



**Asian Program for Regional Capacity Enhancement for  
Landslide Impact Mitigation (RECLAIM) Phase II**

**Final Report on National Training Course  
5 & 8 February 2009**

**Faculty of Geological Engineering  
Universitas Padjadjaran  
Indonesia**

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**Activity Report**  
**National Training Course under the Asian Program for Regional Capacity  
 Enhancement for Landslide Impact Mitigation (RECLAIM II)**  
**Bandung, Indonesia**

**Date** : 5 & 8 February 2009  
**Venue** : Main Conference Hall, LPPM, University of Padjadjaran  
 Jalan Banda No. 40, 2<sup>nd</sup> Floor, Bandung 40115, Indonesia

**Day – 1 (Thursday, 5<sup>th</sup> February 2009)**

<b>Time</b>	<b>Program/Theme</b>	<b>Key Persons</b>
08.00 - 09.00	Registration	
09.00 - 09.30	Opening Remarks Welcome and Opening Speech to the NTC	Chairman of OC Rector of UNPAD
<b>09.30 - 10.00</b>	<b>Tea/Coffee Break</b>	
10.00 – 11.00	Landslide in the Watershed of Forest Region – Policy	Dr. Anang Sudarna (DG of Forestry)
11.00 - 12.00	Landslide Disaster Mitigation – National Policy	Dr. Surono (Geological Agency)
<b>12.00 - 13.30</b>	<b>Lunch Break</b>	
13.30 - 14.15	Landslide Research – Methodology	Prof. Dr Febri Hirnawan (Postgrad Program)
14.15 - 15.00	Landslide Research - Case Study in Bandung Basin	Dr. Emi Sukiyah (Lab. Of Envi. Geology)
<b>15.00 - 15.30</b>	<b>Tea/Coffee Break</b>	
15.30 - 16.00	Landslide Mitigation - Education	Dr. Hendarmawan (Dean of Faculty)
16.00 - 16.30	General Discussion & Conclusions	Dr. Dicky Muslim (Chairman of OC)

**Day – 2 (Sunday, 8<sup>th</sup> February 2009)**

08.30 – 09.00	Preparation for field excursion, gathering in UNPAD Campus	Meeting point: LPPM UNPAD Parking area.
09.00 – 10.00	Departure to Padalarang Landslide Prone Areas near Purbaleunyi Toll Road	
10.00 – 12.30	Field observation and measurement several landslide points	Ir. Zufaldi Zakaria, MSi (Lab. Of Engi. Geology)
13.00 – 14.00	<b>Lunch break</b>	
14.00 – 16.00	Field presentation and discussions	Dr. Dicky Muslim, Ir. Irvan Sophian (Lab. Of Engi. Geology)

16.00 - 17.00	Back to UNPAD Campus	
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**Participants for Seminar/Training Course (45 people)**

- Geological Agency of the Ministry of Energy & Mineral Resources (BGL)
- Watershed Management Agency of the Ministry of Forestry (BPDAS)
- Center for Environmental Geology (PLG)
- Center for Volcanology & Geological Disaster Mitigation (PVMBG)
- Center for Geological Training & Education (PUSDIKLAT-Geologi)
- Indonesian Institute of Sciences (LIPI)
- University of Manado, North Sulawesi (UNIMA)
- Office of Mining and Energy, Morowali District, Central Sulawesi
- Office of Mining & Water Resources, Kuningan District, West Java
- Office of Mining & Energy, Padang District, West Sumatera
- Faculty of Geological Engineering, University of Padjadjaran (FTG)
- Postgraduate Program of Geosciences, University of Padjadjaran (PASCA)
- Research Institute, University of Padjadjaran (LP-UNPAD)
- Community Service Institute, University of Padjadjaran (LPM-UNPAD)
- Students from Timor Leste

**Participants for Field trip (30 people)**

- Indonesian Institute of Sciences (LIPI)
  - University of Manado, North Sulawesi (UNIMA)
  - Office of Mining and Energy, Morowali District, Central Sulawesi
  - Office of Mining & Water Resources, Kuningan District, West Java
  - Office of Mining & Energy, Padang District, West Sumatera
  - Faculty of Geological Engineering, University of Padjadjaran (FTG)
  - Postgraduate Program of Geosciences, University of Padjadjaran (PASCA)
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## ACTIVITY REPORT

### Day – 1 (Thursday, 5<sup>th</sup> Feb 2009)

**Venue** : Main Conference Hall, LPM, University of Padjadjaran  
Jalan Banda No. 40, 2<sup>nd</sup> Floor, Bandung 40115, Indonesia

#### **Landslide in the Watershed of Forest Region – Policy**

**Speaker : Dr. Anang Sudarna**  
**(DG of Forestry, West Java)**

#### **Summary :**

In the first agenda of this activity, the presentation is titled about “Landslide in the Watershed of Forest Region”. As we all know that one of forest functions is to prevent the negative effect that caused by landslide. But data showed a brief explanation that not all forest can prevent landslide. If the land has a thin layer of soil, the forest cannot prevent the landslide, it even can speed up the landslide because the land cannot hold the vegetations on it. The solution for a thin layer land is to plant the short vegetations like shrubs or bush.

Some tables showed us the vulnerable points in some regions in West Java. There are about 500 vulnerable points of landslide in West Java. One of the table data showed that 431.069,35 Ha in West Java Province have a potential for causing the environment disaster and 95.575,18 Ha are in the forest regions. It is such an ironic condition.

Bandung region has about 50 vulnerable points of landslide. Since the beginning of the twentieth century, Bandung Basin has already been the dangerous area. Because, the geological history shows us that until 32 A.D. there was 7.200 Ha of land filled with water in Bandung Basin.

Eighty percent of geothermal potential energy of Indonesia is found in West Java, which many of them are in the conservation areas. In the forest region, among 14 commodities of agriculture plants developed in West Java, around eighty percent can cause landslide.

Programs of the Department of Forestry related to landslide mitigation activities are: 1) Conduct *revegetation* efforts on the landslide areas, 2) Make a good socialization to the people about landslide in and around the forest region, 3) Make a good preventive actions like putting the warning boards in the critical landslide areas, 4) Introduce a technical programs for community to anticipate landslide.

#### **Questions & Answers :**

1. Prof. Dr. Febri Hirnawan  
Based on your experiences working in the government department, looking at that stand regulations,
    - a. How is the relation with the area spatial design?
    - b. Are the conservation areas nowadays having a good planning design?
    - c. Which area those have to be developed?
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Answer :

We're still working on this case. That's why we still need suggestions based on researches. And I really appreciate this kind of forum.

2. Dr. Hendarmawan :

On the term of social programs for community,

- a. Is there any operational scale of the maps for landslide hazard zones, to make easier for the community to understand?
- b. Are those data and maps already socialized/distributed?

Answer :

Until now, we still keep trying to make those programs be socialized. For example, we willingly gave 100.000 of plant seeds to college student in their internships with society so that they can distribute the plant seeds.

3. Mr. Oki Oktariadi (PLG) :

Have you (the Department of Forestry) made some kind of landslide risk map?

Answer :

About the landslide risk map, we're still discussing it in the province forum. This kind of map should be distributed and published, which is the authority of each district (Kabupaten).

4. Mr. Sondi (Secretary of LPPM UNPAD) :

Feeding the cows with *Kaliandra* dry leafs can increase the quality and quantity of milk about double amount,

Can we make cooperation between LPPM UNPAD and Department of Forestry regarding production of *Kaliandra* dry leafs?

Answer :

Yes, I absolutely agree, as long it can give a positive effect and not make damage on forest area. We'll talk about it later.

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 **Landslide in West Java Region – Mitigation Policy**

**Speaker : Dr. Surono (Head of PVMBG, on behalf of DG of Geological Agency)**

**Summary :**

In this second session, the author presented the explanation about national disaster mitigation policy. Indonesia is a supermarket of disasters. Many disasters can happen in this country. Why? Because, as we know that Indonesia is a complex area, it has many tectonic plates which are colliding each other. Therefore the complexity within the crust is causing the changes on the earth surface. Those changes cause disasters, such as earthquake, volcanic activities, and also landslide. For that matter, all the disasters which happen in present here are already been a part of geologic cycle.

One of the duties of Geological Agency is doing action before the disaster (mitigation) and also when the disaster happens (emergency response). So, the study and research about geological disaster have to be elaborated in order to give recommendation needed for mitigation. Mitigation is needed and very important, because at least it can reduce the negative impact caused by the disaster. There are some chart, diagrams, maps and photos which showed the comparisons of landslide in many places in Indonesia.

**Questions & Answers :**

1. Prof. Dr. Febri Hirnawan

There are red and yellow zones in the landslide vulnerability map. Is there any possibility to evacuate the community so that the mitigation in that area would run well?

Answer :

Based on the Act No. 26, 2007, about Landuse Planning Based on Disaster Mitigation, actually, our government just has to provide a feasible area for community to live so that mitigation can run well. But, the problem is that it's hard to find an area suitable for this purpose.

2. Mr. Rifa'i (Department of Forestry)

I found a legal fact in West Java that there are so many projects of institutions in our protected forest, which are not belong to Department of Forestry. How will you solve this problem?

Answer :

Honestly, I couldn't answer your question, because the authority is all in the hand of chief of commissioner, which is the Vice Governor of West Java. We can only give some kind of suggestions and advices based on the data we have.

3. Mr. Muslimin (Office of Mining & Energy, Central Sulawesi)

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- a. You've showed us some diagrams that explained about the number of disasters happened in Sulawesi Island which are so many. But, according to me, if you assort the number of disaster in each province, it won't be that much. Why don't you do that?
- b. The early warning system for volcanic activity in Mount Colo in Central Sulawesi is damaged. What do you think about this? What will you do about this?
- c. How about the geopolitical problems consider to a mitigation effort?

Answer :

- a. I deliberately show that diagram with purpose to make some kind of comparison one area to another. But, thank you for your advice, I'll add specific diagram to show the specific area.
- b. It's sound classically, if we talk about the damage instrument. Because, I know that many tricks happened in the field by our employee. I know that the instrument doesn't have damage at all. But, we'll check it out. Thank you for your information.
- c. Because of this topic (mitigation) has many variables/factors, surely we have to play geopolitical in it. We have to pay attention for every aspect include in mitigation in order to run the process smoothly, including politics.

#### **Landslide Research – Methodology**

**Speaker : Prof. Dr. Febri Hirnawan (Postgrad Program)**

**Summary :**

The third session raised topic of landslide research methodology, especially in West Java. The western part of Java Island has many landslide prone areas, in which many complete triggering factors occur. Landslide prone areas in West Java are generally characterized by: 1) thick expansive residual soils, 2) well stratified sedimentary rocks, 3) high seismic coefficient due to neotectonics, 4) land subsidence, 5) high annual rainfall, 6) deforestation, and 7) inconsistency of mining practices.

There's also a brief explanation about "Understanding Slope Instability due to Triggering Factors for Landslide Initiation" where Indonesia is an active tectonic region. Several factors determining slope instability manifested by landslides are commonly found in the field. They included internal and external factors. Internal factors are inside the slope body, such as geological condition, stratigraphy, geological structures and morphology. External factors are from the outside of slope body, called as triggering factors, such as climate, vegetation, and load. Those factors can determine stable and unstable slope.

Based on a comprehensive geotechnical investigation, the author had made a method to plant vegetations on slope areas. He made some comparison of vegetation effect on slope stability. He found the best way to prevent landslide on the slope. Because, actually in dense vegetation, landslide still happens because of ineffective vegetation. He explained that we have to plant big vegetations on base of the slope as a storm, then small vegetations on the slope for decreasing the load, and medium vegetations on the top.

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These best slope instability phenomena are very appropriate as instable systems for the study of slope instability, from which instable models can be understood very well to be stabilized through simulation. The results of the studies are very suitable for the support of the programs of landslide hazard disaster reduction in mitigation strategy.

**Questions & Answer:**

1. Dr. Hendarmawan

You've explained about water content, Early Warning System, geometric well, and physical & mechanical properties of soil. How to build an Early Warning system geotechnically?

Answer :

We can make a relation between Cohesion (c) and water content. With those variables of factors that I explained before, we make an instrument which connected with a transmitter. The changes of water content either on the top or in the bottom make some fluctuation of ground water level, which is record in that instrument then deliver the signal to an Early Warning System. Accordingly, we can know when the land being critical, and then we do the mitigation easier.

2. Mr. Nana Sulaksana

Science varies in many subjects of disciplines, and each of them has their own paradigm. How to synchronize and unite them so that there will be a productive mitigation effort as a result? Do we need a study center of mitigation?

Answer :

Yes, I actually agree. As we all know that research is a combination between many varies of studies. Negatively, there is an egocentric happens in each discipline of study. But, I surely believe that every study, if they have same methodology, can bring same affordable and same purpose. Science is a universal. We need do research in multidiscipline of studies.

3. Dr. Emi Sukiyah

There was an explanation about methods in planting on slope area,

- a. Have you tested it? How many percent is the success?
- b. In what kind of slope have you tested it?

Answer :

Yes, I have tested it in Majalengka district of West Java. Because Majalengka have many slopes. And I have my own Legal Paten for the method which I fought for 8 years. The obstacle that I face during this research is about financial. We need much fund but in fact we lack of fund.

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**🚧 Landslide Mitigation – Education**

**Speaker : Dr. Hendarmawan (Dean of Faculty of Geological Engineering, UNPAD)**

**Summary :**

Within the fourth session, the presenter delivered some information about the emphasis of landslide issues in education in the Faculty of Geological Engineering, University of Padjadjaran. At first, the Department of Geology was established in 1959 under the Faculty of Mathematics and Natural Sciences. Then, since 2007 it had been reorganized to become Faculty of Geological Engineering. Subjects such as geosciences, applied geology, and environment studies become interest of education in the institution related with landslide hazard monitoring and mitigation.

Faculty of Geology has made cooperation in geological research, exploration, development, courses and training with government institutions, associations, companies, foreign universities and academic institutions. The cooperation with companies is through joint research and mostly through internship program for geological students and lecturers.

Some Faculty members often do the research, either basic (academic) research or applied research. Those studies and researches are on the exploration for and management of the earth's natural resources across a wide spectrum of the geological sciences and to promote the efficient and environmentally sound use of such resources. Landslide disaster mitigation had been many years as priority and gained wide interest from many institutions, even from abroad.

**Questions & Answers :**

1. Mr. Muslimin (Office of Mining & Energy, Central Sulawesi)

- a. I come from outside of Java. What if UNPAD hold a cooperation with our office outside of Java say for Geologic mapping?
- b. What if UNPAD make an "Postgrad program by Research" like UGM or ITB?

Answer :

- a. Basically, I really appreciate your advice. But here the problem is about financial itself. Our students have to spend their own money to do their mapping project in their study. So, if there is a cooperation between the local government with us, I will be so much appreciated.
- b. Yes, we're still in working to reach that goal. We'll make some kind of postgraduate degree "UNPAD by Research" in the near future.

2. Mr. Asep (PUSDIKLAT-Geology)

- a. What are education and training programs developed by FTG-UNPAD?
- b. How do you think that our office in PUSDIKLAT Geology can cooperate with FTG and ADPC in the future?

Answer :

- a. Many cases. Not only landslide, but also geohydrology, geotechnical engineering, geohazard, etc.
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- b. I think it's possible to implement that cooperation in the future. We need a personal approach to make a conduct to do some cooperation. So that we can easier to have an active cooperation in the future.

 **Landslide Research – Case Study of Bandung Basin**

**Speaker : Dr. Emi Sukiyah (Lab. of Environmental Geology)**

**Summary :**

For the last agenda of this activity, Dr. Emi presented some explanations about “Landslide Mitigation in Bandung Basin”. She explained that Bandung basin is a plateau. It is rounded by chain of hilly and mountain. Physiographically, this area included to Bandung zone and Quaternary volcanic.

She gathered information about the strike-slip fault in Ciparay area. Also the variables of structure and landform and made an analysis with statistic test that became a conclusions that there is an active fault in Ciparay area.

The active fault of Ciparay is indicated by: rivers pattern controlled by fractures pattern on the volcanic rocks, value of bifurcation ratio (Rb) among 2 to 2.5 ranges, and displacement of infrastructure facilities broken by fault activities.

She showed us some photos which show many indications of active fault and landslides in West Java and Bandung Basin region. They are Cihanjuang, road of Bandung – Ciwidey, road of Cicalengka – Cinulang, Sukapura, Cihawuk, Citarum valley, etc. Those data based on her PhD dissertation study. The conclusion is there are many active faults in Bandung basin. The occurrence of active fault is usually related to landslides prone areas.

**Questions & Answers :**

1. Prof. Febry Hirnawan

In which area whose potential of landslide is the biggest?

Answers :

In volcanic area, because there are so many weathering processes happen there. Landslide is caused by the instability of the slope in contact area between the fresh and the weathered layer. That's why we need to create risk map of landslide.

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**Some Photographs in the Training Room :**



Opening Ceremony (DG of Forestry, left; Rector of UNPAD, center)

--PICTURE #2--

Participants in the Opening Ceremony

--PICTURE 3--

Q & A Sessions after presentation from DG of Geological Agency

--PICTURE 4--

Participants after Lunch break

**Day – 2 (Sunday, 8<sup>th</sup> Feb 2009)**

**Field trip to Padalarang Landslide areas near Purbaleunyi Toll Road**

**Run down of events**

1. All participants departed from LPPM UNPAD building to Padalarang landslide prone areas at 09.30.
  2. Arrived at 1<sup>st</sup> station around 10.45, discussions and field investigations.
  3. Continued with some explanations about risks of landslide in Citatah area by Mr. Zulfiadi.
  4. Under a small rain at 12 o'clock, all participants went to a nearby restaurant and had lunch. Few of them also went to a praying room.
  5. After lunch, started at 13.00, there was a presentation, by Mr. Zulfiadi, which explained more about mechanism of landslide. He also showed some videos of mechanism of landslide, and caught-on-tape landslides.
  6. At 14.00, Mr. Zulfiadi gave chances for all participants to make questions about his presentation in a debriefing session. Questions were given by :
    - Ms. Cyrke (UNIMA of North Sulawesi Province)
    - Mr. Eko (LIPI)
    - Mr. Muslimin (Central Sulawesi)
    - Mr. Nana Sulaksana (LPPM – UNPAD)
    - Few others
  7. At 15.00, Dr. Dicky gave his presentation about landslide research abroad, especially some published papers from NGI related with Landslide and Rockslide mitigation activities in Europe and Asia. Then discussion session with question and answer from the participants.
  8. All participants were ready to go back to LPPM building and departed from the restaurant at around 16.00.
  9. At around 17.00, all participants arrived at LPPM UNPAD building and went home.
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**Some photographs in the field trip**



Arrived in Padalarang area and briefing by Mr. Zufaldi

--PICTURE #6—

Discussions and field investigation by Dr. Dicky

--PICTURE #7--

Landslide in Citatah area, near to Purbaleunyi Toll Road as background

--PICTURE #8—

Picture Gathering 1

--PICTURE #9--

Explanation of Landslide mitigation in Padalarang area

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Picture Gathering 2