

**Application for World Centre of Excellence(WCoE) on Landslide Risk
Reduction 2023-2026**

1. Name of Organization; **Engineering Geology Research Group (EGRG),**
Department of Geology, University of Peradeniya
2. Name of Leader Dr. Jagath Gunatilake BSc (Geology - Peradeniya), MSc (Engineering
Geology – AIT, Thailand), PhD (Geotechnical Engineering – Saga,
Japan)
- Affiliation: position Senior Lecturer,
Coordinator – MSc Program in Engineering Geology & Hydrogeology
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Core members of the activities

- Names/Affiliations: * Dr. Bhatthiya Athurupana _ Senior Lecturer – Department of Geology,
University of Peradeniya (BSc- Peradeniya, MSc, PhD – Tohoku University)
- * Eng. A.A. Virajh Dias – Additional General Manager – Central Engineering
Consultancy Bureau (CECB), Sri Lanka (BSc - Moratuwa, MPhil - Peradeniya)
- * Mr. RMS Bandara – Project Manager – National Building Research
Organization (NBRO), Sri Lanka (BSc, MSc Peradeniya)
- * Ms. Vidushi Gunatilake - Engineering Geologist/Demonstrator – Department
of Geology, University of Peradeniya, Sri Lanka (BSc - Peradeniya)

3. Date of Submission of Application; 10th April 2023
4. Activity scale and targeted region;
1) Global, 2) ~~Intercontinental~~, 5) National
5. Short Title characterizing past and planned activities (10 words maximum);
“Establishment of an innovative research group on landslides in Sri Lanka”
6. Objectives for 3 years: (5 lines maximum; what you expect to accomplish?)
- To develop advanced methodologies and tools for landslide risk assessment, prediction, and early warning systems, considering geological, geotechnical, and environmental aspects tailored specifically to the diverse landscape of Sri Lanka
 - To collaborate with **National and International Research Institutions, Organizations, and Experts** to foster knowledge exchange, capacity building, and interdisciplinary research on landslides in Sri Lanka.

7. Background Justification: (10 lines maximum)

- Engineering Geology Research Group (EGRG), with the Department of Geology, University of Peradeniya, as its center, has been actively involved, as the sole department of geology in Sri Lanka, in a number of geological investigations focusing on the impact of geohazards on civil-infrastructure, such as major dams and reservoirs, highways and roads research and comprehensive studies on GIS and RS.
- R&D into active landslides, reservoir induced landslides, geological and structural mapping in Sri Lanka, major dam foundation investigations (subsurface drilling and in-situ testing), reservoir leakage investigations (Samanala Wewa Dam, Sri Lanka), tunnel geotechnical investigations (Pollgolla Tunnel, Upper Kotmale and Uma Oya hydropower Project etc), UAV 3-D modeling, and geomorphological studies.
- Contributions to teaching tools of landslide disaster risk reduction by conducting specialized training programmes with the collaboration of the Post Graduate Institute of Sciences of Peradeniya, Geo-Informatics Centre, Asian Institute of Technology(AIT), Thailand and ITC Faculty Geo-Information Science and Earth Observation, University of Twente, Netherlands.

8. Resources available for WCoE activities

Personnel; Team of landslide experts (national and international), Drone experts, Geotechnical experts for rock & soil testing, Postgraduate students (of Engineering Geology & Hydrogeology MSc program and GIS and Remote Sensing MSc Program) and research Assistants

Facilities; Geotechnical investigations, Deep Core drilling Rigs (4 Nos with the capacity up to 600 m), Geotechnical rock and soil testing laboratory, Remote Sensing and GIS laboratory, UAV- High resolution RTK drone Survey, 45 MP (P1) cameras, LIDAR and Thermal Sensors etc.

International teaching collaborations with the Geo-Informatic Centre, Asian Institute of Technology(AIT), Thailand and ITC Faculty Geo-Information Science and Earth Observation, University of Twente, Netherlands and the International consortium of Landslides (ICL), Japan.

Budgets; USD 3000 for annual memberships

USD 5000 – from collaborative research works

Affiliation and Contribution to ICL/IPL and KLC2020; ICL membership, Contribution to ICL activities in various capacities such as in advisory level, facilitator level and implementing level etc.

9. Description of your past activities related to risk reduction of landslides and other related earth system disasters (30 lines maximum)

The Engineering Geology Research Group (EGRG) at the Department of Geology, University of Peradeniya, has been actively engaged in a series of significant initiatives aimed at mitigating the risks posed by landslides and other related earth system disasters in Sri Lanka. The group's dedication to research, innovation, and collaboration has led to notable advancements in understanding, prediction, and risk reduction strategies within this critical field including,

- Pioneered the establishment of a Postgraduate Master's Degree Program in Disaster Risk Management at the Postgraduate Institute of Science, University of Peradeniya.
- Assumed a leadership position during the significant landslide event of 2006 in the Central Highlands of Sri Lanka, which witnessed the occurrence of over 1,300 major and minor landslides, as well as slope failures.
- Led and contributed to the evaluation process aimed at assessing the effectiveness of mitigation techniques implemented at major landslide sites situated along highways, schools, and other vital infrastructure. This undertaking was conducted under the World Bank Project known as CRIP.
- Spearheaded an exhaustive study concerning the potential reservoir-induced landslides associated with the proposed Upper Kotmale reservoir in Sri Lanka.
- Conducted an in-depth investigation into the mechanisms underlying the landslide that transpired at Ogi in Saga Prefecture. The findings of this investigation were subsequently published in the Japan Journal of Landslides in the year 2002.

One of the group's hallmark achievements has been the development of cutting-edge methodologies and tools for landslide risk assessment. By combining geological mapping, slope stability analysis, Geotechnical rock and soil testing laboratory facilities, Remote Sensing and GIS laboratory, UAV-High resolution RTK drone Survey, 45 MP (P1) cameras, LIDAR and Thermal Sensors, the EGRG has created a robust framework for evaluating areas susceptible to landslides. These methodologies have been instrumental in providing government agencies, local communities, and urban planners with valuable information to make informed decisions about land use and development in landslide-prone regions.

The EGRG's commitment to have more research work on early warning systems has also been instrumental in enhancing disaster preparedness. Through the integration of real-time monitoring systems, weather data, and predictive modeling, the group will establish an effective early warning mechanism that can alert authorities and communities about impending landslide events. This innovation has proved crucial in saving lives and minimizing property damage. This holistic approach

has not only enriched the academic community's knowledge but has also fostered meaningful collaborations with government agencies, NGOs, and international partners.

In conclusion, the Engineering Geology Research Group (EGRG) at the Department of Geology, University of Peradeniya, has a commendable track record in undertaking pioneering research and practical initiatives to reduce the risks associated with landslides and other related earth system disasters in Sri Lanka. The group's interdisciplinary approach has facilitated a comprehensive understanding of the underlying causes and triggers of these events, enabling the development of effective risk assessment methodologies. Through their multidisciplinary efforts, the EGRG continues to make substantial contributions to the field of engineering geology, ultimately enhancing the safety and sustainability of communities across the nation.

10. Planned future activities /Expected Results: (20 lines maximum; work phases and milestones)

A. Collaborative Partnerships: July 2023- December, 2026

- Deepening collaborative efforts with ICL in their landslide research initiatives.
- Collaborations with national and international institutions (similar to ICL-IPL), governmental agencies, and non-governmental organizations involved in landslide research and disaster risk reduction.
- Strengthening and expanding the ongoing collaboration with the National Building Research Organization (NBRO) for comprehensive landslide studies. Concurrently, commencing fresh awareness initiatives within landslide-affected zones in the Central Hill Country.
- Establish partnerships to share expertise, exchange knowledge, and facilitate joint research projects. Collaborations can also include sharing of resources, equipment, and facilities.

B. Capacity Building: January, 2024- December, 2026

- Organize training workshops, seminars, and short courses to enhance the technical skills and knowledge of researchers, students, and professionals in the field of landslide research.
- Engaging in meticulous investigations concerning the occurrence of reservoir-induced landslides in the vicinity of major reservoirs throughout Sri Lanka.
- Provide opportunities for researchers to attend conferences, present papers, and participate in relevant professional development activities.
- Publish research findings in reputable scientific journals and present research outcomes at national and international conferences.
- Organize public lectures and awareness programs to communicate research findings to local communities, government agencies, and relevant stakeholders.

11. Beneficiaries of WCoE: (5 lines maximum; who directly benefits from the work?)

- Undergraduates and postgraduate students specializing in Engineering Geology and Geotechnical Engineering at the University of Peradeniya.
- National authorities of Sri Lanka, who will gain invaluable access to a pool of national-level landslide experts.
- Vulnerable communities within Sri Lanka that face the imminent threat of landslides.

12. References: 10 lines maximum, i.e., relevant publications, international/regional/national recognition supporting items 9-10.

1. **Gunatilake, J.**, Iwao, Y. and Yamasaki, T. (2002). Relationship of the faulting to the creep movement of Iwakura landslide in Saga, Japan. Journal of Japan landslide society. Vol 39-2. Pp. 212-223.
2. Iwao, Y., Yamasaki, T. and **Gunatilake, J.** (2000) Disaster induced by debris flow and flash water of Harihara River in Kagoshima, Japan. Mineralia Slovaca. Vol 32, Pp. 391-395.
3. **Dias, A. A. V. and Gunatilake, A. A. J. K.** (2012). A Comparative Analysis of Landslide Susceptibility by WAA and SINMAP Model. Proceedings of IPL Symposium, UNESCO, Paris, 12th November, Pp. 69- 80.
4. **Dias, A.A.V.**, Rupasinghe, N. and **Gunatilaka, J.**, (2013). Joint Technical Emergency Operation Experiences on Landslide Disaster Mitigation Event 2003, Sri Lanka. Proceedings of the World Landslides Forum, Rome. In Landslide Science and Practice, Pp. 785-789.
5. **Dias, A.V. and Gunathilake, A.A.J.K.**, 2014. Evaluation of Sensitivity of the WAA and SINMAP Models (Static) for landslide Susceptibility risk Mapping in Sri Lanka. Proceedings of World Landslide Forum 3, Beijing, 2nd- 6th June. In Landslide Science for a Safer Geo-environment (pp. 167-173). Springer International Publishing.
6. Palamakumbure, L., **Gunatilake, A. A. J. K.**, Kodituwakku, K. P. and Bandara, K. N. (2016). Landslide analysis – A case study from Nawalapitiya. Proceedings of the 32nd Technical Sessions on “rocks, mineral, and prosperity”, Colombo, Sri Lanka, Geological Society of Sri Lanka. 26th February, Pp. 20.
7. **Dias, A.A.V. and Gunathilake, A.A.J.K.**, (2014). Evaluation of Sensitivity of the WAA and SINMAP Models (Static) for landslide Susceptibility risk Mapping in Sri Lanka. Proceedings of World Landslide Forum 3, Beijing, 2nd- 6th June. In Landslide Science for a Safer Geo-environment (pp. 167-173). Springer International Publishing.
8. **Dias, A. A. Virajh**, Herath, H. M. J. M. K. and Kulathilake, L. K. N. S.; Landform Geometry for Restoration of Mountain Roads and Landslide Hazard Resilience; Progress in Landslide Research and Technology, Volume 1 Issue 1, 2022; The Open Access book series of the International Consortium on Landslides (ICL); ISBN 978-3-031-16898-7 (eBook).

Note: Please fill and submit this form by 10 April 2023 to **KLC2020 secretariat** <klc2020@iclhq.org>