Date of Submission	29 March 2019

IPL Project Annual Report 2018

January 2018 to 31 December 2018

1. Project Title: Development of community-based landslide hazard mapping for landslide risk reduction at the village scale in Java, Indonesia (IPL-165)

2. Main Project Fields: Mitigation (conducted in conjuction with IPL Project No IPL-140, IPL-158 and IPL-159).

3. Name of Project leader: Prof. Dwikorita Karnawati
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   Core members of the Project: Names/Affiliations: (4 individuals maximum):
   a. Prof. Teuku Faisal Fathani, Faculty of Engineering, UGM. Center for Disaster Mitigation and Technological Innovation (GAMA-InaTEK) Universitas Gadjah Mada, Indonesia
   b. Dr. Wahyu Wilopo, Faculty of Engineering, UGM. Center for Disaster Mitigation and Technological Innovation (GAMA-InaTEK) Universitas Gadjah Mada, Indonesia
   c. Dr. Hendy Setiawan, Faculty of Engineering UGM. Center for Disaster Mitigation and Technological Innovation (GAMA-InaTEK) Universitas Gadjah Mada, Indonesia
   d. Mr. Suharman: Dept. of Sociology, Faculty of Social and Politics, UGM

4. Objectives: (5 lines maximum)
   To provide simple, practical and communicative landslide hazard map, which is developed through community participation.

5. Study Area: (2 lines maximum):
   at 30 districts at Java, Sumatera, Sulawesi, Kalimantan and Bali Islands

6. Project Duration (1 line maximum): 2010 – 2019.

7. Report

1) Progress in the project: (30 lines maximum)
A community-based landslide hazard mapping has been implemented in several pilot sites in Karanganyar District, Banjarnegara District, Trenggalek District and at another 30 districts at Java,

Sumatera, Sulawesi, Kalimantan and Bali Island together with the community empowerment program through public education. The proposing of this map is very important to support the landuse planning as well as landslide mitigation and early warning. In order to reduce the risk of landslide at the village, a community landslide hazard map needs to be developed. The landslide hazard map provided by the National Agency for Disaster Management (BNPB) with the regional scale for most vulnerable region in Indonesia is not applicable for the mitigation program at the village level. Therefore, it is very challenging to provide a community landslide hazard map which is quite simple to be prepared, and also user friendly for the mitigation actions at the village.

Community participation for landslide hazard mapping was carried out in order to identify the potential landslide zone, therefore the risk of landsilde can be reduced. The mapping was conducted by community task force for the period of two months under the guidance of student community services program from Gadjah Mada University, Indonesia. The existing documentation map, illustrating the locations of houses, road and the landuse within the region of village, was used as the base map of this mapping. This community hazard map, landslide mitigation efforts, evacuation procedures and other related information for public awareness can be published on an information board placed at several locations at landslide venerable area. This community-based landslide hazard mapping for landslide risk reduction has been adopted into Indonesian Standard SNI-8235-2017: Landslide Early Warning System and ISO 22327-2018: Guideline for the implementation of community-based Landslide Early Warning System.

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

A community landslide hazard mapping will be conducted again in several pilot sites in West Java Province, East Java Province, Central Java Province, Sulawesi and Bali by integrating this mapping activity into a student community service program for landslide mitigation for the period of 2 months starting from early July to end of August 2018. The method of mapping that will be conducted is the same as those conducted previously in Karanganyar, Banjarnegara, Trenggalek Districts.

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

   a) The local community and the local authority in the landslide prone area will obtain the benefit by having capacity and capability to conduct a simple landslide hazard mapping, which will be very important for supporting the landuse planning as well as the landslide mitigation and early warning in their living area.

   b) The local as well as the national agency for disaster management will take the benefit by having scientific support for landslide hazard mapping and disaster risk reduction at the village level.

c) The students involved in the community service will obtain an opportunity to improve their capacity to apply their knowledge about landslide hazard mapping into the practical action to solve the real landslide problem in the field.

d) The research and teaching staff involved in this project will have an opportunity to test the performance of smart grid for landslide hazard mapping.

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

1. ISO22327: Guideline for the implementation of community based landslide early warning system. https://www.iso.org/standard/50064.html

2. SNI-8235-2017: Landslide Early Warning System. Indonesian Standardization Agency

3. 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.

4. 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.

5. Fathani T.F., Karnawati D., 2018. A landslide monitoring and early warning system. *Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools,* Springer: 297 – 308.

6. 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.

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. (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.

10. 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.

11. 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.

12. Karnawati D., Wilopo W., Setianto A., Suharman and Fathani TF. (2013) 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. Eds: Claudio Margottini • Paolo Canuti • Kyoji Sassa.

13. Karnawati D, Fathani TF, Wilopo W, Andayani B (2013) Community Hazard Map for Landslide Risk Reduction. *ICL Landslide Teaching Tools*. International Consortium on Landslides. Eds: K. Sassa, B.

He, M. McSaveney, O. Nagai. p. 259-266.

14. WCoE of Landslide Risk Reduction of UGM (2013) National Master Plan for Landslide Mitigation in Indonesia, Eds. Fathani TF, Wilopo W. and Karnawati D. *National Agency for Disaster Management of Indonesia*, December 2013.

15. 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.

16. Karnawati D, Fathani TF, Wilopo W, Setianto A, Andayani B (2011) Promoting the hybrid socio-technical approach for effective disaster risk reduction in developing countries. *Disaster Management and Human Health Risk II*, eds. Brebbia CA, Kassab AJ, Divo EA. WIT Press., Southampton, UK. pp. 175-182.

17. Karnawati, D., W. Wilopo, T. Fathani and B. Andayani. (2011) Promoting the University Social Responsibility in the Capacity Development Program for Landslide Risk Reduction in Indonesia. *American Geophysical Union Fall Meeting*, San Francisco, California, December 5-8, 2011.

18. Karnawati, D., Fathani, TF., Sudarno, I., Andayani, B., Legono, D., Burton PW. (2011) Landslide Hazard and Community-based Risk Reduction Effort in Karanganyar and the Surrounding Area, Central Java, Indonesia, *Journal of Mountain Science*, Vol.8 No.2, 2011.

19. Verrier, M.F. D. Karnawati, E.G. Frost and D. L. Kimbrough (2011) Development of Scientific Procedure for Community-based Hazard Mapping and Risk Mitigation. *Poster presented in American Geophysical Union Fall Meeting*, San Francisco, California, December 5-8, 2011.

20. Development of Community Landslide Hazard Map for Landslide Risk Reduction, *Proceeding of 11th Int. Assoc. of Engineering Geologist Congress*, Auckland, September 5-10, 2010. Auckland, New Zealand.