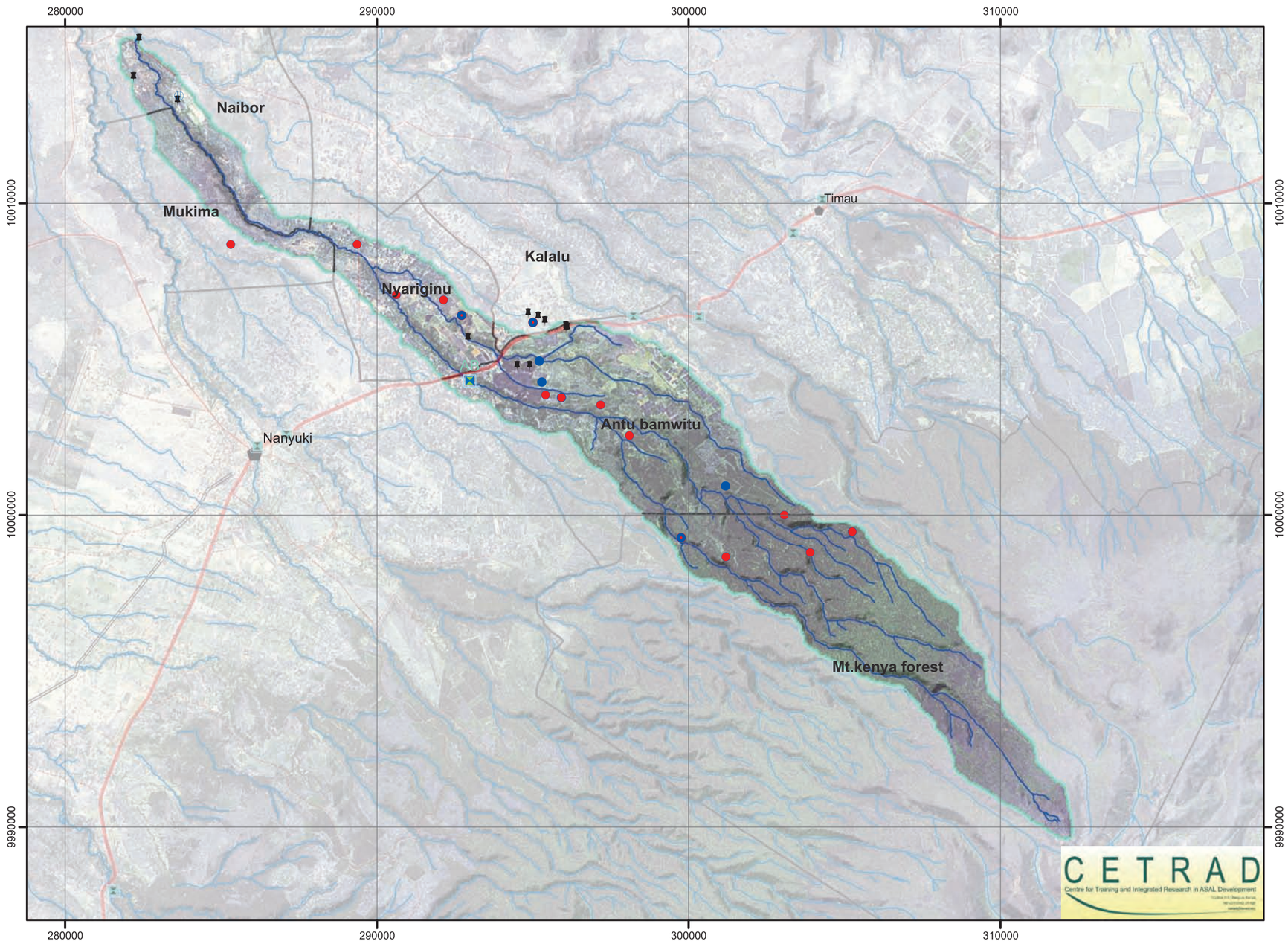
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Demographic data was sourced from KNBS 2009 National Census.

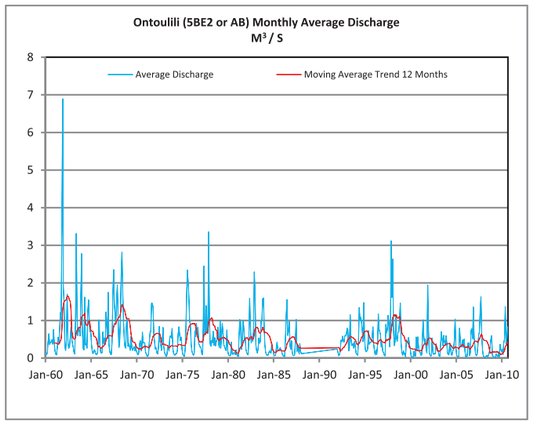
The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

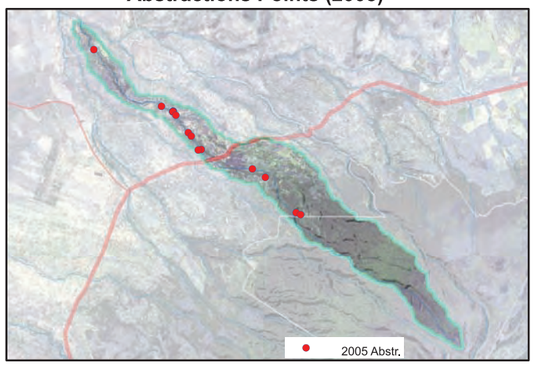
Water Resources and Abstraction Points (2013)



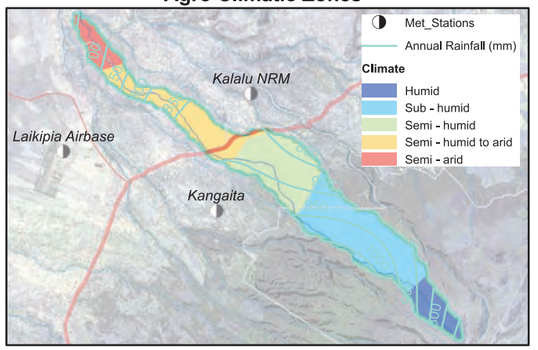
Water Discharge Trends (AB)



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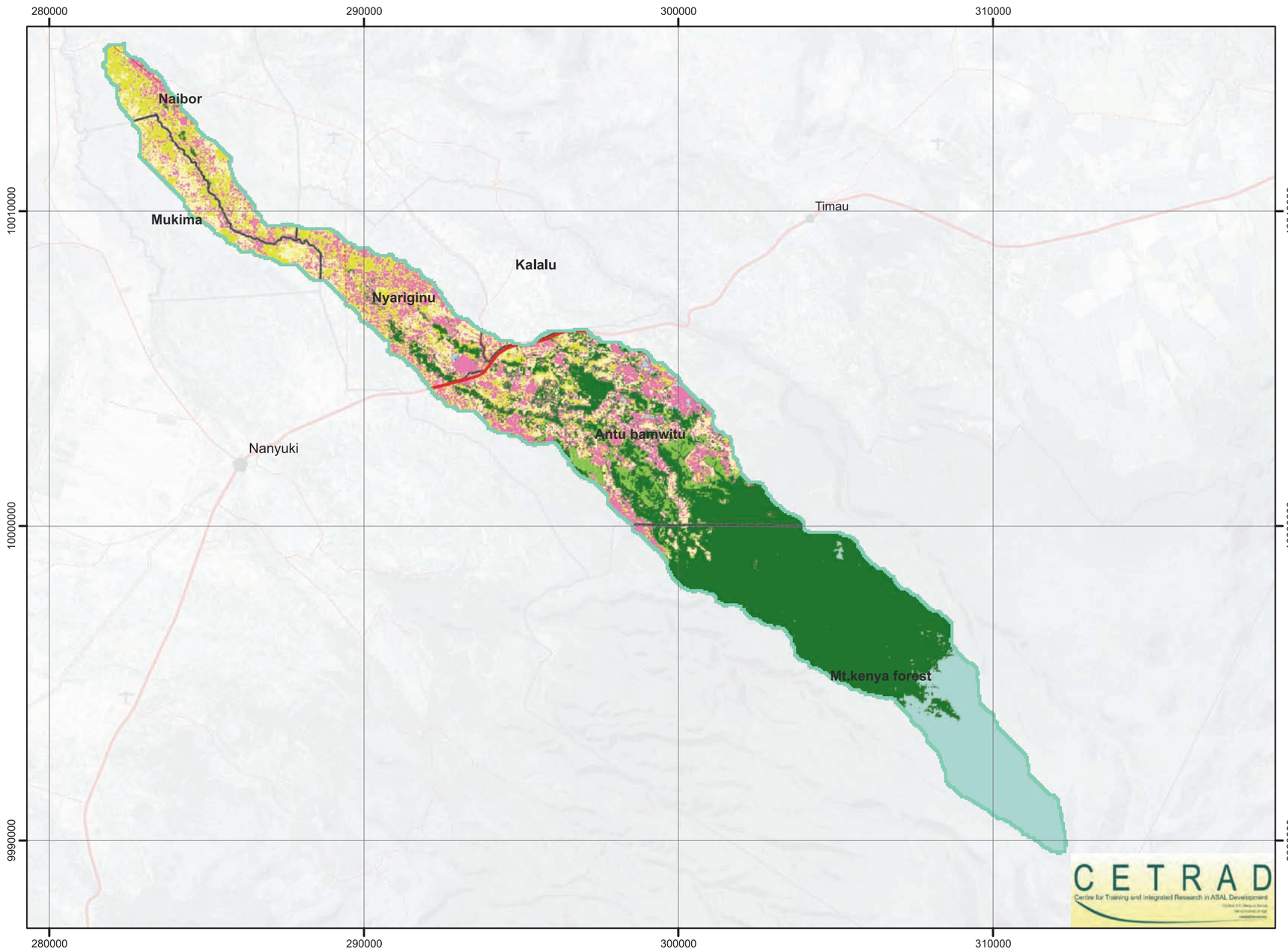
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

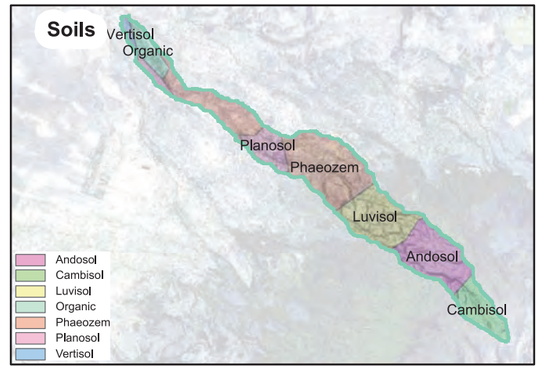
The background image: SRTM 30m.

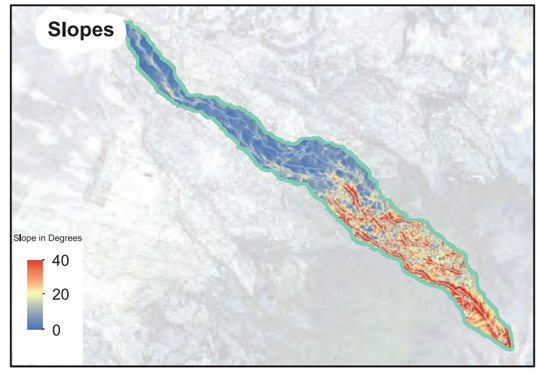
(*) Arid and Semi Arid Lands.

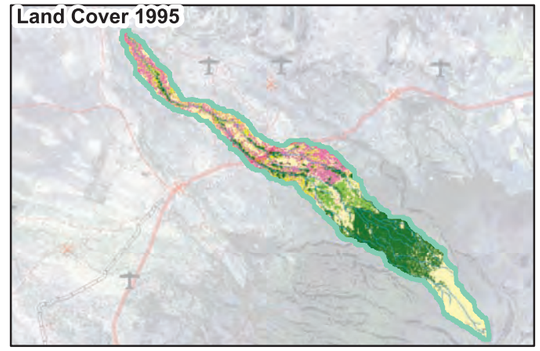
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km^2
Humid	Very high	1,100	2,700	10
Sub-humid	High	1,000	1,600	39
Semi-humid	High to Medium	800	1,400	26
Semi-humid to Semi-arid	Medium	600	1,100	24
Semi-arid	Medium to Low	450	900	8

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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X-Shift: 500,000
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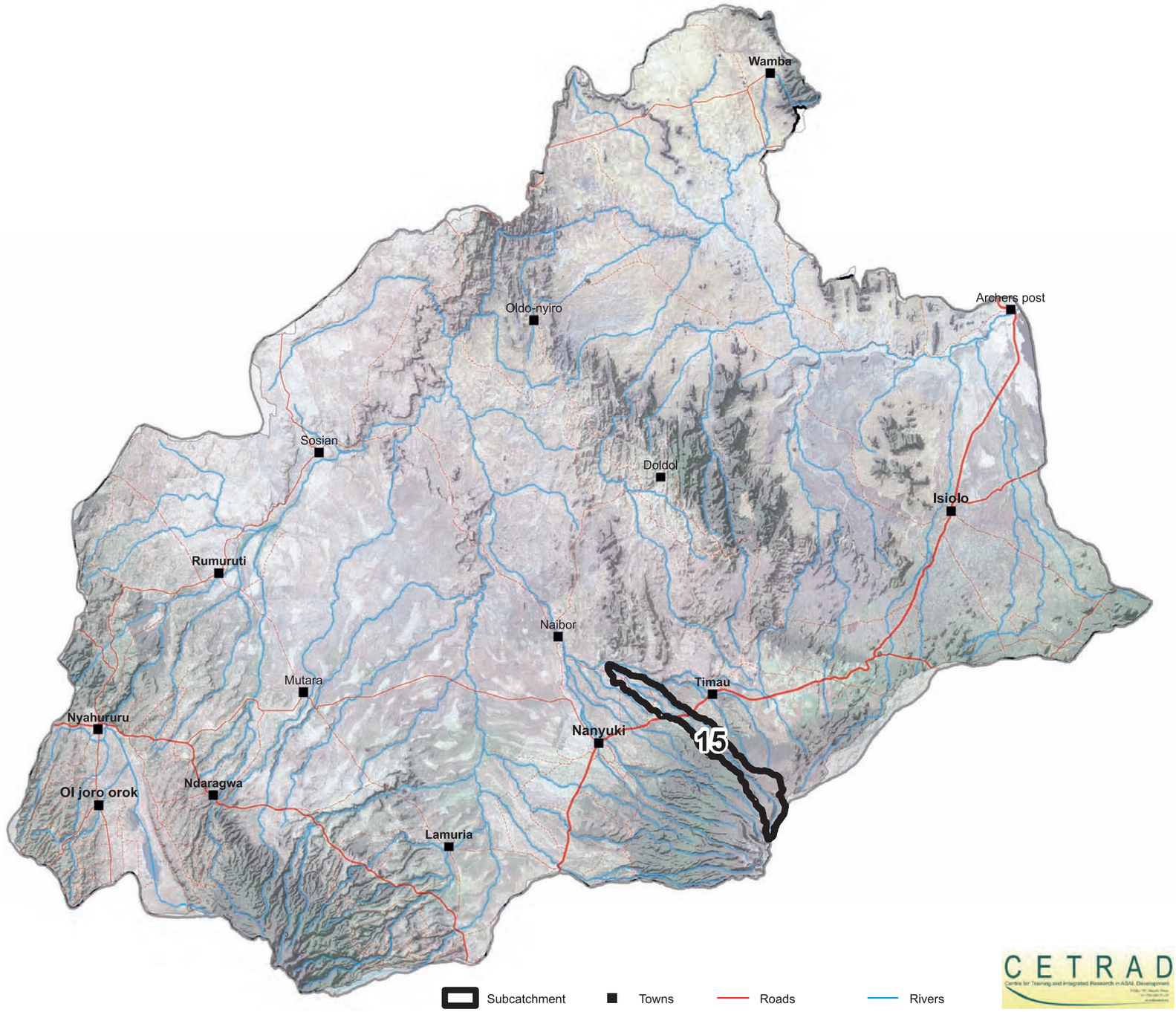
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

15 - Sirimon



N
W E
S

0 5 10 20 30 40 50
Kilometers

Subcatchment
Towns
Roads
Rivers

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Centre for Training and Integrated Research in ASAL Development

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 1,060Km^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

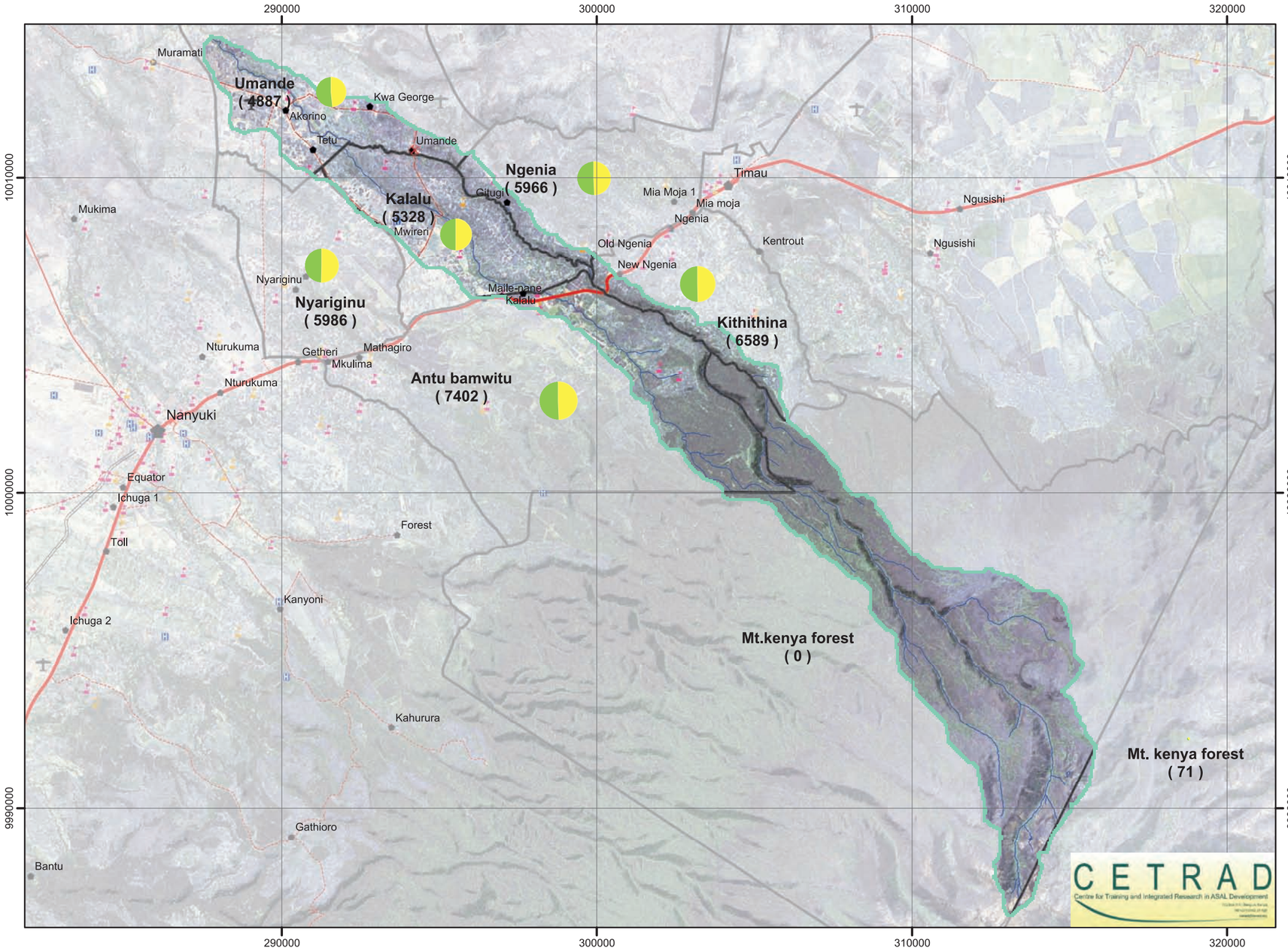
There are two (2) secondary schools and about 16 primary schools; government sponsored (7), Private (1) and Religious organizations (5), Community (1) and Local Authority (2).

Water Resource Users Association Information

Name of WRUA		Sirimon WRUA				
Contact Address email, chairperson, phone		David G. Mungania 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 -Sharing water Equitably -Environment conservation (by planting trees) -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 -Cutting trees on the riparian areas -Illegal abstractors -None payment to WRUA and water use charges mostly by illegal abstractors				
Problems Reported to the WRUA		-Cutting trees on riparian area -Pollution				
Unreported/unexpressed conflicts		-Illegal abstraction. -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 -Non employment of qualified personnel. -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 -Encouraging community to do water storage -Rehabilitation of available water pans to increase water -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 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 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 -Water storage should be done in large by the GOK to save the rivers and assist in small irrigation farmers for food security -WRUAs should be empowered and financed to enable them work effectively with the community -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**	**36,225**	**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

- 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
Latitude of Origin: Equator
Datum: Arc 1960
Reference Ellipsoid: Clarke 1880
X-Shift: 500,000
Y-Shift: 10,000,000

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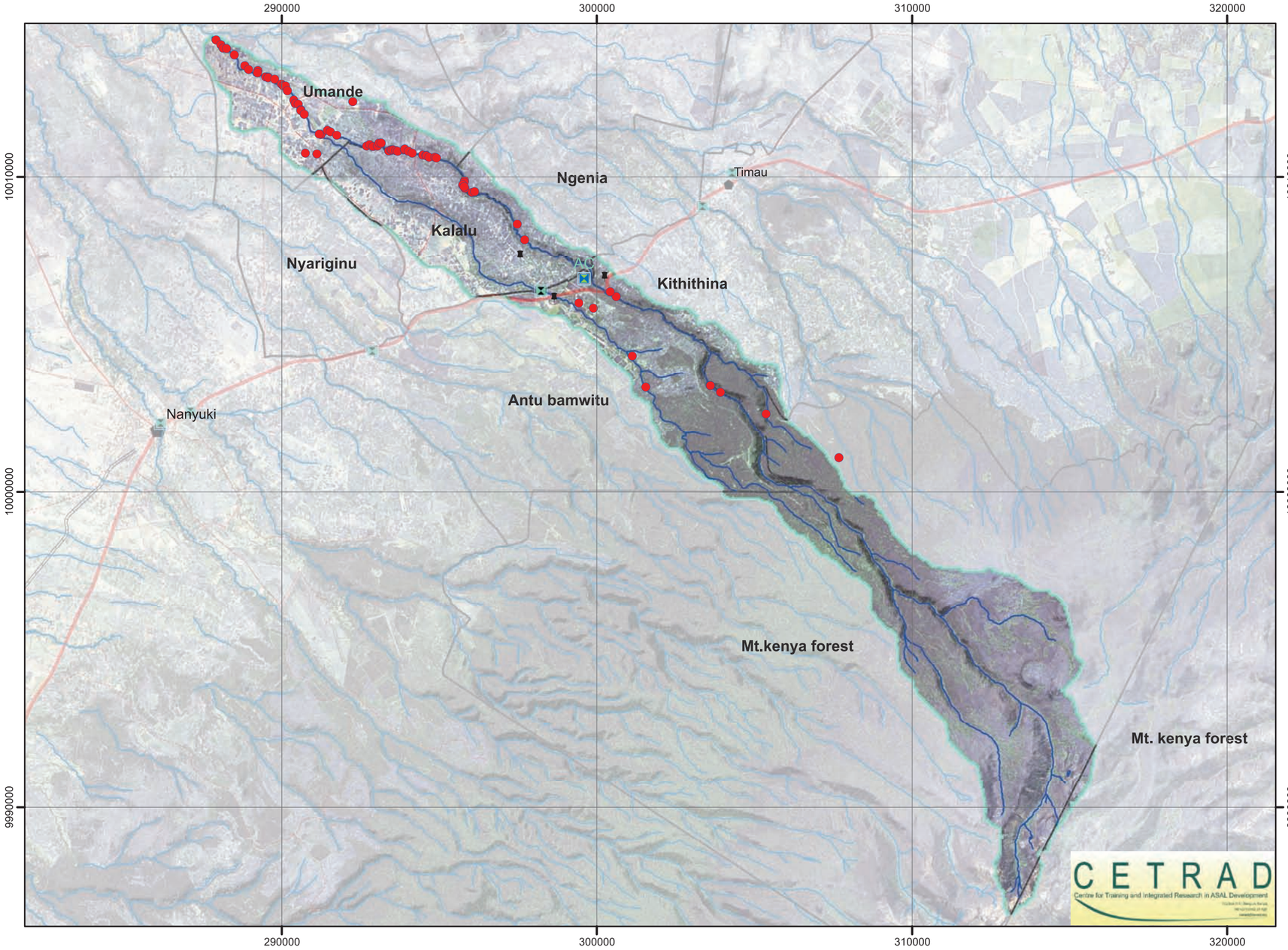
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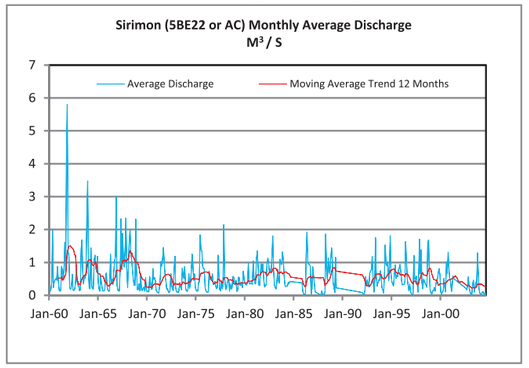
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(*) Arid and Semi Arid Lands.

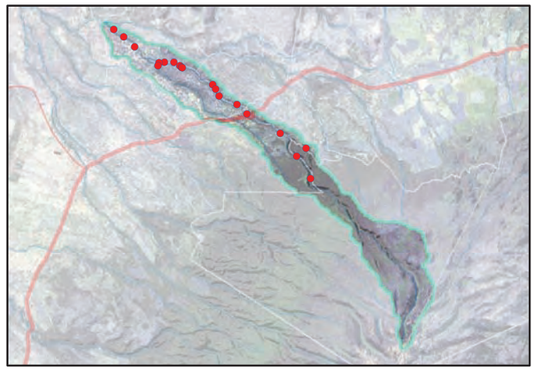
Water Resources and Abstraction Points (2013)



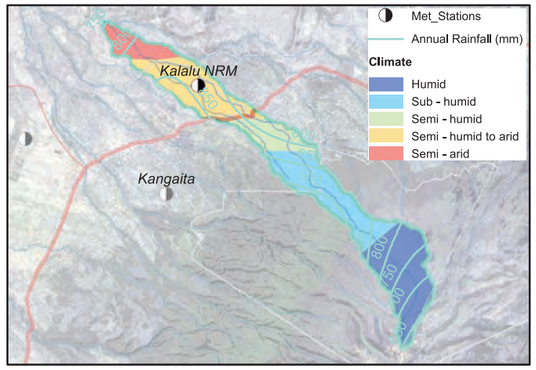
Water Discharge Trends (AC)



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
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- District Hq
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0 1 2 3 4 5 Kilometers

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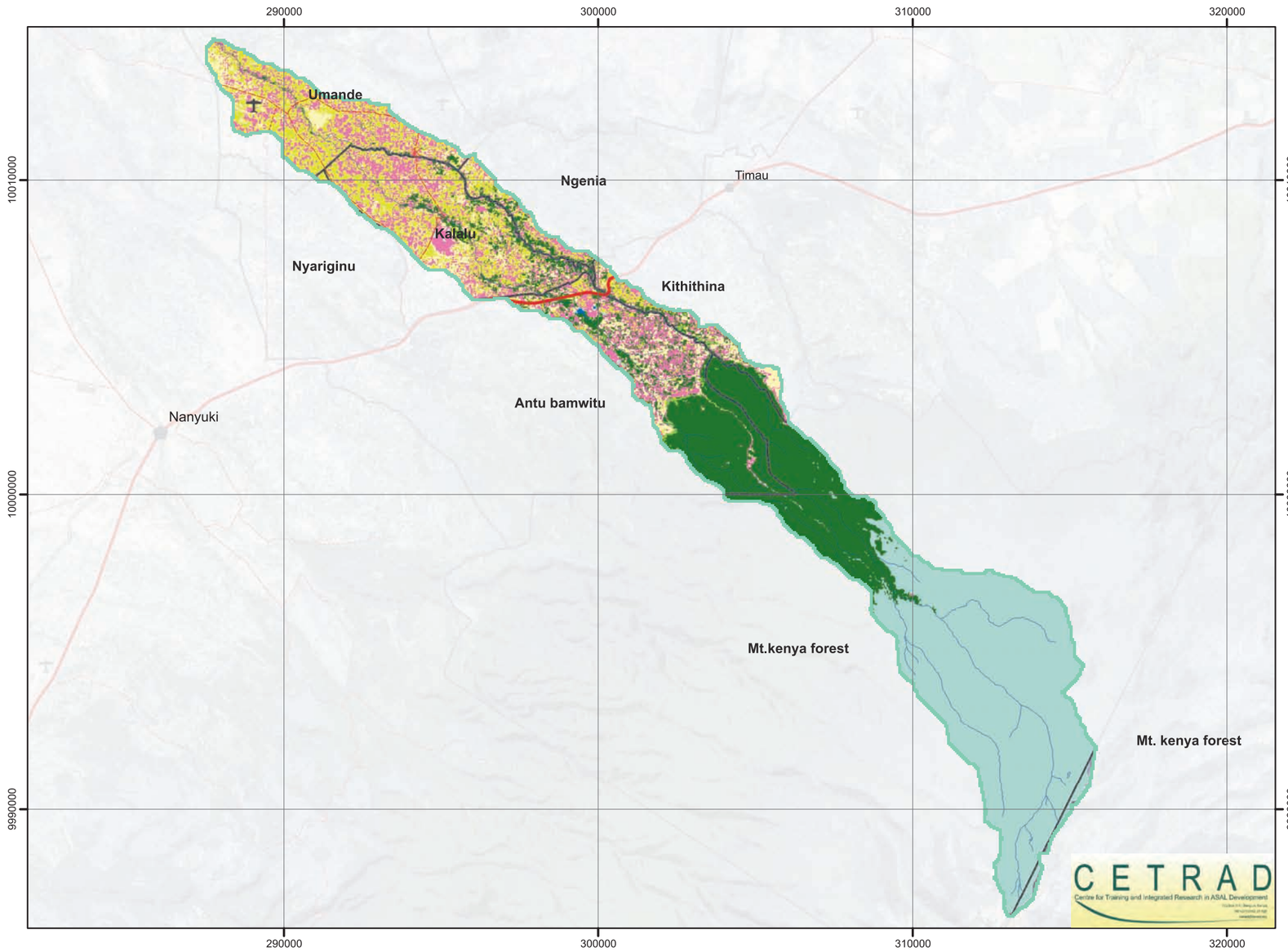
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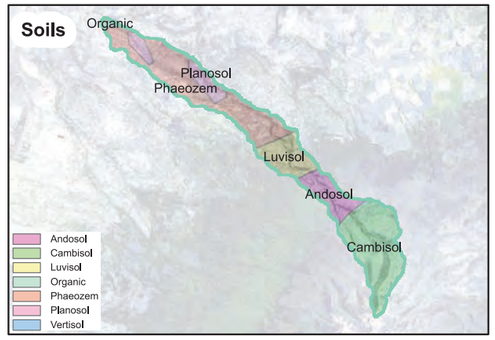
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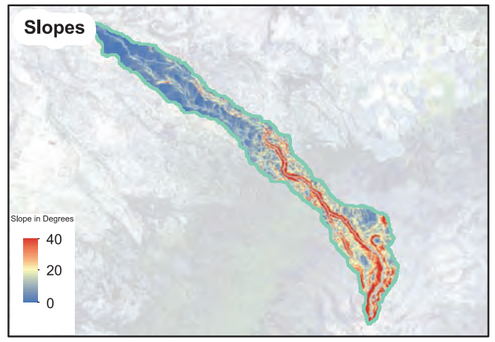
(*) Arid and Semi Arid Lands.

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







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

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Landcover information derived from Landsat Images 30m 2014.

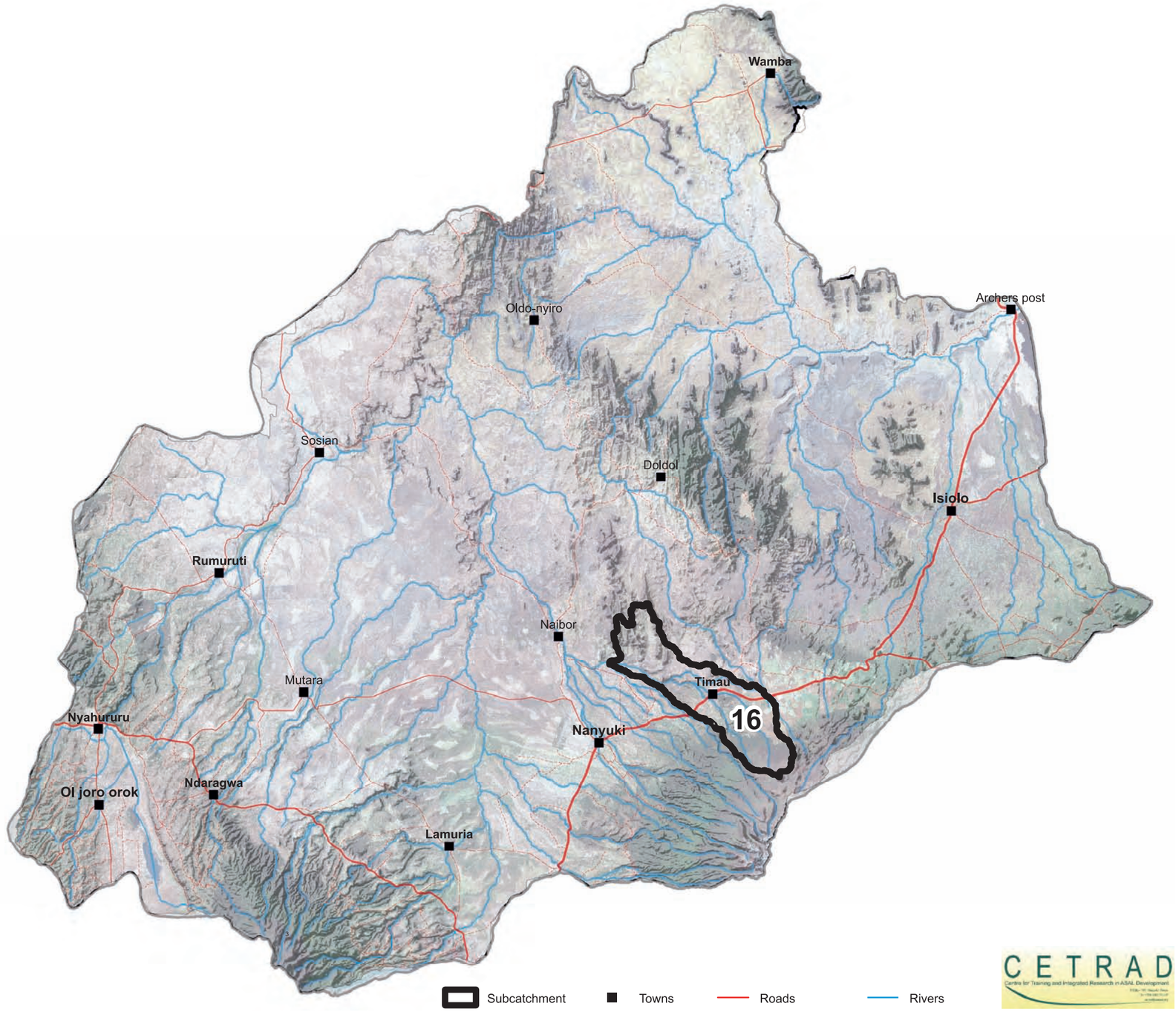
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(*) Arid and Semi Arid Lands.

Landcover Change

	1995		2014	
NAME	Area Km^2	% Cover	Area Km^2	% Cover
Grassland	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**

16 - Timau


Wamba
Archers post
Oldo-nyiro
Sosian
Doldol
Isiolo
Rumuruti
Naibor
Mutara
Timau
16
Nyahururu
Nanyuki
Ndaragwa
Ol joro orok
Lamuria
N
W
E
S
0 5 10 20 30 40 50
Kilometers
Subcatchment
Towns
Roads
Rivers
CETRAD
Centre for Training and Integrated Research in ASAL Development

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 Mercy Kendi-NWRUA manager- 0724597472 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 • Promote legal water abstraction, provide forum for discussion and prevention of water conflicts • Conservation of water catchment areas, ensure efficient and proper water use and sustainable abstraction • 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 • Prolonged drought or lack of rains • Ignorance by few members • Illegal abstraction				
Problems Reported to the WRUA		Illegal abstraction in the river Large horticulture farms pumping water in their dam at night Small scale farmers using pumps Small scale farmers clearing bushes and cutting trees in the riparian lands 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. River pegging, illegal water abstraction, Pollution
Cases of conflicts unresolved and reasons	Cases in court of illegal abstraction due to weak laws governing WRUAs 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 Assisting small scale farmers with drip kits Assisting HIV positive affected/ infected people within the catchment e.g. buying water storage tank for them initiating community tree nurseries for income generation
Achievements	Built a self-regulating weir, installation of measuring devices in all intakes, 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 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 (Name, Year, Type of support, Amount of support)	WSTF – 2010 – Funds -3.8 M LWF – 2010 - Financial support - 3 M AL puckett - 2008-2011 - Financial support - 3.2 M Ol-Donyo farm & Lolomarik farm – 2008 - Financial support - Each 750000 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 • With measuring devices, it is very easier to know water flow from the rivers and equitable distribution of water is achieved • 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 • 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

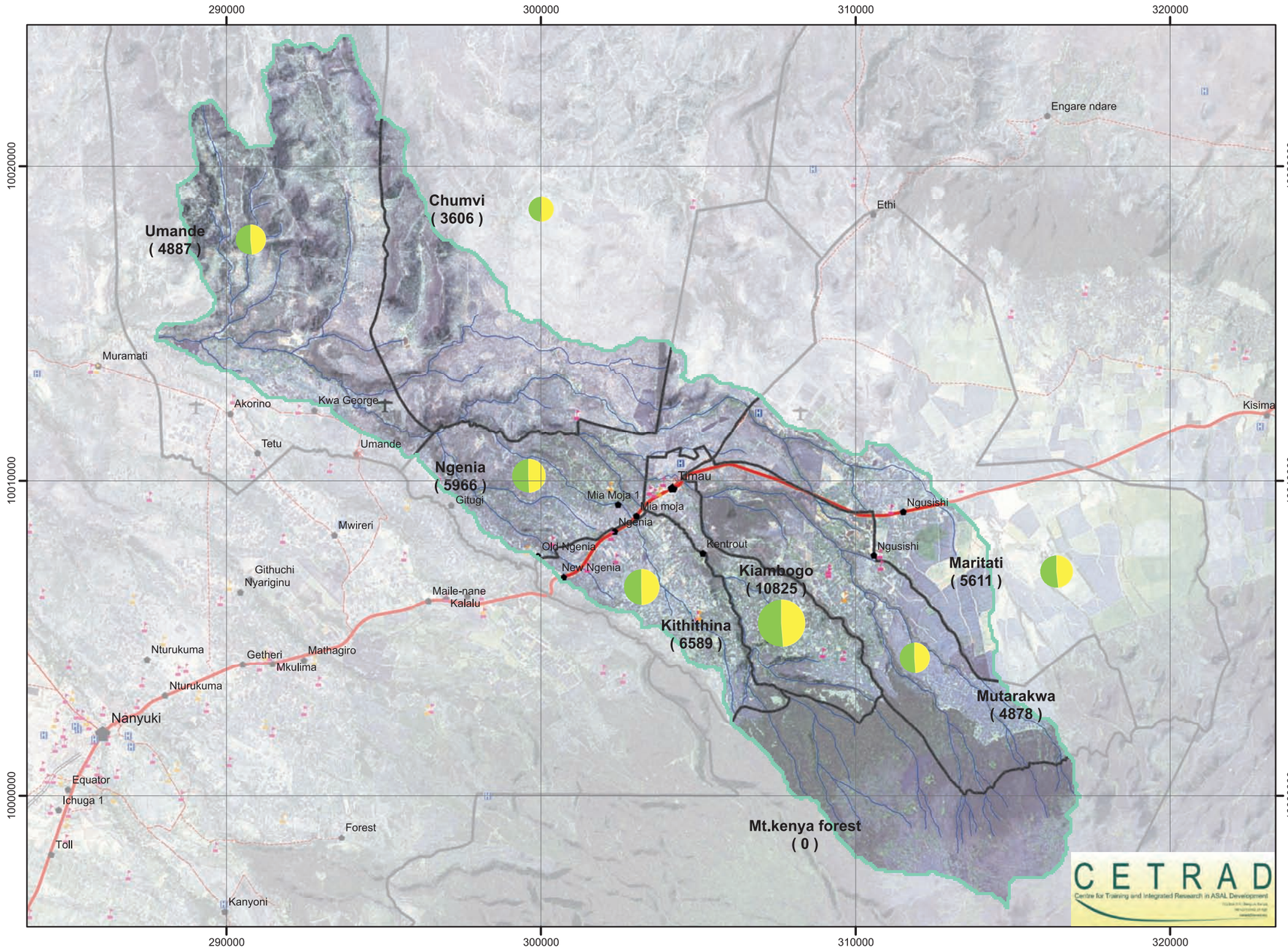
TIMAU SUBCATCHMENT
Fact sheet. Date: July 2014

Teleswani WRUA

Name of WRUA		Teleswani WRUA				
Contact Address email, chairperson, phone		0722311612				
Date of Formation		2003				
	Social services	-				
	Attorney General office	Reg.no. 23831				
	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) -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 -WRUA management lacks funds and skilled personnel
Cases of conflicts dealt with	-Mwiguni- kithithina Umoja,-martin water projects -Kanja- Mukuria water projects -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 -Installed 10 measuring devices -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 (Name, Year, Type of support, Amount of support)	LWF- 2009 Indigenous seedlings, Measuring & controlling devices 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	

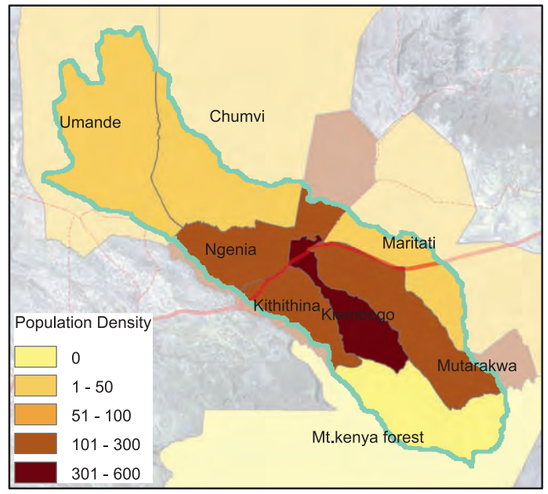
Population Numbers (2009) and Socio Infrastructure



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
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Totals	**1,018**	**21,598**	**20,764**	**42,362**	**42**	**12,967**

Population Density 2009



Population & Sex Ratio

- Female
- Male

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- District Hq
- Division Hq
- Others

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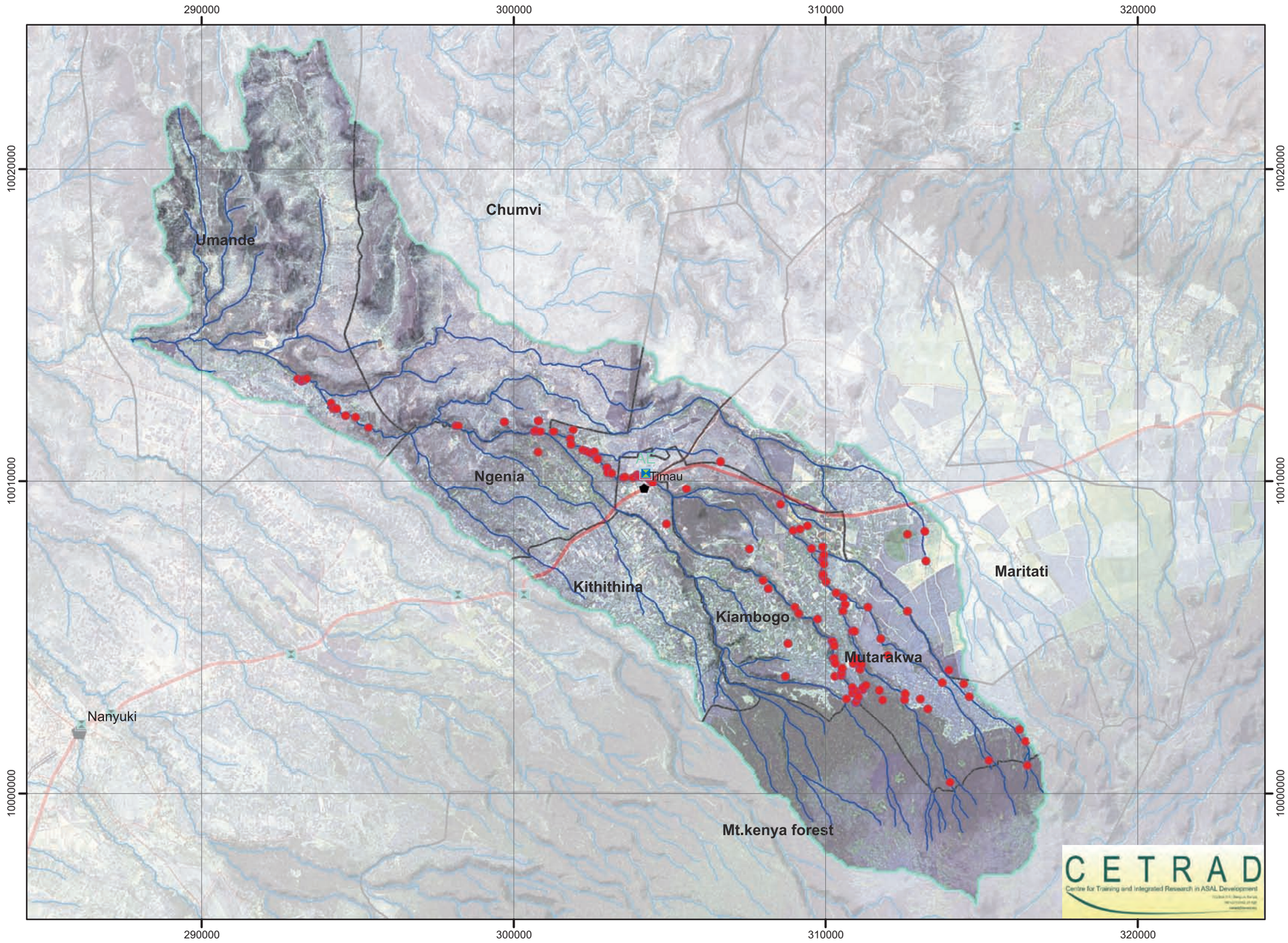
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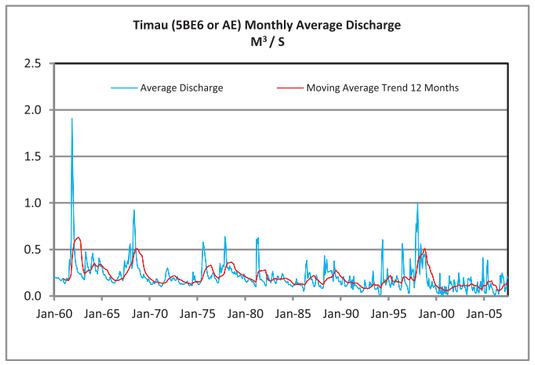
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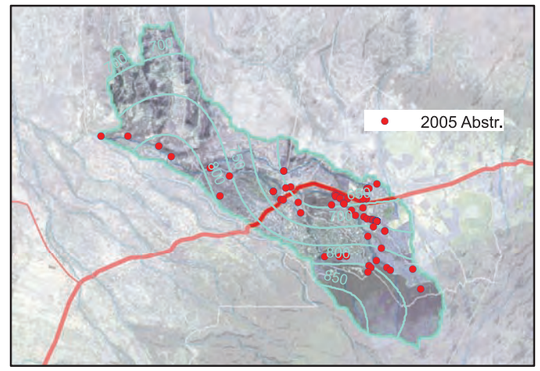
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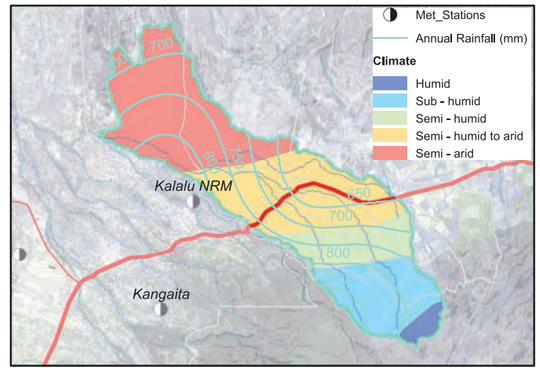
Water Discharge Trends (AE)



Abstraction Points (2005)



Agro Climatic Zones



Abstractions

- Rivers

Features & Boundaries

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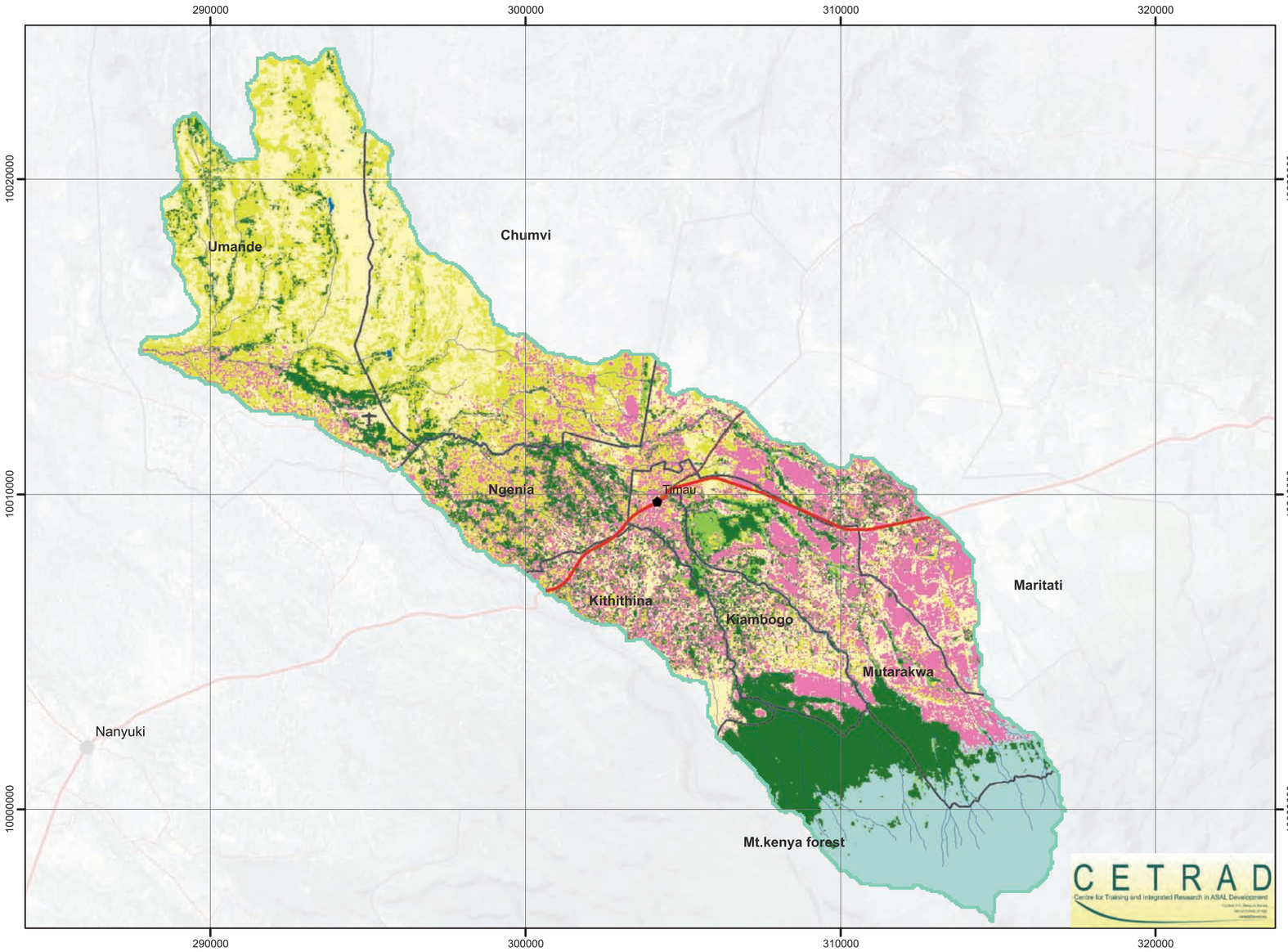
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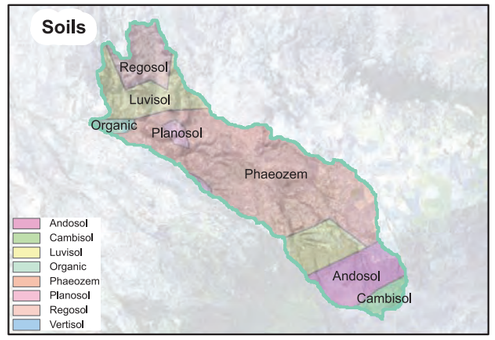
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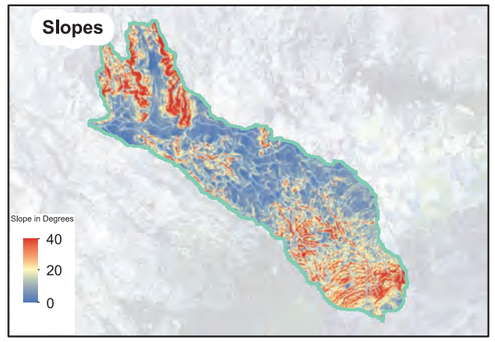
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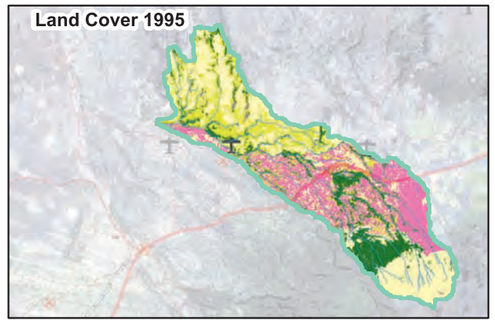
Climate	Agriculture Potential	Minimum Rainfall(mm)	Maximum Rainfall(mm)	Area Km²
Humid	Very high	1,100	2,700	8
Sub-humid	High	1,000	1,600	47
Semi-humid	High to Medium	800	1,400	33
Semi-humid to Semi-arid	Medium	600	1,100	83
Semi-arid	Medium to Low	450	900	98

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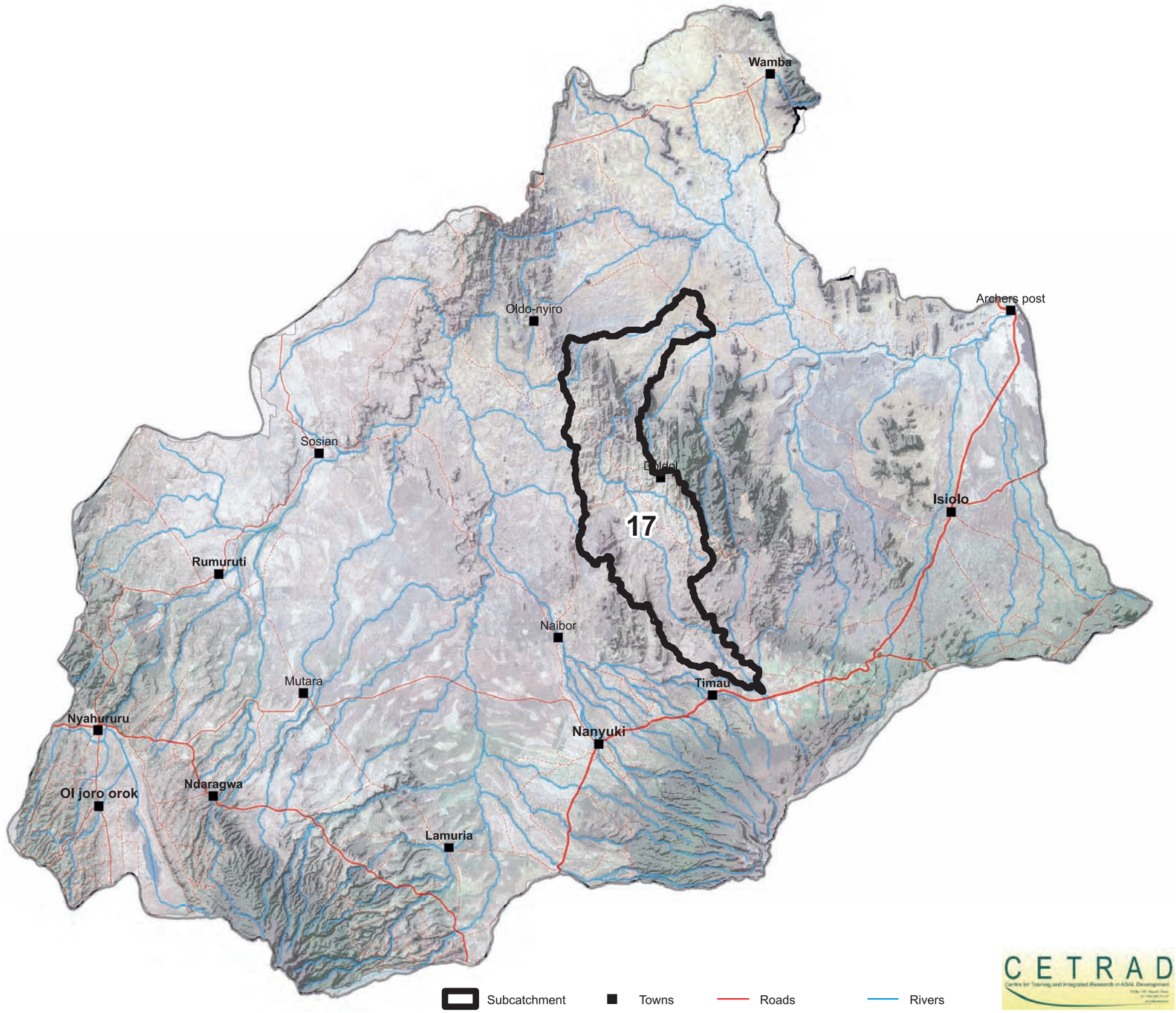
Linear features on this map are all part of CETRAD's comprehensive spatial database, which covers the Upper Ewaso Ngiro Basin, Laikipia, Mwingi and Makueni Districts, Nakuru Municipality, Kenya national data sets as well as other areas.

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
Doldol
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
Centre for Training and Integrated Research in ASAL Development

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 2,828Km^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.

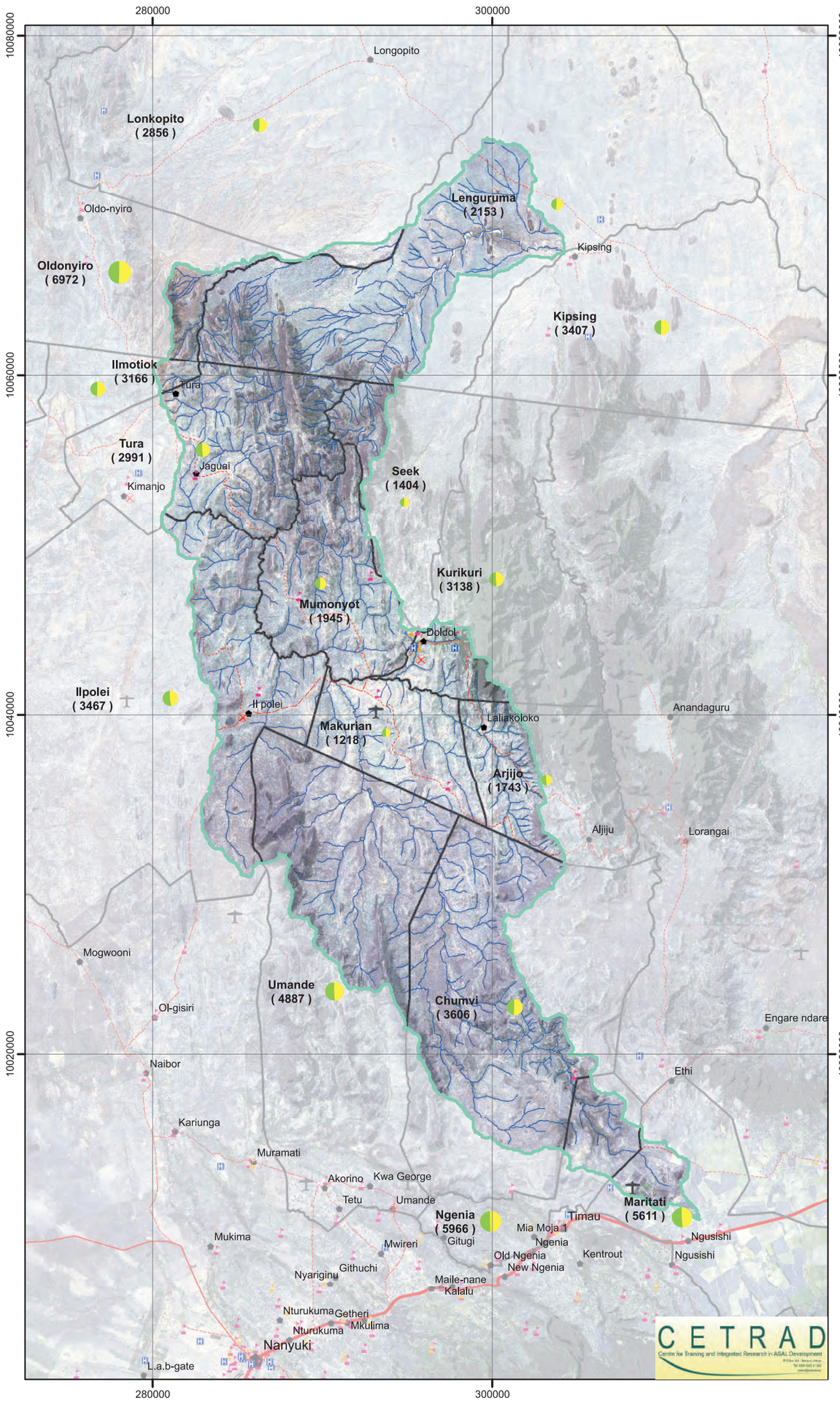
Climate

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).

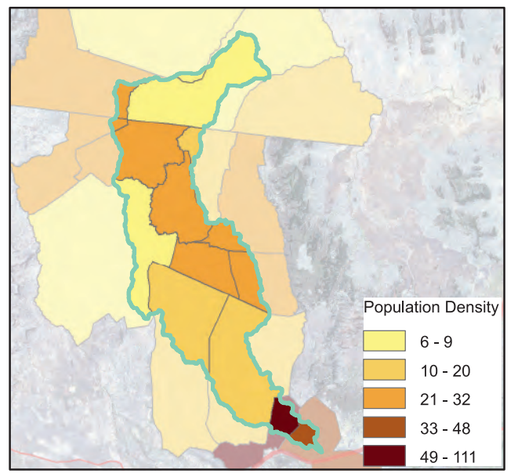
Population Numbers (2009) and Socio Infrastructure



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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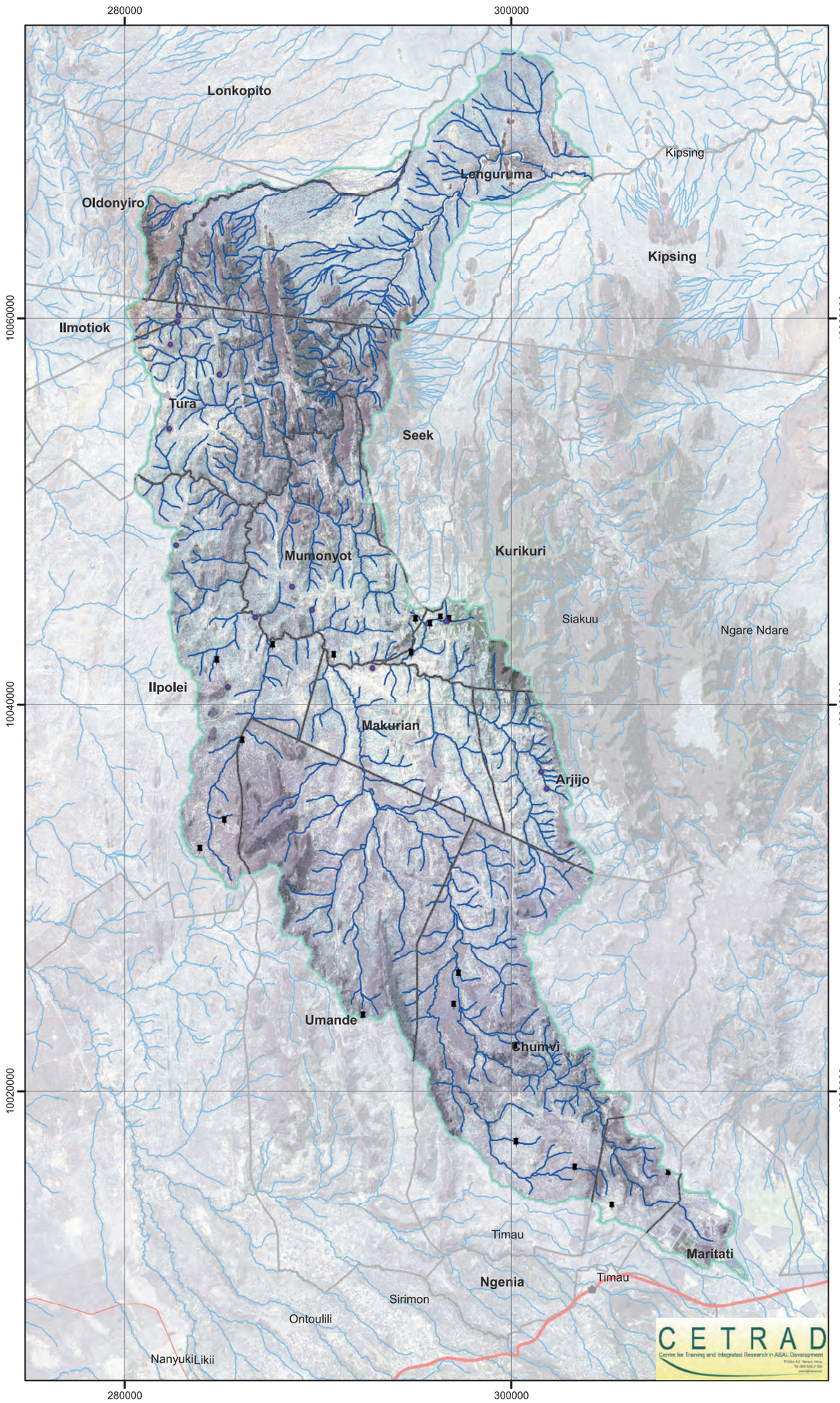
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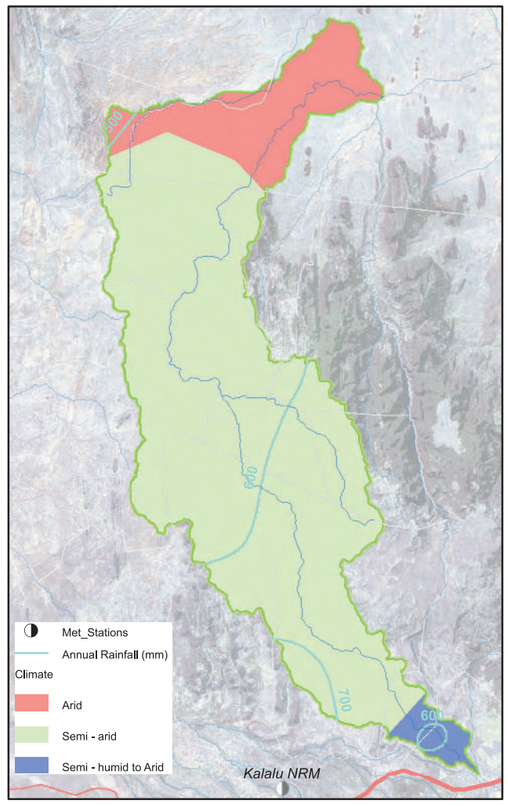
The background image: SRTM 30m.

(*) 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

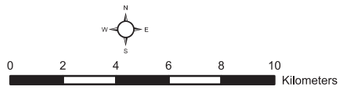
Abstractions
- Dams
- Bore Holes

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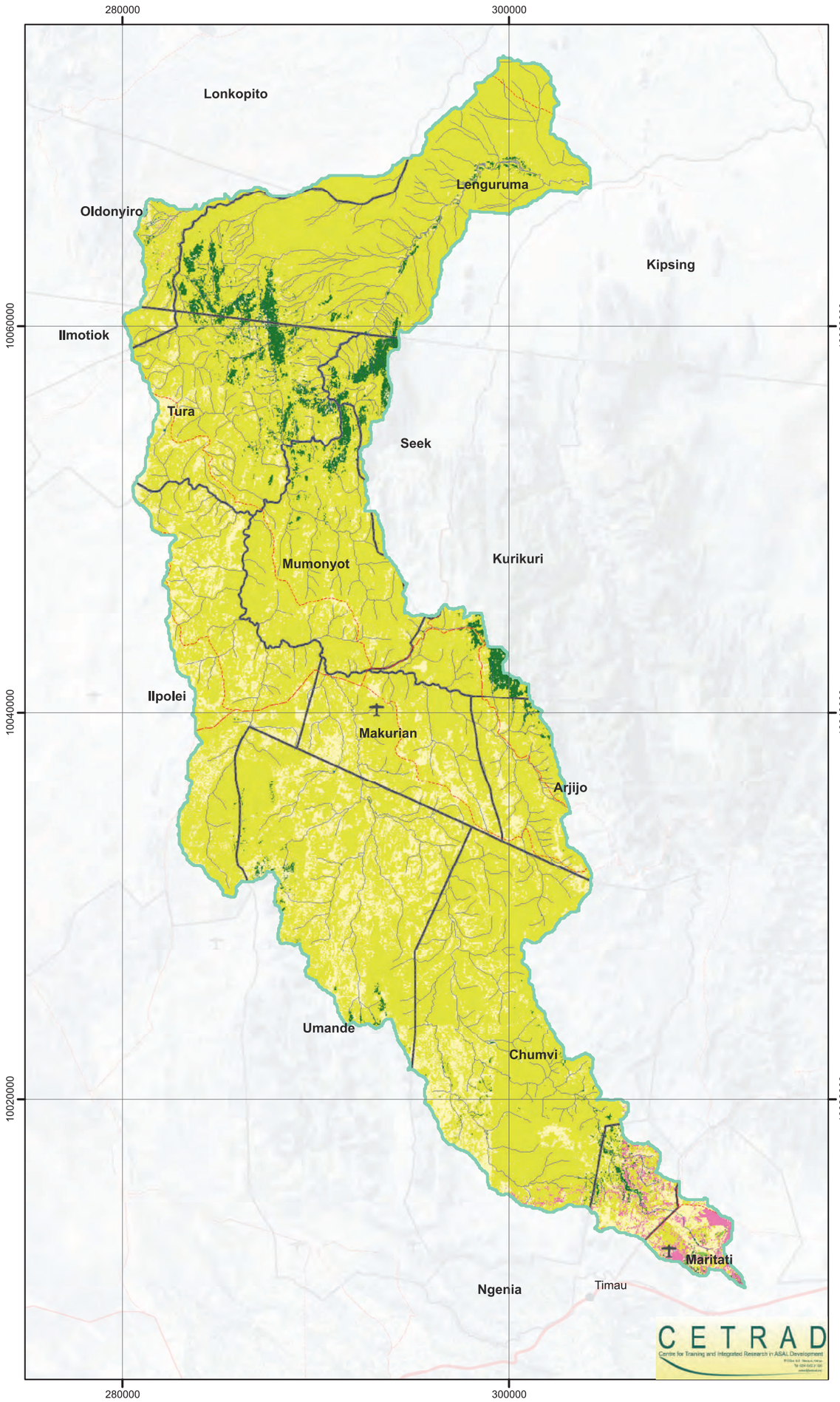
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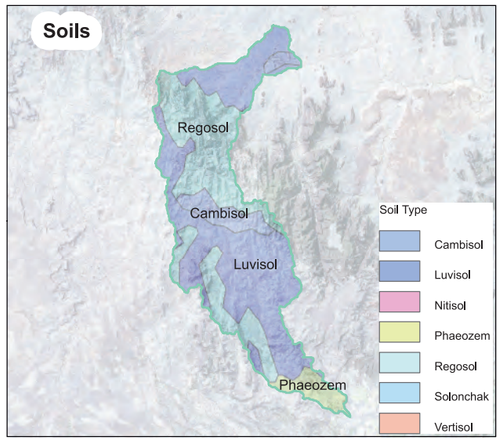
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

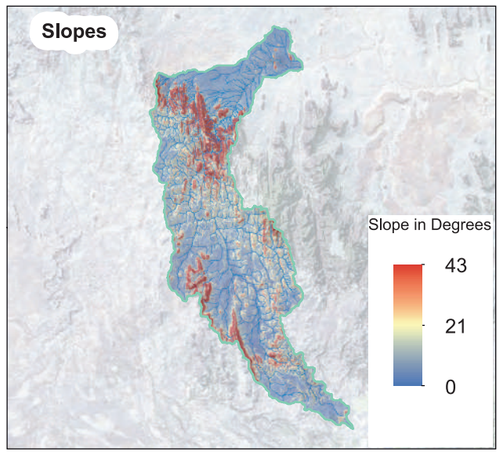
The background image: SRTM 30m.

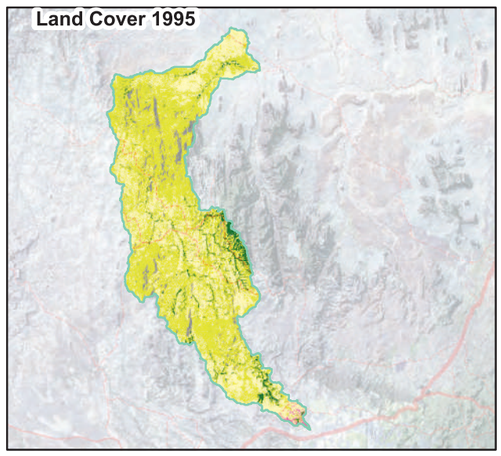
(*) Arid and Semi Arid Lands.

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

N W E S

0 2 4 6 8 10 Kilometers

1:219,798

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
Meridian of Origin: 39^0 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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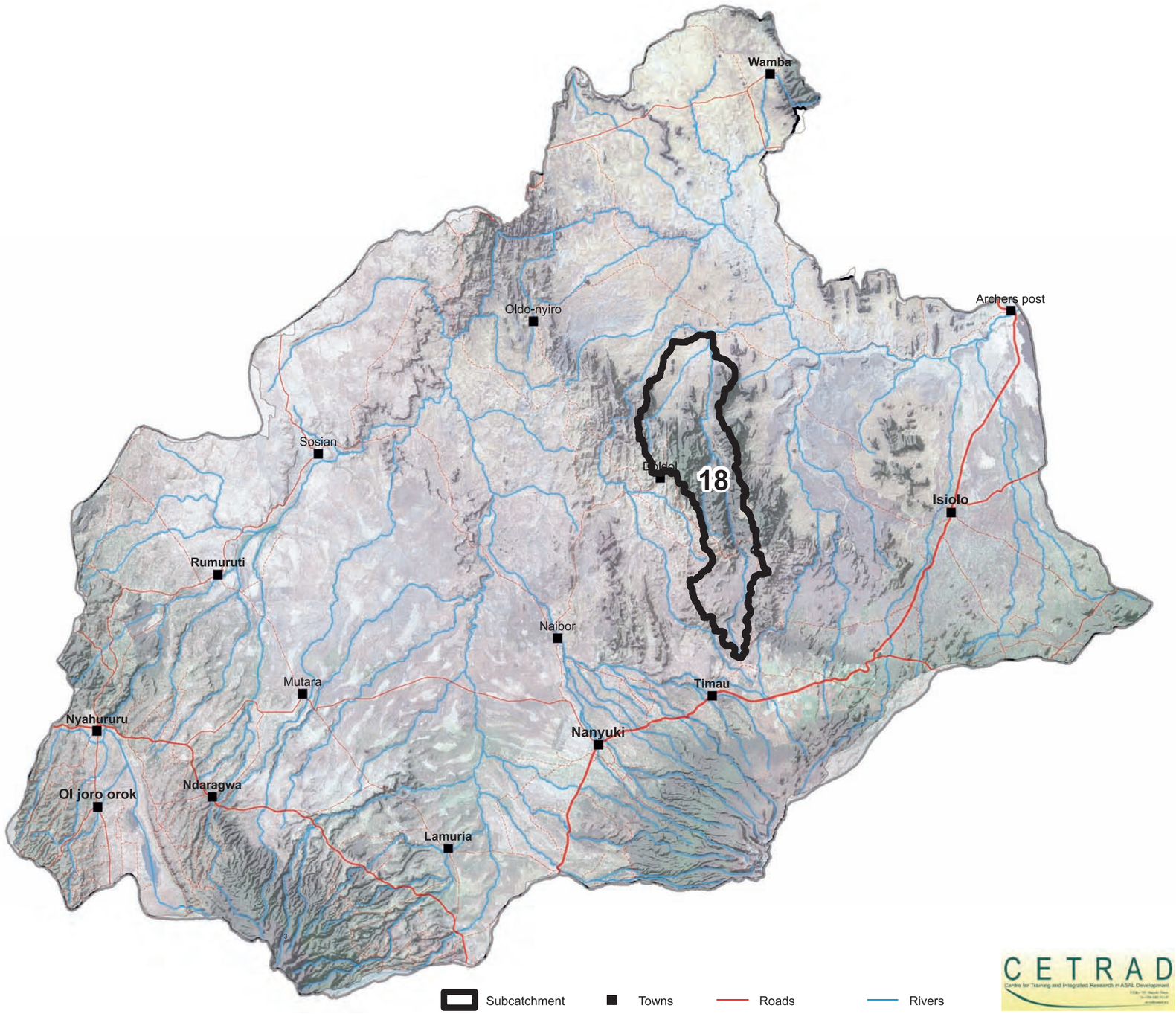
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

18 - Siakuu


Wamba
Oldo-nyiro
Archers post
Sosian
Loldol
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
Centre for Training and Integrated Research in ASAL Development

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 1,691Km^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.

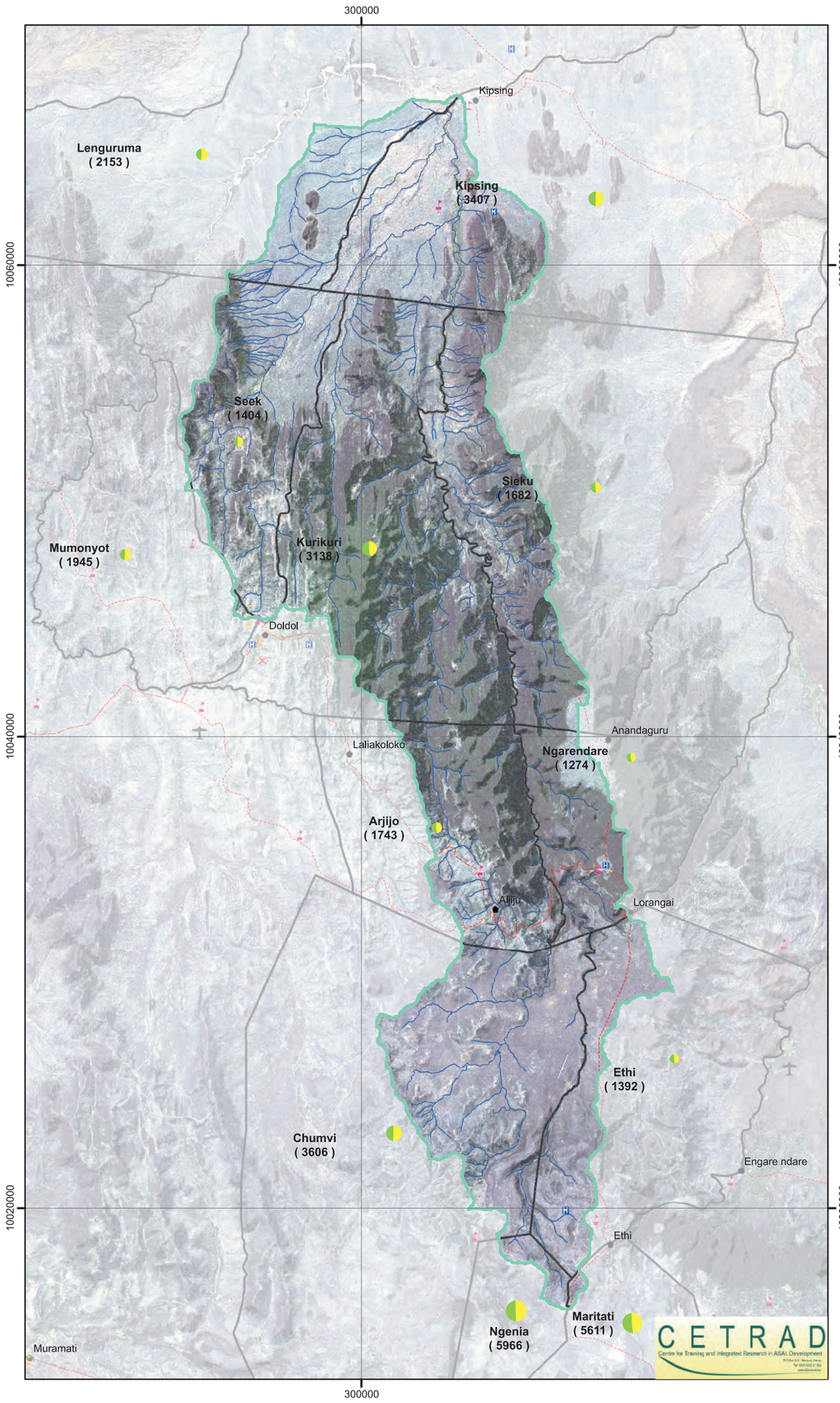
Climate

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).

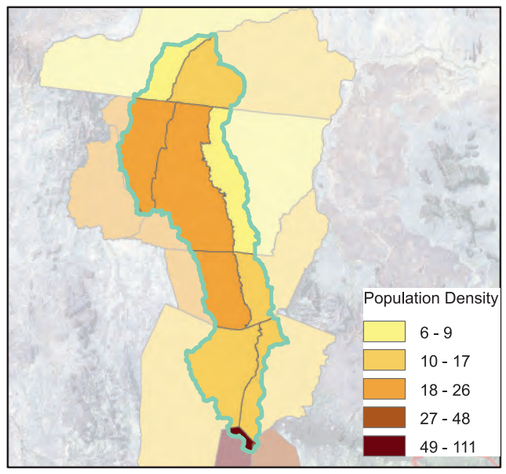
Population Numbers (2009) and Socio Infrastructure



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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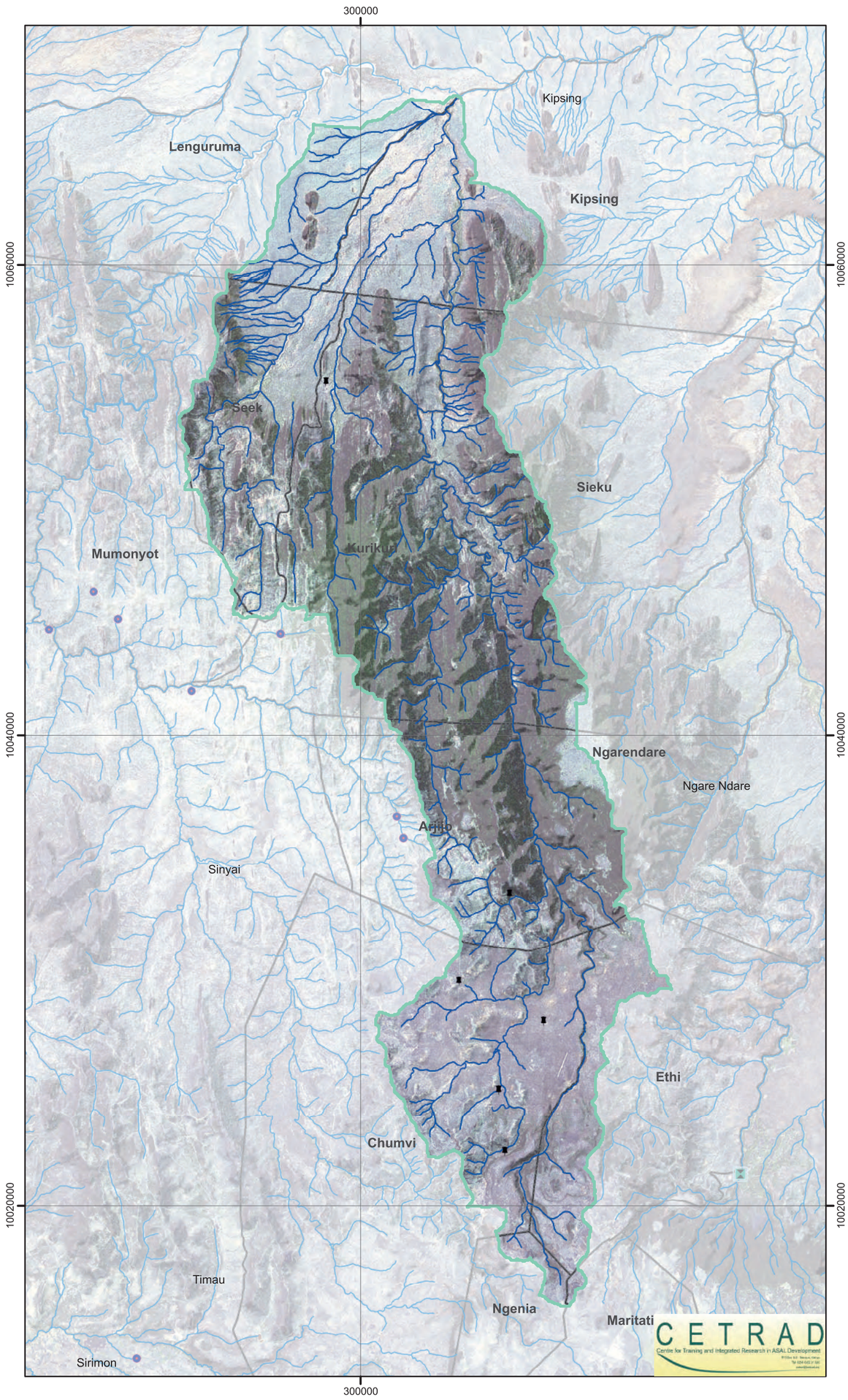
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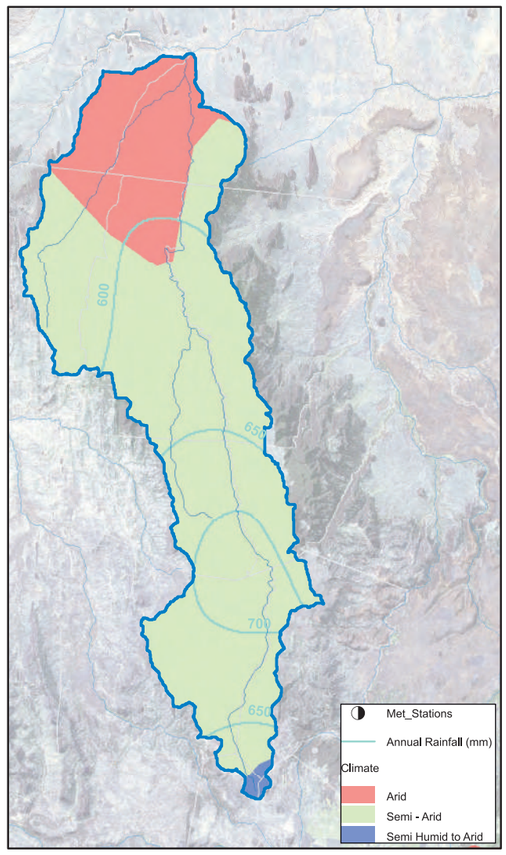
The background image: SRTM 30m.

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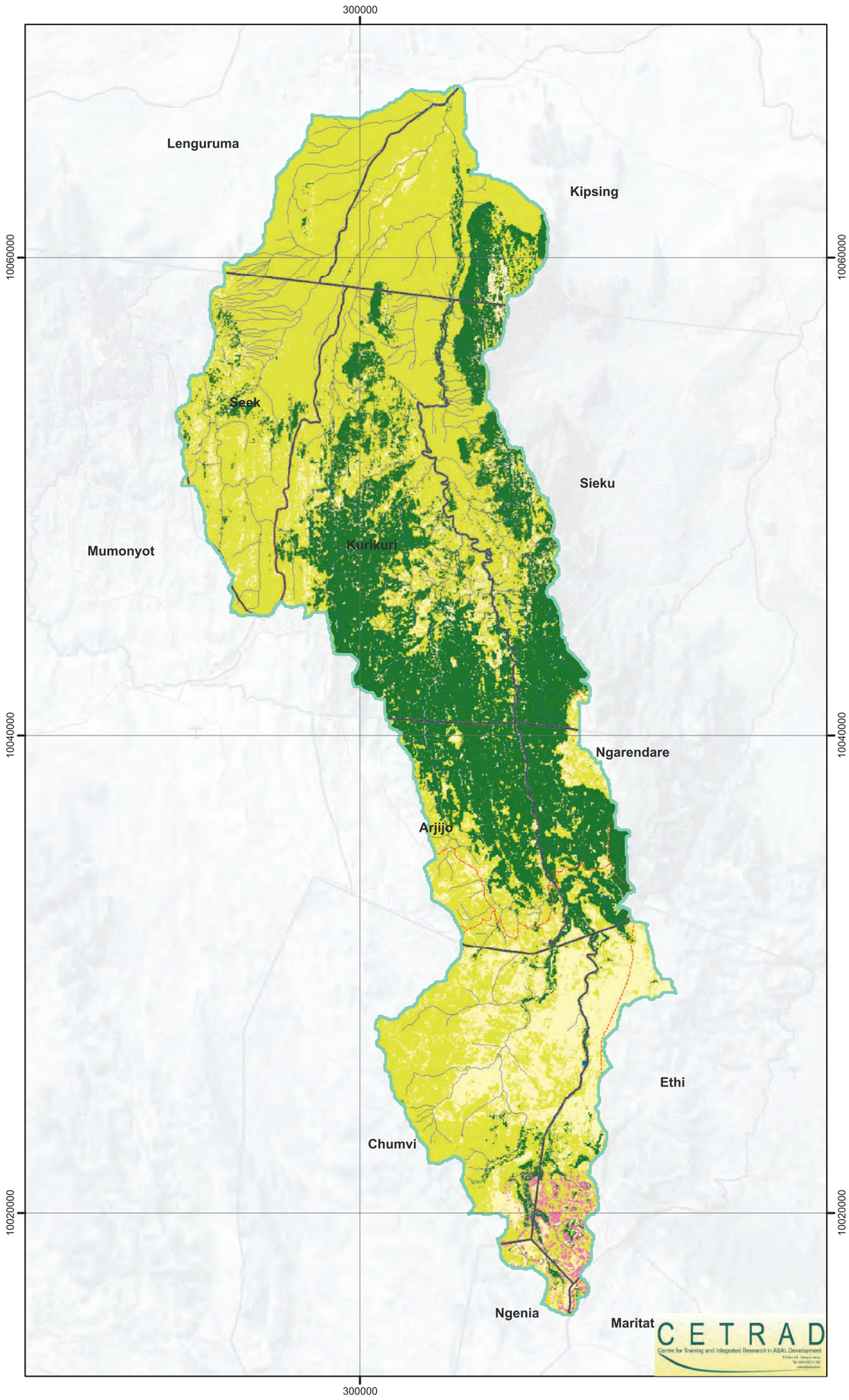
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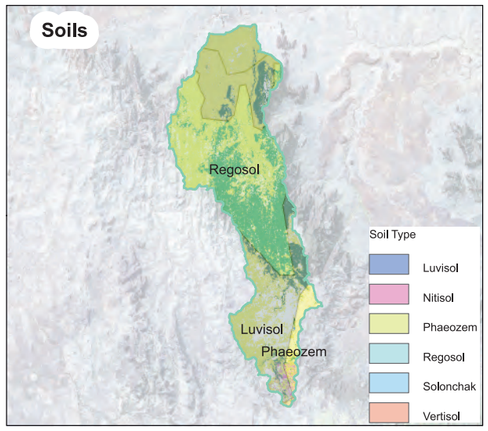
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

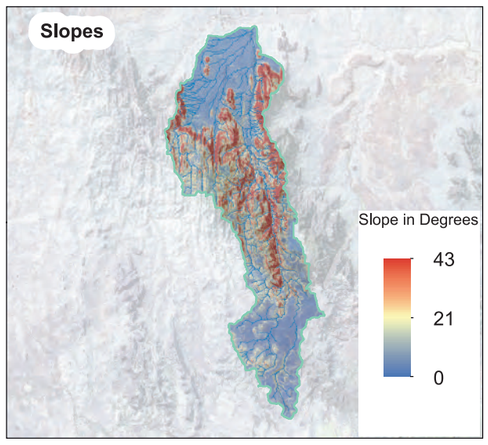
The background image: SRTM 30m.

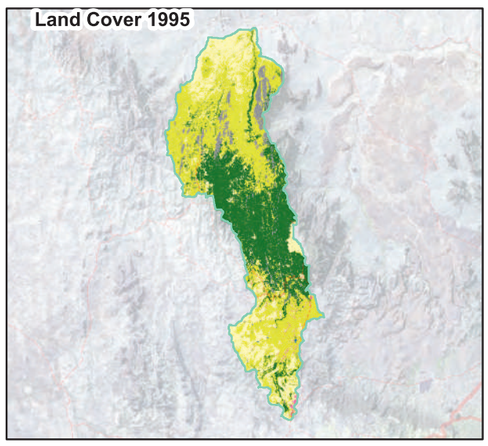
(*) Arid and Semi Arid Lands.

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

N W E S

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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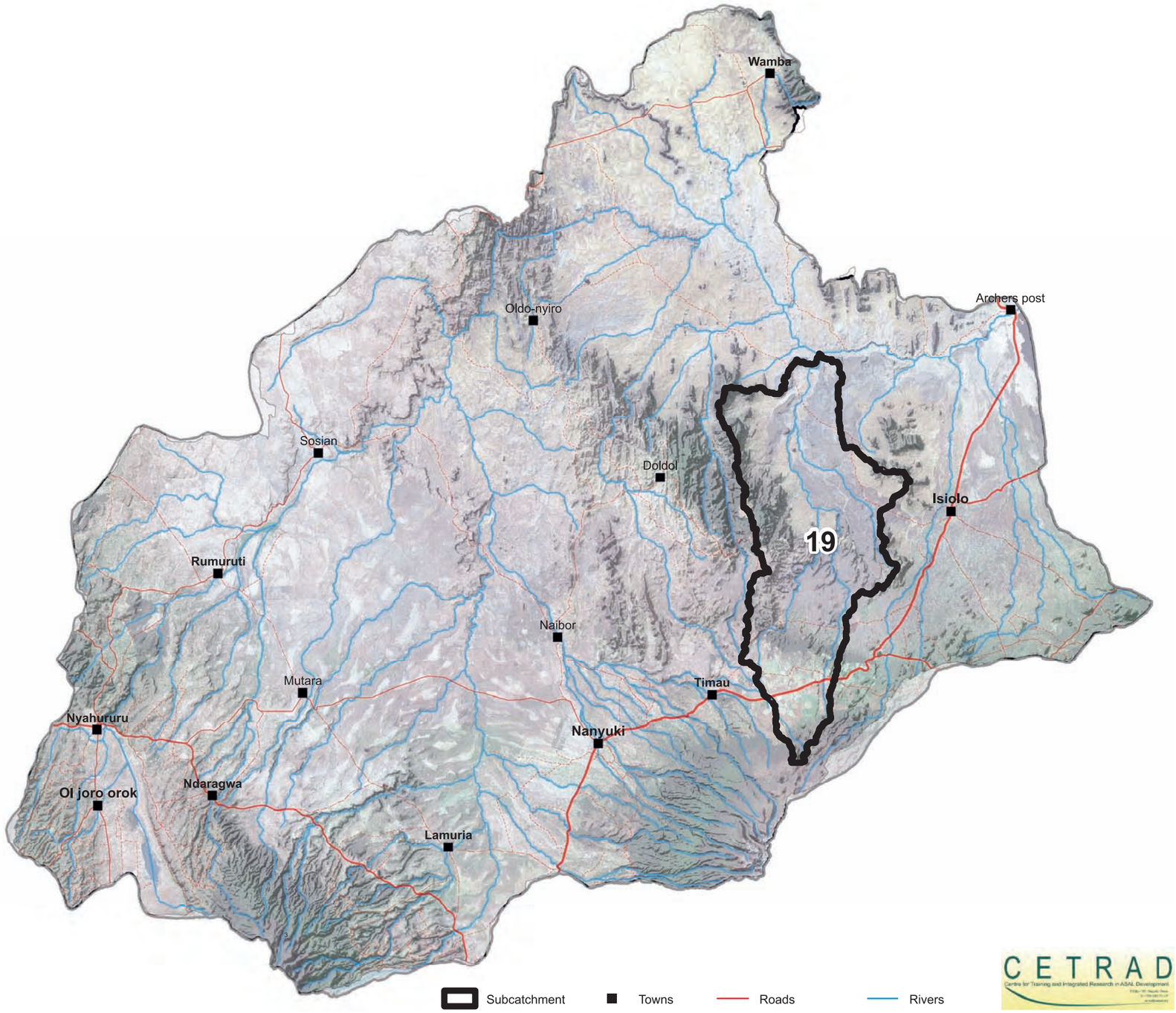
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Landcover information derived from Landsat Images 30m 2014.

The background image: SRTM 30m.

(*) Arid and Semi Arid Lands.

19 - Ngare Ndare



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

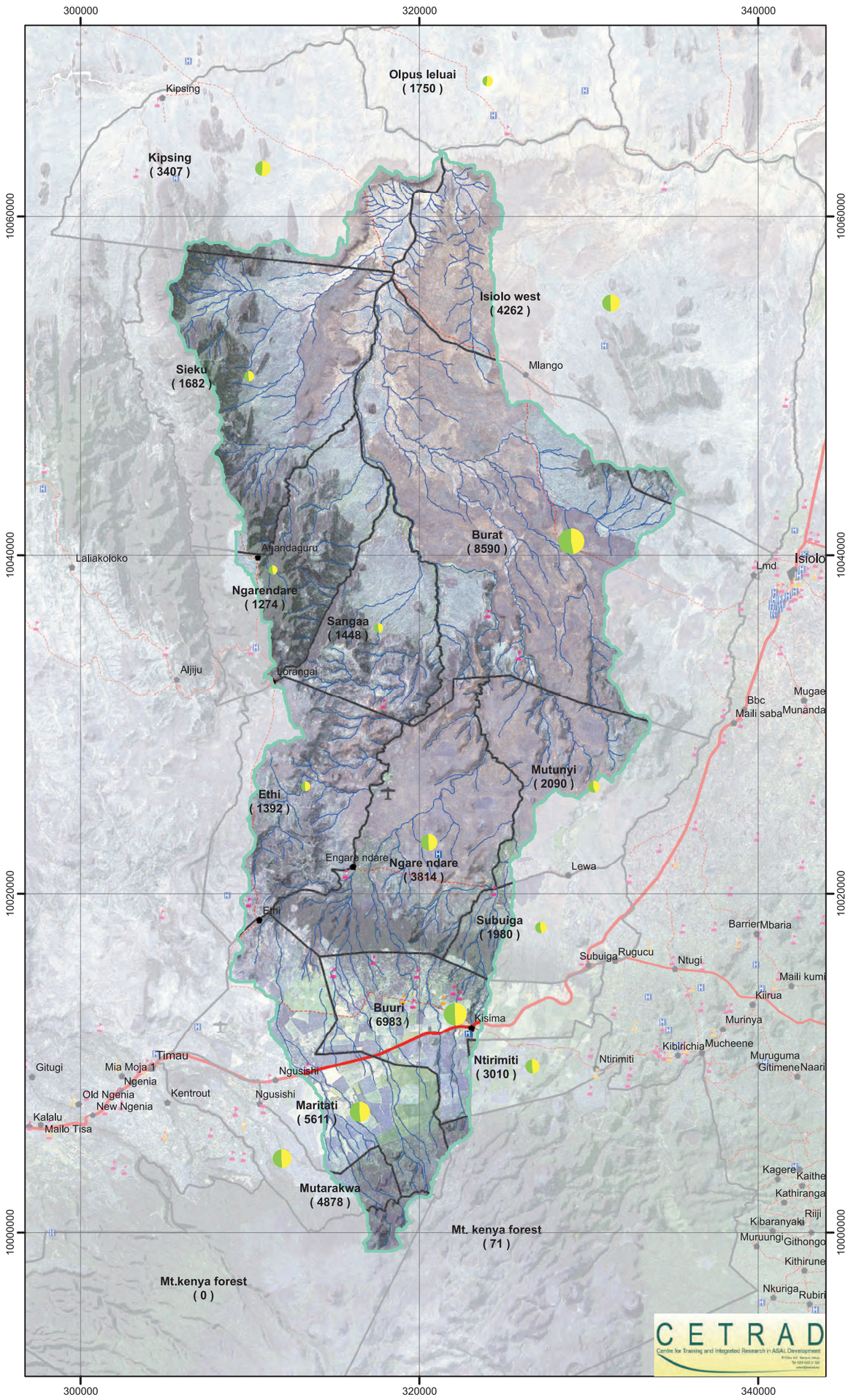
There are two (2) secondary schools and about 28 primary schools; government sponsored (10), Private (2) and Religious organizations (13), Community (1) and Local Authority (2).

Water Resource Users Association Information

Name of WRUA		Ngare Ndare WRUA				
Contact Address email, chairperson, phone		John Harris 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 To safeguard reserve flows for downstream domestic requirements To promote education for sustainable development				
Availability of sanctioning system		-				
Number of Large Scale (Ranches, Conservancies Horticulture others) Farms		Horticulture farms 3 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 - Unexploited water sources - 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 2. The river has been over abstracted so water rationing is practical 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 2. Doing abstraction survey for all projects 3. Encroachment of wetlands
Achievements	60% of trees are planted along riparian Through fencing of wetlands, springs are protected
Hindrances to achieve the goals of the WRUA	1. Inadequate enforcement of WRUA constitution 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 (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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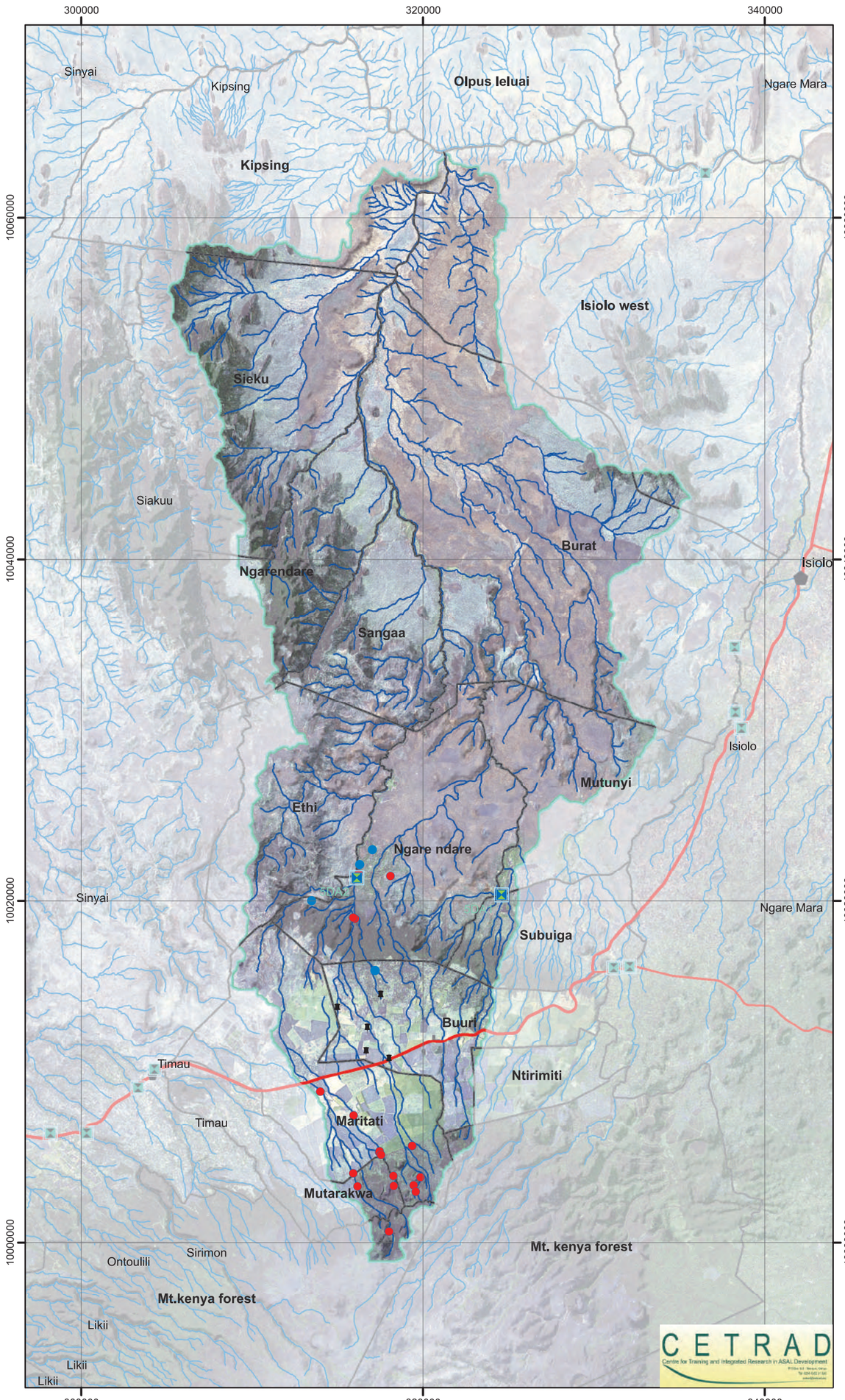
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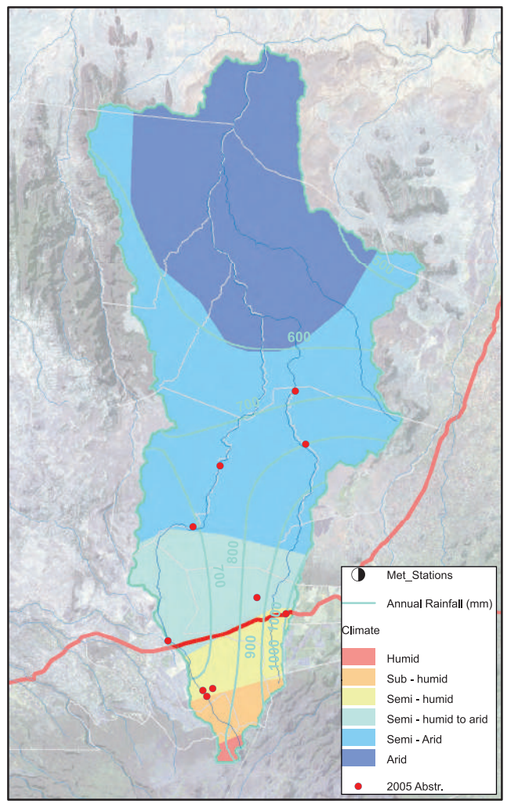
The background image: SRTM 30m.

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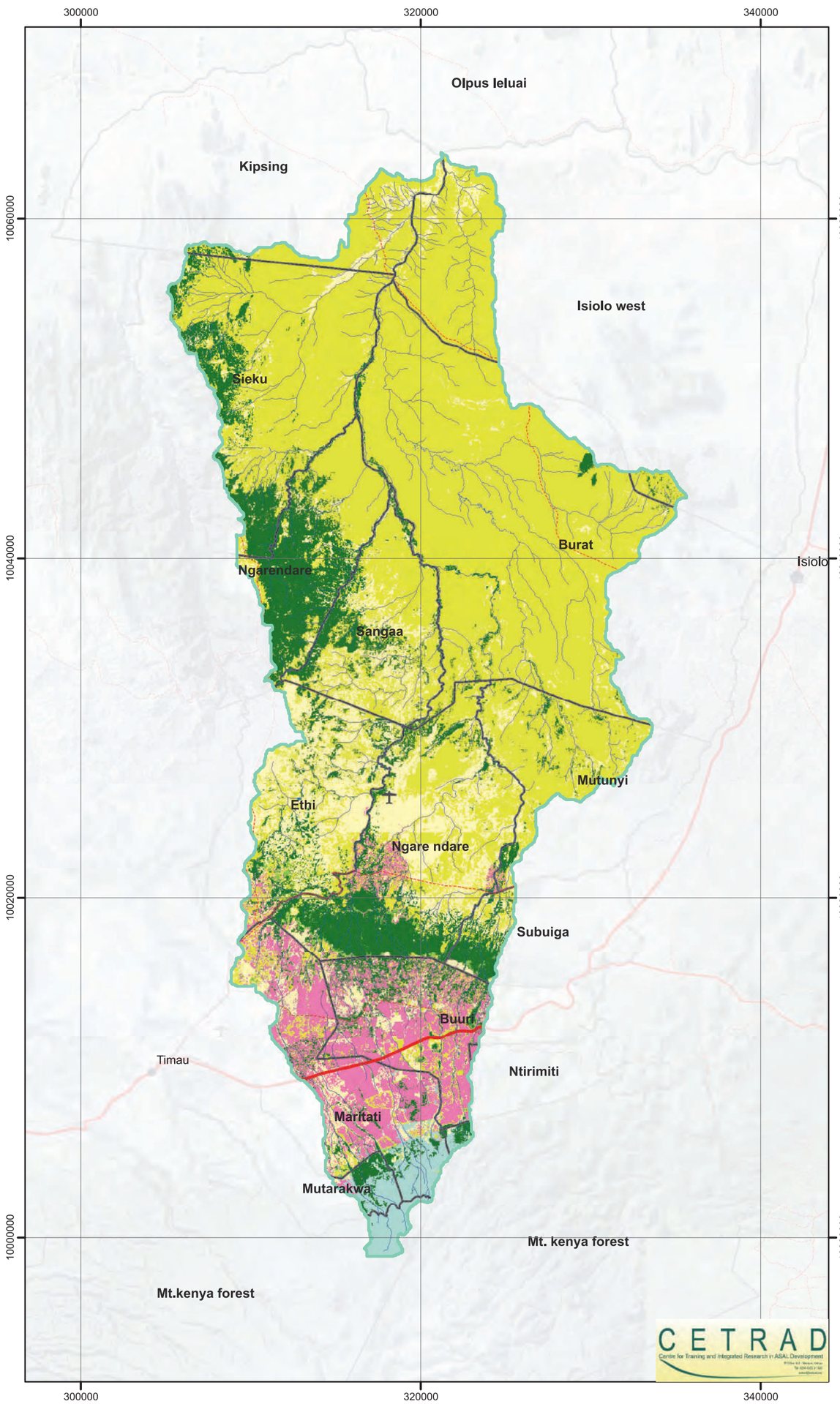
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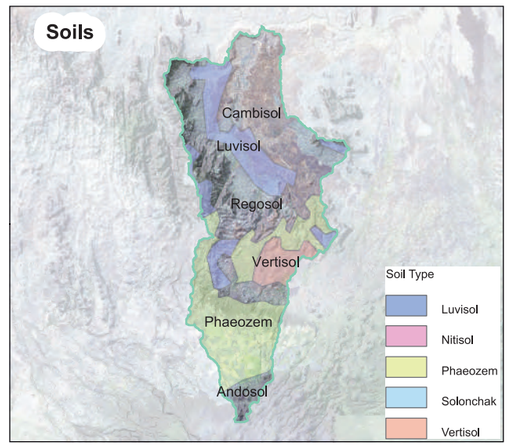
Abstraction points information derived from field survey in collaboartion with WRMA and WRUA's

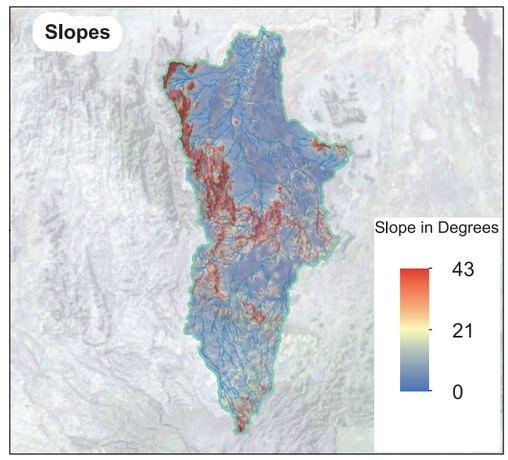
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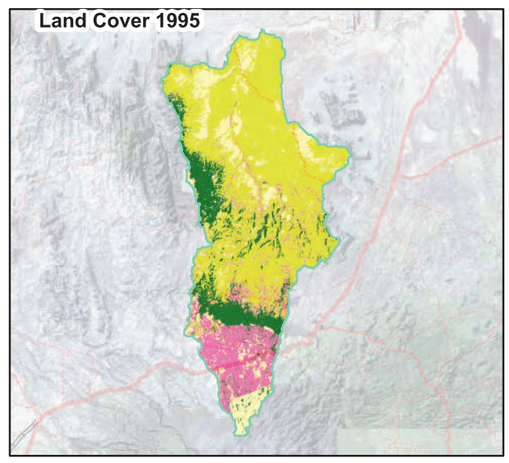
(*) Arid and Semi Arid Lands.

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

0 2 4 6 8 10 Kilometers

1:250,000

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
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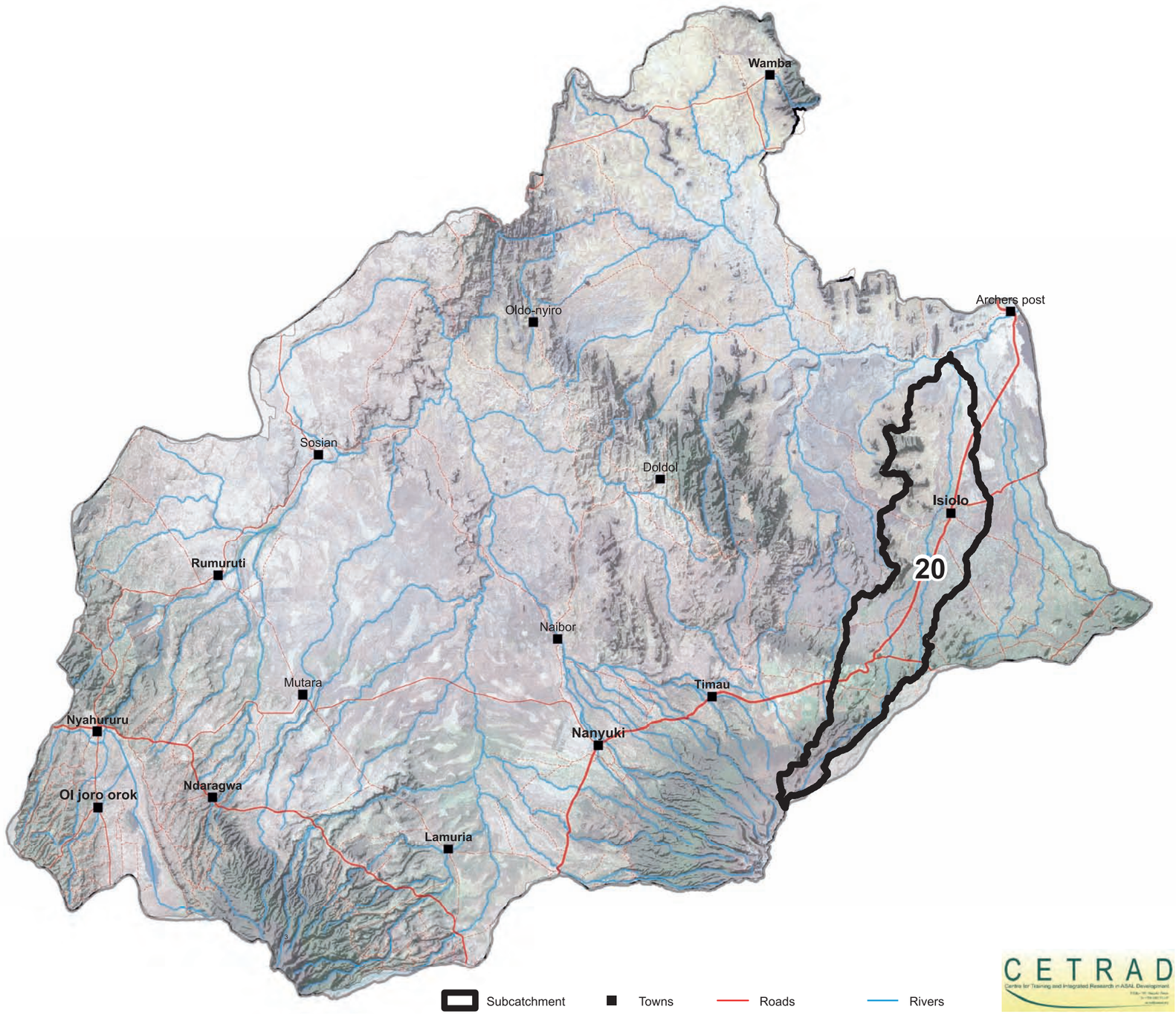
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The background image: SRTM 30m.

(*) 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
Centre for Training and Integrated Research in ASAL Development

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

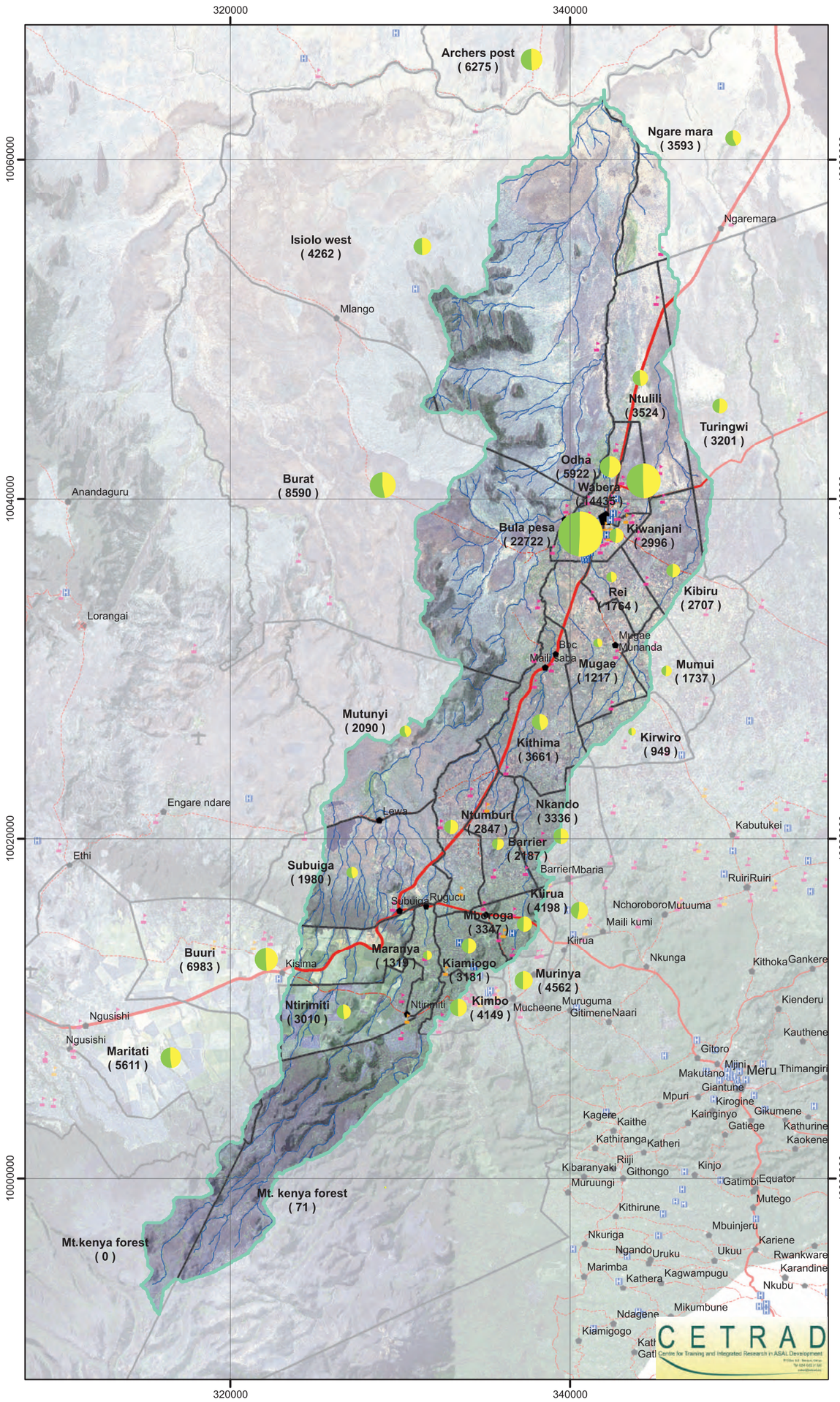
There are ten (10) secondary schools and over 120 primary schools; government sponsored (46), Private (30), Religious organizations (40) and Local Authority (4).

Water Resource Users Association Information

Name of WRUA		Isiolo WRUA				
Contact Address email, chairperson, phone		Box: 472-60300, Isiolo Person: Secretary 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 -Minimise conflicts				
Objectives		-Catchment conservation, planting of trees along the riparian -Economic use of water and solving water related conflicts -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) -Water conflict mostly during dry spells -Destruction of catchment				
Problems Reported to the WRUA		-Pollution (washing cars along the river) -Inadequate water -Water rationing -Destruction of vegetation -Cultivation along river banks -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 -Scarcity of the water resource -Lack funds
Cases of conflicts dealt with	-Water rationing -Scheduling for pump users -Creation of the awareness on the legal provisions
Cases of conflicts unresolved and reasons	-Phase II intakes of Isiolo water & sanitation company -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 -Enforcing compliance with water regularities -Surveillance against devegetation along the springs and river line
Achievements	-Level of awareness has improved -Regulation of water use has been accepted -Equitable distribution of water has been successful
Hindrances to achieve the goals of the WRUA	Lack of funds
Advices to others	Conserve catchment area 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 (Name, Year, Type of support, Amount of support)	Name: UNDP, Year: 2010, Type of support: Funds, Amount of support Ksh.1.8 M 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 Status: 3 are protected, others not protected due to lack of funds
Others	Potential for dams and pans not developed

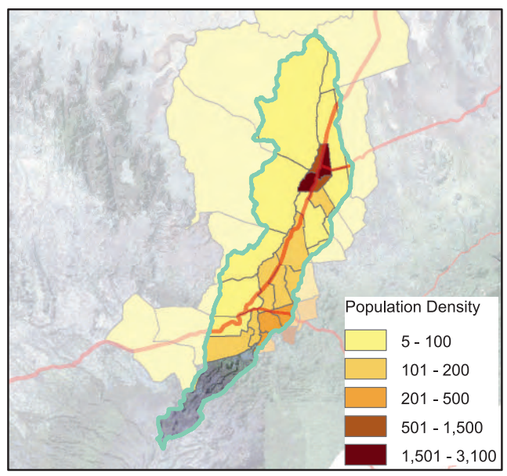
Population Numbers (2009) and Socio Infrastructure



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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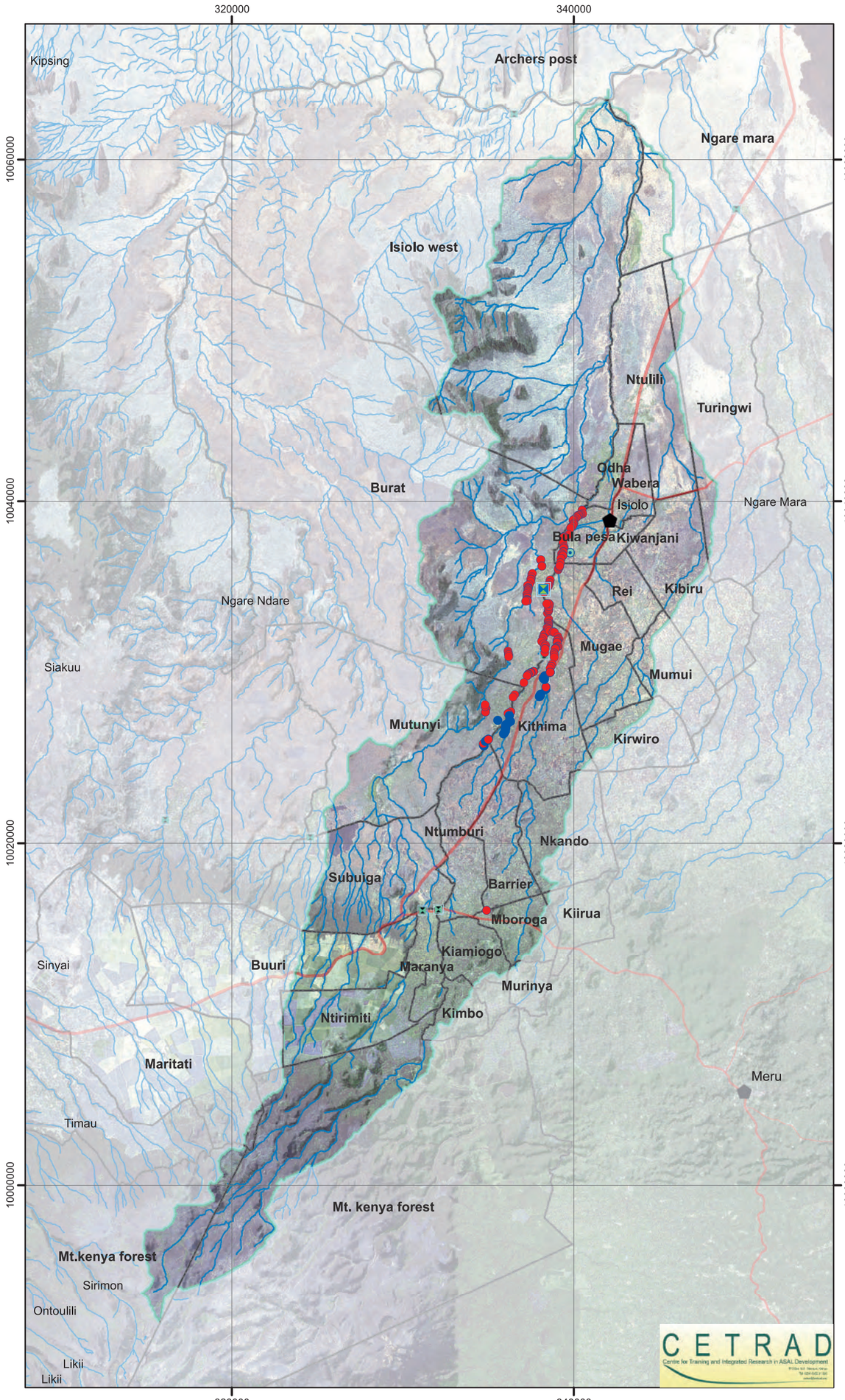
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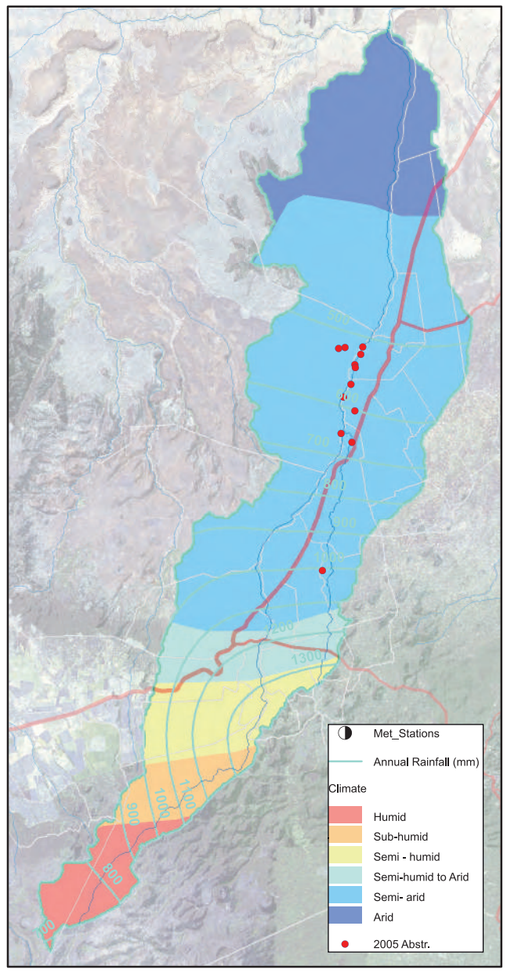
The background image: SRTM 30m.

(*) 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

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
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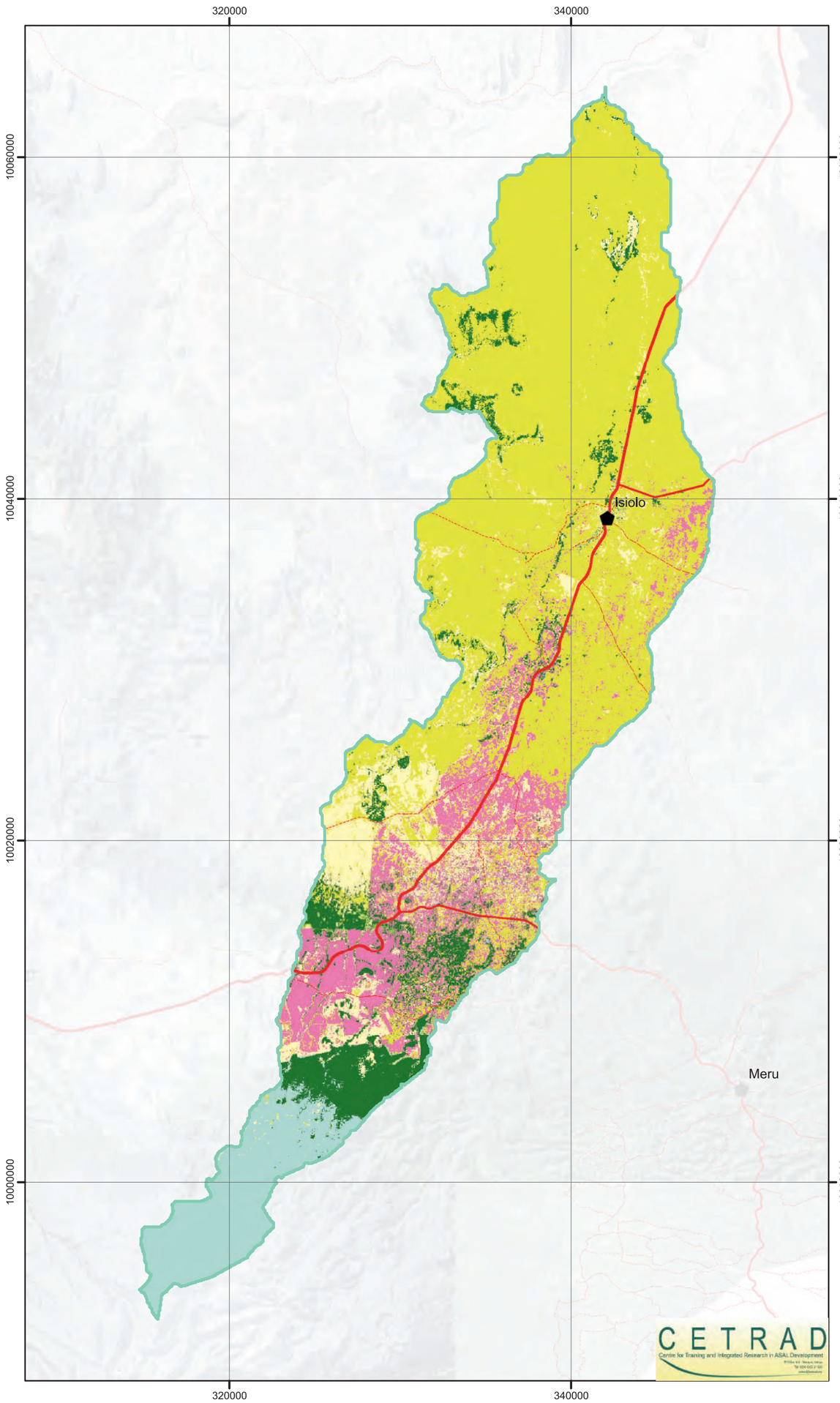
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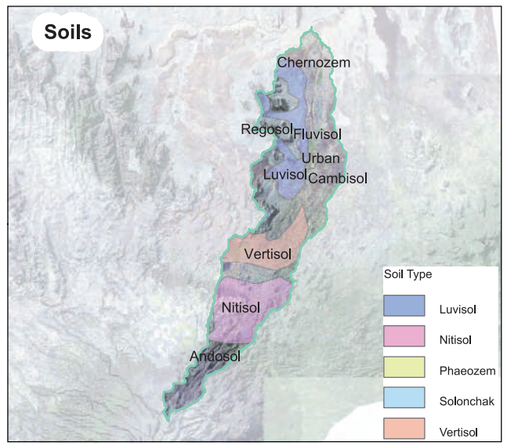
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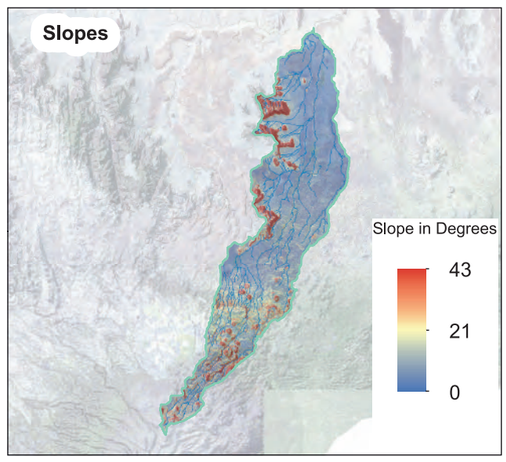
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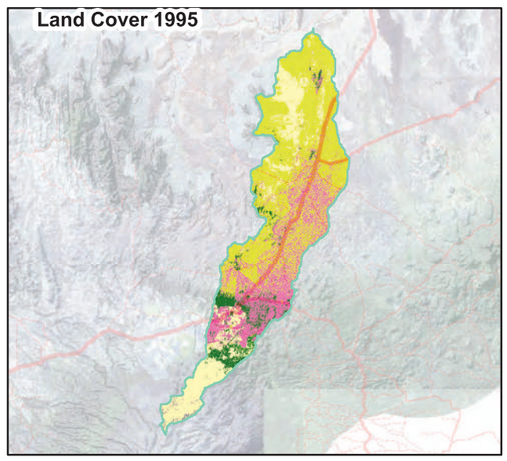
(*) Arid and Semi Arid Lands.

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

N W E S

0 2 4 6 8 10 Kilometers

1:248,588

Projection: Universal Transverse Mercator
UTM Grid: 10 kilometres
UTM Zone: 37
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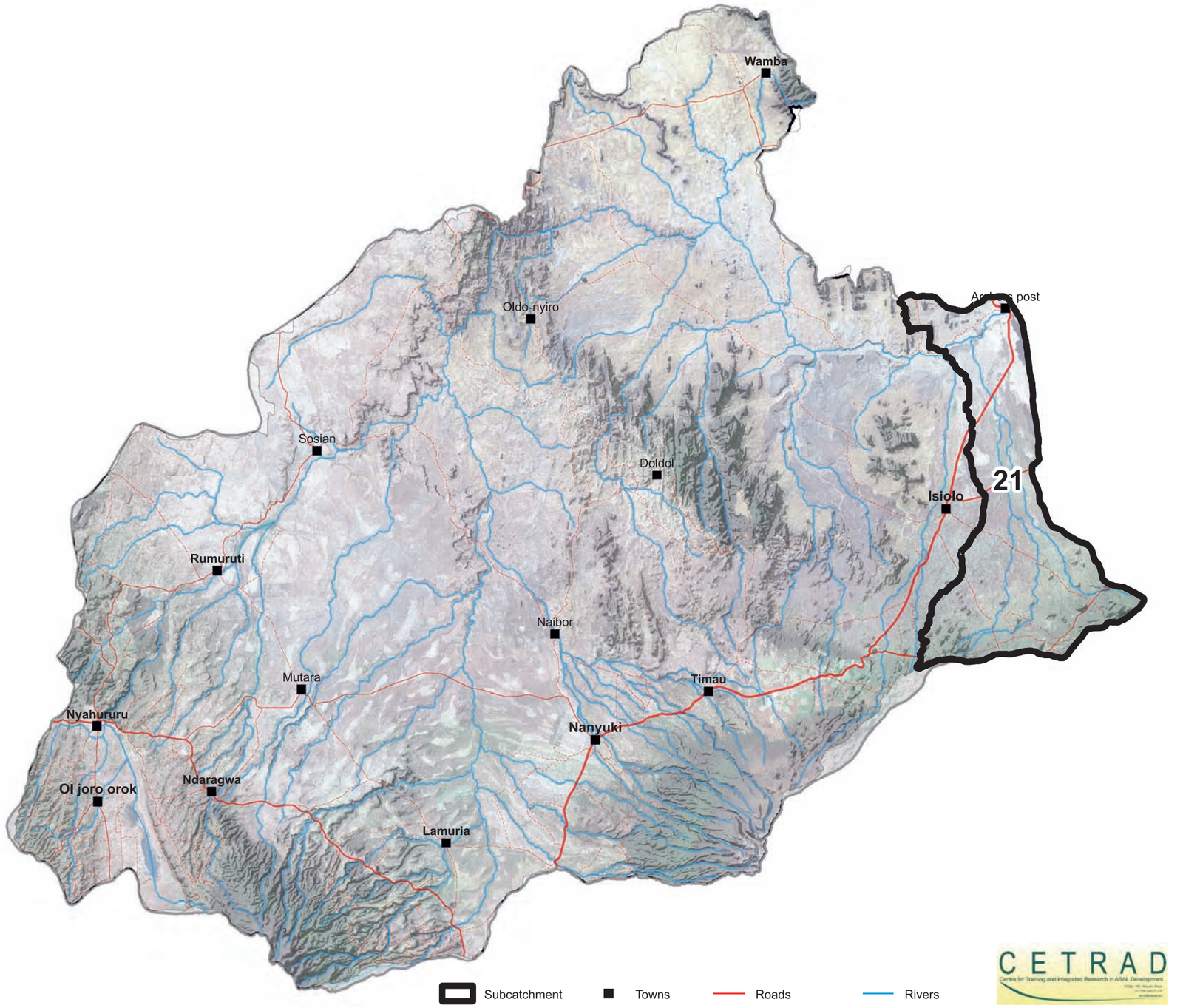
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The background image: SRTM 30m.

(*) 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 1,991Km^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 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 Munyariku water project Animal - human conflict Furrow irrigation 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 • Inadequate water • minimal participation from other stakeholders				

Cases of conflicts dealt with	• Munyariku Vs Maburua water projects • M'ariange Vs Kiaramu water projects
Cases of conflicts unresolved and reasons	• Inadequate skills in water usage • Inadequate water resource • Animal and human conflict
Other activities the WRUA is engaged in	• Creation of awareness to our members • Promoting ways of improving water quantity and quality • Identifying possible site for reservoir, dams • Conservation of the catchment area
Achievements	• List of abstractors • Prepared SCAMP • WRUA registration with AG
Hindrances to achieve the goals of the WRUA	Financial constraints
Advices to others	• Work with all the stakeholders • 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 (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 Effluent discharge from the coffee factories
Existence of Wetlands and their status	exist state: pathetic
Others	Public barazas, seminars

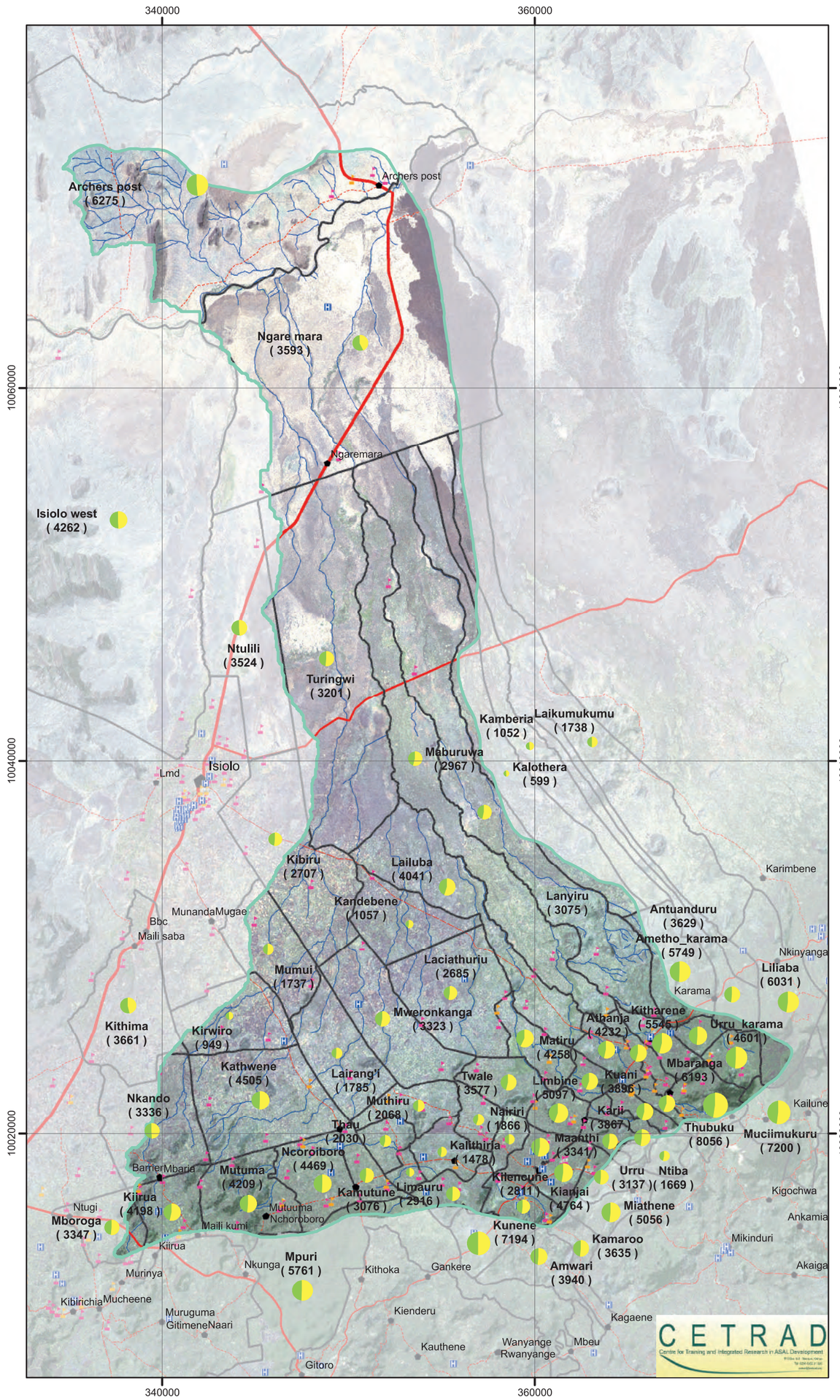
NGARE MARA SUBCATCHMENT
Fact sheet. Date: July 2014

2. Liliaba WRUA

Name of WRUA		Liliaba WRUA				
Contact Address email, chairperson, phone		Isaiah Ntombura (chairperson) Phone: 0729616256 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. • Mobilization of water users and participation in decision making during new applications of permits				
Objectives		-To promote legal water abstraction -Promote good management practices to make efficient and sustainable use of water resource -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 -Misappropriation of some project funds by management committee -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. 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. -Dissemination of information through Barazas. -Conflict resolution committee				

Challenges	-Inadequate funds -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 -Pollution monitoring -Water resource monitoring -Improvements to water use efficiency
Achievements	-WRUA committee members were funded and carried out sensitization seminars -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 -SCMP. -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. -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. -Sensitization meetings. -Water rationing
Institutional Support to WRUA (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	

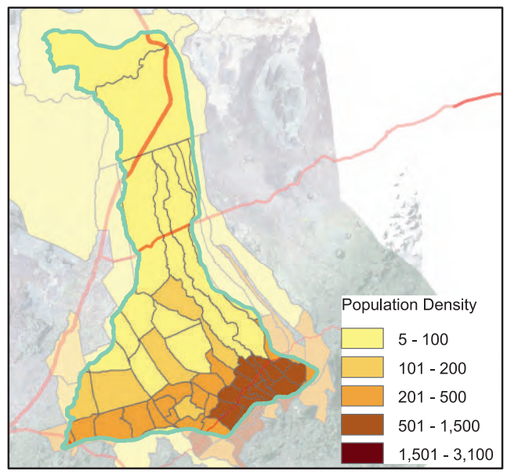
Population Numbers (2009) and Socio Infrastructure



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

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
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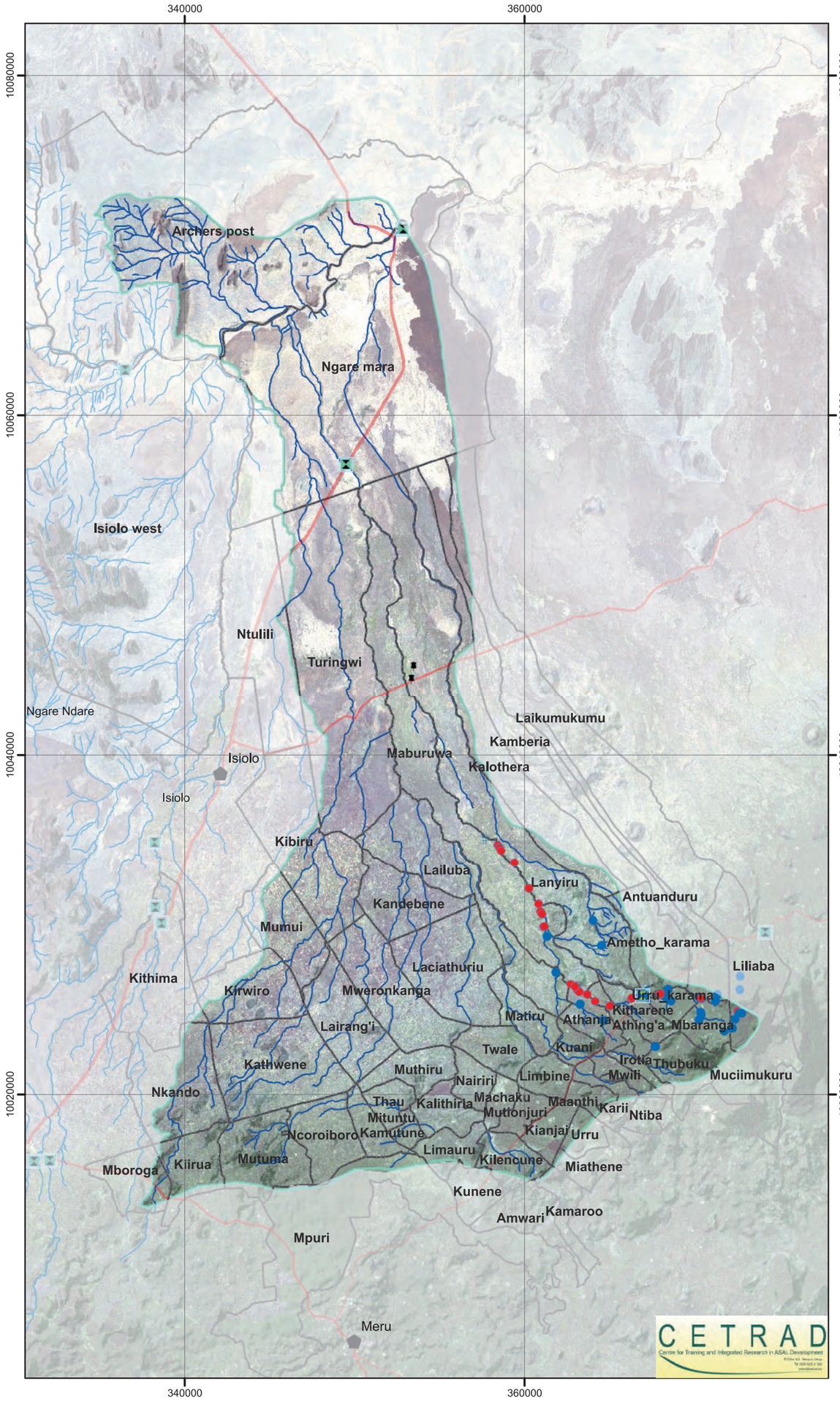
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Demographic data was sourced from KNBS 2009 National Census.

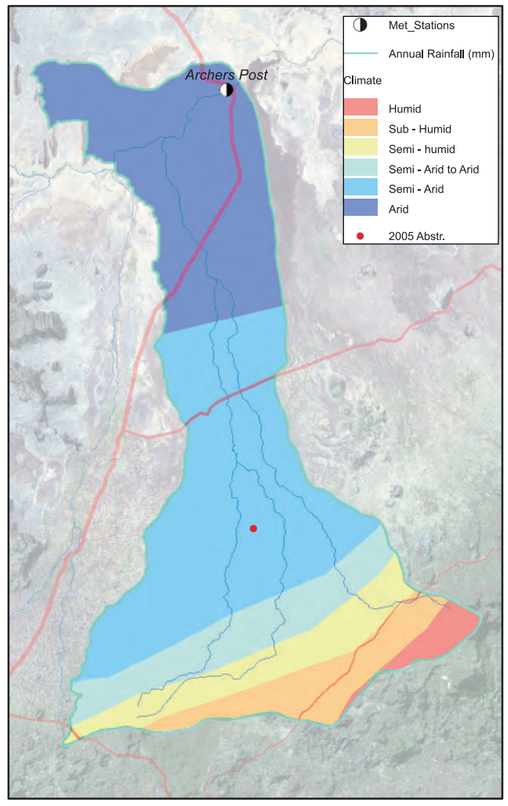
The background image: SRTM 30m.

(*) 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 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

N W E S

0 2 4 6 8 10 Kilometers

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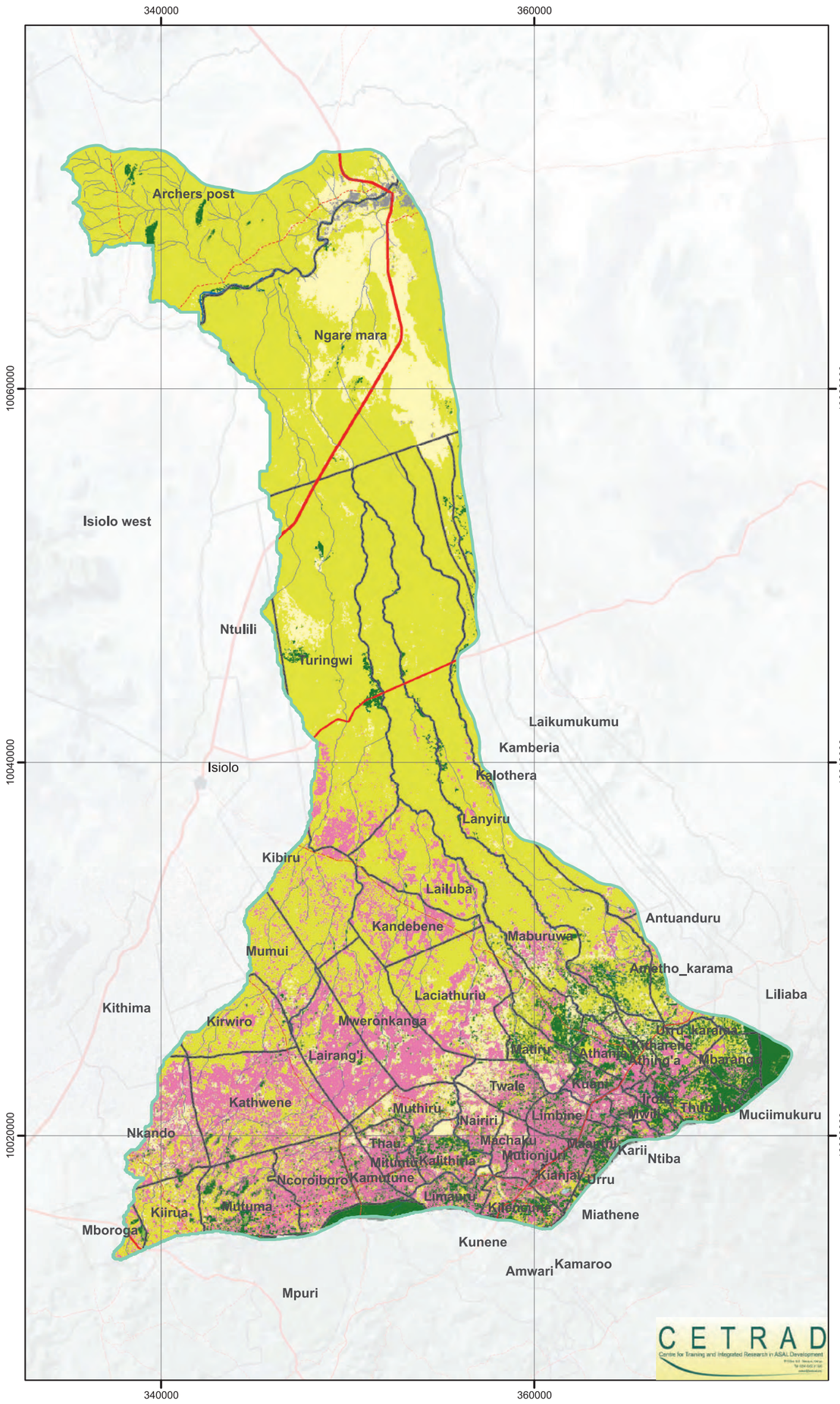
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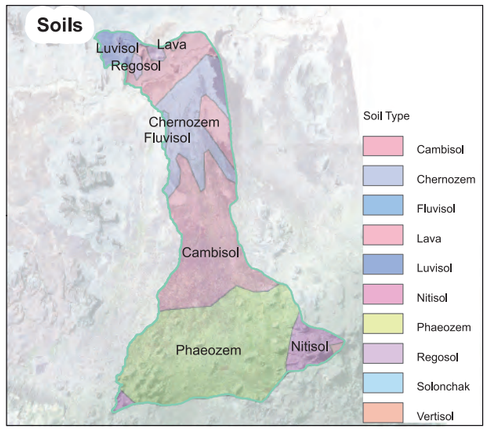
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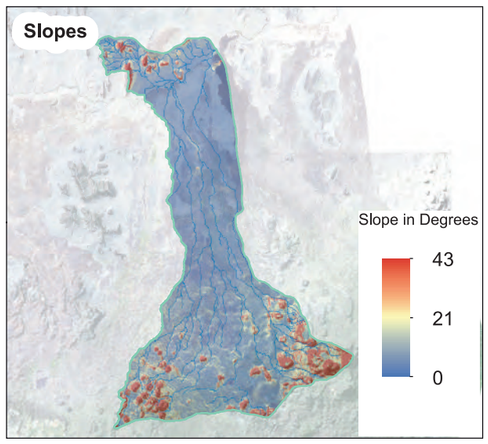
Land Cover 2014



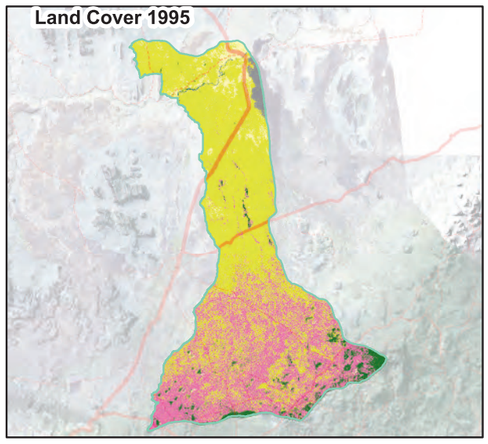
Soils



Slopes



Land Cover 1995



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

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(*) Arid and Semi Arid Lands.















CETRAD

Centre for Training and Integrated Research in ASAL Development

P.O.Box 144 - Nanyuki, Kenya
Tel +254 (0)62 31 328
cetrad@cetrad.org