

Progress Report of WCoE 2018

1. Short Title of WCoE : Development of Community-based and Most Adaptive Technology for Landslide Risk Reduction

2. Name of Institution : Faculty of Engineering, Universitas Gadjah Mada (UGM)

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(4) Progress report of activities up to 31 December 2018 (up to 30 lines)

A. Research development and delivery to the community and government policy, which includes various activities as below:

a. Investigation, hazard and risk mapping, and implementation socio-technical approach for landslide EWS at 98 districts, 30 provinces in Indonesia until December 2018. And further implementation of Landslide EWS at Papua Island, Sulawesi Island, Kalimantan Island in Indonesia and in Timor Leste.

b. Published ISO 22327:2018 Guideline for the implementation of community-based Landslide EWS during ISO TC-292 Meeting in Sydney, Australia on March 2018; based on the result of the technical meeting in Edinburgh UK 2016 and Jeju Island Korea 2017. <https://www.iso.org/standard/50064.html>

c. Establishment of National Master Plan for Landslide Mitigation in Indonesia and National Standard for Landslide EWS conducted in partnership with National Agency

for Disaster Management (BNPB). Included in the National Development Plan 2014-2019.

- d. Field investigation and local/ national government empowerment for landslide and debris flood mitigation at several provinces in Indonesia, on January- December, 2018.
- e. Field investigation and community empowerment for landslide mitigation in Java, Sumatera and Sulawesi, in collaboration with AUN/ Seed Net at the Field of Geological Engineering and Natural Disaster, as a part of Landslide School Network Program.
- f. Geotechnical and Geological Investigation for Landslide Mitigation in Sumatera, Sulawesi, and Java Island for landslide risk reduction program.
- g. Implementing Strengthening Indonesian Resilience: Reducing Risk from Disasters (StIRRRD) in cooperation with GNS Science New Zealand, with the support from the Ministry of Foreign Affair and Trade (MFAT) New Zealand. <https://stirrrd.org/>

B. Research Development and Implementation to the industry (i.e. “PERTAMINA Geothermal” the national oil, gas and geothermal company, MEDCO Energy and Freeport Indonesia) for implementing the Landslide Early Warning System in Geothermal Fields, hydro-power plant and mining area across Indonesian Region, such as in Java, Sumatera, Sulawesi, Kalimantan and Papua. This is an extended effort in the implementation of Landslide Early Warning System which was mainly applied for mining companies, including: PT. INCO Sorowako, PT. Arutmin and Myanmar (United Mercury Group - UMG), as well as preliminary consultation on slope stability at Karst mining site with PT. Holchim Indonesia.

C. Capacity Development Program (Research-based):

- i. Delivering the National Workshop and Field Study on Landslide Risk Reduction and Response, at Central Sulawesi, West Nusa Tenggara, West Sumatera and Bengkulu, on January-December 2018 under StIRRRD Program <https://stirrrd.org/>
- ii. Regular Workshop on Landslide and Geohazard Mitigation to support the resiliency of Geothermal Industries, sponsored by PERTAMINA (Indonesian Oil and Gas Company) and MEDCO Energy International.
- iii. Disaster Risk Reduction Workshop and Fieldtrip with respect to the Local Government Capacity Building Program, conducted in Padang-West Sumatera, Palu-Central Sulawesi, Mataram-Nusa Tenggara Barat and Bengkulu (in collaboration with GNS Science New Zealand, NZ-Aid and National Agency for Disaster Management).
- iv. Collaborative research on landslide mitigation and risk management has been conducted with the universities in South-East Asia, funded by ASEAN University Network/ South East Asian Engineering Education and JICA.

- v. Joint supervision for master and doctoral students research, partnership between Faculty of Engineering UGM - Kyoto University, Japan and also with San Diego State University, USA (which is integrated to the collaborative research) in disaster mitigation of ASEAN region (2004- now).
- vi. Public Education and Community Empowerment in Landslide Prone Area in Java – Sumatera – Sulawesi – Kalimantan - Papua, conducted through Student Community Service for Landslide Mitigation in Indonesia (since 2009-now)
- vii. International summer program (student field visits) in landslide, debris flood, laharcic and volcanic disaster area in Indonesia with the participant from UGM, Australian Universities, British Universities, Japan Universities and Network of Humanitarian Action (NoHA).
- viii. Providing training modules, documentary film, pamphlet (poster, calendar, and leaflet) for supporting the public education in landslides mitigation and preparedness.

(5) Plan of future activities (up to 30 lines)

- a. Maintenance and enhancement of the existing EWS system (socio-technical system) by enhancing the online and telemetry system and by up-scaling the system to the national and regional levels, will be conducted as a partnership program with Pacific Disaster Center, the University of Hawaii and the US Pacific Commander.
- b. Development of Smart Grid as Crowd Sourcing Technology for Community and Cyber-based Landslide Early Warning System in all landslide prone provinces in Indonesia.
- c. Continue to regularly carry out the Student Community Service for Disaster Mitigation, conducted every summer time, with the extended participant from University of Hawaii and may also from UNESCO Youth for Ambassador.
- d. Supporting the local government of West Sumatera, Central Sulawesi, Nusa Tenggara Barat and Bengkulu Province for the Enhancement of Disaster Risk Reduction System, such as through the Collaboration with New Zealand Ministry of Foreign Affairs (MFAT) and also GNS Science New Zealand. <https://stirrrd.org/>
- e. Joint supervision for master and doctoral student research (which is integrated to the collaborative research) in Landslide disaster mitigation, supported by ASEAN University Network/ South East Asian Engineering Education and JICA as well as with Department of Geological Sciences, San Diego State University, USA.

(6) Publication (in Landslides, proceedings, meeting reports, or WEB)

- 1. ISO22327: Guideline for the implementation of community based landslide early warning system. <https://www.iso.org/standard/50064.html>
- 2. Fathani T.F., Karnawati D., 2018. A landslide monitoring and early warning system. *Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools*, Springer: 297 – 308.

3. Karnawati D., Fathani T.F., 2018. A socio-technical approach for landslide mitigation and risk reduction. *Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools*, Springer: 621 – 630.
4. Karnawati D., Fathani T.F., Wilopo W., Andayani B., 2018. Community hazard maps for landslide risk reduction. *Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools*, Springer: 599 – 606.
5. Fathani T.F., Karnawati D., Wilopo W., 2017. Promoting a global standard for community-based landslide EWS. *Advancing Culture of Living with Landslides*, Springer, Vol. 1: 355 – 361.
6. Fathani T.F., Legono D., Alfath M.A., 2017. Sensitivity analysis of depth-integrated numerical models for estimating landslide movement. *Journal of Disaster Research*, June 2017, Vol. 12(3): 607 – 616.
7. Fathani, T.F., Karnawati, D., and Wilopo, W. (2016) An integrated methodology to develop a standard for landslide early warning systems. *Natural Hazards and Earth System Sciences* 16(9):2123-2135.
8. Fathani TF., Wilopo W., Karnawati D. (2015) Developing a National Standard for Landslide Early Warning System, the 13rd International Workshop on Geo-disaster Reduction, August 2015.
9. Karnawati D., Fathani, TF., Wilopo W.: “The Development of National Master Plan for Landslide Mitigation in Indonesia”, the 5th International Workshop on Multi-modal Sediment Disaster, Tainan, Taiwan, October 2014.
10. Fathani TF., Karnawati D., Wilopo W.: “The Most Adaptive and Sustained Landslide Monitoring and Early Warning System”, Proceeding of 3rd World Landslide Forum, Beijing, June 2014.
11. Fathani, T.F., Karnawati, D., and Wilopo, W., 2014. An Adaptive and Sustained Landslide Monitoring and Early Warning System. *Landslide Science for a Safer Geoenvironment*. p. 563-567.
12. Karnawati D., Ma’arif S., Fathani TF., Wilopo W.: “Development of Socio-technical Approach for Landslide Mitigation and Risk Reduction Program in Indonesia”. *ASEAN Engineering Journal Part C, Vol. 2 Number 1, ISSN 2286-8150*. June 2013, p. 22 – 47 C.
13. Karnawati D., Wilopo W., Setianto A., Suharman and Fathani TF.: “Student Community Service Program for Landslide Disaster Risk Reduction in Indonesia”. *Landslide Science and Practice, Volume 7: Social and Economic Impact and Policies*. p. 317 – 323. Editors : Claudio Margottini • Paolo Canuti • Kyoji Sassa.
14. Fathani TF and Karnawati D.: “Progress on the Development of Real-time Monitoring and Early Warning of Landslide”. Proceeding of IPL Symposium, Kyoto, November 2013.
15. WCoE of Landslide Risk Reduction of UGM: “National Master Plan for Landslide Mitigation in Indonesia”, Eds. Fathani TF, Wilopo W. and Karnawati D. National Agency for Disaster Management of Indonesia, Dec 2013.