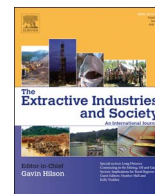




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The Sierra Leone rare earth minerals landscape: An old or new frontier?

Fenda A. Akiwumi^{a,*}, Lorenzo D'Angelo^b^a University of South Florida, USA^b University of Milano-Bicocca, Italy

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ABSTRACT

The rare earth mineral industry in Sierra Leone is touted as a new frontier with ongoing exploration and exploitation of “new deposits”. However, a review of Sierra Leone’s historical mining development reveals not only that knowledge of the occurrence of rare earth mineral deposits date back to the early 20th century when the British colonial government established a geological survey and mines department, but also that the history of this industry cannot be described in linear and progressive terms. New “discoveries” have followed the trends of the international markets of commodities, the invention of instruments and machines for detecting and processing rare earth minerals, civil and military technological demands and innovations, as well as historical changes in global economic and political scenarios. We examine some of the processes by which rare earth minerals have become, at different times throughout the development of Sierra Leone’s mining industry, part of mutable “resource environments”. Using archival research of mainly government documents we argue that the Sierra Leone colonial government, British institutions and mining companies collaborated in the formulation of policies and laws that “created” and, at the same time, secured such strategic minerals for superpowers, largely to the disadvantage of Sierra Leone.

1. Introduction

Modern life in our digital age is dependent on metals derived from rare earth minerals (REMs). Rare earth elements (REEs) like cerium in these slightly radioactive minerals that include monazite, pyrochlore and bastenite have high magnetic and conductive properties and are used in sectors such as communication, transportation, energy generation and defense (USGS, 2014). Currently, China is the world’s leading producer of REEs with a virtual monopoly on controlling the market limiting availability for users such as Japan, and the United States (Ghori, 2015; Humphries, 2013; Kiggins, 2015). Due to the importance of REEs global superpowers are seeking alternative sources and opening new mines. For example, some African countries like Sierra Leone are potential new frontiers for exploitation of REMs by the United States and other nations including China (Bailey Grasso, 2013; Burgess, 2010; Zhanheng, 2011). Other mines and potential African mining sites occur in Kenya, Madagascar, Malawi, Namibia South Africa and Zambia with ongoing exploration and exploitation by firms from a variety of countries like Germany, Japan and Australia (Becker, 2011; Kamau and Mungai, 2013).

The REMs are becoming increasingly important for the Sierra Leone Government, also. The Agenda for Prosperity (2013–2018) endorsed by the Government following the 2012 election, stresses the importance of

the extractive sector for foreign exchange earnings. The United Nations Economic Commission for Africa (UNECA) under its Africa Mining Vision (AMV) is helping Sierra Leone craft a new Core Mineral Policy (UNECA, 2016). The Sierra Leone government sees the REM industry as a new source of income generation and is approving licenses for exploration and exploitation of deposits by foreign companies (SL Govt., 2017a). In 2011, Sierra Rutile Ltd. (SRL), a company that has been dredging titanium-mineral bearing sands since the 1970s (primarily the minerals rutile and ilmenite) reported the presence of REEs in its processing streams. The company plans to exploit and export these metals (Bermudez-Lugo, 2012). However, a review of Sierra Leone’s historical mining development reveals that knowledge of the occurrence of REMs in this mining area and other parts of Sierra Leone dates back to the early 20th century. In 1919, Great Britain facilitated the establishment of a geological survey in Sierra Leone, a British colony from 1893 to 1961.

The development of this industry cannot be described in linear terms. New “discoveries” have followed the trends of the international markets for mineral commodities, technical innovations for detecting and processing REMs, as well as historical changes in global economic and political scenarios. Using the concepts of *resource making* and *resource taking* as our framework (Bridge, 2009, 2010; Richardson and Weszkalnys, 2014), we examine some of the processes that have

* Corresponding author.

E-mail address: fakiwumi@usf.edu (F.A. Akiwumi).<https://doi.org/10.1016/j.exis.2017.11.010>

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allowed certain minerals such as REMs present in the territory of Sierra Leone to become resources. We show how these minerals cannot be examined separately from others or from the broader contexts that contribute to their *making*: funding and adequate facilities for geological survey and laboratory research, industrial and technological innovations for extracting useful metals, market opportunities, and the role of powerful actors with geopolitical and economic interests. We draw upon a variety of historical and current Sierra Leone government and international agency documents, mining company reports, and other sources such as research papers, Internet and newspaper articles.¹ We show that Great Britain, the United States, and British and American institutions and companies collaborated in REM exploration in the Sierra Leone Colony. Great Britain guided the colony in the formulation of regulations that secured such strategic minerals for these powerful nations. Our premise is that these actors opened a REM frontier during the colonial period which was subsequently closed, and is now in the process of being reopened.

The paper is organized as follows: In the next section we discuss the conceptual underpinning of the paper. We then chronicle some of the historical geopolitical scenarios that led to development of a REM industry in Sierra Leone. We follow this with an overview of early colonial efforts at searching for and evaluating deposits of REMs and associated minerals containing other strategic metals like niobium, uranium and thorium. We then discuss the current status of REM mining in Sierra Leone including Chinese companies as actors in the postcolonial landscape. Using the titanium mineral sands industry as a case study, we analyze relevant laws to reveal how colonial history continues to shape current mining. Finally, we briefly evaluate the role of the National Mineral Agency (NMA) in controlling mineral resources including challenges with illicit extraction, smuggling, and artisanal mining of REMs as a livelihood for local communities.

1.1. Resource making and resource taking

A common assumption is that mineral resources are natural substances present in the environment, simply waiting to be discovered. Increased knowledge of territory using instruments capable of amplifying human perception leads to discoveries (De Gregori, 1987). The discovery of resources, however, is a result of complex historical processes influenced by cultural, economic, technological and geopolitical factors. (Bridge (2009, 1219) opines that resources are “a cultural category into which societies place those components of the non-human world that are considered to be useful or valuable.” As such, they are continually *made* “through technical invention and physical production, as well as through acts of epistemological and ontological creativity” (Richardson and Weszkalnys, 2014, 12). The economist Erich Zimmermann proposed that “resources are not, they become” (1951, 15). In the context of an institutional theory of resources, economist Thomas De Gregori (1987) interprets Zimmermann’s idea as resources being “neither fixed nor finite” (1987, 1241) for human ingenuity and technology will ensure their continual discovery and exploitation.

¹ These sources provided information on mineral exploration policies and efforts in the colonial era as well as mineral occurrences and associations. We reviewed the annual reports of the Sierra Leone Geological Survey and Sierra Leone Mines Departments from 1921 through the 1960s to glean policies and laws surrounding mineral exploitation. We particularly focused on content analysis of historical and current versions of mining agreements specific to dredging of mineral sands containing REEs to reveal clauses suggesting a monopolistic hold by British, American and other foreign companies on these minerals and inequitable arrangements for Sierra Leone. These specifically were the Titanium Minerals Agreements (currently the Sierra Rutile Agreement Act of 2002) starting with the 1959 agreement revised in 1972, 1989 and 2002, and the Bayer Preussag Agreement 1973 (Ratification Act (1974). We further analyzed the 1947 and 1949 colonial ordinances governing radioactive minerals which cover the mildly radioactive REMs. Other important data sources were United Nations and World Bank reports and the United States Geological Survey (USGS) Minerals Yearbook country reports on Sierra Leone that provide valuable information on mineral development and export statistics.

Richardson and Weszkalnys (2014) remind us, however, of the negative socio-ecological impacts of human endeavors.

Since resource making processes are influenced by a variety of factors, outcomes for the same substance may differ in different environments. In particular, resource making is not a politically neutral process (Bridge, 2009, 2010; Richardson and Weszkalnys, 2014). Our paper examines some of the processes by which REMs have become part of a mutable resource environment, at different times throughout the development of Sierra Leone’s mining industry. These include the entanglement of geological advancements, technological innovations, and geopolitical scenarios. We also address the question of who directs and benefits from resource making. For as Bridge (2010, 824) points out resource making can be “a form of taking or theft in which the material and cultural attachments of existing resource users are alienated.”

2. Early colonial exploration

Great Britain’s economic and political interests, notably the manufacturing and military industries instigated geological surveys in colonies. Between 1919 and 1922 munition minister Winston L. S. Churchill initiated a mineral survey of African colonies followed shortly by enactment of the Colonial Development and Welfare (CDW) Act of 1929. The CDW Act provided low interest loans to British industries interested in mineral resource development in colonies like Sierra Leone (Akiwumi, 2012; D’Angelo, 2016). In 1929, Lord Passfield, Secretary of State for the Colonies, made clear the prevailing British government policy behind the Act. It was to ensure a constant supply of minerals to the British military industry, reduce unemployment in Great Britain through commerce with colonies, and assist the economic development of the Colonial Empire (Segkoma, 1986). According to provisions of the Act, only colonial governments could submit applications for grants and loans which would be reviewed by the Colonial Development Advisory Committee. British interests typically prompted applications (Hoogvelt and Tinker, 1978).

During and immediately after the Second World War, REMs, and minerals containing uranium, thorium, and niobium were crucial for defense technology. Great Britain and the United States saw mutual benefit in collaborating to explore for these minerals and gain control over identified reserves, particularly in British colonies. Exploration intensified in African colonies after a newly independent India imposed, in the late 1940s, an embargo on monazite exports to the United States (Klinger, 2015).

When Great Britain sent Second Lieutenant Frank Dixey, a geologist to Sierra Leone in 1919 under Churchill’s mineral survey initiative, no detailed geomorphological maps of this territory existed. Between 1919 and 1921, therefore, his top assignment was preparing a map. Dixey did most of the surveying on foot using rudimentary equipment comprising a prismatic compass, a bicycle wheel fitted with a milometer and an aneroid barometer (Dunham, 1983). He identified some potentially exploitable minerals and was the first to discover monazite, that contains the REEs cerium, neodymium, and lanthanum in stream concentrates (SL Govt., 1921, 1929). This was the beginning of the Sierra Leone Geological Survey (SLGS).

Subsequently, other British geologists working in Sierra Leone trained in the use of new high-powered instruments and state-of-the-art mineral exploration methods. For example, in 1948, J. D. Pollett, Director of the SLGS attended a short course in the use of a Geiger counter to detect radioactive minerals while he was on leave in Great Britain (SL Govt., 1950).² In 1951, a team led by personnel from Great Britain’s Ministry of Supply working with SLGS geologists used a Land Rover mounted Geiger counter to traverse the country in search of

² The Geiger Counter was at the time a relatively new invention by Hans Geiger and Walther Müller in 1928 and it was later on improved with the use of the halogen tube invented in 1947 by Sidney Liebson.

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