Curriculum Vitae

Name : **Dr. Karung Phaisonreng Kom**

Date of Birth : 12/02/1991

Gender : Male

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Education:

- **Ph.D in Applied Geology (Hydrogeology), Awarded Doctorate Degree on April 28, 2023,** Centre for Applied Geology, Gandhigram Rural Institute – Deemed to be University, Tamil Nadu
- **M.Sc. Applied Geology (2011-2013), 1st class with Distinction (82.86%),** University of Mysore, Mysore, Karnataka
- **B.Sc. in Geology (Honors),** Zoology, Chemistry (2008-2011), **1st class (65.33%),** Manipur University, Imphal

Awards and Fellowship:

- Awarded the best paper and presentation in INC-IAH & CSMU International Conference on "Addressing Challenges of Groundwater and Environmental Hazard Management through Socio-Scientific and Technological Approaches.
- Awarded the best paper and presentation in Track-5: Environmental Hazard, Effects, Monitoring and Control With Programming and AI in INC-IAH & CSMU International Conference on "Addressing Challenges of Groundwater and Environmental Hazard Management through Socio-Scientific and Technological Approaches"

- Senior Research Fellowship (NFST), Ministry of Tribal Affairs, Government of India (2018-2021)
- Junior Research Fellowship (NFST), Ministry of Tribal Affairs, Government of India (2016-2018)
- Post Matric Scholarship for ST students-Manipur (2007-2013)

All India National Level Exam Qualify:

- Qualify Graduate Aptitude Test in Engineering (GATE) Geology and Geophysics (GG) – 2016

Research Experience (Projects and Positions):

1. **Position:** Ph.D. Scholar (November 2016-October 2022)

Title of Thesis : Geospatial Technologies Based Integrated Hydrogeological Studies in Parts of Noyyal Basin, Tamil Nadu, India

Guide : Dr. Balasubramanian Gurugnanam, Director, Centre for Applied Geology

Institute : Gandhigram Rural Institute – Deemed to be University

Summary of the work: My doctoral research focuses on understanding the groundwater quality and quantity of the study area using geospatial technologies. We also assessed the non-carcinogenic health risk of high nitrate and fluoride exposure in groundwater.

The investigated region is a part of the Noyyal basin, situated in the northwestern part of the Coimbatore district, Tamil Nadu, India. It lies between latitudes $10^0$49'0"N and $11^0$10'31" N and longitudes $76^0$48'10" E and $77^0$11'35" E, covering an area of 1513.87 km^2. A total of ten years (2011 - 2020) of rainfall and Water level data from eleven rainfall stations and observation wells were collected from Public Works Department, Chennai, and Tamil Nadu Water Supply and Drainage (TWAD) Board, Coimbatore. The data were processed to seasonal fluctuation considering winter, summer, southwest, and northeast seasons. The obtained rainfall and water level maps were integrated through GIS software to determine the dependency between the parameters.

A geophysical survey was conducted in the study area to understand the subsurface characteristics and, most importantly, the groundwater resource status. The Schlumberger configuration of Vertical Electrical Sounding was utilized in this study. The thematic layers, such as topsoil thickness, weathered zone thickness, first fracture zone thickness, and second fracture zone

thickness spatial maps, are overlaid one over the other to find out suitable sites for artificial recharge areas. The final output map reveals that the most suitable groundwater recharge area covers an area of 431.48 $km^{2,}$ and 908.75 km^2 is in the moderately appropriate area.

A total of 50 groundwater samples during pre-and post-monsoon 2019 were collected and analyzed, and the concentrations were compared with WHO (2011) and BIS (2012) standards for drinking water. The order of dominance of major ions found during the PRM and POM seasons was $Na^+ > Ca^{2+} > Mg^{2+} > K^+$ (cations) and $Cl^- > HCO_3^- > SO_4^{2-} > NO_3^- > F^-$ (anions). The Piper trilinear diagram indicates that about 54% (PRM) and 72% (POM) of samples are mixed Ca-Mg-Cl, indicating high salinity water mixing caused by surface contamination sources. The Gibbs plot revealed that rock-water interaction controls the groundwater chemistry in the study area. The pre-and post-monsoon WQI values for the study area ranged from 49 to 395 and 37 to 347, respectively, indicating that most samples are suitable for drinking, except 14% and 8% samples of PRM and POM, respectively, are unsuitable for drinking purposes. The suitability for irrigation was evaluated using irrigational indices such as Sodium Percentage (Na%), Sodium Adsorption Ratio (SAR), Kelly's Ratio (KR), Residual Sodium Carbonate (RSC), Permeability Index (PI), and graphical diagrams such as Wilcox and United States Salinity Laboratory (USSL). Based on Kelley's Ratio, about 50% of the samples (PRM&POM) were deemed unsuitable for irrigation practices due to high sodium levels in the Water.

The non-carcinogenic health risks posed by nitrate and fluoride in different age groups were estimated. The results show that children are more vulnerable to non-carcinogenic causing health hazards than adults in both seasons due to their lighter body weights and being more sensitive to the non-carcinogenic health hazards of nitrate and fluoride than adults. Groundwater potential zones (GWPZ) of the study area were identified using Remote Sensing, GIS and AHP techniques. The resultant map (GWPZ) was classified into four zones: poor, moderate, good and very good, covering an area of 353.16 km^2, 749.8 km^2, 356.27 km^2, and 54.64 km^2, respectively. Finally, the results from the hydrogeological studies were integrated into a GIS environment using a weighted sum overlay analysis tool to generate the consolidated map for sustainable groundwater resource development in the study area. The output map shows that most of the study area was under the moderate zone, covering an area of 734.56 km^2 during pre-monsoon and 726.50 km^2 post-monsoon season.

Research Areas:

- Hydrogeology
- Environmental Geochemistry
- Hydro-geochemistry and Groundwater Pollution
- Hydrogeophysics
- Remote Sensing & GIS

Techniques/ Skills:

Hydrogeochemistry:

- Groundwater sampling, conducting analysis and interpretation of various groundwater, soil, and other hydrogeology-related data
- Analysis of sodium and potassium concentrations through Flame photometer
- Estimation of nitrate and sulphate with the use of a Spectrophotometer
- Extensive experience in titrimetric analysis for measuring calcium, magnesium, chloride, bicarbonate, total hardness
- Fluoride measurement through ion-selective electrode

Hydrogeophysics:

- Vertical Electrical Sounding methods-Resistivity Survey (Schlumberger array)
- Profiling (Wenner array)

Remote Sensing & GIS:

- Mapping of aquifer recharge and aquifer storage using geospatial technologies.
- Experience in extracting thematic maps from satellite and conventional maps through GIS for groundwater potential zone mapping.
- Landslide and Flood Susceptibility mapping using AHP-based Geospatial technology.
- Spatial distribution maps of groundwater quality, rainfall, water level, etc., using GIS interpolation methods (IDW, Kriging, etc.).
- Processed aerial or satellite imagery to create Landuse/landcover changes and predictions.
- Work with raster datasets and DEMs to analyze localized drainage basins using the ArcGIS Spatial Analyst extension.
- Experience in generating maps for Water and wastewater management, land use planning, and transportation through GIS.
- Compile data required for map preparation, including aerial photographs, survey notes, records, reports, and original maps.

- Examine and analyze data from ground surveys, reports, aerial photographs, and satellite images to prepare site maps and aerial mosaics.
- Experience in data conversion, database management, and GIS digitization and analysis
- Assisted in data management organization, including vector and raster data.
- Satellite imagery and aerial photographs Georeferencing.
- Produce and update overlay maps to show information boundaries, water locations, and topographic features on various base maps and at different scales.

Geological Map Reading and Interpretation

Technical/Computer Skills & Software:

- GIS & RS Software (ArcGIS, Google Earth)
- Microsoft Office
- AquaChem
- Rockworks
- Golden Software (Grapher)
- SPSS Software

Publications in Peer-reviewed Journals: Seven

Abstracts and Poster Presentation: Four

Reviewer of Journal: Environmental Earth Sciences, Euro-Mediterranean Journal for Environmental Integration (Springer Nature)

Number of papers reviewed: Nine

Publications (Citations: 80; H-index:5; i10-index:4):

1. M.G. Rajamanickam, Chandramohan Kumar, C.S. Ratheesh Kumar and **Karung Phaisonreng Kom** (2024). Temporal assessment of land use land cover dynamics in Ernakulam district, Kerala, India: A Remote Sensing and GIS Approach. **Indian Hydrobiology (UGC-CARE).**
2. **Karung Phaisonreng Kom**, B. Gurugnanam, S. Bairavi and S.Chidambaram (2023). Sources and geochemistry of high fluoride groundwater in hard rock aquifer of the semi-arid region. A special focus on human health risk assessment. **Total Environment Research Themes (Elsevier),** https://doi.org/10.1016/j.totert.2023.100026
3. **Karung Phaisonreng Kom**, B. Gurugnanam and S. Bairavi (2022). Non-carcinogenic health risk assessment of nitrate and fluoride contamination in the groundwater of Noyyal basin,

India. **Geodesy and Geodynamics (Elsevier)**, 13 (6) 619-631. https://doi.org/10.1016/J.GEOG.2022.04.003

4. **Karung Phaisonreng Kom**, B. Gurugnanam, and V.Sunitha (2022). Delineation of groundwater potential zones using GIS and AHP techniques in Coimbatore district, South India. **International Journal of Energy and Water Resources (Springer)**, 1–25. https://doi.org/10.1007/S42108-022-00188-Y
5. **Karung Phaisonreng Kom**, B. Gurugnanam, and V.Sunitha (2022). Nitrate contamination in groundwater of Coimbatore district (South India) and human health risk assessment. **The Journal of Indian Geophysical Union**, 26(3), 217-227, **UGC Approved Journal**, UGC Indexed No: 49066
6. **Karung Phaisonreng Kom**, B. Gurugnanam, V.Sunitha Y. S.Reddy, and A.K. Kadam (2021). Hydrogeochemical assessment of groundwater quality for drinking and irrigation purposes in western Coimbatore, South India. **International Journal of Energy and Water Resources (Springer)**, 1–20. https://doi.org/10.1007/S42108-021-00138-0
7. K. Kalaivanan, B.Gurugnanam, M.Suresh, **Karung Phaisonreng Kom** and S. Kumaravel (2019). Geoelectrical resistivity investigation for hydrogeology conditions and groundwater potential zone mapping of Kodavanar sub-basin, southern India. **Sustainable Water Resources Management (Springer)**, 5(3), 1281–1301. https://doi.org/10.1007/S40899-019-00305-6
8. **Karung Phaisonreng Kom**, B. Gurugnanam and K. Kalaivanan (2018). Geospatial Technology Based Groundwater Potential Zone Mapping in Parts of Noyyal Basin, Tamil Nadu, India. International Journal of Scientific Research in Science and Technology, 4(2), 1234–1254. **UGC Approved Journal** No: 64011, www.ijsrst.com

Book Chapter Published:

1. **Karung Phaisonreng Kom** and B. Gurugnanam (2022). Human Health Risk Assessment of Fluoride contamination in groundwater resources around the textile corridor of Coimbatore, South India. Groundwater Sustainability & Techniques (A Geological Perspective), 70-83, ISBN: 978-81-954929-0-9, Published by: NFED Publications.

Conference and Workshop:

1. Attended “a one-day Brain Storming session on Aquifer Management and Water Governance in Kerala”, held on April 29th, 2024, at Taj Vivanta, Thiruvananthapuram, Kerala.

2. Presented Oral: **Karung Phaisonreng Kom** “Spatial Analysis of Groundwater Quality for Drinking and Irrigation purposes, using WQI, PIG and GIS in the Ernakulam district, Kerala” at the INC-IAH & CSMU International Conference (January 20-21, 2024) at Chhatrapati Shivaji Maharaj University, Panvel, Navi Mumbai, India.

3. Presented Oral: **Karung Phaisonreng Kom** “Hydrogeochemistry and groundwater quality assessment in Ernakulam district, Kerala using WQI and Multivariate Statistical Analysis” at the Fifth Indian National Groundwater Conference, which held from 05-06 December, 2023 at IIT-Hyderabad.

4. Presented Poster: **Karung Phaisonreng Kom** "Assessment Of Groundwater Quality and associated Human Health Risk in Western Noyyal Basin, Tamil Nadu, India" in the International Conference on Water: From Pollution to Purification, organized by Inter University Instrumentation Centre (IUIC), School of Environmental Sciences (SES) and Advanced Centre of Environmental Studies and Sustainable Development (ACESSD), Mahatma Gandhi University, Kottayam, Kerala, India from February 09-12, 2023.
5. Presented Oral: **Karung Phaisonreng Kom** "Assessment of Groundwater Potential Zones in Hard Rock Terrain of Western Noyyal Basin, Tamil Nadu, India through the application of GIS" in the Three Days International Virtual Conference on Multidisciplinary Approaches on Tribal Sustainable Development, organized by the Indian Institute of Public Administration, India from January 28-30, 2021.
6. Presented Oral: **Karung Phaisonreng Kom** "Geospatial Technology based Groundwater Potential Zone Mapping in parts of Noyyal Basin, Tamil Nadu, India" in the National Seminar on Recent Research Trends in Geological Studies -GEOGRI-2019, organized by the Centre for Applied Geology, Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, from March 25-26, 2019.
7. Presented Poster: **Karung Phaisonreng Kom** "Groundwater Quality Assessment for Drinking and Irrigation purposes in parts of Noyyal Basin, Tamil Nadu, India" in the 3rd National Geo-Research Scholars Meet-2019 at Wadia Institute of Himalayan Geology, Dehradun, Inda,

during June 6-8, 2019.

8. Attended the Five days Webinar on "Emerging Perspectives in Earth Sciences" organized by the PG Department of Geography, Yuvakshetra Institute of Management Studies, Palakkad, India, on August 19-24, 2020.
9. Attended the National Webinar on "Grammarly – Live Demo" conducted by Gandhigram Rural Institute (Deemed to be University), Dindigul, Tamil Nadu, India, on November 17, 2020.
10. Attended the National Webinar on "Geomatic Field in Geosciences" conducted by the Department of Geosciences, Dr. B.R. Ambedkar University, Etcherla, Srikakulam, India, on September 4, 2020.
11. Attended the National Workshop on "Research Prospects of Artificial Intelligence and Deep Learning in Computer Vision" organized by the Department of Computer Science and Applications, Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, India, from February 20-22, 2019.
12. Attended the One Day National Level Workshop on "Writing a Technical Research Paper" conducted by Rathinum School of Architecture, Coimbatore, India, on March 2, 2019.
13. Attended the One Day National Workshop on "Accessing E-Resources and Reference Tools" held at the Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, India, on September 19, 2019.
14. Attended the One Day National Workshop on "Alert and Access of Online Resources" held at the Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, India, on January 25, 2019.
15. Attended the National Workshop on "Popularization of Remote Sensing Based Maps and Geospatial Information," organized by the Indian Society of Remote Sensing and Indian Space Research Organization on August 11, 2017.
16. Attended "Geospatial World Forum 2017" in Hyderabad, India, from January 22-25, 2017.
17. Attended the XIII Convention of the Mineralogical Society of India and National Seminar on "Current Trends of Research in Precambrian Geology and Vision 2020", organized by the Department of studies in Earth Science, University of Mysore, Mysore, India, from March 20-21, 2013.
18. Participated in the International Workshop on "Magmatic Ore Deposits 2012", jointly organized by the Geological Society of India, Bengaluru, Geological Survey of India,

Bengaluru, Jadavpur University, Kolkata, and Department of Earth Science, University of Mysore, Mysore, India on December 1-8, 2012.

19. Participated in the "Science Special Lecture Series in Earth Science and Geoinformatics" held at Mangalore University, Karnataka, India, on October 10-12, 2012.
20. Participated in the National Workshop on "Recent Advances in Sedimentary Basins and Associated Mineral Deposits of India" by the Department of Earth Science, University of Mysore, Mysore, India, from September 29-30, 2011.

Training:

- Attended e-Training on "Application of Remote Sensing" conducted by the Geological Survey of India Training Institute, Hyderabad, India, from July 22-29, 2020.
- Attended Training on "Geological Mapping Techniques" conducted by the Geological Survey of India Training Institute, Field Training Centre, Chitradurga, India, from April 30 to May 10, 2012.
- Participated in the "Two days Training Programme on "Groundwater Scenario & Management in Coastal Andhra Pradesh" organized by the Department of Geosciences, Dr. B.R.Ambedkar University, Srikakulam & the Central Groundwater Board, Southern Region, Hyderabad, India, on August 24-25, 2020.
- Attended "One day Course on ArcGIS Desktop Orientation" conducted by ESRI India on September 23, 2019.
- Participated in National Service Scheme (NSS) "SPECIAL CAMP" organized by the Ananda Sigh Higher Secondary Academy, Imphal, at the instance of Youth Affairs and Sports, Government of Manipur, India from August 10-19, 2006.

Co-curricular Activities:

- Contributed as Master of Ceremonies and a student volunteer in organizing the National Conference on "National Seminar on Recent Research Trends in Geological Studies -GEOGRI-2019" organized by the Centre for Applied Geology, Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, 2019.