

# Calcite and Dolomite Mineralization in the area around Balangoda and Critical Analysis of Mining Methods and Utilization of the Deposits

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**Abstract:** Among the industrial minerals found in Sri Lanka Calcium and Magnesium Carbonate bearing minerals and rocks play a major role in local industry. Crystalline Dolomite and Calcite found in metamorphic terrains are used in ceramic industry, fertilizer industry and in local lime manufacturing plants. Major Calcite and Dolomite occurrences in the metamorphic Precambrian basement are found in Digana, Kekirawa, Polonnaruwa, Balangoda, Baddulla, and Okkampitiya. Studies carried out in the area around Balangoda showed the calcite and dolomite occurrences are located in the area of Illukpellesa, Rajawaka and Molamure. Legal and illegal small scale mining has been carried out in the area during last few decades. Studies also showed most of the mining is carried out haphazardly. No proper mining methods have been used for maximum utilization of the deposits. Furthermore, long term mining has not uplifted the socio-economic conditions of the people of the area and proper environmental protection methods have also not been used. Systematic mapping of the deposits, educating miners on proper mining methods, safety precautions and value of environment protection could lead for better utilization of the deposits. Proper financial guidance through possible co-operate system to obtain financial assistance for mining , transporting materials and finding systematic market for continuous material supply could also uplift the socio-economic condition of the community.

**Key words:** Environment, Mapping, Mines Occurrences, Socio-economic condition

## 1 Introduction

The Island Sri Lanka consists of various kinds of mineral deposits which contribute to the country's' economy. The development of the country is vitally linked with the development of its industrial and other mineral deposits. An adequate supply of minerals is

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therefore essential for the maintenance and improvement of the living standard of people. (Cooray 1984 & Herath 1995) The study area, Balangoda is situated in Rathnapura district at Sabaragamuwa province. (Figure 1).

Preliminary studies in the area around Balangoda show number of deposits of calcite and dolomite occurrences in the areas mainly in Rajawaka, Molamure.

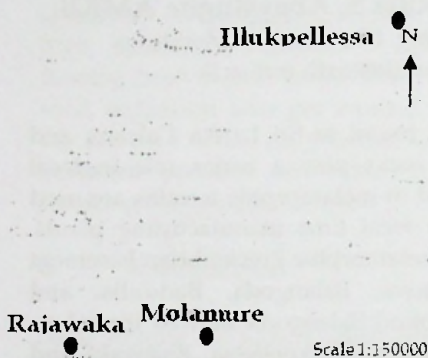


Figure 1. Location map of the area

The study is focused to understand the distribution pattern of the Calcite and Dolomite deposits in the area and critical analysis of the present mining activities together with the utilization of the deposits. The study also aims to understand the socio-economic condition of mine owners and mine workers.

## 2. Methodology

During the field survey, geological mapping was carried out to understand the distribution of Calcite and Dolomite. Furthermore GPS coordinate of each mine was taken to identify the exact location of the mine. Field mapping was carried out using existing maps, GPS and compasses and mineral resources map was prepared. 36 of Samples of

Calcite and Dolomite were collected from mines.

Mining, Socio-economic and environmental data were collected from mine owners (12) and other mine workers (25) through the pre-prepared questionnaires based on following parameters. (i) the methods of drilling and blasting, (ii) mining history, (iii) mining licenses, (iv) cost for a blast hole, (v) annual production of each mine, (vi) safety precautions applied by worker and miners, (vii) encountered mining problems, (viii) attitude of miners towards government officials (GSMB, AGA and village head), (ix) financial situation of miners and workers in the area (x) environmental impacts of the area due to the mining activities.

Laboratory tests were performed to obtain non-carbonate mineral percentage and carbonate percentage of Calcite and Dolomite minerals in the area. Microscopic analysis was done to identify non-carbonate minerals of the samples.

Responses for questionnaires were given marks as maximum (for very bad condition) of 5 and minimum (very good condition) of 1. The total marks obtained by each mine/mine worker was indicated as a percentage. Accordingly to the %, a mine or mine worker's condition was graded again as very bad\_(81-100%), bad\_(61-80%), fair\_(41-60%), good\_(21-40%) and very good\_(0-20%). Final percentage of each grade was calculated with respect to the total number of mines/ mine workers.

## 3. Results

### 3.1 Field survey-part I

Northeast trending crystalline limestone layer has extended southward to the town Pallededa (Figure: 4).



Figure 4. Mineralization of the area

### 3.2 Field survey-part II

#### 3.2.1. Analysis of mine owners

Analysis of 10 parameters shows 58% of the mine owners belong to very bad position of the classification and 42% of them are in bad position in the classification. No mine owners are at fair, good and very good positions.

#### 3.2.2 Analysis of mine workers

Table 1. Financial situation of the mine owners and mine workers

Grade	Num of people as a %
Very rich	0%
Rich	0%
Moderate	8%
Poor	18%
Very poor	74%

Table 2. Mining problems (accidents, health problems and weather condition) of mine owners and workers

Grade	Num of people as a %
Very low	0%
Low	0%
Moderate	4%
High	34%
Very high	62%

According to the analysis of the parameters, 60% of the mine workers belonged to very bad position of socio-economic condition and 40% of them were in bad position of socio-economic condition in the classification.

Table 3. Environment condition of the area with opinions of the mine owners and workers

Grade	Environmental condition as a %
Very good	0%
Good	0%
Moderate	0%
Bad	47%
Very bad	53%

Table 4. Critical analysis of data showing legality of mines

With mining license	50%
No mining license	50%

Table 5. Drilling and blasting Knowledge of mine owners mine workers

Grade	Num of people as a %
Very good	0%
Good	0%
Moderate	2%
Bad	22%
Very bad	76%

Table 6. Critical analysis of data showing safety precautions applied

Grade	Num of people as a %
Very good	0%
Good	0%
Moderate	0%
Bad	0%
Very bad	100%

### 3.3 Lab testing

Based on the result of mineralogical analysis, the samples from Thanjanthenna showed high content of non-carbonate minerals as impurities (Fig.5). Also the majority of non-carbonate minerals found in calcite and dolomite are Quartz, Muscovite and Phlogopite and minor amount of Spinel and Corundum.

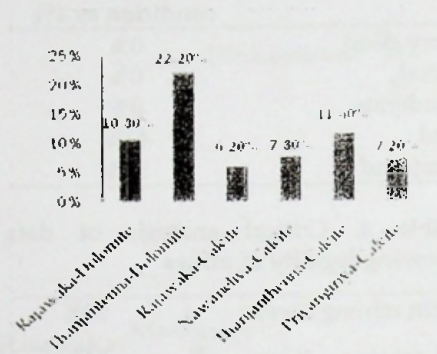


Figure 5. Percentage of non-carbonate mineral content of samples from different locations

Mine workers condition was analysed based only socio-economic conditions of them. According to the analysis 60% of mine workers fall under very bad socio-economic conditions and 40% of are at bad socio-economic condition.

### 4. Discussion

The area is rich of considerable amount of Calcite and Dolomite mineralization suitable for mining. Mining has been carried out for last few decades.

However, mining methods practiced in the area is at a very poor situation. The workers had a very poor knowledge on drilling and blasting, safety precautions as well as possible adverse impacts of mining to the environment.

Mine owners status was analysed based on mining, socio-economic and environment condition.

### 5. Conclusion

The area around Balangoda is rich with Calcite and Dolomite deposits. Although mining activities have been carried out during last few decays, studies showed that most of the mining is carried out haphazardly. No proper mining methods have been used for the maximum utilization of the deposits. Furthermore long term mining has not uplifted the socio-economic conditions of the people and proper environmental protection methods have also not been used.

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