

Focus Area 8 : 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-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 yet to be carried out and remains a vital requirement. Hence it is proposed to undertake a 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 which 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 and reliable method of determining rapidly the mineral-bearing potential covering large areas. An airborne magnetic survey carried in 1951 by a Canadian company covered only the southwest sector of the country. It is strongly recommended to undertake an Airborne Geophysical Survey covering the whole country including its offshore narrow continental shelf.

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 or pathfinder elements to detect subsurface mineral deposits. GSMB has already commenced a country-wide geochemical survey and it is necessary to expedite the work mobilizing more teams, possibly from Universities.

The mineral based industries in Sri Lanka are a significant sector of the economy both in terms of production units, persons employed and the wide range of products and technologies they cover; and its future growth potential. Porcelain, Wall and Floor Tile and Glass can be mentioned as advanced mineral based industries established in Sri Lanka. Most of the minerals mined in Sri Lanka are used for product manufacturing locally. Only mica, graphite, vein quartz and mineral sands (limonite, rutile and zircon) are exported in the mineral form. The policy of the Government is to encourage end product manufacturing locally and discourage exports in 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 the possibility of using Sri Lankan thorium as a reactor fuel are also recommended.

Sub Areas, Issues and Relevant Interventions

Table 1: Sub Areas and Justifications

Sub Areas	Justifications
1) Mineral Exploration - Ocean	Available Marine Geological and mineral resources data are limited No systemic studies have been undertaken for mineral exploration in the continental shelf of Sri Lanka
2) 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.
3) Product Development	Still some of the minerals are exported as in mineral form. Need to increase the export market through value added minerals

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) Inadequate inland reserves of building materials (mainly construction sand)	i) Resource information in the continental shelf of Sri Lanka	Pure and Applied Research a) Compile information on the available resources on Sri Lanka's Continental shelf b) Preparation of marine geology maps
	II) Lack of information on the availability of mineral sands in the continental shelf		
2) Mineral Exploration - Land	I) Increase in demand for mineral resources	i) Airborne Geophysical mapping and Geochemical mapping for mineral resources	Pure and Applied Research Airborne geophysical survey
	II) Lack of information on available resources		
3) Product Development	I) Lack of research and development in product manufacturing using minerals available in Sri Lanka.	i) Research on product development	Pure and Applied Research a) Synthesis of graphene and nanomaterials as a value addition to graphite b) Investigations on thorium-fueled liquid fluoride reactor c) Montmorillonite purification pilot plant d) Synthesis of precipitated calcium carbonate e) Investigation on 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 Formulation of a national policy for Mineral resources, exploitation and product development

***Table 3: Interventions and Key Performance Indicators**

Sub Areas and Issues/Problems	Interventions/Activities									
	Policy studies	Pure and Applied Research	Innovation	ICT	Nanotechnology	Biotechnology	Indigenous knowledge & IPR	Testing, Standardization & Accreditation	Capacity Building	Popularization
1) Mineral Exploration - Ocean										
i) Lack of information on the availability of mineral sands in the continental shelf		√								
Time Frame (TF)		Immediate – Medium (to be completed in 5 years)								
KPIs Publication of two maps each year, starting from second year										
Lead Institute		NARA								

**Please note that this is only a sample page*