ANNUAL REPORT 2023

NATIONAL BUILDING RESEARCH ORGANISATION

MINISTRY OF DEFENCE

2023

The Annual Report 2023 was approved by the NBRO Interim Management Committee (IMC) on its meeting held on 27th February 2024

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தேசிய கட்டிட ஆராய்ச்சி நிறுவனம்
NATIONAL BUILDING RESEARCH ORGANISATION
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CONTENT

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ABOUT NBRO

National Building Research Organisation (NBRO) was established following the approval of the Cabinet of Ministers on 4th March 1984. Today, after nearly 39 years in existence, the NBRO stands out as a leading R & D institution and a reputed technical service provider.

Roles of the Organization extend from (i) being the focal point for landslide disaster risk management and conducting related research and development. (ii) Encouraging research and development into appropriate technology for housing & construction sector. (iii) Promoting construction capable of withstanding the impact of natural disasters and providing technical guidance for building resilience and (iv) Providing technical consultancy and testing services in areas of institutional expertise.

NBRO is a multi-disciplinary institution, having six technical divisions namely, Building Materials Research & Testing Division, Environmental Studies & Services Division, Geotechnical Engineering & Testing Division, Human Settlements Planning & Training Division, Landslide Research & Risk Management Division and Structural Eng. Research & Project Management Division, supported by the Administration Division, Finance Division, ICT & Program Unit and Internal Audit Unit.

NBRO conducts research related to its scope of work and also as request by the industry. Being the national focal point for landslide risk management in Sri Lanka, NBRO carries out activities of identification of slope instability, assessment of associated risk, mapping of hazardous zones, monitoring of ground

NBRO as a dutiful service provider together with technical experts from various disciplines is always geared up to provide suitable solutions to maintain and improve the quality of life of all citizens.

movement in landslides and rainfall in landslide-prone areas, issuance of landslide early warning, mitigation of landslides and unstable slopes and building of awareness of landslide hazard. In addition, NBRO issues Landslide Risk Assessment Reports (LRAR) for all construction and development activities in landslide-prone areas in the country as a unique service. General Treasury provides annual allocations for research and makes provisions for landslide risk management projects implemented by NBRO.

NBRO as a self-funded institution meets its recurrent expenditure, by earning revenue by the provision of laboratory testing and technical consultancy services. With its ISO accredited and best-equipped laboratories NBRO performs geotechnical engineering investigations and testing of building materials for suitability in construction, testing of water, wastewater, soil, sediment, air and stack emissions; assessment of building condition & structural integrity, and various other technical consultancy services that bring in NBRO its much needed revenue.

NBRO as a dutiful service provider together with technical experts from various disciplines is always geared up to provide solutions to maintain and improve the quality of life of all citizens.

OUR VISION

A nation living in a safer, sustainable & disaster resilient built environment

OUR MISSION

Reduce disaster risks through building resilience to ensure safer & sustainable built environment for all

OUR GOALS

- Goal 1: Achieve technical excellence in disaster risk assessment in related disciplines & subject areas
- Goal 2: Achieve legal status, statutory powers and the recognition in DRR in related disciplines and subject areas.
- Goal 3: Be an apex national entity in providing quality accredited testing & technical consultancy services in environmental, geotechnical engineering, building materials, resilient built environmental planning and resilient construction technology.
- Goal 4: Achieve excellence in Research and Development in DRR and in disaster resilient development technology & innovation.
- Goal 5: Establish national and regional cooperation and connectivity to promote and sustain DRR and resilient development science and technology
- Goal 6: Strengthen institutional capacity for effective disaster risk reduction in related disciplines & subject areas
- Goal 7: Achieve financial sustainability of NBRO for effective performance in DRR.
- Goal 8: Become the centre of excellence for landslide disaster risk management as the national focal point.
- Goal 9: Build disaster resilience through Climate Smart early warning technology
- Goal 10: Build disaster resilience through ecosystem-based risk mitigation technology
- Goal 11: Build disaster resilience through community science-based risk mitigation

CHAIRMAN'S REVIEW

I am pleased to write this statement for the Annual Report and Consolidated Financial Statements of National Building Research Organisation (NBRO) for the year ending 31st December 2023 as the Chairman of the Interim Management Committee of NBRO and also as the Secretary to the line ministry.

As a premier research and development institution carrying out a crucial role in disaster risk management and building resilience in built environment towards national development, this report presents a full cross section of NBRO's technical capabilities and its financial sustainability. NBRO has entered into a new era by initiating work of great magnitude in view of building disaster resilience in the country. Whilst staying at the forefront as a leading and efficient government entity, NBRO continued to fulfil its duties and responsibilities fully and to the best of its ability. Overcoming challenges, NBRO continued to earn high levels of income and show profits to gain financial success and stability.

NBRO as the national focal point for landslide disaster management, continued to perform and carry out assigned responsibilities commonly known zonation and mapping, early warning, mitigation and resettlement work. Issuing Landslide Risk Assessment Reports with suitable technical recommendations for development activities in landslide prone areas has now become a pre- requisite for building permits issued by local authorities which is considered as a decisive step in minimizing damages due to unplanned human interventions in landslide prone districts.

NBRO's commitment extends beyond landslides providing vital geotechnical expertise to various infrastructure development projects, unique services such as building condition assessments, building material testing for quality assurance, issuing recommendations for chemical disaster risks assessment & management and monitoring adherence to environmental quality standards in air quality, water quality, and noise levels. NBRO expanded its horizon by introducing Geospatial Intelligence for Sustainable and Resilient Built Environment and innovations such as production of ISO standard reference sand for laboratory testing purposes minimizing the costly importation.

NBRO has entered into a new era by initiating work of great magnitude in view of building disaster resilience in the country.

International partnerships remained a pillar stone of NBRO progress. Collaborations with world renowned institutions like JICA, ICL, USGS, UN agencies, University of Salford and the World Bank yielded fruitful results in R&D and capacity building. Initiation for development of a Building Code for Sri Lanka is a significant achievement among them.

Beyond the commitment for cost minimization, NBRO actively pursued strategic grant opportunities such as collaboration with foreign donors and development agencies, secured valuable funding for key projects like ongoing mega project, the Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP). Many landslide mitigations were completed in 2023 under this mega project and mitigation/ stabilization of unstable slopes around schools, hospitals and on railway & road sides in the landslide prone areas were commenced under financial support from AIIB & GOSL expecting the completion during 2024-2025.

NBRO continued to prioritize its long-term fiscal stability in 2023. Staff's dedication to self-generated income through consultancy and testing services yielded impressive results, showcasing NBRO expertise and value proposition. This self-reliance allowed NBRO to reinvest resources into critical areas like personnel training, cutting-edge equipment, and innovative research initiatives.

Looking ahead, NBRO remains committed to its self-sustaining model while exploring new funding opportunities and recognize the importance of maintaining financial well-being to ensure the continued ability to serve as a reliable partner in safeguarding people of Sri Lanka. This success would not be possible without the unwavering dedication of the team. I extend my sincere gratitude to Director General Eng. (Dr.) Asiri Karunawardena and his team for their tireless efforts. Their commitment to excellence continues to propel NBRO forward.

As we look towards the future, we recognize the need to adapt to a challenging environment. Fostering a culture of innovation will be crucial in addressing increasingly complex disaster scenarios. We also remain committed to strengthening ties with stakeholders, including the Ministry of Defence, line institutions and local communities, to ensure a united front against future challenges.

Before concluding, I take this opportunity to express my sincere gratitude who have played a pivotal role in NBRO's journey. We are deeply indebted to His Excellency the President and the Hon. State Minister of Defence, whose leadership and foresight have steered us towards success. Furthermore, I would like to extend my sincere appreciation to the members of the Interim Management Committee (IMC) for their unwavering support and collaboration

in achieving our goals. Their dedication has been instrumental in navigating challenges and propelling us forward.

Additionally, we are grateful to the Director Generals of institutions under the Disaster Management Division of the Ministry of Defence and our esteemed stakeholders for their continued confidence on NBRO. Their partnership is crucial in strengthening our efforts and enabling us to make a meaningful impact. With such strong collaborations and unwavering support, NBRO remains confident in its ability to build a safer and more resilient Sri Lanka.

The year 2023 served as a testament to NBRO's resilience and adaptability. As we strive towards our vision of a disaster-resilient Sri Lanka, we remain confident that through continued collaboration, innovation, and unwavering commitment, we can build a safer and more sustainable future for all.

General Kamal Guneratne (Rerd.)
WWV RWP RSP USP ndc psc MPhil
Chairman
Interim Management Committee,
National Building Research Organisation
(Secretary / Ministry of Defence)

EXECUTIVE REPORT

It is my honor to present this Annual Report together with the Consolidated Financial Statements of NBRO for the year ending 31st December 2023. In the preceding year of 2024, the NBRO persisted in maintaining its position at the forefront as a public enterprise, diligently fulfilling its duties and responsibilities despite encountering numerous challenges. NBRO remained committed to achieving its objectives promptly, demonstrating commendable technological and financial performance ensuring institutional stability throughout the year.

In the past 39 years of existence, NBRO served under many ministries moving from one line ministry to another far too frequently. This resulted NBRO to change its direction often, made to assume different roles and turning these challenges to its advantage, serving in many important national development projects in the country, and thereby learning newer technologies, expanding its scope of work and more importantly, acquiring the remarkable adaptability of NBRO to change. As NBRO was selected as the authorised institution for landslide related studies and services in 1985, it was imperative that NBRO venture deep into the field of Disaster Management. NBRO's horizon was further broadened when affiliated under the ministry of disaster management in 2007 and it has now become one of the reputed multidisciplinary public entity mandated to carrying out (i) Landslide disaster management and related research and development as the national focal point, (ii) encouraging research and development for appropriate technology for the housing and construction sectors, (iii) promoting and providing guidelines for building resilience to natural disasters and (iv) providing technical consultancy services in areas of corporate expertise.

The commitment demonstrated by NBRO's staff has been exemplary, contributing significantly to the organization's present status. As a result of their dedication, NBRO has emerged and maintained as a leading and reliable technical service provider, offering an extensive range of services covering critical sectors such as disaster risk management, housing, construction, and environment.

NBRO sustains its operations and recurrent expenditures primarily through revenue generated from the provision of consultancy and testing services to both state and private sectors. This self-earned revenue constitutes a significant portion of NBRO's

financial resources and is crucial for meeting staff salaries and covering most institutional expenses. In the year under review, NBRO recorded a consolidated turnover of LKR 793.8 million, showcasing its resilience amid stiff market competition in the laboratory testing and consultancy services sector. Despite the challenges posed by competitive agencies, NBRO's strategic efforts led to a net profit of LKR 146.9 million excluding non exchange profit of LKR 132.5 million particularly noteworthy impressive 31% growth in net profit compared to the preceding year.

As the technical arm of the Disaster Management Division of the Ministry of Defence, NBRO holds a pivotal position in advancing the division's mission. NBRO's mission primarily focused on the technical aspects of enhancing disaster resilience in the country, aligning its efforts achieving the Sustainable Development Goals and the guidelines outlined in the Sendai Framework of Actions. The institution's Strategic Plan highlights its commitment with a strong emphasis on research and development on diverse areas of disaster management including housing & construction, disaster mitigation strategies, early warning technology, structural stability of buildings, public awareness and training, and other technical interventions aimed at fortifying the building resilience against disasters.

Role as the National Focal Institution in Landslide Risk Management

NBRO continued to perform and carry out assigned responsibilities commonly known hazard zonation mapping, issuing landslide early warning, mitigation, resettlement and policy intervention. Issuing Landslide Risk Assessment Reports with technical recommendations prior to any development activities in landslide prone areas is a pre- requisite for building permits issued by local authorities which is the significant intervention in minimizing life losses and property damages due to non-engineered, haphazard human interventions in landslide prone districts.

Throughout the year 2023, NBRO had to respond to a series of incidents including unstable slope failures, cutting and retaining wall failures and rock falls etc. These incidents were particularly prevalent during April to May and September to December, affecting part of districts such as Badulla, Matara, and Rathnapura. Several minor events were also reported in Kandy, Kegalle, Nuwara Eliya, Matale, Kalutara, and Galle districts. NBRO diligently fulfilled its pre-assigned roles, which encompassed monitoring, issuing early warnings for evacuation, conducting timely investigations, and implementing corrective and preventive measures to mitigate the impact of these incidents.

As far as the landslide mitigation interventions are concerned, AIIB-assisted Reduction of Landslide Vulnerability by Mitigation Measures Project is by far the first landslide mega project NBRO has undertaken to implement and now running at its peak. Under this mega project landslide mitigation/ stabilization of unstable slopes at 127 locations around schools, hospitals and on railway & road sides in the landslide prone areas are being carried out expecting the completion during 2024-2025. As an important milestone, Phase I encompassed mitigation efforts at 24 critical landslide sites, completed in 2023

demonstrating NBRO's effectiveness in implementing vital risk reduction measures. The rectification of the unstable slope segment at Malapattawa in Nuwara Eliya District and the Landslide Mitigation Project of Kotaherakanda in Colombo District were also completed under treasury funds enhancing infrastructure resilience. In addition, NBRO played a crucial role in the rectification of an unstable slope and damaged auditorium building at the National Institute of Fundamental Studies (NIFS) in Kandy providing a complete package inclusive of geotechnical investigations, designs, and technical support for mitigation.

Mitigation work at NIFS Kandy

Mitigation work at Kegalle bypass road under RLVMMP

NBRO recognizes the importance of landslide early warning systems in mitigating the impact of natural disasters. The Landslide Early Warning Centre (EWC) at NBRO's Head Office plays a pivotal role in issuing timely early warnings and evacuation orders during extreme weather events through Emergency Operation Centre of the DMC. As part of its commitment to ensuring the safety of communities, the EWC operates round the clock, diligently monitoring conditions and responding promptly to potential threats. NBRO's extensive network comprises over 330 automated rain gauges strategically installed in catchment and landslide-vulnerable areas.

Other Technical Interventions

NBRO recognizes the significance of monitoring ambient air quality in urban areas as a crucial technical intervention. The introduction of new monitoring technologies and the development of Internet of Things (IoT) systems have ushered in a new era in air quality studies in Sri Lanka. NBRO has commanded this transformative change by embracing integrated technologies to establish a continuous ambient air quality monitoring network across the country. NBRO is committed to updating and maintaining a quality control database using the data collected from this monitoring network, which is made available to the public through the NBRO website on a daily basis.

In 2023, NBRO accomplished a significant milestone with the establishment of the Geospatial & Intelligence Laboratory (GeoAi_Lab), signaling a leap forward in geospatial intelligence capabilities. This state-of-the-art facility is poised to revolutionize spatial data collection, processing, and analysis, offering a wide

range of consulting services in geomatics, geography, statistics, and urban informatics. Throughout 2023, the GeoAi_Lab has been instrumental in providing innovative solutions and insights across various sectors.

Research and development needs are often identified convening an annual industry consultation with stakeholders to identify pressing research needs within the industry. This collaborative effort ensures that NBRO's R&D program remains responsive to the evolving demands of the sector, facilitating the integration of industry insights into research work. NBRO hosts its Annual Research Symposium, serving as a platform to showcase the outcomes of research conducted by NBRO and its collaborative efforts with local and international stakeholders and publish outcomes as symposium proceedings. The 13th Annual Research Symposium is planned be held on 29th Feb 2024 at Colombo.

Commercial scale production of ISO standard reference sand for laboratory testing purposes has been initiated in 2023, with the aim of minimizing the costly importation. It is a great achievement for NBRO to be able to make this product as a research innovation making commercial level production a reality.

Assessment of structural stability of state-owned public buildings and other high occupancy buildings commonly used by the general public is a decisive step taken by NBRO towards minimizing the impacts of building collapses due to structural failures and various other reasons. NBRO issues technical/ structural assessment report for buildings and make recommendations inclusive of improvements to structural integrity and defect rectifications.

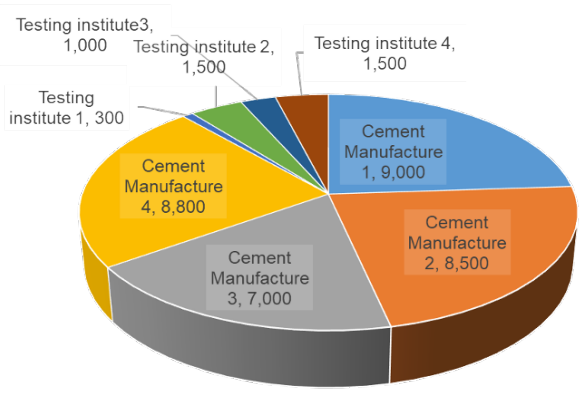


Fig. Importation of testing sand - 2023

The process of Geo-technical Clearance for assessing possible adverse impacts to adjacent built environment is one of the significant regulatory measures introduced by NBRO under the Planning & Development Regulations of Urban Development Authority (UDA). The impacts of a particular proposed development to adjacent properties and surrounding built environment especially during the construction of the substructure of the building is thoroughly assessed during this process.

NBRO's unwavering commitment to ensuring the quality and timely delivery of technical consultancy and testing work has been instrumental in maintaining its competitive advantage. NBRO upholds stringent quality standards by maintaining ISO 17025 accreditation across all three NBRO laboratories. This accreditation serves as a testament to NBRO's dedication to quality assurance and underscores its adherence to internationally recognized standards.

Technology Partnerships

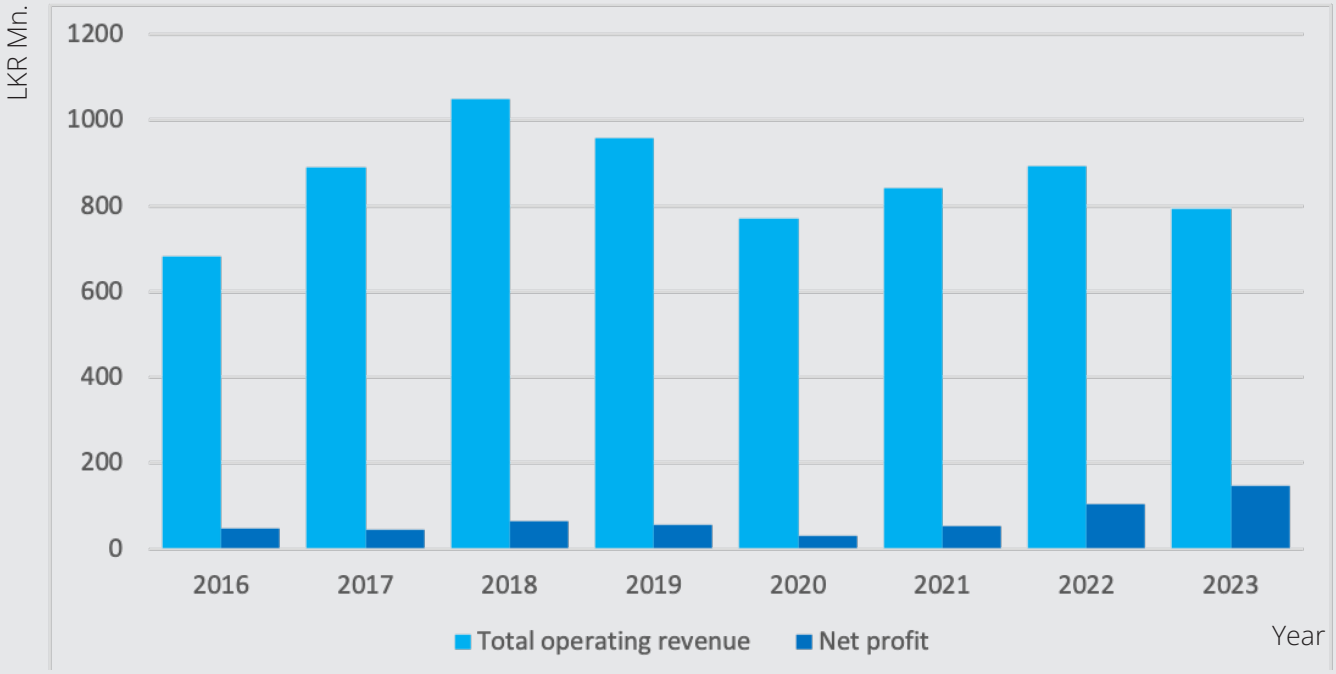
International agencies and institutions often extend their technical assistance to NBRO. In the year 2023, Japan International Cooperation Agency (JICA), the World Bank, and Asian Infrastructure Investment Bank (AIIB) continued to provide their assistance to NBRO. In addition, United States Geological Society (USGS), University of Salford and Huddersfield University of UK too assisted NBRO in various projects and programs.

The Science and Technology Research Partnership for Sustainable Development (SATREPS) initiative of the Japan Science and Technology Agency (JST), represents a five-year joint effort between Japan and Sri Lanka. The project aims to leverage advanced technology, introduced through global partners of the ISDR-ICL Sendai Partnerships 2015-2025, to enhance disaster risk reduction efforts for rain-induced rapid and long-travelling landslides. The project has facilitated academic and scientific exchange. Two NBRO scientists have completed their Ph.D. studies and other Ph.D. and M.Sc. students currently pursuing their degrees at Japanese universities.

Revenue

Recurrent expenditure of NBRO is mainly met by the revenue generated by provision of consultancy & offering a wide spectrum of laboratory testing services to state and private sectors. A significant net annual profits have been recorded continuously from 2010. Over the years, the financial stability of the institution has been firmly established during which period the revenue, profits and reserves have been steadily growing. In addition, NBRO effectively

Total Operating Revenue vs. Net Profit for last 8 years



utilize funds received from the general treasury for implementing disaster risk management projects on annual basis.

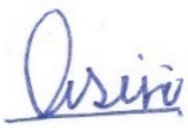
Appreciation

I take this opportunity to thank Hon. Ranil Wicremesinghe, the President and Minister for Defence and Hon. State Minister of Defence, Mr. Premitha Bandara Tennakoon and General Kamal Gunaratna (Retd.), Secretary of the Ministry of Defence, and also the Chairman of Interim Management Committee (IMC) of NBRO, whose direction and guidance have paved NBRO the way to this success. I also wish to thank members of the IMC and Audit & Management Committee, Director Generals of Disaster Management Centre and Department of Meteorology, the Director Generals of Department of National Budget, Department of General Treasury, National Planning Department, External Resources Department (ERD) and Director of National Disaster Relief Services Centre (NDRSC) who deserve great appreciation.

At this juncture our gratitude is also extended to our international stakeholders, JICA, the World Bank, UNDP, ADPC, NGI, AIIB, USGS, ICL, SATREPS of Japan, THINKlab of University of Salford UK, and all the local collaborating institutions and universities for providing technical and financial assistance for various projects and programs. In addition, I express my sincere thanks to our local stakeholders and valued customers for their continued confidence on us.

I am grateful to the dedicated employees of NBRO, without the help of whom we will not be able to perform at this extent during the recent unfavorable economic condition. Our appreciation is gratefully extended to this remarkably competent team, whose knowledge, skills and professionalism make the backbone of NBRO.

We will continue working cooperatively to improve the NBRO performance further in the coming years and accomplish the mission and objectives set by Strategic Plan. We are sure that our team members will be very supportive to each other and collaborate across teams in sharing ideas and achieving great outcomes.



Eng. (Dr.) Asiri Karunawardena
Director General

MANAGEMENT OF NBRO

MINISTER IN-CHARGE OF THE SUBJECT

Hon. Ranil Wicremesinghe
Minister of Defence

Hon. Premitha Bandara Tennakoon
State Minister of Defence

Presently a Cabinet approved Interim Management Committee (IMC) with Secretary of the line ministry as the Chairman guides and directs the administrative, financial and management functions of NBRO.

INTERIM MANAGEMENT COMMITTE OF NBRO (IMC)

General (Retd.) Kamal Gunaratna
(Chairman)
Secretary, Ministry of Defence

Major General Sudantha Ranasinghe
Director General,
Disaster Management Centre

Dr. Sugath Yalegama
Addl. Secretary (Policy & Admin),
Ministry of Urban Development & Housing

Mr. A K Karunanayake
Director General,
Department of Meteorology

Mr. H U R Fonseka
Chief Accountant, Disaster Management Division, Ministry of Defence

Mrs. S. Jalatheepan
Director, Department of Project Management and Monitoring of the Ministry of Finance, Economic Stabilizationand National Polices

Eng. (Dr.) Asiri Karunawardena
Director General/Secretary IMC
National Building Research Organisation

AUDIT & MANAGEMENT COMMITTEE

Mrs. S. Jalatheepan
Chairperson
Director, Department of Project Management and Monitoring of the Ministry of Finance, Economic Stabilizationand National Polices

Mr. A. K. Karunanayake
Member
Director General,
Department of Meteorology

Mr. H.U.R. Fonseka
Member
Accountant,
Disaster Management Division,
Ministry of Defence

Observer

Mrs. L. B. G. Sandamali
Audit Superintendent
Audit Office

Mrs. J. A. W. K. Jayakody
Chief Internal Auditor
Disaster Management Division, Ministry of Defence

In participation

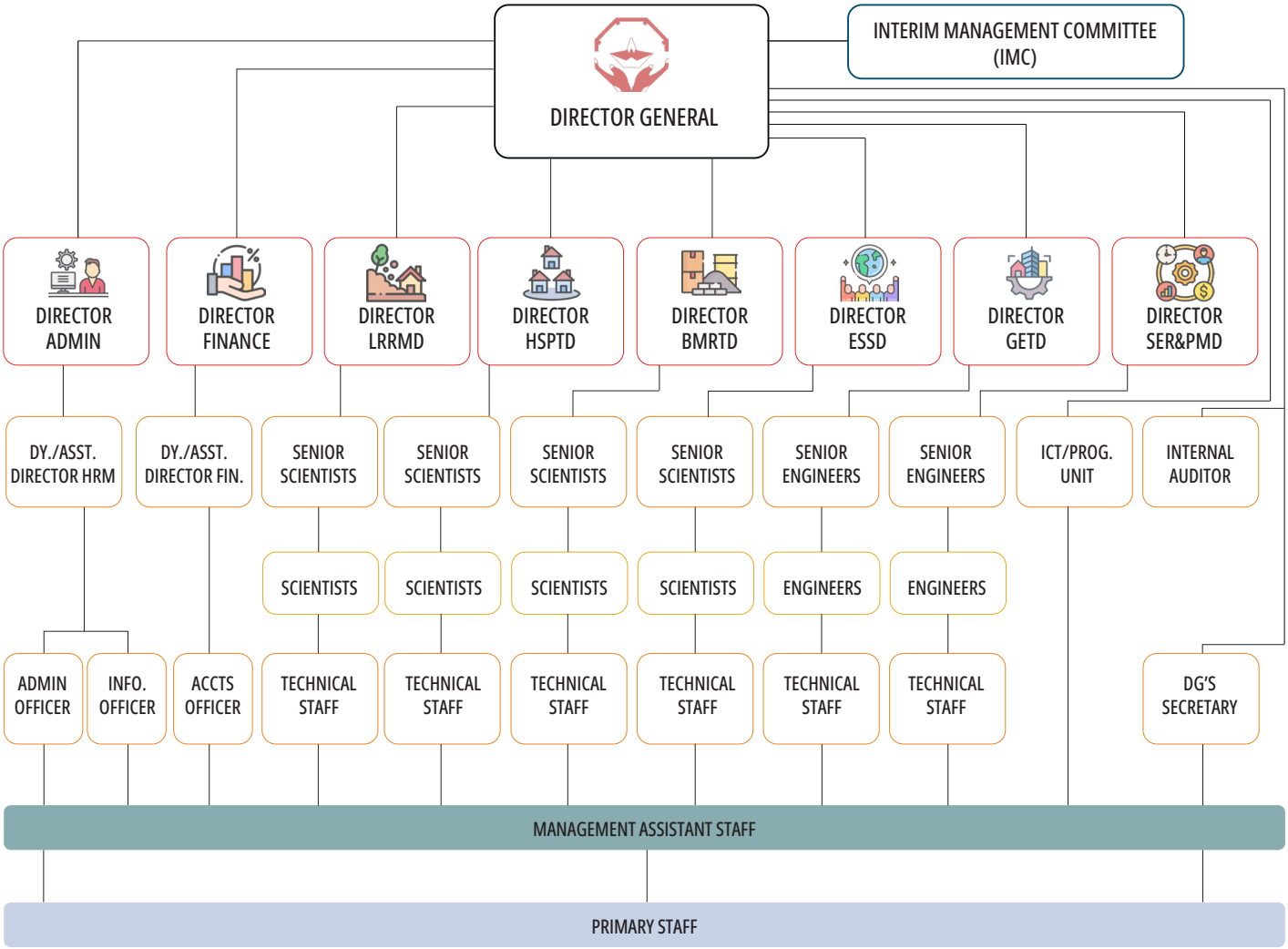
Eng. (Dr.) Asiri Karunawardena
Director General

Mrs. Kumudu Randeny
Director (Finance)

Mr. H. L. Ruwanthilaka
Internal Auditor

National Building Research Organisation

Organisation Structure



BMRTD - Building Materials Research & Testing Division
ESSD - Environment Studies & Services Division
GETD - Geotechnical Engineering & Testing Division
HSPTD - Human Settlements Planning and Training Division
LRRMD - Landslide Research & Risk Management Division
SER&PMD - Structural Engineering Research & Project Management Division
ADMIN - Administration Division
FINANCE - Finance Division

SENIOR MANAGEMENT OF NBRO

Eng. (Dr.) Asiri Karunawardena	Director General
Mr. Sarath Premasiri	Director, Environmental Studies & Services Division
Mr. Kithsiri N Bandara	Director, Geotechnical Engineering & Testing Division
Mrs. Sunethra Muthurathna	Director, Building Materials Research & Testing Division
Ms. Dammika Kahahengoda	Director, Structural Engineering Research & Project Management Division
Dr. Gamini Jayatissa	Actg. Director, Landslide Research & Risk Management Division
Mr. Chinthaka Rathnasiri	Actg. Director, Human Settlements Planning & Traning Division
Mrs. Kumudu Randeny	Director, Finance
Mr. Sarath Cooray	Actg. Director, Administration
Mr. Senerath Bandara	Project Director (PMU), RLVMM Project

ANALYSIS OF FINANCIAL & OPERATIONAL PERFORMANCE

During the year under review NBRO carried out the following specific tasks in line with its designated functions and Strategic Action Plan.

Landslide Mitigation Site, Kaluaggala Town

Projects under Public Investment Program

Landslide Risk Assessment Reporting Process (LRAR)

LRAR process has been implemented targeting to reduce life loss and property damages due to man-made activities and haphazard development in the hilly areas. NBRO issues Landslide Risk Assessment Reports to local governmental and project approving authorities recommending whether to grant or not approval to a building permit or approval of a development project when sites are in landslide-prone areas. By 31st December 2023 NBRO has granted approval over 102,000 applications since the issuance first started in March 2011. The number of approvals issued in 2023 was 9,590 and the number of applications rejected for the period was 836. NBRO charges a nominal fee to process an application, carry out necessary investigations and issue a report. The General Treasury provided Rs. 37.6 Mn in the year 2023 to cover the recurrent expenditure of this process and the balance expenditure was borne by NBRO revenue as CSR.

Table: Progress of the Issuance of Landslide Risk Assesment Certificates for Construction and Development Activities in Landslide Prone Areas (LRAB & LRAD) - (01.03.2011 - 31.12.2023)

#	District	01.03.2011 - 31.12.2023				01.01.2023 - 31.12.2023				December 2023					Pending Application Details		
		Applications Received (1)	Permission granted (2)	Permission not granted (3)	Applications Cancelled due to other reasons (4)	Applications Received	Permission granted	Permission not granted	Applications Cancelled due to other reasons	Applications Received	Permission granted	Permission not granted	Applications Cancelled due to other reasons	Total applications pending	Pending For initial Investigation / report preparation	Referred to revisit / detailed inspection	Details Pending from Client
1	Kandy	23,311	21,185	319	1,754	1,774	1,864	3	87	74	89	1	2	53	48	0	5
2	Matale	10,078	10,024	18	32	854	858	1	-	56	55	0	0	4	4	0	0
3	Nuwaraeliya	8,913	8,449	89	328	689	647	6	147	29	28	2	0	51	31	3	17
4	Badulla/ Monaragala	14,850	14,269	252	320	1,486	1,543	31	-	41	61	0	0	9	9	0	0
5	Kagalle	13,127	12,461	75	545	896	872	8	105	31	18	2	0	46	46	0	0
6	Rathnapura	14,198	12,477	47	1,603	1,450	1,372	1	90	74	78	0	10	71	53	2	16
7	Kalutara	1,475	1,406	16	48	202	185	5	18	9	5	0	0	5	5	0	0
8	Galle	19,327	19,171	12	92	2,132	2,027	3	68	87	66	0	0	52	52	0	0
9	Matara/ wH'tota	2,491	2,478	5	8	153	151	-	2	9	9	0	0	0	0	0	0
10	Kurunagala	72	69	-	1	28	26	-	-	1	2	0	0	2	0	0	2
11	Colombo/ Gampaha	104	96	3	4	53	45	2	4	2	2	0	0	1	1	0	0
Total		107,946	102,085	836	4,735	9,717	9,590	60	521	413	413	5	12	294	249	5	40

Landslide Investigations, Research & Development

Landslide Hazard Zonation Mapping Programme (LHMP)

Landslide hazard zonation maps, with a scale of 1:50,000, have been prepared, covering 32,593.1 sq. km across 13 districts identified as landslide-prone under LHMP. Additionally, maps at a finer scale of 1:10,000 have been created to encompass 9,880 sq. km in prioritized areas, at the end of 2023 with the completion of mapping for 480 sq. km in the Ratnapura district, utilizing Rs. 19.27 million.

The maps generated through this project play a crucial role in various risk reduction activities, including the issuance of landslide early warnings, conducting landslide investigations leading to hazard risk assessments, and producing LRAR. Furthermore, these maps are instrumental in identifying and prioritizing potentially hazardous sites for mitigation strategies. These maps are utilized in national and regional level planning by various institutions. Public can access most of these maps free of charge through the NBRO website (www.nbro.gov.lk), fostering a collaborative and informed approach to landslide management.

Landslide Investigations (LI)

District and Divisional Secretaries, and other officials from governmental institutions, frequently request NBRO to conduct landslide investigations to identify risks at specific sites concerning the safety of neighbouring human settlements, infrastructure, and plantations, and to provide immediate recommendations. In 2023, a total of 3,106 landslide investigations were carried out. The General Treasury allocated Rs. 68.83 million for this work.

Landslide at Haldumulla, Badulla District

Landslide at Akuressa, Matara District

Landslide at Peradeniya Town

Landslide at Southern Expressway, Pinnaduwa

Landslide Mitigation Program (GOSL Funded)

NBRO executes structural mitigations of unstable slopes and potential landslides on a priority basis utilizing government funds. In 2023, the rectification of unstable slope segment at Malapattawa in Nuwara Eliya District was completed spending Rs. 72.17 million. Additionally, the landslide mitigation project at Kotaherakanda, was also completed in the same year utilizing Rs. 41.6 million. Currently, the Bolthumbe project, landslide mitigation project & mitigation at Zahira College in Nuwara Eliya, are being carried out utilizing Rs. 46.3 million & Rs. 28.9 millions respectively.

Landslide Mitigation Project at Malapattwa

Development of Risk Profile for landslide prone areas

Landslide risk profile development project was initiated in 2016, for developing series of outputs to guide local, regional and national level decision makers in disaster risk reduction and development planning. Risk profiles covering landslide prone districts have been developed to enhance the capacity of national and sub-national level agencies in assessing the disaster risk and formulating short, medium and long-term disaster risk reduction decisions.

The Landslide Risk Information Portal is an online platform designed to facilitate efficient and quick retrieval of data related to landslide risk. Currently, 84,000 elements at risk data have been uploaded onto the portal. Elements at risk refer to the population, properties, economic activities, or any other defined values exposed to hazards in a given area. The aim of elements at risk analysis is to assess the characteristics of inhabitants, properties, and the use of buildings at risk of landslides.

Moreover, the portal provides access to 1:50,000 and 1:10,000 landslide hazard map layers, landslide investigation (LI) locations, landslide mitigation locations, building footprints, landslide flow path areas, solution matrices for identified locations, and analytical features. The portal can be accessed at https://lrip.nbro.gov.lk/. In addition, following activities were carried out in 2023 out of the 5-year planned work.

- ◊ DSD Level Ledger development for 29 DSDs
- ◊ Landslide Risk Information dissemination workshops for reginal and local level decision makers – 9 workshops (Kegalle, Ratnapura, Matale and Galle districts)
- ◊ Enhancing and customizing Landslide Risk Information Portal (LRIP)
- ◊ Simulation of Landslide Flow Path (Yellow Zone & Red Zone) for 26 LHMP map layers
- ◊ Identification of Risk Clusters and Risk Reduction Measures - for 10 DSDs

Enhancing real time landslide forecasting & early warning capacity (Maintenance of the system)

NBRO maintains a network of 330 automated rain gauges for monitoring rainfall in landslide-prone areas for effective issuance of landslide early warnings, as triggering of landslides mostly occurs due to increase in soil moisture by high intensity rainfall. Scientists of Landslide Early Warning Centre at the NBRO study weather forecasts issued by the Department of Meteorology and analyze rainfall data acquired from the automated rain gauges for issuing early warnings combinedly with the Emergency Operation Centre of Disaster Management Center. In addition, NBRO has improved its capacity in landslide monitoring with ground movement detection instruments and moisture sensing instruments. 198 early warnings have been issued in 2023 and the treasury provided Rs. 10.0 Mn for repairs and maintenance work of the system.

Building Assessment & Condition Reporting (BACR) Project

NBRO is playing a crucial role in providing building assessment and condition reporting services. Despite being self-funded, NBRO receives requests from both public and private sectors, charging fees accordingly. However, instances of owners unable to afford these fees pose risks to their safety and that of adjacent communities by continuing to reside in potentially hazardous structures.

Recognizing the crucial need for structural resilience, the government allocated Rs. 25 million to NBRO particularly targeting impoverished buildings like schools, hospitals, and other public gathering buildings for assessments.

Eligibility criteria for grant allocation are meticulously designed to address urgent needs within the

Weligama District Secretariat Building

School Building in Gampaha

government sector, considering factors such as buildings being utilized beyond their design life, evidence of aging-related deterioration, compromised structural integrity, damages during disasters, poor maintenance practices, or adverse impacts from nearby construction activities.

Through detailed studies of existing buildings, NBRO advises clients on whether to demolish or rehabilitate and how to restore structures for future use.
A significant outcome of this support is evident in NBRO issuing over 400 comprehensive reports for various government facilities, evaluating their structural conditions. In 2023 alone, 48 reports were issued under the Building Assessment and Condition Reporting (BACR) project.

RESEARCH & DEVELOPMENT PROGRAM

NBRO Research and Development (R&D) Programme was initiated in 2013 and continue utilizing research grants from the General Treasury. Annual Government grant Rs 5.3 Mn is allocated to undertake research and development work. Fund was effectively utilized for R&D projects focusing on "Creating a safer built environment". A comprehensive R & D program is designed by NBRO and research needs are often identified in consultation with the industry. NBRO holds in the beginning of the year the Annual Industry Consultation Meeting with its stakeholders to learn the research needs in industry. The allocated fund has utilized for continuing research from 2022 and for the new research proposals of 2023. Accordingly,

13 researches conducted in 2023 R & D programme. The NBRO Research Committee continued to provide guidance to scientists to conduct their research projects and NBRO provided necessary assistance and facilities. The following table gives information of the R & D Projects of 2023.

Table: Research Titles of the R & D Programme 2023

Division	Research Title	Principal Researcher
LRRMD	Strengthening the prediction power of landslide hazard zonation maps by incorporating zone-based rainfall thresholds through infiltration modeling.	Mr. Milinda Amarasinghe
	Calibration and evaluation of the available NGI Ground Penetrating Radar (SF-GPR) system using model tests for absolute utility detection	Mr. N K R Senevirathne
SE & PMD	Development of manual/guidelines for repair and retrofitting of damaged/deteriorated/unstable buildings	Ms. Ajantha Basnayake, Ms Sathya Bandaranayake
	Experimental study on Fly Ash-Based Alkali-Activated Geopolymer concrete blocks	Ms. H S N Perera
	The implications of adopting Eurocodes for designing disaster-resilient buildings in Sri Lanka.	Ms. H A Pathirana
ESSD	Investigate the acoustic properties of internal wall plaster with recycled material as a fine aggregate replacement for screening indoor noises in multistory buildings.	Mr. Kasthuri Chandrasena
	Tree Risk Assessment for identification of hazardous trees for issuing Early Warning to prevent casualties and damages to properties due to tree failures within the Colombo Municipal Council area	Mr. VDW Sumanaseka
	Development of a high-precision acid rainwater collector & detector as a secondary confirmation strategy of ambient air quality	Mr. Ruwan Ruhunuge
HSPTD	Self-assessment tool for assessing Disaster Resilience of low–rise buildings/Houses in Sri Lanka.	Mr. Anuruddha Vijekumara
GETD	Cyclic shear resistance of typical Sri Lanka soil	Ms. Amali Palliyaguruge
BMRTD	The contribution of the NBRO to Sri Lankan ancient stupa	Mr. Akila Sandaruwan
	Exploring a suitable solution to recycle/dispose of shredded currency notes particles/briquettes (currency waste)	Mr. Chirath Weerasena
	Introducing local ISO Standard sand for cement testing	Mr. Heshan Ellegama

Annual research Outcomes are presented and published at the annual NBRO research symposium.

SYMPOSIA

BUILDING RESILIENCE
40 Years in Retrospect

13TH ANNUAL RESEARCH SYMPOSIUM 2023

29th February 2024 | Colombo, Sri Lanka

The 13th Annual Research Symposium of the NBRO is scheduled to be held on 29th February 2024 in Colombo. This event is organized parallel to the celebrating 40th year anniversary of NBRO since inception of its operation in 1984. This year's Symposium is planned to be conducted under the broad theme of "Building Resilience: 40 Years in Retrospect", targeting the mission of NBRO in the process of building resilience in the built environment.

The symposium is designed to be a collaborative platform with participation of public and private sectors institutions, academia, professional bodies, and international and regional partner agencies and individual eminent experts in the similar disciplines.

The symposium inauguration is planned with a keynote speech on "Building Resilience as an Adaptation Strategy to Climate Change", followed by a guest speech from chief representative of JICA Sri Lanka, an address by the chief guest Hon. Kanaka Herath, State Minister of Technology. Further, it is planned to have a special launching session.

A panel discussion on "Resilience in the Built Environment: Strategic Interventions" is planned to be held with the participation of eminent experts from the industry.

The event will showcase the outcomes of research studies conducted by NBRO in the year 2023, featuring over 30 abstracts and presenting around 25 studies across six technical sessions named;

- Technical Session 1: Technology Advancements for Landslide Risk Management
- Technical Session 2: Innovations in Resilience Buildings
- Technical Session 3: Empowering Communities for Resilient Settlements
- Technical Session 4: Sustainable Environment for Healthy Living

The symposium will facilitate strengthening the partnership with professionals of the built environment and further enhance the capacity of the NBRO.

MAJOR CONSULTANCY PROJECTS

Geo-technical Clearance for Assessing Possible Adverse Impacts to Adjacent Built Environment

NBRO issues Geo-technical Clearance for proposed development activities which includes pilling and/ or deep excavations. The main objective of this Geotechnical clearance is to assess impacts of a particular proposed development to adjacent properties and surrounding built environment especially during the construction of the substructure of the building.

The requirement is enacted by clause no. 57 (3) c. of the Urban Development Authority (UDA) Planning & Development Regulations 2021, gazette No. 2235/54 published on July 08, 2021. Further, the NBRO has signed a Memorandum of Understanding (MoU) with Tourism Development Authority (SLTDA) and One Stop Unit (OSU) of UDA to streamline the clearance process.

Accordingly, NBRO has issued 15 geo-technical clearances and renewals for the year 2023 and received LKR 3.7 million as consultancy for the service. Following table illustrate the issuance of clearances and renewals during 2017 to 2023.

Table: Issued clearances and renewals from 2017 to 2023.

Year	2017	2018	2019	2020	2021	2022	2023
No. of clearances and renewals	32	38	20	09	35	21	15

Rectification of Unstable Slope and Damaged Auditorium Building of National Institute of Fundamental Studies (NIFS) in Kandy

In response to a request from the Secretary of the National Institute of Fundamental Studies (NIFS), NBRO, known for its expertise in geotechnical engineering, provided consultancy services to address two critical issues at the NIFS headquarters located on Hanthana Road, Kandy.

Geotechnical Investigation and Design:

NBRO conducted a comprehensive geotechnical investigation to assess the subsurface conditions and properties of the subsoil. Additionally, a geological survey was undertaken to analyze the geological

features of the problematic area. Utilizing data gathered from site visits, geotechnical investigations, geological mapping, and related analysis, NBRO formulated a detailed design incorporating appropriate mitigation measures to stabilize the unstable slope adjacent to the NIFS premises.

Mitigation Measures:

The proposed mitigation measures for stabilizing the unstable slope beneath the auditorium building include soil nailing, construction of retaining walls, reshaping, and drainage improvements encompassing both surface and subsurface drains. The execution of these mitigation measures have been completed, and the project is currently within its defect liability period, ensuring the long-term stability of the slope.

Cracked Walls at NIFS

Successful Completion of Slope Stabilization Works

The slope stabilization works have been executed successfully, marking a significant milestone in the project. The construction contract amount totaled approximately 137 million Sri Lankan Rupees, excluding taxes, and the project was completed within a span of 8 months, demonstrating NBRO's efficiency and commitment to delivering high-quality outcomes within specified timelines.

Rectification of Damaged Auditorium Building

To address the structural issues of the damaged auditorium building, NBRO has proposed retrofitting techniques aimed at strengthening structural elements such as beams, columns, and slabs as necessary. The finalization of structural recommendations is currently in progress, paving the way for the commencement of tendering works to rectify the auditorium building.

Slope Stabilization Works

Consultancy Supervision of phase 1- Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP)

Phase I of the RLVMMP project was completed successfully in 2023 under the direct supervision of the NBRO. Phase 1 consisted of 24 critical landslide sites, and all sites achieved 100% physical progress. Preparation of final documents such as completion reports etc., is in progress, however, some packages are in the final stage. Furthermore, all sites have been formally handed over to the Employer Project Management Unit (PMU).

Table : The overview of Phase I

Package	Number of Sites	Cost of completion Rs.(Mn)	Status
01R	04	420.41	Civil works and defect liability period is 100 % completed. Sites were handed over to Stake holders.
02R	07	553.62	
03R	02	306.63	
04A	06	433.74	Civil works are 100% completed. Defect liability period is in progress.
04B	04	290.77	
04C	01	430.53	

Landslide Mitigation Site, Kalawana GCC

Quality Testing of Offshore Sand at Washing Plants at Muthurajawela

Since 2020, NBRO has been collaborating with the Sri Lanka Land Development Corporation (SLLDC) as a third-party testing provider to ensure the quality of washed offshore sand supplied for the local construction industry. This partnership focuses on the offshore sand washing plants located at Muthurajawela.

Equipped with a dedicated laboratory facility, NBRO conducts all aggregate testing according to the SLS and BS standards. Adhering to the guidelines outlined in SLS 1397, NBRO officials carry out sampling and testing at weekly and monthly intervals to verify compliance with standard requirements.

Sampling from the Sand Piles

Quality Testing of Reinforced Concrete Structure of New Kelani Bridge Project

In response to the emergence of vertical cracks in the diaphragm walls of the centre box girder within the new Kelani Bridge project, the Road Development Authority and the project contractor have expressed a pressing need to ascertain the crack profile, specifically focusing on depth and width factors. These parameters are crucial for assessing the serviceability and safety of the bridge structure.

Recognizing the significance of timely and accurate investigations, NBRO-BMRTD, renowned pioneers in civil infrastructure investigations, swiftly conducted crack investigations. Through proper examination and analysis, NBRO-BMRTD determined the status of the cracks, allowing for the design of appropriate repair strategies tailored to the specific conditions observed.

Non-destructive testing on the diaphram wall

Site-Specific Environmental and Social Management Plans

NBRO carries out the Reduction of Landslide Vulnerability by Mitigation Project (RLVMMP) with the financial assistance Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying 127 unstable slopes in high-risk areas in 11 districts of 06 provinces of the country. The project is implemented in accordance with environmental and social safeguards and mandates of the AIIB and that of Sri Lanka. An environmental and social management framework (ESMF) was prepared as required by the AIIB environmental and social safeguard policy to provide a guide for the application of AIIB safeguards and national environmental and social mandates during the implementation of project actions. The project implementing agency (NBRO) is expected to ensure the implementation of environmental and social management plans prepared under the ESMF during all phases of project implementation so that the impacts on the environment and community are minimal. According to the recommendation of ESMF, Site Specific environmental and Social Management Plans (SSESMP) were prepared for all sites as the environmental & and social setting and health & and safety conditions are more site-specific, The SSE&SMP gives planning, design, construction, and operation phase environmental, social, and health & safety management measures to be considered in the project Implementation. The Environmental Studies and Services Division prepared 86 SSESMP for 46 sites close to roads, 11 sites close to the upcountry railway line, 18 sites in schools, 6 sites close to religious places, and 5 sites close to government buildings in 11 districts of which 30 sites are in Ratnapura district. All SSESMPs were uploaded to the project website.

Site Visit by the Project Team

Structural Investigations and Damage Assessments of Buildings

SER&PMD of NBRO extends its comprehensive services to both public and private sector clients, catering to the assessment needs of various structures such as schools, universities, training institutions, factories, hospitals, office buildings, supermarkets, hotels, houses, and more. With a focus on ensuring structural integrity and safety, SER&PMD offers a wide range of consultancy services tailored to the unique requirements of each project.

These services include design review, site investigation, condition assessment, structural stability assessment, and repair/retrofitting works, among others. SER&PMD also provides cost estimation services to aid clients in budget planning and decision-making processes. Moreover, the division conducts pre, intermediate, and post-crack surveys for existing buildings during the execution of new construction projects, ensuring thorough assessment and compliance with structural standards.

In 2023 alone, the Structural Engineering Research and Project Management Division conducted investigations on various buildings and structures, issuing a total of 97 reports to its clients in the private sector.

Project Management and Consultancy Services

NBRO is dedicated to offering a diverse array of project management consultancy services, spanning building construction, repair works, landslide mitigation, and other civil engineering endeavors. These services encompass the preparation of bill of quantities and tender documents, selection of contractors through government procurement processes, vigilant contract administration, and thorough construction supervision, among others.

Notably, NBRO has provided consultancy services for numerous building projects to external parties, demonstrating its expertise and technical prowess in addressing a wide range of challenges. Examples include the Renovation Work of the office building of Kolonnawa Urban Council, Repairing work Stage – I at Gampaha Pradeshiya Sabha building, and Investigate - Design & Rectification Works of Water Leaks on the Roof Slab of the Disaster Management Division under the Ministry of Defense.

Further, NBRO provided consultancy services to the University of Kelaniya for design, construction supervision, and contract administration for cutting failure. This initiative proved to be highly effective in safeguarding the students and peoples who are living in the area. The project, valued at Rs. 48.8 Mn, was successfully completed in 2023.

These consultancy services serve as a cornerstone in extending NBRO's support to external organizations, empowering them to navigate complexities in building construction, landslide mitigation, and infrastructure development.

Landslide Mitigation Project at University of Kelaniya

INCOME BY TESTING & CONSULTANCY

Provision of technical testing and consultancy services in the fields of landslide studies and services, geotechnical engineering, project management services, building materials, human settlements planning and environmental management was continued as summarized below:

Table : Income by Testing & Consultancy Works

Activity/ Division	No. of consultancy jobs	No. of testing/ Investigation jobs	Total Income Generated (Rs. Mn.)
Landslide Research & Risk Management Division	723	6908	82.80
Geotechnical Engineering & Testing Division	103	38	198.80
Environment Studies & Services Division	590	590	63.33
Building Materials Research & Testing Division	3	1846	43.07
Structural Engineering Research & Project Management Division	157	-	44.97
Human Settlements Planning & Training Division	27	-	16.33
Consultancy work RLVMM Project	-	-	25.64
Other Revenue	-	-	137.04
Total			611.98

OTHER TECHNICAL INTERVENTIONS

NBRO's GeoAi_Lab Spearheads Innovation in Geospatial Intelligence for Sustainable and Resilient Built Environment

A Geospatial & Intelligence Laboratory (GeoAi_Lab) established in NBRO on September 27, 2023, marking a significant advancement in geospatial intelligence. Within the Human Settlements Planning and Training Division, this advanced facility unites a group of highly skilled experts, such as Geospatial and Remote Sensing Analysts, Cartographers and Visualisation Experts, IT & Database Administrators, and Software Developers/Programmers. The GeoAi_Lab, with expertise in geomatics, geography, statistics, and urban informatics, is ready to transform the field of spatial data collecting, processing, and analysis.

The GeoAi_Lab offers a variety of services that demonstrate its dedication to delivering cutting-edge solutions for the creation of resilient settlements:

1. Drone Surveys - Drone based Geospatial data acquisition, processing, and analysis
2. Remote Sensing - Remote sensing and satellite image analysis
3. Spatial Databases - Spatial database and field survey app development based on Esri platform
4. Spatial Data Visualization - Spatial data visualization and reporting
5. Layout Planning and Land Sub-division - Land layout planning for land subdivision towards resilient settlement development
6. Training -Training and capacity building in geospatial intelligence

This newly established laboratory worked in a variety of consulting services in 2023, of supplying precise data and information for a wind turbine project in Vadamaarachchi, Jaffna, the laboratory provided consulting services. The laboratory was capable of furnishing comprehensive imagery and data pertaining to the 33-square-kilometer project

site by leveraging drone technology. This data and imagery comprised topography, vegetation, and infrastructure. The laboratory provided consulting services for a Kegalle city building facades research study, and also laboratory was able to provide a 3D model, videos, and photographs with exceptional levels of detail regarding the study area. Furthermore, a comprehensive building survey was undertaken within the designated research area in order to gather necessary information for the purpose of the study. Furthermore, drone surveys were conducted in the districts of Rathnapura, Badulla, Galle, Matara, Kegalle, and Badulla where recent landslides have taken place. By means of these drone surveys, NBRO is capable of offering decision makers with important information pertaining to the landslides in order to facilitate future investigations.

Opeining of the Geo_Ai Laboratory

NBRO Involvement of the Dheeghavapiya Restoration Project

The conservation efforts for the "Deeghawapiya" stupa have resumed, facilitated by the Department of Archaeology in collaboration with the Sri Lanka Armed Forces and various government institutions. In this restoration project, the NBRO has provided a pivotal role, contributing expertise in materials quality and crack monitoring.

Through its knowledge and experience, NBRO enhances the conservation process by providing valuable insights into materials quality assessment and implementing effective crack monitoring techniques.

Quality of the brick manufacturing process

The manufactured special clay bricks are selected for restoration by using the systematic approach carried out by the NBRO. All the brick lots are tested according to the standard test method and ensure the quality of the brick lot meets the specification norms. Also, the NBRO representatives are closely monitoring the brick production to ensure the quality of the manufacturing process.

Crack Monitoring

NBRO officials have been consistently monitoring the two existing cracks since December 2022. Their

focus is on identifying any propagation and changes in width at specific locations in response to varying loads and environmental conditions. This ongoing monitoring is crucial for understanding the behavior of the cracks over time and implementing appropriate measures for maintenance and preservation

Current view of the Deegawapiya Stupa

Quality Control in Clay Brick Production

Repairing and Upgrading of Abandoned Mobile Air Quality Laboratory to Improve the Ambient Air Quality Monitoring Network

The Vehicular Emission Testing office has handed over a Mobile Ambient Air Quality Monitoring laboratory (MAAQML) with an attached vehicle on 27th November 2023 which was accident in 2014 and then after not operated and abandoned at Central Environmental Authority (CEA) at Battaramulla. This MAAQML was purchase on 2013 by the financial assistance of the Vehicular Emission Test Trust Fund from M/s Globle Scientific Systems (Pvt) Ltd and handed over to the CEA for the operation. The MAAQML system is manufactured by "Environment SA", Germany and not operated for about six years due to the financial difficulties and non-responding of supplier for the repairing of damage due to accident.

Once the MAAQML handed over to NBRO in November 2023, our technical group were deeply studied the gas and particulate analyzers and found that most of analyses are in working order and can be make used for air quality monitoring after they calibrated. The vehicle attached to carrying the laboratory is also in good working conditions with some miner damages to its body. Rectifying of vehicle, analyzers and power system of the MAAQML are being updating to add the system for ambient air quality monitoring program. However, the software system of the data collection has to be update to operate add this MAAQML to the monitoring network.

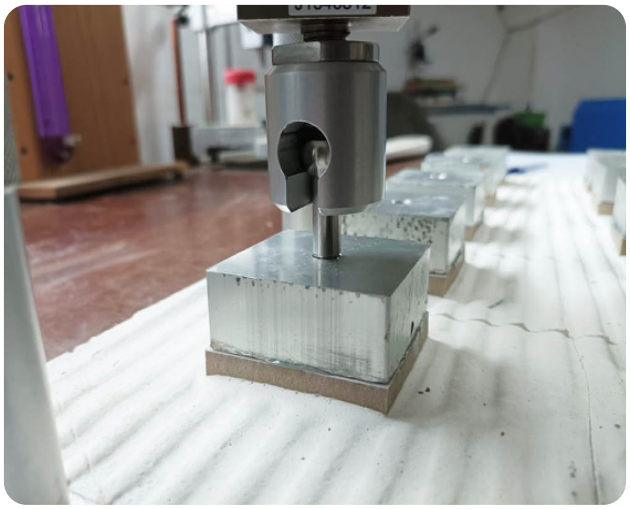
Mobile Ambient Air Quality Monitoring Laboratory

Introducing Dispersion & Resin Tile Adhesive Test at NBRO

As a leading supplier of testing facilities in Sri Lanka, NBRO's Building Materials Testing Laboratory has expanded its tile adhesive testing services. With a reputation for excellence, NBRO have been providing cementitious tile adhesive testing to the construction sector and manufacturers since 2017. Recently, NBRO has introduced new testing services specifically for dispersion and resin-based tile adhesives, catering to the evolving needs of construction material manufacturers.

Our building material testing laboratory now offers comprehensive testing for dispersion and resin-based tile adhesives, covering key parameters including shear adhesion strength in standard and wet conditions, as well as under accelerated heat aging. NBRO also test for heat resistance, impact resistance, and open time.

These parameters are tested in accordance with international standards such as ANSI 136.1, ISO 13007-2, and EN 12004-2, guaranteeing reliable results that meet industry benchmarks. NBRO committed to providing accurate and insightful testing services to the construction sector. NBRO's expansion into dispersion and resin-based tile adhesive testing demonstrates its dedication to staying at the forefront of industry advancements. NBRO look forward to continued collaboration and growth, serving the construction sector with excellence in testing and innovation.



Modified Machine Arrangement for Testing

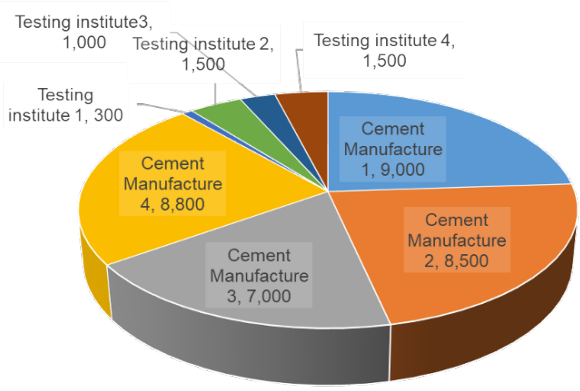
Standard Sand from NBRO

NBRO produces standard sand with the requirements given in the relevant standard. NBRO has the capacity to produce standard sand to cater to the demand in Sri Lanka.

Cement testing is essential for the SLSI certification process, materials clearance for consignment, and source approval in construction. In the SLSI certification process, cement manufacturers should conform their product to comply with the test parameters given in the SLS standard.

The main three properties are mentioned on the SLS 107,515,1247,1253 and 1697 standards as mechanical, physical, and chemical properties. Under mechanical properties, compressive strength is the main parameter that determines the durability of cement. It is categorized as Early strength and Standard strength considering the curing time of the testing prism. Prism is cast with combing cement, distilled water, and standard sand according to procedures given in the SLS ISO 679 standard. Standard sand shall comply with the particle size distribution and moisture content specified and determined in the SLS ISO 679 standard.

Standard sand was imported from several countries such as China, Germany, and France. In 2021, 37,600 packets were purchased and it cost more than Rs. 28 million. Due to the economic crisis happening in the country, the government imposed many regulations on restrictions of importing materials. Hence, cement manufacturing companies faced difficulties in importing standard sand for cement testing. SLSI requested NBRO to find local sources to produce standard sand. NBRO is always geared to solve



Standard Sand Consumption in Sri Lanka

industrial problems by conducting research studies under the guidance of expertise. This study was conducted under supervision of Emirate Professor S.M.A. Nanayakkara, Senior Proffeesor of University of Moratuwa.

Now, NBRO produces standard sand with the requirements given in the relevant standard. It is commercially available at NBRO premises at a reasonable price. NBRO has the capacity to produce standard sand to cater to the demand in Sri Lanka. Technically qualified staff always prepare to monitor the process. Tokyo Cement Company PLC, Lanwa Sanstha Cement Corporation (Pvt) Ltd, Central Engineering Consultancy Bureau, and DHT Cement Pvt Ltd are the main clients.

NBRO Manufactured Standard Sand Product Ready to dispach

NBRO Involvement in Managing Disaster Risk on Incidental Fires at Chemical Industries

With the development of the world's industrialization and the increasing population, the chemical industry is booming, the chemical plant accidents continue to rise rapidly, Sri Lanka is no exception and has been experiencing chemical disasters. The very recent examples are fires that broke out at "Global Care Products", Kandana and "Watercare Technologies (Pvt) Ltd", Homagama on 8th August 2023, and 17th August 2023 respectively. Both industries have used flammable and volatile chemicals with low flash points as raw materials in their manufacturing processes. The main danger from smoke is reduced visibility. Smoke and toxic gases and vapours generated during a fire are responsible for the harmful effects such as respiration difficulties, and mild irritation of the eyes, nose and skin.

NBRO was informed by the Central Environmental Authority (CEA) and Disaster Management Center (DMC) of both of these incidents. Consequently, a team headed by the Director of the Environmental Studies and Services Division reached the location immediately in each case and monitored gas concentrations to identify the risk levels for the safety of surrounding communities, and were reported to relevant authorities and responsible institutes for immediate actions since the actions taken in the initial minutes of an emergency are critical in saving lives and safeguarding the livelihoods of vulnerable people. These chemical fire incidents in Sri Lanka shed light on both the progress made and the challenges that remain in ensuring effective chemical fire safety and emergency response and emphasize a national chemical emergency coordinating structure, including appropriately trained staff with the right knowledge and skills for dealing with each of the stages.

Fire breaks out at Watercare Technologies (Pvt) Ltd, Homagama

Development of a High-precision acid rainwater collector & detector as a secondary confirmation strategy of ambient air quality

Air pollution caused by human activities has become a major environmental issue in urban cities. The main air pollutants are acidic gases like sulfur dioxide (SO2) and nitrogen oxides (NOx), as well as Particulate Matter. These pollutants can be deposited on the ground through wet and dry deposition, causing a decrease in the pH of rainwater and harming ecosystems. Acid rain, with a pH of around 4.0, can

have serious large-scale effects on ecosystems and buildings. Therefore, it is important to implement a real-time monitoring platform to identify the acidity in rainwater and prevent future contamination. Rainwater quality monitoring in Sri Lanka is limited to pH measurements at a few monitoring stations, with no correlation to air pollution levels. Remote sensing units are unreliable due to calibration accuracy issues. To overcome these drawbacks, high-precision rainwater collectors are being developed to measure pH, conductivity, and TDS in real-time events with self-calibration facilities.

The project began in October of 2023 with the designing of a rain gauge made of acrylic materials. Initially, the gauge was tested without sensors, and relevant sensors were purchased in November for further fabrication and trial and error works. The designing and programming works are still ongoing, and the prototype model will be deployed for testing at the site by the end of August 2024. It requires a lot of modifications with sensor types before finalization.

Infiltration rate of soils in the field Using double-ring infiltrometer

This test method is useful for field measurement of the infiltration rate of soils for the application of liquid waste disposal, evaluation of potential septic-tank disposal fields, leaching and drainage efficiencies, irrigation requirements, water spreading and recharge, and canal or reservoir leakage, among other applications. The NBRO has been assessing this parameter on customer requests to determine the Discharge rate Hydrolic loading rate specified in Tolerance limits of the discharge of wastewater or effluent on land for agriculture purposes stipulated in National Environmental (Protection and Quality) Regulations, published in the Gazette Extraordinary No. 2264/17 of 27.01.2022. The Act specifies the in-situ infiltration rate of the land to which the effluents be discharged shall be measured in accordance with the standard test method for infiltration rate of soils in the field using double-ring infiltrometers stipulated in ASTM D3385-09.

The double-ring infiltrometer method consists of driving two open cylinders —Cylinders approximately 500 mm (20 in.) high and having diameters of about 300 and 600 mm (12 and 24 in.), one inside the other, into the ground, partially filling the rings with water or other liquid, and then maintaining the liquid at a constant level. The volume of liquid added to the inner ring, to maintain the liquid level constant is the measure of the volume of liquid that infiltrates the soil. The volume infiltrated during timed intervals is converted to an incremental infiltration velocity, usually expressed in centimeters per hour (cm/hr.) or inch per hour (inches/hr.) and plotted versus elapsed time. The maximum-steady state or average incremental infiltration velocity, depending on the purpose/application of the test is equivalent to the infiltration rate.

Double-ring Infiltrometer

Tree Risk Assessment for Identification of Hazardous Trees to Prevent Casualties and Damages to Properties due to Tree Failures within the Colombo Municipal Council Area

Urban trees, integral to urban design for centuries, enhance civic spaces with scenic beauty and offer diverse human, environmental, and economic benefits. However, they face urban challenges such as the heat island effect, limited root space, destruction, and nutrient deficiencies, impacting their well-being. Morphological alterations affect vitality and disrupt urban services, posing risks to people and property. Trees can fail during natural events like heavy wind and rainfall, causing damage and even fatalities. Recognizing these challenges highlights the need for sustainable urban planning and maintenance, ensuring urban trees' ongoing benefits while holistically mitigating potential risks.

The safety concerns surrounding urban street trees increased in Sri Lanka following a tragic incident on October 6, 2023. A massive tree fell on a bus in Colombo-02, causing five fatalities and injuring nearly 20 people, prompting community responses and heightened awareness. In the aftermath of the incident, the Disaster Management Division of the ministry directed the NBRO to lead efforts in devising a mechanism to minimize disasters related to tree failures. The meeting resulted in crucial decisions aimed at establishing a comprehensive Tree Risk Management Plan:

- To assign the National Building Research Organisation (NBRO) as the focal point for issuing early warnings to minimize the possible future consequences associated with tree falling.
- To develop an inventory that categorizes the risk of trees falling and collapsing.
- To prepare comprehensive rectification guidelines for managing the health of trees declared hazardous.

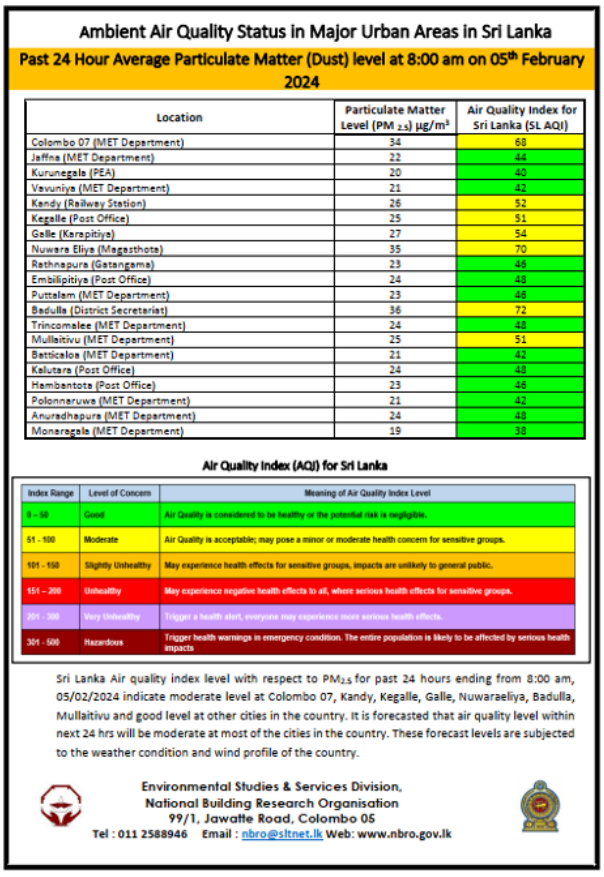
The ESSD of NBRO has launched a research initiative focused on Tree Risk Assessment within the Colombo Municipal Council area. The primary goals include identifying hazardous trees, implementing early warning systems, and proactively preventing casualties and property damage resulting from potential tree failures.

Field Visit by Working Group Team

Development of Internet of Things (IoT) Systems for Database Management and Generating Daily Reports for General Public

Introduction of new monitoring technologies and development of Internet of Things (IoT) systems for database management has created new era in air quality studies in Sri Lanka. NBRO has made this change in the air quality monitoring with integrated technologies to develop continuous ambient air quality monitoring network in Sri Lanka. The present monitoring network consists of 20 real-time air quality monitoring units for the monitoring of PM (PM10 & PM2.5). The data are published in NBRO official website (www.aq.nbro.gov.lk), displayed in the display panels and daily informed to relevant agencies for emergency actions. Eg:- Disaster Management Centre.

Also, the data are widely used for trend analysis, impact analysis, correlation analysis, etc. in the scientific publications. Further, data are given to a wide range of stakeholders such as Ministry of Environment (Air Resource Management Center), Central Environmental Authority, Department of Motor Traffic, other relevant regulatory institutions, researchers, undergraduate and postgraduate students, professionals, policy developers, the mass media and general public, etc.



Ambient Air Quality Status in Major Urban Areas in Sri Lanka

Past 24 Hour Average Particulate Matter (Dust) level at 8:00 am on 05th February 2024

Location	Particulate Matter Level (PM 2.5) µg/m³	Air Quality Index for Sri Lanka (SL AQI)
Colombo 07 (MET Department)	34	68
Jaffna (MET Department)	22	44
Kurunegala (PEA)	20	40
Vavuniya (MET Department)	21	42
Kandy (Railway Station)	26	52
Kegalle (Post Office)	25	51
Galle (Karapitiya)	27	54
Nuwara Eliya (Magasthota)	35	70
Rathnapura (Gatangama)	23	46
Embilipitiya (Post Office)	24	48
Puttalam (MET Department)	23	46
Badulla (District Secretariat)	36	72
Trincomalee (MET Department)	24	48
Mullaitivu (MET Department)	25	51
Batticaloa (MET Department)	21	42
Kalutara (Post Office)	24	48
Hambantota (Post Office)	23	46
Polonnaruwa (MET Department)	21	42
Anuradhapura (MET Department)	24	48
Monaragala (MET Department)	19	38

Air Quality Index (AQI) for Sri Lanka

Index Range	Level of Concern	Meaning of Air Quality Index Level
0 – 50	Good	Air Quality is considered to be healthy or the potential risk is negligible.
51 - 100	Moderate	Air Quality is acceptable; may pose a minor or moderate health concern for sensitive groups.
101 - 150	Slightly Unhealthy	May experience health effects for sensitive groups, impacts are unlikely to general public.
151 – 200	Unhealthy	May experience negative health effects to all, where serious health effects for sensitive groups.
201 - 300	Very Unhealthy	Trigger a health alert, everyone may experience more serious health effects.
301 - 500	Hazardous	Trigger health warnings in emergency condition. The entire population is likely to be affected by serious health impacts

Sri Lanka Air quality index level with respect to $PM_{2.5}$ for past 24 hours ending from 8:00 am, 05/02/2024 indicate moderate level at Colombo 07, Kandy, Kegalle, Galle, Nuwaraeliya, Badulla, Mullaitivu and good level at other cities in the country. It is forecasted that air quality level within next 24 hrs will be moderate at most of the cities in the country. These forecast levels are subjected to the weather condition and wind profile of the country.

Environmental Studies & Services Division,
National Building Research Organisation
99/1, Jawatte Road, Colombo 05
Tel : 011 2588946 Email : nbro@sltnet.lk Web: www.nbro.gov.lk

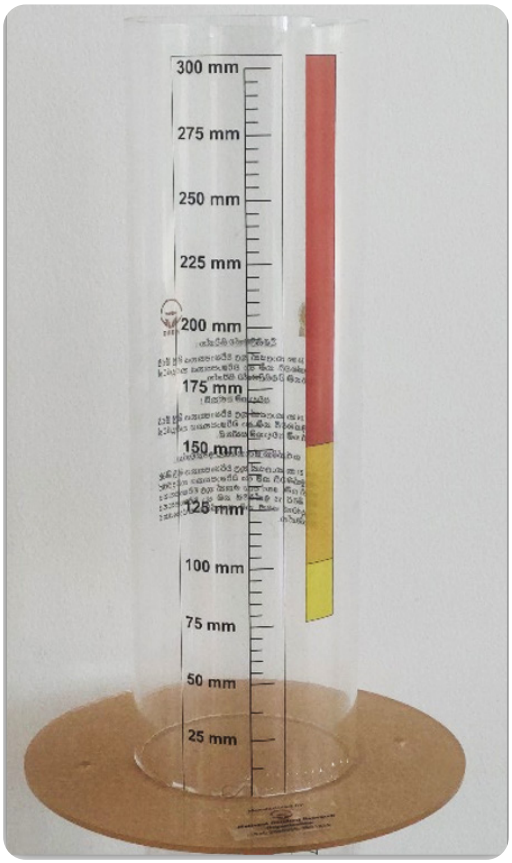
Ambient Air Quality Status Report

Manual Rain Gauges Developed by NBRO

Sri Lanka is recognized as vulnerable to climate change impacts, ranked 100th of 181 countries in the 2017 ND-GAIN Index. Unpredictable variability of rainfall patterns in the country could probably be due to global climate change with the increase in the frequency of extreme weather events. Floods, landslides, and drought are causing significant human, environmental, and economic losses which seriously affect the GDP of the country hence, there is an urgent need and essential requirement of reducing human and economic damages by managing these disaster risks in the country through early warning based on reliable rainfall prediction.

NBRO has identified the value of precise measurements and the necessity of data point resolution on rainfall values for early warning. NBRO has designed a standard and durable, manual rain gauge with a 300 mm measuring capacity. The measurement of the amount of precipitation in a certain area over a period of time can be used from the household level to a wide range of uses; prediction of threshold water levels in farming, flood and landslide warning and etc.

The device is user-friendly for measures as the rain gauge design is adaptable and may be tailored to the client's needs, such as scale and instruction language is available at an affordable price with proper after-sales services.



A Manual Rain Gauge Produced by NBRO

Application of Drone Technology for Disaster Risk Reduction

The drone-based technology plays in revolutionizing disaster management. The use of unmanned aerial systems enables swift and accurate data collection in the before and aftermath of disasters. This capability is crucial for timely decision-making and effective coordination in disaster preparedness, emergency response and mitigation efforts. NBRO has been at the forefront of utilizing drone technology for several years in the crucial areas of landslide risk identification and mitigation activities. Over the years, NBRO has not only adopted drone technology but has also actively sought collaborations, both locally and internationally, to enhance its capabilities and broaden its applications.

Survey Consultancy, Vadamarachchi, Jaffna

The integration of drone technology into landslide risk management represents a paradigm shift in how NBRO approach and address critical challenges in disaster-prone areas. Drones provide NBRO with a unique and invaluable tool for capturing high-resolution images and data from the air enhances the precision and efficiency of the landslide risk management process.

In order to enhance effectiveness of NBRO's drone-based initiatives, bringing in diverse perspectives, expertise, and resources, NBRO collaborated with international institutions such as RNH International (Pvt.) Ltd. and Aereo India (Aarav Unmanned System Pvt. Ltd.).

Survey Consultancy, Vadamarachchi, Jaffna

Drone Survey Consultancy, Kegalle Town

Capacity Development Workshop

In commemoration of World Habitat Day 2023, NBRO Launches Advisory Service on Resilient Housing

Sri Lanka is prone to various natural disasters such as floods, landslides, high-wind, drought and tsunamis. Further, triggering of these natural disasters intensified with the impacts of climate change, with increased frequency of extreme weather events.

The vulnerability of Sri Lanka's housing & infrastructure to these climate-related hazards has been a growing concern. Homes and communities across the nation have suffered devastating losses, and the need for resilient housing solutions has never been more pressing.

Recognising these challenges, the National Building Research Organisation (NBRO) is taking a proactive step towards addressing these critical issues by establishing an advisory service for the resilient housing. This initiative is launched in commemoration of World Habitat Day 2023, as a testament to Sri Lanka's commitment to enhancing resilience, and safety for citizens.

ADVISORY SERVICES ON RESILIENT HOUSING:

Guidance on Land Selection and Layout Planning: NBRO offer recommendations for land selection, layout planning, and land development to ensure the houses are located in areas that minimise vulnerability to natural disasters and environmental risks.

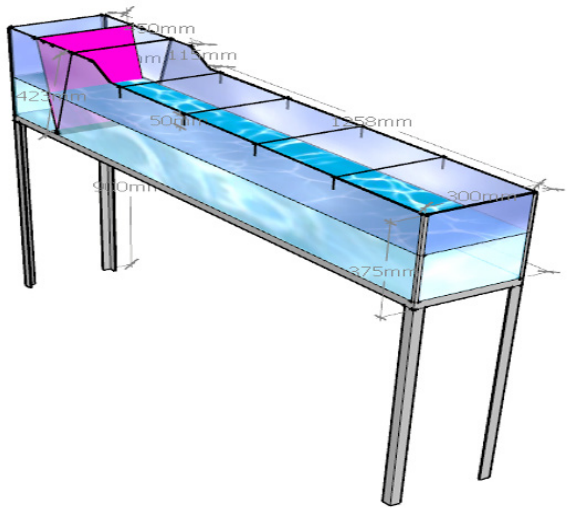
Review and Enhancement of Layout and Subdivision Plans: Reviewing layout plans and subdivision proposals, offering insights and improvements that prioritise resilience. Ex. drainage networks, retaining structures, setting-out house plans, etc.

Recommendations on House Plan for Resilience Enhancement: Comprehensive evaluations of house plans (new construction or retrofitting existing houses) Ex. Technical recommendations for sub-structure and superstructure of house constructions.

Impact Assessment on Castlereagh Reservoir bank Erosion by the Water Waves Generated During take-off and Landing by Float Aircraft, owned by Cinnamon Air

Upon request from CEB, Saffron Aviation (Pvt) Ltd requested NBRO to conduct a study on waves generated during the take-off and landing by float aircraft on the Castlereagh reservoir bank. Accordingly, the following methodology was followed to conduct the impact assessment.

1. Selection of locations on the reservoir bank to measure the incident wave height.
2. In-situ measurement criteria
3. Water wave height and bank slope measurement
4. Laboratory simulation experiment
5. Turbidity and Erosion test
6. Data interpretation



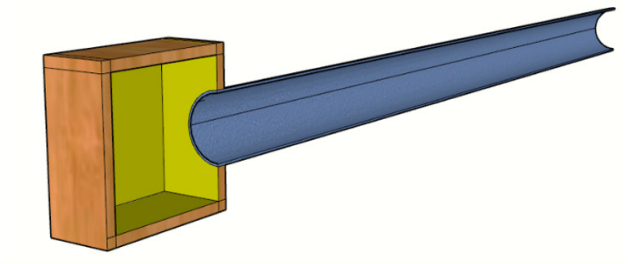
Laboratory Simulation

Onsite Wave Height Monitoring (Sensor Based)

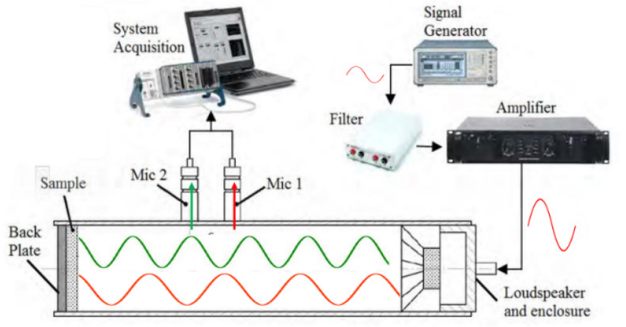
Investigate the Acoustic Properties of Wall Plaster for Screening Indoor Noises in Residential Buildings

This study aims to investigate the acoustic properties of internal wall plaster with recycled material as a fine aggregate replacement for screening indoor noises that are generated due to day-to-day activities in multistory residential buildings. A comprehensive literature survey was carried out to identify frequency ranges of indoor noises in multistory residential buildings and selected frequencies was utilized for investigating the acoustic properties of internal wall plaster with recycled material.

The testing of acoustic properties of the wall plaster with recycled material was carried out according to the ISO 10534-2 (Determination of sound absorption coefficient and impedance by impedance tubes) and the experimental set-up is consist of an impedance tube, two microphones, full range speaker, amplifier and laptop with a sound card for the determination of normal incidence sound absorption coefficients and normal specific acoustic impedance ratios of prepared wall plaster samples with different mixing ratios of recycled material.



Cross-sectional view of the Impedance Tube



Sound Absorption Coefficient Measuring

Project on Capacity Development for the evidence-based improvement of strategies and policies on Air Quality Management (AQM) in Colombo Metropolitan Area

Ministry of Environment, NBRO and Central Environmental Authority (CEA) implement a project on "Capacity Development for the Evidence Based Improvement of Strategies and Policies an Air Quality Management in Colombo Metropolitan Area (CMR)" with the financial assistant of the French Agency for Development (AFD) together with Air Pariff, the technical partner. The three -party fexte partnership agreement among the Agency France Development (AFD), the Air Pariff the Technical Partner and Ministry of Environment was signed in March 2023.

The objective of the Technical Assistance program is to strengthen the capacity of Sri Lankan authorities regarding air quality management.

Field Visit with the Project Team

PROJECTS WITH FOREIGN / DONOR COLLABORATION

Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP)

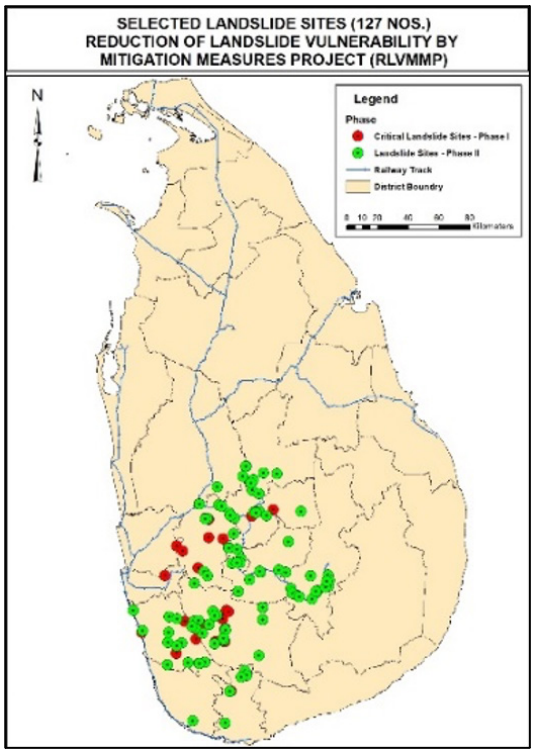
NBRO commenced the Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP) originated from Cabinet-approved Integrated Landslide Mitigation Programme. This mega project includes mitigation of identified high-risk landslide sites and also, roadside unstable slopes and unstable slopes along the railway lines in the hill country over 5 years. The main components of this project are:

- Civil work and associated design and construction supervision/management activities
- Policy and Regulation Enhancement
- Institutional Capacity Building
- Technical Support and Project Management

Sri Lankan Government and the Asian Infrastructure Investment Bank (AIIB) provide funds to carry out this mega project. Project financing has been revised recently in June 2022 from USD 110 Mn. to USD 101.3 Mn. Accordingly, the total number of sites to be mitigated was also revised from 147 to 127. The Province/District wise summary of the selected sites and the Sites location map are stated below.

Table : Distribution of Mitigation Sites

Province	District	No. of Sites
Western	Colombo	1
	Gampaha	1
	Kalutara	20
Central	Kandy	16
	Matale	10
	Nuwara-Eliya	7
Southern	Galle	2
	Matara	6
North Western	Kurunegala	4
Uva	Badulla	18
Sabaragamuwa	Ratnapura	26
	Kegalle	16
TOTAL		127



Location Map of the Selected Landslide Sites

The civil works contracts for all 06 Packages in Phase I (24 critical landslide sites) and 01 Package in Phase II (01 emergency landslide site - Nallathanniya) are 100% completed. and Ten (10) Packages (51 landslide sites) in Phase II were awarded at present. The procurement process for the balance of civil works contracts (51 landslide sites) is in progress. The summary of the present progress of Phase I and Phase II is stated in the following tables.

Table: Progress of Phase I - Component 01

Package	No of Sites	District(s)	Status
Package 01	04	Ratnapuna	Civil works 100% completed The defect liability period for Package 01 and Package 02 has been completed and Final handing over is in progress Defect liability period of other packages in progress
Package 02	07	Ratnapura, Kalutara	
Package 03	02	Matara	
Package 04A, 04B, 04C	11	Kegalle, Kurunegala, Kandy, Gampaha, Colombo	

Table: Progress of Phase II - Component 01

Package	No of Sites	District(s)	Status
Package 09	01	Nuwara-Eliya	Civil works 100% completed
Package 07 (Lot 1-6)	32	Ratnapura, Kalutara, Galle, Matara	Construction in progress
Package 05 (A-E)	25	Kandy, Matale, Kegalle, Kurunegala	Construction works of 05A, 05B, 05C and 05D in progress. The procurement process of 05E is in progress
Package 06 (A-F)	23	Nuwara Eliya, Kegalle, Ratnapura, Badulla, Matara, Galle	The procurement process is in progress
Package 08 (Lot 1-3)	22	Railway Line (Rambukkana-Badulla)	Waiting for the Cabinet approval for awarding of the contracts

Landslide Mitigation Completed site - Site No: 148 Nallathanniya (Package 09)

Landslide Mitigation Completed Site - Site No: 011 Kegalle By-pass Road (Package 04C)

Preparation and Establishment of a National Building Code for Sri Lanka

Sri Lanka, an island nation in the Indian Ocean, grapples with significant challenges in its built environment, with over 80% of its buildings being non-engineered and vulnerable to natural hazards. The country faces a multitude of risks, including flooding, landslides, cyclones, droughts, tsunamis, etc. The average annual losses from natural disasters amount to $380 million, with climate change projections indicating a potential 1.2 percent loss of GDP by 2050. Vulnerability arises from various factors such as geographical location, topography, climate change, population concentration, and uncontrolled urbanization.

To address these pressing issues, the Government of Sri Lanka initiated the project for the Preparation and Establishment of a National Building Code in 2016. In April 2019, the Cabinet endorsed the proposal to develop a national building code and tasked the Construction Industry Development Authority (CIDA), the NBRO, and the Urban Development Authority (UDA) to collaborate on ensuring resilient aspects are incorporated into the new code.

A crucial step in this endeavor was the Building Regulatory Capacity Assessment (BRCA), which provided recommendations for concrete actions to enhance the country's building regulatory framework, thereby improving the safety and resilience of construction.

In 2023, the World Bank provided technical assistance for the project under three main tasks:

1. Conceptualization of the Sri Lanka Building Code
2. Review of the building approval process
3. Capacity assessment of building sector professionals

These tasks were undertaken throughout 2023, involving desk-based research, literature reviews, and stakeholder consultations. A stakeholder consultation held in June facilitated discussions with representatives from key public agencies, academia, professional institutions, and the private sector.

Key Findings Validation Workshop

Following the stakeholder consultation, analysis and recommendations were developed across various categories, including building code development, building control process reform, and capacity building.

A key milestone was the validation workshop held in December 2023, where broader stakeholder groups engaged in discussions on setting out code technical requirements, organizing code document delivery, updating approval and enforcement processes, and planning awareness raising, training, and capacity building initiatives.

With the conceptualization phase of the building code concluded by December 2023, the next phase involves the initiation of actual code development led by the Government of Sri Lanka, in collaboration with NBRO, CIDA, UDA, and all relevant stakeholders. This marks a significant stride towards enhancing the resilience of Sri Lanka's built environment and mitigating risks associated with natural hazards.

Key Findings Validation Workshop

USGS-NBRO Landslide Collaborations in 2023

In the year 2023, a successful five-day workshop was held from October 2nd to October 6th, organized by the United States Geological Survey (USGS) for officials from the NBRO. The primary focus of this workshop was to enhance the expertise of NBRO officials in the field of landslide susceptibility mapping. Practical sessions were included, involving the utilization of advanced tools and methodologies, notably incorporating the application of the "PISA" susceptibility model and Logistic Regression techniques.

Following the successful completion of the workshop, discussions were initiated regarding potential

collaborative projects between the USGS and NBRO. These collaborative endeavors are expected to leverage the newfound knowledge gained during the workshop, facilitating the exchange of knowledge and resources between the two entities. The collaborative projects are seen as an opportunity to advance landslide research and management practices.

Development of early warning technology of rain-induced rapid and long-travel landslides in Sri Lanka - SATREPS (JICA)

The International Landslide Consortium (ICL) and NBRO jointly carry out a project titled "Disaster risk reduction of rain-induced rapid and long-travelling landslides" under the Science and Technology Research Partnership for Sustainable Development (SATREPS) of Japan Science and Technology Agency (JST). This five-year Japan-Sri Lanka joint project is implemented during the 2019-2023 period. This project introduces advanced technology through the global partners of ISDR-ICL Sendai Partnerships 2015-2025, to disaster risk reduction of rain-induced rapid and long-travelling landslides. Several local and Japanese collaborating and support agencies participate in this project work.

Work related to the following outcomes have been commenced.

- The technology of 24-hour in-advance prediction of heavy rainfalls and resulting groundwater pressure build-ups is developed. A technology to identify locations of rain-induced rapid long-travelling landslides and their moving areas is developed.
- Technology and framework for effective risk communication to community people living in mountains and local cities are developed.
- A system for early warning of rain-induced rapid long-travelling landslides is developed by integrating the technologies mentioned above based on the joint research in the pilot study sites. The developed system with guidelines and manuals is provided for use in other areas in Sri Lanka.
- The developed technologies will ensure the public's safety and secure vulnerable communities from landslides and associated hazards.

The new project office was established in NBRO – Sri Lanka and Two NBRO scientists have completed the Ph.D. Other Ph.D. and M.Sc. Students still reading in Japanese universities. MSSG training and LS-Rapid Training were carried out for five NBRO scientists in Japan for continual improvement under capacity development. Equipment to strengthen the geotechnical engineering divisional laboratory with sophisticated equipment including Undrain Ring Shear apparatus have been installed. The Landslide technical forum held with the collaboration of the National Building Research Organization (NBRO), and the International Consortium on Landslides (I.C.L.) was successfully held on the 25th of August, 2023, at the Jasmine Hall of BMICH premises. This significant event was filled with renowned experts from Japan and NBRO scientists in landslide and early warning systems research.

The Landslide Technical Forum - BMICH

Seismometer Installation in Sri Lanka under SATREPS-RRLL Project

As a component of the project "Development of Early Warning Technology of Rain-Induced Rapid and Long-Travelling Landslides" under the SATREPS program, seismometer instrumentation, in conjunction with rain gauges, has been strategically deployed at identified potential landslide locations across the country. The primary objective of these installations is to continuously monitor both regional and local seismic activity, thereby facilitating the assessment of its potential correlation with the triggering and activation of landslides.

Initially, four best locations were carefully chosen for installation, covering key regions such as Kandy, Aranayake, Athwelthota, and Kalugala. Subsequently, recognizing the significance of expanding monitoring coverage, two additional installations were carried out in the Kothmale and Aranayake regions. Accordingly, total of fifteen seismometers have been strategically positioned across various landslide-prone areas in Sri Lanka.

Installed Seismometers

Seismometer Locations

These installations represent a crucial step forward in enhancing our understanding of the complex dynamics surrounding rain-induced landslides and underscore our commitment to developing effective early warning systems aimed at mitigating the associated risks and safeguarding vulnerable communities. Through continuous monitoring and analysis of seismic data, we strive to strengthen our preparedness and response mechanisms, ultimately minimizing the impact of landslides on lives and livelihoods.

Collaborative Project Addressing Landslide Risk and Climate-Induced Loss in Bulathkohupitiya DS Division

In 2023, the NBRO partnered with SLYCAN Trust to undertake a comprehensive project aimed at examining the intricate dynamics of landslide risk, human mobility, and climate-induced loss and damage in the Bulathkohupitiya Divisional Secretariat (DS) of Kegalle district, Sri Lanka. This collaborative initiative sought to confront the escalating challenges arising from the heightened frequency and severity of disasters, particularly landslides, in the region.

Three distinct sites were strategically selected within the division, including a resettlement site, a high-risk settlement, and a medium-risk settlement, the project conducted thorough data assessments and engaged in stakeholder consultations at local and national levels. Through this process, climate risks were identified, existing community capacities were evaluated, and adaptation gaps and forms of loss and damage were addressed.

The study delved into the historical context, establishing links between the history of landslides and human mobility, while also outlining the socio-economic repercussions faced by vulnerable communities. Preliminary findings highlighted community concerns and potential solutions, particularly in the context of planned relocation and resettlement. Moreover, the project scrutinized the enabling policy environment, aligning its efforts with key national and international frameworks.

This collaborative endeavor between NBRO and SLYCAN Trust holds significant implications for generating valuable insights and strategies to mitigate the multifaceted challenges posed by landslide risks, human mobility, and climate-induced loss and damage in Sri Lanka. The findings and recommendations stemming from this project are anticipated to guide future policies and actions aimed at bolstering community resilience and reducing vulnerabilities in landslide-prone areas.

Resettlement and High Risk Locations - Bulathkohupitiya

NBRO's Strategic Collaboration with Janathakshan GTE Ltd. for Pre-Monsoon Awareness Programs in Kegalle and Ratnapura Districts

To enhance community resilience against the threat of landslides and disasters, the NBRO proactively partnered with Janathakshan GTE Ltd. The initiative involved the execution of two comprehensive awareness programs in the Kegalle and Ratnapura districts, supported financially by Janathakshan GTE Ltd.

The inaugural program, held on September 26, 2023, was presided over by the Kegalle District Secretary and saw the active participation of approximately 80 individuals at the DS Office auditorium in Kegalle. Subsequently, the second program, chaired by the Ratnapura District Secretary on October 31, 2023, attracted around 85 participants at the Ratnapura DS Office auditorium.

As an integral component of these awareness programs, the outcomes of the Landslide Risk Profile Development Project were disseminated among the participants. Furthermore, crucial deliverables, including the District Landslide Risk Profile, the DSD Level Landslide Risk Status Report - Ledger Wallet, DSD Level Landslide Risk Profiles, DSD Level Landslide Exposure Maps, and Database, were formally presented to key authorities and stakeholders.

Janathakshan GTE Ltd., an emerging organization dedicated to fostering green and equitable development by building resilience, played a major role in ensuring the success of these programs. Their steadfast cooperation with the NBRO highlighted a commitment to proactive disaster management and community empowerment.

Participants at Kegalle Workshop

Participants at Ratnapura Workshop

NBRO Participation in the 6th World Landslide Forum, at Florence, Italy

The World Landslide Forums are organized every three years to bring together scientists, engineers, practitioners, businesses, and policy makers from around the world to share progress on landslide risk reduction on a global scale.

The 6th World Landslide Forum was held from 14 Nov. 2023 in Florence, co-organized by the International Consortium on Landslides and the UNESCO Chair in Prevention and Sustainable Management of Geo-hydrological Hazards at the University of Florence, under the International Programme on Landslides (IPL) supported by five United Nations' organizations (UNESCO, WMO, FAO, UNDRR, UNU) and four international scientific organizations (ISC, WFEO, IUGS e IUGG).

With a participation of over 1100 attendees from more than 60 countries, the Forum encompassed general plenary sessions, parallel scientific sessions, technical exhibitions, workshops, and various supplementary events across its four-day duration.

The main theme of the Forum was "Landslide Science for Sustainable Development," emphasizing the crucial role of addressing landslide impact, among other hazards, in achieving the United Nations' Sustainable Development Goals by 2030.

Fourteen researchers, including the Director General, Senior Scientists, and Scientists, presented their innovative research at the Forum representing NBRO.

This event served as a ideal platform for the exchange of ideas and the establishment of connections among scientists, stakeholders, and policymakers involved in landslide analysis, disaster investigation, and risk management worldwide. This gathering presents a significant opportunity for NBRO on a global scale in the future.

NBRO Team at The 6th World Landslide Forum

MOBILISE 3.0: Digital Toolset for Building Resilient Communities

The MOBILISE project, a collaborative effort between the NBRO, THINKlab at the University of Salford (UK), and funded by the ADPC and the World Bank, is dedicated to enhancing Sri Lanka's technical capacities for Disaster Risk Reduction (DRR) activities by strengthening its digital infrastructure.

Throughout the year 2023, the MOBILISE project achieved several significant milestones. It introduced three digital applications: the Multi-Hazard Early Warning Dashboard, the 'Megha' mobile application, and the MOBILISE platform. These applications are designed to provide innovative and resilient solutions, with the MOBILISE platform currently hosting 888 data layers, enabling comprehensive scenario analyses, including damage assessments.

A key achievement of the project has been the successful engagement of local stakeholders in innovative activities aimed at building local disaster resilience. This was facilitated through numerous demonstrations and training sessions, including 14 training sessions conducted for mobile applications, resulting in over 60% of officers in the Kalutara district downloading the application during the initial stage. The project has also made strides in disseminating early warnings, particularly for landslides, through the mobile application, with plans to extend this service to flood early warnings in the future.

Looking ahead, the Living Lab concept within the MOBILISE project is set to play a pivotal role in advancing technology solutions and partnerships to establish resilient communities across Sri Lanka, starting in the Kalutara District. The pilot phase of the Living Lab has demonstrated the effective use of technology in creating a shared data platform, analyzing local risks, and implementing a community-based early warning system.

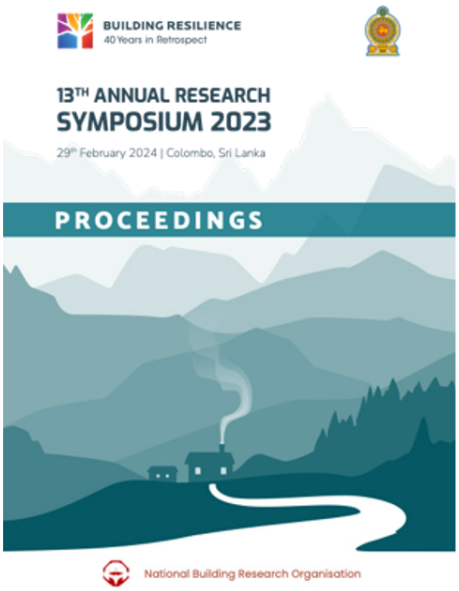
The Living Lab aims to leverage local digital programs and deploy solutions such as the multi-hazard early warning dashboard, the MOBILISE platform, and the Megha mobile application for collaborative, evidence-based decision-making in support of resilient communities. Plans are underway to establish a "Resilience Planning Hub" at the NBRO premises, serving as the "Centre of Excellence" for building resilience in human settlements and providing resilience planning guidance to all districts in Sri Lanka, in collaboration with district/divisional secretariats.

Living Lab facility Established at the Kalutara District Secretariat

NBRO PUBLICATIONS

Symposium Proceedings of the 13th Annual Research Symposium of the NBRO

NBRO Annual Research Symposium Proceedings are a collection of research papers and academic studies presented at the annual NBRO Research Symposium. These proceedings showcase the latest research and developments in the field of building and housing construction and cover a wide range of topics such as structural engineering, materials science, building codes and standards, and natural hazards and disaster risk management. The proceeding of 13th Annual Research Symposium of the NBRO includes 36 abstracts representing latest research and developments in these areas.

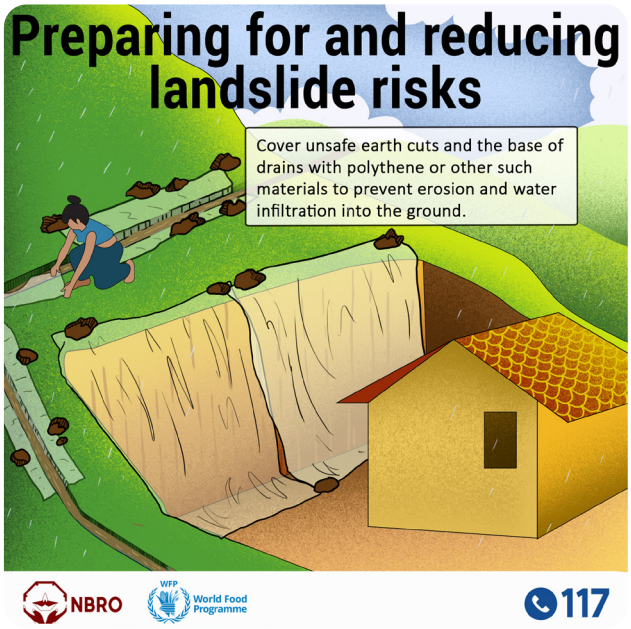


Electronic Newsletters

NBRO published two electronic newsletters in the year 2023

Landslide Awareness through social media (Facebook, YouTube, Twitter and etc.) on landslide risk management

NBRO launched several public awareness programmes on disaster preparedness aiming the two monsoons in 2023 through the social media such as Facebook, twitter and WhatsApp. The awareness material was developed under the technical cooperation between NBRO and WFP on Media awareness creation.



Awareness Materials Developed by NBRO and WFP under the Technical Cooperation

PRESIDENT'S AWARDS FOR SCIENTIFIC RESEARCH

organised by
National Research Council Sri Lanka

Aiming to build a vibrant scientific and technological community in the country, the National Research Council has designed and implemented the NRC President's Awards since 1999. It recognizes a distinguished piece of Sri Lankan research and bestowing awards from the President of Sri Lanka, as a national honor to efforts of our scientists. This felicitates the authors and inventors of publications and patents of years 2019 and 2020.

The President's Awards for Scientific Research (PASR) for publication years 2019 and 2020 was held on the 21st November 2023 at the Sirimavo Bandaranaike Memorial Exposition Centre of the BMICH, Colombo 07.

Eng. (Dr.) Asiri Karunawardena, the Director General of the National Building Research Organisation and Mr. R. M. S. Bandara, Project Director, RLVMMP and Mr. H. D. S. Premasiri, Director, Environmental Studies and Services Division received President's Awards for three separate Scientific publications for years 2019 and 2020, organized by the National Research Council (NRC).

The awards were presented for following research publications

1. Khang Dang, Kyoji Sassa, Kazuo Konagai, **Asiri Karunawardena, R. M. S. Bandara**, Kiyoharu Hirota, Qinwen Tan, Nguyen Duc Ha (2019), Recent rainfall-induced rapid and long-travelling landslide on 17 May 2016 in Aranayaka, Kegalle District, Sri Lanka Landslides, Vol 16,pp 155-164

2. Qinwen Tan, Kyoji Sassa, Khang Dang, Kazuo Konagai, **Asiri Karunawardena, R. M. S. Bandara**, Huiming Tang, Go Sato (2020) Estimation of the past and future landslide hazards in the neighboring slopes in the 2016 Aranayake Landslide, Sri Lanka Landslides, Vol 17, pp 1727-1738

3. Mahesh Jayaweera, Buddhika Gunawardana, Manju Gunawardana, **Asiri Karunawardena**, Viraj Dias, **Sarath Premasiri**, Janith Dissanayake, Jagath Manatunge, Nimal Wijeratne, Dhananjith Karunarathne, Saman Thilakasiri (2019) Management of municipal solid waste open dumps immediately after the collapse: An integrated approach from Meethotamulla open dump, Sri Lanka Waste management, Vol 95, pp 227-240.

TRAININGS, SEMINARS AND WORKSHOPS ORGANISED

Under the NBRO Training and Awareness Programme, following activities were performed during the year 2023;

NBRO Showcases Expertise and Innovation at TECHNO 2023 Exhibition

In a display of its diverse capabilities and commitment to cutting-edge research, the NBRO made a significant impact at the prestigious TECHNO 2023 educational exhibition. Held from September 20th to 22nd, 2023, at the Bandaranaike Memorial International Conference Hall (BMICH), the event provided NBRO with a prime opportunity to engage with a broad audience and highlight its multifaceted expertise.

Visitors to NBRO's exhibition booth were treated to an immersive educational experience, gaining insights into the organization's wide-ranging competencies. From Human Settlements Planning & Training to Landslide Research & Risk Management, Structural Engineering Research & Project Management, Building Materials Research & Testing, Geo Technical Engineering, and Environmental Studies & Services, NBRO showcased its proficiency across various domains of research and development.

NBRO Stall at the Techno Exhibition 2023

Beyond showcasing its technological advancements, NBRO used TECHNO 2023 as a platform for fostering meaningful interactions and knowledge exchange. Industry professionals, researchers, and stakeholders engaged in fruitful discussions, further enhancing collaboration opportunities and paving the way for future partnerships.

NBRO's participation at TECHNO 2023 not only reaffirmed its pivotal role in shaping the engineering landscape but also highlighted its dedication to environmental sustainability and resilient human settlements. By demonstrating its commitment to innovation and excellence, NBRO set the stage for continued growth and impactful contributions to national development initiatives.

NBRO Stall at the Techno Exhibition 2023

Naval & Maritime Academy's Civil Engineering Mechanics Embark on a Transformative Environmental and Educational Excursion to NBRO

On May 11, 2023, a group of officers and sailors enrolled in the Petty Officer qualifying course at the Naval & Maritime Academy in Trincomalee embarked on a visit to the NBRO. The purpose of their visit was to gain insight into the various divisions housed within NBRO.

The participants were first given several lectures on NBRO's role in DRR. They learned about the organization's history, its mandate, and its various programs and projects. They also learned about the importance of DRR and the role that NBRO plays in helping to build a more resilient Sri Lanka. During this visit, the participants were granted the unique opportunity to explore NBRO's state-of-the-art ISO Standard laboratories, including the Building Material and Testing Laboratory, Geo-Technical Engineering Laboratory, and Environment Studies and Service Laboratory. This hands-on experience allowed them to witness firsthand the exceptional laboratory services provided by NBRO.

Demonstrations by NBRO Officers at the Workshop

Workshop on Scientific Writing and Publishing in Disaster Risk Related Subjects

The NBRO hosted a workshop focused on scientific writing and publishing for researchers in disaster risks and related subjects on 24th July 2023. The workshop was led by Prof. Dilanthi Amarathunga and Prof. Richard Haigh from the University of Huddersfield, UK, who are also esteemed editors of the International Journal of Disaster Resilience in the Built Environment, the workshop covered key aspects of the publishing process.

The workshop witnessed enthusiastic participation from approximately 40 scientists who attended the event in person at the venue. Additionally, there were 30 more scientists who actively joined the workshop online, creating a successful hybrid event that catered to both physical and virtual attendees. Participants were educated on the significance of publishing research, not only as an obligation but also as an opportunity to contribute to the academic community, inspire peers, and advance disaster resilience understanding. The workshop further provided valuable insights into selecting appropriate journals, crafting a coherent writing philosophy, and adhering to ethical publishing practices. The event's collaborative environment allowed researchers to engage in interactive discussions and left them equipped with the necessary tools to effectively communicate their research findings, promoting positive change in the field of disaster resilience worldwide.

During the Workshop on Scientific Writing

NBRO Participate in a School Exhibition

The Technology Society of WP/JA Mahamathya Vidyalaya, Athurugiriya, hosted an educational exhibition on October 26, 2023, within the school premises. The event featured stalls dedicated to various subject areas, including Engineering Technology, Science for Technology, Geography, and more.

Among the exhibitors, the NBRO seized the opportunity to highlight its premier position in the field. In a dedicated stall, NBRO showcased important information related to landslides, resilient construction, building material testing and environmental monitoring related testing.

The NBRO exhibit provided valuable insights into the organisation's expertise and contributions to these vital domains. Students, educators, and visitors had the chance to engage with NBRO representatives, gaining a deeper understanding of the advanced technologies and methodologies employed in the field.

NBRO's participation in this educational initiative not only reinforced its commitment to knowledge dissemination but also allowed visitors to access valuable information in the critical areas of landslides and environmental testing.

NBRO Stall at Technology Society Exhibition

First Response Trainees from the Sri Lanka Air Force visited NBRO to gain experience in landslide risk management and laboratory services

On 25th October 2023, a group of trainees and instructors from the Sri Lanka Air Force's "No 34 Disaster Management and First Response Basic Course" visited the NBRO. The visit included a demonstration of NBRO's involvement in Disaster Risk Reduction (DRR) and an experience-sharing session on first response at disaster events.

The trainees also had the opportunity to explore NBRO's state-of-the-art ISO standard laboratories, such as the Environment Studies and Services Laboratory, Building Material Research and Testing Laboratory, Geotechnical Engineering Laboratory and Geospatial & Intelligence Laboratory. This allowed them to gain a better understanding of the laboratory services offered by NBRO.

The visit was a valuable learning experience for the trainees and a great opportunity for NBRO to showcase their work in DRR and laboratory services. NBRO is committed to sharing their knowledge and expertise with the community and looks forward to future collaborations with the Sri Lanka Air Force and other organizations in the future.




Demonstrations by NBRO Officers at the NBRO Lab Visits

AUDIT & MANAGEMENT COMMITTEE REPORT

Audit and Management Committee Report of the National Building Research Organisation for the Year 2023

The composition of the Audit and Management Committee (AMC) of the National Building Research Organisation (NBRO) as of 31 December 2023 is as follows.

S/N	Name, Designation and Institute	Designation in the Committee
01	Mrs.S,Jalatheepan. Director, Department of Project Management and Monitoring of the Ministry of Finance, Economic Stabilization and National Policies.	Chairperson
02	Mr. A.K.Karunanayake, Director General, Department of Meteorology.	Member
03	Mr. H.U.R. Fonseka, Chief Accountant, Disaster Management Division, Ministry of Defence.	Member
04	Mrs. J.A.W.K. Jayakody. Chief Internal Auditor, Disaster Management Division, Ministry of Defence.	Observer
05	Mrs. L.B.G. Sandamali. Audit Superintendent, National Audit Office.	Observer

Observations of the NBRO's Internal Audit Unit (IAU) on the audit queries issued by the National Audit Office were discussed at the AMC meetings. In particular, the Annual Internal Audit Plan prepared by the IAU of the organization for year 2023, was further reviewed and the audit observations and recommendations were made in relation to the organization's operational, control, and risk management processes. The AMC has made recommendations for improvement and rectification of these audit observations. Accordingly, the roles set out in Financial Regulations 133 and 134, the instructions stated in the circulars of the Department of Management and Audit, Department of Public Enterprises, the Audit Standards of Sri Lanka and the provisions of the National Audit Act No. 19 of 2018 have been taken into consideration at the AMC, to guide the management of the NBRO to achieve the objectives of the Organisation. The quantitative and quality of the corrections and recommendations made by the organization, on the observations and recommendations of the AMC made in the audit queries and reports, were also examined.

Four AMC meetings were held in the year 2023 and the Committee has directed the management to provide necessary guidance to maintain the internal control systems in a proper and accurate manner.

AUDITED FINANCIAL STATEMENTS

Statement of Financial Position as at 31st December 2023

LKR

	Annex No	As at 31.12.2023		As at 31.12.2022
Current Assets				
Cash and cash equivalents	1		59,593,612	14,641,682
Receivables				
Trade Debtors	2	113,408,556		190,290,744
Sundry Receivables	3	43,546,053	156,954,609	24,982,172
			216,548,221	**229,914,598**
Inventories	4		28,029,316	4,575,467
Receivables from staff	5		57,027,968	73,827,278
Pre-payments	6		17,892,008	31,290,393
Other Current Assets				
Project work in progress	7	99,307,574		69,984,069
Term Deposits	8	751,212,055	850,763,628	592,710,492
Non - Current Assets			**1,170,017,141**	**1,002,302,296**
Infrastructure, Plant & Equipment	9	338,247,547		150,971,425
Land and buildings	9	54,520,404		53,506,140
Intangible Assets	9	20,737,239		4,201,850
Leasehold land	9	7,965,000		7,965,000
New Lab Building Working in Progress		735,171,684		648,610,080
Mini Laboratories Work in Progress		1,380,000	1,158,021,873	1,380,000
Total Assets			**2,328,149,016**	**1,868,936,789**
LIABILITIES				
Current Liabilities				
Payables				
Advance Received from Clients	10	379,533,198		295,853,607
Sundry payables	11	169,575,835	549,109,034	129,789,852
Non – Current Liabilities				
Long term provisions				
Provision for Gratuity	12	81,356,254	81,356,254	86,940,688
Total Liabilities			**630,465,288**	**512,584,148**
Net Assets			**1,697,683,727**	**1,356,352,641**
NET ASSETS / EQUITY				
Capital contributed by Government & Other entities	13	589,982,586		589,982,586
Reserves – Revaluation Surplus		122,657,548		27,875,989
			712,640,134	
Accumulated Surplus/ (Deficit)				
Surplus brought forward	14		749,664,033	471,508,338
Surplus for the year			235,379,561	266,985,728
Net Assets / Equity			**1,697,683,727**	**1,356,352,642**

Statement of Financial Performance for the Year Ended 31st December 2023

LKR

Revenue	Annexure	Year 2023	Budget 2023	Year 2022
Revenue				
Environmental Studies & Services Division	**15**	63,326,050	65,600,000	55,843,122
Geo Technical Engineering & Testing Division	**16**	226,450,351	294,000,000	252,180,913
Landslide Research & Risk Management Division	**17**	208,493,060	214,000,000	248,413,086
Human Settlement Planning & Testing Division	**18**	44,675,761	252,200,000	46,763,750
Building Material Division	**19**	45,752,750	47,950,000	40,157,465
Project Management Division	**20**	68,091,580	149,800,000	159,768,826
Total Operating Revenue		**656,789,552**	**1,023,550,000**	**803,127,162**
Other Income	**21**	137,043,311	60,000,000	90,920,313
Total Revenue		**793,832,863**	**1,083,550,000**	**894,047,475**
LESS - Expenses				
Salaries, Wages and Employee Benefits	**22**	356,286,366	425,747,000	437,423,552
Supplies and consumables used	**23**	206,598,762	520,123,000	241,709,502
Depreciation	**24**	35,862,471	80,300,002	59,156,349
Impairment of Property, plant and Equipment	**25**	27,019,323	29,149,200	20,875,246
Other Expenses	**26**	20,956,938	27,397,000	22,259,111
Finance Cost	**27**	184,734	36,000	75,833
Total Expenses		**646,908,594**	**1,082,752,202**	**781,499,593**
Net Operating Profit before Tax		146,924,269	797,798	112,547,882
Income Tax			-	9,000,000
Levy for Consolidated Fund		44,077,281		
Net Operating Profit after tax		**102,846,988**	**797,798**	**103,547,882**
Non Exchange Revenue	**28**	207,196,487	10,000,000	178,504,297
Less : Depreciation for Grant Assets & Consumables	**24**	74,663,914	6,000,000	15,066,452
Total Surplus for the year		**235,379,561**	**4,797,798**	**266,985,727**

Cash Flow Statement for the Year Ended 31st December 2023

LKR

	2023	2022
Surplus / (Deficit)	**235,379,561**	**266,985,728**
Adjustments		
Depreciation	76,540,986	74,222,800
Provision for Gratuity	9,822,587	15,863,377
Gratuity Payment	(15,407,021)	(13,621,058)
Under/Over provision for debtors	(131,814)	(264,760)
Under/Over provision for Income Tax Payable	(385,301)	
Under/Over provision for Consolidated Fund Payable	(31,064,365)	
Disposal of Fixed Assets		(299,299.06)
Non Exchange Revenue	(207,196,487)	(178,504,297)
unrealized Interest Income	(32,971,196)	(24,021,439)
Operating Surplus(Deficit)before working capital changes	**34,586,950**	**140,361,053**
Changes in working capital		
Increase in Receivables	(4,179,027)	-156,696,278
Increase in Receivable from Staff	16,799,310	16,417,775
Increase in Pre payments	13,398,385	29,392,230
Increase in Inventories	(23,453,850)	(236,383)
Increase in Working In Progress	(20,752,184)	113,793,763
Increase in Deposits	(158,501,563)	(149,089,328)
Money Received from Client	83,679,590	(220,674,197)
Increase in Sundry Creditors	39,785,984	22,981,860
Net Cash flows from Operating Activities	**(18,636,405)**	**(203,749,506)**
Cash flows from Investing Activities		
Interest Income	95,600,344	58,632,012
Purchase of Fixed Assets	(239,208,494)	(247,953,041)
Disposal of Fixed Assets		370,000
Net cash flow from Investment activities	**(143,608,151)**	**(188,951,029)**
Cash flows from Financing Activities		
Grant	207,196,487	178,504,297
Other Government Grants		
Cash flows from Financing Activities	**207,196,487**	**178,504,297**
Net change in Cash and Cash equivalents	44,951,929	(214,196,238)
Cash and cash equivalents beginning of the period	14,641,682	228,837,920
Cash and cash equivalents as at 31.12.2023	**59,593,613**	**14,641,682**
Note- Cash and Cash equivalents		
Cash at Bank and hand	59,593,612	14,641,682
	59,593,612	**14,641,682**

Notes to Accounts

1. Basis of Accounting

Financial Statements have been prepared by Complying with generally accepted Accounting Principles, Fundamental assumptions, Public Sector Accounting Standards and Accounting Standards introduced by the Institute of Chartered Accountants from time to time and also by considering the followings.

(a) Going Concern

(b) Consistently Application of Accounting Policies.

(c) Revenue and expenses recognition on accrual basis.

(d) Disclosure to deviations to Standards

2. General Accounting Policies

2.1 Depreciation Policies.

(a) Depreciation is provided based on number of days used

(b) Fixed assets are depreciated on Straight Line basis using the following rates.

Fixed asset type	%
Buildings	2.5
Machinery and Lab Equipment	20
Furniture & Fitting	10
Vehicles	20
General Office Equipment	20
Computer Hardware & accessories	20
Computer Software	20
Drawing Office Equipment	10
Tools	50
Library Books	5
Fire Extinguishers	10

2.2 Valuation of Closing Stock

Unutilized materials stocks have been valued at cost.

2.3 Provision for Gratuity

Provision for gratuity is calculated based on the Actuarial Valuation Method and payment is done based on the Gratuity Act

2.4 Provision for doubtful Debtors

A provision has been made for doubtful debts on the basis of;

(a) 1 % Provision for debts outstanding over 2-10 years.

(b) 25 % Provision for debts outstanding over 10 years.

2.5 Grant Received

Local and Foreign grants received for purchasing Property, Plant and Equipment were considered as non-exchange revenue as per the SLPSAS 11 and the incomplete portion of ongoing projects which are not recognized as income, carry out using grants were considered as current liabilities.

Statement of Responsibility for Financial Statements in terms of Sec. 7 A.

The Accounting policies & Notes to Accounts on pages 06 form an integral part of these Financial Statements. The Board of Directors is responsible for the preparation and presentation of these Financial Statements. These Financial Statements were approved by the Board of Directors and signed on their behalf.

Chief Financial Officer of NBRO

K.K.H.Randeny
Director (Finance)
National Building Research Organisation

K.K.H. RANDENY
DIRECTOR FINANCE
NATIONAL BUILDING RESEARCH ORGANIZATION
FINANCE DIVISION
99/1, JAWATTA ROAD,
COLOMBO - 05.

Chief Executive Officer of NBRO

Eng.(Dr.) Asiri Karunawardena
Director General
National Building Research Organisation

Eng. (Dr.) Asiri Karunawardena
Director General
National Building Research Organisation
No. 99/1, Jawatta Road,
Colombo 5, Sri Lanka.

Member of the Interim Management Committee of NBRO

H. U. R. Fonseka
Chief Accountant
Disaster Management Division
Ministry of Defence

H.U.R.Fonseka
Chief Accountant
Ministry of Defence
Disaster Management Division
Vidya Mawatha, Colombo 07.

Chairman of the Interim Management Committee of NBRO

General Kamal Gunarathne (Retd.) WWV RWP RSP USP ndc psc MPhil
Secretary
Ministry of Defence

General Kamal Gunaratne (Retd)
WWV RWP RSP USP ndc psc MPhil
Secretary
Ministry of Defence.

AUDITOR GENERAL'S REPORT

Auditor General's Report is attached to Sinhala Copy

LAST 10 YEARS FINANCIAL HIGHLIGHTS

In 2023, NBRO recorded consolidated revenue of Rs. 793.83 Mn. inclusive of Revenue from customary NBRO services of Rs. 604.96 Mn. in 2023. The institution depends mostly on this consultancy revenue generated to meet its recurrent expenditure.

Rs. 188.87 Mn. has been utilized for projects and programs carried out in year 2023 under government grant. The total consolidated expenditure for the corresponding period was Rs. 646.91 Mn. A net profit of Rs. 146.92 Mn. is recorded.

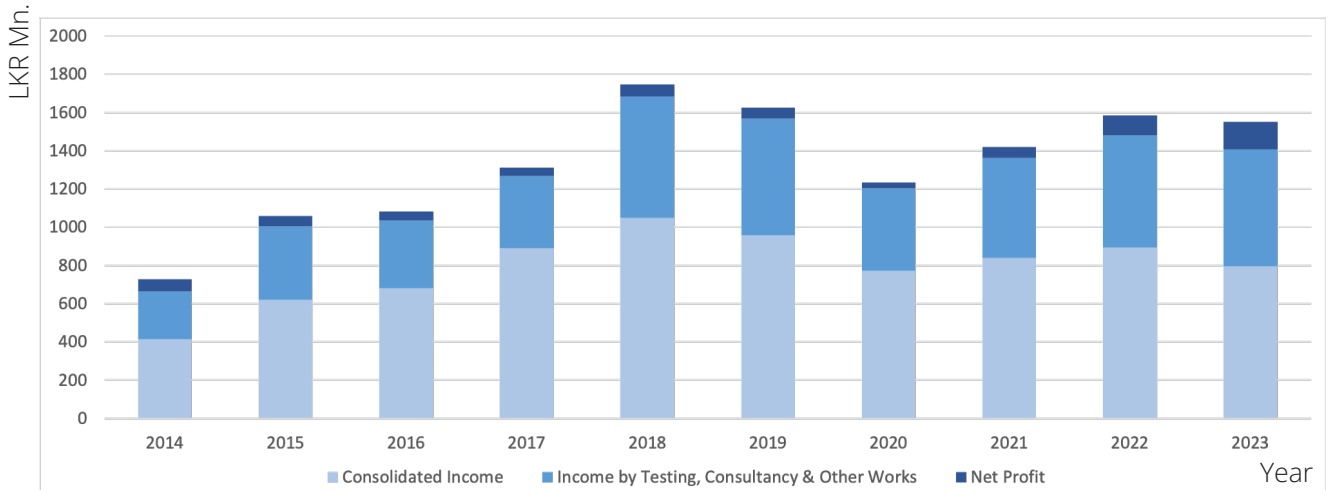
The expenses on personal emoluments for the staff strength of 345 including daily paid employees was Rs. 356.29 Mn. in 2023 as against the staff strength of 359 with daily paid employees was Rs. 437.42 Mn. In year 2022.

The institution growth and enhanced performance have been mainly due to the courageous effort of the management and the staff of NBRO

Last 10 years financial highlights

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Consolidated Income	415.68	619.18	681.2	888.7	1048.3	958.9	771.3	840.3	894.05	793.8	
									107,2.55	998.31	<<
Income by Testing, Consultancy & Other Works	247.99	384.63	352.89	379.64	634.11	610.71	433.21	523.42	586.71	605.00	
Net Profit	62.75	53.55	47.9	43.8	63.7	55.2	30.2	54.5	103.6	146.9	
									266.99	235.4	<<

<< With non exchange revenue



CORPORATE GOVERNANCE REPORT

Human Resource/ Capacity Development

NBRO has set its Vision and Mission with the aim of enhancing its capacity to meet the Disaster Risk Reduction (DRR) needs of the Ministry. In alignment with this goal, NBRO is currently undertaking steps to formalize its mission through legislative means and to enhance staff capabilities to ensure the delivery of high-quality outputs.

In 2023, the institution prioritized the recruitment of several new employees to fill essential vacant technical positions. As a result, 11 staff officers were successfully recruited, comprising 7 Scientists, 2 Management Assistants, and 2 Primary staff members. Notably, there were no retirements recorded during this period.

No	Salary / Code	Staff Category	Approved Cadre	Staff Available (Permanent)	No of Vacancies (Permanent)	Staff Available (Other Basis)
1	HM 2- 3	Senior Manager (CEO)	01	01	0	-
2	HM 1-3	Senior Manager	08	06	02	-
3	AR2	Senior Academic/ Scientist	25	18	07	-
4	MM 1-1	Middle Management	12	05	07	-
5	AR 1	Academic/ Scientist	124	87	37	25
6	JM 1-1	Junior Management	25	21	04	04
7	MA 2-2	Management Assistant (Tech)	36	25	11	10
8	MA 1-2	Management Assistant (Non Tech)	53	46	07	07
9	PL 1,2&3	Primary	102	65	37	25
	TOTAL		386	274	112	71

Recruitment, retirements & resignation of permanent staff in 2023

No	Sal/ Code	Staff Category	No of Recruitment	No of Resignations	No. of Retirement
1	HM 1- 3	Senior Manager (CEO)	-	-	-
2	HM 1-1	Senior Manager	-	-	-
3	MM 1-1/JM 1-1	Middle/ Junior Management	-	01	-
4	AR2	Senior Academic/ Scientist	-	-	-
5	AR 1	Academic/ Scientist	07	03	-
6	MA 2-2	Management Assistant (Tech)	02	01	-
7	MA 1-2	Management Assistant (Non Tech)	-	01	-
8	PL 1,2&3	Primary	02	01	-
	TOTAL		11	07	-

Procurement of Property Plant and Equipment

Item	Doner Agency	2023
Fire Wall	GOSL	3,599,296
Rain Gauge	GOSL	1,089,000
Landslide Monitoring Equipment	JICA	32,895,841
Clearance Exp	GOSL	10,625,067
Property, Plant & Equipment	JICA	49,490,088
Seismograph Monitoring Equipment	JICA	17,193,225
Property, Plant & Equipment	CRESMP	83,585,302
Property, Plant & Equipment	Ministry of Investment Promotion	430,000
Property, Plant & Equipment	GOSL	5,570,234
		204,478,052

Staff training / attending workshops & seminars

NBRO Nominated below employees for forigan traning programmes and higher studies opportunities .02 Scientist were Selected for Masters /Ph.D.Programmes abrod as given below

NO	Name	Designation division	Training Program	Period	Country
1	Mr.R.M.S.A.K.Rathnayaka	Scientist AR- i	Mssa Rainfall Predictium Simulation	8th Feb to 11th March 2023	Japan
2	Mr. H.R.Maduranga	Senior Engineer AR- 2	short Tearm Training Program Under The JICA Satreps "Development of Early Warning &Technology of Rain Induced Rapid and long travelling	8th Feb to 11th March 2023	Japan
3	Ms. N.P.G.Amali	Engineer			
4	Mr. A.R.P.Weerasinghe	Geologist AR-1			
5	Mr. D.S.Munasinghe	Senior Scientist AR-2	Urban Resilience to Climate Extremes in South Asia	20th to 22nd March 2023	Vietnam
6	Mr. M.Somarathne	Senior Scientist AR-2 /Geologist AR-2	Training Under the JICA Technical Cooperation Poject for Mainstreaming Disaster Risk Reduction through Establishiy Local Disaster Risk Reduction Plans based on River basin Strategy	21St May to 2nd June 2023	Japan
7	Ms. G.K.B.M.Gannoruwa	Scientist AR -1 Materials Engineer	Training Program of ITCA Knowledge Co- Creation Program Sediment Disaster Risk Reduction	04th to 24th June 2023	Japan
8	Mr. P.H.C.S.Rathnasiri	Senior Scientist AR-2	Training Program ot 7 th Asia Pacific Dralogue Plat form on Anticipatory Action	13th to 15th June 2023	Kathmandu
9	Mr. P.H.C.S.Rathnasiri	Senior Scientist AR-2	Training Program of 2023 ISUS Policy Sharing Conference and 2023 ISUS Global Friends Night	18th to 23th Aug 2023	South Korea
10	Ms. K.A.N.Saroja	Scientist AR -1	Praticipating Master's Program in Japanees Grant aid for HR Development Scholarship Program (JDS)	12th Aug 2023 to 10th oct 2025	Japan
11	Ms. M.A.K.Kumari	Scientist AR -1	Participating Doctoral Program in Mon bukagakushoto Scholarship Program	24th sep 2023 to 30th sep 2026	Japan
12	Mr. H.D.S.Permasiri	Director (Technical)	Training Program on South Climate Conclave dhaka Chopter held in dhakon	20th to 28th sep 2023	Bangaladesh
13	Dr. Jayathissa	Director LRRMD	DAAD Re Invitation Program	1st oct to 29th Dec 2023	Germaru

14	Mr. E.Wimalawardena	Scientist AR -1	Dectoral Program in Environmental Studies, Degree program in life and Grath Science, Graduate School of Science ,and Technology	16th Oct 2023 to 01st oct 2026	Japan
15	Mr. S.H.S.Jayakody	Scentist (Civil Engineer) AR-1	Post Dectoral (Research) Position Kyoto University	16th Oct 2023 to 31st Oct 2024	Japan
16	Mr. K.N.Bandara	Director GETD	Participating "The Regional Capacity Enhancement for Landslide Impact Mitigation	30th Nov to 1st Dec 2023	Bankok ,Thailand
15	Eng . (Dr).Asiri Karunarathna	Director General			
16	Mr. Dayan Munasinghe	Senior Scientist AR -2			
17	Ms. S.A.M.S.Dissanayaka	Senior Scientist AR -2			
18	Mr. N.I.C.Peiris	Senior Scientist AR -2			
19	Ms. H.H.Hemasinghe	Senior Scientist AR -2	Participating Training Program of 06 th World Landslide	11th to 18th Nov 2023	Itly
20	Mr. D.M.D.S.Dissanayaka	Senior Scientist AR-1			
21	Ms. N.P.G.Amali	Scientist Engineer AR-1			
22	Ms. A.R.P.Weerasinghe	Scientist (Geologist) AR -1			
23	Ms. R.M.I.V.Rathnayaka	Scientist AR -1			
24	Ms. D.M.I.K.Ariyarathna	Scientist AR -1			
25	Mr. R.R.D.Ranjana	Scientist -(Environmentalist) AR-1	JICA Knowledge Co-Creation Program Comprehensive Disaster Risk Reduction, Online	19th Dec 2023 to 14th Jan 2024 and 13th Jan to 22ndFeb 2024	Japan
26	Ms. H.H.Hemasinghe	Senior Scientist AR-2	short Tearm Training Program Under The ITCA SATREPS "(Science &Technology Research Partnership for Sustainable Development) Project Development of Early Warning Technology of Rain	21st Jan to 04th Feb 2024	Japan
27	Ms. C.N.Subasinghe	Senior Scientist AR-2			
28	Ms. D.M.D.I.K.Ariyarathna	Scientist AR -1			
29	Mr. Selvarajan Jayaprakash	Scientist AR -1			
30	Ms. I.A.N.Chanchala De Silva	Scientist AR -1			

Annexures to Financial Statements

Annexure 01

Cash and Cash Equivalents

LKR

Description	Sub Annexure	2023	2023
Cash and Bank - Head Office (Current Ac Integrated with Savings Ac)		878,908	9,162,641
Maney Market Account		50,497,582	
Cash and Bank – District Office		355,627	397,654
Cash and Bank – District Office (Collection Account)		7,034,129	5,081,387
Credit Card Control Account		38,567	
Cash		788,799	
	1a	59,593,612	14,641,682

Annexure 02

Receivables – Trade Debtors

LKR

Description	Sub Annexure	2023	2022
Trade Debtor		113,408,556.0	190,290,744
	2a	113,408,556	190,290,744

Annexure 03

Sundry Receivables

LKR

Description	Sub Annexure	2023	2022
Receivable Tender Payments	3a	101,062	385,410
Receivable Other Payments	3b	2,910,454	210,451
Receivable Gurantees	3c	-	211,313
Sundry Receivable D/O		195,586	153,559
Interest receivable		32,971,196	24,021,439
Recevable from RLVMMP		1,753,045	
Other Receivables - Fuel		162,586	
To be Reconciled		0	
To be Reconciled			
WHT Receivable		5,452,125	-
		43,546,053	24,982,172

Annexure 04

Inventories

LKR

Description	Sub Annexure	2023	2022
Printing and Stationary		3,251,721	3,049,509
Chemical and Glassware		2,097,189	1,525,957
Monitoring Equipments		22,680,406	
	4a	28,029,316	4,575,467

Annexure 05

Receivables from Staff

LKR

Description	Sub Annexure	2023	2022
Festival Adavance	5a	134,250	149,250
Special Salary Adavance	5b	2,400	2,400
Travelling & Subsistance Adavance	5c	15,101	28,951
Special Cash Adavance	5d	23,022	5,134
Distress Loan	5e	14,955,829	11,817,149
MSC Loan	5f	7,500	156,025
Other Advances	5g	754,700	876,485
Staff Vehicle Loan	5i	16,372,074	24,826,440
Staff housing Loan	5j	24,763,093	35,965,445
		57,027,968	73,827,278

Annexure 06

Pre-Payments

Description	Sub Annexure	2023	2022
Advances to Contractors	6a	12,867,201	24,729,620
Other Pre Payments	5h	5,024,806	6,560,772
		17,892,008	31,290,393

Annexure 07

Project Work in Progress

LKR

Description	Sub Annexure	2023	2022
Project Management Division		331,579	-
Geo Technical Engineering & Testing Division		95,503,271	66,611,345
Human Settlements Planning & Training Division		3,472,724	3,372,724
	7a	99,307,574	69,984,069

Annexure 08

Term Deposits

LKR

Description	Sub Annexure	2023	2022
Term Deposit		751,182,055	592,680,492
Employee Security deposit investments		30,000	30,000
	8a	751,212,055	592,710,492

Annexure 09

Infrastructure, Plant & Equipment

Cost

LKR

Description	2023	2022
Lab and Field Equipment & Plant & Machinery	420,247,458	548,264,537
Vehicles	113,653,397	70,783,026
Office Equipment	73,953,165	63,407,241
Computer Hardware & Assessories	150,264,094	78,604,710
Furniture and Fittings	27,272,845	25,833,154
Drawing Office Equipment	301,109	301,109
Library books and Periodicals	4,551,922	4,546,652
Tools	1,928,794	1,905,122
Fire Extinguishers	162,441	162,441
	792,335,225	793,807,992

Provision for Depreciation

Description	2023	2022
Pro. For Machinery & Lab equipment's	243,866,086	435,281,928
Pro. For Dep. Of Vehicles	55,830,157	70,783,026
Pro. For Dep. Of Office equipment's	61,795,723	58,368,359
Pro. for Dep. Computer Hardware & Assessories	66,961,589	55,191,753
Pro. For Dep. Of Furniture & Fittings	19,371,947	17,169,994
Pro. For Dep. Of drawing Office equipment's	301,109	301,109
Pro. For Dep. Of Books	3,792,543	3,700,297
Pro. For Dep. Of Tools	1,909,937	1,905,122
pro. For Dep. Of Fire extinguishers	148,588	134,980
	453,977,679	642,836,567

Net book Value

Description	2023	2022
Lab and Field Equipment & Plant & Machinery	176,381,372	112,982,609
Vehicles	57,823,240	0
Office Equipment	12,157,442	5,038,882
Computer Hardware & Assessories	83,302,504	23,412,956
Furniture and Fittings	7,900,898	8,663,160
Drawing Office Equipment	-	0
Library books and Periodicals	759,379	846,355
Tools	18,857	0
Fire Extinguishers	13,853	27,461
	338,357,547	150,971,425

Land and Building

Cost

LKR

Description	2023	2022
Land and Building	68,166,930	65,448,492
	68,166,930	65,448,492

Provision for Depreciation

Description	2023	2022
Land and Building	13,646,526	11,942,353
	13,646,526	11,942,353

Net book Value

Description	2023	2022
Land and Building	54,520,404	53,506,140
	54,520,404	53,506,140

Intangible Assets

Cost **LKR**

Description	2023	2022
Compute Software	41,023,904	21,199,558
	41,023,904	21,199,558

Provision for Depreciation

Description	2023	2022
Compute Software	20,286,665	16,997,708
	20,286,665	16,997,708

Net book Value

Description	2023	2022
Compute Software	20,737,239	4,201,850
	20,737,239	4,201,850

Leasehold Land

Cost **LKR**

Description	2023	2022
Leasehold Land - Ratnapura (Note *)	7,965,000	7,965,000

Annexure 10

Advance Received from Clients

LKR

Description	Sub annexure	2023	2022
Environmental Studies & Service Division		3,087,000	7,823,000
Geo Technical Engineering & Testing Division		103,150,444	86,382,321
Landslide Research and Risk Management Division		-	4,688,296
Human Settlements Planning & Training Division		131,534,981	142,454,583
Project Management Division		140,059,180	54,447,076
Unidentified Credits (Rs. 1,193,960.49 has been identified as at 19/02/2024)		1,701,593	58,332
	10a	379,533,198	295,853,607

Annexure 11

Sundry Payables

Description	Sub Annexure	2023	2022
Accrued Expenses		21,278,574	8,106,644
Repayable tender deposits		818,717	1,086,717
Repayable retention deposits		28,210,573	25,559,301
Repayable security deposits		174,596	174,596
Excess from customers		388,908	361,488
Payables to Contractors/Other		7,331,003	46,720,876
Provision for Leave Encashment		8,793,845	12,000,000
Provosion for Transport		2,230,136	
Provision for Bonus/Performance Incentive		1,890,711	4,035,000
Provision for Audit Fee		500,000	500,000
Provision to Other Staff		-	2,000,000
Income Tax Payable		-	11,972,055
Salary Payble		1,001,893	841,066
EPF Payble		3,842,191	4,367,410
ETF Payble		524,249	595,870
Stamp Duty Payable		20,750	24,025
VAT		16,082,488	11,290,343
SSCL Payable		1,123,750	154,463
PAYE Tax		169,307	-
WHT Payable		52,500	
Levy for Accumulated Fund Payable		75,141,646	
	11a	169,575,836	129,789,852

Annexure 12

Provision for Gratuity

LKR

Description	2023	2022
Opening Balance	86,940,688	84,698,369
Charge for the Year	9,822,587	15,863,377
Payments made during the year	(15,407,021)	(13,621,058)
Closing Balance	81,356,254	86,940,688

Annexure 13

NET ASSETS / EQUITY

Capital contributed by Government & Other entities

Description	2023	2022
Balance	589,982,586	589,982,586

Annexture 14

ACCUMULATED SURPLUS/ (DEFICIT)

	LKR	
	2023	2022
Opening Balance	471,508,338	403,533,592
Add		
Profit for the previous year	266,985,727	70,461,437
	738,494,065	473,995,029
Add		
Prior Year Adjustment		(2,486,691.0)
Correction of Depreciation	(9,045,660)	
Recognision of Non Exchange Revenue	43,093,972	
Recognision of WIP	8,571,321	
Under Provision of Income Tax 2022	(385,301)	
Levy for Consolidated fund-2022	(31,064,365)	
Balance C/F	749,664,033	471,508,338.0

Divisional Revenue & Expenditure

Annexure 15

Environmental Studies & Service Division

Description	2023			2022		
	Income	Expenditure	Surplus /(Deficit)	Income	Expenditure	Surplus/ (Deficit)
ESSD Head Office activities	63,326,050	59,905,368	3,420,682	48,533,500	47,491,898	1,041,601
Chemical Disaster Risk Programme			0	4,250,000	4,114,614	135,386
RLVMMP - Supervision			0	3,059,622	2,851,572	208,050
	63,326,050	59,905,368	3,420,682	55,843,122	54,458,084	1,385,038

Annexure 16

Geo Technical Engineering & Testing Division

Description	2023			2022		
	Income	Expenditure	Surplus/ (Deficit)	Income	Expenditure	Surplus/ (Deficit)
GED Head Office activities	198,796,450	182,606,948	16,189,502	195,379,119	173,708,108	21,671,011
SATREPS	3,104,933	6,768,577	-3,663,644			
RLVMMP - Supervision	24,548,968	26,564,361	-2,015,393	56,801,794	63,742,226	-6,940,432
	226,450,351	215,939,886	10,510,465	252,180,913	237,450,334	14,730,579

Annexure 17

Landslide Research and Risk Management Division

Description	2023			2022		
	Income	Expenditure	Surplus/ (Deficit)	Income	Expenditure	Surplus/ (Deficit)
Automated rain gauges project	10,000,000	9,933,170	66,830	13,794,593	13,726,385	68,208
Landslide hazard Zonation Mapping	14,266,250	14,165,387	100,863	17,970,000	17,849,150	120,850
Building approval process	65,109,545	58,494,185	6,615,359	59,121,796	59,590,926	-469,129
Land Investigations	63,830,591	62,129,263	1,701,328	65,261,646	66,129,749	-868,103
Landslide Mitigation			0	2,548,563	2,543,109	5,454
TCLMP - Phase 11			0	2,832,002	2,795,030	36,972
Consultancies	55,286,674	57,505,230	-2,218,556	86,884,486	75,949,712	10,934,774
	208,493,060	202,227,234	6,265,826	248,413,086	238,584,061	9,829,025

Annexure 18

Human Settlement Planning & Testing Division

Description	2023			2022		
	Income	Expenditure	Surplus/ (Deficit)	Income	Expenditure	Surplus/ (Deficit)
HSD Head Office activities	16,334,511	15,939,513	394,999	14,271,096	13,890,540	380,555
Landslide hazard Zonation Mapping	5,000,000	4,767,413	232,587	5,000,000	4,850,339	149,661
Precast Housing Project	2,341,250	1,896,101	445,149	4,770,000	4,694,071	75,929
Special Investigations	5,000,000	4,558,816	441,184	2,243,306	2,205,540	37,766
Landslide Risk Profile	16,000,000	15,616,640	383,360	18,944,140	18,764,109	180,031
TCLMP - Phase 11	0	0	0	1,535,209	1,533,040	2,169
	44,675,761	42,778,482	1,897,279	46,763,750	45,937,639	826,111

Annexure 19

Building Materials Division

Description	2023			2022		
	Income	Expenditure	Surplus/ (Deficit)	Income	Expenditure	Surplus/ (Deficit)
Head Office activities	43,072,382	40,179,765	2,892,617	36,085,535	39,600,485	-3,514,949
Building Assessment Project	2,368,175	2,263,779	104,396	2,806,169	2,730,523	75,646
RLVMMP - Supervision	312,193	475,799	-163,606	1,265,761	1,847,990	-582,229
	45,752,750	42,919,343	2,833,407	40,157,465	44,178,998	-4,021,533

Annexure 20

Project Management Division

Description	2023			2022		
	Income	Expenditure	Surplus/ (Deficit)	Income	Expenditure	Surplus/ (Deficit)
PMD Head Office activities	44,974,122	31,606,366	13,367,756	43,289,551	23,101,422	20,188,129
Building Assessment Project	16,490,439	16,275,490	214,949	24,533,830	25,399,902	-866,072
RLVMMP - Supervision	777,017	1,435,633	-658,616	1,388,139	1,332,676	55,463
Landslide Mitigation Projects	5,850,002	5,086,454	763,548	90,557,307	90,793,999	-236,693
	68,091,580	54,403,943	13,687,637	159,768,826	140,627,998	19,140,828

Annexure 21

Other Revenue

Description	2023	2022
Interest Income	128,571,539	82,653,451
Surcharge, bond& interest on distress loans	4,143,772	6,383,848
Disposal Income	-	299,299
Non Refundable Tender Deposit	4,242,500	1,469,715
Registration Fee	85,500	114,000
	137,043,311	90,920,313

Annexure 22

Salaries, Wages and Employee Benefits

Description	2023	Budget 2023	2022
Salaries	194,501,538	221,900,000	223,370,525
Wages	41,840,997	36,300,000	60,905,814
Over Time and Holiday Payments	15,029,672	11,700,000	14,800,368
Risk Allowance	56,250	36,000	36,000
Special Allowance	14,486,882	17,220,000	17,961,262
Contribution to EPF - 12%	24,023,441	29,780,000	30,801,132
Contribution to ETF - 3%	6,005,861	7,445,000	7,640,663
Performance Incentives	1,890,711	29,376,000	9,032,195
Consultant's Payments	4,740,669	9,496,000	8,116,052
Encashment of Medical leave	5,989,580	11,535,000	8,963,486
Employee Insurance Scheme	7,312,760	7,320,000	5,985,142
Staff trainings - Foreign	26,400	200,000	50,388
Staff trainings - Local	125,459	79,000	60,000
Seminar & Workshop	494,341	515,000	274,965
Bonus	1,981,417	7,125,000	6,363,633
Travelling & Subsistence	20,366,028	16,900,000	22,558,334
Travelling - Foreign	1,339,335	3,280,000	487,633
Employee welfare	6,252,436	4,080,000	4,152,583
Gratuity	9,822,587	11,460,000	15,863,377
	356,286,366	425,747,000	437,423,552

Annexure 23

Supplies and Consumables used

Description	2023	Budget 2023	2022
Sub Contract Payment	73,986,296	396,400,000	90,293,795
Transport	35,344,362	47,100,000	53,380,094
Telephone and Postage	8,787,592	10,200,000	9,064,042
Electricity	15,742,575	8,652,000	6,527,437
Water	845,246	1,310,000	1,023,430
Rates and Taxes	17,000	400,000	282,042
Janitorial Services	3,233,090	3,000,000	2,431,479
Advertising	3,503,380	1,000,000	2,563,790
Hire charges - Equipment's	1,514,745	50,000	34,500
Printing and Stationary	7,367,006	9,300,000	7,454,554
Chemical & Glassware	155,008	1,200,000	608,222
Other Materials	24,949,766	11,900,000	44,309,824
Fuel	27,641,258	26,300,000	20,436,830
Security charges	2,928,927	2,400,000	2,421,506
Survey Maps	89,200	5,000	4,800
Information Technologies	493,310	906,000	873,158
	206,598,762	520,123,000	241,709,502

Annexure 24

Depreciation

Description	2023	Budget 2022	2022
Depr. Of Land & Buildings	424,833	80,300,002	356,872.53
Depr. Of Computer Hardware & Accessories	4,958,115		6,690,339.30
Depr. Of Computer Software	1,648,591		2,449,962.41
Depr. Of Lab & Field Equipment's	24,064,046		43,496,469
Depr. Of Office Equipment's	2,479,822		3,625,919
Depr. Of Furniture & Fittings	2,176,790		2,215,955
Depr. Of Vehicle	0		195,496
Depr.of Library Books & Periodicals	91,852		93,539
Depr. Of Tool	4,815		18,188
Depr. Of Fire Extinguisher	13,608		13,608
	35,862,471	80,300,002	59,156,348

Depreciation & for grant Assets

Description	2023	Budget 2023	2022
Depr. Of Land & Buildings	1,279,340	6,000,000	311,948.60
Depr. Of Computer Hardware & Accessories	5,468,361		1,134,751
Depr. Of Computer Software	1,534,777		2,671,500
Depr. Of Lab & Field Equipment's	30,041,625		10,701,193
Depr. Of Office Equipment's	928,854		221,501
Depr. Of Furniture & Fittings	25,163		25,163
Depr. Of Vehicle	1,400,000		-
Depr.of Library Books & Periodicals	394		394
Depr. Of Tool			
Depr. Of Fire Extinguisher			
Other Material	33,985,400		
	74,663,914	6,000,000	15,066,452

Annexure 25

Impairments of Property, Plant & Equipment

Description	2023	Budget 2023	2022
R & M Of Building	310,282	1,100,000	0
R & M Of Plant and Machinery	1,882,475	2,441,200	2,986,153
R & M Of Vehicles	14,693,088	11,900,000	10,119,248
R & M Of Photocopiers	2,655,832	1,040,000	354,211
R & M Of Computers	2,820,184	1,800,000	1,290,635
R & M Of Other Office equipment	372,321		250
R & M of Machinery & Lab Equipment	3,999,929	7,640,000	4,197,568
R & M Of Office equipment	74,089	3,130,000	1,808,831
R & M Of Furniture & Fittings	211,125	98,000.00	118,350
	27,019,323	29,149,200	20,875,246

Annexure 26

Other Expenses

Description	2023	Budget 2023	2022
Rent	14,190,035	19,505,000	16,684,603
Safety Equipment	331,430	1,490,000	404,035
Sundry Expenses	134,119	66,000	132,277
Subscription & Memberships	541,955	546,000	629,591
Publicity/ Exhibition	100,000	100,000	-
Insurance - Life	1,770,256	3,050,000	2,507,514
Audit fees	492,000	500,000	450,000
Payment to board members	329,950	200,000	270,750
Chairman's Emoluments	262,500	200,000	187,500
Refreshments	1,321,982	1,000,000	651,635
Registration Fee	143,791	140,000	40,000
Legal Fee	-	100,000	33,840
Donations	10,000	500,000	-
Custom Clearance Charges	38,231		2,606
Site Expenses	1,158,875		
Bad Debts	131,814		264,760
Total	20,956,938	27,397,000	22,259,111

Annexure 27

Finance Cost

Description	2023	Budget 2023	2022
Bank Charges	184,734	36,000	75,833
	184,734	36,000	75,833

An Amount of Rs. 5,336,120.00 incurred for Research & Development was included in above expenses.

Annexure 28

Non Exchange Revenue

Item	Doner Agency	2023	2022
Fire Wall	GOSL	3,599,296	
Rain Gauge	GOSL	1,089,000	
Landslide Monitoring Equipment	JICA	32,895,841	29,119,041
Clearance Exp	GOSL	10,625,067	12,283,890
Property, Plant & Equipment	JICA	49,490,088	80,146,512
Seismograph Monitoring Equipment	JICA	17,193,225	
Property, Plant & Equipment	CRESMP	83,585,302	
Property, Plant & Equipment	Ministry of Investment Promotion	430,000	
Property, Plant & Equipment	GOSL	5,570,234	
Computer	Salford University		1,780,562
Ratnapura Building	GOSL	2,718,434	51,173,591
Landslide Management Information System	UNDP		2,600,000
Landslide Detection Network	UNDP		1,400,700
		207,196,487	178,504,297

Notes...

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