Turkana County Government

COUNTY RESOURCE MAPS

Turkana County Government

County Resource Maps

Table of Contents

1 Introduction

This resource map report for Turkana County focuses on the following key natural resources:

a) Water

b) Minerals

c) Forests

d) Wildlife

e) Renewable Energy (Geothermal, solar and Wind).

Having mapped her natural resources, Turkana County has therefore shifted gears towards paying attention to how sustainable exploitation of the listed resources may attract investors and indeed guarantee a better quality of life for her people. The resource maps therefore will act as a guide to current and future investors to make strategic decisions in regard to where to invest within Turkana County.

2 Natural Resources in Turkana County

2.1 Water

The main sources of water in rural parts Turkana County are unprotected dug wells, streams, boreholes and boreholes. More than half (61%) of rural households in Turkana County (n= 103,827) use unimproved water sources with majority relying on unprotected wells and streams. However the majority of these households are found in Turkana North district where 60% (n= 43,792) of rural households rely on unimproved water sources (GOK/ UNICEF WASH PROGRAMME, 2013). Water resources potential for the county is not yet established as no proper monitoring installations exist in permanent rivers. The presumed availability of groundwater along river lines is the key reason for shallow wells and boreholes across the county. Access to water greatly affects food security as clearly observed through levels of livestock production, crop production, sanitation, health and nutrition, and therefore hampering human productivity.

The county has rich aquifers at Lotikipi, Nakalale and Napuu, with the latter having been established as a reliable source of water for the growing population in Lodwar.

Surface water from the seasonal rivers is accessed by the community during the rainy season, and also accessed by digging holes in the sandy areas of riverbed to access water during the dry season. This water is not portable and hence the communities as exposed to water borne diseases. Despite the dry nature of the county in most parts of the year, there are

a few permanent rivers including the Turkwel River, Kerio River, Elelea irrigation canal, Nabwanyang River, Nawoyawoi River.

Turkana County presents several springs running from cold to warm to hot springs. The warm springs include; Eliye Springs, also known as Ille Springs. This is a remote village on the western shore of Lake Turkana in Kenya, near the mouth of River Turkwel. Nearby the spring is the Eliye Spring Resort. It is located 50 kilometres east of Lodwar and 40 kilometres south of Kalokol. Koyasa warm spring is found in the North in Kibish ward. The hot springs include; Lomonakipi spring hot spring in Kibish, Muruatapa hot spring, Lobiritit hot spring and Kachapo hot spring in Latea and the Kapedo hot springs. The county also presents a number of cold springs, for example one in Nakurio in Kerio Delta.

2.2 Minerals

Turkana County shares almost similar geological formations and structure with the neighbouring countries: Uganda, Ethiopia and Sudan. This is so because the structural evolution, tectonics and volcanism which culminated in the present rock types and structures took place almost at the same span of time.

The county is traversed by the extensive Eastern African Rift System, which equally traverses through Tanzania and Ethiopia on the east and through Uganda on the west. It is no wonder then that it is within this structure and deep basins of sedimentary deposits outside it that some prospects of oil and gas deposits are manifested. The cratonic masses bordered by this huge rift structure take the share of many types of metallic and non-metallic mineral deposits and materials.

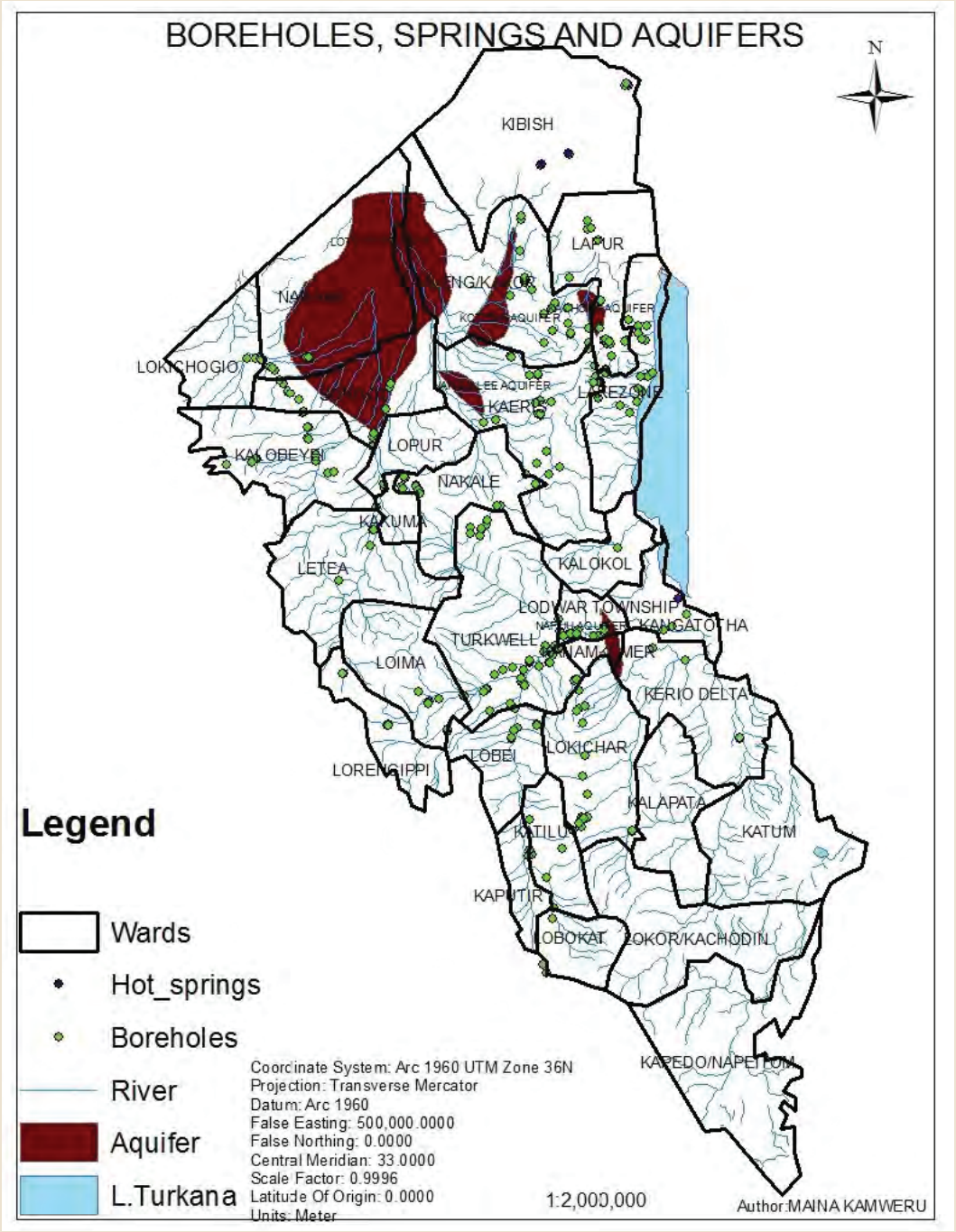


Figure 1: Map Indicates, rivers, boreholes and aquifers

The table below gives a snapshot of the minerals available, their location of occurrence and their typical uses:

No.	Mineral	Location	Typical Use	Level of Exploitation
	Asbestos	Southern part of Lokichar	Insulated boiler covers, roofing sheets, fire proof paints	Untapped
	Barytes	Lokichar	Manufacture of paints, drilling muds, as filler, and as an ingredient in glass making	Untapped
	Bentonite	Occurrence fairly spread: needs further exploration	Drilling mud, binder (e.g. foundry-sand bond, iron ore pelletizer), purifier, absorbent (e.g. pet litter), and as a groundwater barrier.	Untapped
	Beryl	Loichangamatak Hills	Gemstones emerald (green), aquamarine (greenish blue to blue), morganite (pink to orange), red beryl (red), heliodor (yellow to greenish yellow), maxixe (deep blue), goshenite (colorless), and green beryl (light green)	Untapped
	Bornite / Copper	Kaakelae, at Kaaleng-Kaikor border, Lokichar, Karasuk	basis of numerous industrial alloys such as brass, gunmetal, speculum, bronze, and bell metal	Untapped
	Calcite	Kaeris, Kalapata, Turkwel, Emuroy and Kirikinie	Ornamental stone and lime products	Untapped
	Chromite	Lokichar	Manufacture of corrosion-resistant alloys	Untapped
	Corundum	Loima, Nandunga, Kanukurdio,	Grinding media, polishing compounds, sand papers, grinding wheels, and other cutting applications	Untapped, except for a few people that collect the gemstones after the rains
	Galena	Occurrence fairly spread: needs further exploration	Manufacture of storage batteries, water pipes, roofing sheets, solders, and coverings of electric cables	Untapped
	Gold	Karusuk, Nakalale, Kaputir, Loima and Sasame	Industry, medicine, computers, electronics, jewelry, dentistry, coins, space, art and more	There is quite some artisanal activities and no large scale venture in the entire county.
	Graphite	EPEIYELEL area of Karasuk	Foundry facings and moulds, graphite crucibles, lubricants, paints, dry batteries, brushes for electric motors and generators, stove polishes, electrodes, explosive and pencils	Untapped

No.	Mineral	Location	Typical Use	Level of Exploitation
	Garnet	Occurrence fairly spread: needs further exploration	Gemstones and use in industry as abrasives	Untapped
	Gypsum	Kapua in Kalokol, Nakaale in Kalapata and Naposimoru in Lokichar	Cement industry, in fertilizers, as filler in various materials such as paper and paint, and in the manufacture of Plaster of Paris	There is near artisanal activity. The potential is huge for local and regional cement manufacturers
	Iron Ore	Lokichar, Kaaleng, Kaeris and Lapur	Castings, wire, rod, sheet	Untapped
	Magnesite	Occurrence fairly spread: needs further exploration	Refractory bricks, furnace linings and crucibles	Untapped
	oil	Lokichar Basin	Petroleum ether, petroleum spirit, kerosene or paraffin, diesel oil, lubricating oil and fuel oil	Exploration at advanced stage and commercial viability established.
	Silver	Kaeris, Songot and Lokichar	Electrical engineering, electronics, chemical plant, and certain brazing alloys	Untapped
	Talc	Occurrence fairly spread: needs further exploration	Manufacture of paint, roofing felts, rubber and ceramics	Untapped
	Geothermal	Koyasa, Eliye, Lomonakipi, Muruatapa, Lobiritit and Kapendo	Generation of green energy	There are a few companies that have expressed interest and discussions with the county are ongoing.

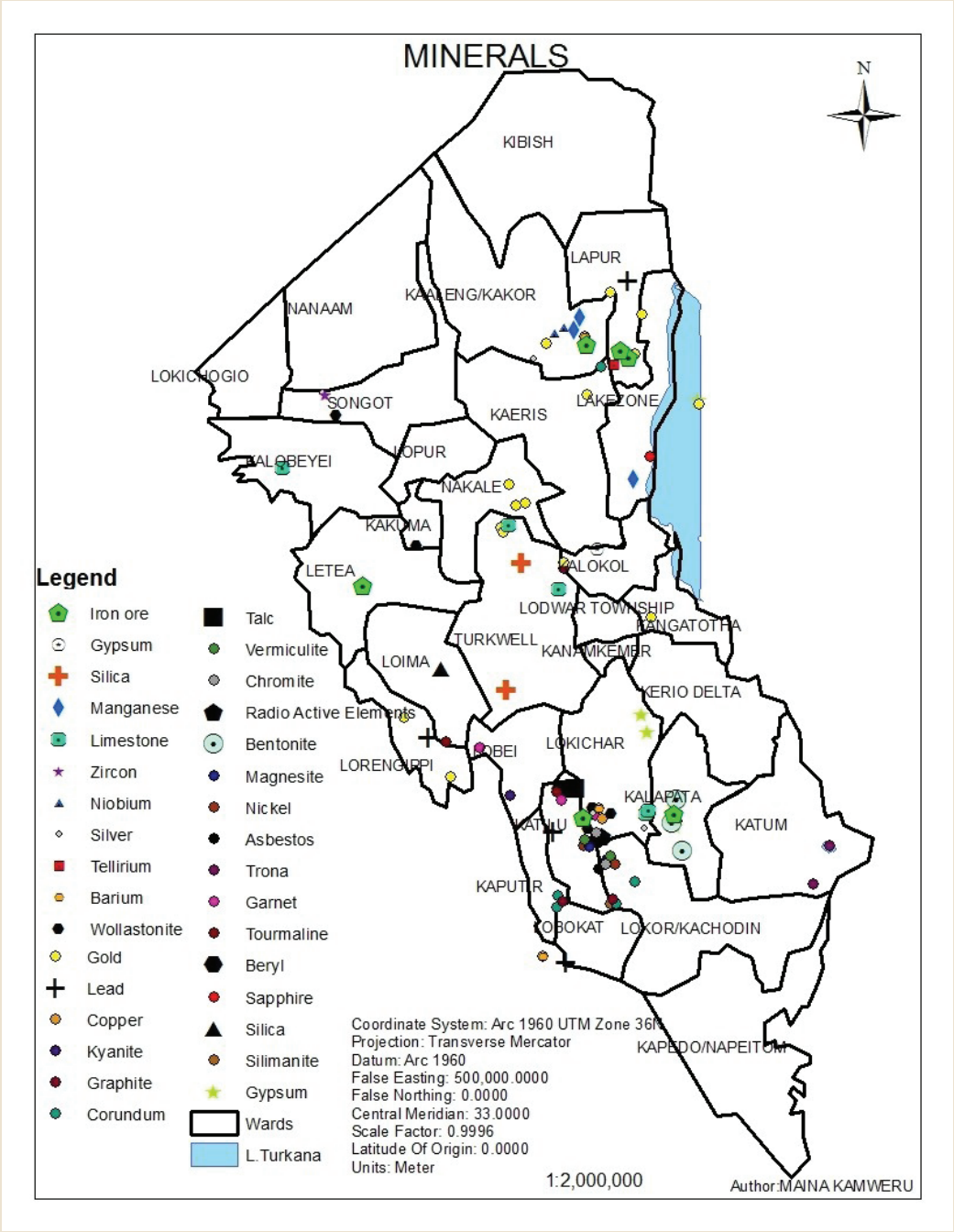


Figure 2: Outline of common minerals, their locations and level of exploitation

2.3 Forests

The Forest tree cover in Turkana County is estimated at 4.06%. There exist forests in high altitude ranges or mountain (montane forests) and along river courses (riverine forests). Forests known to exist are found on Loima hills, Mogila hills, Songot hills, Pelekech Hills, Lorionotum, and Lokwanamur.

2.4 Wildlife

Lake Turkana is an important site for water birds with up to 220,000 congregants having been recorded at one time and 84 water bird species, including 34 Palearctic migrants, known from the lake according to Nature Kenya. Other aquatic animals in the ecoregion include *Hippopotamus amphibius*, Crocodylus spp., and an endemic freshwater turtle, the recently discovered and imperiled Turkana mud turtle (*Pelusios broadleyi*).

Wildlife in Turkana County is managed under the Western conservation area with head offices are in Kitale. Role of KWS is to carry out Problem Animal Control (PAC) and Human Wildlife Conflict resolution (HWC). The South Turkana National Reserve is under the county Government but currently managed by the KWS. Plans are underway to hand it over to the county government in Kainuk.

Turkana County government is making every effort to address the issues of banditry and cattle rustling that have previously portrayed the county as unsafe and insecure. In order to attract meaningful investment and the resultant socio-economic development in the area, the County government must work with the national government to address the perennial security problem.

Leopards and Hyenas can be found on the Murueiris Hills, whereas Lions, Ostriches, gazelles elephants are found in Kibish Sub-county. Tortoises are found in Todonyang area. Survey done in Loima identified 87 species of avifauna, 48 in Aminit forest above 2,050 m and the rest in Acacia wetland at 800 – 2,050 m. The only herbivores identified are bushbucks, troops of Olive baboons and bush pigs. Elephants and buffaloes were absent but are known to have existed here in the past.

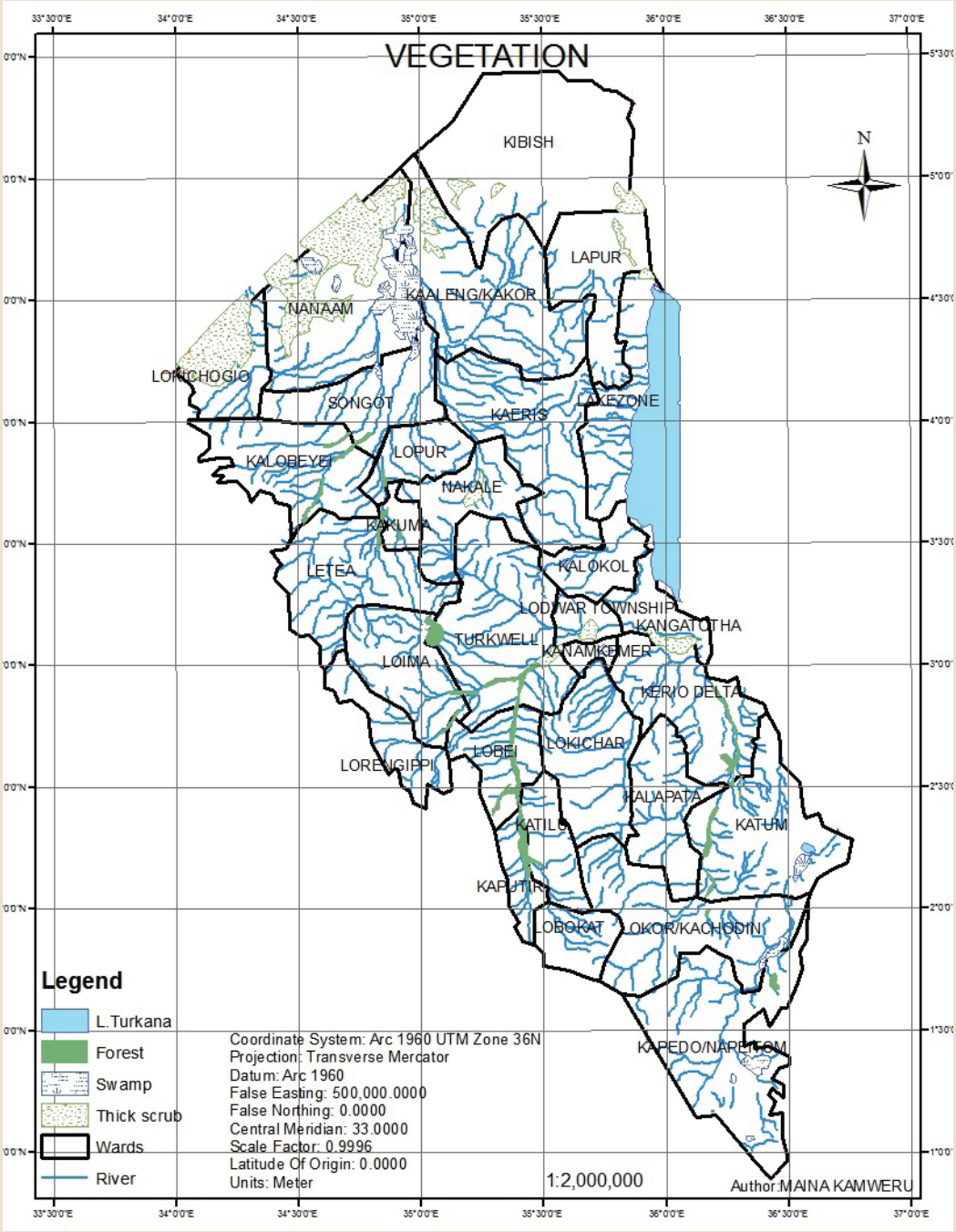


Figure 3: Vegetation and Rivers in Turkana

2.5 Renewable Energy

2.5.1 Solar Energy

Turkana County enjoys sunlight for an average of 10 hours daily. This is an opportunity that is already being tapped into, albeit on a relatively small scale. The radiant heat and light has been harnessed from the sun as both electrical and thermal form. Electricity generated can be used directly or can be stored in batteries for future use. In the case of storing the power, a charge controller is necessary to protect the battery from damage as a result of overcharging or undercharging.

Global Horizontal Irradiance (GHI) and Daily Normal Irradiance (DNI) data acquired from 34 metrological stations over a period of 3 years was used to develop a solar atlas for the country. GHI is more relevant when assessing PV potential and an average value that exceeds 5kWh/m^2 indicates good solar potential. It is evident from the national atlas that Turkana County receives between 4 -6kwh/m^2 of daily solar radiation and therefore has a vast potential for solar energy production.

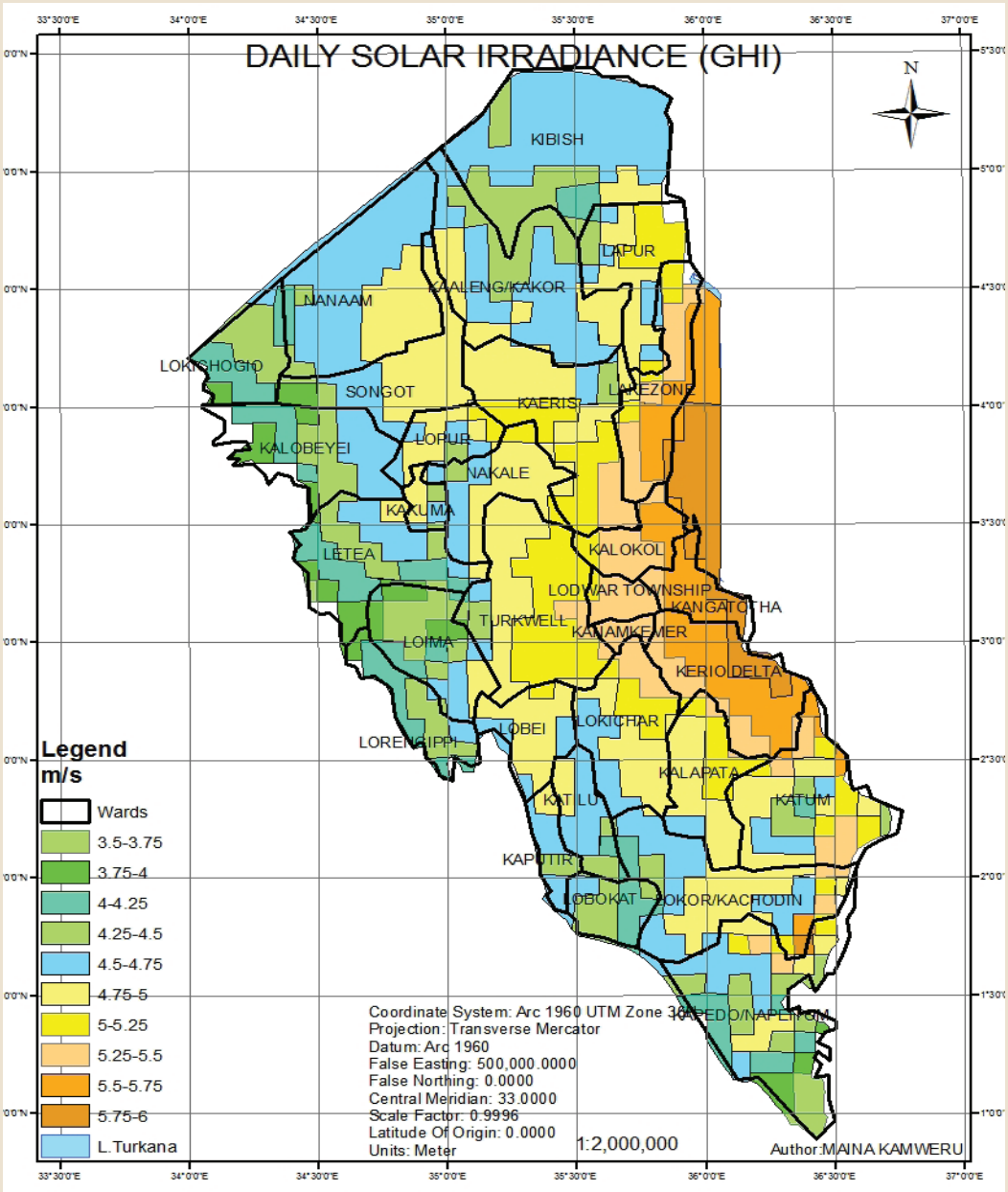


Figure 4: Daily Solar Irradiance in Turkana County

2.5.2 Wind Energy

Wind energy is extracted from air flow and can either be mechanical or electrical. A wind atlas developed alongside the solar atlas by SWERA in May 2008 based on data collected between 2000 and 2002 from about 34 synoptic ground stations spread across the country at heights of 10m and 50m. Wind speeds above 3.5m/s are enough to spin wind turbines, with speeds above 6m/s being the most ideal for firm electricity generation. Most parts of Turkana County can be categorized as moderate wind energy zones since wind speeds are

between 3-5m/s. Northern parts of the county and some parts bordering the lake to the south, are good energy zones since wind speeds experienced are in excess of 5m/s.

From a survey done by Economic Consulting Associates for the kfW project in 2014, the following 7 sites within Turkana County: Naduat, Kokuro, Kalokol, Oropoi, Kataboi, Longtech Island and Lowarengak. Short listing was based on criteria such as absence of the national grid in the area, sufficient electricity demand, economic activities, potential for expansion and synergy with existing projects.

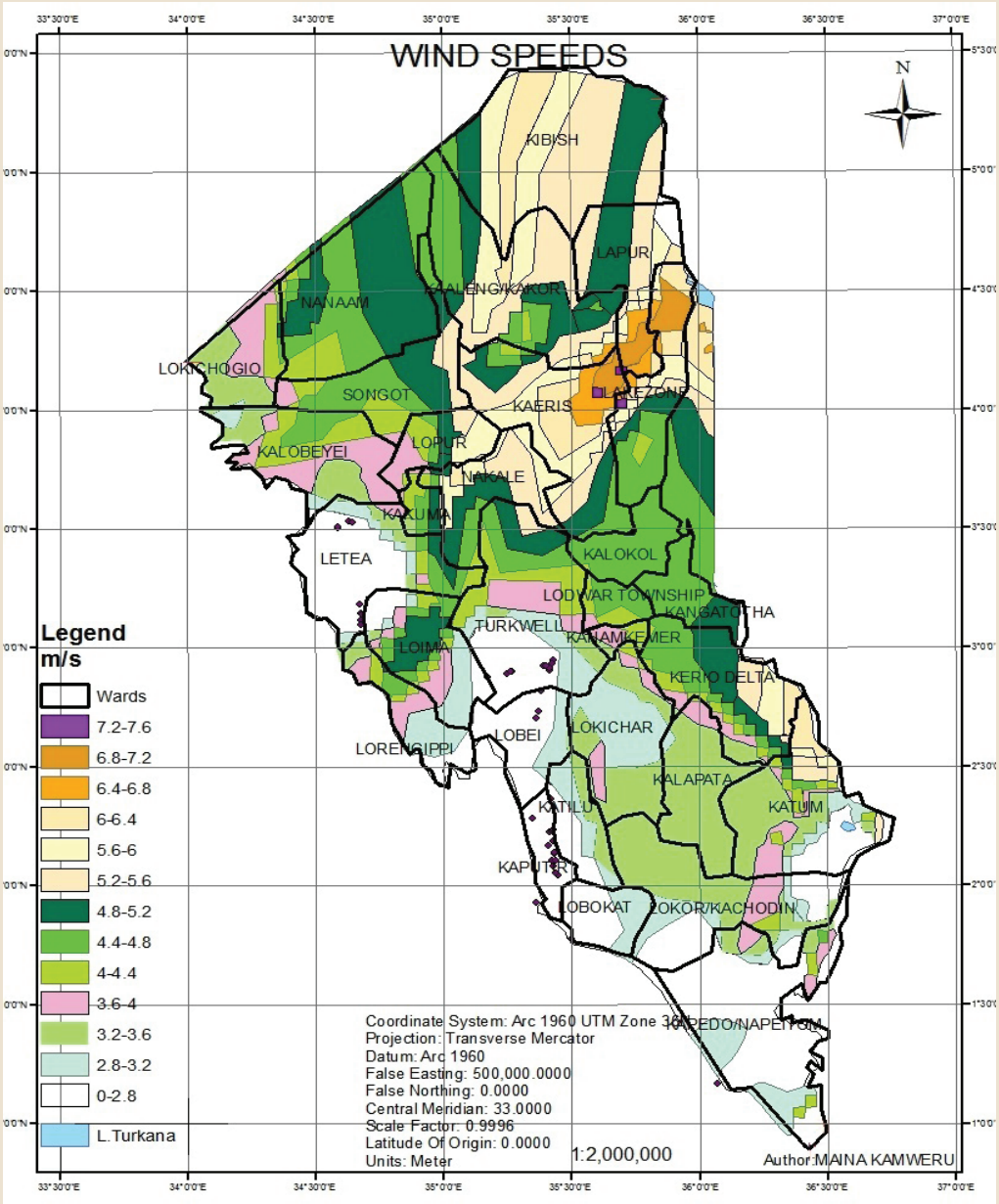
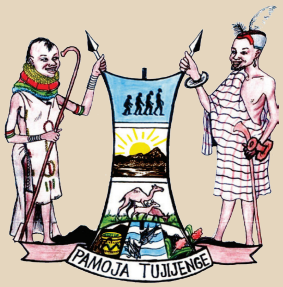


Figure 5: Annual Mean Wind Speed in Turkana



Turkana County Government
P.O. Box 11, 30500
Lodwar