

**THE ENVIRONMENTAL GEOLOGICAL
STUDIES IN BAWSAING AREA,
KALAW TOWNSHIP, SHAN STATE (SOUTH),
MYANMAR**

PhD DISSERTATION

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ABSTRACT

Bawsaing area lies approximately 33km north of Heho, Kalaw township, Shan State (South). The environmental geological aspect of the mining area is attempted for the first time with the environmental geological studies on landslides, deforestation, water contamination, mining impact, air pollution, acid mine drainage, soil contamination and the other environmental problems which affect the people, animals and plants. Stratigraphically, the area consists of the middle and late Ordovician rock units of the Pindaya Group, i.e. Wunbye Formation and Nan-on Formation. Wunbye Formation is divided into three subunits such as, the lower subunit (O_2W^1) consisting of algal stromatolitic limestone, oolitic and dolomitic limestone, siltstone and dolomites in which galena ore deposits are hosted, the middle subunit (O_2W^2) composes of silt-laminated limestone and laminated limestone which bears galena associates with barite ore deposits, and the upper subunit (O_2W^3) comprising of burrowed limestone and dolomitic limestone that contains barite and cerrusite ore deposits. These ore deposits are also extracted from the layers of siltstone of Nan-on Formation which comprises of reddish brown ferruginous layers in some localities. These ore deposits are controlled by stratigraphy and structures of rock units. There are internal intermittent drainage systems with many sinkholes. The climate is moderate with heavy rain falls in rainy season.

The natural as well as human-induced environmental problems are encountered. Landslides frequently occur in the open cut barite mine areas at the eastern part of Bawsaing. Bawsaing area is deforested by the cultivation and the wood cutting for fire woods. The rain water storage kans/ponds are numerous, but only Minkan is the only drinking water kan/pond in Bawsaing. The villagers use this kan/pond and the wells for drinking, and others are used for domestic need and for animals. The analysis of water quality shows that water of Minkan and all the wells are potable. All the other kans/ponds, especially Twinsauk and Phoneggyi kans/ponds, are contaminated with lead, zinc and cadmium. There are now many mining companies in progress. The values of lead, zinc and copper of the stream sediments and soils are analysed. Mine workers suffer high blood pressure, colic diseases and back pains. Some villagers are also suffering high blood pressure. Animals are the most affected ones because of lead poison. Calves which eat the sprouts of grasses and bushes suffer congested inhalation and ingestion of lead

particulates in early rainy season. The vegetation growths are slow and sparse. The thanatphet leaves (*Nacotina* sp.) and tea leaves (*Camellia* sp.) are analyzed, and it shows that they contain somewhat high level of lead.

Integrated assessments of the environmental conditions of study area are illustrated as the integrated maps which show the affected areas of lead, zinc, and copper at the cultivated areas of thanatphet leaves and tea leaves.

In Bawsaing, lead particles may be ingested or inhaled posing problems to human health, plants and animals. Many individuals show no outward signs of lead poisoning. But it should be paid much attention to.

Underlying carbonate sediments will undoubtedly reduce the acidity of the mine drainage water and hence, it will somewhat reduce the toxicity.

It is necessary to introduce the awareness of public health by educating people to be conscious of lead exposure and at the same time, the ways and means of prevention and protection should be made so as to recognize, avoid and minimize the undesirable effects happened in some mining environments.

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