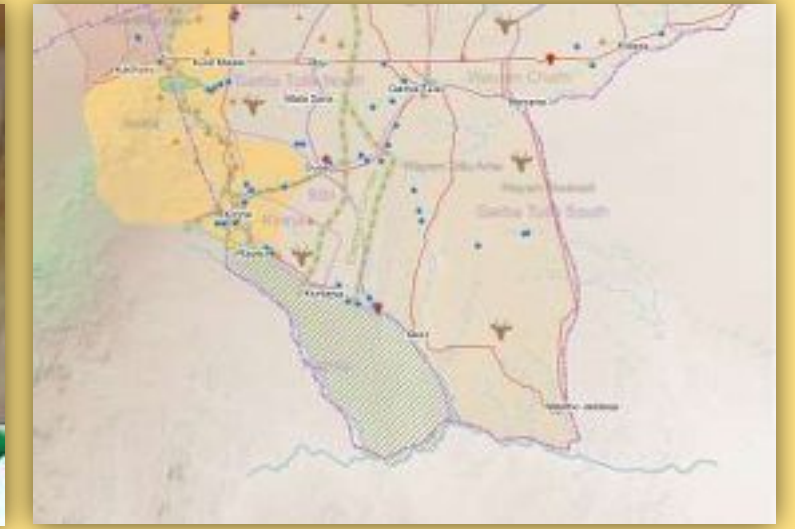


Resource Atlas of Isiolo County, Kenya

Community-based mapping of pastoralist resources
and their attributes



July 2015



Acknowledgements

Many people and organisations contributed the development of this Resource Atlas of Isiolo County. I am grateful to His Excellency, the governor, Dr. Adhi Godana Doyo for his valuable insight, effort, commitment and contribution that led to the successful completion of this Resource Atlas.

Special gratitude to development partners that included the National Drought management Authority (NDMA), Adaptation Consortium and Resource Advocacy Programme (RAP) who provided the technical expertise on participatory digital mapping. This undertaking would not have been possible without their support.

I also express my appreciation to the GeoData Institute, University of Southampton, United Kingdom. They ensured the technical design, application and back-stopping in the digital mapping process. Special thanks go to those who carried out the field work and those who mobilised the communities and facilitated their participation in this process.

Finally, I am indebted to DFID Kenya (UK Aid) and to CORDAID for the funding they provided through the Adaptation Consortium to enable this important work to have gone ahead. It is with great pride that the county government would like to share this Resource Atlas. I hope that users will find it relevant and in line with the needs and realities of our time; that this contributes to the realization of our vision of a developed, just and a cohesive County where all enjoy a high quality of life.



Mrs Amina A. Omar
Country Executive Committee Member
Water, irrigation, Environment and Natural Resources

Foreword

The Resource Atlas of Isiolo County documenting pastoralists' knowledge the resources that sustain their livelihoods is the first of its kind in Kenya. It is an important document in our arsenal of planning tools to deliver the County Integrated Development Plan, 2013-17, and meet our mission of improving the livelihoods of the people of Isiolo through participatory engagement in the provision of basic infrastructure and services.

The livestock sector, dominated by pastoralism, is the backbone of our county's economy and the livelihood for the majority of our people. However, many years of under-investment in this sector, have left pastoralists with high poverty levels and vulnerable to extreme climate events such as drought. The Isiolo CIDP, 2013-17 and the Isiolo County Livestock Strategy have identified measures to strengthen the livestock sector. Among the identified interventions there are proposals to improve pasture and water management, enhance livestock disease control initiatives, develop markets and market infrastructure, construct modern abattoirs and create disease free zones. The County Resource Atlas will guide us in planning and implementing these interventions.

Furthermore, and equally importantly, this Atlas will contribute to the development of the County Land Policy and Spatial Plan. We will use the community's intimate knowledge of the location, extent and inherent qualities of the resources that underpin their livelihoods and the pastoral livestock sector to ensure we develop a coherent and complementary land use plan for the county that promotes economic development, sustainable environment management and social harmony. The Atlas will guide us in where best to invest in water, health, marketing, transport and communication facilities and infrastructure to support the growth of our economy and the well-being of our people.

In acknowledging this undertaking, this Resource Atlas indicates the commitment of my County Government in strengthening and improving the livelihoods of the people of Isiolo. I want to say a special thank you to the people of Isiolo. Never before have we managed to capture the wealth of indigenous knowledge our people have of their environment in a way which can be understood and appreciated by all development actors. Nor have we been able to involve them to such an extent in county government decision-making. The process by which the Atlas has been developed has allowed us to ensure the enhanced participation of local people in the county planning process – a key objective of devolution as provided by the Constitution.

Finally, I recognise that an atlas is never finished. All it can show is the situation at a certain time. We live in a changing and dynamic world. The climate is changing and impacting on our rivers, forests, rangelands and water resources. As a county government we will continue to make investments that build a resilient economy and society. In view of this, and to ensure our planning is always informed by the most up-to-date and relevant information and data, we will continue to review and update the Resource Atlas.



Dr Adhi Godana Doyo
Governor, Isiolo County

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Participatory GIS mapping process

Background

The policy and institutional environment in Kenya is supportive of pastoral livestock development in the ASALs. The Constitution of Kenya (2010) has provisions for strengthening livestock production and transforming ASAL economies, while Kenya Vision 2030 recognizes the importance of livestock production in the ASALs to overall national agricultural development.¹

The Constitution of Kenya 2010 introduced devolved government with an Executive and an Assembly. County governments are responsible to provide opportunities for communities and citizens to be more intimately involved in the planning and implementation of development projects that impact on their livelihoods. To support community participation, practical measures are needed to facilitate dialogue and understanding between county government actors and local people. On the one hand, county government staff need to better understand the rationale of local livelihood systems and how different communities plan their activities, particularly in the face of climate change; but, on the other hand, local people also have to understand how county government planning and budgeting systems work.

Participatory digital mapping using satellite imagery and digital earth and other open source Geographic Information Systems (GIS) is a practical tool bridging the knowledge and communication gap between pastoral communities and county government planners. It is offering an effective 'tool' for participatory planning and

¹ Additional provisions in support of pastoral livestock development are found within Sessional Paper No. 8 of 2012 on the National Policy for the Sustainable Development of Northern Kenya and other Arid Lands, The National Land Policy, the Agricultural Sector Development Strategy (ASDS) 2010 to 2020 and Sessional Paper No. 2 of 2008 on National Livestock Policy.

decision-making in support of climate change adaptation in the drylands of Kenya.

The use of participatory mapping is not new in seeking to capture an understanding of the community and its use of natural resources. These maps are typically drawn on the ground using stones, bits of wood and other easily available material to depict key features such as schools, water points, forest areas, etc. Such processes produce perception maps rich in local knowledge and reflecting community priorities. From the perspective of government planners, however, such maps are of limited use for planning as they lack accurate scales and coordinates – characteristics essential for demarcating the location and extent of resources on which to develop byelaws for their protection and good management.

The process used in Isiolo County combines digital mapping with community-drawn perception maps. This offers a number of benefits. While fully capturing the wealth of local knowledge, they contain a built in coordinate system which respond to a global reference grid, enabling their linkage to maps used in formal systems. Furthermore, the coordinate system provides a geographically precise basis from which to discuss natural resource management, making outputs of participation in mapping more universally useable. These benefits, however, need to be carefully balanced to avoid the risk that through this process pastoral resources, that are highly dynamic, are 'frozen' in time and space. The flexible nature of digital maps allows users to zoom in and work on specific areas, and then to zoom out to obtain a wider view of the data. This is critical when developing maps of pastoral resources and livelihood strategies that require a presentation of data and analysis at the ecosystem scale, reflecting the dimension at which the system operates.

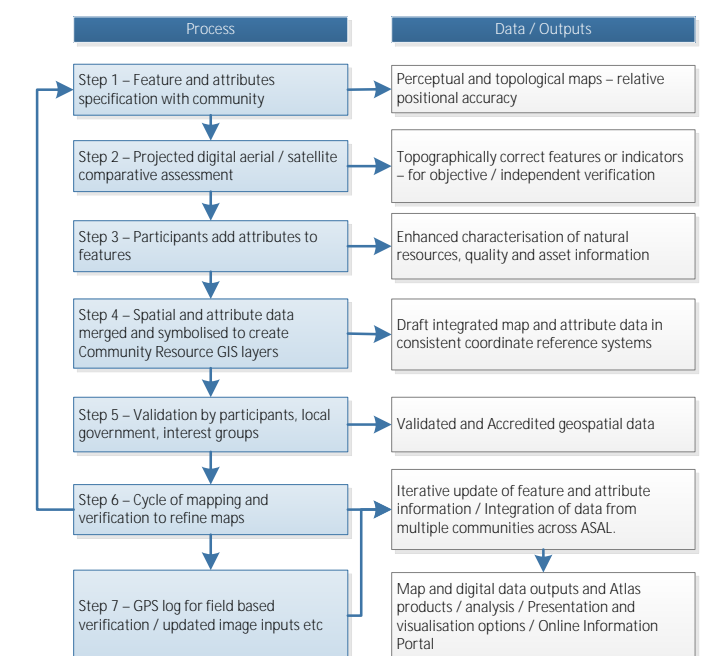
The participatory GIS mapping process was initiated by the Adaptation Consortium (www.adaconsortium.org), a

government led initiative under the leadership of the National Drought Management Authority within the Ministry of Devolution and Planning. The Consortium works in the arid and semi-arid counties of Garissa, Isiolo, Kitui, Makueini and Wajir. The Consortium consists of Christian Aid working with ADS-Eastern in Kitui and Makueni; International Institute of Environment and Development (IIED) working with Resource Advocacy Programme (RAP) in Isiolo, Womankind Kenya in Garissa, and Arid Lands Development Focus (ALDEF) in Wajir; the Met Office (UK) and the Kenya Meteorological Services (KMS). It is funded by DFID Kenya (UK Aid) under its Strengthening Adaptation and Resilience to Climate Change in Kenya plus programme and CORDAID..

Mapping process

The participatory mapping process has adopted Geographic Information System (GIS) workflows within community workshops that has allowed for creation of integrated, consistent and standardised geospatial information.

The process consists of seven steps illustrated below:



Step 1: Community level meetings to develop perception maps on the ground and/or on paper. The 1st step is the production of a community perception map of the resources important for their livelihood system. This map can be drawn on the ground and should be done in a community setting to enable the participation of a large group of people. Several maps may be produced by smaller sub-groups (women, youth, elders) and then amalgamated. The final map is then copied onto paper.

Step 2. Digital mapping is introduced. This step takes place in a workshop setting with a smaller group of key informants chosen by the community as well as county government planners and technical staff. The presence of the latter is critical to the process of legitimising community knowledge. Following a quick explanation of satellite imagery, Google Earth is projected onto a wall next to the perception maps developed under step 1. The use of Google Earth is only for orientation and to enable participants to navigate the imagery and cross-reference their paper-mapped key resources against the satellite imagery. Features that participants feel are important (e.g. water points, wet and dry season grazing areas, drought reserves, wildlife routes) are then captured digitally using open source applications (Quantum GIS (QGIS)) and JOSM, the Open Street Map editing platform). This produces the coordinates that pinpoint the locations of natural resources in a manner that can be independently and objectively verified (see Figure 2).

This highly interactive process of geo-referencing local knowledge to a coordinate reference system allows resource maps to be produced to any scale, and in real-time, with the community. This stage also allows the first level of 'validation' of the data and discussion on the suitability of the products to meet the stakeholders' needs (community, local government and other external stakeholders).

Step 3 Qualitative and quantitative attributes describing the key resources are collected. As participants put features onto the map they also describe the specified characteristics or attributes of these features. Attribute data includes a fuller description of the physical characteristics of the resource (e.g. soil type, water

quantity and quality, pasture species) as well as issues concerning its management (e.g. under customary or modern management, land tenure status, negotiated or paid access, area of conflict). Updating this data on a regular basis will inherently add temporal and trend data to the spatial database, highlighting the need to structure the data systems well to manage time-based data and record updates.

Steps 4-6: Data verification cycles integrated into the mapping process to capture community feedback and verify the records in the geospatial data and their attribute values against the specification. The mapping includes a series of validation, cross-checking and verification cycles, run with the community and in a few instances including on the ground verification. This stage also allows the first level of 'validation' of the data; the suitability of the products to meet the stakeholder (community and external stakeholder) needs.



Initial mapping and attribution with Isiolo community members

Step 7: Field validation. Field validation is carried out where the verification stages highlight gaps in information. For example, cloud cover on the satellite imagery may mask details of a particular water point on the ground, or where there is uncertainty over classifications or attributes. Verification consists of targeted field visits to take GPS markers or to hold a meeting with the local community to clarify a particular issue. This information is then uploaded on the map.

The features recorded also have attributes, such as volumes of flow at water points, seasonality of the pastures and different classes of features (e.g. types of water point). A comprehensive mapping legend has been developed with the community, which forms part of the mapping outputs and themes.



Legend of features and attributes for Isiolo mapping

Data management

Data management within the programmes has adopted Open Source technologies, to reduce barriers to uptake at county levels; software is free and development is supported by a wider community of software developers.

Data and information collected and capacity created as part of the programme will contribute to programme's sustainability, with the potential to re-use the data for subsequent programmes and in other contexts. To realise these benefits the preparatory stage has evaluated data management issues.

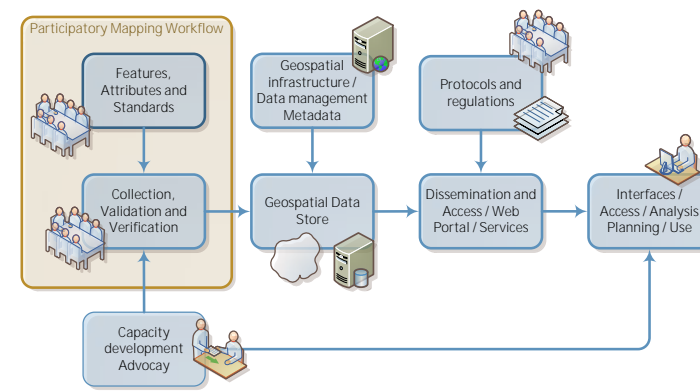
The technologies selected to support this participatory GIS have been based on Open Source software components; these have been explicitly experimental and evolved through the programme. Within the preparatory stages a series of platforms and data management approaches have been tested using paper mapping, satellite imagery, crowd-sourcing as part of validation, update and data dissemination and validation through the web portal.

ASALs cover a wide, trans-national area with multiple communities with knowledge of their own neighbourhood, with their own views of what features are significant, with varied naming conventions of features and with inherent geographic variation. These factors present a further challenge for production of a coherent dataset across a wide ASAL area. A technical challenge has been to accommodate loosely structured datasets that meet the community specification whilst still allowing for 'back office' coordination and standardisations. The approach adopted has been to use the Open StreetMap (OSM) model; this has unstructured data to represent features types by tags, which can be defined by the community.

As datasets are combined for the wider area the geographic database moves towards a spatial data infrastructure. There is a need for a way of identifying and aggregating similar features at different levels and displaying these with the same cartographic. For example, there were differences between the separate district workshops and even between separate groups within a single meeting for describing the same feature. In Isiolo data were exported to OSM XML and JOSM, the OSM editor, which was used to attribute similar features through attribute-based rendering of the map data.

Isiolo maps and data

Participatory mapping in Isiolo has generated three principle outputs i) the paper based mapping – as illustrated in the thematic mapping in this Resource Atlas of Isiolo County ii) digital GIS data layers for the different themes of natural resource information and iii) a prototype web based information portal for wider access and visualization of the data and information.



Overview of proposed data management for Atlas geospatial data layers

This information can now support the resilience assessments, total economic valuation studies and can assist with the spatial targeting of actions within the community adaptation fund.



Website access and visualisation of the combined mapping layers for part of Isiolo County

A prototype online portal, developed within the Isiolo project, has initially been built around the ODC Open Database License that allows the map data to be shared, copied and adapted, subject to attribution, 'share-alike' and 'keep open'. Similarly, the imagery used within the portal has adopted the CC-BY-SA, with share, adapt and commercialization rights subject to attribution and share-alike conditions.

The wider access to these datasets needs further consultation with the community; current web-hosting of the portal is within GeoData Institute, with the objective to transfer this to a Kenyan host organisation.

Mapping

The following pages contain maps of natural resource themes for Isiolo County. In each section an overview of the whole county is shown, followed by larger scale maps of portions of the county to show as much detail as possible. Data sources for each mapping section are given at the front of each thematic section.

At present the Central Ward has yet to conduct the participatory mapping programme, hence the absence of data in this area

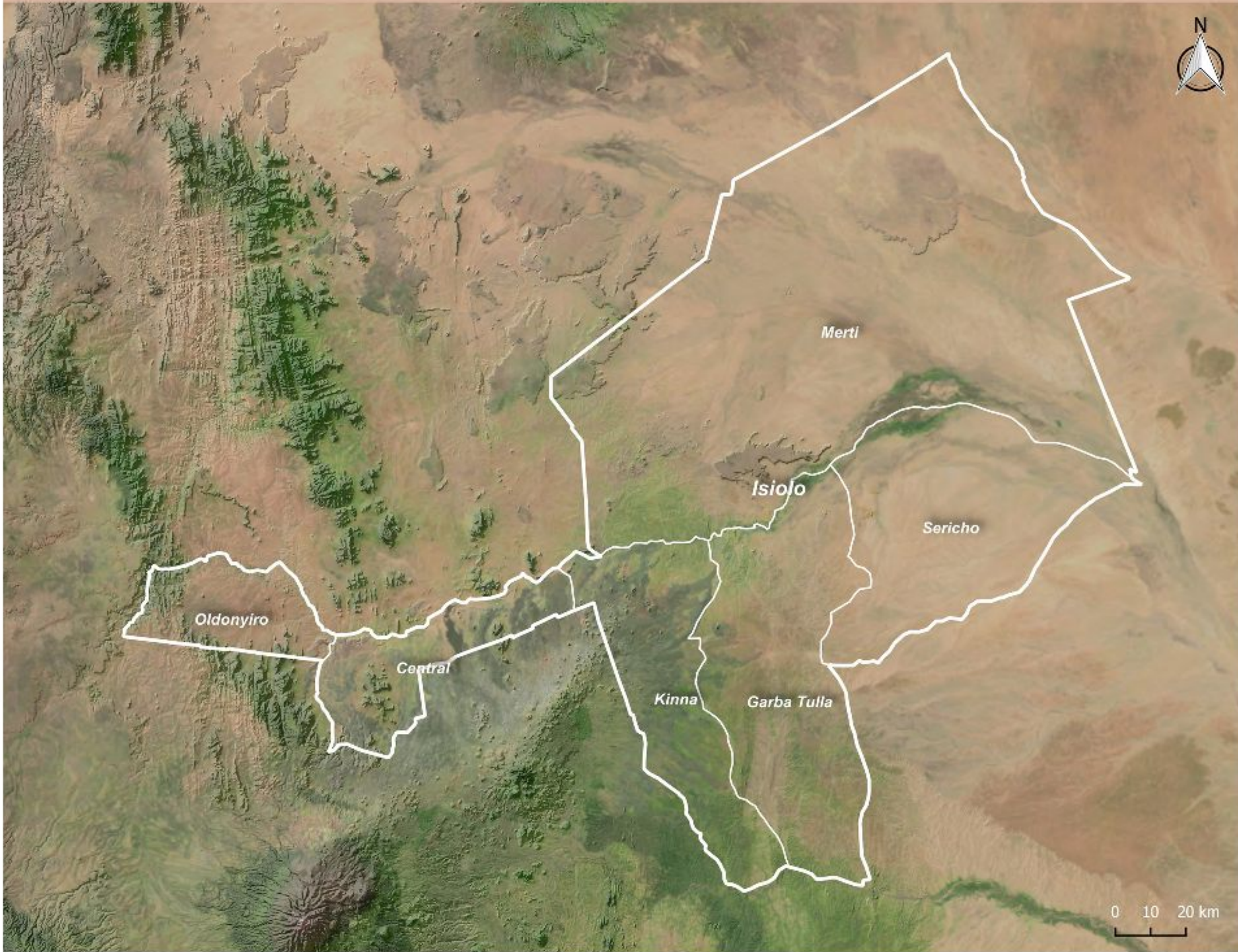
Location



Data Sources


Imagery – Landsat 7 ETM+ Mosaic 2013 NASA Landsat Program

Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Administrative layers

 Admin boundary

Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Basemap - Trueearth 250m imagery

Ward boundaries - GADM v2.0
2012.gadm.org

Infrastructure



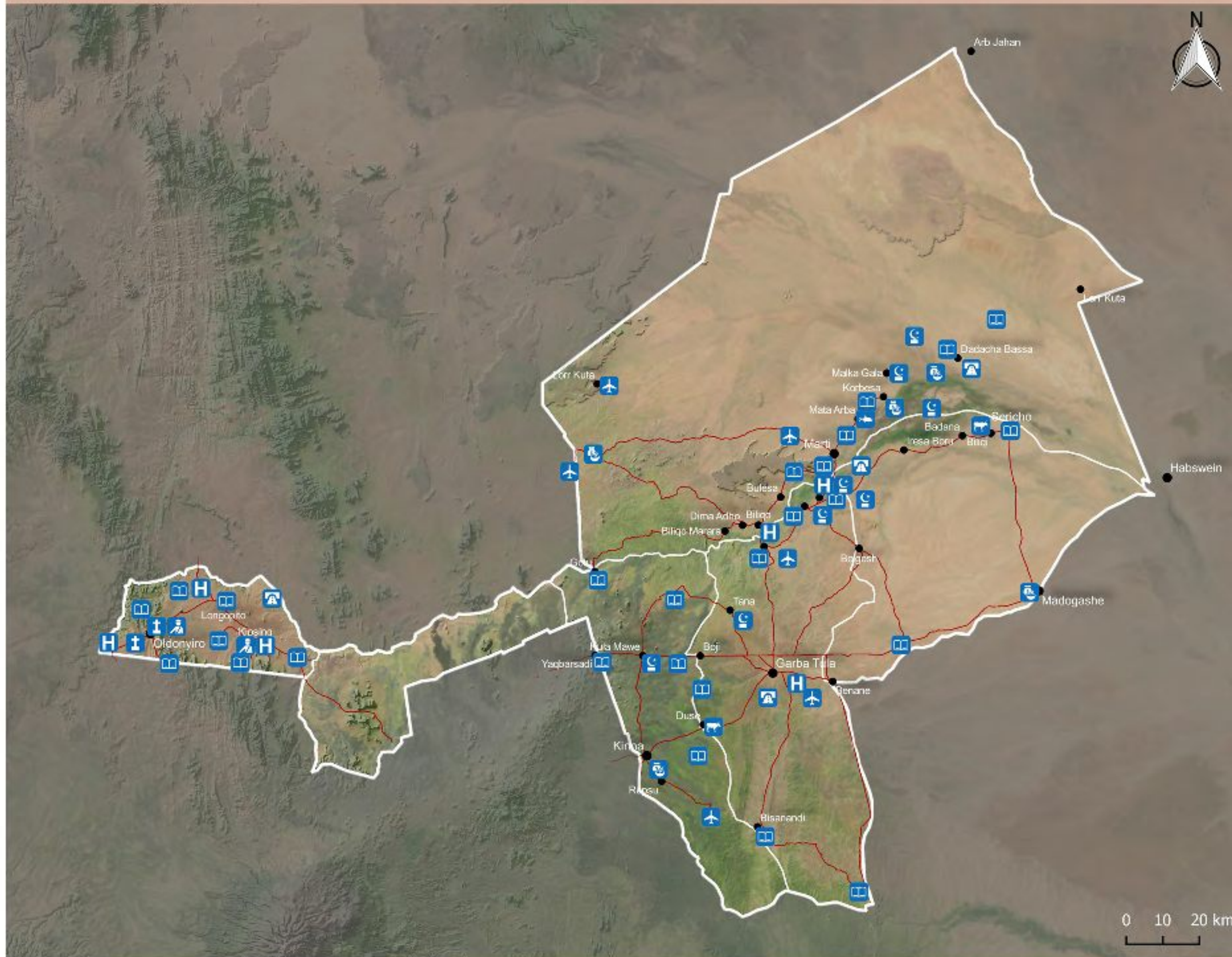
Data Sources

Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Infrastructure

- Administrative
- Airstrip
- Church
- Educational
- Fish farm
- Livelihood
- Livestock market
- Medical
- Phone mast
- Mosque
- Police station
- Radio station
- Safety and security

Settlements

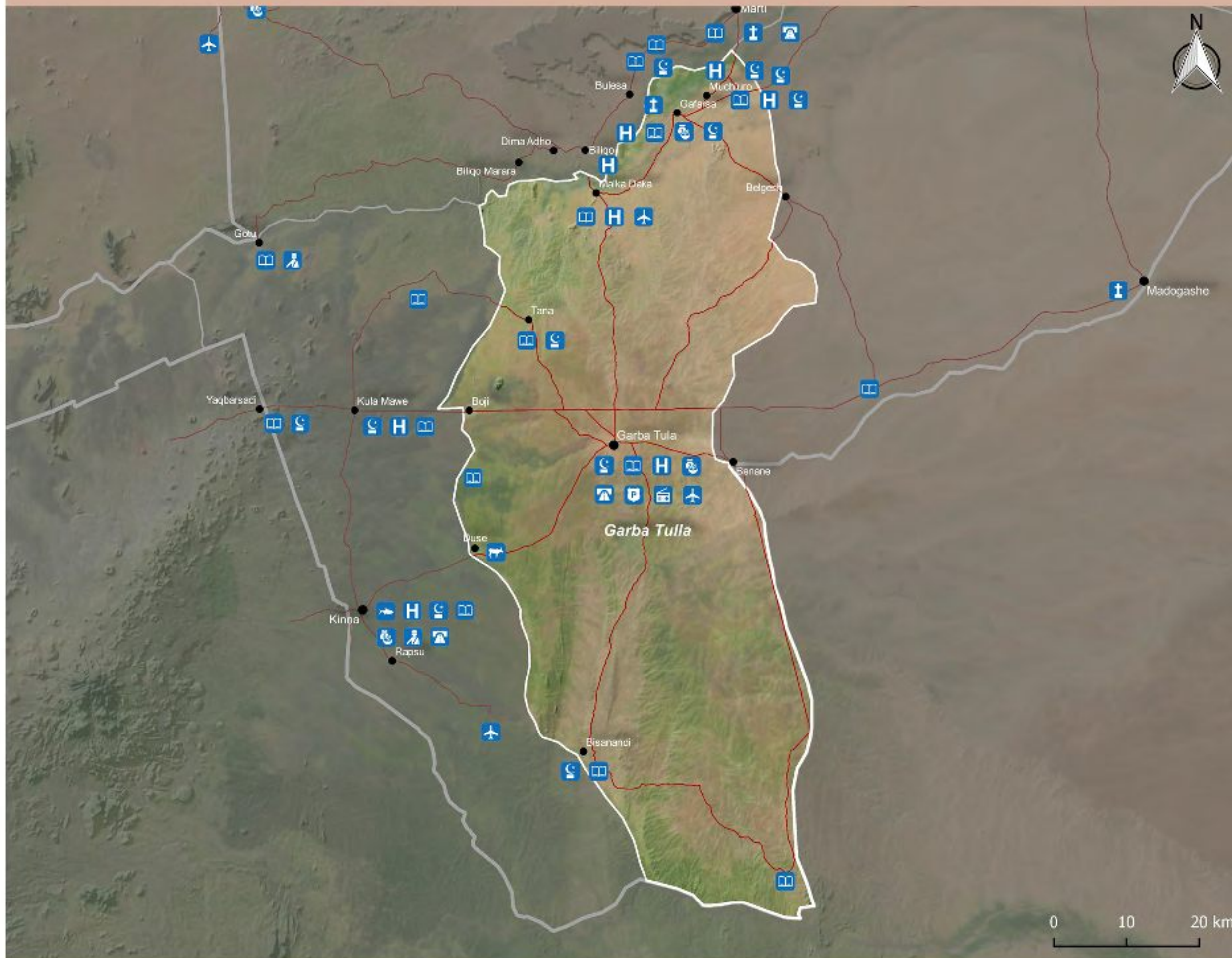
- Village
- Town

Administrative layers

- Admin boundary
- Roads

Data Sources:
 Background Hillshade - SRTM 2003
 (www.cgiar-csi.org/data/srtm90m-digital-elevation-database-v4-1)
 Basemap - Trueearth 250m imagery
 Settlements - Community collected data Kenya 2013
 Infrastructure - Community collected data Kenya 2013
 Roads - Open Street Map © OpenStreetMap contributors
 Ward boundaries - GADM v2.0 2012 gadm.org





Map Legend

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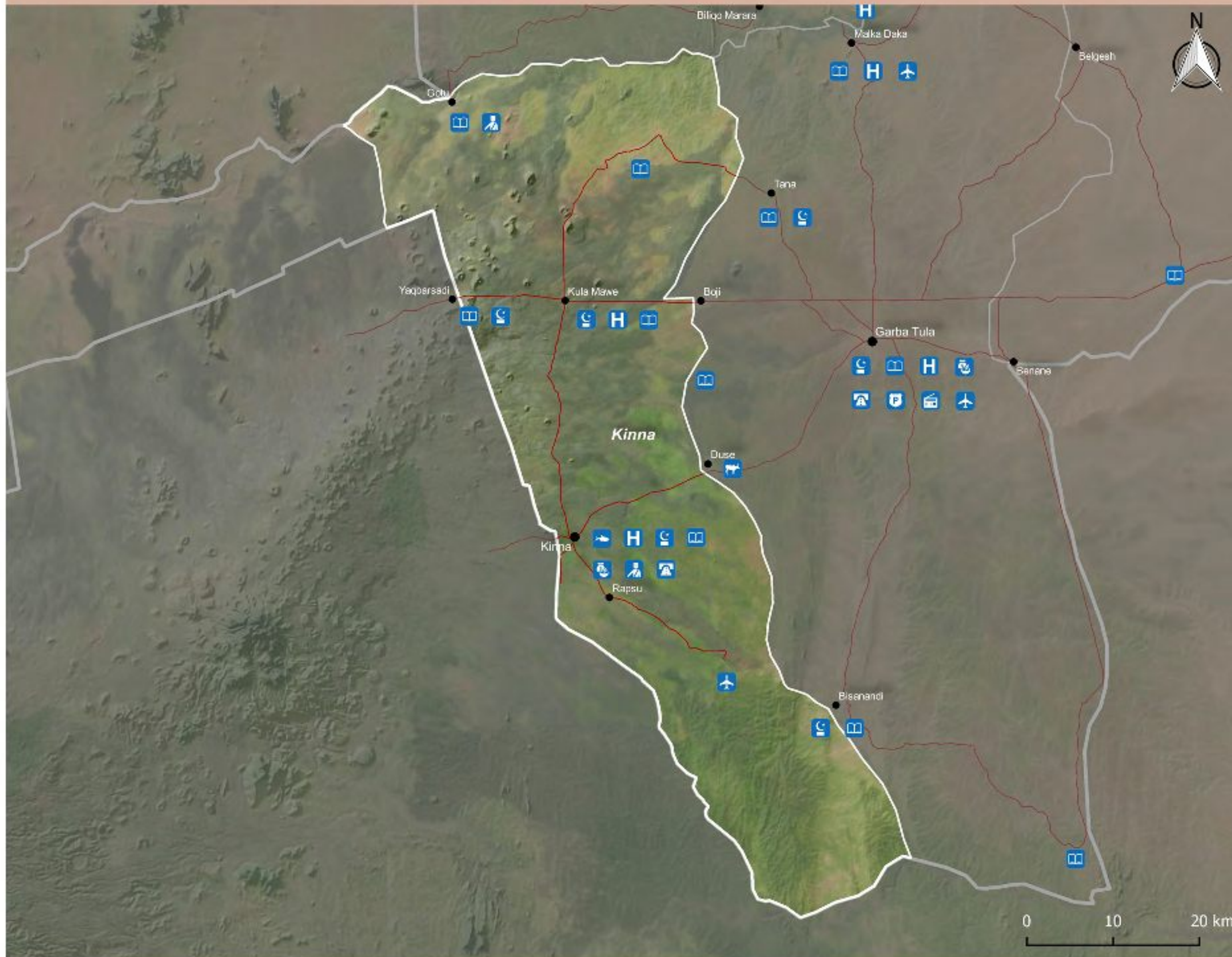
Basemap - Trueearth 250m imagery

Settlements - Community collected data Kenya 2013

Infrastructure - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org



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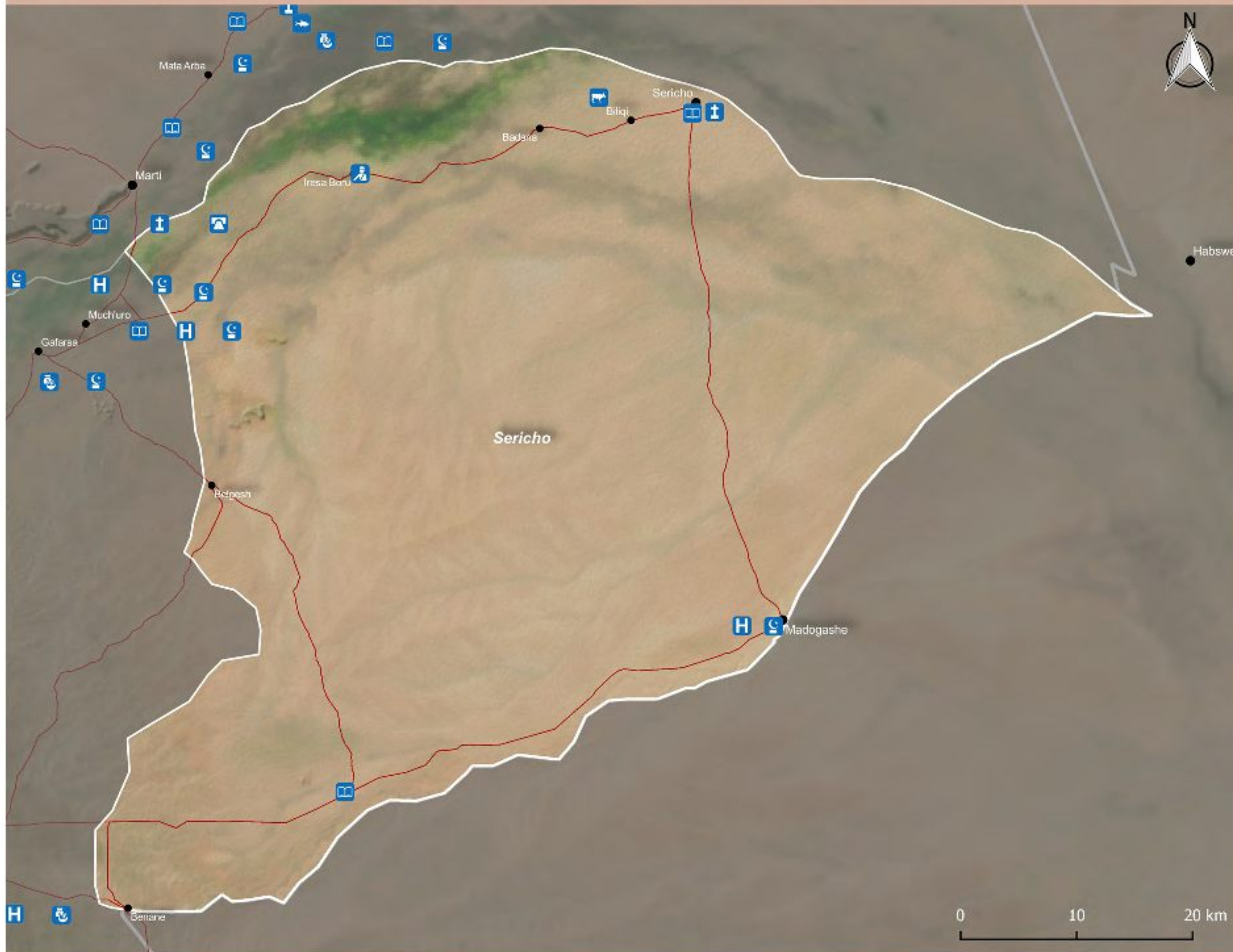
Settlements

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- Town

Administrative layers

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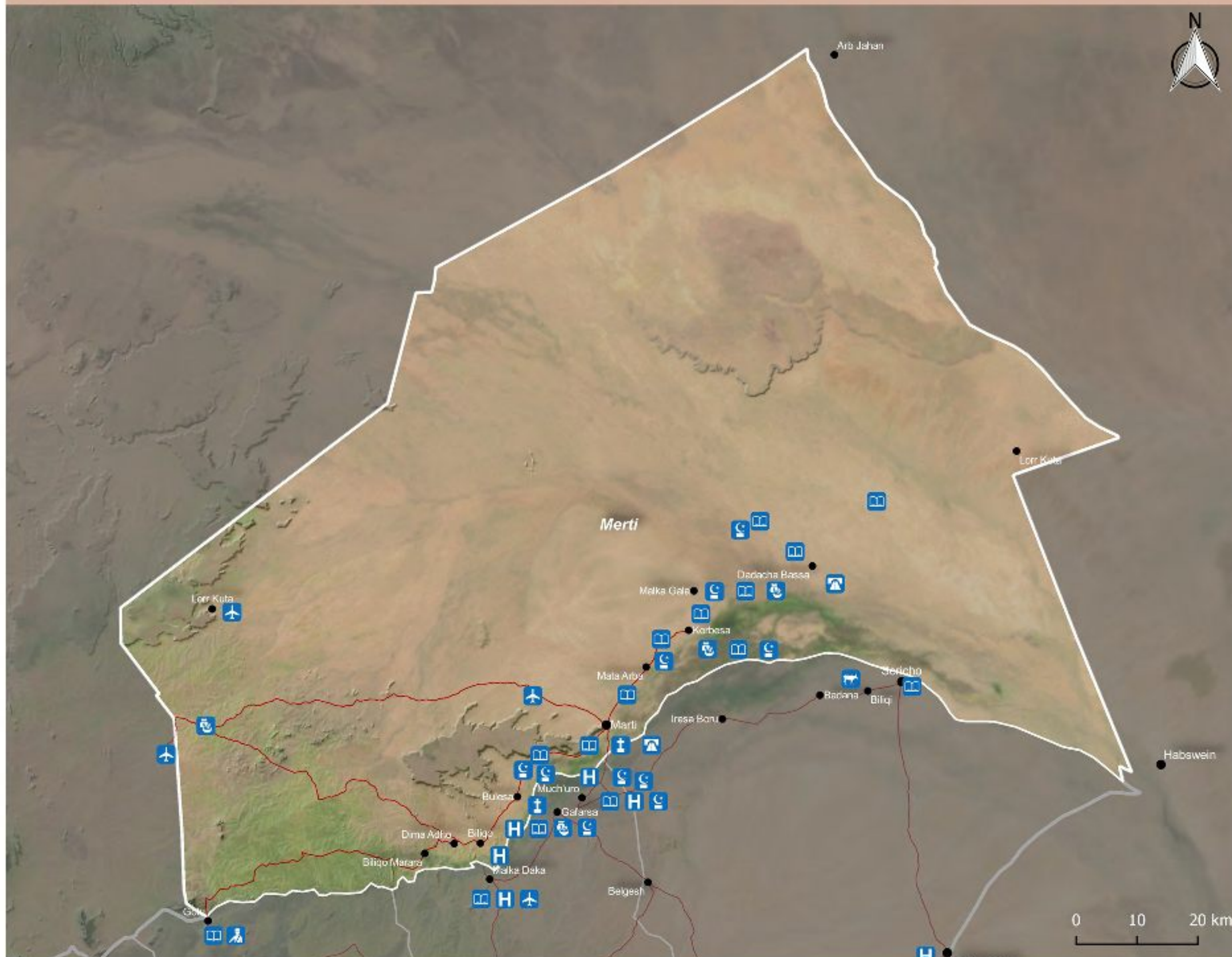
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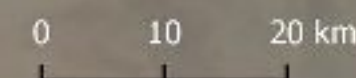
Basemap - Truemarble 250m imagery

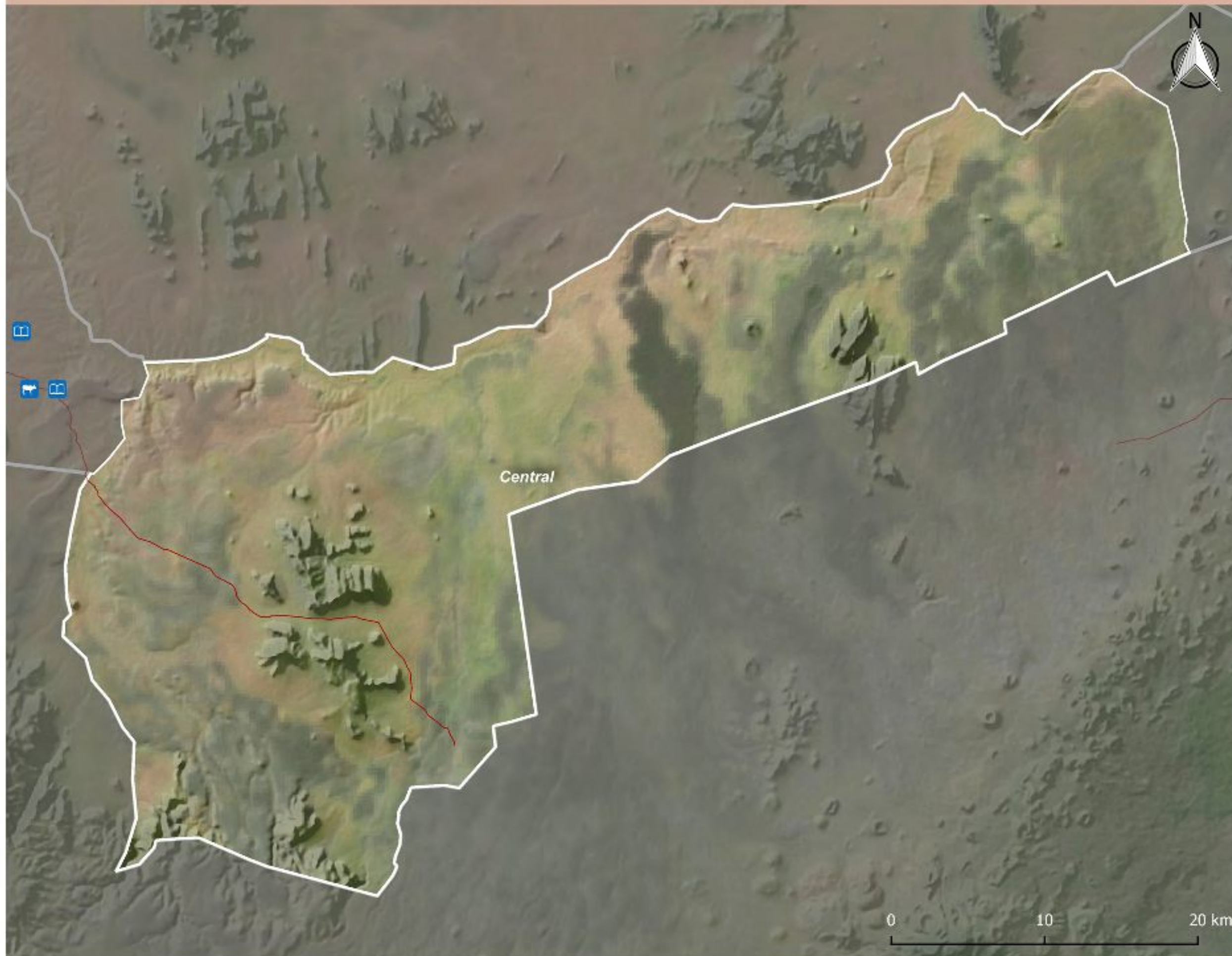
Settlements - Community collected data Kenya 2013

Infrastructure - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org





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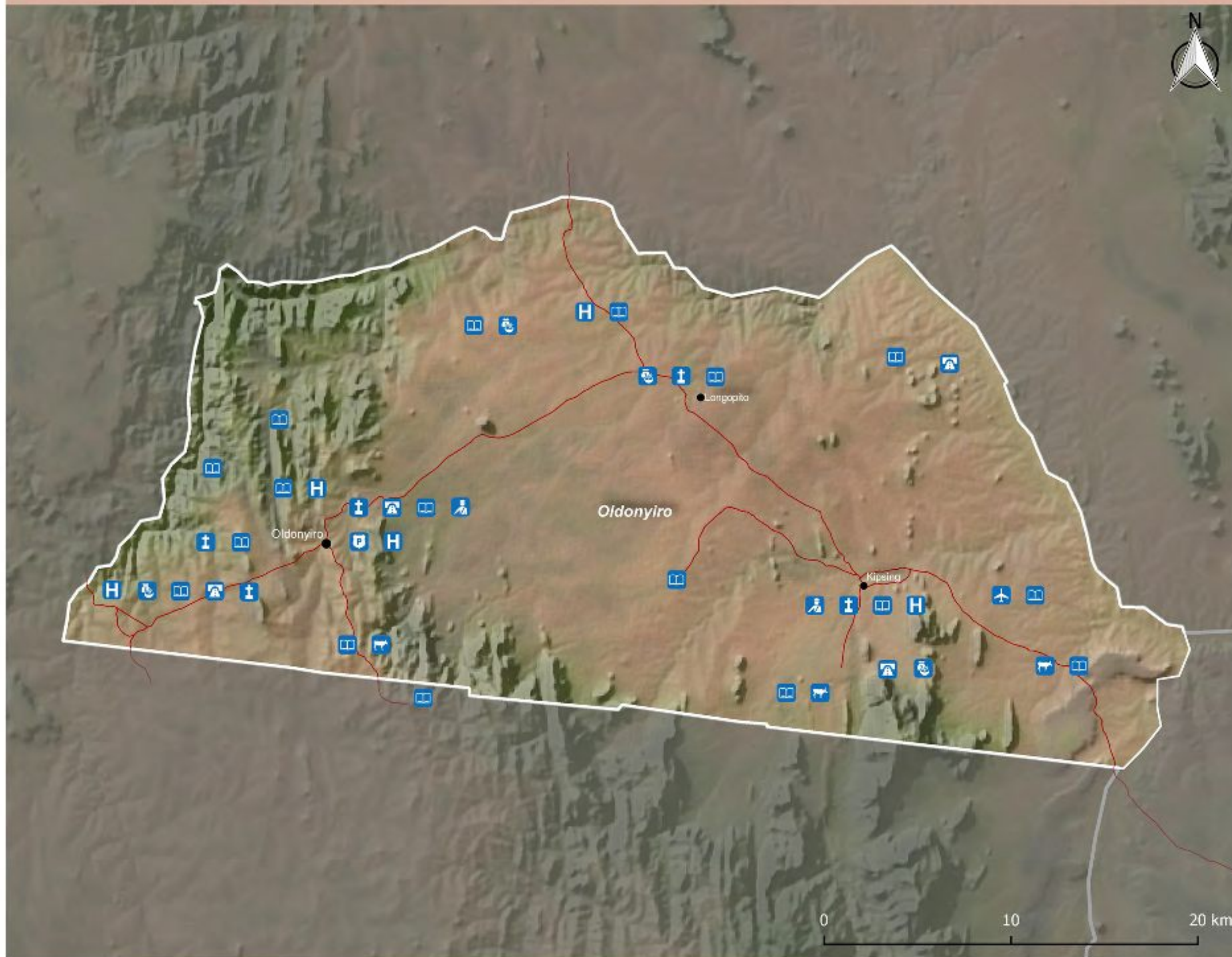
Settlements

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Administrative layers

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Roads - Open Street Map © OpenStreetMap contributors
Ward boundaries - GADM v2.0 2012 gadm.org

Physical



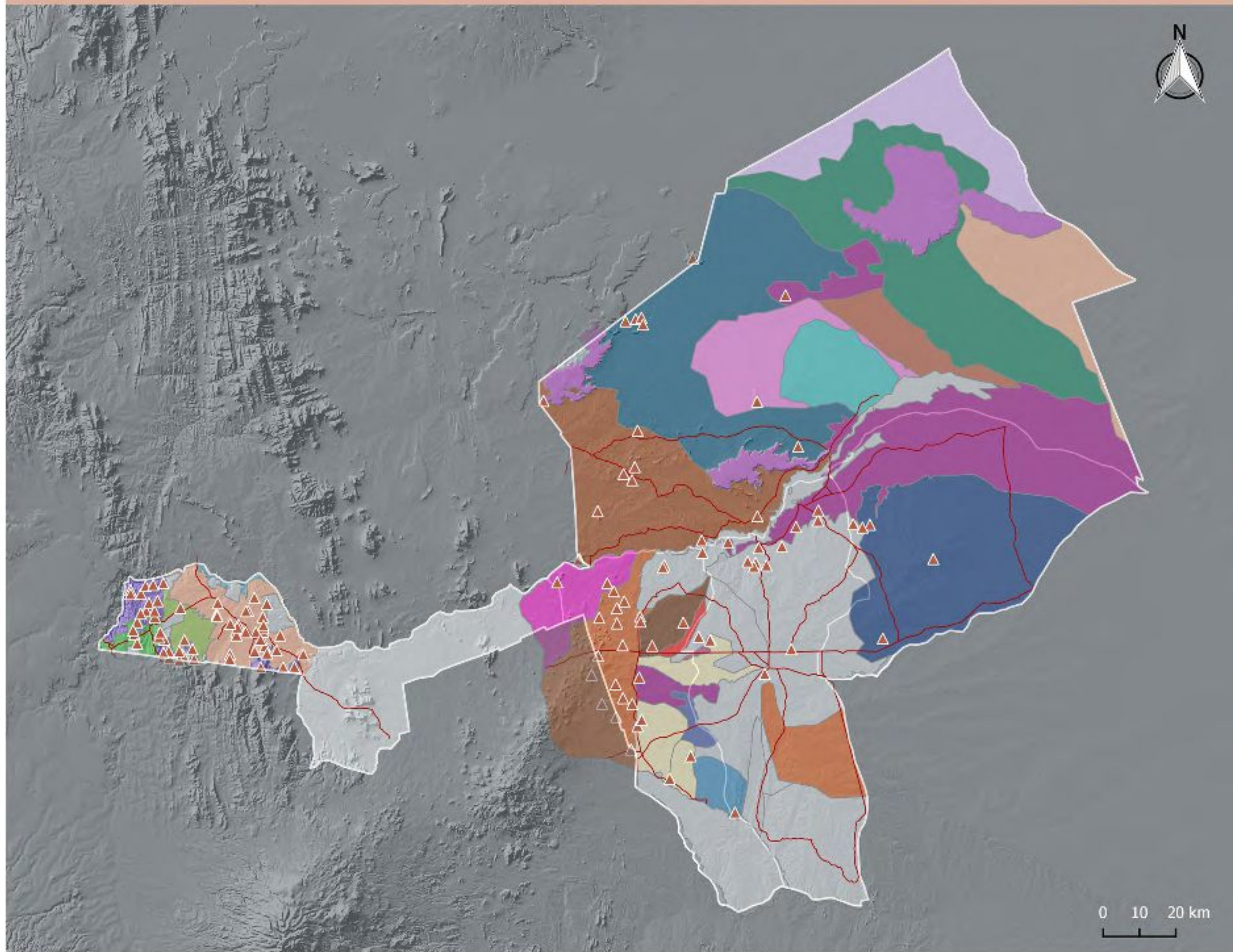
Data Sources

Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Soils, Prominent Hills - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Soil type

- Boji
- Bulle
- Bulle Shurr Malbe
- Charri
- Cherab
- Garr
- Ingotot
- Kotich
- Kotich/Malbe
- Lchogi
- Ldonyo
- Lpurkel Onyonkie
- Malbe
- Malbe Boji
- Malbe Kotich
- Malbe Omar Kotich
- Omaar
- Omar Malbe
- Omar Malbe Boji
- Rampason
- Shurr
- Wayam
- Wayam Charri
- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative later

- Roads
- Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003 (www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1)

Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Hills - Community collected data Kenya 2013

0 10 20 km





Map Legend

Soil type

- Boji
- Bulle
- Bulle Shurr Malbe
- Charri
- Cherab
- Garr
- Ingotot
- Kotich
- Kotich/Malbe
- Lchogi
- Ldonyo
- Lpurkel Onyionkie
- Malbe
- Malbe Boji
- Malbe Kotich
- Malbe Oomar Kotich
- Oomaar
- Oomar Malbe
- Oomar Malbe Boji
- Rampason
- Shurr
- Wayam
- Wayam Charri
- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative later

- Roads
- Admin boundaries

Data Sources:

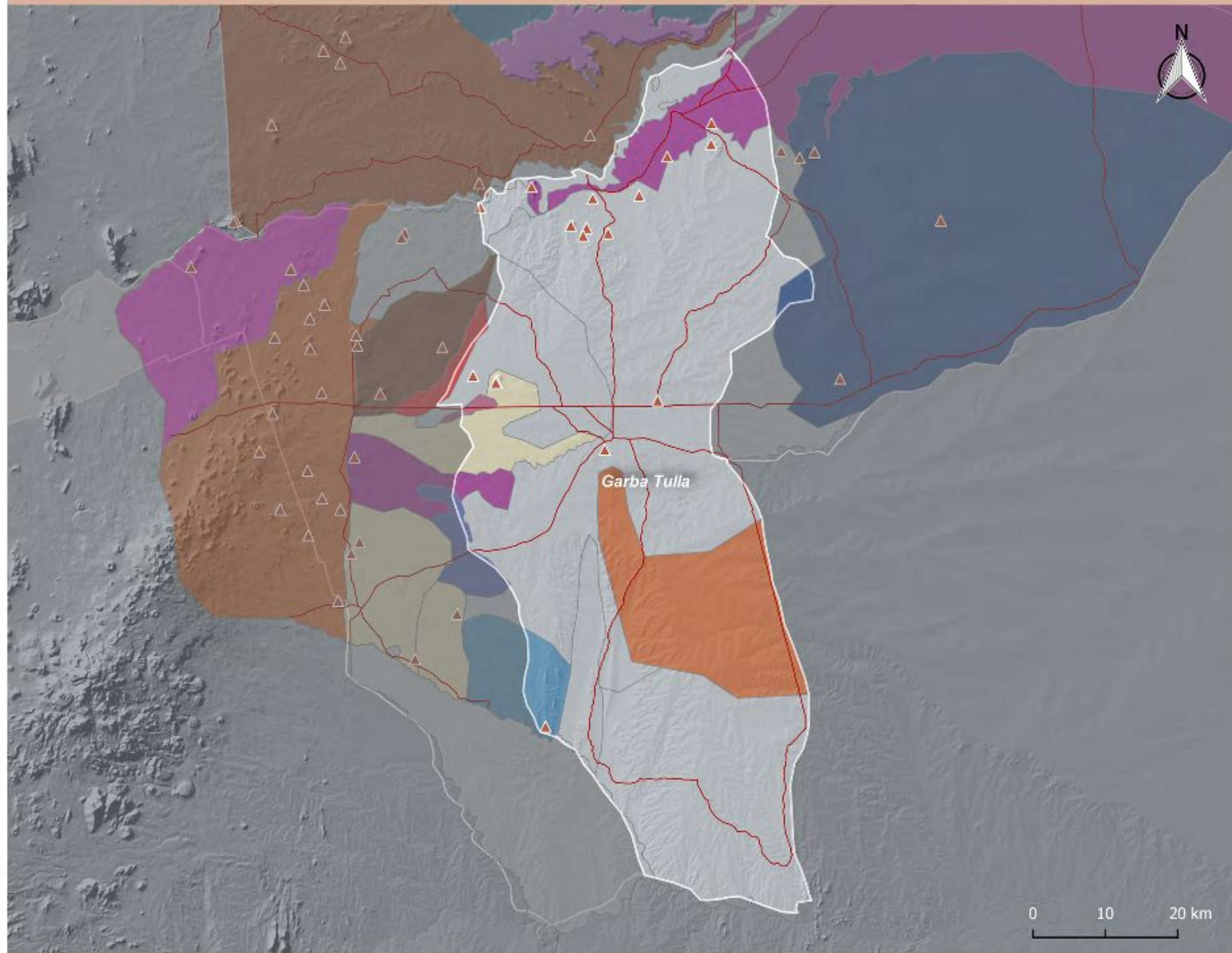
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Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Hills - Community collected data Kenya 2013





Map Legend

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- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative later

- Roads
- Admin boundaries

Data Sources:

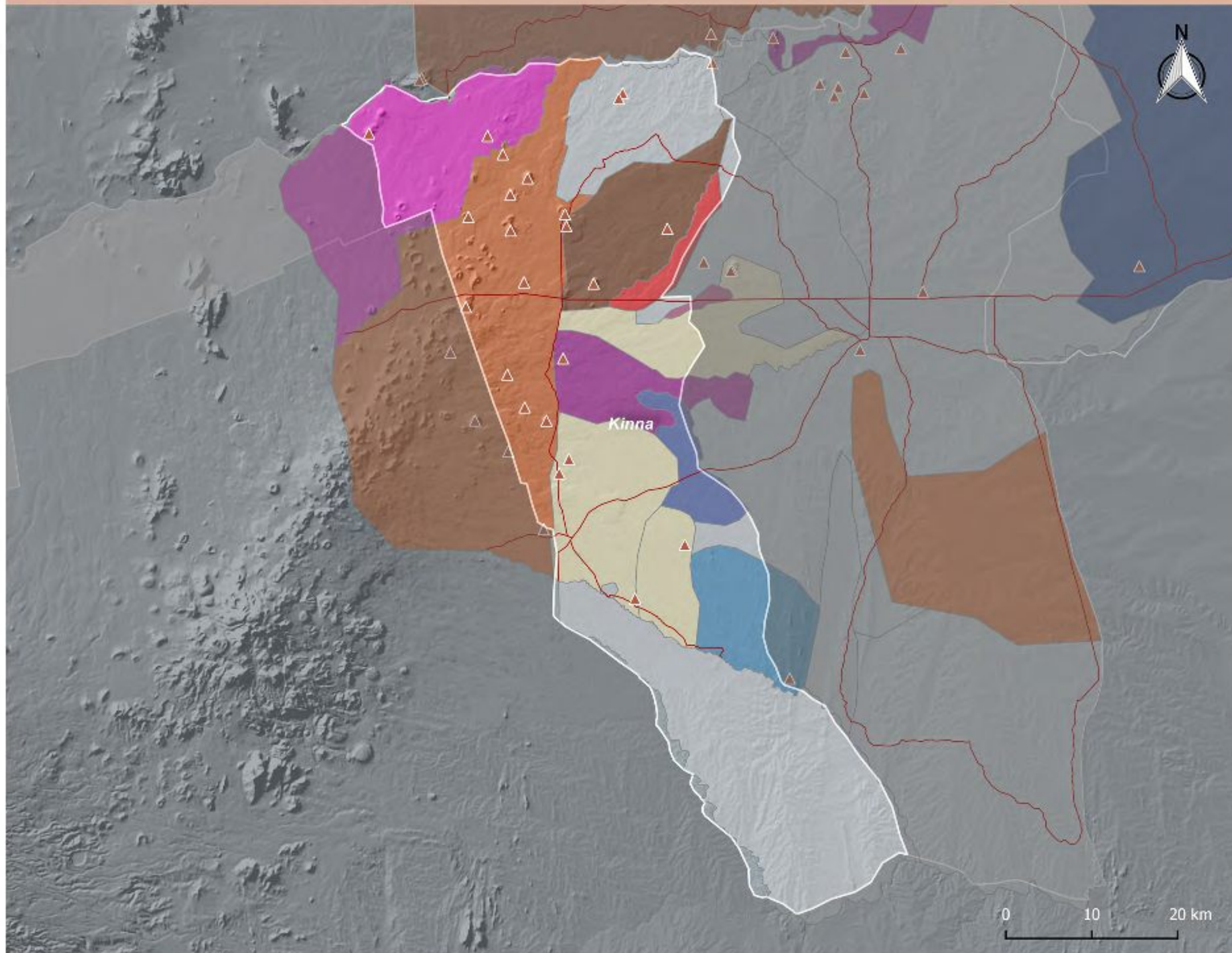
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Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Hills - Community collected data Kenya 2013



0 10 20 km

Physical

Sericho



Map Legend

Soil type

- Boji
- Bulle
- Bulle Shurr Malbe
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- Cherab
- Garr
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- Lpurkel Onyionkie
- Malbe
- Malbe Boji
- Malbe Kotich
- Malbe Omar Kotich
- Oomaar
- Oomar Malbe
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- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative later

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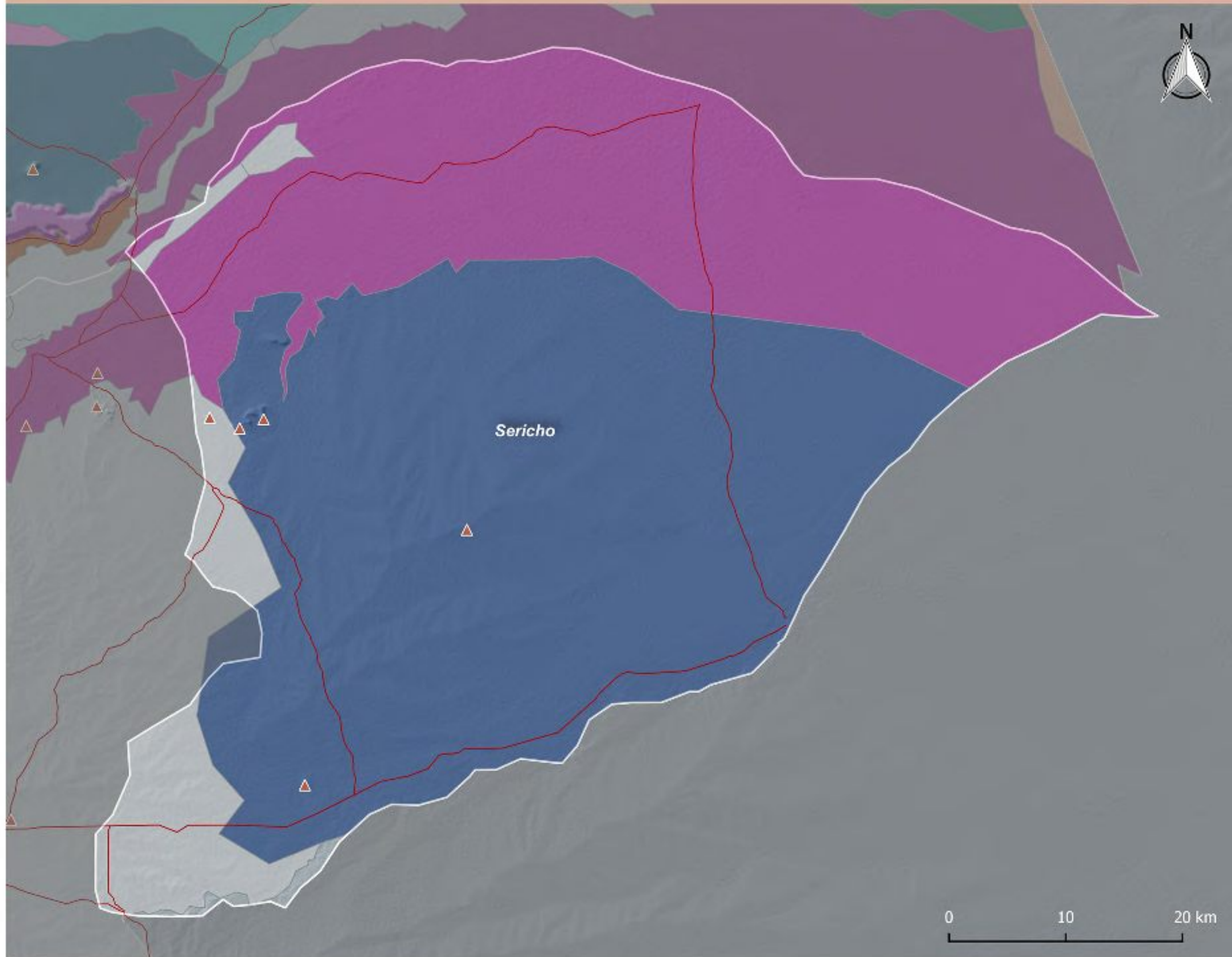
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- Wayam Charri
- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative laters

- Roads
- Admin boundaries

Data Sources:

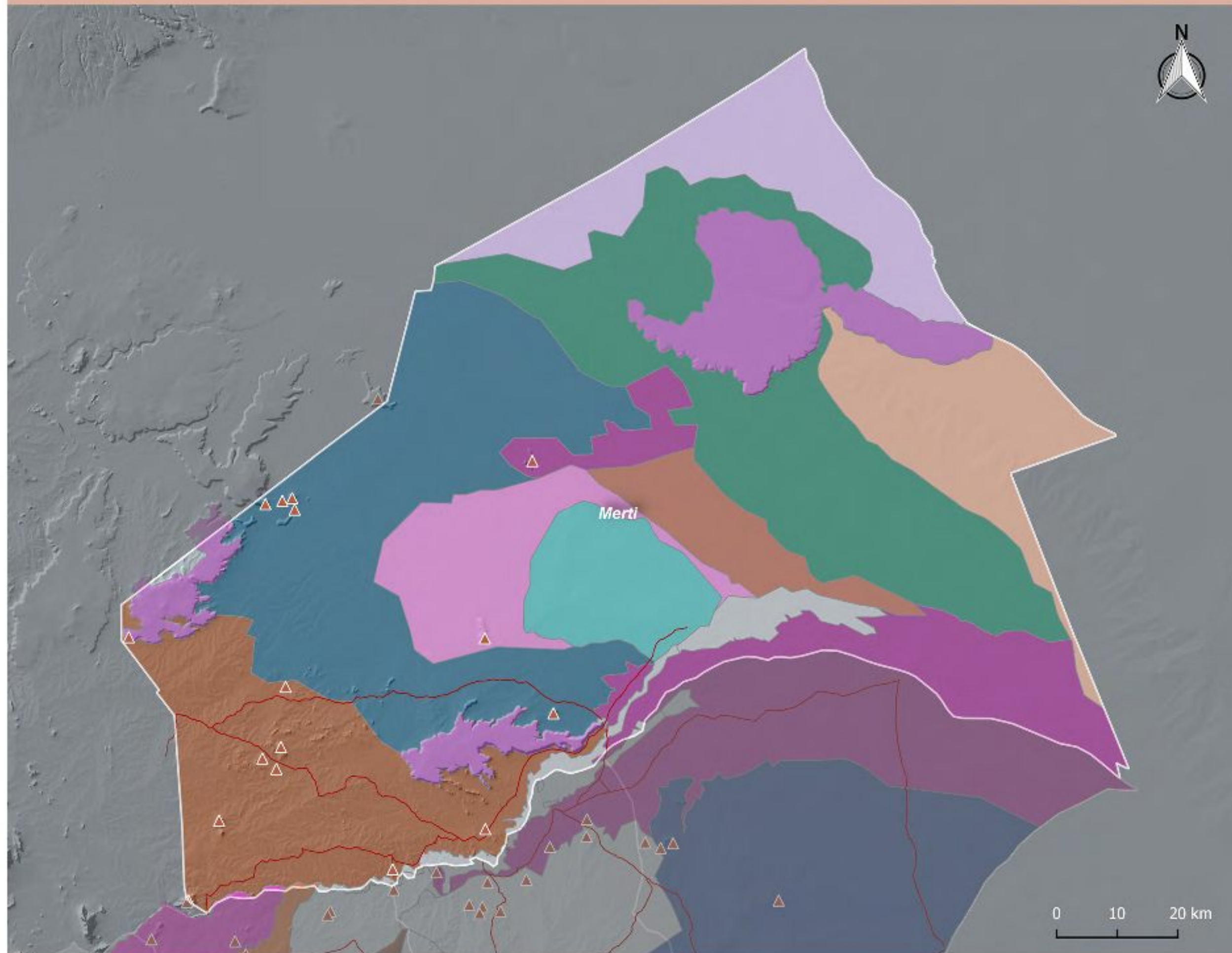
Background Hillshade - SRTM 2003 (www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1)

Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

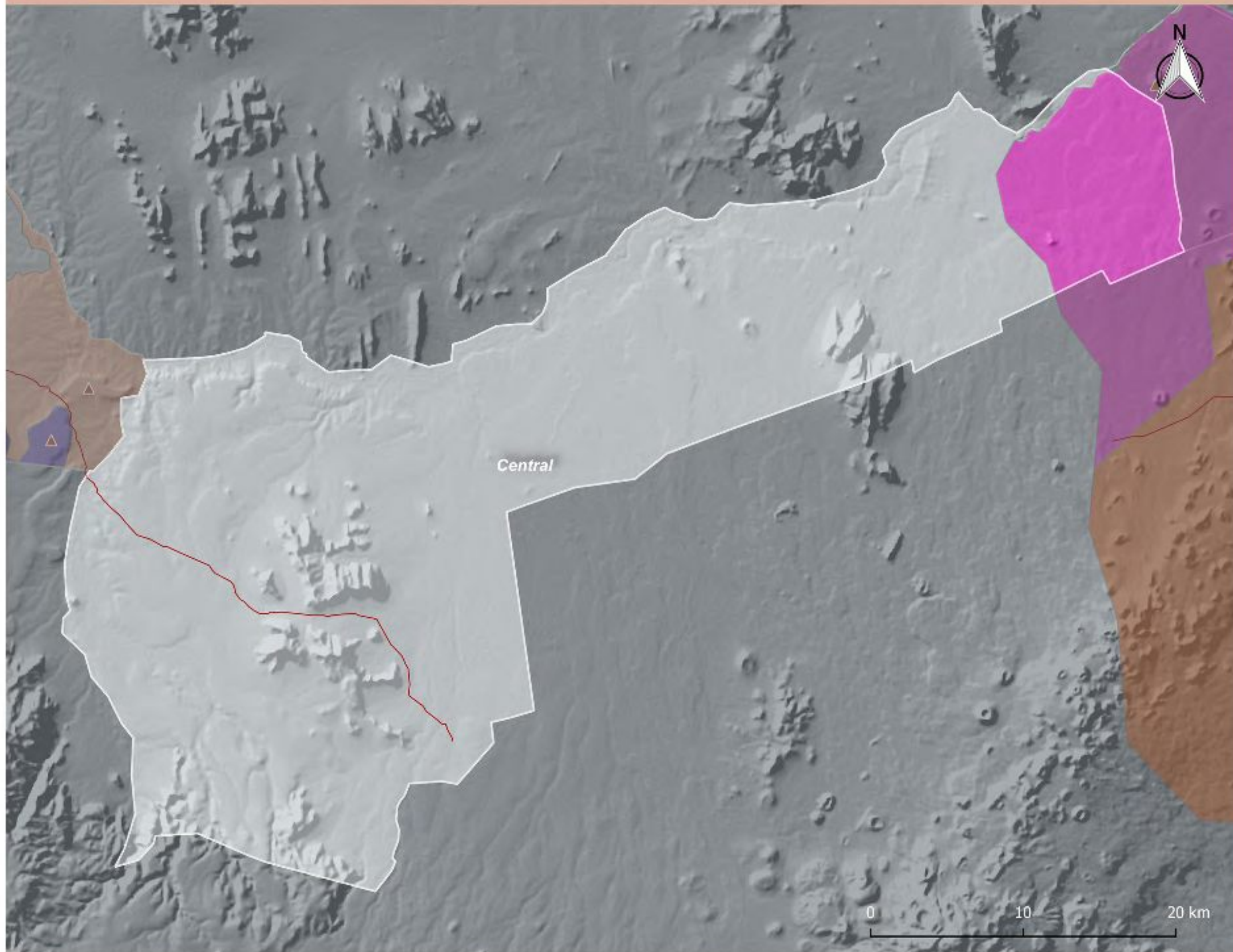
Hills - Community collected data Kenya 2013



0 10 20 km

Physical

Central



Map Legend

Soil type

- Boji
- Bulle
- Bulle Shurr Malbe
- Charri
- Cherab
- Garr
- Ingotot
- Kotich
- Kotich/Malbe
- Lchogi
- Ldonyo
- Lpurkel Onyionkie
- Malbe
- Malbe Boji
- Malbe Kotich
- Malbe Oomar Kotich
- Oomaar
- Oomar Malbe
- Oomar Malbe Boji
- Rampason
- Shurr
- Wayam
- Wayam Charri
- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative laterers

- Roads
- Admin boundaries

Data Sources:

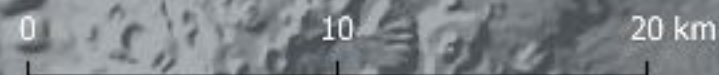
Background Hillshade - SRTM 2003 (www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1)

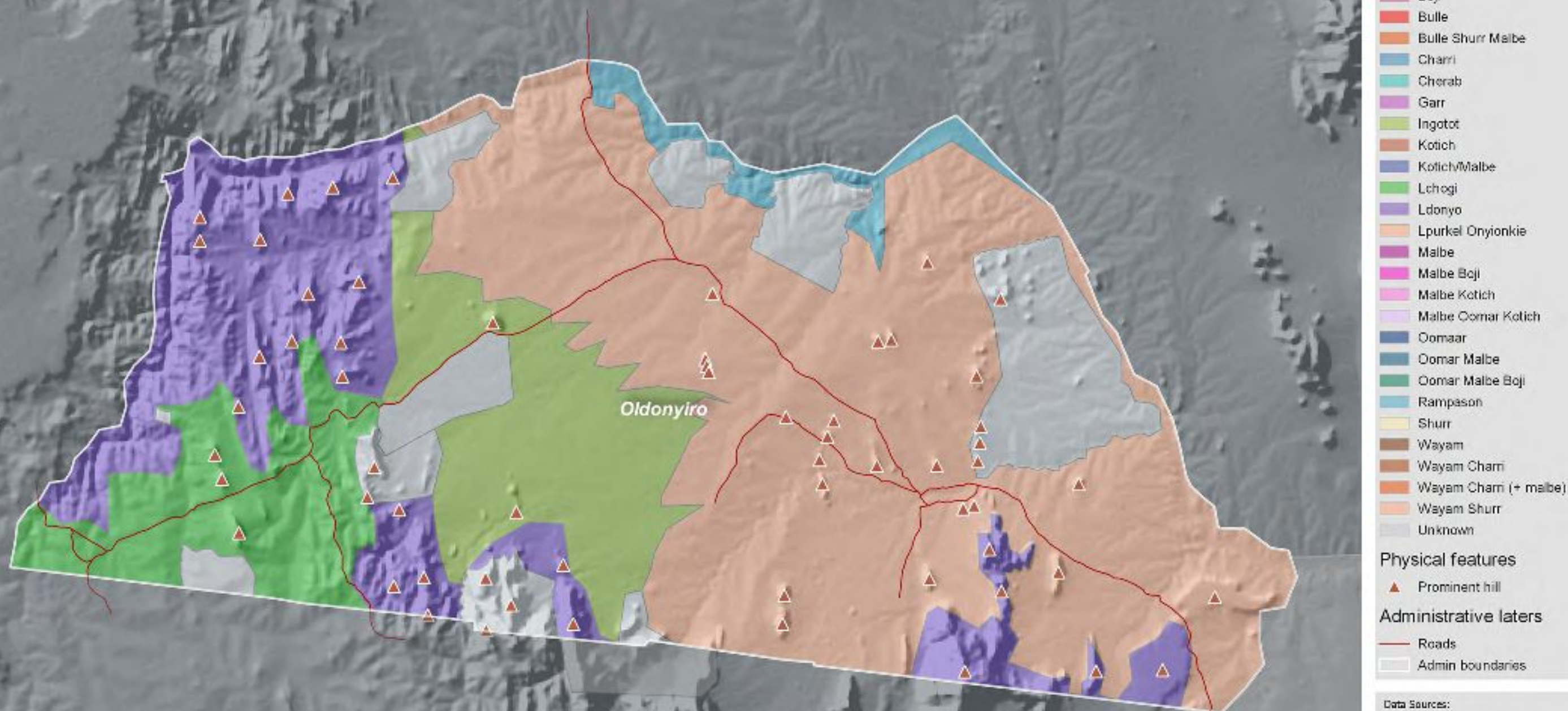
Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Hills - Community collected data Kenya 2013





Map Legend

Soil type

- Boji
- Bulle
- Bulle Shurr Malbe
- Charri
- Cherab
- Garr
- Ingotot
- Kotich
- Kotich/Malbe
- Lchogi
- Ldonyo
- Lpurkel Onyionkie
- Malbe
- Malbe Boji
- Malbe Kotich
- Malbe Oomar Kotich
- Oomaar
- Oomar Malbe
- Oomar Malbe Boji
- Rampason
- Shurr
- Wayam
- Wayam Charri
- Wayam Charri (+ malbe)
- Wayam Shurr
- Unknown

Physical features

- Prominent hill

Administrative later

- Roads
- Admin boundaries

Data Sources:

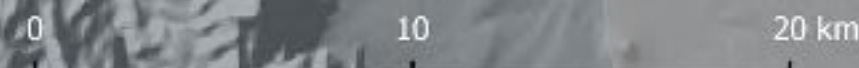
Background Hillshade - SRTM 2003 (www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1)

Soil type - KENSOTER dataset, Kenya Soil Survey and ISRIC

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Hills - Community collected data Kenya 2013



Land Use



Data Sources

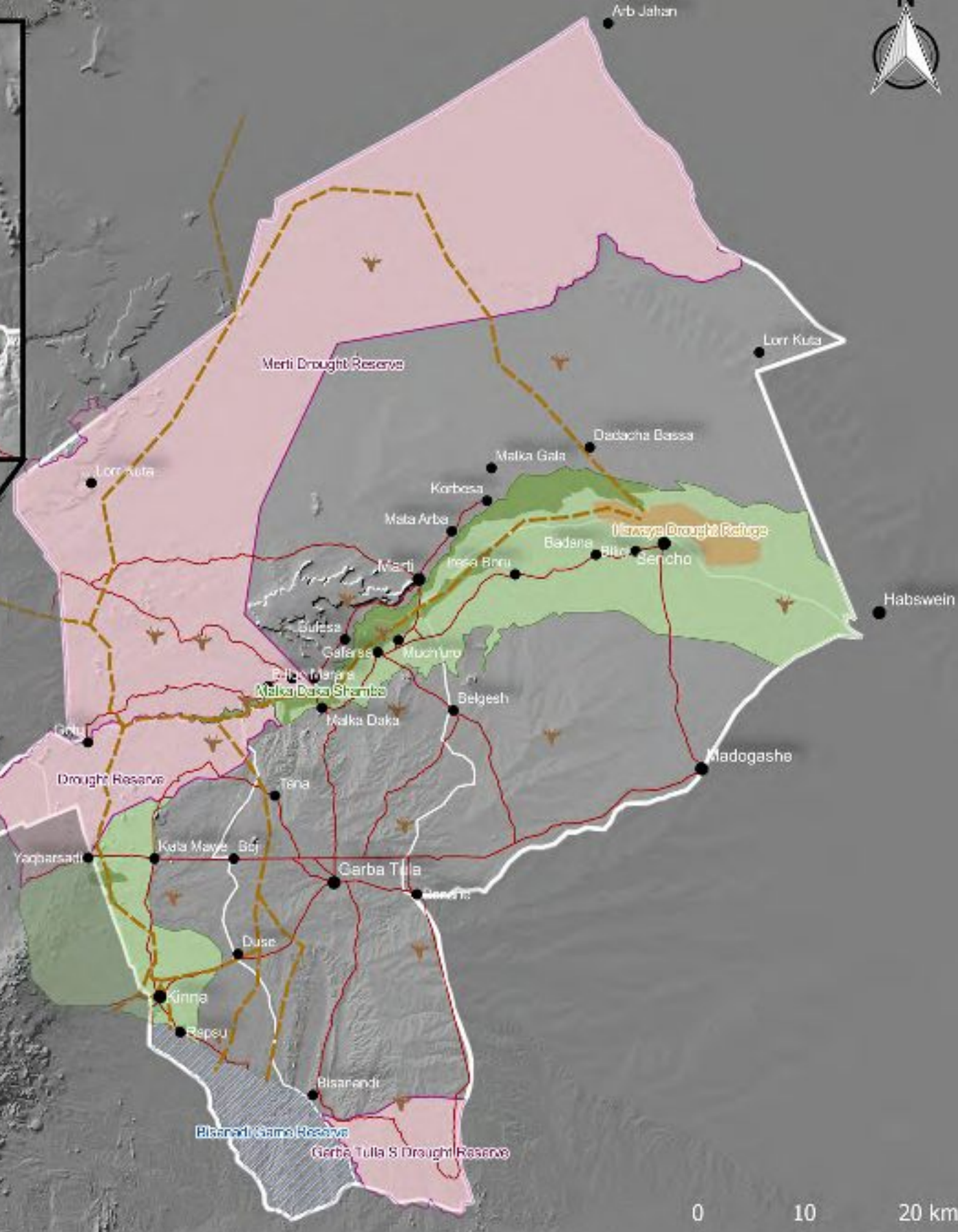
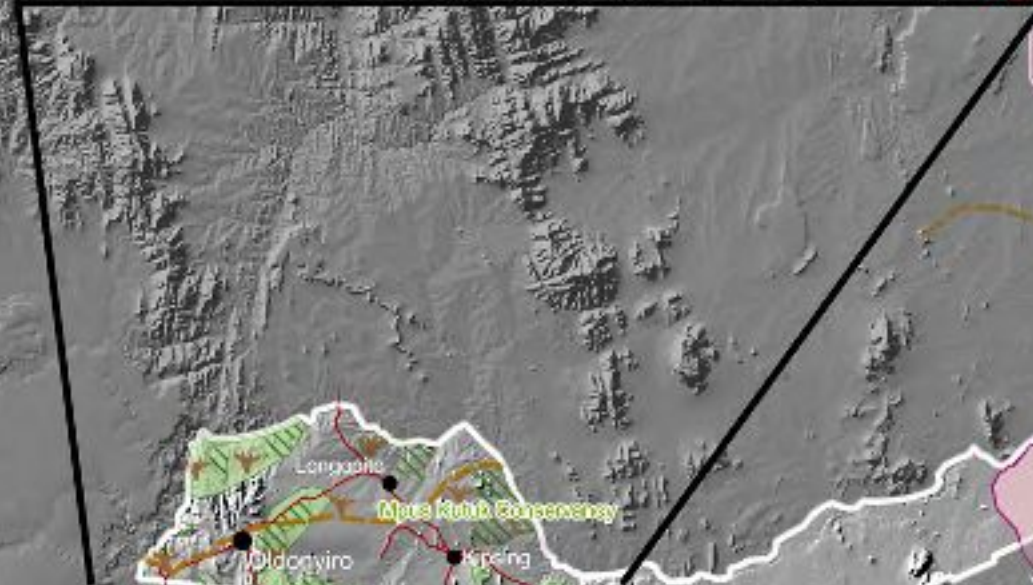
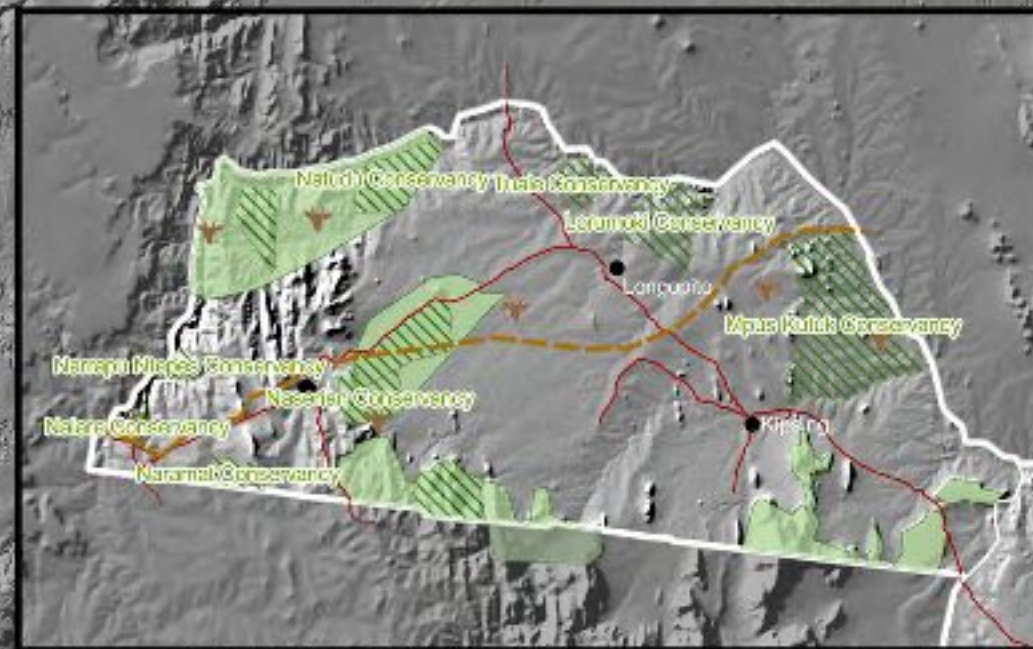
Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Grazing Areas, Settlements, Forest, Wildlife locations - Community collected data Kenya 2013

Nature Conservancies – The World Database on Protected Areas (WDPA). Cambridge, UK: UNEP-WCMC. www.protectedplanet.net [Accessed May 2012]

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

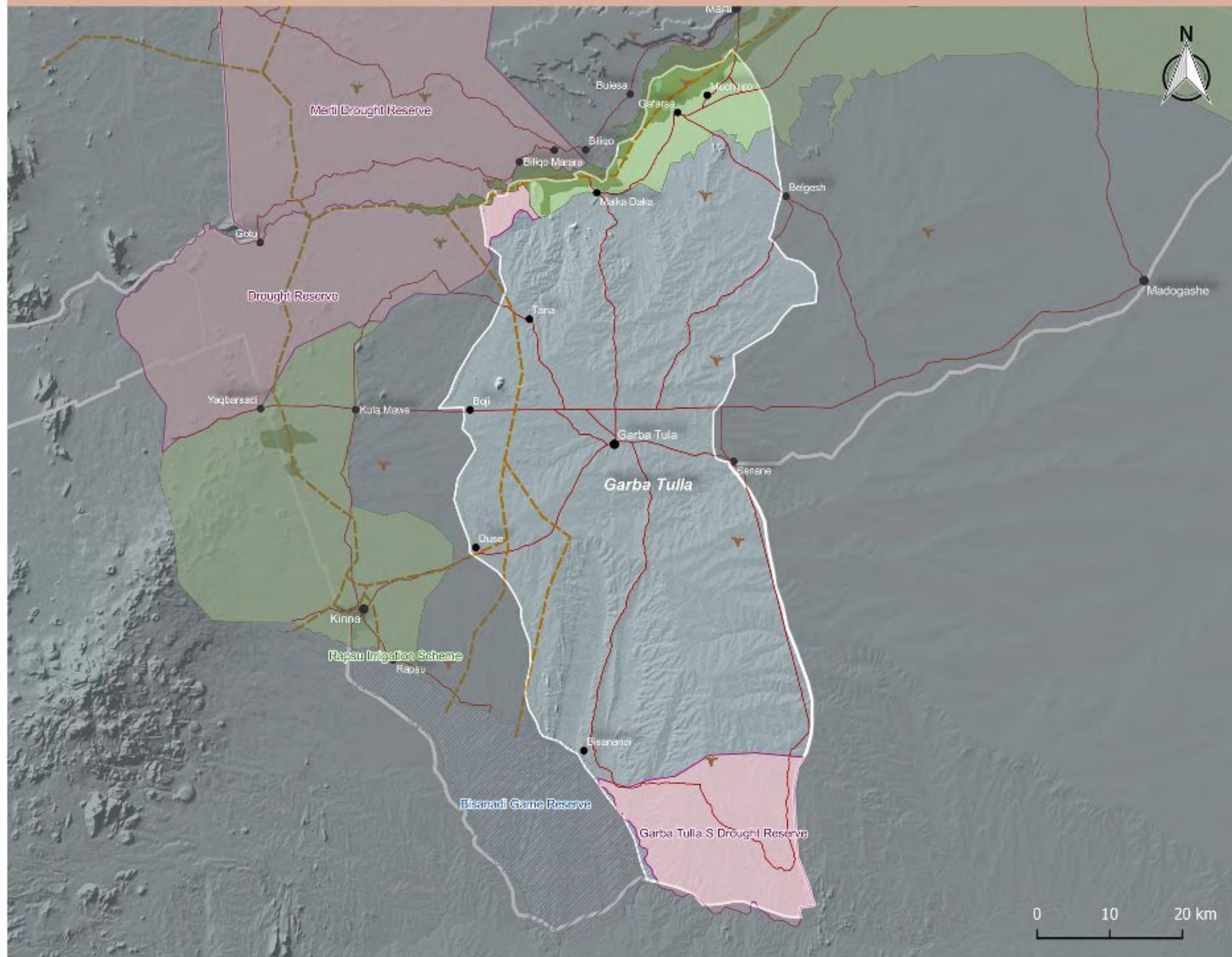
Wildlife designations - NRT

Landuse - Africover/Globecover

Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012. gadm.org





Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

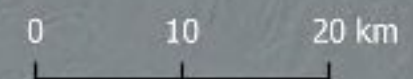
Settlements - Community collected data
 Kenya 2013

Wildlife designations - NRT

Landuse - Africover/Globecover

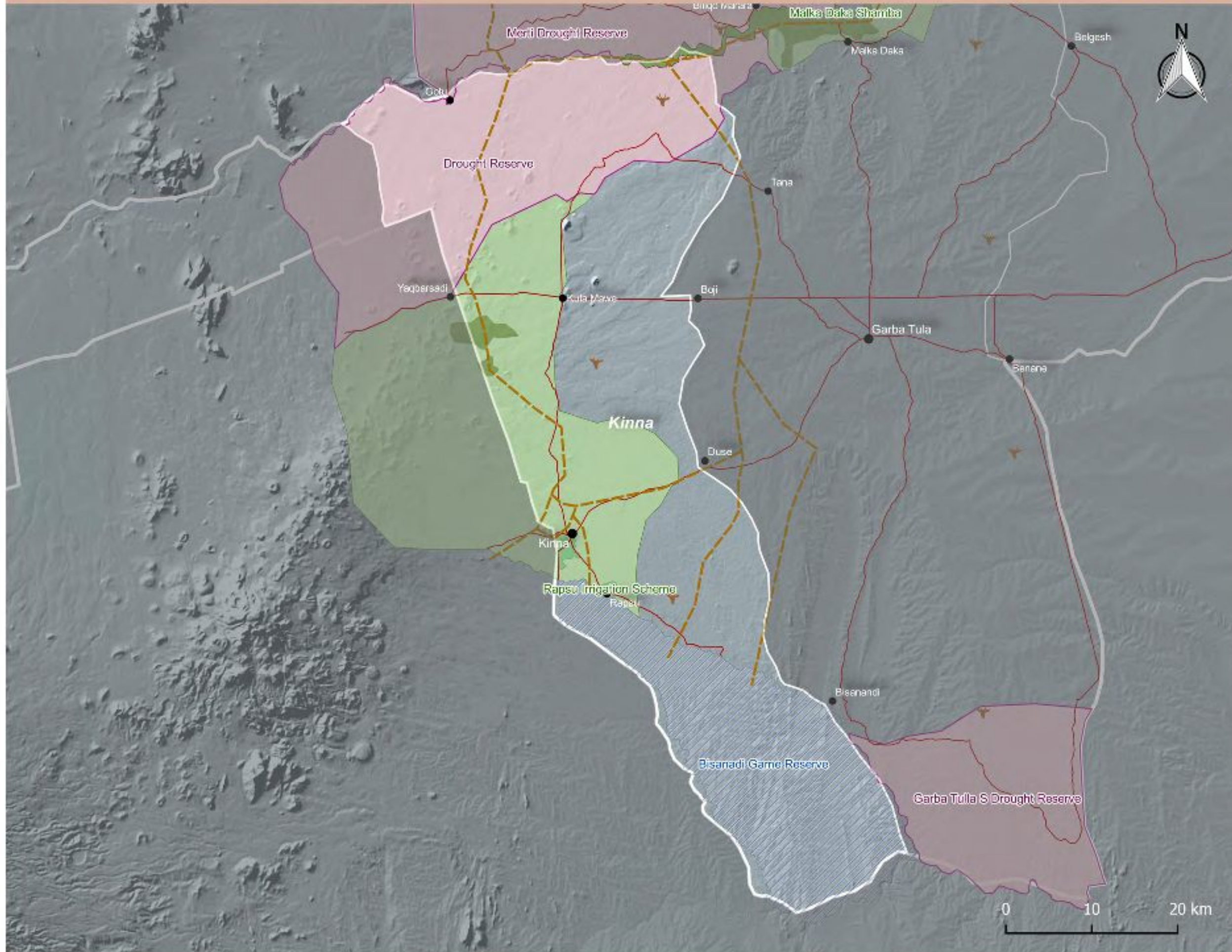
Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012. gadm.org



Land use

Kinna



Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

Wildlife designations - NRT

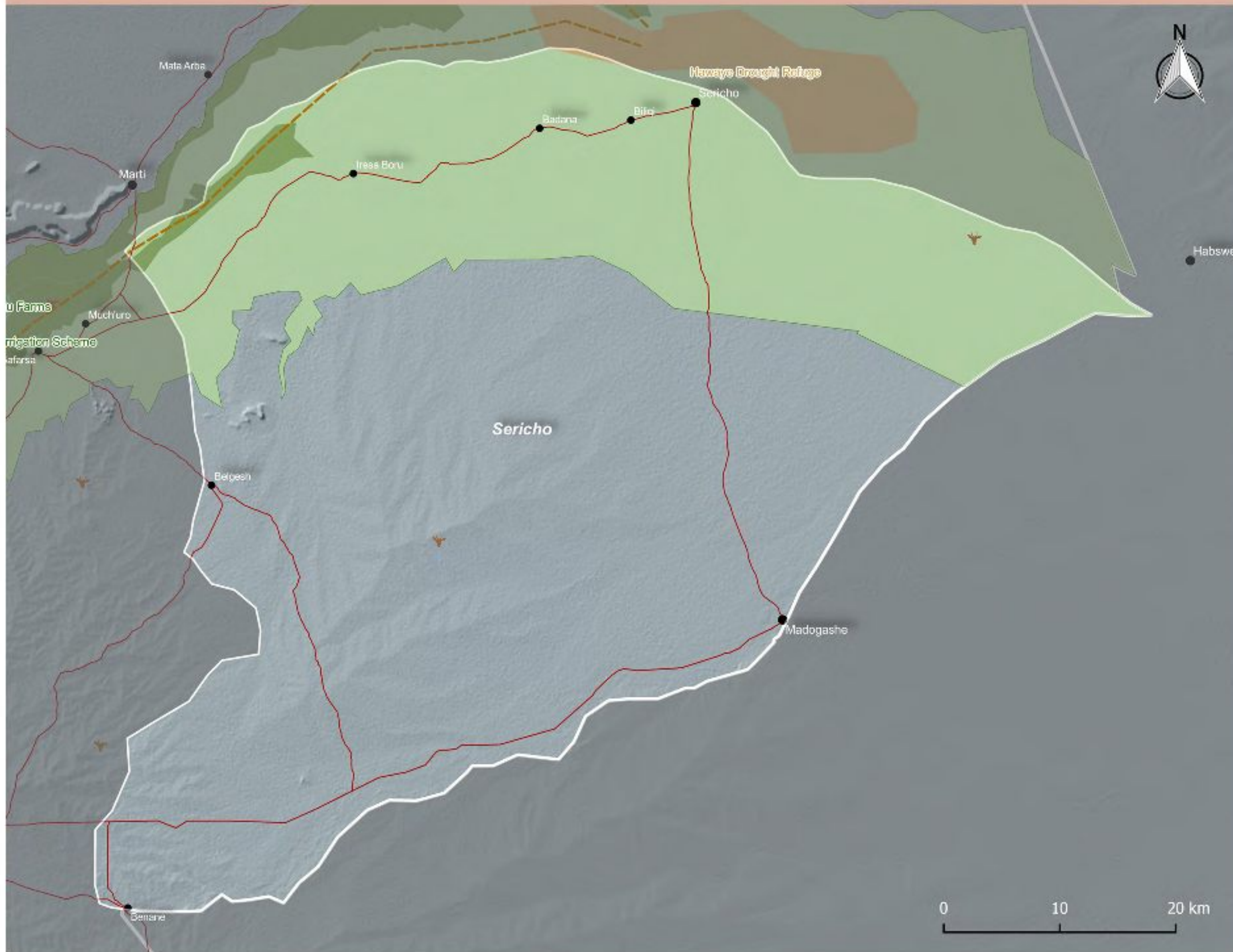
Landuse - Africover/Globecover

Roads - Open Street Map
© OpenStreetMap contributors

Ward boundaries - GADM v2.0
2012 gadm.org

Land use

Sericho



Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

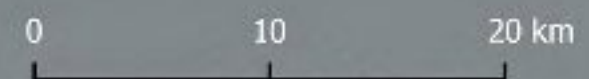
Settlements

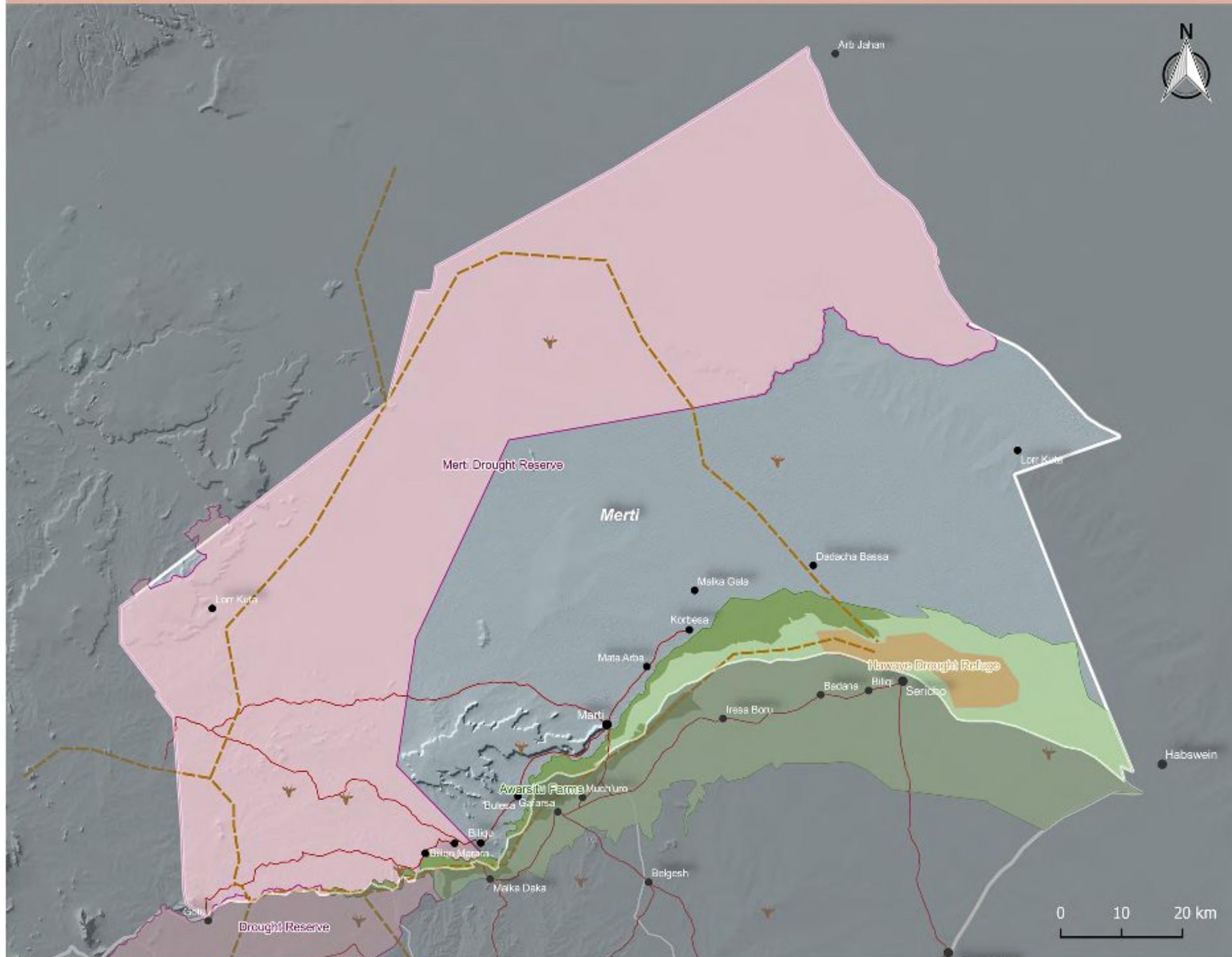
- Village
- Town

Administrative layers

- Roads
- Admin boundaries



Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
Settlements - Community collected data Kenya 2013
Wildlife designations - NRT
Landuse - Africover/Globecover
Roads - Open Street Map © OpenStreetMap contributors
Ward boundaries - GADM v2.0 2012 gadm.org





Map Legend



Wildlife layers

-  Wildlife
-  Wildlife corridor



Land use

-  Agricultural area
-  Conservancy
-  Drought refuge
-  Drought reserve
-  Dry season grazing
-  Game reserve
-  Forest

Settlements

-  Village
-  Town

Administrative layers

-  Roads
-  Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

Wildlife designations - NRT

Landuse - Africover/Globecover

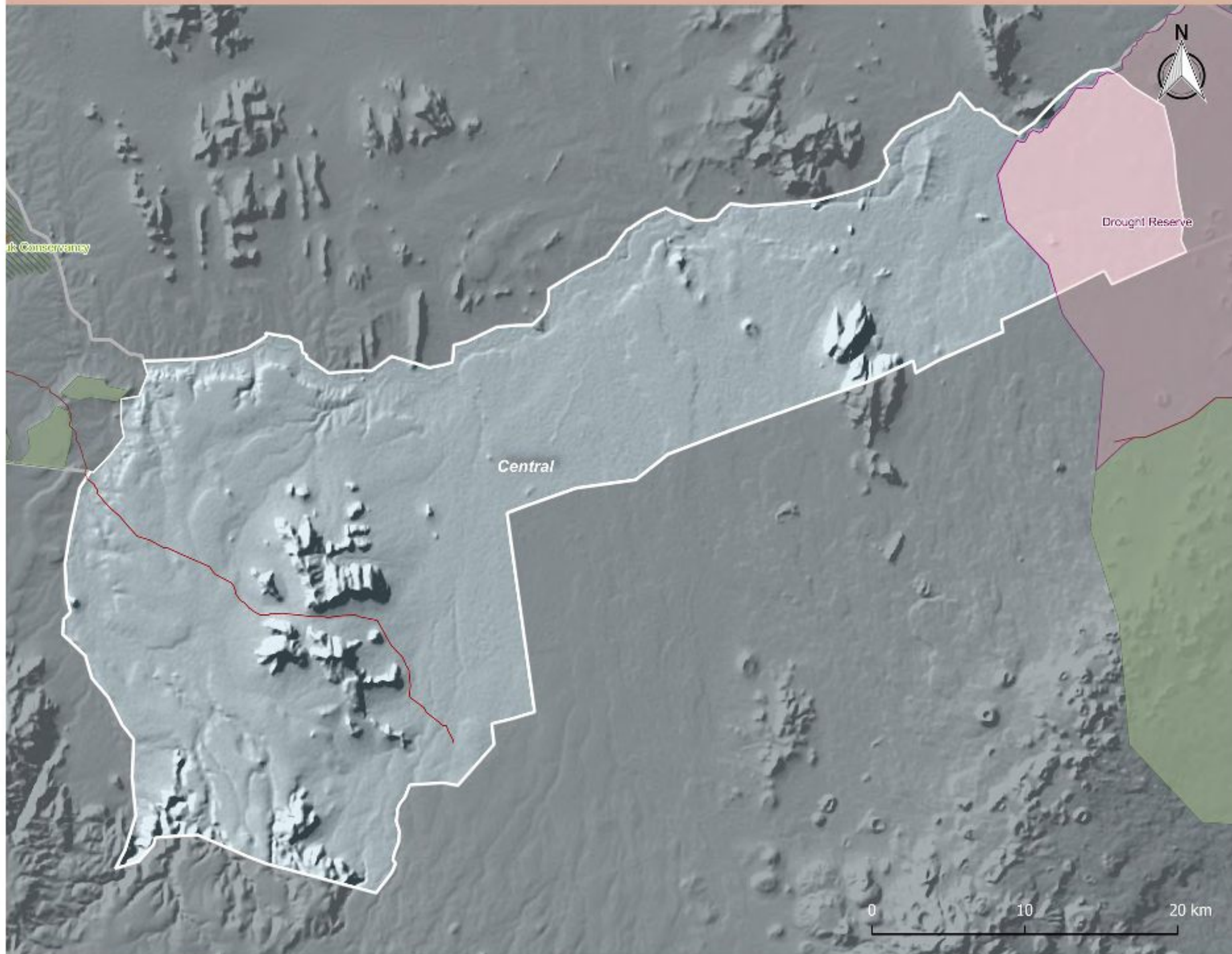
Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012. gadm.org



Land use

Central



Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

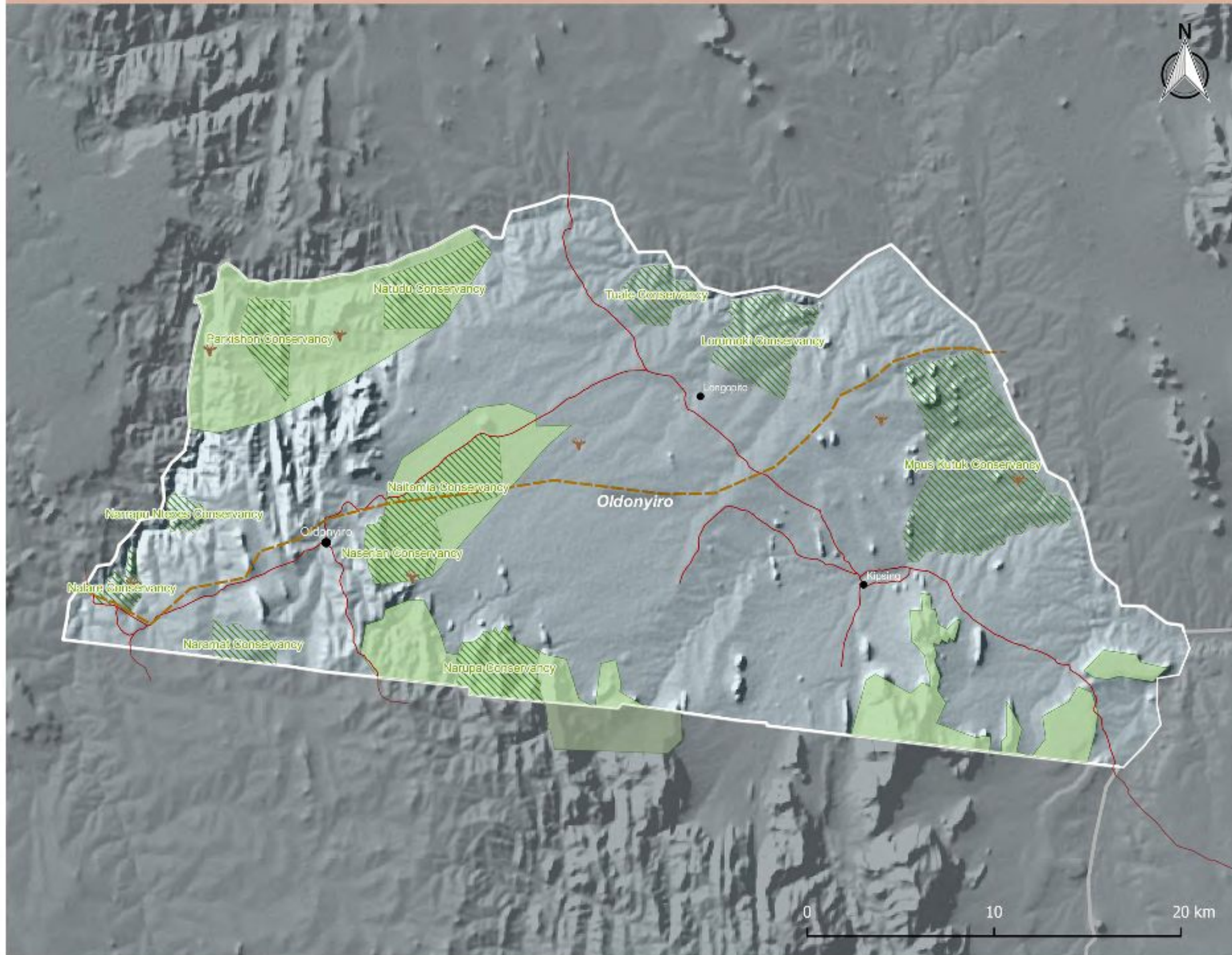
Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
Settlements - Community collected data Kenya 2013
Wildlife designations - NRT
Landuse - Africover/Globcover
Roads - Open Street Map © OpenStreetMap contributors
Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Wildlife layers

- Wildlife
- Wildlife corridor

Land use

- Agricultural area
- Conservancy
- Drought refuge
- Drought reserve
- Dry season grazing
- Game reserve
- Forest

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

Wildlife designations - NRT

Landuse - Mricover/Globecover

Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012.gadm.org



Land Cover



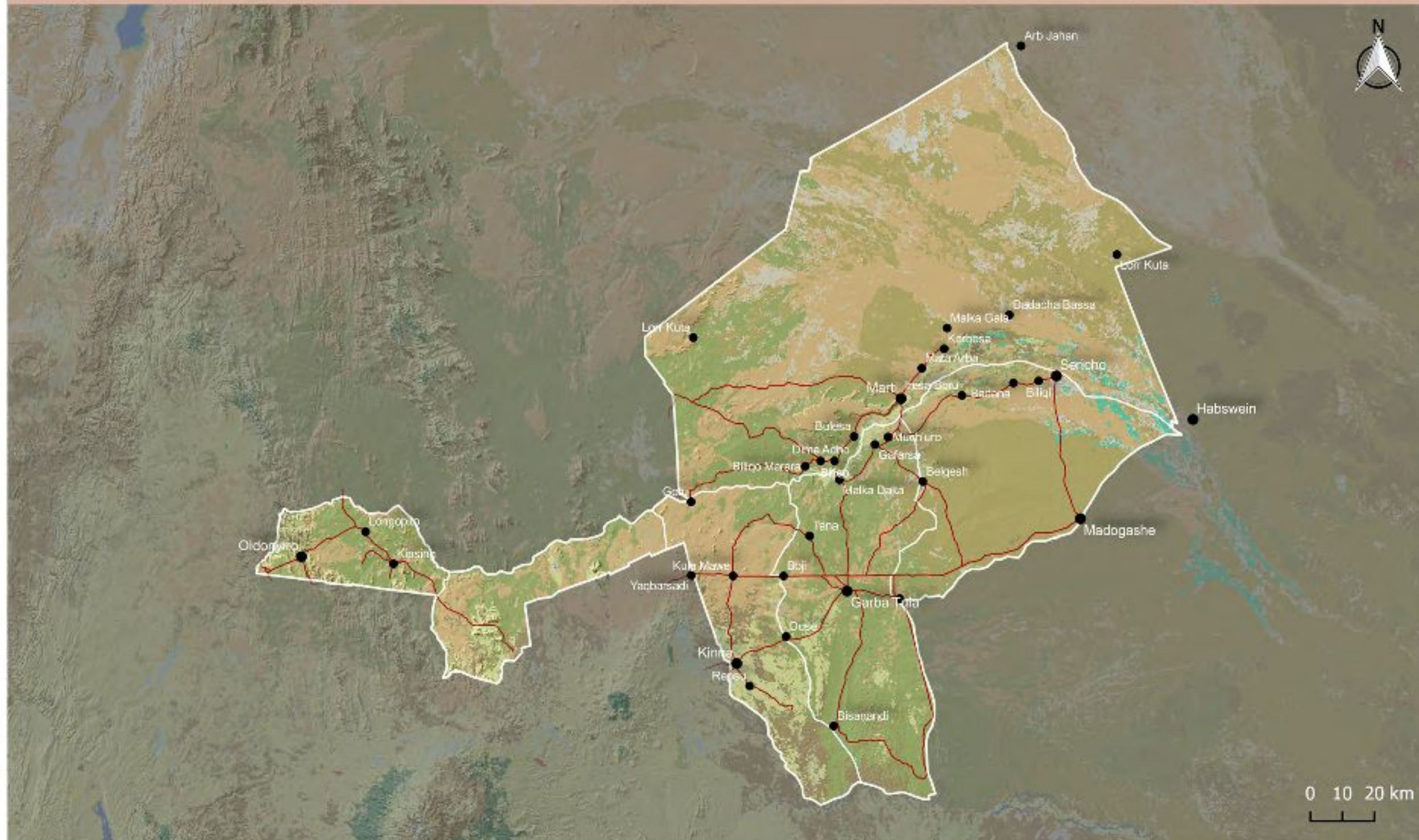
Data Sources

Globcover – Global Land Cover 2009. © ESA 2010 and UCLouvain

Ward boundaries - GADM v2.0 2012 gadm.org

Landcover

Isiolo



Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

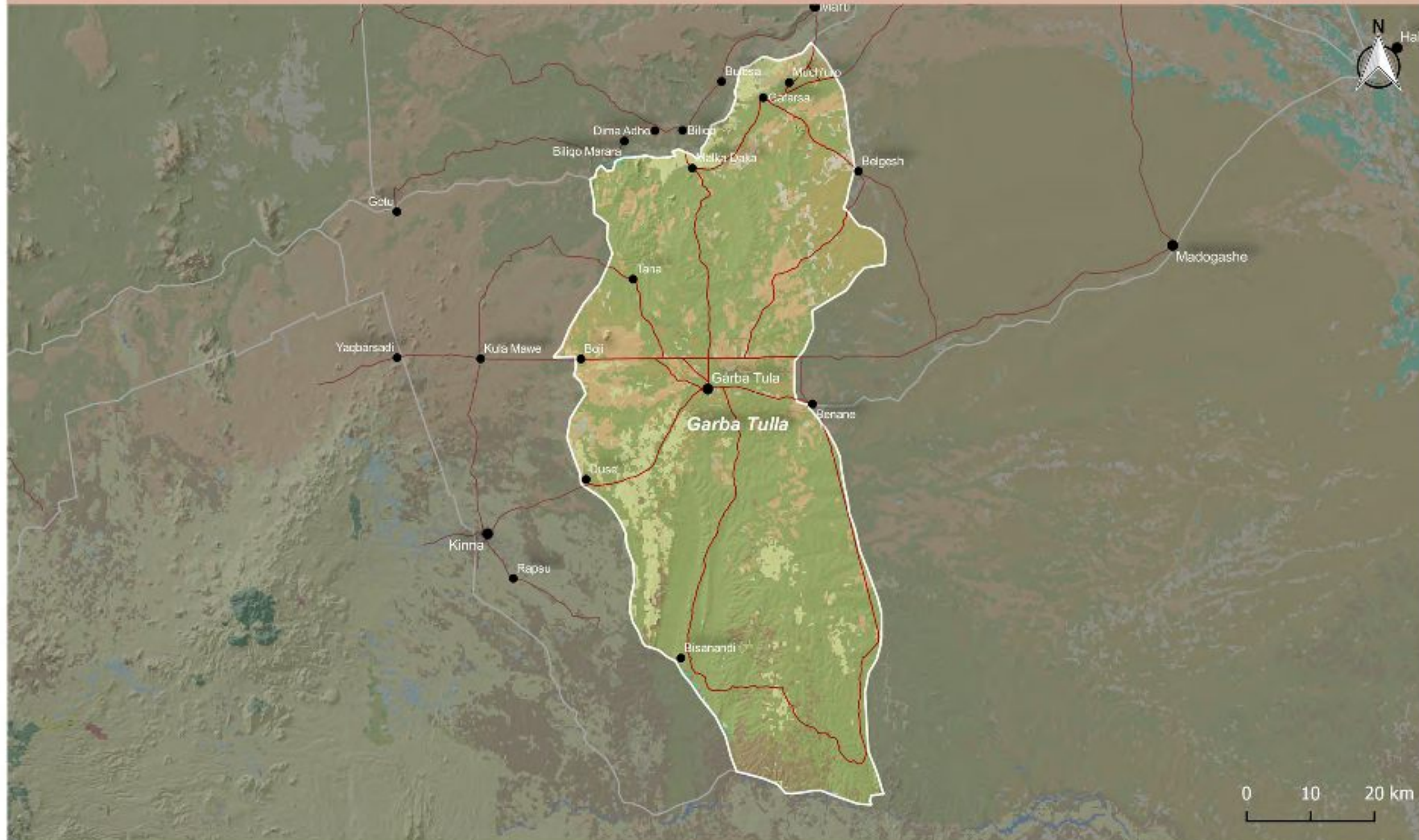
ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements	Cropland, rainfed	Tree cover, broadleaved, deciduous, open (15-40%)	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Tree cover, flooded, fresh or brackish water
Village	Herbaceous cover	Tree cover, needleleaved, evergreen, closed to open (>15%)	Shrubland	Tree cover, flooded, saline water
Town	Tree or shrub cover	Tree cover, needleleaved, evergreen, closed (>40%)	Shrubland evergreen	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
Administrative layers	Cropland, irrigated or post-flooding	Tree cover, needleleaved, evergreen, open (15-40%)	Shrubland deciduous	Urban areas
Roads	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	Tree cover, needleleaved, deciduous, closed to open (>15%)	Grassland	Bare areas
Admin boundaries	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	Tree cover, needleleaved, deciduous, closed (>40%)	Lichens and mosses	Consolidated bare areas
ESA Landcover 2010	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree cover, needleleaved, deciduous, open (15-40%)	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	Unconsolidated bare areas
No data	Tree cover, broadleaved, deciduous, closed to open (>15%)	Tree cover, mixed leaf type (broadleaved and needleleaved)	Sparse shrub (<15%)	Water bodies
	Tree cover, broadleaved, deciduous, closed (>40%)	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)	Sparse herbaceous cover (<15%)	Permanent snow and ice

Landcover

Garba Tulla



Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

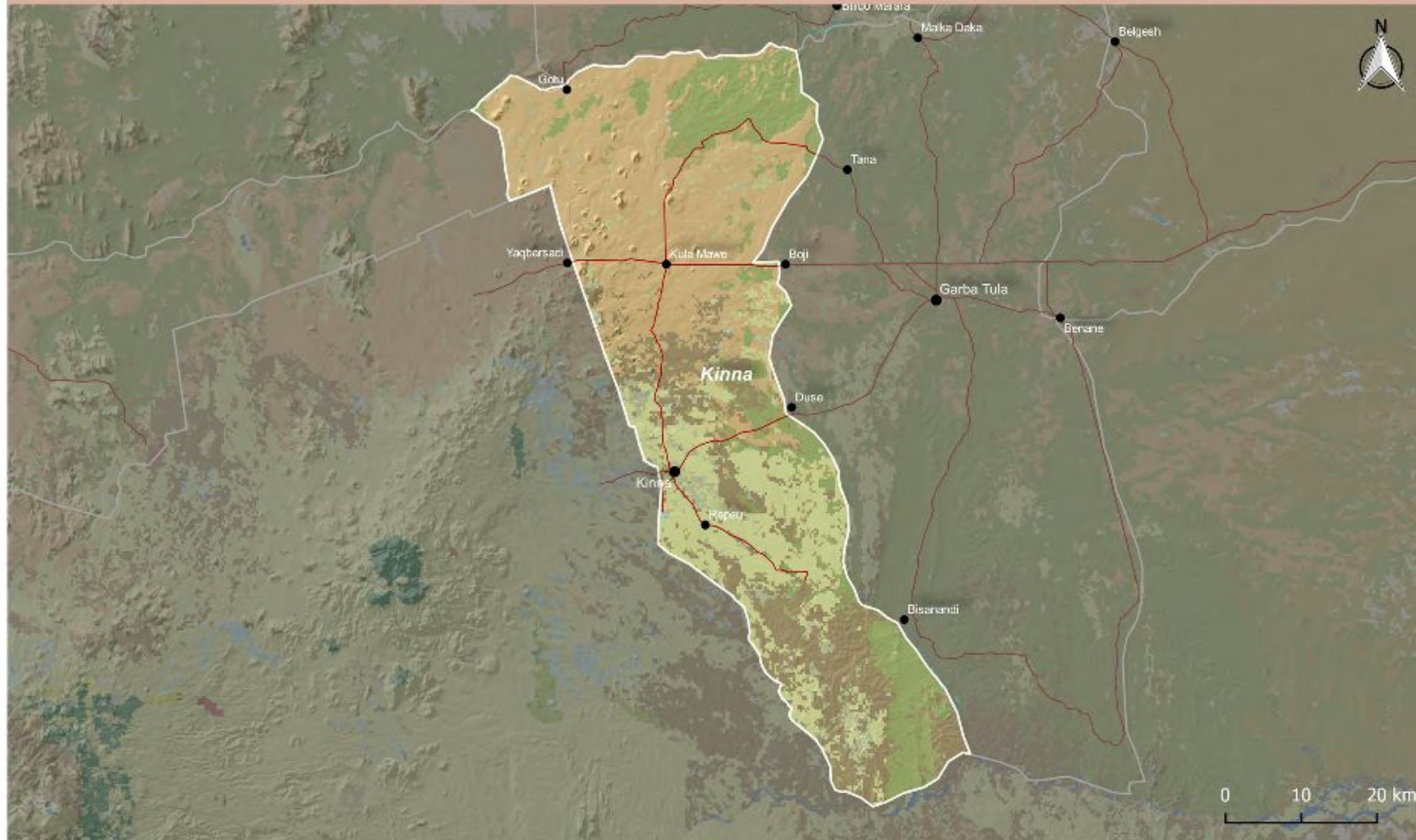
ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements	Cropland, rainfed	Tree cover, broadleaved, deciduous, open (15-40%)	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Tree cover, flooded, fresh or brackish water
Village	Herbaceous cover	Tree cover, needleleaved, evergreen, closed to open (>15%)	Shrubland	Tree cover, flooded, saline water
Town	Tree or shrub cover	Tree cover, needleleaved, evergreen, closed (>40%)	Shrubland evergreen	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
Administrative layers	Cropland, irrigated or post-flooding	Tree cover, needleleaved, evergreen, open (15-40%)	Shrubland deciduous	Urban areas
Roads	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	Tree cover, needleleaved, deciduous, closed to open (>15%)	Grassland	Bare areas
Admin boundaries	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	Tree cover, needleleaved, deciduous, closed (>40%)	Lichens and mosses	Consolidated bare areas
ESA Landcover 2010	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree cover, needleleaved, deciduous, open (15-40%)	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	Unconsolidated bare areas
No data	Tree cover, broadleaved, deciduous, closed to open (>15%)	Tree cover, mixed leaf type (broadleaved and needleleaved)	Sparse shrub (<15%)	Water bodies
	Tree cover, broadleaved, deciduous, closed (>40%)	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)	Sparse herbaceous cover (<15%)	Permanent snow and ice

Landcover

Kinna



Data Sources:

Background Hillshade - SRTM 2003
<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>

Settlements - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

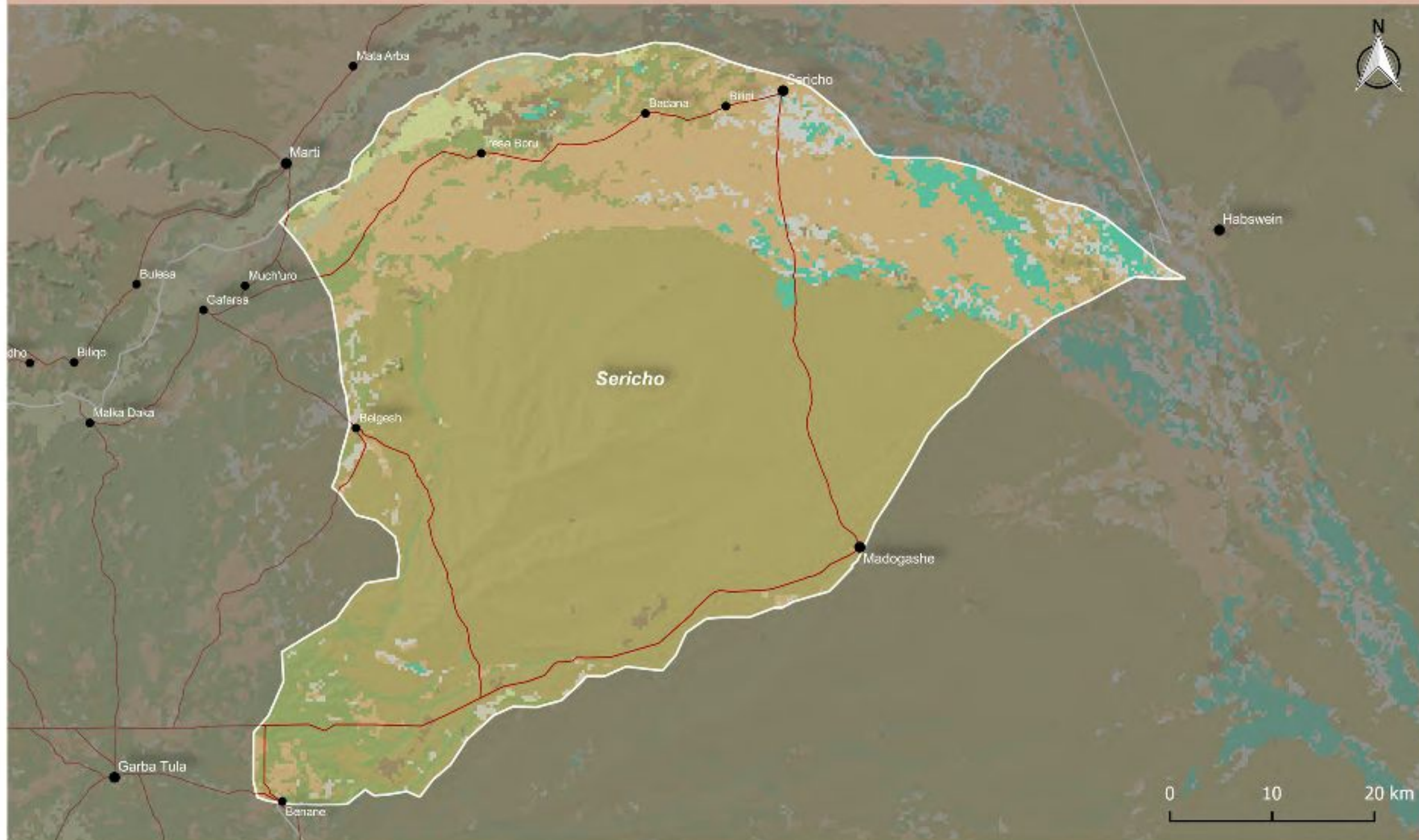
ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements	Cropland, rainfed	Tree cover, broadleaved, deciduous, open (15-40%)	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Tree cover, flooded, fresh or brackish water
Village	Herbaceous cover	Tree cover, needleleaved, evergreen, closed to open (>15%)	Shrubland	Tree cover, flooded, saline water
Town	Tree or shrub cover	Tree cover, needleleaved, evergreen, closed (>40%)	Shrubland evergreen	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
Administrative layers	Cropland, irrigated or post-flooding	Tree cover, needleleaved, evergreen, open (15-40%)	Shrubland deciduous	Urban areas
Roads	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	Tree cover, needleleaved, deciduous, closed to open (>15%)	Grassland	Bare areas
Admin boundaries	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	Tree cover, needleleaved, deciduous, closed (>40%)	Lichens and mosses	Consolidated bare areas
ESA Landcover 2010	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree cover, needleleaved, deciduous, open (15-40%)	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	Unconsolidated bare areas
No data	Tree cover, broadleaved, deciduous, closed to open (>15%)	Tree cover, mixed leaf type (broadleaved and needleleaved)	Sparse shrub (<15%)	Water bodies
	Tree cover, broadleaved, deciduous, closed (>40%)	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)	Sparse herbaceous cover (<15%)	Permanent snow and ice

Landcover

Sericho



Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

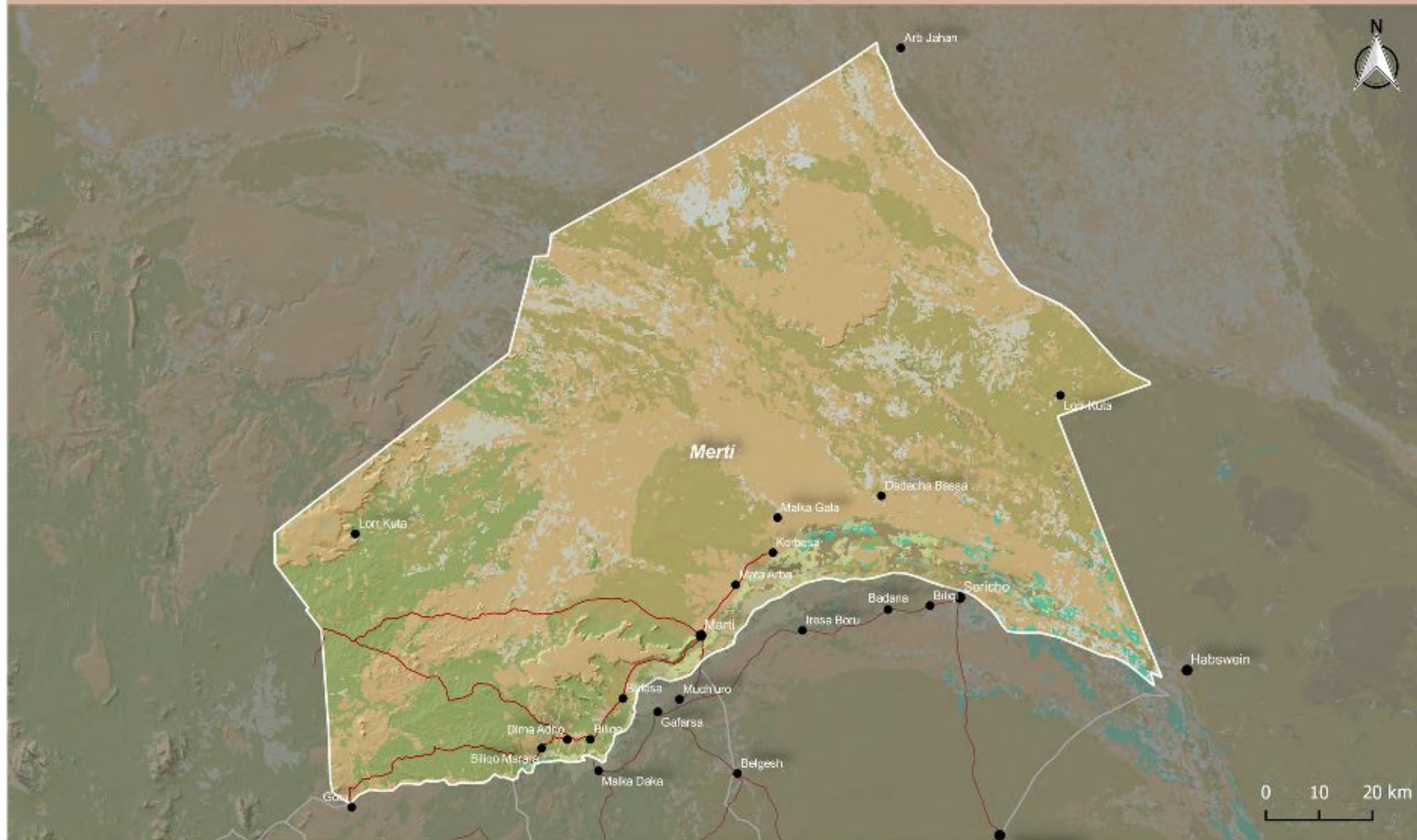
ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

<p>Settlements</p> <ul style="list-style-type: none"> ● Village ● Town <p>Administrative layers</p> <ul style="list-style-type: none"> — Roads □ Admin boundaries <p>ESA Landcover 2010</p> <ul style="list-style-type: none"> ■ No data 	<ul style="list-style-type: none"> ■ Cropland, rainfed ■ Herbaceous cover ■ Tree or shrub cover ■ Cropland, irrigated or post-flooding ■ Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%) ■ Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%) ■ Tree cover, broadleaved, evergreen, closed to open (>15%) ■ Tree cover, broadleaved, deciduous, closed to open (>15%) ■ Tree cover, broadleaved, deciduous, closed (>40%) 	<ul style="list-style-type: none"> ■ Tree cover, broadleaved, deciduous, open (15-40%) ■ Tree cover, needleleaved, evergreen, closed to open (>15%) ■ Tree cover, needleleaved, evergreen, closed (>40%) ■ Tree cover, needleleaved, evergreen, open (15-40%) ■ Tree cover, needleleaved, deciduous, closed to open (>15%) ■ Tree cover, needleleaved, deciduous, closed (>40%) ■ Tree cover, needleleaved, deciduous, open (15-40%) ■ Tree cover, mixed leaf type (broadleaved and needleleaved) ■ Mosaic tree and shrub (>50%) / herbaceous cover (<50%) 	<ul style="list-style-type: none"> ■ Mosaic herbaceous cover (>50%) / tree and shrub (<50%) ■ Shrubland ■ Shrubland evergreen ■ Shrubland deciduous ■ Grassland ■ Lichens and mosses ■ Sparse vegetation (tree, shrub, herbaceous cover) (<15%) ■ Sparse shrub (<15%) ■ Sparse herbaceous cover (<15%) 	<ul style="list-style-type: none"> ■ Tree cover, flooded, fresh or brackish water ■ Tree cover, flooded, saline water ■ Shrub or herbaceous cover, flooded, fresh/saline/brackish water ■ Urban areas ■ Bare areas ■ Consolidated bare areas ■ Unconsolidated bare areas ■ Water bodies ■ Permanent snow and ice
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Landcover

Merti



Data Sources:

Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

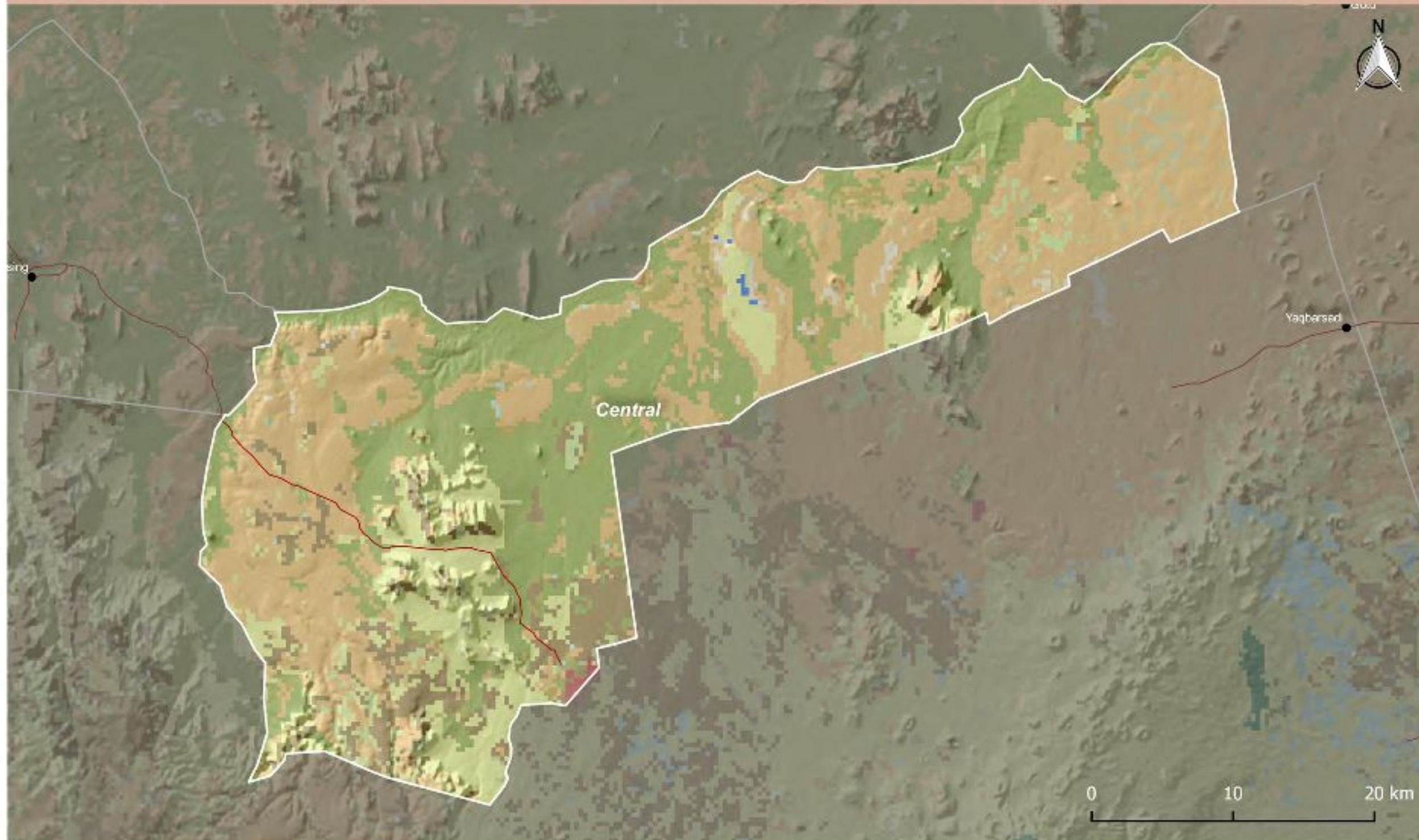
ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements		ESA Landcover 2010	
● Village	● Town	■ No data	
Administrative layers			
— Roads	□ Admin boundaries		
■ Cropland, rainfed	■ Herbaceous cover	■ Tree cover, broadleaved, evergreen, closed to open (>15%)	■ Tree cover, broadleaved, deciduous, closed (>40%)
■ Tree or shrub cover	■ Cropland, irrigated or post-flooding	■ Tree cover, broadleaved, deciduous, open (15-40%)	■ Tree cover, broadleaved, deciduous, closed to open (>15%)
■ Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	■ Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	■ Tree cover, needleleaved, evergreen, closed (>40%)	■ Tree cover, needleleaved, evergreen, open (15-40%)
■ Tree cover, broadleaved, evergreen, closed to open (>15%)	■ Tree cover, needleleaved, deciduous, closed (>40%)	■ Tree cover, needleleaved, deciduous, open (15-40%)	■ Tree cover, mixed leaf type (broadleaved and needleleaved)
■ Tree cover, needleleaved, evergreen, closed to open (>15%)	■ Tree cover, needleleaved, deciduous, closed (>40%)	■ Tree cover, needleleaved, deciduous, open (15-40%)	■ Mosaic tree and shrub (>50%) / herbaceous cover (<50%)
■ Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	■ Shrubland	■ Shrubland evergreen	■ Shrubland deciduous
■ Shrubland	■ Shrubland evergreen	■ Shrubland deciduous	■ Grassland
■ Shrubland evergreen	■ Shrubland deciduous	■ Grassland	■ Lichens and mosses
■ Shrubland deciduous	■ Grassland	■ Lichens and mosses	■ Sparse vegetation (tree, shrub, herbaceous cover) (<15%)
■ Grassland	■ Lichens and mosses	■ Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	■ Sparse shrub (<15%)
■ Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	■ Sparse shrub (<15%)	■ Sparse shrub (<15%)	■ Sparse herbaceous cover (<15%)
■ Sparse herbaceous cover (<15%)	■ Sparse herbaceous cover (<15%)	■ Sparse herbaceous cover (<15%)	■ Sparse herbaceous cover (<15%)
■ Tree cover, flooded, fresh or brackish water	■ Tree cover, flooded, saline water	■ Shrub or herbaceous cover, flooded, fresh/saline/brackish water	■ Urban areas
■ Tree cover, flooded, saline water	■ Shrub or herbaceous cover, flooded, fresh/saline/brackish water	■ Urban areas	■ Bare areas
■ Shrub or herbaceous cover, flooded, fresh/saline/brackish water	■ Urban areas	■ Bare areas	■ Consolidated bare areas
■ Urban areas	■ Bare areas	■ Consolidated bare areas	■ Unconsolidated bare areas
■ Bare areas	■ Consolidated bare areas	■ Unconsolidated bare areas	■ Water bodies
■ Consolidated bare areas	■ Unconsolidated bare areas	■ Water bodies	■ Permanent snow and ice
■ Unconsolidated bare areas	■ Water bodies	■ Permanent snow and ice	
■ Water bodies	■ Permanent snow and ice		
■ Permanent snow and ice			

Landcover

Central



Data Sources:

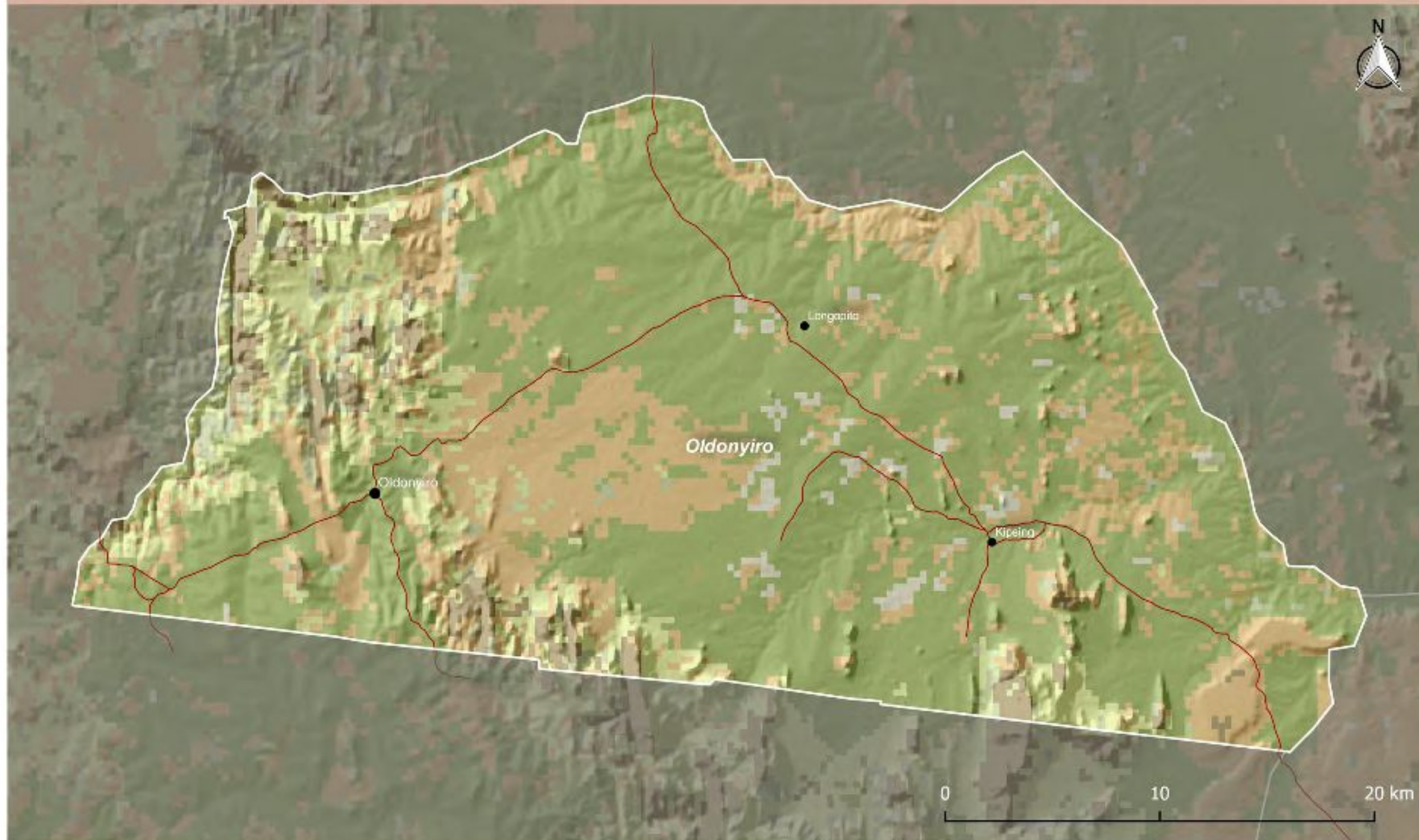
- Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
- Settlements - Community collected data Kenya 2013
- Roads - Open Street Map © OpenStreetMap contributors
- Ward boundaries - GADM v2.0 2012 gadm.org
- ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements	Cropland, rainfed	Tree cover, broadleaved, deciduous, open (15-40%)	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Tree cover, flooded, fresh or brackish water
Village	Herbaceous cover	Tree cover, needleleaved, evergreen, closed to open (>15%)	Shrubland	Tree cover, flooded, saline water
Town	Tree or shrub cover	Tree cover, needleleaved, evergreen, closed (>40%)	Shrubland evergreen	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
Administrative layers	Cropland, irrigated or post-flooding	Tree cover, needleleaved, evergreen, open (15-40%)	Shrubland deciduous	Urban areas
Roads	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	Tree cover, needleleaved, deciduous, closed to open (>15%)	Grassland	Bare areas
Admin boundaries	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	Tree cover, needleleaved, deciduous, closed (>40%)	Lichens and mosses	Consolidated bare areas
ESA Landcover 2010	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree cover, needleleaved, deciduous, open (15-40%)	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	Unconsolidated bare areas
No data	Tree cover, broadleaved, deciduous, closed to open (>15%)	Tree cover, mixed leaf type (broadleaved and needleleaved)	Sparse shrub (<15%)	Water bodies
	Tree cover, broadleaved, deciduous, closed (>40%)	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)	Sparse herbaceous cover (<15%)	Permanent snow and ice

Landcover

Oldonyiro



Data Sources:

- Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
- Settlements - Community collected data Kenya 2012
- Roads - Open Street Map © OpenStreetMap contributors
- Ward boundaries - GADM v2.0 2012 gadm.org
- ESA Landcover 2010 - <http://www.esa-landcover-cci.org/?q=node/153>

Map Legend

Settlements	Cropland, rainfed	Tree cover, broadleaved, deciduous, open (15-40%)	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Tree cover, flooded, fresh or brackish water
Village	Herbaceous cover	Tree cover, needleleaved, evergreen, closed to open (>15%)	Shrubland	Tree cover, flooded, saline water
Town	Tree or shrub cover	Tree cover, needleleaved, evergreen, closed (>40%)	Shrubland evergreen	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
Administrative layers	Cropland, irrigated or post-flooding	Tree cover, needleleaved, evergreen, open (15-40%)	Shrubland deciduous	Urban areas
Roads	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)	Tree cover, needleleaved, deciduous, closed to open (>15%)	Grassland	Bare areas
Admin boundaries	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)	Tree cover, needleleaved, deciduous, closed (>40%)	Lichens and mosses	Consolidated bare areas
ESA Landcover 2010	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree cover, needleleaved, deciduous, open (15-40%)	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)	Unconsolidated bare areas
No data	Tree cover, broadleaved, deciduous, closed to open (>15%)	Tree cover, mixed leaf type (broadleaved and needleleaved)	Sparse shrub (<15%)	Water bodies
	Tree cover, broadleaved, deciduous, closed (>40%)	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)	Sparse herbaceous cover (<15%)	Permanent snow and ice

Water and Drainage



Data Sources

Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements, Waterpoints, Water features- Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org



Map Legend

Water locations

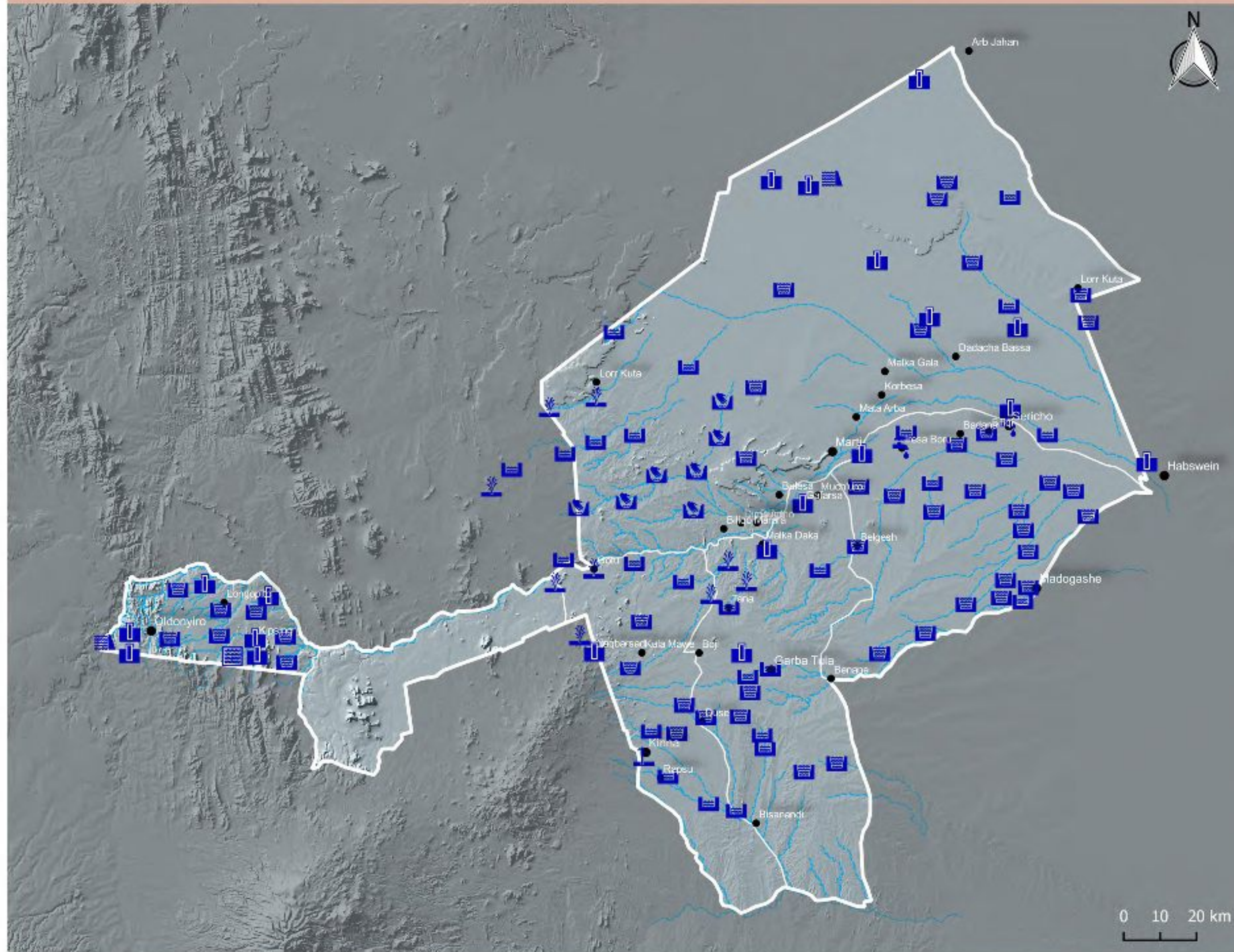
- Borehole
- Dam
- Hand pump
- Natural Pan
- Pan
- Salt lick
- Sand dam
- Scoop
- Shallow well
- Spring
- Standpipe
- Tank
- Turbine
- Drainage

Settlement

- Village
- Town

Administrative layers

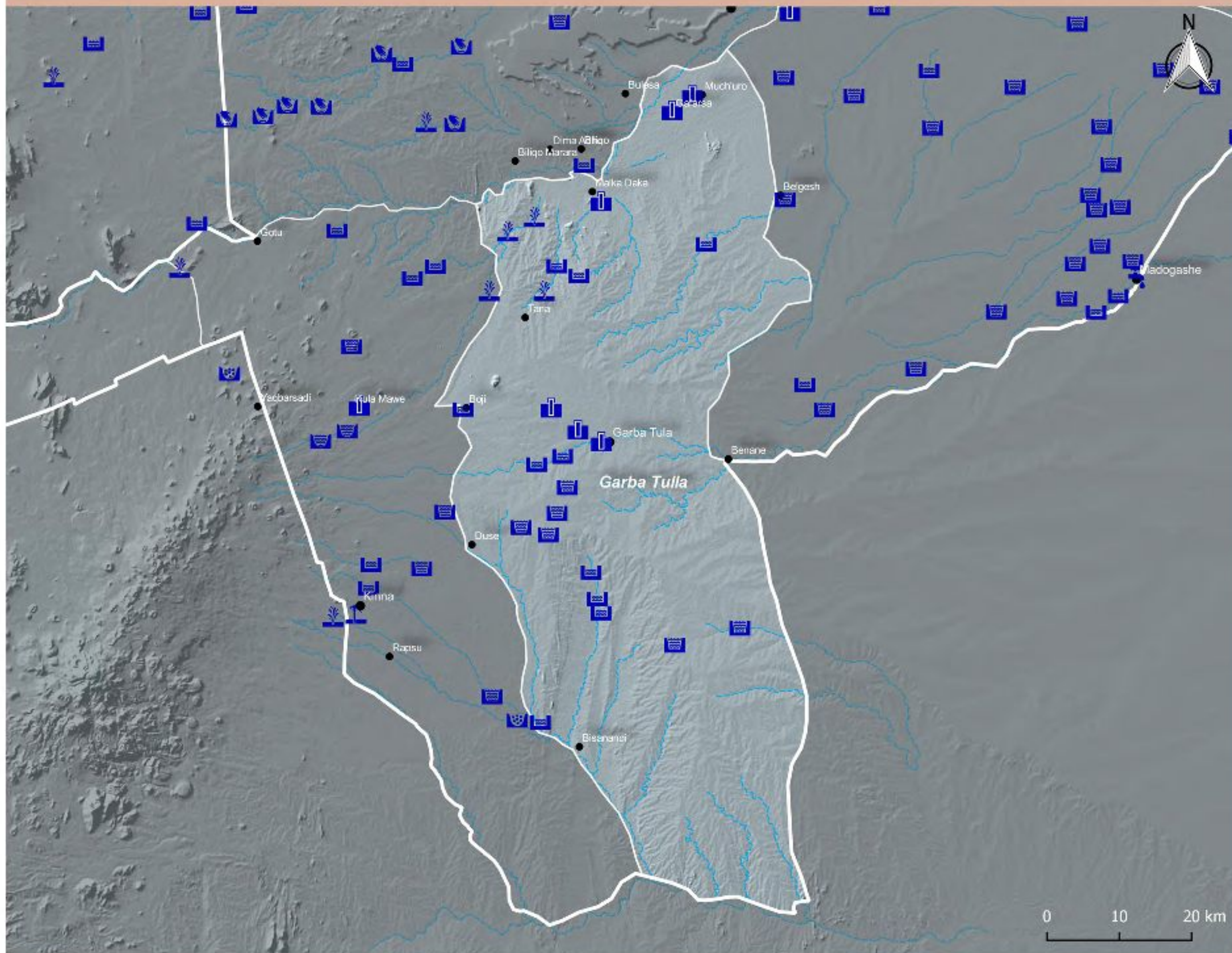
- Admin boundaries



Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
Settlements - Community collected data
Kenya 2013
Water and Drainage - Community collected data
Kenya 2013
Ward boundaries - GADM v2.0
2012 gadm.org

Water and Drainage

Garba Tulla



Map Legend

Water locations

- Borehole
- Dam
- Hand pump
- Natural Pan
- Pan
- Salt lick
- Sand dam
- Scoop
- Shallow well
- Spring
- Standpipe
- Tank
- Turbine
- Drainage

Settlement

- Village
- Town

Administrative layers

- Admin boundaries

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

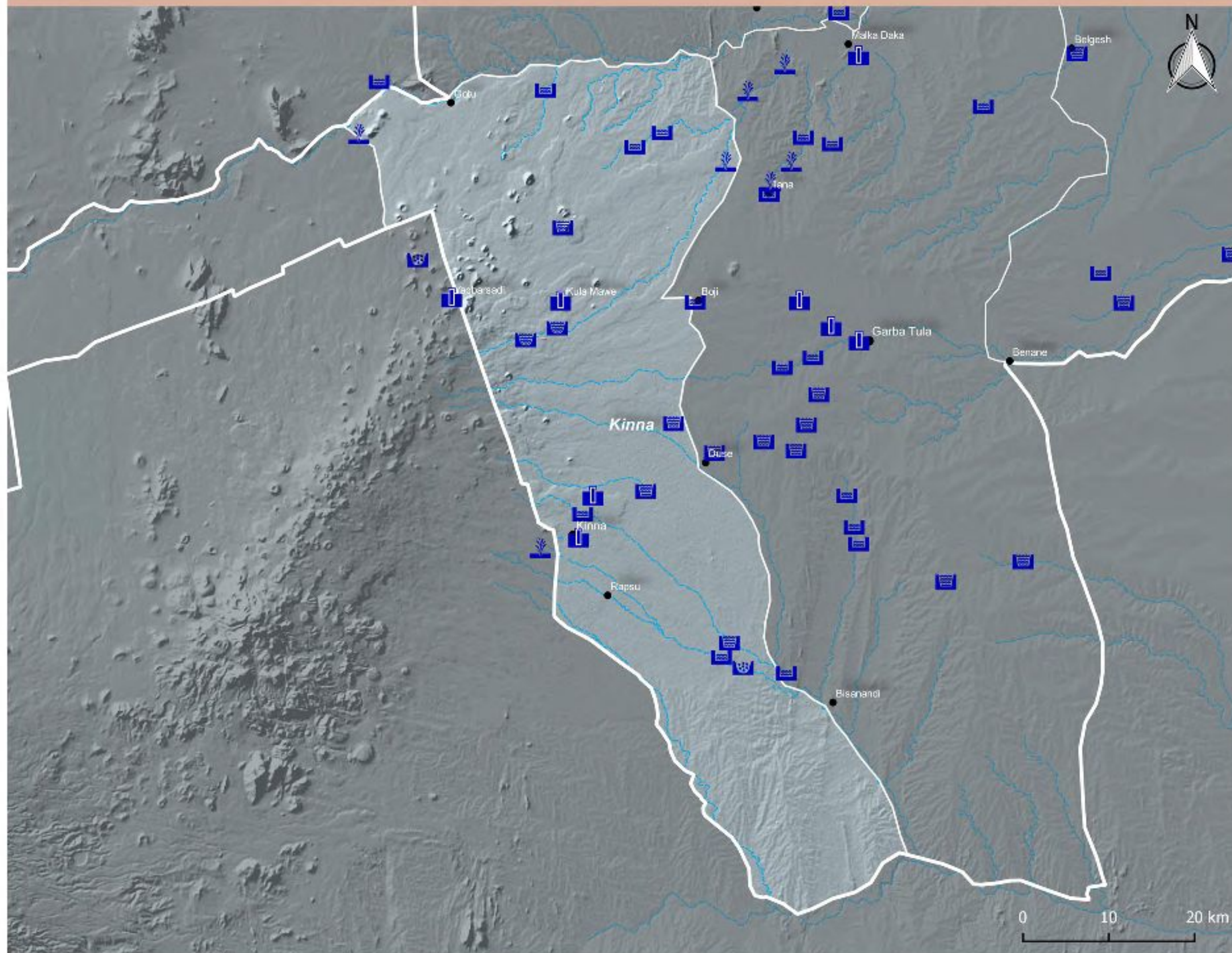
Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org

0 10 20 km

Water and Drainage

Kinna



Map Legend

Water locations

- Borehole
- Dam
- Hand pump
- Natural Pan
- Pan
- Salt lick
- Sand dam
- Scoop
- Shallow well
- Spring
- Standpipe
- Tank
- Turbine
- Drainage

Settlement

- Village
- Town

Administrative layers

- Admin boundaries

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

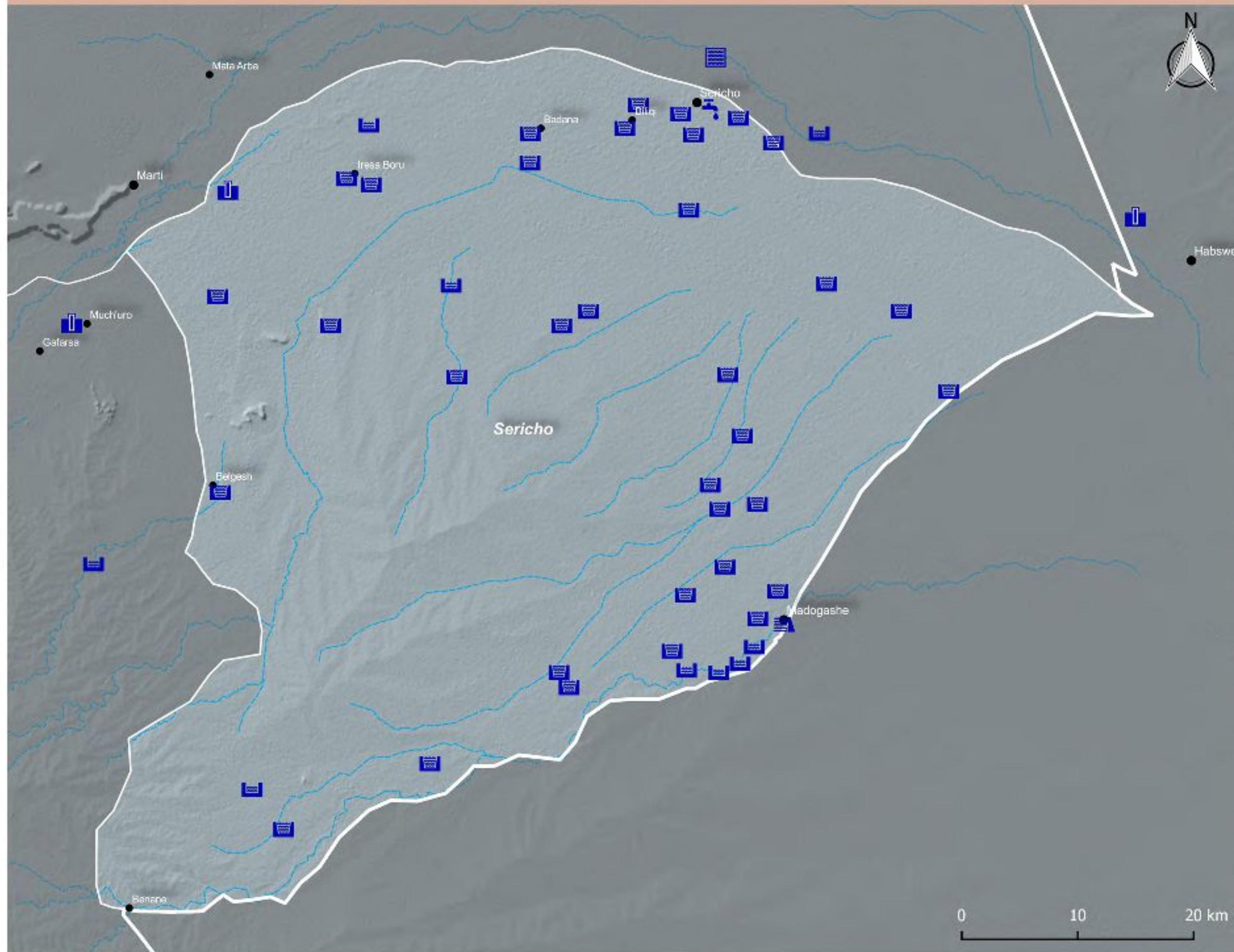
Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org




















Water and Drainage

Sericho



Map Legend

Water locations

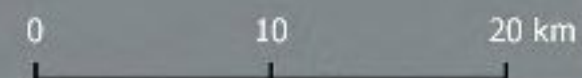
-  Borehole
 -  Dam
 -  Hand pump
 -  Natural Pan
 -  Pan
 -  Salt lick
 -  Sand dam
 -  Scoop
 -  Shallow well
 -  Spring
 -  Standpipe
 -  Tank
 -  Turbine
 -  Drainage
- ### Settlement
-  Village
 -  Town
- ### Administrative layers
-  Admin boundaries

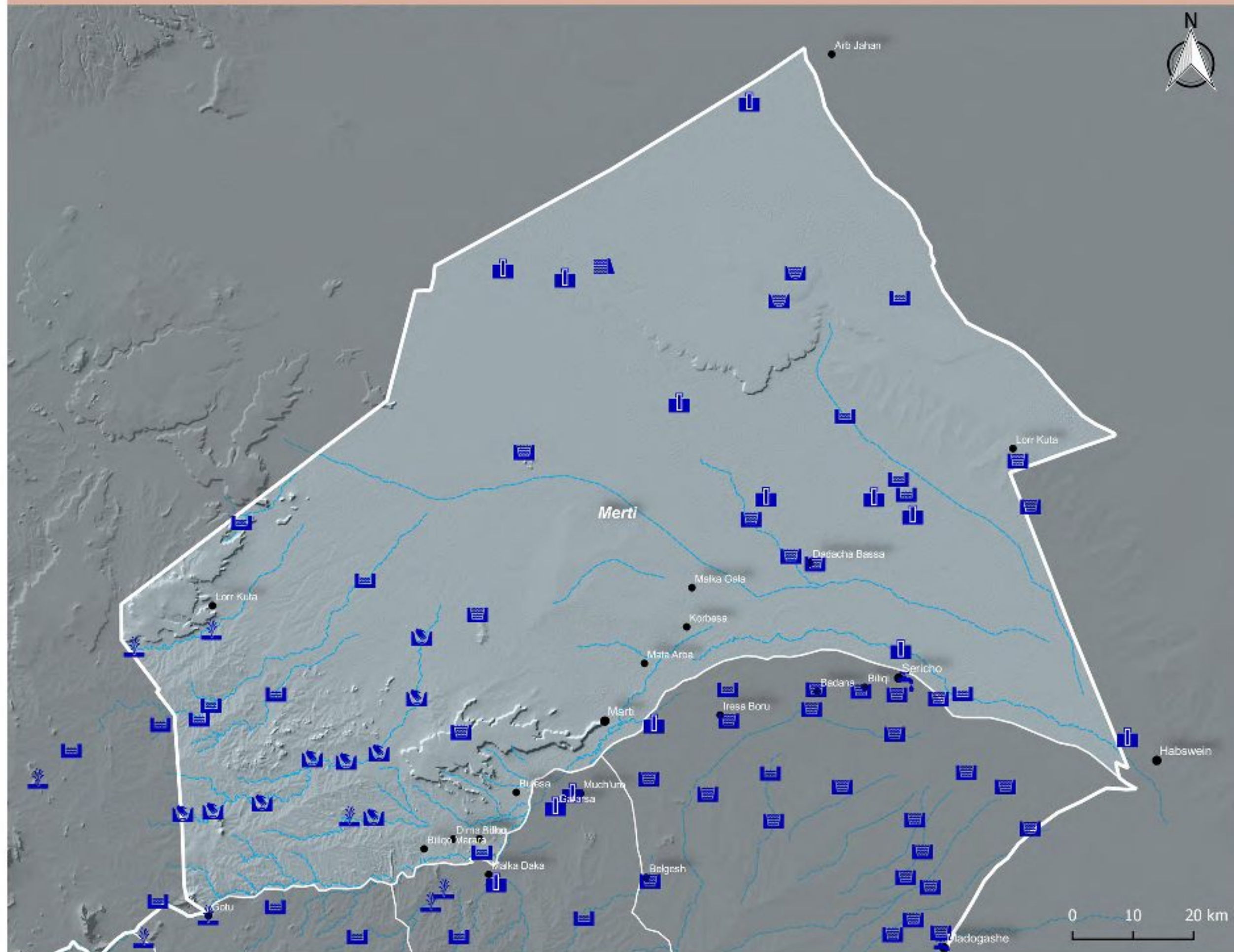
Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org





Map Legend

Water locations

- Borehole
- Dam
- Hand pump
- Natural Pan
- Pan
- Salt lick
- Sand dam
- Scoop
- Shallow well
- Spring
- Standpipe
- Tank
- Turbine
- Drainage

Settlement

- Village
- Town

Administrative layers

- Admin boundaries

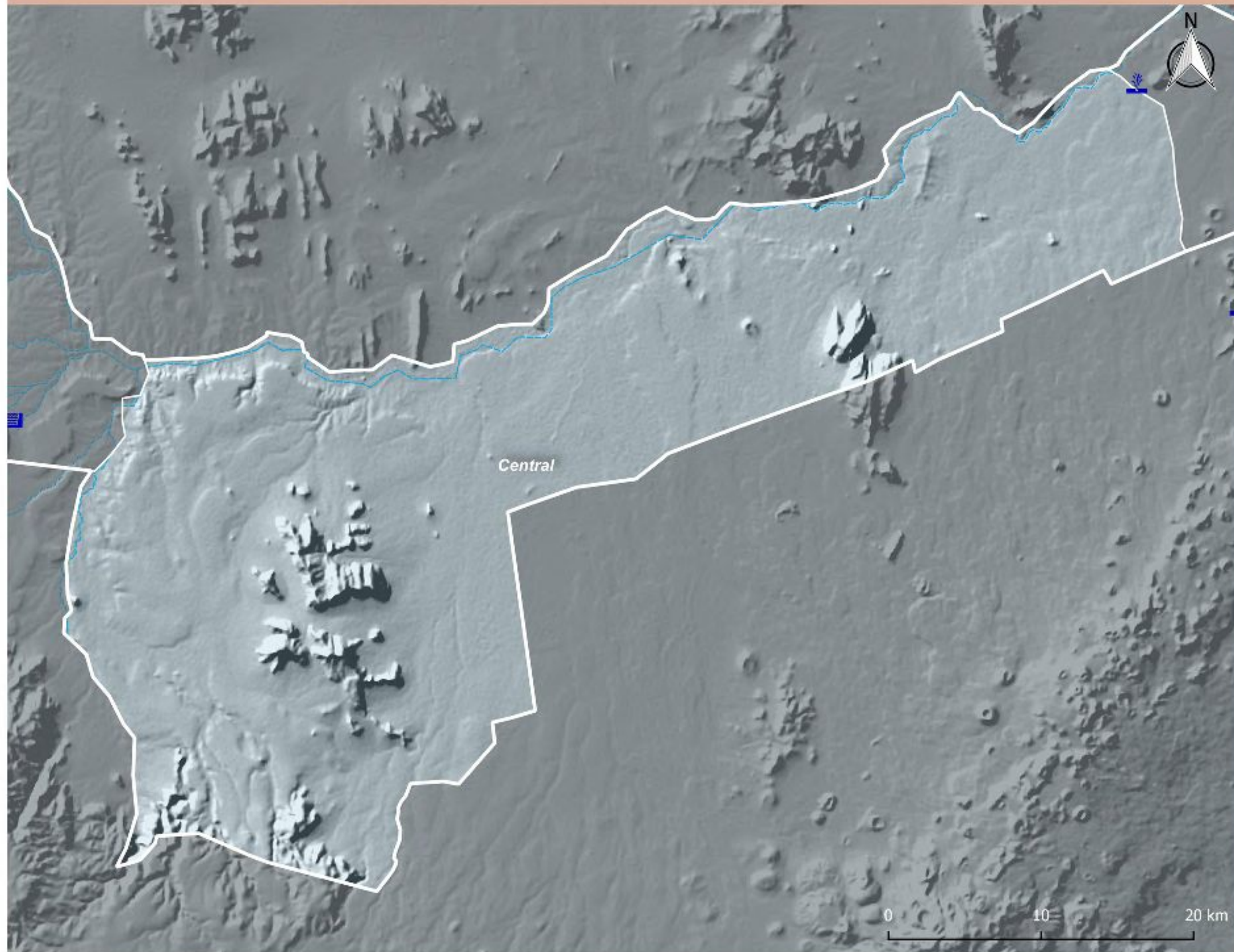
Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org





Map Legend


Water locations

-  Borehole
-  Dam
-  Hand pump
-  Natural Pan
-  Pan
-  Salt lick
-  Sand dam
-  Scoop
-  Shallow well
-  Spring
-  Standpipe
-  Tank
-  Turbine
-  Drainage

Settlement

-  Village
-  Town

Administrative layers

-  Admin boundaries

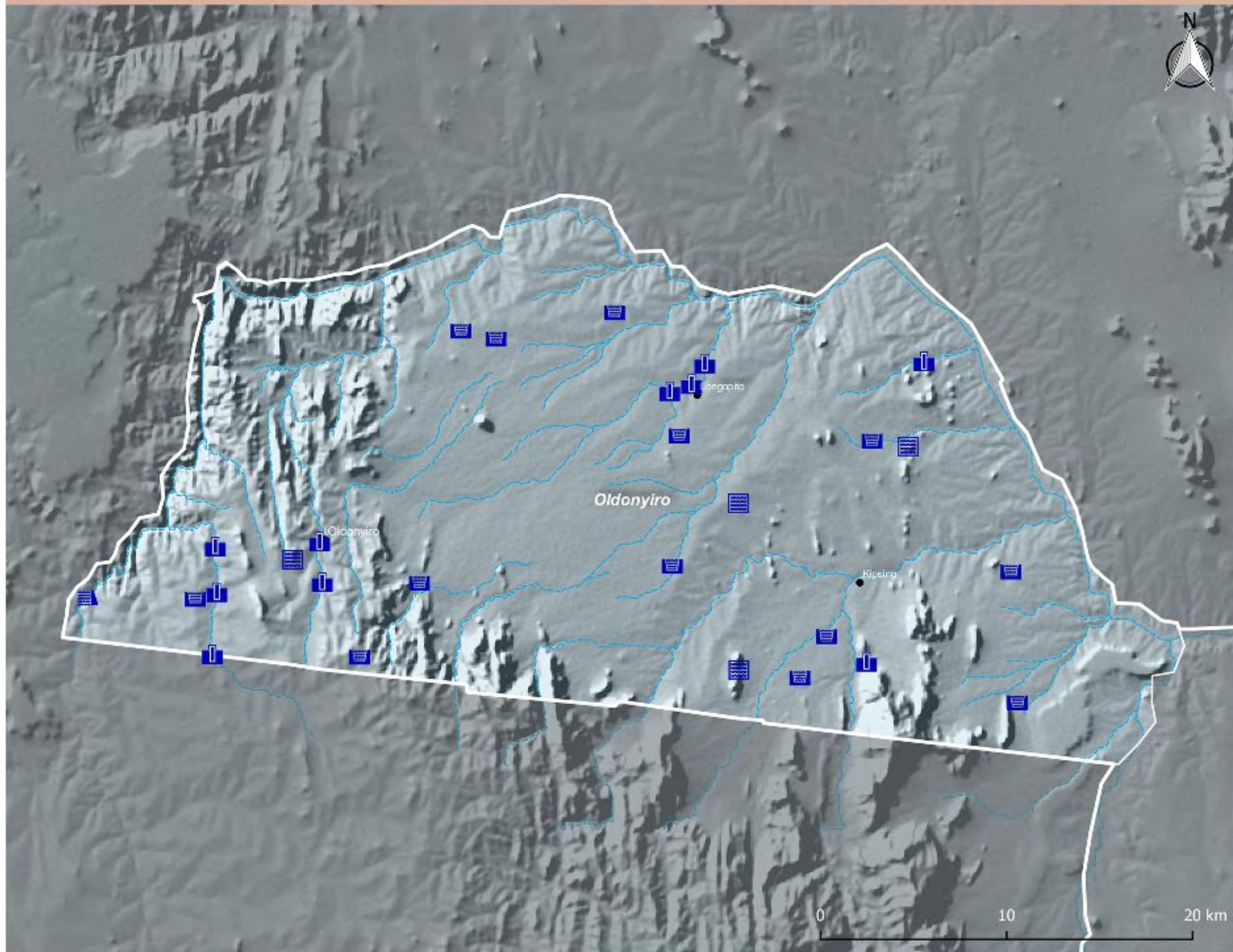
Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org





Map Legend

Water locations

- Borehole
- Dam
- Hand pump
- Natural Pan
- Pan
- Salt lick
- Sand dam
- Scoop
- Shallow well
- Spring
- Standpipe
- Tank
- Turbine
- Drainage

Settlement

- Village
- Town

Administrative layers

- Admin boundaries

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org

Water Point Capacity



Data Sources

Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements, Waterpoints, Water features- Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

Water Point Capacity

Isiolo



Map Legend

Water layers

Water point capacity
(cattle per day)

- 0 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000

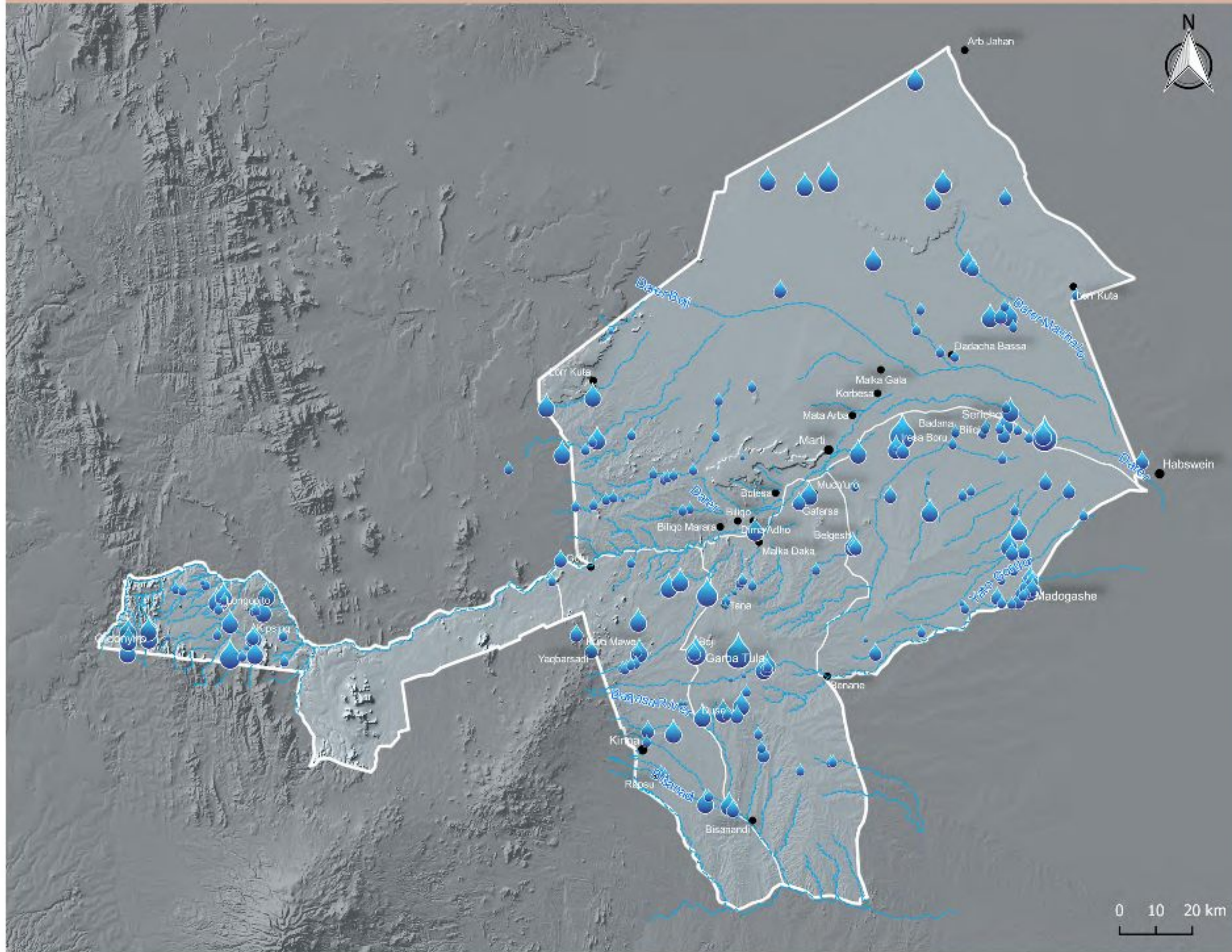
--- Drainage

Settlements

- Village
- Town

Administrative layers

□ Admin boundaries



Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

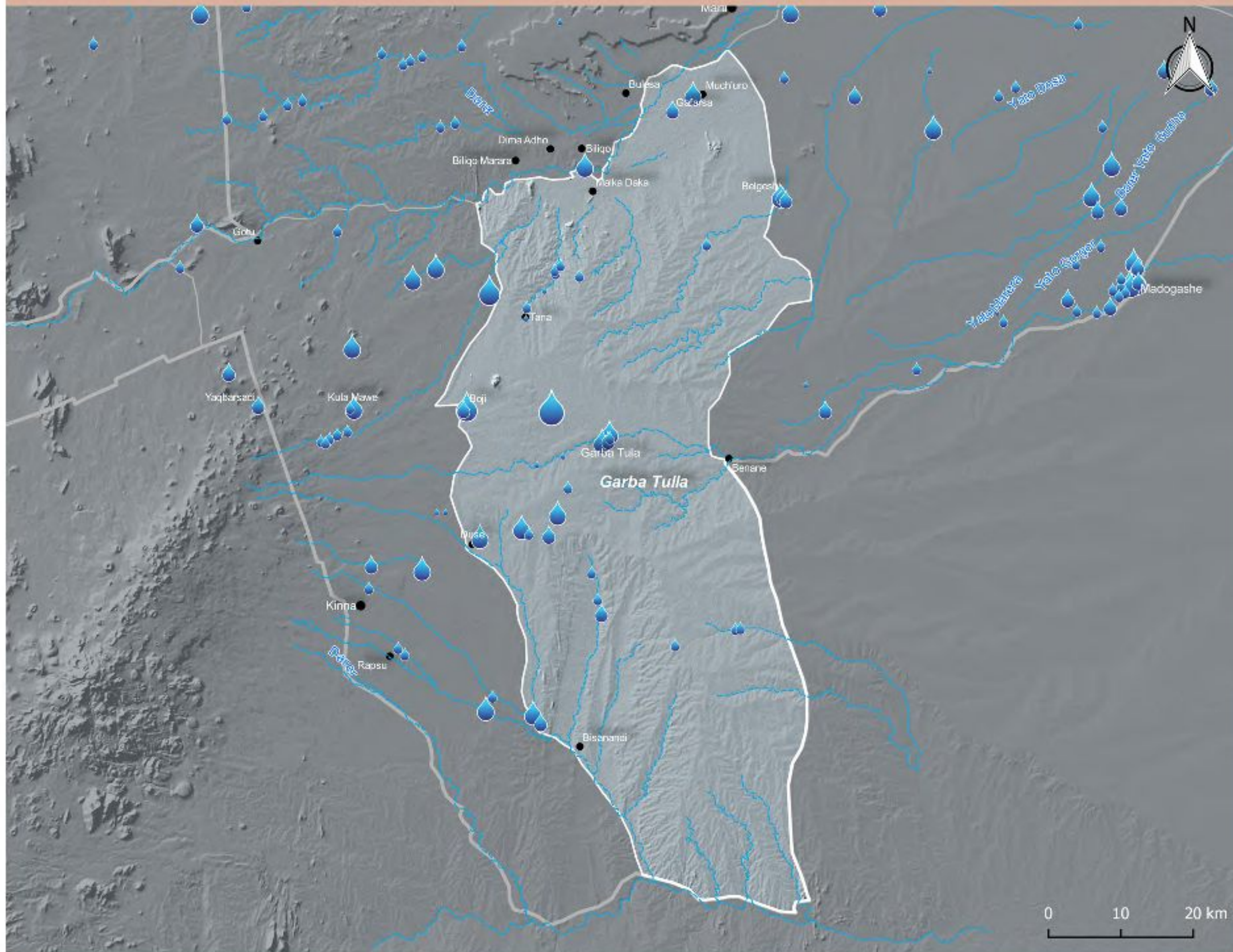
Settlements - Community collected data Kenya 2013

Water and Drainage - Community collected data Kenya 2013

Ward boundaries - GADM v2.0 2012 gadm.org

Water Point Capacity

Garba Tulla




Map Legend



Water layers

Water point capacity
(cattle per day)


-  0 - 100
-  101 - 500
-  501 - 1,000
-  1,001 - 5,000
-  5,001 - 10,000
-  10,001 - 20,000

 Drainage

Settlements

-  Village
-  Town

Administrative layers

 Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v1-1>)

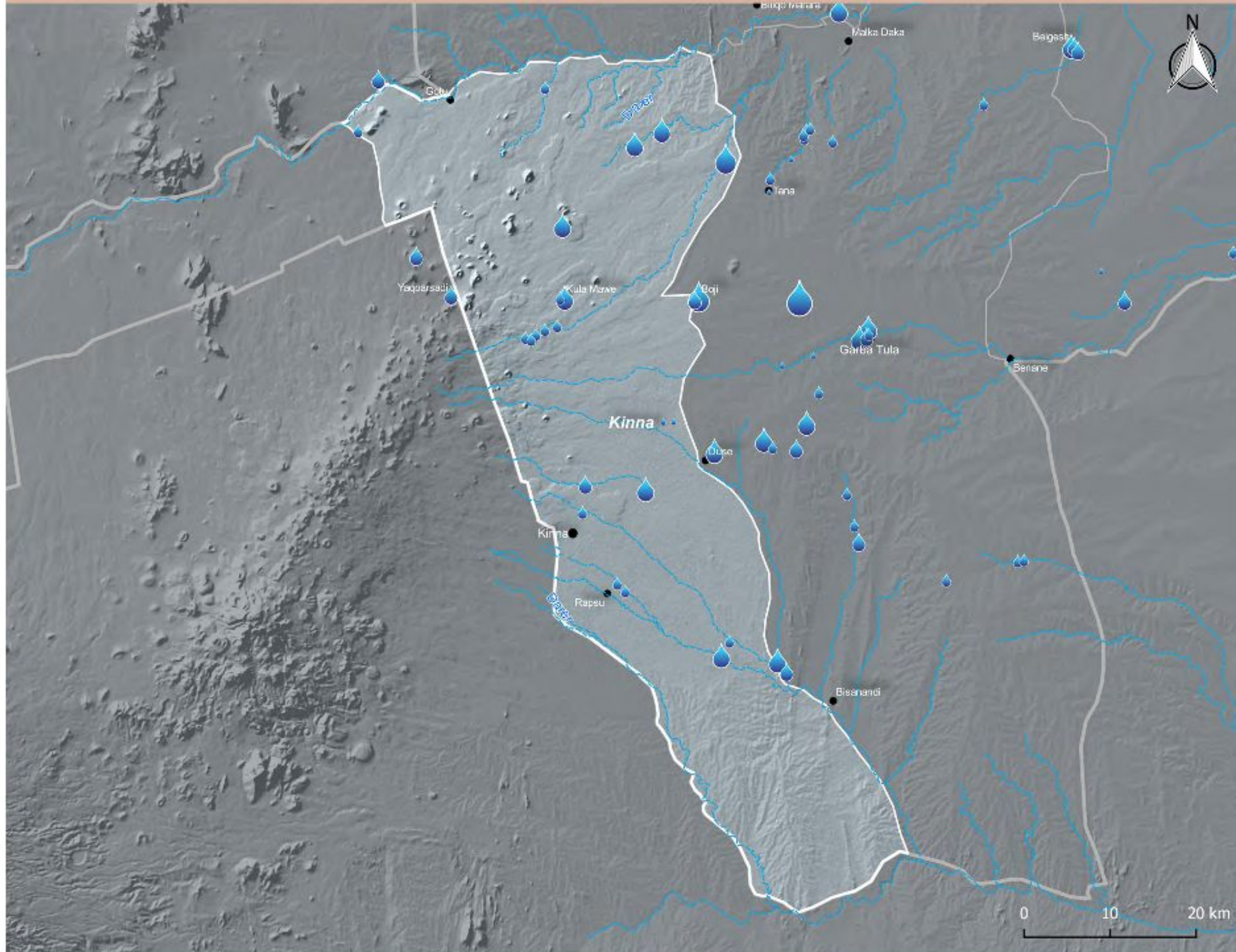
Settlements - Community collected data Kenya 2013

Water and Drainage - Community collected data Kenya 2013

Ward boundaries - GADM v2.0 2012 gadm.org

Water Point Capacity

Kinna



Map Legend

Water layers

Water point capacity
(cattle per day)

- 0 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000

--- Drainage

Settlements

- Village
- Town

Administrative layers

□ Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v1-1>)

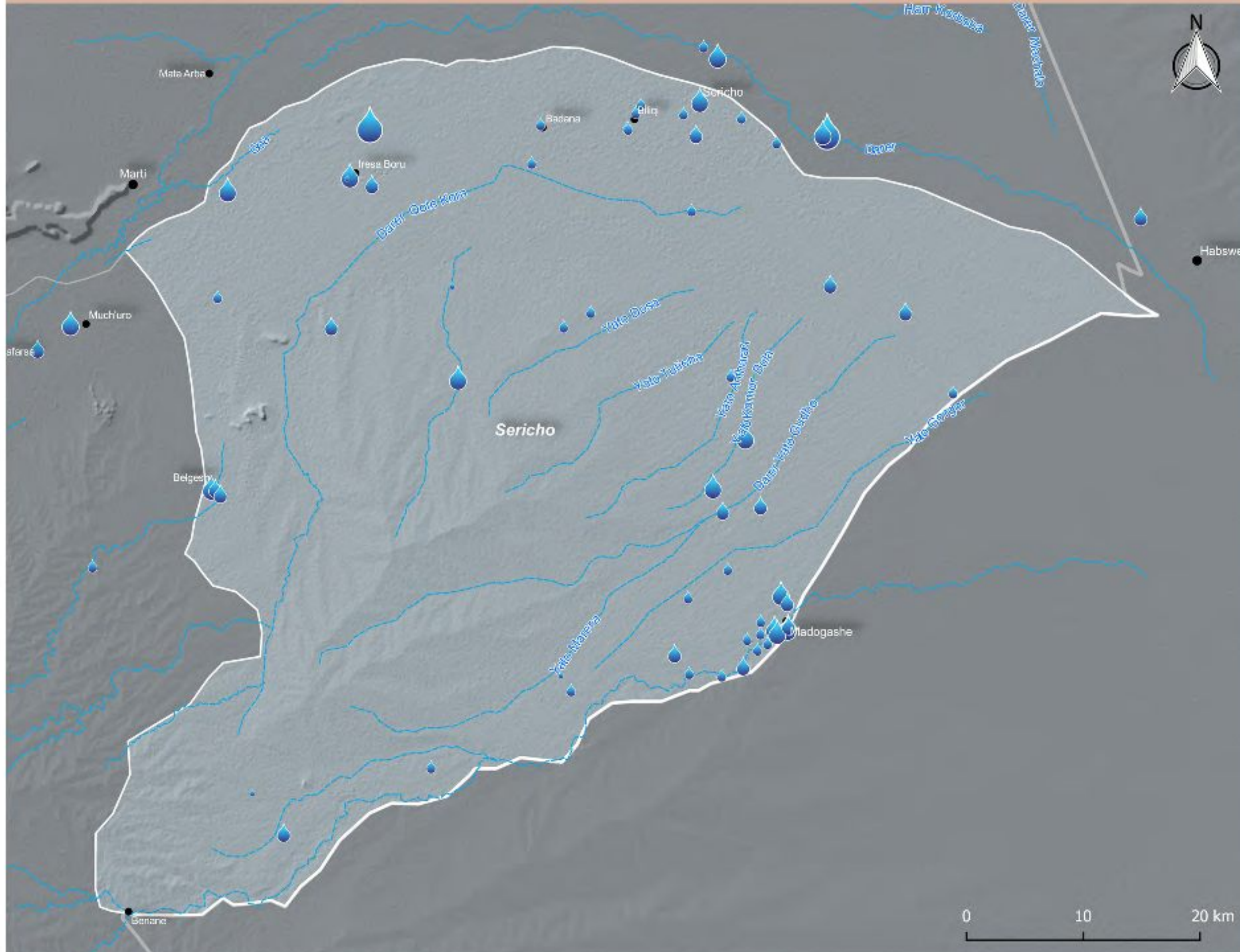
Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org

Water Point Capacity

Sericho



Map Legend

Water layers

Water point capacity (cattle per day)

- 0 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000

--- Drainage

Settlements

- Village
- Town

Administrative layers

□ Admin boundaries

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v1-1>)
Settlements - Community collected data Kenya 2013
Water and Drainage - Community collected data Kenya 2013
Ward boundaries - GADM v2.0 2012 gadm.org



Water Point Capacity

Merti




Map Legend



Water layers

Water point capacity
(cattle per day)


-  0 - 100
-  101 - 500
-  501 - 1,000
-  1,001 - 5,000
-  5,001 - 10,000
-  10,001 - 20,000

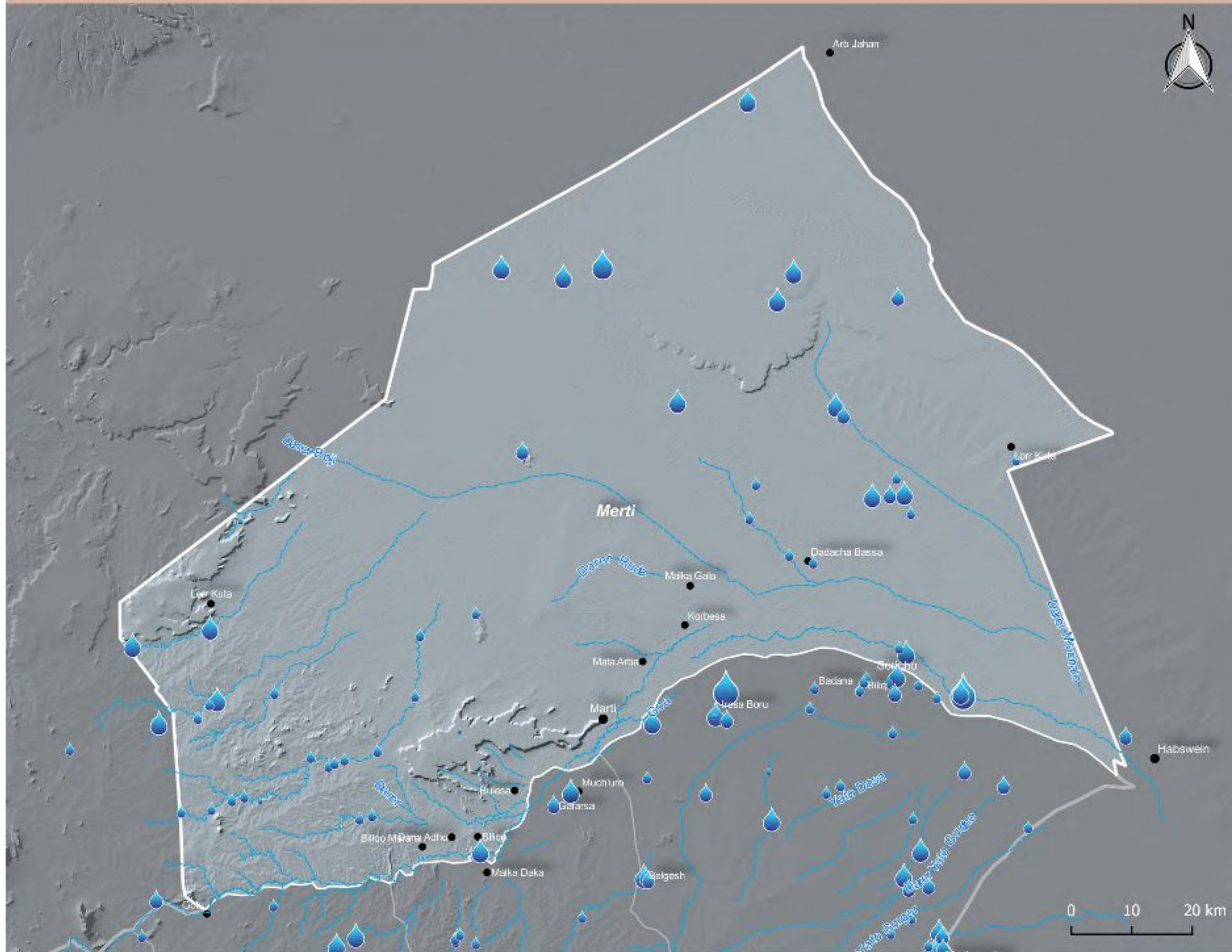
 Drainage

Settlements

-  Village
-  Town

Administrative layers

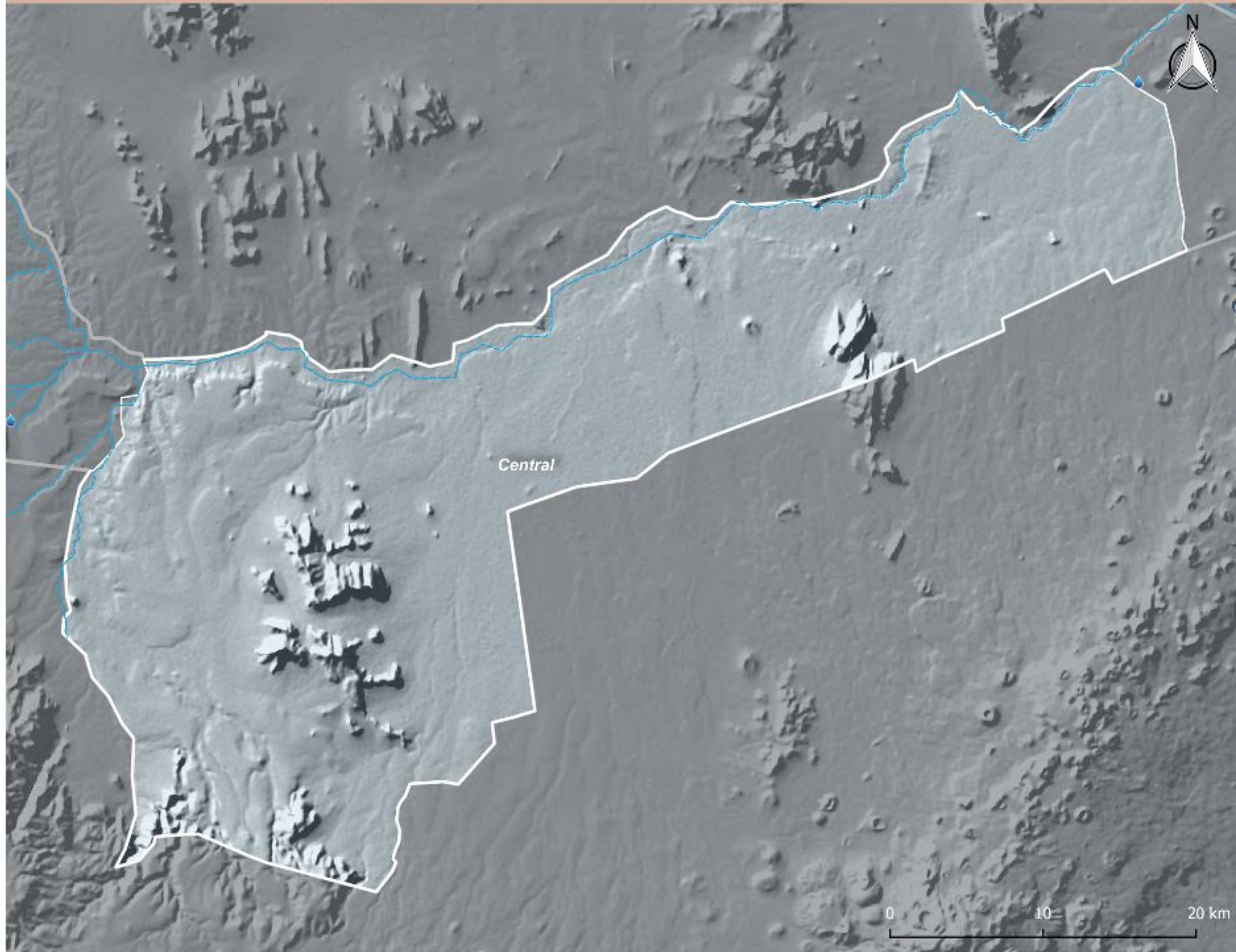
 Admin boundaries



Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v1-1>)
Settlements - Community collected data Kenya 2013
Water and Drainage - Community collected data Kenya 2013
Ward boundaries - GADM v2.0 2012 gadm.org

Water Point Capacity

Central



Map Legend

Water layers

Water point capacity
(cattle per day)

- 0 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000

--- Drainage

Settlements

- Village
- Town

Administrative layers

□ Admin boundaries

Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v1-1>)

Settlements - Community collected data
Kenya 2013

Water and Drainage -
Community collected data
Kenya 2013

Ward boundaries - GADM v2.0
2012 gadm.org

Water Point Capacity

Oldonyiro



Map Legend

Water layers

Water point capacity
(cattle per day)

- 0 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000

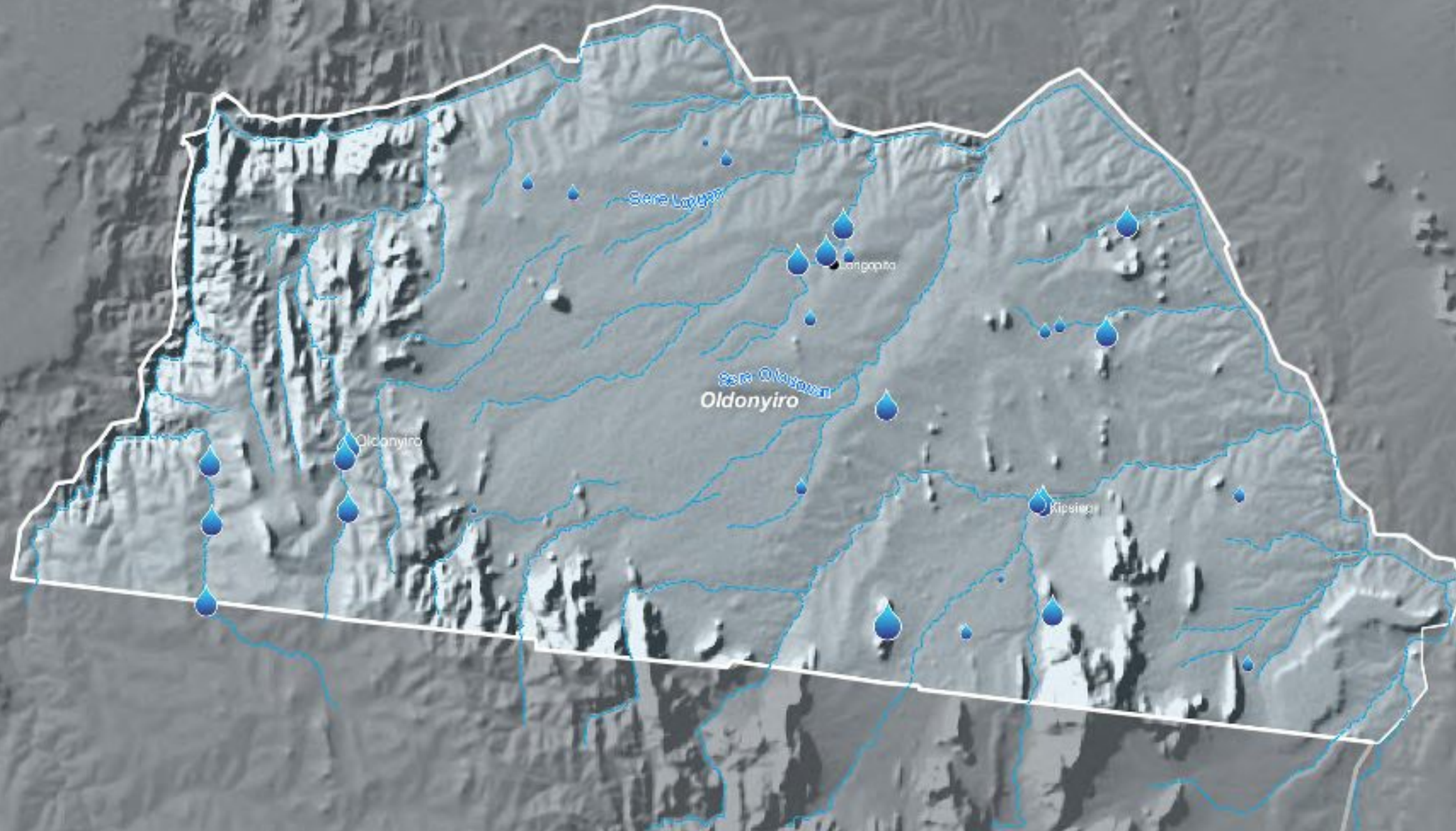
--- Drainage

Settlements

- Village
- Town

Administrative layers

□ Admin boundaries



Data Sources:

Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data Kenya 2013

Water and Drainage - Community collected data Kenya 2013

Ward boundaries - GADM v2.0 2012 gadm.org

Climate Adaptation Fund Projects



Data Sources

Background Hillshade - SRTM 2003 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

ICAF Project Locations - Community collected data Kenya 2013

Roads - Open Street Map © OpenStreetMap contributors

Ward boundaries - GADM v2.0 2012 gadm.org

The Kenyan Constitution, passed in 2010, foresaw an increased role for local government, and the devolution of increased powers to the level of the Counties. Over the course of 2010, community-consultations assessed how customary institutions for planning currently interfaced with government and other institutions. Traditional grassroots organizations, such as the Dedha, were observed to have considerable legitimacy and power at the local level, but were not recognized by the State. Their activities and membership overlap with those of the new democratic institutions, including the elected councils at Ward level.

A series of workshops were held with community and government participants in early 2011, to design the institutional structure of a devolved finance mechanism in keeping with the anticipated county government structure, and to agree a workplan. The Isiolo Climate Adaptation Fund (ICAF) was established by representative County and Ward Adaptation Planning Committees (CAPC and WAPCs) to finance public good investments for improved resilience to climate change. This was supported through a £900,000 accountable grant from DFID (of which £500,000 was ring-fenced for the ICAF), with an additional grant of EUR 152,327 from CORDAID.



CAPC Meeting with Christian Aid

The ICAF established and supported WAPCs from rural wards to identify, develop and implement priority projects for adaptation to climate change. The one-off cost to establish the Fund in Isiolo was £455,687. The budget placed at the disposal of the WAPCs for the first round of investments implemented in late 2013 and early 2014 was £355,796. By August, 2014, all activities designed by the WAPCs had been implemented and a 2nd round of adaptation investments was under development.



Samburu women fetching water from the Mokori catchment tank ICAF project

The first round included capacity building activities in four wards (Kinna, Garba Tula, Sericho, and Merti), with a total combined value of £66,234. The purpose of these investments was to strengthen customary resource management institutions, known locally as Dedha. These institutions enable the communities to cope with seasonal variability through the designation of areas with ephemeral water sources for grazing during the wet season, and others where there are permanent water sources to be conserved for the dry season and drought periods.

The capacity building activities included the preparation and facilitation of strategic processes and meetings to strengthen the functions of the customary institutions. The strategies sometimes involved the purchase of equipment to be used by teams of scouts under the

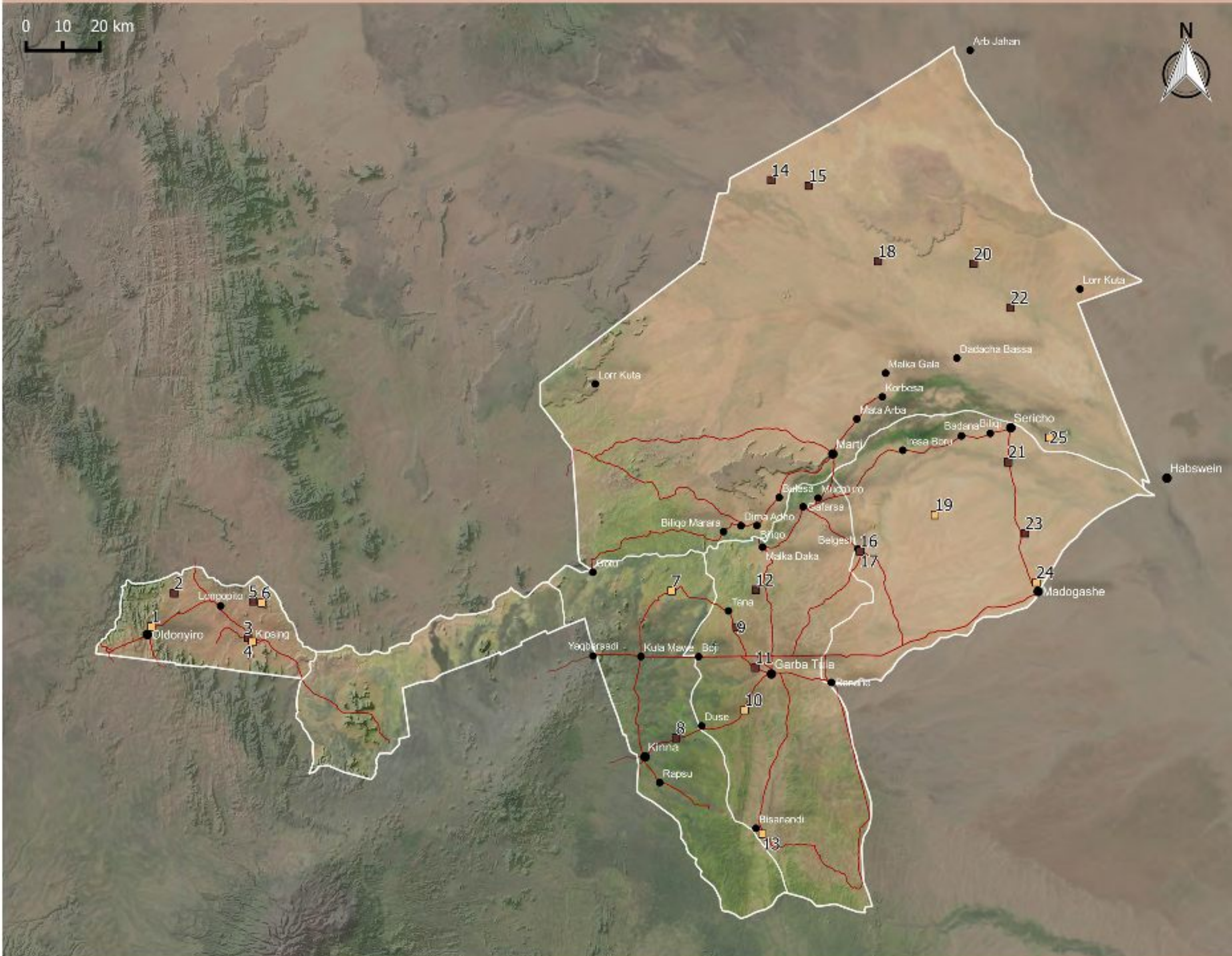
supervision of the customary institutions. The strategic activities and purchases were carried out by qualified NGOs, selected and contracted by the WAPCs for this purpose.



Kulamawe Livestock handling facility ICAF project

CAF Projects

Isiolo



Map Legend

CAF projects

- Round 1 (yellow square)
- Round 2 (black square)

Settlements

- Village (small black dot)
- Town (large black dot)

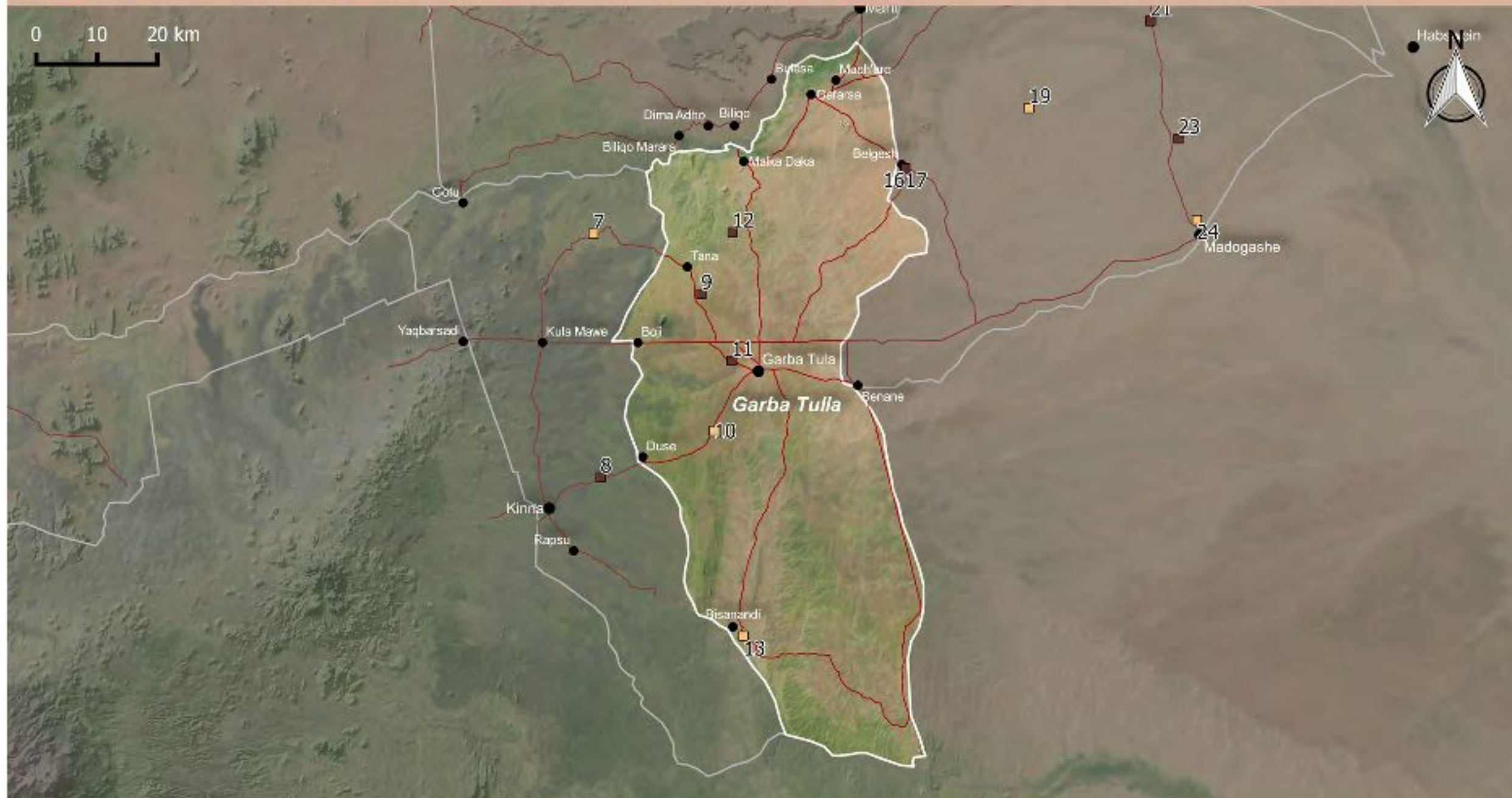
Administrative layers

- Roads (red line)
- Admin boundaries (white outline)

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)
Settlements - Community collected data Kenya 2013
CAF Projects - Community collected data Kenya 2013
Roads - Open Street Map © OpenStreetMap contributors
Ward boundaries - GADM v2.0 2012 gadm.org

CAF Projects

Garba Tulla



Map Legend

CAF projects

- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

ID	Name	Description
7	Barambete Safe Livestock Handling Facility	Used for livestock vaccination
8	Harr Bibi	Bibi Pan: Fencing with concrete fence and barbed wire, troughs constructed outside and water from pan pumped to it, buiding pump House and security house and sanitation facility
9	Dembala Dedha	Blocking inlet to the Pan
10	Dembala Buyo	Rehabilitation of Har Buyo water
11	Range Water borehole	Two troughs constructed
12	Kurofta Nolu Shallow Well	Rehabilitation of Shallow Wells and construction of troughs
13	Skot Livestock Market	
16		Rehabilitation of Belgesh Water pan
17	Harr Belgesha 2	
19	Harr Forosa	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water
21	Harr Qota Kara	
23	Harr Komor Bula	
24	Manyageb	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

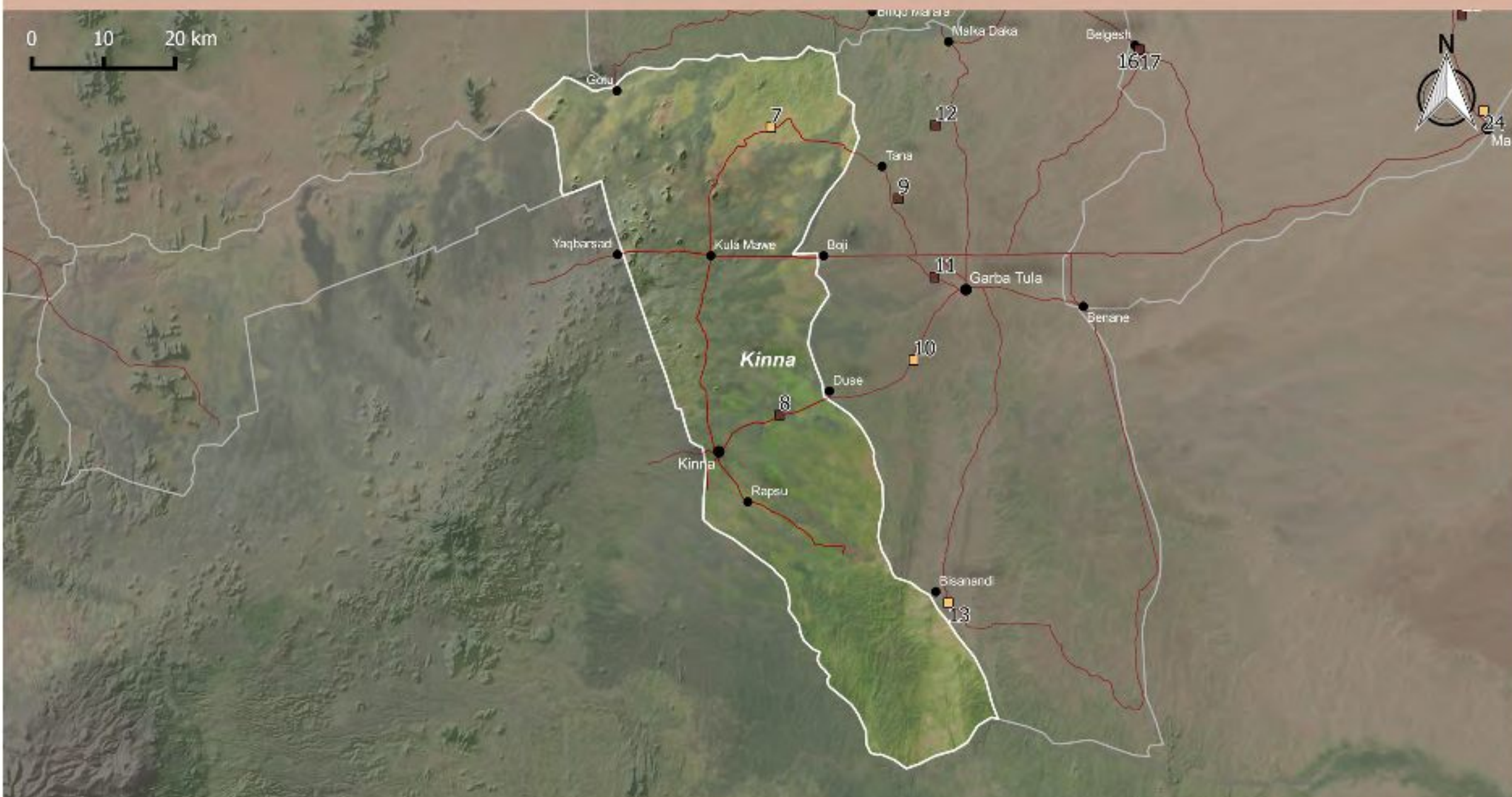
CAF Projects - Community collected data
Kenya 2013

Roads - Open Street Map
© OpenStreetMap contributors

Ward boundaries - GADM v2.0
2012. gadm.org

CAF Projects

Kinna



Map Legend

CAF projects

- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

ID	Name	Description
7	Barambete Safe Livestock Handling Facility	Used for livestock vaccination
8	Harr Bibi	Bibi Pan: Fencing with concrete fence and barbed wire, troughs constructed outside and water from pan pumped to it, buiding pump House and security house and sanitation facility
9	Dembala Dedha	Blocking inlet to the Pan
10	Dembala Buyo	Rehabilitation of Har Buyo water
11	Range Water borehole	Two troughs constructed
12	Karofa Nolu Shallow Well	Rehabilitation of Shallow Wells and construction of troughs
13	Skot Livestock Market	
16		Rehabilitation of Belgesh Water pan
17	Harr Belgesha 2	
23	Harr Komor Bula	
24	Manyagab	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water

Data Sources:
 Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

CAF Projects - Community collected data
 Kenya 2013

Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012. gadm.org

CAF Projects

Sericho



Map Legend

CAF projects

- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

ID	Name	Description
9	Dembale Dedha	Blocking inlet to the Fan
11	Range Water borehole	Two troughs constructed
12	Kuroftu Molu Shallow Well	Rehabilitation of Shallow Wells and construction of troughs
16		Rehabilitation of Belgesha Water pan
17	Herr Belgesha 2	
19	Herr Fororsa	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water
21	Herr Qote Kara	
23	Herr Komor Bula	
24	Manyagab	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water
25	Hawaya Wells	WAPC Sericho rehabilitated the two shallow wells to prevent the walls to collapse and enhance accessibility of water

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

CAF Projects - Community collected data
Kenya 2013

Roads - Open Street Map
© OpenStreetMap contributors

Ward boundaries - GADM v2.0
2012. gadm.org

CAF Projects

Merti

0 10 20 km



Map Legend

CAF projects

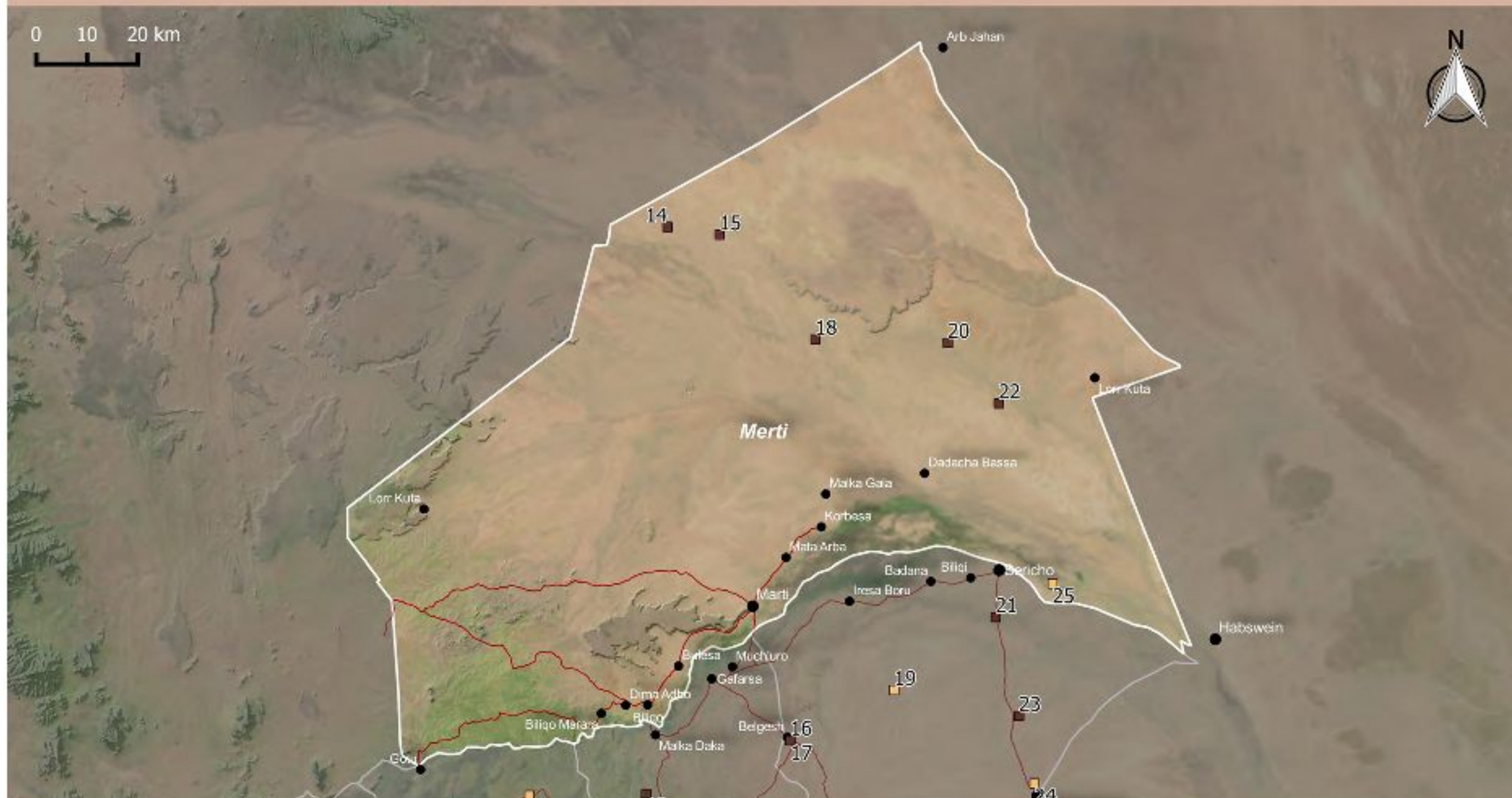
- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries



ID	Name	Description
7	Barambete Safe Livestock Handling Facility	Used for livestock vaccination
12	Kuroftu Molu Shallow Well	Rehabilitation of Shallow Wells and construction of troughs
14	Duma Borehole	
15	Yamicha Borehole	
16		Rehabilitation of Belgesh Water pan
17	Harr Belgesha 2	
18	Urur Borehole	
19	Harr Fororsa	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water
20	Urur Pan	
21	Harr Qote Kara	
22	Alango Wells	
23	Harr Komor Bula	
24	Manyageb	WAPC Sericho rehabilitated and fenced the pan, constructed the troughs outside and provide clean water outside increasing the duration and quality of water
25	Hawoye Wells	WAPC Sericho rehabilitated the two shallow wells to prevent the wells to collapse and enhance accessibility of water

Data Sources:
Background Hillshade - SRTM 2003
(<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
Kenya 2013

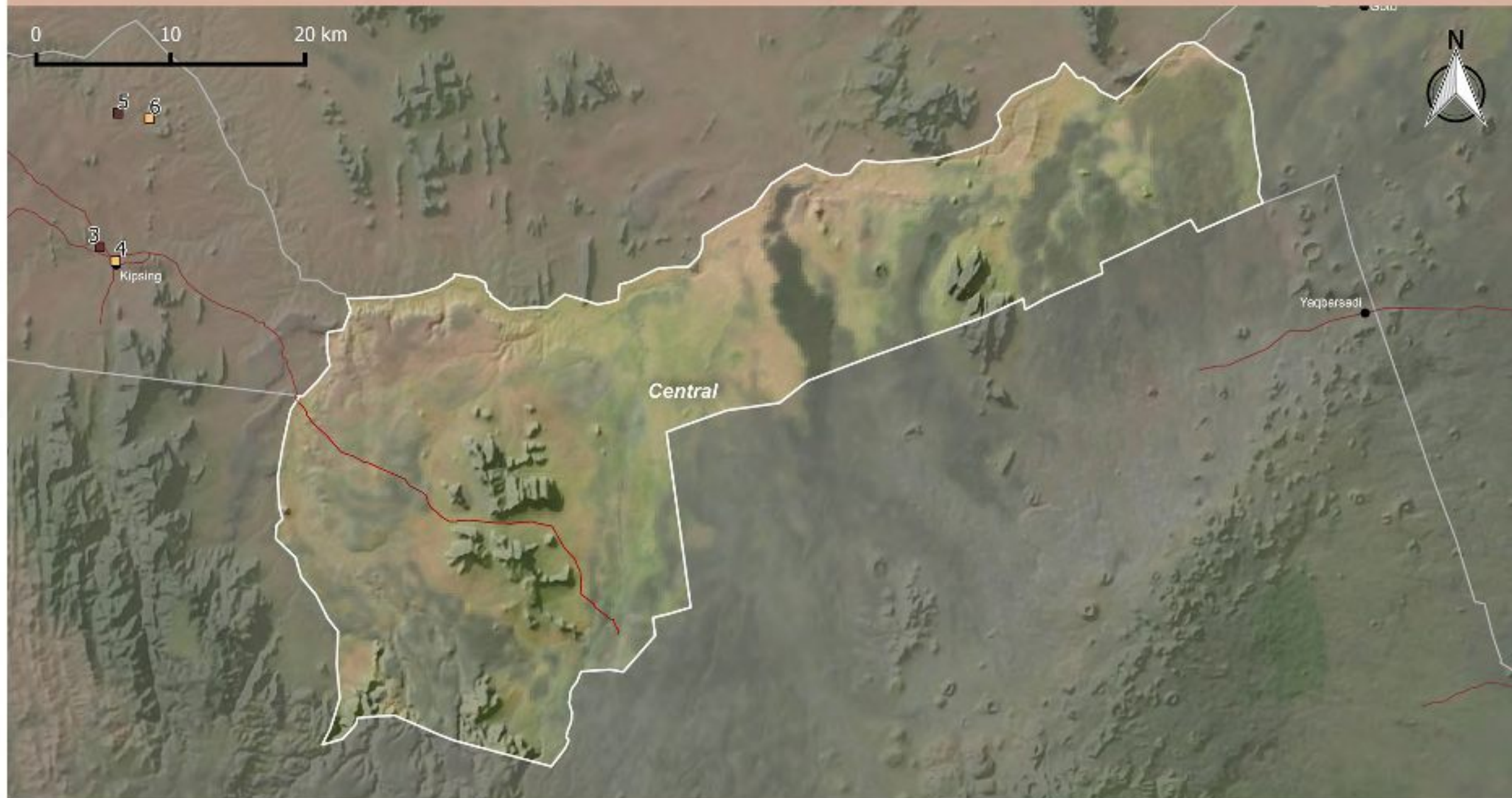
CAF Projects - Community collected data
Kenya 2013

Roads - Open Street Map
© OpenStreetMap contributors

Ward boundaries - GADM v2.0
2012. gadm.org

CAF Projects

Central



Map Legend

CAF projects

- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

ID	Name	Description
3	Lengibeng Sand Dam	
4		Rehabilitation of 2 Kipsing Sand Dams.Oldonyiro WAPC project to enhance provision of water for domestic and livestock use
5	Ikempejeto	
6	Makori Masonry Tank	

Data Sources:
 Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

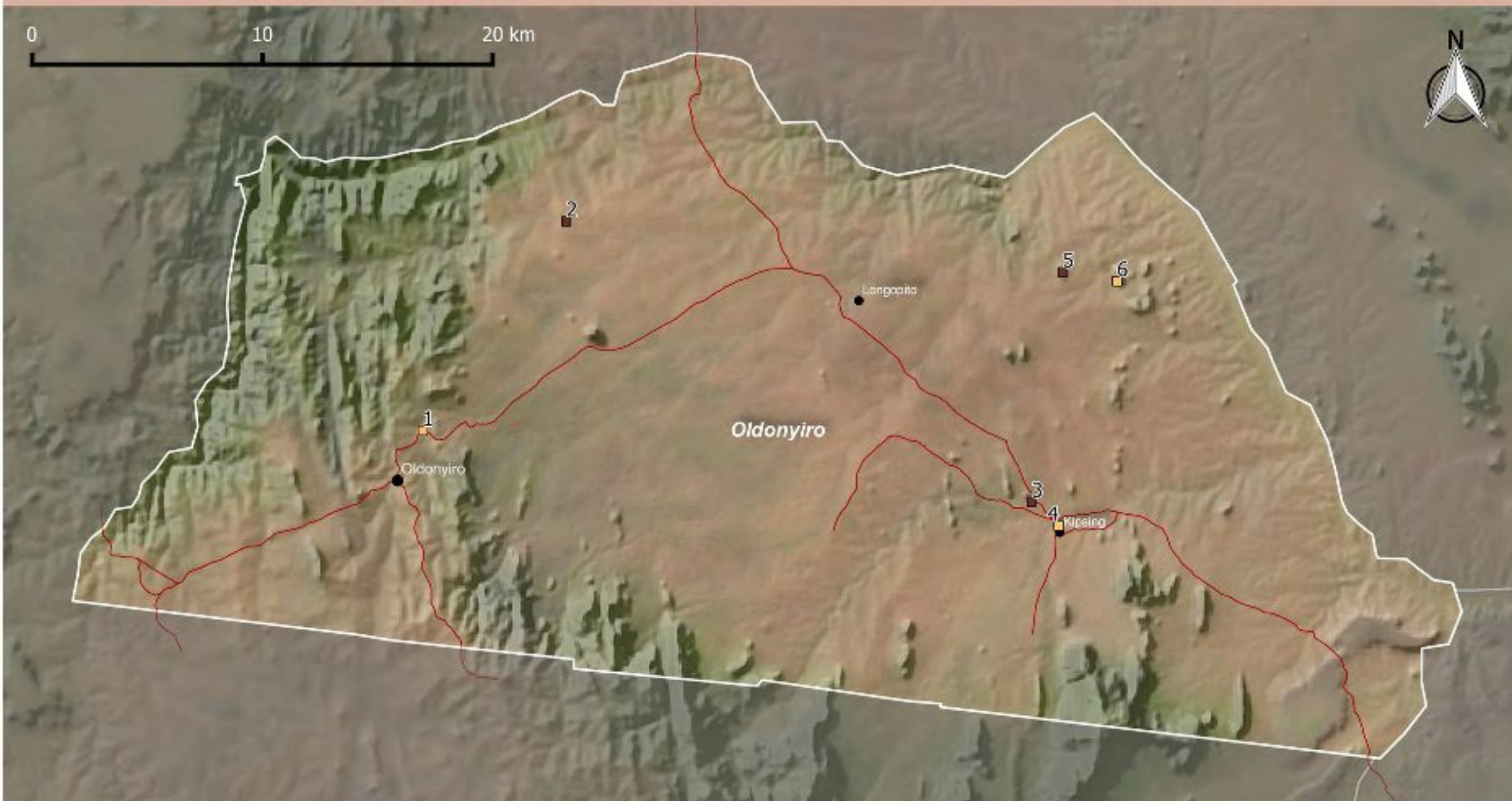
CAF Projects - Community collected data
 Kenya 2013

Roads - Open Street Map
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Ward boundaries - GADM v2.0
 2012. gadm.org

CAF Projects

Oldonyiro



Map Legend

CAF projects

- Round 1
- Round 2

Settlements

- Village
- Town

Administrative layers

- Roads
- Admin boundaries

ID	Name	Description
1	Mlima Chui Sand Dam	new Mlima Chui Sand Dam, Oldonyiro WAPC project to enhance the provision of water for domestic and livestock use
2	Nontudu Pan	
3	Lengiteng Sand Dam	
4		Rehabilitation of 2 Kipsing Sand Dams, Oldonyiro WAPC project to enhance provision of water for domestic and livestock use
5	Nempejeto	
6	Mokori Masonry Tank	

Data Sources:
 Background Hillshade - SRTM 2003
 (<http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>)

Settlements - Community collected data
 Kenya 2013

CAF Projects - Community collected data
 Kenya 2013

Roads - Open Street Map
 © OpenStreetMap contributors

Ward boundaries - GADM v2.0
 2012. gadm.org



The Consortium brings together Christian Aid (CA), International Institute for Environment and Development (IIED), Kenya Meteorological Services (KMS) and UK Met Office. The Consortium is hosted by the National Drought Management Authority.

The consortium funded under Strengthening Adaptation and Resilience to Climate Change in Kenya plus (StARCK+) aims at preparing county government to access global climate finance fund in support of adaptation and climate resilient development and to mainstream mechanisms that allow communities to prioritise investments in public goods that build their resilience to climate change. The Adaptation Consortium is funded by UK Aid from the Department for International Development. The Atlas also incorporates the work undertaken by earlier programmes.

Photographs in this Atlas courtesy of James Pattison, Tom Rowley, and RAP



RESOURCE ADVOCACY PROGRAM
Our resources Our Future



UNIVERSITY OF
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Kenya Meteorological Department

