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IPL Project Annual Report 2018

January 2018 to 31 December 2018

1   Project Title: Development of Community-based Landslide Early Warning System in Indonesia (IPL 158)

2   Main Project Fields: Monitoring and Early Warning and conducted in conjunction with IPL Project no IPL-140, IPL-159 and IPL-165.

3   Name of Project leader:

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Core members of the Project: Names/Affiliations: (4 individuals maximum)

   a.   Prof. Dwikorita Karnawati: Head of the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), Indonesia (dwiko@bmkg.go.id)

   b.   Dr. Wahyu Wilopo: GAMA-InaTEK - Geological Engineering Department, Faculty of Engineering, Universitas Gadjah Mada, Indonesia (wilopo_w@ugm.ac.id)

   c.   Dr. Hendy Setiawan: GAMA-InaTEK - Geological Engineering Department, Faculty of Engineering, Universitas Gadjah Mada, Indonesia (hendy.setiawan@ugm.ac.id)

   d.   Mr. B. Wisnu Widjaya: National Disaster Management Agency (BNPB), Indonesia

4   Objectives: (5 lines maximum)

   -   Community empowerment with respect to community-based disaster risk reduction in landslide vulnerable areas, by integrating technical and social system.

   -   Improvement of awareness, preparedness, and resilience of the community in facing disasters in order to create a resilient village, which is at the root of the nation's resilience.

5   Study Area: (2 lines maximum): at 98 districts located in 30 provinces of Indonesia.

6   Project Duration (1 line maximum) : 2009 - 2019

7   Report

1)   Progress in the project: (30 lines maximum)

The community-based landslide monitoring and early warning system (EWS) has been developed in

Indonesia since 2007. Since then, this research project is supported by ICL. This activity is monitored and evaluated annually, in order to provide a solution for the problem faced during its implementation. The coordination between the government, university, private company and the community plays an important role for the effectiveness and sustainability of this program. A strategic approach for landslide disaster risk reduction is developed through the promotion of monitoring and information flow and command system.

Landslide Early Warning System (LEWS) were developed involving a simple and low cost equipment up to high technology by using a telemetry system for data transfer. The monitoring devices comprise the sensor to measure rainfall intensity, surface deformation, slip surface deformation and pore water fluctuation in the sliding mass. These devices provide an online monitoring and could be accessed in a webserver. This system can be adjusted depending on the site conditions.

Until December 2018, the landslide EWS has been implemented in 98 districts at 30 provinces in Indonesia, with the financial support from National Disaster Management Agency (BNPB) and private sectors. The system also has been implemented in Myanmar. A landslide evacuation drill was carried out as an effort to establish a ready community in facing disasters. The simulation was a training for the Disaster Preparedness Team and was carried out following the Standard Operating Procedure and evacuation map. On March 2018, LEWS has been promoted as an international standard ISO 22327: Guideline for the implementation of community-based Landslide EWS:

https://www.iso.org/standard/50064.html

2) Planned future activities or Statement of completion of the Project (15 lines maximum)

This landslide monitoring and early warning devices will be further developed, by implementing them in several pilot site including in Papua and Kalimantan Islands in Indonesia and in Banglades and Timor Leste, and evaluate their technical performance as well as the impact to the community. Results of the evaluations will be used to facilitate the enhancement of the system performance. In 2018, National Disaster Management Agency (BNPB) and District Disaster Management Agency (BPBD) will support the implementation of landslide EWS at another 30 prone districts in Indonesia.

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)

Various potential beneficiaries of the project may be achieved including strengthened international partnership and good cooperation among related institutions. Besides the integration of this monitoring and warning system is very important. This because of several institutions might have their own system, but not yet integrated with the other monitoring system. A national framework needs to be promoted to coodinate all of landslide monitoring systems in Indonesia. By this integration, the landslide monitoring and early warning system at national-provincial-district level

could be enhanced and could work properly.

4) Results: (15 line maximum, e.g. publications)

Research papers published in journals or presented at conferences

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 –

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., 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.*

7. 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.

8. Karnawati D., Fathani, TF., Wilopo W. (2014) The Development of National Master Plan for Landslide Mitigation in Indonesia, the 5th International Workshop on Multi-modal Sediment Disaster, Tainan, Taiwan, October 2014.

9. 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

10. Karnawati D., Ma'arif S., Fathani TF., Wilopo W. (2013) 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.

11. Fathani TF and Karnawati D. (2013) Progress on the Development of Real-time Monitoring and Early Warning of Landslide. *Proceeding of IPL Symposium*, Kyoto, November 2013.

12. Fathani TF, Karnawati D (2012) Lessons Learned in the Development of Landslide Early Warning System in Indonesia. *Proceeding of IPL Symposium 2012*, UNESCO HQ, Paris. pp. 30-34.

13. Karnawati D, Frost EG, Fathani TF and Subroto (2012) Smart Grid for Landslide Monitoring and Early Warning System in Indonesia. *Proceedings of the 10th Anniversary of ICL – January 2012*, Kyoto. pp. 72-77.