



Research Scientist

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Degrees

MSc Physics (KNUST, Ghana), BSc. Physics (KNUST, Ghana)

2001 – Date: Research Scientist

Mr. Patrick Amankwah Mainoo is a Research Scientist of the Council for Scientific and Industrial Research

He had applied Geographical Information System (GIS) and groundwater exploration and in the preparation thematic maps to facilitate groundwater resources management in Ghana. He had provided several consultancy services to Government, Non-Governmental Organizations (NGOs) corporate bodies and individuals in establishing sustainable sources of groundwater supply in Ghana. He had quite experience in basin groundwater monitoring in Ghana. He had supervised many internship students, National Service personnel and undergraduates in their research works. He was actively involved groundwater resources monitoring in some selected river basins in Ghana (White Volta, Densu and Pra) under the DANIDA – Assisted Integrated Water Resources Management (IWRM). He contributed immensely to the Hydrogeological Assessment of the Northern Ghana Project (HAP), which sought to bring better understanding of the hydrogeological settings of the three (3) Regions of Ghana to enhance sustainable management of groundwater resources. He has several consultancy and technical reports to as well six (6) peer-reviewed articles to his credit.

Research Interests

1. Groundwater assessment in terms of quality and quantity to guarantee sustainable groundwater development, exploration, utilization and management.
2. Hydrogeological investigations in all geological settings in Ghana to delineate zones of groundwater potential for drilling to supply sustainable water to urban, peri-urban and rural settings.
3. Application of integrated geophysical techniques in groundwater exploration.
4. Evaluation of geophysical techniques in various geological settings in Ghana to ascertain
5. Designing, capturing and management of groundwater and related data for research purposes.
6. Application of GIS platform and Remote Sensing in groundwater exploration, management and preparation of customized thematic maps for effective groundwater resources management in Ghana.

Current Research

The focus on my research has been understanding the hydro-geophysical signatures of the geological settings of Ghana. In Ghana about 68% of the populace are living in rural and peri-urban communities that are dispersed across. Traditional sources of water supply like surface water resources (rivers, streams, lakes, ponds etc.) in recent time have been highly polluted as a results of several factors such as illegal mining, waste disposal, deforestation and population growth just to mention a few. Groundwater resources had been harnessed as the major alternative source of water supply in these dispersed communities in Ghana. Hydrogeologically, Ghana is underlain by three main provinces namely (1) Precambrian Igneous and metamorphic rocks (Complex Basement, 54% of Ghana), is associated with Buem, Dahomeyan, Togo structural unit Unit, Tarkwain, Birimian, Tamnean and Eburnean (2) Paleozoic Sedimentary Formations (Voltaian System, 45% of Ghana), which consist of Kwahu-Murago, Oti-Pendjari and Obosom Fomations (3) and Cenozoic, Mesozoic, Paleozoic Sedimentary Strata (Coastal Province, 1% of Ghana).

Groundwater occurrence and development in the Crystalline Basement and the Voltaian System, which underlain about 99% of Ghana, is generally controlled by secondary porosity and the interconnectivity of the fracture systems. In order to guarantee the establishment of sustainable boreholes in Ghana, there is the need to research to delineate potential aquifer zones and to predict depths to such productive systems. This research is being carried using integrated geophysical techniques including application of Geographic Information System

(GIS), Geological map, Tectonic Map, Electrical Resistivity Tomography (ERT), Electromagnetic (EM) and Remote Sensing (SI) methods. Knowing depth-to-productive aquifer systems using appropriate geophysical technique would go a long way in ensuring access to sustainable water supply in Ghana.

Current Projects

Catholic Relief Services (CRS-Ghana, ICOWASH Project)
Hydro-geophysical studies to delineate zones of high groundwater potential to guarantee sustainable water supply in some selected communities in West Mamprusi District in the Northern Region of Ghana.

Publications (Peer-reviewed)

Refereed Journal Papers

1. Issah, M, Mansuru, Anning, A., Acheampong, Noye, M, Reginald, and Patrick A. Mainoo (Jan, 2018). Prospecting for Groundwater Using the Continuous Vertical Electrical Sounding Method. *European Scientific Journal*, Vol. 14 No. 3 (Jan. 2018), ISSN 1857 -7881, pp. 67-85.
2. Osmund D. Ansa-Asare, Rose E. Entsua-Mensah, Anthony A. Duah, Benson K. Owusu, Barnabas Amisigo, Patrick A. Mainoo and Samuel Obiri (2014). Multivariate and Spatial assessment of water quality of Lower Pra basin Ghana. *Journal of Natural Sciences Research*, Vol. 4, No. 21 (Nov. 2014), pp. 99-113.
3. Mainoo, P.A., Duah, A. A. Agyekum, W.A. and Menyeh, A. (2012): Evaluation of aquifer characteristics of Voltaian sedimentary rocks in the Brong Ahafo Region of Ghana. *Journal of Ghana Science Association*, Vol. 14 (2) Vol. 14 (2), Dec. 2012, pp. 73-85.
4. S. Dapaah-Siakwan, William A. Agyekum and Patrick A. Mainoo (2011): Landfill Site Investigation in the Tema Metropolis Using 2-Dimensional Resistivity Technique. *Ghana Journal of Science*. Vol. 51(2011) pp 25-51
5. William A. Agyekum, S. Dapaah-Siakwan, Patrick A. Mainoo & P. K. Darko (2009). Application of Integrated Geophysical Techniques for monitoring wells site selection in the White Volta River Basin. *Journal of the Ghana Science Association*. Vol. 11, No.1, June, 2009. pp 40-50.
6. Manu E, Agyekum W. A, Duah A. A, Mainoo P.A and Yidana S M, 2018 Application of 2D-Electrical Resistivity Tomography in delineating groundwater potential zones: Case study from the Voltaian Super Group of Ghana (In press, *Journal of African Earth Science*. Manuscript no. AES6263.
7. Manu E., Agyekum W.A., Duah A. A, Mainoo P.A., Okrah C, Van-Dycke S Asare (2016). Improving Access to Potable Water Supply using Integrated Geophysical Approach in a Rural Setting of Eastern Ghana. *Elixir Environ. & Forestry* 95 (2016) 40714-40719

Conference Papers

- • Manu E, Agyekum W. A, Duah A. A, Mainoo P.A and Yidana S M, 2018. Graduate Research Collaboration with the Water Research Institute to provide Potable Water Supply to Selected Communities, AGU Fall Meeting 2018, paper no. ED51H-0651.
- • Manu E, Agyekum W. A, Duah A. A, Mainoo P.A and Yidana S M, 2018. Application of 2D-Electrical Resistivity Tomography in Delineating Groundwater Potential Zones: Case Study from the Voltaian Super Group of Ghana, West Africa. AGU Fall Meeting 2018, paper no. NS31C-1272
- • Patrick A. Mainoo, Anthony A. Duah, William A. Agyekum, Evans Manu and Akwasi Preko, Aboagye A. Menyeh: Delineating sources for sustainable groundwater supply in the savannah region of Ghana using integrated geophysical approach. (Conference paper Ghana Institution of Engineers, June 2015).
- • Evans Manu: Trends in Groundwater exploration: New methods and case studies: (2nd African Geosciences Student Conference, Kumasi, Ghana May 2014)