

07

MINERAL RESOURCES

Introduction

This report basically focuses on two important aspects of mineral resources namely exploration and product development. Understanding the surface geology and shallow sub-surface structure of the Earth are vital in mineral exploration. Systematic geological mapping of Sri Lanka has been already completed by the Geological Survey and Mines Bureau (GSMB). However, mapping of the continental shelf around Sri Lanka is a vital requirement which is yet to be carried out. Hence it is proposed to undertake “side scan” sonar and sub bottom profile survey covering the continental shelf within the next five years.

Mineral deposits occur at the surface as well as at various depths of the earth’s crust. So far the mineral deposits discovered in Sri Lanka, except the Panirendawa iron ore deposit, are those exposed to the surface. Hence it is necessary to investigate the subsurface to have a proper understanding of the mineral deposits of the country. Geophysical and Geochemical techniques are strong tools used in mineral exploration, especially in detecting subsurface deposits.

Air-borne geophysical surveys that measure variations of gravity, magnetic and radiometric levels have been proved to be the most cost effective method of rapidly determining the mineral-bearing potential over a large area. An airborne magnetic survey carried out in 1956 by a Canadian company only covered the southwest part of the country. It is strongly recommended to undertake an Airborne Geophysical Survey covering the whole country including its Exclusive Economic Zone (EEZ).

Systematic geochemical prospecting is used throughout the world in mineral exploration. Geochemical prospecting involves mainly the analysis of rocks, soils, soil gas, plant material and water, for indicators such as pathfinder elements to detect subsurface mineral deposits. GSMB has already commenced a country-wide geochemical survey and it is necessary to expedite the work possibly in collaboration with universities.

The mineral based industries in Sri Lanka is a significant sector of the economy in terms of production units, persons employed, range of products and its future growth potential. Porcelain, wall and floor tiles and glass can be mentioned as advanced mineral based industries established in Sri Lanka. The policy of the Government is to encourage end product manufacturing locally and discourage exports in mineral form. However, mica, graphite, vein quartz and mineral sands (limonite, rutile and zircon) are allowed to export in the mineral form. Some of the new industries that can be established using these minerals are synthesis of graphene and nanomaterials as a value addition to graphite and purification of zircon and montmorillonite. Research related to synthesis of precipitated calcium carbonate, possibility of using Li, Na and Iron intercalation to Sri Lankan natural vein graphite to be used in rechargeable batteries and using Sri Lankan thorium as a reactor fuel are recommended.

Sub Areas, Issues and Relevant Interventions

Table 1: Sub Areas and Justifications

Sub Areas	Justifications
1) Mineral Exploration - Land	Research and Geophysical and Geochemical maps would help in understanding the country's subsurface Geological environment, which would lead to the discovery of new mineral deposits.
2) Mineral Exploration - Ocean	Available marine geological and mineral resources data are limited as no systemic studies have been undertaken for mineral exploration in the continental shelf of Sri Lanka.
3) Product Development	The exporting of minerals in the raw form should be discouraged through development of value added products

Table 2: Issues/Problems, R&D Needs and Relevant Interventions

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
1) Mineral Exploration- Ocean	I) Lack of information on availability of mineral resources including oil and gas in the EEZ	i) Conducting geophysical and geochemical surveys over EEZ to ascertain the availability of mineral resources including oil and gas	Pure and Applied Research a) Geophysical (gravity, magnetic, radiometric and seismic) and geochemical surveying and modeling of shallow subsurface of the EEZ b) Preparation of bathymetry, marine geological and geophysical maps
2) Mineral Exploration - Land	I) Increase in demand for mineral resources II) Lack of information on available resources	i) Airborne geophysical mapping and geochemical mapping for mineral resources	Pure and Applied Research a) Geochemical surveys and airborne geophysical surveys and compilation of maps
3) Product Development	I) Lack of research and development in product development using minerals available in Sri Lanka.	i) Research and development on product development	Pure and Applied Research a) Synthesis of graphene and nanomaterials as a value addition to graphite b) Thorium-fueled liquid fluoride reactor c) Montmorillonite purification pilot plant d) Synthesis of precipitated calcium carbonate e) Li, Na and iron intercalation to Sri Lankan natural vein graphite
	II) Lack of long-term stable comprehensive policy for mineral sector development, and implementation	i) Formulation of relevant policies	Policy Studies a) Formulation of a national policy for mineral resource exploitation and product development