**EXPLORING GROUNDWATER POTENTIAL EVALUATION AT KOSERE PRISON, IFEWARA, ATAKUMOSA LOCAL GOVERNMENT, ILE-IFE, SOUTHWESTERN NIGERIA THROUGH RESISTIVITY DATA ANALYSIS**

**CHAPTER ONE**

**INTRODUCTION**

* 1. **BACKGROUND**

Water is a vital resource for most basic human needs which cannot be over-estimated. The distribution of groundwater is a critical factor in exploration, hence the need for prospecting of groundwater aquifers in the subsurface.

However , groundwater prospecting in complex basement terrain can be a challenge due to the complex nature of the geological formations (Sunmonu et al, 2018; Wannamaker et all, 2016). Prospecting for groundwater in basement complex terrains requires in-depth understanding of the geology, hydrogeology, and groundwater flow dynamics, as well as the use of appropriate geophysical and drilling techniques(Olobaniyi et al, 2016).

Exploration of groundwater in complex basement environments necessitates meticulous mapping of lineaments, such as fractures, fault zones, and joints, which serve as crucial groundwater pathways and storage locations(Hasan et al., 2018).

To overcome this challenge, geophysical methods such as the electrical resistivity method is employed to investigate the subsurface. The electrical resistivity technique is a non invasive geophysical method that measures electric current flow through the subsurface, simply conductivity and resistance to flow of electric current. This helps to determine the saturated and dry zones in the subsurface since fluid is conductive and less resistance, hence areas with high resistivity values are indicative of low water reserves and those with low are indicative of potential aquifers.

The Electrical resistivity method is preferred to other geophysical methods due to its effectiveness in accessing subsurface conditions, give high resolution image of the subsurface and cost of carrying out relative to other geophysical method.

* 1. **DESCRIPTION OF THE STUDY AREA**

The study area is the Kosere prison along Ifewara road situated in Atakumosa Local Government area of Osun State, Southwestern Nigeria. It has a 817 meters perimeters, width of 169 meters and length of 244 meters, located on latitude 7.4767446 and longitude 4.5813186. Ifewara falls within the Ilesha schist belt and is underlain by gneiss, migmatite and metasediments ranging from Precambrian to Palezoic age. The area is easily accessible by roads, both major and minor connecting to the correctional facility.

* 1. **RELIEF, CLIMATE AND VEGETATION**

The studied area falls within the tropical climate region having distinct wet and dry seasons with landforms shaped by geological processes. The average annual temperature is  33° degrees and the average rainfall ranges from 1125 mm in derived savanna to 1475 mm in the rainforest belt of the state . The seasons are Rainy season (April to October), harmattan season (November to January) and dry season (February to March).

The vegetation of Osun State has been described as lowland forest zone (Keay, 1959), semi-deciduous moist forests (Charter, 1969) and GuineoCongolian forest drier type (White, 1983).

**1.4 PREVIOUS WORK**