

DEPARTMENT OF MINES, MINERALS & GEOLOGY

GOVERNMENT OF SIKKIM

GANGTOK



ANNUAL REPORT (2013-2014)

DEMAND NO. 25

DEPARTMENT OF MINES, MINERALS & GEOLOGY

GOVERNMENT OF SIKKIM

ANNUAL BUDGET 2013-14

An Annual Plan size of Rs. 159.60 lakhs was approved for the Department of Mines, Minerals & Geology for the financial year 2013-14.

Detail Breakup of the provision are as under:-

I. 2853-REVENUE SECTION

DIRECTION & ADMINISTRATION- **Rs. 109.60**
Lakhs.

This sum was proposed to meet up expenditures on Departmental Overheads, payments of salaries and Medical Advances, Payment of Rents, Rates & Taxes, wages of M.R. Staff working in the office, Travel Expenses and purchase of Office Equipments and Stationeries.

Detail Break-up of expenditure under the Head is indicated as under: -

| | (Rs. in Lakhs) |
|--------------------------|----------------|
| I SALARIES | 63.00 |
| II. TRAVEL EXPENSES | 5.00 |
| III. OFFICE EXPENSES | 26.00 |
| IV RENT, RATES & TAXES | 0.60 |
| V. MACHINERY & EQUIPMENT | 15.00 |

TOTAL

109.60

RESEARCH & DEVELOPMENT-

RS. 30.00

Lakhs

This provision was earmarked with a view to take up detail geological studies and Contour Survey of various landslides, Geo-environmental Appraisals of important towns and road –sections along the national Highway 31 A and the State Highways. The provision was utilized on payment of M R. employees and following works undertaken by the department

1. Contour Surveying and Mapping of Marchak Area in East Sikkim.
2. Water Analysis of perennial springs of State.
3. Geo-Technical investigation of Lagyep Hydel Power Project in East Sikkim.
4. Land Slides Inventory of Sikkim

MINERAL EXPLORATION-

Rs. 20.00

Lakhs

A sum of Rs. 20.00 Lakhs was earmarked under the head and carried out the following plan programmes.

1. Exploration of SiO₂ rich (quartzite rock) for glass and ceramic industries.
2. Water analyses for portability of water from 80 springs in the state.

ANNUAL REPORT – 2013-2014

INTRODUCTION:-

Mines, Minerals & Geology Department established in the year 1976 is engaged in following activities as per the allocation of business of Govt. of Sikkim.

1. Control and Conservation of entire Mining & Geological activities in the State.
2. Regulation & Development of Major Minerals according to National Mineral Conservation Policy.
3. Grant of prospecting licenses, mining leases for exploration and exploitation of various major minerals.
4. Levying & Collection of royalties on major minerals.
5.
 - (i) Identification of unstable areas in collaboration with other concerned departments and suggestion of remedial measures thereof.
 - (ii) Chemical and bacteriological test of spring water samples.
 - (iii) To investigate and develop mineral water resource for public benefit.
 - (vi) To carry out Geo-technical studies of flood behavior of two major river system viz. Teesta and Rangit rivers of Sikkim.
6. Formulation of Policies connected with development and conservation of Mineral resources including minor mineral which is controlled by Forest Department.
7. Participation in joint ventures for mineral resources utilization in the State.
8. Training of Personnel.
9. Administrative Control of Department building.
10. Matters relating to Sikkim Mining Corporation and other mining activities in the state.

11. Public Service Statutory Rules of the services with which Department is concerned.

Sikkim being mountainous terrain with rugged topography, fragile eco-system, varied geological condition under thrust fault environment, active slope modification processes, drainage pattern - Geological and Geotechnical investigation is pre-requisite for any developmental activities. In addition to this, Sikkim receives heavy rainfall and constituent material behaves differently under saturated and unsaturated condition. A slight change in slope configuration due to developmental activities and as well as natural processes leads to degradation of slopes under threshold condition. Therefore developmental activities especially road construction, building and hydro-electric power projects where large amount of earth works/excavation is involved needs scientific approach and understanding of behavior and understanding of geo-environmental conditions of overlying slopes in addition to geotechnical investigation of specific site. Ongoing practice of dumping of spoils on hill slopes and river bed had lead to adverse consequences and if it is continued unabated, adverse effects are likely to be devastating. There is an urgent need to formulate clear polices for integrated and sustainable development especially in the rugged mountain terrain like Sikkim. After having worked in rugged mountainous terrain for over two decades on various aspects of geology, geo-techniques the personnel of the Department of Mines, Minerals & Geology have become equipped with enough experiences and understanding of mountain conditions and imperatives in implementing appropriate interventions/responses.

The Department of Mines, Minerals & Geology has carried out the following studies till date:-

1. Rock bolting on Left abutment of Pabong Bridge on Singtam-Tarku road section.
2. Studies on impact of glacial lake outbursts at Yume Samdong (Tenbewa glacier) in North Sikkim.
3. Geo-technical studies of Turung slide in parts of South Sikkim.
4. Geo-technical studies of 9th mile slide in parts of East Sikkim.
5. Geo-technical studies of 'O' mile creep (Forest check Post near Ranipool) in parts of East Sikkim.
6. Geo-technical studies of 6th Mile slide in parts of East Sikkim.
7. Geological studies of Phaledara dolomite deposits in parts of South Sikkim.

8. Geological studies of Lime stone occurrences in and around Mamley area in West Sikkim.
9. Dolomite investigation around Kholaghari in parts of South Sikkim.
10. Contour survey and geological studies of occurrence of building material along Rangpo Khola (between Rangpo-Rorathang).
11. Detail geo-technical studies of Barmeli Bridge at Borong in South Sikkim.
12. Microbiological assessment and portability of spring water from various sources.
13. Contour survey and feasibility studies of Subway at ridge-park area.
- 14. The department issued stability report of housing and other civil construction site. The revenue earned through issue of such reports is Rs. 123.88 lakhs (from financial year 2003-04 to March 2014).**
15. The departmental officers are frequently updated with latest technologies connected with geological study. The G.I.S., G.P.S. system and geotechnical testing of rocks and soils are systematically introduced in the department as a capacity building measure.

For planning of any developmental projects in mountainous terrain needs clear understanding of slope configuration, amount of slope modification spoils likely to be generated and identification of area for their disposes in a scientific and environmental friendly manner and for this base maps are required. The Department has gained high degree of efficiency in contour surveying for geological, geotechnical and mining activities. The Department is fully equipped with latest survey equipments manned by a professional survey team. The Department is in a position to take care of all requirements of sister Departments and Central Govt. agencies in the State.

Sikkim is undergoing unprecedented development and demand for construction material mainly sand, aggregates, stones etc have increased manifold. Their extraction, however, is still highly unscientific and haphazard. This has lead not only to over exploitation threatening the overall stability of slopes but also supply of poor quality materials. Since the use and management of natural resources is one of the important concern of integrated and sustainable mountain development, exacerbated change need must be based on thoroughly understood, workable and clearly defined policies. The Department of Mines, Minerals & Geology can play a

major role in systematic mining (extraction) of minor minerals (sand, gravels & stones) and appropriate intervention for conservation & development of quarry sites with proper quality control in a geo-environment friendly manner.

Impact of climatic changes/global warming leading to depleting/retreat of glaciers, glacial lake outbursts in the himalayan region is a great concern. Scientists all over the world are worried about the consequences of such alarming situation. Sikkim Himalayas having numerous glaciers and glacial lakes which regulates the flow of two rivers. The future sustainability of hydro power projects is directly or indirectly depended on the glaciers. Besides Hydro Electric Projects Industrial townships are growing in the river valleys. Hence glaciological studies and assessment of geo-environmental condition of glacial lakes in higher region needs urgent attention. Keeping in view of the facts, the Department had trained two officers of the Department on glaciology from Glaciological Division of Survey of India in recently and planning to take up joint venture on glaciological studies with Geological Survey of India.

PROGRESS REPORT OF 2013-2014

A. SCHEMES

(I) DEPARTMENTAL WORKS

The department carried out:-

- 1. Stability studies carried out of 474 nos. of Public House Building sites and sites of other sisters departments.**
2. Analysis of mineral samples in the laboratory for estimation of mineral content.
3. Analysis of core samples of soil and rock in the laboratory for estimation of bearing capacity of soil and rock.
4. Analysis of water samples of various sources for determination of portability.
5. Framing and implementation of Sikkim Minor Minerals Concession Rules for the regulation of minor minerals (sand, stones) of the State.
6. Preparation of landslide inventory mapping of Sikkim.

7. Geotechnical investigation of Lower Lagyap Hydel Project for re-alignment of water channel.
8. Contour mapping & Geo-technical investigation of Marchak & its surrounding area for setting up Satellite Township, East Sikkim.
9. Geotechnical investigation of area for setting up 2nd & 3rd Battalion Head Quarter of IRB in South Sikkim.
10. Geological mapping and sample analysis for SiO₂ rich (Quartzitic) rocks for setting up glass ceramics industries area around Tharpu-Mangsari and surrounding area, West Sikkim.

(II) CONSULTANCY AND OTHER WORKS

1. Geological and Geo-technical Investigation and Stability Zonation Mapping of Method and Suburbs. (Project Completed).
2. Mitigation measures for slope stabilization method by rock bolting at Amdo-Golai (Project Completed).
3. Geological and Geo-technical investigation of land proposed for construction of ANM Training Institute cum Hostel at Geyzing, West Sikkim.
4. Geological and Geo technical investigation of land proposed for construction of Livelihood School at Mangalbari, West Sikkim.
5. Surface geological mapping of Rolep Hydro Electric project, Rolep, East Sikkim.
6. Geological and Geo-technical investigation of land for proposed construction of Hotel at Near Bakthang, Gangtok, East Sikkim.
7. Geo-technical investigation of land for construction of Butterfly Park- Rang Rang, North Sikkim.
8. Geological Geo- technical Mapping of land for porposed construction of Hotel cum Boutique at Pangthang, East Sikkim.
9. Geological Geo-technical Mapping and study of land proposed for construction of slaughter house at Majitar, East Sikkim.

10. Geo-technical investigation for construction of Ramayan Village at Lower Tumin, East Sikkim.
11. Geotechnical Investigation of the area for erecting of Bhanjhakri statue at Jhakri Dunga, Uttarey, West Sikkim.

B. TRAINING

1. Shri Keshar Kr. Luitel, Assistant Geologist attended training on Seismic Micro zonation by Geo- technical and Geo-physical method at Shillong, conducted by GSI.
2. Miss Prakriti Pradhan, Assistant Geologist attended training on UNLFC at Bhuneswar, Orissa.

THE FUTURE PLANS OF THE DEPARTMENT ARE AS FOLLOWS:

1. Geo-technical studies and stability zonation mapping of all townships in the state.
2. Flood behavior studies of two major river system and its tributaries.
3. Reserve estimation of major and minor minerals deposits phase wise throughout the state including lime stone, dolomite and marble.
4. Geological and geo-technical studies of all vulnerable areas and landslide throughout the state.
5. Upgradation and modernization of geo-technical laboratory.
6. Microbiological and bacteriological analysis of various water sources in the state.
7. Study on various rock type available in the state, with regard to their utilization potential as dimension stone.

8. Central government has stressed for immediate framing and implementation of Minor Mineral Concession Rules under Mines, Minerals (Development and Regulation) Act 1957 as Sikkim being only state who has yet not framed the rules.
9. Detail geological studies/investigation along proposed HRT (Head Race tunnel) alignment of all the upcoming power projects in the State with emphasis on water resources to make comparative studies on change/impact on water resource and geo-environmental hazards in the area in future.

Taking in account the importance of role of geology and geo-technical investigation for developmental activities, technical manpower strength mainly in the field of Geology & Geotechnical wing needs to be enhanced almost to double of the present day cadre strength in next 10 years.