

# CURRICULUM VITAE

## Dr. Kuria, Zacharia Njuguna

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**Name:** Kuria, ZachariaNjuguna

**Date of Birth:** 12<sup>th</sup> February, 1971

**Nationality:** Kenyan

**Profession:** Hydrogeologist/Geophysicist

**Designation:** Senior Lecturer, University of Nairobi  
Groundwater Consultant (Licence No. WD/WRP/61)

**Experience:** Twenty (20) years

### **Professional**

**Affiliations:** Professional Member of the Geological Society of Kenya (No. 581); Registered Geologist (Reg. No. 102); Registered environmental expert with NEMA (National Environmental Management Authority); Academic Member of Staff (University of Nairobi).

University of Nairobi Representative to National Technical Committee Spearheading the Kenya Groundwater Mapping Project (KGMP).

Member of the Task Force on Site Selection for Nuclear Installations in Kenya spearheaded by Kenya Nuclear Electricity Board (KNEB).

Station Operator for Comprehensive Nuclear Test Ban Treaty Organisation (CTBTO) projects.

**Task assigned:** Lecturing in the fields of Hydrogeology, Environmental Geology, and Geostatistics and Computational Methods; and general administrative duties within the Department of Geology. Carrying-out

### **Summary Profile**

Dr Kuria holds PhD in applied Geophysics from University of Twente, Faculty of ITC, Netherlands titled "Seismotectonics of active faults; Magadi fault system, southern Kenya Rift ISBN No. 978-90-6164-315-9, ITC Dissertation No. 194." and published a paper "Active fault segments as potential

earthquake sources: inferences from integrated geophysical mapping of the Magadi fault system, southern Kenya Rift” the data set used include earthquake data, satellite imagery, digital elevation model (DEM), electrical resistivity tomography (ERT), airborne magnetic and ground magnetic. He has used collocated transient electromagnetic (TEM) and magnetotelluric (MT) soundings to image deep faults, furnish fault architecture and its constituents and how they influence seismicity. He has mapped faults from Central Kenya Rift (Lakes Baringo-Bogoria) to Southern Kenya Rift (Lake Magadi) including Suswa-Mai Mahiu area using airborne magnetic survey.

Dr Kuria has successfully applied geophysical techniques to map buried caves along roads and related projects using the geophysical techniques examples include mapping of sinkholes along the Mombasa Southern bypass near Changamwe using Electrical Resistivity Tomography (ERT), Mapping buried caves at Kipeto Wind Project in Kajiado, Carried out detailed faults/fractures mapping along tunnel routes i.e. along 11km Tunnel between Molo and Londiani (part of Itare Dam), 9km tunnel route for Karura Hydropower Plant between Kindaruma and Kiambere Power Stations along Tana River, 12km tunnel along Northern Water Collector in Muranga. In addition the seismic refraction and ERT methods have been applied delineating faults/fractures for numerous dams in Kenya namely; Maara Dam in Chogoria, Meru South Area, Crocodile Jaw Dam at Isiolo County, Mkurumudzi Dam and Koromojo Dam in Kwale County, Maira Dam Project, Busia County, High GrandFall Mega Dam Project along Tana River and Kholombidzo Dam, **Malawi**. In these projects the availability and quality of the construction resource material (quarry and borrow area) was assessed.

He has recently completed some projects Suswa area while others are still on-going. These include detailed geophysical mapping i.e. 32 No. Vertical Electrical Sounding to establish characteristics of various rock types with depth, 20 No. Electrical Resistivity Tomography to delineate faults/fractures that may affect foundation of substation electrodes, 1 No. Transient Electromagnetic Measurement for deep probe (1 km depth) and 1 No. Magnetotelluric Measurement for depth (100 km depth) current flow. The team has completed soil blending (a comprehensive assessment of insitu and external soils) in perusal of a suitable economical compaction mix and dynamic compaction is on-going for foundation improvement at Suswa HVDC Sustation. Has carried out Rock Resource Assessment for SGR Quarries at Suswa

On groundwater investigations, Dr. Kuria Worked as a groundwater consultant in Southern **Sudan, Somalia, Somaliland, and Putland** between 2002 to 2007 for UNICEF-OLS (20 boreholes in

Yambio, Maridi and Tobura), Norwegian Church Aid (10 boreholes in Nuba Mountains, Catholic Relief Services (10 boreholes in Ezo, Yambio and Tobura), Drilling Services International (30 boreholes at Kapoeta) and ADRA Somali (5 boreholes in Dinsor and Condition assessment (5 boreholes) in neighbouring districts). Locally he has evaluated and successfully designed well fields (several boreholes located together) i.e. Olobanita Well field supplying in Nakuru Town and Delmonte Wellfield. He has carried out Groundwater Resource Assessment of the entire Mandera County, entire Muranga County and entire Uasin Gishu County.

He was Head of Groundwater Section and Acting Deputy District Water Officer in Kisumu from 1998 to 1999. Responsible for management of government drilling programmes and contracts within the District, Supervision of drilling works, Borehole design and construction, geological logging, pump tests operations, and database management. Carried out over 50 groundwater survey projects within Nyanza province.

He has trained on seismology, seismic data analysis, hazard assessment and risk mitigation at Potsdam, Germany (October 2005) and Helwan in Cairo Egypt (1995).

He has trained in use of high resolution Quickbird Satellite Imagery and GIS at Regional Centre for mapping Resources for Development (2004).

### **Education**

2011	PhD University of Twente (Faculty of ITC), Netherlands.
2001	M.Sc. Hydrogeology/Geophysics University of Nairobi (Grade “A” in all Course Units).
1995	B.Sc. Geology (First Class Honours) University of Nairobi – Best Student Award.

### **Employment Record:**

#### **PERIOD 2012 – TODATE:**

##### **Senior Lecturer:**

University of Nairobi, Department of Geology. Involved in lecturing the following courses: *First Year Masters Courses: Hydrogeology (SGL 517); Groundwater modelling (SGL 518) using numerical analysis, which covers Model discretization, Model Calibration and Simulation of different abstraction scenarios. The software used is MODFLOW;*

*Geological thermodynamics (SGL 524); Geophysical field project (SGL 532); Undergraduate courses: Environmental Geology (SGL 409) and Hydrogeology (SGL 406); introduction to geological thermodynamics (SGL 312); Geostatistics (SGL 204). Postgraduate Diploma Environmental and Natural Disaster Management: Environmental Geoscience (SGL 606);*

Station Operator for CTBTO Project: Involved in seismological and infrasonic data acquisition, management and transmission to Vienna, Austria.

Representative of Department of Geology to School of Physical Sciences Postgraduate studies Committee (SPS-PSC).

## **PERIOD 2006 – 2012:**

### Lecturer:

University of Nairobi, Department of Geology. Involved in lecturing the following courses: **First Year Masters Courses:** *Hydrogeology (SGL 517); Fourth Year Courses: Environmental Geology (SGL 409) and Hydrogeology (SGL 406); Second Year Course: Geostatistics (SGL 204). Postgraduate Diploma Environmental and Natural Disaster Management: Environmental Geoscience (SGL 606);*

Station Operator for CTBTO Project: Involved in seismological and infrasonic data acquisition, management and transmission to Vienna, Austria.

## **PERIOD 2002 – 2006**

### Assistant Lecturer:

University of Nairobi, Department of Geology. Involved in lecturing the following courses: **First Year Masters Courses:** *Hydrogeology (SGL 517); Fourth Year Courses: Environmental Geology (SGL 409) and Hydrogeology (SGL 406); Second Year Course: Geostatistics (SGL 204). Postgraduate Diploma Environmental and Natural Disaster Management: Environmental Geoscience (SGL 606);*

Station Operator for CTBTO Project: Involved in seismological and infrasonic data acquisition, management and transmission to Vienna, Austria.

## **Publications:**

### Thesis/Dissertation

1. Kuria, Z.N. 2011. Seismotectonics of active faults; Magadi fault system, southern Kenya Rift. PhD Thesis, University of Twente, Netherlands. ISBN No. 978-90-6164-315-9, ITC Dissertation No. 194.
2. Kuria, Z.N. 2001. Hydrogeology of Lake Nakuru drainage basin, using electrical resistivity survey. M.Sc. Thesis, University of Nairobi, Kenya.
3. Kuria, Z.N. 1994. Geological Mapping of Makweni (Kibwezi Area) and Kitui (Ikutha Area) Districts. B.Sc. Dissertation, University of Nairobi, Kenya.

### Published Journal articles

1. Kanoti, J.R., Olago, D., Opiyo, N., Nyamai, C., Dindi, E. and **Kuria, Z.** (2019). Characterization of Major Ion Chemistry and Hydro-Geochemical Processes in Mt. Elgon Trans-Boundary Aquifer and Their Impacts on Public Health. *Journal of Environment and Earth Science*. Vol.9, No.4, ISSN 2224-3216.
2. Mulwa, J.K., Kimata, F., Suzuki, S. and **Kuria, Z.N.** (2014). The seismicity in Kenya (East Africa) for the period 1906–2010: *Journal of African Earth Sciences* 89:PP.72–78.
3. **Kuria, Z.** (2013). Groundwater distribution and aquifer characteristics in Kenya. In P. Paolo, O. O. Daniel, & T. O. Christian, Kenya: A natural Outlook. *Geo-Envinmental Resources and hazards* (pp. 83-107). Elsevier.
4. Komolafe, A.A., **Kuria, Z.N.**, T Woldai, T., Noomen, M., Anifowose, A.Y.B. 2013. Investigations into the tectonic faults on Magadi geothermal field using ground and aeromagnetic data. *Sci Rev Res Int* 3 (4), 385-406.
5. Komolafe, A.A., **Kuria, Z.N.**, Woldai, T., Noomen, M., Adeleye Yekini Biodun Anifowose, A.Y.B., 2012. Integrated Remote Sensing and Geophysical Investigations of the Geodynamic Activities at Lake Magadi, Southern Kenyan Rift. *International Journal of Geophysics*, Volume 2012 (2012), 15 pages, doi:10.1155/2012/318301.
6. Kodikra, G.L., Woldai, T., van Ruitenbeek, J.A., **Kuria, Z.N.**, van der Meer, F., Shepherd, K.D., van Hummel, G.J. 2012. Spectral remote sensing of evaporate minerals and associated sediments in Lake Magadi area, Kenya. *International Journal of Applied Earth Observation and Geoinformation* Volume 14, Issue 1, p. 22-32.
7. **Kuria, Z.N.**, Woldai, T., Barongo, J.O., van der Meer F.D. 2010. Active fault segments as potential earthquake sources: inferences from integrated geophysical mapping of the Magadi fault system, southern Kenya Rift. *Journal of African Earth Sciences* 57, 345-359.
8. **Kuria, Z.N.**, Woldai, T., Opiyo\_Akech, N. 2010. Imaging saltwater intrusion into coastal aquifers with electrical resistivity tomography at Lamu Island, South Coast Kenya. *African Journal of Science and Technology* 11 (2) 57-72.
9. Kodikra, G.L., Woldai, T., van Ruitenbeek, J.A., **Kuria, Z.N.**, van der Meer, F., Shepherd, K.D., van Hummel, G.J. Spectral remote sensing of evaporate minerals and associated sediments in Lake Magadi area, Kenya. Submitted:*International Journal of Applied Earth Observation and Geoinformation*.

### Submitted Journal articles

1. Kuria, Z.N., Woldai, T., van der Meer F.D., Barongo, J.O., Noomen, M., Komolafe, A., van der Meijde, M. Crustal thermal regime for central to southern Kenya Rift: implication for geothermal resources. Submitted: *Geothermics; International Journal of geothermal research and its application*.
2. Kuria, Z.N., Woldai, T., van der Meer F.D., Barongo, J.O., Noomen, M., Komolafe, A., van der Meijde, M. Characterisation of thermal and tectonic structures for central to southern Kenya Rift: Seismotectonic implication. Submitted: *Journal of African Earth Sciences*.

3. Kuria, Z.N., Woldai, T., van der Meer, F.D., Barongo, J.O. Fault growth through nucleation and interaction at Lakes Magadi-Natron area, south Kenya rift: inferences from repeat pass radar interferometry, Submitted: International Journal of Digital Earth.
4. Kuria, Z.N., Barongo, J.O., Woldai, T., van der Meer F.D. Dyke intrusion and fluidized fault zone inferred from magnetotelluric studies at Magadi fault system, southern Kenya implication for seismicity distribution. Submitted: Geophysical Journal International.

#### Books and book chapters

1. Kuria, Z.N., 2009. Hydrogeology. Teaching manual for open and distance learning. University of Nairobi press.
2. Kuria, Z.N., 2011. Introduction to geological thermodynamic. Teaching manual for open and distance learning. University of Nairobi press.
3. Kuria, Z.N., Geology, geological processes and distribution of fluoride in rocks. Book chapter under review.

#### **Student supervision (MSc.):**

Henry Kubai Mwaura	I56/74227/14
George Kinyanjui Mwaura	156/82719/15
Alexander Mutuku Nzomo	156/82812/15
Julius Odida Ogut	156/79737/12
Samuel Kamau Runo	156/80912/12
Tabitha Wambui Githinji	156/68395/11
Samoei Ongwae	I56/70677/07
Isaac Kanda	I56/8526/06
Anastasia Wanjiku Mwangi	I56/7913/06
Ann Mwangi	I56/8525/06
Joyce Okoo Atieno	I56/7363/04
Joseph MuideMunyoki	I56/7678/04
Marietta WanjiruMutonga	I56/7688/04
Agnes WanjiruGatuambui	I56/8695/04
Mathew LoleLoltome	I56/7181/02

#### **On-going MSc supervision:**

Ngetich Simon	I56/86810/2016
Emmanuel Mulehane Acholla	I56/6732/2017
Misongo Moses	I56/14020/2018
Yonis Ali Yusuf	I56/12746/2018

#### **Student supervision (PhD):**

1. **Samson Omondi Oiro.** Proposed research project: Hydrogeological and Hydro-geochemical Investigation of Lake Victoria South Catchment Area in Kenya. A sandwich between University of Nairobi- Kenya and Ghent University-Belgium.
2. **Tabitha Wambui Githinji.** Proposed research project. Assessment of groundwater characteristics in Wajir- Habaswein Region, Kenya and the Impacts of Climate Change/Variability and population growth on future sustainable management of the resource. A sandwich between University of Nairobi- Kenya and La Trobe University-Australia.
3. **Tanui J. Florence.** Hydrogeology of the Napuu Alluvial Aquifer System and its vulnerability to Rainfall and Streamflow variability, Turkana County, Kenya”.
4. **Ogut Julius Odida** Hydrogeophysical and Hydrogeochemical Characterization of Msambweni Aquifer, Kwale County, Kenya.

**Training (on-job):**

1. Attended a two weeks Program on Scientific of Kenya Experts to Turkish Atomic Energy Authority (TAEK), on Nuclear Power Plant – Siting and Site Evaluation, in Ankara Turkey 12-25<sup>th</sup> March 2018.
2. Attended training workshop: African Region Infrasound Workshop and Integrated Training for NDC Held 12-16<sup>th</sup> February 2018 in Tunis, Tunisia
3. Attended a training workshop on distant learning at Kenya Wildlife Training Institute at Naivasha (6-11<sup>th</sup> March 2006) and compiled a teaching manual SGL 312: Introduction to geological thermodynamics.
4. Attended a training workshop on distant learning at Egerton University (March 6-11<sup>th</sup> 2006) and a compiled a manual SGL 406: Hydrogeology.
5. Trained on application of geophysics to continental shelf research as part of the desk study for claim beyond 200 nautical miles at UNEP Nairobi (March 14-24<sup>th</sup> 2006).
6. Trained on seismology, seismic data analysis, hazard assessment and risk mitigation at Potsdam, Germany (October 2005) as a part of the PhD programme.
7. Trained in use of high resolution Quickbird Satellite Imagery and GIS at Regional Centre for mapping Resources for Development (June 2004).

**PROJECTS CARRIED WITH OTHER ORGANISATIONS (2003- TODATE)**

**Hydrogeological and Geophysical Studies:**

Groundwater Resource Assessment of the entire Muranga County, 2018 (*Mangat I.B. Patel and Partners/JICA*) – on going.

Groundwater Resource Assessment of the entire Mandera County on-going (*Earthview Geoconsultants/Radar Technologies International*)

Groundwater Resource Assessment of the entire Uasin Gishu County, 2017 (*Mangat I.B. Patel and Partners/JICA*).

Kenya groundwater mapping programme on-going (*Ministry of Water and UNESCO*).

Groundwater resource assessment of five (5) towns in western Kenya (Kendu bay, Uyugis, Ndhwa, Ukwala and Ugunja), 2016 (*CAS Consultants*).

Hydrogeological survey (2boreholes) at Transmara Sugar Company, Transmara area, Kilgoris, Narok County 2016 (*Transmara Sugar Company*).

Hydrogeological survey (3boreholes) at University of Nairobi Kenya Science Campus, Main Campus and Kikuyu Campus 2016 (*University of Nairobi*).

Hydrogeological Survey at Mau Narok, Nakuru County, Kenya, 2016 (*ESEDO/Solution Link*).

Hydrogeological Survey at Purko Trust Land, Narok County, Kenya, 2016 (*ESEDO/Solution Link*).

Rapid transboundary diagnostic assessment: Mt. Elgon Aquifer on the Kenya side, Kenya, 2015 (*IGAD*).

Hydrogeological Survey at Rabai Power, Near Mazeras, Kilifi County, Kenya, July 2015 (*Rabai Power Ltd.*).

Hydrogeological Survey at near Kilifi Town, Kenya, July 2015 (*Broad Supplies Ltd*).

Hydrogeological Survey at Malili Village, Konza Area, Makueni County, June 2015 (*Broad Supplies Ltd*).

Hydrogeological Survey at Jupiter Site, Near Samburu Town, Vinyudini Sub-Location, Kinango Division Kwale County, Kenya, June 2015 (*Rift Energy/Earthview Geoconsultants*).

Hydrogeological Survey at Mars Site, Kinangoni Sublocation, Kinango Division Kwale County, Kenya, June 2015 (*Rift Energy/Earthview Geoconsultants*).

Hydrogeological Survey at Mercury Site, At Kithengwa Mchenda Sublocation, Kaloleni Division, Kilifi County, Kenya, June 2015 (*Rift Energy/Earthview Geoconsultants*).

Hydrogeological Survey at Saturn Site, Near Silaloni Town, Silaloni Sub-location, Kinango Division Kwale County, Kenya, June 2015 (*Rift Energy/Earthview Geoconsultants*).

Hydrogeological Survey at Purko Development Trust Land, near Tipis Shopping Centre, Narok County, Kenya, May 2015 (*ESEDO/ Solutions Linkconsult (EA) Ltd.*).

Hydrogeological Survey at Mau Narok Area, Nakuru County, Kenya, April 2015. (*ESEDO/ Solutions Linkconsult (EA) Ltd.*).

Rapid Trans-boundary Diagnostic Assessment: Mt. Elgon Aquifer, Kenya, March 2015 (*IGAD*).

Hydrogeological Survey at Hudun Site, Sool Region, Somaliland 2014 (DNO, Earthview).

Hydrogeological Survey at Westmont Borehole, Menelik Road, Near Yaya Centre 2014 (*Lawyer Ogeto*).

Hydrogeological Survey at Teejay Estates, Hatheru Road, Lavington 2014 (*Lawyer Ogeto*).



Hydrogeological Survey Replacement of Borehole 6, at IFO Refugee Camp, Lagh Dera District, Garissa County, Kenya 2014 (*CARE International*).

Hydrogeological survey report at Suswa Power Station, Suswa Area, Narok County 2013 (OPAL Ltd).

Hydrogeological Survey Report at St. Francis Xavier Girls Secondary School 2013 (*St. Francis Xavier Girls Secondary School*).

Hydrogeological Survey Report at Sala-1 Site, Garse Village, Griftu area, Wajir County 2013 (*Africa Oil Ltd*).

Hydrogeological Survey Report at Bahasi-1 Site, Barchuma Area, Marsabit County 2013 (*Africa Oil Ltd*).

Hydrogeological Survey Report at Machakos Junction, Machakos County 2013 (*Mr. Kathome*).

Hydrogeological Survey Report at Kiping’i Village For Kiping’i Community Water Project, Nyakach District 2013 (*World Vision Kenya*).

Hydrogeological Survey Report at Mbogoini Village for Mbogoini Community Water Project, Subukia District, Nakuru County 2013 (*World Vision Kenya*).

Hydrogeological Survey Report at Banana Area for Mugumo Flat, Kiambaa Location Kiambu County 2012 (*Mr. Peter Wamwaki Kariuki*).

Well-field design for 10 boreholes Phase III 2010 (*Delmonte Ltd*).

Detailed groundwater investigation (10 boreholes) Phase II, 2010 (*Delmonte Ltd*).

Groundwater Resource Assessment for 10 boreholes Phase I 2010 (*Delmonte Ltd*)

Hydrogeological Survey, Chelele-Kaluva area, Kitui East 2010 (*Mr. Philip Wambua*).

Hydrogeological survey, Kithau – Mulala Area, Nzau District, 2009 (*Augustine Suka*);

Hydrogeological Survey, Mamboleo, Kisumu City, (*Alicia Bakers and Confectioners Ltd.*).

Hydrogeological survey, Ndeiya Area, Kiambu West District, 2009 (*ST. Veronica Intergrated Learning Centre*).

Geological, hydrogeological and Geophysical investigations, Lamu Island (*National Museums of Kenya*);

Hydrogeological and Geophysical investigations, five (5) sites and Conditions assessment (5 boreholes) in Dinsor District, **Somali** (*ADRA Somali*).

Hydrogeological and Geophysical investigations, thirty (30) sites Kapoeta North and South, Eastern Equatorial Southern **Sudan** (*AAR Japan and Drilling Services International*);

Pre-feasibility study of the Rural Water Supply Scheme for Kwanza, Kapcherop, Kapsowar, Matunda, Kaptama, Kapsakwony, Cheptais, Kamakoiwa, Lugari, Lumakanda, Kipkarren, Bukembe, Navakholo, Funyula, Musanda, Serem, Sio, Port Victoria, Hamisi, and Lessos (*Mangat I.B. Patel & Partners*).

Pre-feasibility study on groundwater potential assessment for eight towns namely Kakamega, Busia, Nambale, Mumias, Butere, Kapenguria, Makutano and Kimilili (*Mangat I.B. Patel & Partners*).

Hydrogeological and Geophysical investigations, Four Borehole Sites at Athi River Junction (*Archer Dramond Ltd*);

Hydrogeological and Geophysical investigations, fifteen (15) sites in Awoda Payam, Aweil Centre County Bahr El Ghazal, **Sudan** (*Groundwater Survey Ltd*)

Hydrogeological and Geophysical investigations, Ten (10) sites in Awoda Payam, Aweil County, Bahr El Ghazal, **Sudan**(*Groundwater Survey Ltd*).

Geophysical investigations of the upper most geological formations for Jomo Kenyatta International Airport: Terminal Renovations and Expansions (*Surtech Ltd*).

Geophysical investigation of the soil profile along 50 kilometer section between SonduMiri power station and Kisumu sub-station (*KENGEN/Surtech Ltd*).

Borehole site investigations at Kagondo Area, Nairobi (*Mr. Macharia Mwangi*).

Borehole site investigations off Langata Road, Karen, Nairobi (*Central Bank of Kenya Pension Fund*).

Borehole condition assessment of Baharini and Kabatini well fields In Nakuru District (*Mangat I.B. Patel and Partners*)

Borehole site investigations for Ten (10) boreholes at Yambio Area, Southern **Sudan** (*UNICEF*)

Borehole site investigations for Ten (10) borehole site investigations Nuba Mountains, Southern **Sudan** (*Norwegian Church Aid*).

### **Geophysical Studies and geotechnical investigations**

Report on Mapping Clay Pockets using Electrical Resistivity Tomography at Suswa HVDC Sustation, May 2018 (*Siemens Aktiengesellschaft Germany*)

Geotechnical investigations for extension of the existing Suswa Substation, May 2018 (*Siemens Aktiengesellschaft Germany*)

Rock Resource Assesment using Seismic Refraction for Cut-Stone Quarry at Kaguma Village, Meru County May 2018 (*Hutton Construction Ltd*)

Geological Survey and Electrical Resistivity Tomography (ERT for the Proposed Weir, Retaining Wall and Intake Chamber along Athi River at Kayata Area, Machakos County April 2018 (*CAS Consultants Ltd*)

Rock Resource Assessment using Electrical Resistivity Tomography (ERT) at Royal Nairobi Golf Course, Nairobi County March 2018 (*Mr. Jackson Kanyarati*)

Geotechnical investigations for foundation at Mombasa Cement factory, Kilifi County, March 2018 (*Mombasa Cement Ltd*).

Rock Resource Assessment using Electrical Resistivity Tomography (ERT) at Engineer Area (Muthoni's Farm) in Kinangop, Nyandarua County March 2018 (*Mr. Lenana*).

Soil blending (a comprehensive assessment of insitu and external soils in perusal of a suitable economical compaction mix) followed by dynamic compaction for foundation improvement at Suswa HVDC Sustation, January 2018 (*Siemens Aktiengesellschaft Germany*).

Report on Geotechnical Investigations at Existing Suswa substation (drilling of 6 boreholes, trial pits, laboratory tests and SPT TEST), Mt. Suswa Area, Nakuru County, January 2018 (*Siemens Aktiengesellschaft Germany*).

Report on Geotechnical Investigations at Suswa Electrode Site (drilling of 32 boreholes and SPT TEST), Mt. Suswa Area, Narok County, 2017 (*Isolux Corsan*).

Report on Geophysical Investigations at Electrode Site (VES, ERT, TEM and MT), Mt. Suswa Area, Narok County, 2017 (*Isolux Corsan*)

Report on Soil characterization using Electrical Resistivity Tomography and Earth Resistivity Testing Using Four Terminal Method (-Wenner Array), Suswa Power Station, Mt. Suswa Area, Narok County, 2017 (*Isolux Corsan*).

Rock Resource Assessment ( Using Multichannel Analysis of Surface Waves (MASW) at Komo Area, Kiambu County, 2017 (*Samba Ltd*).

Geophysical and Geotechnical Investigations (Seismic Refraction, Trial Pits and DCP Test), At Ruaka Site, Kiambu County, 2017 (*Heri Homes Properties Ltd*).

Seismic refraction survey conducted at the Itare Dam Site, Ndoinet, molo, in Nakuru County, Kenya, 2016 (*Lilac Engineering Ltd. and Isolux Corsan* ).

Refraction Microtremors at the Suswa Power Substation, Suswa Area, Narok County, Kenya, 2016 (*Lilac Engineering Ltd. and Isolux Corsan*).

Assessment of rock resources for ballast Using Electrical Resistivity Tomography at Suswa area, Narok County, Kenya 2016 (*China Road and Bridge Corporation/Earthview Geoconsultants*).

Rock resource assessment using Seismic Refraction at proposed Kamulu Quarry Site, Kamulu Area, Machakos County, Kenya, 2016 (*Herbert Kariithi Githinji & Rufus Gachanja Kanyari*).

Earth electrical resistivity survey at Mikinduri substation, in Mikinduri, Meru County, Kenya, 2016. (*Mass labs Ltd.*)

Earth electrical resistivity survey at Kiamutugu substation, in Kiamutugu area, Kirinyaga County, Kenya, 2016. (*Mass labs Ltd.*)

Geological mapping and geophysical survey (Electrical Resistivity Tomography) of 60 turbines locations as a part of evaluation of buried caves at Kipeto Wind Farm, Kajiado 2015 (*Earthview Geoncosultants Ltd/Iberdrola Engineering and Construction*).

Geological mapping and geophysical investigations for Kholombidzo Hydropower Plant, Neno and Blantyre Districts, Malawi 2015 (*Connex Cosultant Ltd/COBA*).

Geological investigation and electrical resistivity tomography (ERT) for the proposed Mutindwa Dam Site, Chogoria, Meru South area, 2015 (*CAS Consultants*).

Multichannel analysis of surface waves (MASW) and Downhole Seismic at the proposed High Rise Building, Upper Hill, Nairobi County, Kenya 2015 (*Terraconsult Kenya Ltd*).

Multichannel analysis of surface waves (MASW) 1D and 2D models for Menengai Geothermal Project, Nakuru County, Kenya (*Rocklink Ltd*).

Report on geophysical Survey (vertical electrical sounding) at the Proposed Large Scale Photovoltaic (PV) Project Site in Ngeria area, Eldoret 2015 (*Mass labs Ltd.*).

Geological and geophysical survey proposed quarry site at Mavoko, Parcel No.; Mavoko block 2/124 (Katani), Mavoko Sub-county, Machakos County, 2015 (*H-Young & Co. (EA) Ltd.*)

Report on Earth Electrical Resistivity Survey at Loiyangalani 220 Kv substation, 2015 (*Opal Ltd*)

Report on Earth Electrical Resistivity Survey at Kitui 220 Kv substation, 2014 (*Mass Labs Ltd.*)

Geophysical survey using Wenner Array profiles in Ruiru, Nairobi for the proposed UNILEVER Factories at Tatu-city and the Northern unit (*Masslabs Ltd*).

Geological mapping, geophysical and geotechnical investigations for 9km tunnel as a part of Karura hydropower plant, Mbeere Districts 2014 (*KENGEN, Kelly Construction, Earthview Geoconsult*).

Report on Seismic Refraction Survey for the proposed Ndakaini Dam-Kabete Reservoir water Pipeline 2014 (*Mangat I.B. Patel & Partners*).

Evaluation of rock resource (hard stones) for ballast in six counties: Embu, Meru, Kitui, Machakos, Makueni and Tharaka /Nithi, 2014 (*Geotech Lab Test Ltd*).

Geophysical Investigations ( Electrical Resistivity Tomography) for Sinkholes in the vicinity of Mombasa Southern Bypass, Changamwe Mombasa, 2014 (*Mass Labs Ltd.*).

Report on soil testing using electrical resistivity survey at Athi River, 2014 (*Mass Labs Ltd.*)

Report on soil testing using electrical resistivity survey at Kitengela, 2014 (*Mass Labs Ltd.*)

Report on Earth Electrical Resistivity Survey at Maungu 220 Kv substation, 2014 (*Mass Labs Ltd.*)

Report on earth electrical resistivity survey at Bomet 220 Kv substation, 2014 (*Mass Labs Ltd*)

Multichannel Analysis of Surface waves (MASW), At Aluminium-Can Manufacturing Plant, Sultan Hamud, Makueni County, Kenya, 2014 (*Gibbs, Engineering & Construction*).

Geophysical Investigations (Electrical Resistivity Tomography) for Maara Dam, Meru County, 2014 (*CAS Consultants*).

Multichannel Analysis of Surface Waves for building foundation, Kinangop Wind Farm, 2014 (*Earthview Geoncosultants Ltd/Iberdrola Engineering and Construction*).

Geophysical Investigations (Wenner Survey) for the proposed Power Substations located at Kipevu area, Mombasa County, 2013 (*Opal Ltd./Kenya Power*).

Geophysical Investigations (Wenner Survey) for the proposed Power Substations located at Mariakani area, Kilifi County, 2013 (*Opal Ltd./Kenya Power*).

Geophysical Investigations (Wenner Survey) for the proposed 33/11 kv Power Substations located at Kabarak, Kipsaraman, Elgon View, Kibos, Maseno, Ahero and Chepsion under Keep Kenya Lot 2-Projects, 2013 (*Opal Ltd./Kenya Power*)

Geophysical Investigations (Electrical Resistivity Tomography) for Isiolo Dam: Crocodile Jaw Oldo Nyiro 2013 (*CAS Consultants*).

Multichannel Analysis of Surface Waves for building foundation, San Marco Centre Malindi Kenya 2013 (*DPI/Earthview Geoconsult*).

Geophysical Investigations (Seismic refraction survey) for the proposed Mkurumudzi Dam, Kwale County-Regional Geophysical Survey Limited-November, 2012 (*Grout and Shotcrete Ltd*).

Geophysical Investigations (Seismic refraction rippability survey) for the proposed 15 storey Car park at Adams Arcade, Nairobi County, 2012 (*Septcom Ltd –Eng Minju Kariuki*).

Geophysical Investigations (Electrical Resistivity Tomography) for three (3) Dam sites located at Ugunja (NZ42A), Lusumu (NZ40A), and Hemstead near Turbo (NZ33B), 2012 (*CAS Consultants/Ministry of Special Programmes*).

Geophysical Investigations (Electrical Resistivity Tomography) for Thwake Dam site along Athi River, Wote County, 2012 (*CAS Consultants/Ministry of Special Programmes*).

Geophysical Investigations (vertical Electrical Sounding, Electrical Resistivity Tomography and geological logging) for the proposed Moi Air Base power substation project, Nairobi County, 2012 (*Opal Ltd./Kenya Power*).

Geophysical Investigations (vertical Electrical Sounding, Electrical Resistivity Tomography) for the proposed Makongeni power substation project, Thika area, 2012 (*Opal Ltd./Kenya Power*).

Geological mapping, geotechnical and geophysical investigations (Surface seismic refraction) for Maira Dam Project, Busia County, 2012 (*Nile Basin Initiative*).

Geophysical investigations (Surface seismic refraction) for Mkurumudzi Dam Project, Kwale County-Regional Geophysical Survey Limited-January, 2012 (*Grout and Shotcrete Ltd*).

Geophysical investigations (Electrical Resistivity Tomography and Surface seismic refraction) for Koromojo Dam, Kwale County-Regional Geophysical Survey Limited-January, 2012 (*Grout and Shotcrete Ltd*).

Geophysical investigations (surface seismic refraction) for the sugar factory foundation, Kwale international Sugar Company (Kiscol)-Regional Geophysical Survey Limited- November, 2011 (*Grout and Shotcrete Ltd*).

Geophysical investigations (Surface seismic refraction) for High GrandFall Mega Project along Tana River, Tharaka and Mwingi Districts- (Regional Geophysical Survey Ltd)-2011(*Grout and Shotcrete Ltd/AEGIS International*).

Detailed groundwater investigation in Isiolo area (8 boreholes), 2010 (*Log Associates and World Vision*).

Geological mapping, geophysical and geotechnical investigations for Karura hydropower plant, Mbeere and Kitui Districts 2010(*KENGEN, Foundation Piling, Earthview Geoconsult*).

Geophysical, geotechnical and topographical survey, Kenya School of Monetary studies, Ruaraka Campus, Nairobi (*Kenya School of Monetary Studies, Department of Geology*).

Geophysical survey (resistivity tomography) at six bridge sites, along Mulot – Muhuru Bay roads (*Mangat I.B. Patel and Partners*).

Soil resistivity survey at Rabai and Embakasi power substations (*Opal Ltd/Kenya Power*).

**PERIOD 1999-2002: Hydrogeologist with Groundwater Survey (K) Ltd, Nairobi.**

Involved in the following investigations (located in Kenya, unless indicated otherwise):

Hydrogeological and Geophysical Studies:

One borehole at Taita Ranch-Bachuma, Taita Taveta District (*Satao Camps*), One borehole at Langata Road, Karen area, Nairobi (*Himatlal Morarji Manek*); One borehole at Zainabu Formation Centre, Salgar Township, Nakuru District (*Techno Relief Services*); Evaluation of community water supply for Baringo North (Belgium Technical Cooperation); Formulation of second phase of Baringo community water supply (Belgium Technical Cooperation); one borehole at Sigona Golf Club, Kikuyu Area, Kiambu District (*Booth Irrigation Ltd.*); Ten boreholes in Nyal Area, Upper Nile, **Sudan** (*UNICEF-OLS*); Two boreholes at Kitany Area, Keiyo District (*Maria Soti Academy and Mr. C.K. Cheserem*); One borehole at Kitengela, Kajiado District (*Carnation Plant Production Ltd.*); One borehole at Embakasi Area, Nairobi (*Sarin (Sarova) Ltd.*); One borehole at Kakuma Division, Turkana District (*New Testament Church*); Two boreholes at Lokangae and Nagerewoi Location, Lokichoggio Division, Turkana District (*AMREF-CBHC*); One borehole at Isinya Area, Kajiado District (*Mr. and Mrs. Axelsson*); One borehole at Vota area, Mikuyu Location, Machakos District (*Peter Muthoka*); Twenty one boreholes in Nuba Mountains, Southern Kordofan, **Sudan** (*Diocese of El Obeid*); One borehole at Maragua Ridge, Makuyu, Muranga District (*Vision and Victory Church*); One borehole Maranjau Village, Murang'a District (*Vision and Victory Church*); One borehole at Oldoinyo Sabuk, Machakos District (*Felix Kyengo*); Five boreholes at Lokichoggio Division (Lopiding, Nalamacha, Nakabeit, Lotengan, Naemoit and Kalopusuk), Turkana District (*AMREF*); One borehole at Orongo Village, Buoye Area, Kisumu District (*St. Meshack's Fellowship Church*); One borehole at Randago, South Alego Location, Siaya District (*Samuel Ochanda*); One borehole at Residence of Indonesian Ambassador, Urafiki Lane, Limuru Road, High Ridge Area, Nairobi (*Embassy of Republic of Indonesia*); One borehole at Nundoto Dam, Maralal, Samburu District (*El Nino Emergency Project*); One borehole at Oshwal Jain School, Mpaka Road, Parklands Area, Nairobi (*Oshwal Jain School*); One borehole at Gatamayu School for Mentally Handicapped, Karatina Village, Nyanduma Location, Kiambu District (*Multi-Choice Ltd*); One borehole at Maanzoni Estate, Lukenya Area, Machakos District (*Caroline Malinda*); One borehole on Ojijo Road, Parklands Area, Nairobi (*Parklands Shade Hotel*); One borehole on Airport North Road, Embakasi Area, Nairobi (*SDV Transami Ltd*); One borehole on Kitui Road, Industrial Area, Nairobi, (*Akamba Public Road Services*); One borehole on Upper Hill Road, Nairobi (*Hisa Ltd*); Nakuru Water Supply and Sanitation Study, Preliminary Report on groundwater potential and Well siting, Nakuru North Wellfield, Nakuru District (*NWC&PC/ Mangat Patel*); One borehole at Kamburu Hydroelectric Dam, Mbeere District (*Mowlem Construction Co.*); One borehole at Ahero, Nyando District (*Ahero Widow Group*); Two boreholes at Awendo-Sare, Migori District (*Sony Sugar Co.*); Two boreholes at Ganze, Kilifi District (*Roy McKenzie*); Groundwater Resources Assessment (Location of 5 drilling sites), Kokoto farm, Njoro, Nakuru District (*Premier Fluor Mills Ltd.*); Hydrogeological and geophysical data interpretation (112 VES) Msambweni, Kwale Area to determine the most suitable areas for large scale groundwater development (*Tiomin Resources Inc.*); One borehole at Makuyu, Muranga District (*Vision of Christ*).

**Specialised Hydrological Studies:** Design flood assessment for the Tana River bridge at Garsen (*Gauff Ingenieure*); Borehole resistivity logging at exploratory borehole for Garissa Water Supply (*Foundation Engineering Ltd.*)

**Drilling Contracts Management / Drilling Supervision, Development, and Test Pumping:** One borehole Rosslyn Villas, Lone Tree Estate, Nairobi (*American Embassy*); One borehole at Ngong Race Course, Ngong Road, Nairobi (*Mentor Ltd.*); One borehole at Kalimoni-Juja Area, Thika District (*KPP Plant Production*); One borehole at Vota Area, Mikuyu Location, Machakos District (*Mr. Peter Muthoka*); One borehole at Mbumbuni Area, Makueni District (*J.M. Muia*); One borehole

at Castle Brewery, Castle Road, Thika District (*Castle Brewing Ltd.*); One borehole Lamuria, NaroMoru, Laikipia District (*Liashu Ltd.*); One borehole at Kenbelt Stores, Old Mombasa Road, Industrial Area, Nairobi; One borehole at Nairobi South Power Plant, Lunga Lunga Road, Industrial Area, Nairobi (*Iberafrica Power East Africa*); One borehole at Woodmere Apartments, Kilimani, Nairobi; One borehole Ganze, Kilifi District (*Roy McKenzie*); One borehole for Emmanuel Sisters, Gatanga, Thika District; Nakuru Water Supply and Sanitation study, Nakuru District - 3 Exploratory boreholes (*NWC&PC/Mangat Patel*); one borehole in Nairobi for Kolping Organization (K); one borehole at Kenton College, Nairobi.

**Tender evaluation:**

*Carried out tender evaluations for the supervised boreholes mentioned above and also construction of an elevated pressed steel tank for Kolping Organisation (K).*

**Borehole Condition Assessment:**

One borehole at ApondoKasaye Primary School, Koguta, Upper Nyakach (*Mangat I.B. Patel and partners*); One borehole at Nundoto Dam, Maralal, Lorroki Division, Samburu District (*HP Gauff*).

**PERIOD 1999-1998:**

Hydrogeologist with the Ministry of Water Resources; Head of Groundwater Section in Kisumu District with the following duties: General administration of groundwater section; Geological, geophysical and hydro-geological surveys aimed at the location of borehole sites; Design and supervision of borehole construction and test pumping programmes, and advice on all matters related to groundwater.

**Borehole site investigations:** *UNICEF supported community wells project* in Kombewa Division, Kisumu District - 50 hand pumped wells; Hydrogeological survey to select suitable borehole sites for the Aomo and ApondoKasaye School in Kisumu (*Mangat I.B. Patel and Partners*).

1997. Hydrogeological and Geophysical Studies: Applied Geographical Information Systems (GIS) data and electrical resistivity survey (over 40 soundings) in assessing the groundwater condition of the Lake Nakuru Drainage Basin (MSc. Research project).

Applied electrical resistivity survey in assessing groundwater potential of Ngong Hills.

1994. Geological Studies: Geological Mapping of Makweni (Kibwezi Area) and Kitui (Ikutha Area) Districts in assessing Natural Resources Distribution, University of Nairobi; Geological Mapping of Kajiado District, University of Nairobi, (BSc. Dissertation).

**Awards:**

DAAD Scholarship for Master programme (1996)

DAAD Scholarship for PhD (2005)

Fellowship: international institute of Geoinformation and earth observation ITC Netherlands (2007).

**Relevant Skills**

Experience with various types of computer software, groundwater modeling packages and geographical information systems (GIS) ILWIS, ENVI, ArcGIS, and ERDAS. Operating systems: Windows and MS Dos. Geophysical and interpretational programs: Schlumberger, Schlumb, Schinv, Resist and IXD. Borehole design, logging, and testpumping software: AquiferTest.

Carried out site investigations for approximately 300 boreholes. Highly conversant with the execution and interpretation of geophysical measurements techniques: electro-magnetical profiling with Geonics EM-34, Vertical electrical soundings, Wenner profiling (with ABEM Terrameter SAS 300, 1000 and Lund Imaging, Syscal instrument R2 Tomography Equipment), Seismic refraction (with EG&G Geometrics 12 channel seismograph).

Drilling Supervision, borehole design and test pumping analysis of over 200 successful boreholes in a wide range of hydrogeological conditions (volcanic, alluvial, coastal, metamorphic basement). Experienced in the application of relevant drilling techniques: reverse and direct rotary (with air, foam and polymer), down-the-hole hammer and percussion.

**Languages**

<b>Language</b>	<b>Speaking</b>	<b>Reading</b>	<b>Writing</b>
English	excellent	Excellent	excellent
Kiswahili	excellent	Excellent	excellent
Kikuyu	excellent	Excellent	excellent

**Referees**

Prof. Norbert Opiyo-Akech (Associate Professor)  
 Department of Geology  
 University of Nairobi,  
 P.O. Box 30197, Nairobi.

Prof. Justus Barongo (Associate Professor)  
 Department of Geology  
 University of Nairobi  
 P.O. Box 30197, Nairobi.

**Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, these biodata correctly describe myself, my qualifications and my experience.

Signature (Z. N. Kuria ) Date: (30/05/2018)