

Bacolor Church, Pasig-Potrero River (Site B, Stop 5)

- Our Lady of the Rosary Parish Church, Bacolor, Pampanga was built during the Spanish time when Bacolor was the political and economic center of the Province of Pampanga
- More than 8 meters of lahar sediments buried properties in this town, including this church during lahar occurrences in 1991, 1994 and 1995.



Downtown Bacolor now covered in Lahar

Photo by Andro & Tess Camling, July 1997

Figure 6. Site B. Our Lady of the Rosary Parish Church in Bacolor, Pampanga. Located 1 km from GSO and directly along the path of the Pasig-Potrero River System. At least 8 meters of lahar deposits emplaced which buried properties, including this church.

Taal Volcano Profile

LOCATION: BATANGAS PROVINCE, 60 km South of Manila (14°00.1' N - 120°59.6'E)
(Figure 1, blue box)

PHYSICAL CHARACTERISTICS:

Type of Volcano: A complex of cinder and tuff cones formed inside a large caldera

Main Rock Type: Olivine basalt

Area of Volcano Island: 23 sq km

Highest Point of the Volcano Island: 311 m asl - SW rim of the Main Crater

Base Diameter: 5 km (longest dimension)

Volume: 2 km³

Area of Taal Lake: 267 sq km; 2 m asl (lake level); depth: 100 m (N portion) 150-160 m (southern portion)

Cones and Craters: 35 identified cones (26 tuff cones, 5 cinder cones, 4 maars) and 47 craters

Main Crater: 1.9 km in dia.; blue-green in color; 4 m asl; deepest point: 76 m; pH 2.3-2.5; site of 12 historical eruptions from 1749 to 1911 (1749, 1754, 1790, 1808, 1825, 1842, 1873, 1874, 1878, 1903, 1904 and 1911)

Taal Caldera: 25 km across; formed between 140,000 to 5,380 B.P.

Major Adjacent Volcanic Edifices: Mt. Makiling, Mt. Batulao, Mt. Sungay, Mt. Malepunyo, Mt. Macolod

HISTORICAL ERUPTIONS:

No. of Recorded Eruptions: 33 since 1572

Latest Eruption: 03 September 1977 (phreatic eruption)

Destructive Eruptions:

1749 - destroyed the entire Volcano Island and the towns of Taal, old Sala and part of old Tanauan

1754 - destroyed towns of Sala, Lipa, Tanauan and Talisay

1911 - devastated Volcano Island; killed 1334 people; ashes reached Manila

1965 - affected the entire Volcano Island; ashfall covered an area of 60 sq. km; killed 200 people

Historical Eruption Centers:

Main Crater (e.g. 1749, 1754, 1911 eruptions)

Binintiang Malaki (e.g. 1767, 1715 eruptions)

Binintiang Munti (e.g. 1709, 1731 eruptions)

Pira-piraso (1731 eruption)

Off Calauit (1716 eruption)

Mt. Tabaro Eruption Site (1965-1970, 1976-1977 eruptions)

Eruption Types:

Phreatic - steam-driven explosion (e.g. 1878, 1911, 1970)

Phreatomagmatic - steam-driven with magma involved (e.g. 1749, 1965, 1966)

Strombolian - quiet lava emissions (e.g. 1968, 1969)

Plinian - eruption of great violence characterized by voluminous explosive ejections of pumice and ash flows (1754 eruption)

Known Precursors to Historical Eruptions:

- Increase in frequency of quakes with occasional felt events accompanied by rumbling sounds
- Increase in temperature and level of Main Crater Lake
- Development of new thermal areas/reactivation of old ones
- Ground swells or inflation and ground fissuring
- Increase in temperature of ground probe holes at Mt. Tabaro
- Sulfuric odor and acrid fumes
- Fish kills and drying up of vegetation, among others

Phenomena Associated with Eruption:

- Base surges - rapidly moving mixtures of volcanic debris and steam
- Ashfalls and ballistic projectiles
- Lava flows
- Seiches/Tsunamis and flooding
- Fissuring and ground subsidence
- Lakeshore Landslide

MONITORING TECHNIQUES:

Monitoring Methods:

1. Geophysical Methods

Seismic monitoring - telemetered seismic network; seismographs at Buco and Pira-piraso

2. Geodetic Methods - ground deformation

Electronic distance measurement (EDM)

Precise leveling

Tilt measurement (wet and dry)

3. Multiparameter digital telemetry - seismic, tilt, temperature, acoustics, radon, conductivity, water level

4. Geochemical and geothermal methods (pH, silica, chloride)

5. Visual Observations

Monitoring Stations:

- Pira-piraso Observatory - 4.5 km N of Main Crater ($121^{\circ}00.01'E$, $14^{\circ}02.06'N$) (Figure 7)
- Buco Observatory - 9.7 km N of Main Crater ($120^{\circ}59.06'E$, $14^{\circ}05.10'N$) (Figure 7)
- Tagaytay Observatory - 11.3 km NW of Main Crater ($120^{\circ}56.04'E$, $14^{\circ}06.18'N$)



Figure 7. Site C. Location map of the Taal Volcano Monitoring Network. Tour stops are also identified in the map.

EVACUATION SCHEME/HIGH DANGER ZONES

Areas to be evacuated in case of eruption similar (in nature and magnitude) to:

- 1965 activity -** entire Volcano Island with 5,800 inhabitants or 960 families; and 4 lakeshore barangays of Agoncillo and Laurel with a total population of 4,913 persons or about 845 families*
- 1911 activity -** entire Volcano Island; and lakeshore barangays of Talisay, Tanauan, Agoncillo, Balete, San Nicolas and Laurel with a total population of 132,921 or 22,981 families*

* 1991 Census

The Volcano Island is under the jurisdiction of two municipalities: Talisay (northern sector) and San Nicolas (southern sector). The barangays under these municipalities are:

TALISAY – Balantoc, San Isidro, Bignay, Tabla, Look, and Pira-piras

SAN NICOLAS - Alas-as, Saluyan, Pulang Bato, and Calait-Tuoran

Additional areas to be evacuated shall be determined based on the development in eruptive style and location of the monitored parameters.

TAAL VOLCANO ALERT SIGNALS (Revised November 1992):

ALERT LEVEL	CRITERIA	INTERPRETATION
No alert (NORMAL)	Background, quiet	No eruption in foreseeable future.
1 (ABNORMAL)	Low level seismicity, fumarolic, other activity	Magmatic, tectonic or hydrothermal disturbance; no eruption imminent.
2 (ALARMING)	Low to moderate level of seismicity, persistence of local but unfelt earthquakes. Ground deformation measurements above baseline levels. Increased water and/or ground probe hole temperatures, increased bubbling at Crater Lake.	A) Probable magmatic intrusion; could eventually lead to an eruption. B) If trend shows further decline, volcano may soon go to level 1
3 (CRITICAL)	Relatively high unrest manifested by seismic swarms including increasing occurrence of low frequency earthquakes and/or harmonic tremor (some events felt). Sudden or increasing changes in temperature or bubbling activity or radon gas emission or Crater Lake pH. Bulging of the edifice and fissuring may accompany seismicity.	A) If trend is one of increasing unrest, eruption is possible within days to weeks. B) If trend is one of decreasing unrest, volcano may soon go to level 2
4 (ERUPTION IMMINENT)	Intense unrest, continuing seismic swarms, including harmonic tremor and/or "low frequency earthquakes" which are usually felt, profuse steaming along existing and perhaps new vents and fissures.	Hazardous explosive eruption is possible within days.

ALERT LEVEL	CRITERIA	INTERPRETATION
5 (ERUPTION)	Base surges accompanied by eruption columns or lava fountaining or lava flows.	Hazardous eruption in progress. Extreme hazards to communities west of the volcano and ashfalls on downwind sectors.

Volcano Monitoring at Taal

- Surveillance at Taal Volcano began in December 1952. The first volcanological station at Taal Volcano was established in Barrio Alas-as, along the western shore of Volcano Island; initially equipped with a three component, low sensitivity Akashi seismograph; a water tube tiltmeter; thermometers and short-wave radio transmitters
- Alas-as station in Volcano Island was destroyed during the 28 September 1965 eruption; station sand blasted and all monitoring equipment were destroyed
- Taal Volcano's Pira-piraso station was established in 1966; equipped with a 3-component Akashi seismograph and one component Whitmore seismograph and a watertube tiltmeter, which was later replaced by a 3-component Hosaka seismograph
- In 1968, the Akashi seismograph was replaced by a short period Inshimoto seismograph
- In 1970, a 3-component Hosaka seismograph and a Sony tape with Watanabe recorder replaced both the Akashi and Inshimoto seismographs.
- With the support of JICA, PHIVOLCS was able to install new seismic monitoring network at Taal Volcano and vicinity: three seismic stations at the Main Crater, Calauit, and Binintiang Munti and three repeater stations at Napayung, Tagbakin and Daan Kastila

Tour sites at Taal

PHIVOLCS Buco Volcanological Observatory, Talisay, Batangas (Stop ❶)

- Buco Observatory, located at the northern shore of Taal Lake, Buco, Talisay was constructed in 1969-1970 under the supervision of the Department of Public Works; PHIVOLCS was then known as Commission on Volcanology (COMVOL). (Figure 7)
- To this day, local residents still frequently refer to PHIVOLCS as COMVOL
- At present, Buco Observatory houses the bulk of the volcano monitoring equipment for Taal and serves as the central monitoring station for Taal Volcano; also the venue for the permanent volcano exhibit and an information center for visitors
- From the observatory, we can see several prominent features on the Volcano Island. These are a) Binintiang Malaki (meaning big leg) tuff cone (1700's eruptions), b) Mt. Balantoc tuff ring (age unknown, prehistoric), c) the outer wall of Main Crater (1749, 1754, 1911) beyond the 1965 eruption site, and d) Binintiang Munti (small leg) tuff ring (1600-1700's).

PHIVOLCS Pira-Piraso Volcanological Observatory, Volcano Island (Stop ★2)

- Located across the lake on the north shore of Volcano Island
- Pira-Piraso (meaning torn or shredded into small pieces) refers to a group of islets, which is a product of one or several of its eruptions, found on the northeastern corner of the Volcano Island
- The Volcano Island was declared as a Permanent Danger Zone (PDZ) by COMVOL after its 1965 eruption; was formerly a school building prior to the eruption
- The new Pira-Piraso Observatory in constructed in 1992
- No other significant structures other than the observatory exists on the Volcano Island because the whole Island was inside PDZ, which means that permanent habitation on the island is not allowed
- Unfortunately, the PDZ status did not deter local folks from Taal Volcano Island; population ballooned in last two decades; unofficial estimates put the present number of inhabitants between 4,000 and 5,000.



Figure 7. Site C. Location map of the Taal tour stops.

Main Crater, Volcano Island (Stop 3)

- Daang Kastila (Spanish Trail) is an old established route that give a good look-out point to Main Crater Lake; located across the lake on the north shore of Volcano Island
- It takes about 1 hour to hike to the crater rim at a leisurely pace; horses are also available for hire, the slope is gentle and the climb is relatively easy except for a portion close to the crater rim
- Along the trail are sites that showed thermal manifestations during the 1993 seismic unrest
- The Main Crater Lake has a diameter of 1 km and depth of 75 meters at its deepest; has blue-green acidic water, with pH between 2.5 to 3
- On the north-northeast shore of the lake are steaming grounds; at times, geysers may also be active
- An island, which can be seen on the southwest side of the lake, consists of dipping layers of pyroclastic deposits and is probably the remnant of an old edifice carved out during one of its former eruptions
- Truncated arcuate morphologies along the crater rims suggest the presence of overlapping volcanic centers and/or collapse structures

Tagaytay Picnic Grove, Tagaytay City (Stop 4)

- One the most popular point overlooking the Volcano Island, Taal Lake, and surrounding areas; most prominent volcanic feature is the Binintiang Malaki to the west that many visitors mistake for the main volcano edifice
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Other volcanic edifices and composite volcanoes that comprise the Southwestern Luzon Volcanic Field can be seen from this point. Directly east is Mt. Makiling and behind it farther to the east is Mt. Banahaw. South of Mt. Makiling is Mt. Malepunyo. On the southeastern caldera rim is Mt. Macolod. To the west is Mt. Batulao, and to the northwest, Mataas na Gulod.

FIELD TRIP RECOMMENDATIONS:

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| <ul style="list-style-type: none"> • Bring sufficient bottled water for the field trips especially the Taal trip because it will involve long hikes to and from the Taal Crater rim • Wear suitable/comfortable field outfit especially footwear • Packed lunch (extra food optional) should be prepared for the Taal trip • Bring extra clothing and raincoat for the Taal trip because it would entail a boat ride to the Taal Island |
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アンケート集計（フィリピンセミナー）

- (1) After your completion of the Course, did you have any situation that you thought the outcomes of the Course made a positive impact to your duty? If yes, please describe the situation and the outcome which you think caused the positive impact.

ア 集計結果 YES 20人、NO 0人

イ 具体的コメント（抜粋）

- (ア) 日本で学んだ火山活動に対する測地学的モニタリング手法を自国に応用し、火山活動警戒レベルの判定に役立てている。（インドネシア・Hendrasto）
- (イ) 1993年に日本で研修を受けた後、ピナツボ火山の火山泥流発生危険区域を設定し、それを政府関係機関に通報する仕事に従事しているが、同業務を遂行する上で日本での研修が大変役に立っている。（フィリピン・Tubianosa）
- (ウ) 帰国して2ヶ月後に、担当していた Bumsan 火山が噴火した。1994年11月から翌年1月まで噴火活動が続いたが、自信を持って日本で習得した観測技術を活かすことができた。また、短期・中期の火山に対する評価のみならず、災害対策について政府、マスコミ、住民とも連携を深めることができた。（フィリピン・Manlangit）
- (エ) 2004年の研修に参加して帰国した直後に、Taal 火山が異常現象を示し始め、日本で学んだ分析手法をすぐに役立たせることができた。（フィリピン・Rodriguez）
- (オ) 帰国後上司から、日本の研修で得た成果をまとめるよう指示があり、自分の組織がどのように砂防に取り組んでゆくべきかを報告した。その結果、流域管理において、より責任ある役割を担うこととなり、洪水と干ばつ、雨期と乾期、少ない降雨量への対応など総合的に検討している。（イラン・Hemmati）
- (カ) 日本で学んだ砂防技術を自国に合ったものにし、土砂災害軽減のために役立てている。また、複数国の帰国研修員を結ぶネットワーク構築の計画があるが、お互いの情報交換等のために大変有益なものとなろう。（インドネシア・Utomo）
- (キ) 日本での研修成果を活用し、我々は現在ネパールの都市部における土砂災害ハザードマップ及び地震災害ハザードマップの作成

に従事している。日本の研修は今後とも是非続けてほしい。もし可能であれば、研修の内容にケーススタディをもう少し取り入れて欲しい。(ネパール・Chitrakar, Sapkota)

- (ク) 私は現在、中国西部地域の表面侵食防止及び緑化工法についての研究、土木技師に対する自然災害危機管理についての研修、大学院生に対する災害危険予測についての指導等を行っているが、これらの研究・教育活動を行う上で日本での研修が役立っている。(中国・Zhengfang)
- (ケ) 日本での研修を終えた後、公共事業・道路省において、複数の洪水防御プロジェクトのマスタープラン作成、フィジビリティスタディ等に参画しているが、日本で勉強した計画立案についての技術的ノウハウが大変役立っている。(フィリピン・Sosa)
- (コ) 研修終了後は、道路の設計及び工事をする際、排水やのり面保護に関して、より注意を払うようになった。また、情報共有の大切さを学び、日本で習得した地すべりや洪水、浸水を軽減するための方法を、同じ職場の技師に講義した。(フィリピン・Bertillo)

(2) After your completion of the Course, did you have any opportunity to be involved in an international project (including Japan) regarding disaster management? If yes, please describe the project and your role in it.

ア 集計結果 YES 3人、NO 17人

イ 具体的コメント(抜粋)

- (ア) 2004年9月16日から同年11月15日まで、(独)日本学術振興会の招聘により、京都大学防災研究所において「自然災害の危機管理」の研究を行った。(中国・Zenghang)
- (イ) 日本国際協力銀行による円借款プロジェクトである Agrarian Reform Infrastructure Support Project, Fase II において、日本人コンサルタントとともに橋梁の設計業務に従事した。(フィリピン・Bertillo)
- (ウ) UNDP プロジェクトである CSCAN に携わったことがある。(フィリピン・Manlangit)

(3) After your completion of the Course, did you have any opportunity to be involved in a JICA project/expert in your country? If yes, please identify the project/expert and describe your role in it.

ア 集計結果 YES 11人、NO 9人

イ 具体的コメント（抜粋）

- (ア) 火山・土砂災害対策局(DVGHM)において、JICA 派遣シニアボランティア（2002 – 2006）のカウンターパートとして、火山地帯への観測機器の設置、データ分析等を担当している。（インドネシア・Hendrasto）
 - (イ) PHIVOLCS が 2000 年に JICA の協力のもとに始めた火山・地震モニタリングシステムに関するプロジェクトの中で、観測機器の操作、データ管理等の業務に従事している。上記プロジェクト開始前には、JICA 専門家と一緒に、観測機器の選定、中継基地のための用地買収等の仕事にも携わった。（フィリピン・Tubianosa）
 - (ウ) 上記の JICA プロジェクトを開始するに当たり、地震観測ネットワーク設置のために必要とされた用地の選定と買収の責任者としての仕事に従事した。（フィリピン・Manlangit）
 - (エ) 2001 年に開始された JICA 火山地域総合防災プロジェクトのカウンターパートとして砂防関係の業務に従事している。（インドネシア・Utomo, Murod）
 - (オ) 我々は JICA プロジェクト “Kathmandu Valley Earthquake Disaster Management” のカウンターパートとして、地質・地震関係データの収集・提供等の業務に携わっている。（ネパール・Chitrakar, Sapkota）
 - (カ) フィリピン治水・砂防技術力強化プロジェクトのカウンターパートとしての業務に携わっている。（フィリピン・Sosa, Felizardo）
 - (キ) JICA が行った複数の火山災害対策、洪水対策等に関するプロジェクト・開発調査に、カウンターパートとして従事した。（フィリピン・Lingan）
 - (ク) JICA 開発調査「Study on Comprehensive Disaster Prevention around Mayon Volcano」のカウンターパートとして、土地利用計画の分野を担当した。（フィリピン・Bertillo）
- (4) JICA Training Course is principally intended to enhance and develop human resource in the target country; however, it is clear that if the human resource development is directly linked to the organization strengthening and systems building process in the country, more effective disaster mitigation/prevention measures can be set up. In this means

please describe in detail how you and your organization can contribute to the organization strengthening and systems building process in the field of disaster management in your country.

ア 具体的コメント（抜粋）

- (ア) 私の所属する省は洪水対策、土砂災害対策、土壌侵食防止、干ばつ対策等を担当しているが、人材育成のために職員の再教育に力を入れている。そのためには、JICA 他の外国からの技術協力が大変有効である。（イラン・Afshin）
- (イ) JICA 火山地域総合防災プロジェクトを通じ、災害軽減のための組織強化と人材育成がなされている。特に、Gadjah Mada 大学の修士課程では自然災害管理のコースを設け、防災関係の人材育成に力を入れている。（インドネシア・Utomo）
- (ウ) 日本の研修で得た火山学に関する基礎的な科学的知識と実務経験により、自分のデータ処理・分析能力が向上した。このことは、より正確なデータをもとに地方政府に警戒・避難を助言することが可能となり、ひいては、組織の信頼度が増し、組織強化のために良い効果を生み出すこととなる。（インドネシア・Kristianto, Hendrasto）
- (エ) 1993 年の JICA の研修により防災についての知識を深めることができた。また、PHIVOLCS 内の独自の研修により、私及び他の職員のハザードマップ、災害軽減計画等についての作成能力が深まり、組織が強化された。その結果として、PHIVOLCS は、政府・民間関係機関及び地域住民にハザードマップ等を周知できるようになり、災害軽減のために貢献している。（フィリピン・Tubianosa）
- (オ) DPWH には、災害軽減のための様々な分野について研修を受けた人材集団がおり、彼らが、災害管理に関する技術移転を通じ、DPWH 及び他の機関の組織強化に努めている。（フィリピン・Roces）
- (カ) DPWH は、フィリピン国内の 18 の主要河川の洪水対策を所掌しており、その組織は JICA 治水・砂防技術力強化プロジェクト他によって強化されているので、必要に応じ、全国に存在する地方事務所を通じ他の組織の人材育成にも貢献することができる。（フィリピン・Sosa）

(5) What kind of multilateral partnership do you think is needed to further

develop the capacity of disaster management, especially in the volcanology and sabo field, in the region?

ア 具体的コメント（抜粋）

- (ア) フォローアップセミナー、短期研修コース、域内の関連プロジェクト視察などが有益であると思われる。また、砂防学会の創設、国際砂防ネットワークの活性化も有益であろう。（イラン・Afshin）
- (イ) 災害対策のためには、情報・知識・経験等を相互に交換することが有益であるが、そのためには域内でのネットワーク構築が必要である。（インドネシア・Utomo）
- (ウ) 災害対策のためには、火山泥流災害及び砂防事業を中心にした災害防止管理についての情報交換が必要である。（インドネシア・Kristianto）
- (エ) JICA 研修参加国間での災害管理・ハザードマップ作成分野での研究成果・論文等の相互交換、JICA 帰国研修員に対する再研修、JICA による技術文献の供与、帰国研修員の災害防止に対する活動を支援するための JICA 基金の創設。（ネパール・Chitrakar, Sapkota）
- (オ) 現在の災害管理を改善するためには、更なる有償資金協力及び技術協力プロジェクトの実施が有効であるが、その際にローカルスタッフに対する研修がパッケージになると一層効果的なものになると思われる。（フィリピン・Tubianososa）
- (カ) フィリピンでは、最も頻繁に発生する自然災害は水によるものである。2004 年 11 月及び 12 月の台風がもたらした土砂災害により死者 600 名、行方不明者 700 名の被害を引き起こした。災害軽減の方策としてはハード対策が一般的であるが、ハザードマップ作成や警戒システム設置等のソフト対策も、より安価で効果的であると考えられている。DPWH ではソフト対策についての技術が未熟であること、並びに政府予算が厳しい状況にあることから、日本政府からのソフト対策についての技術協力が必要とされている。（フィリピン・Sosa）

(6) FREE SPACE. Any comments, suggestions or opinions for this Seminar are most welcomed.

ア 具体的コメント（抜粋）

- (ア) フォローアップセミナーの実施について、報告書作成などについての事前準備に万全を期すため、もう少し時間的余裕をもって連絡していただきたい。（イラン・Afshin）

- (イ) JICA の中に帰国研修員ネットワークを構築し、技術のブラシアップを目的にしたフォローアップセミナーを数年毎に開催してほしい。(イラン・Hemmati)
- (ウ) 火山・砂防に関する集団研修は今後とも継続してほしい。また、今回のようなフォローアップセミナーを毎年開催してほしい。(インドネシア・Utomo)
- (エ) フォローアップセミナーは今回限りのものでなく、今後とも続けてほしい。また、火山・砂防集団研修も継続してほしい。(インドネシア・Murod)
- (オ) このセミナーは大変有益であった。今後とも最低2年に1度は開催してほしい。(インドネシア・Kuristiananto)
- (カ) 今回のセミナーでは、災害から人的・物的被害を最小限に抑えるための情報や経験を交換することができ、大変有益であった。今後とも3年に1回くらいの頻度で開催してほしい。(インドネシア・Hendrasto)
- (キ) 今回のセミナーでは、各人がそれぞれの国で実際に行っている災害管理業務について意見交換ができ、また、他国の経験から学ぶことができ、大変有益なものとなった。この種のフォローアップセミナーは今後とも継続してほしい。(ネパール・Chitrakar, Sapkota)
- (ク) JICA に感謝する。(中国・Zengheng)
- (ケ) 今回のセミナーは、我が国が台風による洪水や土砂災害により被害を被った時期に開催されたが、同じような災害についての問題を抱えている国々の参加者と意見交換ができ、またお互いの絆を強めることができた。このような機会を与えてくれたJICAに感謝申しあげる。(フィリピン・Tubianososa)
- (コ) フォローアップセミナーは大変有益であった。お互いの絆を強めることができ、また、日本でのすばらしい思い出を再燃させるものであった。今後とも続けてほしい。(フィリピン・Manlangit)
- (サ) 国内外の参加者と十分な意見交換するためには5日間では十分ではない。また、技術能力更新のために、2年に1度のフォローアップセミナーを開催してほしい。(フィリピン・Loza)
- (シ) 今回のセミナーでは、ハザードマップ等のソフト対策が中心であったが、ハード対策も取り入れてほしかった。(フィリピン・Lingan)
- (ス) 一週間は短過ぎたが、初回であるので致し方ないと思う。同様のセミナーをもう少し参加人数を多くして、もっと頻繁に開催してはどうだろうか。その際に、特定テーマについての研究論文の提出を義

務づけてはいかがか。(フィリピン・Felizardo)

- (セ) セミナーでの発表方法についての連絡があったのが11月30日で、データ集め等が十分にできなかった。また、セミナーでは、ハード及びソフト対策について徹底的な議論ができると良かった。フィリピン他開発途上諸国に対し、引き続き JICA の協力をお願いしたい。
(フィリピン・Bertillo)
- (ソ) 今回のフォローアップセミナーはすばらしいものであった。JICA 専門家の災害対策に関する技術講演からたくさんを学び、また、各国からの参加者と意見交換をすることができ、お互いに学ぶところがあった。(フィリピン・Ignacio)
- (タ) この種のフォローアップセミナーをもっと頻繁に開催してほしい。3年に2回、最低でも1回は開催していただきたい。(フィリピン・Itay)

以 上

アンケート集計（ペルーセミナー）

回収：22名（参加者全23名）、22名のうち火山学：14名、火山砂防工学：8名

1. After you completion of the Course, did you have any situation that you thought the Course made a positive impact to your duty? If yes, please describe in detail the situation.

回答者数：22名、No：1名、Yes：21名

No：Carlos, Nicaragua.

Yes：以下コメント

Chile：

When I back from to my country after finishing the course in Japan, I assume the coordination of the seismo-volcanic unit. The knowledge acquired in the volcanic emergencies management, has permitted to create methodologies in order to work in risk management. Besides, it has allowed me the coordination of three projects related with volcanic risk. On the other side, as my institution is in charge of the coordination of the national system of * protection, the acquired knowledge in the volcanology course has permitted to me to work closely with scientists of specialized institutions which has to be with volcanic risk studies.

Gomez, Colombia：

Because I was working at a volcanic observatory the general overview of the different Japanese observations and techniques for volcano monitoring give me a better idea of geophysical applied, other types of instrumentation not known at that time in my county (e.g., broad band seismometers) and doing the final part related with the individual study, I could make a general analysis of an special type of Galeras seismic signals (the Tornillos: screw)

Raigosa, Colombia：In the last years, Colombia has improved the monitoring systems of the active volcanoes. For that reason volcanologist in my country have the opportunity of working with lots of information coming from the monitoring of active volcanoes. My training in Japan was directed to the processing and interpretation of seismic signals (long period volcanic signals) and in that sense, the course made a positive impact because help me to get a better understanding of some of the process related with the role of fluids in the dynamic of active volcanoes.

Rodolfo, Costa Rica：

(a) Improve knowledge on active volcano monitoring systems: 1- conventioned techniques, 2- new methods and systems, 3- broad and specific training, (b) Specific research topic on volcano deformation (sakurajima volc. Observet. 2 months stay), (c) Establish contacts for further research projects, (d) Improved local and regional capabilities on volcano monitoring, (e) Regional impact (after training) on other volcano observatories, (f) improvement of technological transference (training and equipments), (g) Cultural enrichment, “volcano friends”, “nihongo”, and more.

Soto, Costa Rica：

Back to Costa Rica, we had several emergencies, or better said, crisis. One at Srazu in 1991 and at Diucon de la Viejain 1991-92, and them 1995 and 1998. Knowledge from the courses did a positive impact on interpretation and handling of data to better manage these situation.

Remigio, Ecuador：

After completing the course in Japan I did not work in the field of Sabo engineering because I move to USA to continue my higher education. However, five years later and after returning to Ecuador once I finished my Ph.D. studies, I got involve in several projects in the disaster prevention field, especially in the numerical modeling of debris and mudflows of both volcanic and hydrometeorological origin and in designing disaster prevention countermeasures.

Francisco, El Salvador：

Our University has got some financial support for to continue our volcanic monitoring program. And now we are doing annual studies related to CO2 flux coming from soil. Also we are beginning studies related with geochemistry and evaluation of SO2 flux using remote sensing (MINIDOAS system)

Byron, Guatemala：

In my work we continue our monitoring program. We are searching a way to contact JICA experts to implement a lab considering gases, analysis, also. We need a collaboration to obtain equipment to make gases analysis on the field.

Roberto, Honduras:

After completion the 1993 course in volcanic Sabo Engineering, I come back to my country, between my duties I was assigned to sabo works and my office continued assistance from Japan to Sabo Engineering matters. In 1997 I was also participant in seminar for administration for disaster prevention actually by ourselves we develop different projects in the country and with low cost solutions attend emergencias and high vulnerability zones especially in flood control management conclusion. The seminar had very important impact in my duties, where actually I' m the head office. Another application was the opportunity to give class in private university about erosion and sediment control.

Claudio, Honduras:

The Course made a positive impact to my duty because there are better vision for work of improvement of rivers and implement work of low cost. The control of erosion and sediment is very important in especial in the duties of the project of river Choloma.

Carlos, Mexico:

When I returned to Coloma, Mexico, I left my previous job as field geologist in CFE (Comision Federal de Electricidad) and joined to the Coloma University where the volcano observatory was beginning to operate. With a government funds we began the geologic work at Colima volcano, which take about 3 years of field work. Short time after we finished the geologic map we began the elaboration of the volcanic hazard map of Colima. Poor budget didn' t allow the edition of both maps until recent times. The volcanic hazard map was published two years ago with the Colima Civil Protection Authorities support and the geologic map is in press with a guide book in collaboration with the UNAM (The national university).

Ramos, Mexico:

I think that with this seminar, I will have more elements for propose and complete some proposals in another projects for sediment and erosion control and also water for recharge the aquifers at metropolitan area of Mexico state, near of Popocatepetl volcano.

Emilio, Nicaragua:

After come back from Japan, now I am the director of seismology at Instituto Nicaraguense de Estudios Temitonales (INETER). I have the responsibility of the seismic network in Nicaragua, Including the new broadband seismic network provide from Japan at 2004.

Jorge, Peru:

I think that the state or situation of the technical knowledge in Japan about disaster prevention allowed me to consider practical or non-practical solutions for a determined situation. I recommended in some case the construction of small sabo dams (up to 6 meters high) to be constructed in some debris flow active areas.

Juan, Peru:

Indeed, the course allowed to apply the techniques learned during the training. So I made microgravity survey in Misti and Sabancaya volcanoes. Also, it allowed me to know the volcanic phenomena more widely and at this moment I work besides to apply geophysical methods in the numerical modeling of events of volcanic origin.

Zenon, Peru:

In my institution, CISMID, we are mostly involved in strong ground motion monitoring and seismic microzonation of cities, however, since I came back from Japan in 1999 after completing my postgraduate studies, I' ll have been involved in some projects that included the design of countermeasures for landslides and stabilization of earthquakes triggered landslides. That was the main topic that I' ve worked in when I was attending the Sabo engineering course.

Jaime, Peru:

Always I think that this course will contribute in the evolution of my concept about the transportation of sediments. Justly I am preparing a paper on Gallito Ciego Dam and its speedy process of sedimentation. I will try to exchange opinion with other participants and get a better conclusion of my investigation work.

Enrique, Peru:

Before the training course I was not carrying out any project related to volcanic subject. After the training course I could be in charged of making several works, such as volcanic mapping, volcanic stratigraphy, lithology and volcanic setting interpretation through satellite imagery and aerial pictures. Four years (2000–2003) were good for me, because experience specially in volcanic mapping and its interpretation of products origin. Nowadays, my actual job is exploration for gold and copper deposits, so fortunately, these are deposits are related directly with volcanic and subvolcanic settings; therefore it helps me much in defining favorable seds, lithology, etc. Using the volcanology as a good and important tool for geology.

Katherine, Peru

My research topic in Japan was about self-potential (SP) studies on ASD volcano. When I came back to Peru, I had to process some SP data from Ubinas volcano, so I was able to process and interpret this data thanks to the training I received in Japan.

Visentina, Peru:

Contributed in my duty, specially in the hot spring monitoring around volcanoes in the south of Peru. I learned a new method for monitoring flow rate CO2 gases from a hot spring.

Venezuela:

Universidad Central de Venezuela, Geology School These: as Tutor of “The San Jose de Galipan Basin” Sediment Map”. Technical Advisoring in Mass Movement condition in Venezuela (Funvisis), Stabilization Works advisor at Barcelona City (Ministry of Infrastructure- PDVSA)

2. After your completion of the Course, did you have any opportunity to be involved in an international project (including Japan/ JICA) regarding disaster management? If yes, please identify the project and you role in it.

No : 10 名、Yes : 12 名

No : 以下コメント

Gomez, Colombia:

I would have to clarify that INGEOMINAS and particularly the volcanological observatory of Pasto is involved since 1997, in a common research project with the Federal Institute for Geosciences and Natural Resources - BGR (from Germany) in relation with volcano monitoring - so called “the multi parameter station at Galeras Volcano”. Also INGEOMINAS Pasto has the support from time from the USGS through the volcanic crises assistance team (VCAT), particularly since 2004 for the reactivation and eruptive stage of Galeras volcano. INGEOMINAS is also working with the “project Multinacional Andino” (Andean Multinational Project) related with and integrated vision of hazards, community and information (georeferenced data, maps, and so on)

Raigosa, Colombia:

I want to say here that my job is not directly related with disaster management, but with the prevention of disaster. However, INGEOMINAS is part of the “National system for prevention and attention of disasters”

Remigio, Ecuador, Francisco, El Salvador, Byron, Guatemala, Carlos, Mexico, Carlos, Nicaragua, Enrique, Peru, Katherine, Peru, Visentina, Peru

Yes : コメント

Chile:

(1) “Pilot Project for monitoring and surveillance of border volcanoes Peteroa and Copahue”, financed by Overseas Development Administration of the United Kingdom. (2) “Natural Disasters in Border areas of Ecuador- Peru, Chile” financed by OEA. My work was coordination in Chile of this project. (3) “Multinational Andean Project, Geosciences for the Andean Countries” financed by the Canadian International Cooperation Agency. I was present in the meeting as a person on behalf of National Emergency Bureau (ONEMI)

Rodolfo, Costa Rica:

I was never involved in disaster management, but I have been involved in scientific matters. (a) tectonics (GPS) in Nicoya Peninsula. Continuous GPS (Inuma san and Obana san) Experts who stayed in Costa Rica, (b) Two more projects in seismicity of Costa Rica and volcano mapping (by GIS). My role in both international project was as a cooperater. Main Costa Rica researcher

for (a) was Dr. Marino Protti and for (b) was Eduardo Malavassi.

Soto, Costa Rica:

With French scientists in geological and volcanological situation in Riucon de la Vieja, geochemistry in Riucon and Srazu, and hazard assessment in Sreual with Stalian scientists.

Roberto, Honduras:

1998–2001 “Construction” of emergency works in sabo master plan Choloma Sanpedro Sula Cortes (head office hydraulic works department counterpart of the development project).

2001–2002 “Study” master plan for flood control and landslides in Fijucijalpa, Honduras. (head office of one counterpart institution, (totally five))

Claudio, Honduras:

In the project of control the erosion and sediment of river Choloma and my work was coordinate different activities for development self.

Ramos, Mexico:

I can involved in some project, considering to my institution and country. That project can be about sediment control and water recharge for solve the water problem (like in my country) making sabo dams along streams, gullies and ravines.

Emilio, Nicaragua:

1) New broad band seismic network in volcanoes of Nicaragua (JICA/JAPAN). In this project I am the responsible from Nicaragua.

2) Study of continental cortical Nicaragua and Costa Rica (Geomal).

Jorge, Peru:

I did some advising work for a Non government Organization named MORAY. In the last two years I have done soil mechanics studies as well as I have prepared hazard maps in areas occupied by people in rural areas.

Juan, Peru:

At the moment I participate in the LAHAR project is a effort of the research institutions of Spain, Mexico, Peru and Bolivia to design Methodology of evaluation of hydrovolcanic processed in the region. In this project I participate like researcher in the numerical modeling of events produced by collapse of volcano flanks. Also I have participate in the project supported by the IRD (Institute of Research and Development of France) in the preliminary cartography of volcanic deposits of actives volcanoes in the south of Peru with Dr. Jean Claude Thovret.

Zenon, Peru:

After the 2002 southern Peru earthquake I’ ve participated in a project carried out by the local authorities of Arequipa city with the support of the Germany Cooperation Agency (GTZ). It consisted in developing the seismic hazard map of rural areas in highlands of Arequipa which were highly affected by earthquake triggered landslides. In this project I was a geotechnical specialist. CISMID also developed the seismic microzonation of Moquegua city, which was severely damaged by the 2005 earthquake. This project was developed with local funds, since no financial aid was obtained from international agencies. I was the head of this project.

Jaime, Peru:

Yes, now I’ m working through IMEFEN–CISMID in a project about Gallito Ciego Dam in cooperation with INADE institute (National institute of development) the basic problem in this mayor infrastructure is the speedy process of sedimentation. The specific objective in this study is : 1) Estimate vulnerability and risk in “Gallito Cigo” Dam 2) Determine projects of prevention and attention of disasters of mayor hidrawlic infrastructure to avoid or to mitigate the potential disasters. 3) Elaborate manuals and regulations to prevention of disasters in Gallito Ciego Dam. 4) Establish priorities considering the magnitude and imminence of risk and their impact in population and economic infrastructure terms in risk. I am working in this project as coordinator among CISMID–IMEFEN and INADE institute.

Venezuela:

On the JICA’ s project related to the Risk Management of Caracas City, I was supervising the geology field work as Funvisis counterpart. The JICA’ s geologisits and I checked everyone of the rivers and basins that covered the study area. The study involved field work, slope angle analysis, aerophotograph analysis. We recognize landslides and slope failure as well as any

other process related to mass movement.

3. How do you define the present situation of your country in the volcanic and sediment-related disaster management filed? What do you think you can do to contribute to improve the present situation in your country?

回答者数 : 22 名

Chile:

There are works in geological and hazard studies at different volcanoes. But three are only 6 active volcanoes monitored with seismic networks, which is a very small amount taking into account that there are more than 50 active volcanoes in Chile. In addition it would be important to mention that just a few scientist are working on this field on Chile by different reasons.

Gomez, Colombia:

I think that particularly in terms of volcanic disaster management, in Colombia the situation is quite good. Of course it can and it must to be improved, but in comparison with some other countries, let said Latin-American countries, our situation is going well. At Colombia, we have the national system for disaster prevention and mitigation witch was a main coordinator office in Bogota, but the system itself is composed by regional and local offices. The system includes operative educational and scientific committees with permanent character. They have regular meetings and they act as prevention or attention depending on the situation, also depending on the emergency "size", at first the response has to be local, then regional and finally national or international. Colombia has a single Geological service (INGEOMINAS) which is the official institution in charges of volcano monitoring and hazard maps production. This information is included in developing plans of the cities.

Raigosa, Colombia:

In the last twenty five years, Colombia has been affected by many natural disasters. For this reason, the government has made many efforts to improve the monitoring systems of all kind of natural disasters and in the creation of institutions for the prevention and management of natural disasters. My institution, INGEOMINAS plays an important role in the programs of prevention of disasters and in that sense, my contribution to improve the present situation of my country is related with the improvement of the knowledge of the processes related with active volcanoes, their impact over the areas of influence of these volcanoes and the measures for the mitigation of the impact that these phenomena can produce.

Rodolfo, Costa Rica:

Volcanic disaster management: It belongs to the National Committee of Emergency. Our institute is just a scientific advisor for volcano activity. OVSICORI (my institute) is devoted to active volcano monitoring, not disaster management. Costa Rica has traditionally contributed to the regional volcano monitoring through international cooperation. Example: Oct. 1985 technical assistance to Colombia grous on volcano monitoring of deformations. Local (national) situation is now improving through better budget for new equipments. Regional (Central American) situation on volcano monitoring is much better in Nicaragua and El Salvador than 10 years ago. But volcano studies in Guatemala are not improving, unfortunately.

Soto, Costa Rica:

Volcanological studies are getting more ***, as well as sediment-related ones. This compared to 15 years before. The most important is that most projects in research are managed or led by Costa Ricans. My contribution would be mainly applying the knowledge in Sedogyaud volcanology: mapping of volcanoes and hazard assessment. And teaching to new generation how to tackle these duties according to the learned experiences.

Remigio, Ecuador:

Even though there has been many sediment related disasters in the past few years the government has done little to have an effective management procedure to reduce damages due to there events, Management of these disasters has been focused in helping people in the aftermath of the disaster providing shelter for as long as the reconstruction last. As university professor working in the civil engineering field I can introduce to young undergraduate and graduate students to develop basic research thesis in the field of sediment-related disasters both in the engineering

field and in the management.

Francisco, El Salvador:

Our country has actually one institution responsible of disaster management field but this institution has not yet strong relations with other institution like public university and others. Also we think that this institution needs more public budget for to support different task specially link with education. From our university we can impulse projects for to prepare our population in those themes continues improving our volcanic monitoring program (incorporating complementary methodologies in this task)

Byron, Guatemala:

In Guatemala has actually one institution working in the field disaster management about sediment control using the sabo tools.

Roberto, Honduras:

Honduras have a very high vulnerability in flood control and sediment disaster fields. My office contribute development emergency projects in some cities and we are members of the commits for disaster management. Especially in the Structural measures. Some time we recommend no-structural measures. The problem all the time is the budget- this kind of seminar increase the knowledge I believe is another form to help the country because I can notify present the similar situation in other countries to my authorities.

Claudio, Honduras:

The situation in my country in the sediment related disaster management field is no enough due to economic problems and laws in force for example law the environment and land use I think to propose education for an early implementation due to vulnerability of sedimentation and to flood problems.

Carlos, Mexico:

The present situation at Mexico in the volcanic aspect, at Popocatepetle volcano the management is good with the CENAPRED (National Center of Disaster Prevention). In the case of colima volcano the good relationship between civil protection authorities (Local Authorities) and Colima volcano observatory in more or 10 years, is very well. But in the case of sediment-related disaster, the management in the recent times was very bad (Oct-Nov 2005, Chinpas case). This recent case showed the poor preparation and management of sediment-related disaster in Mexico. I think that my possible contribution to improve the resent situation in both cases (volcanic and sediment-related disaster management) is the recommendation of the interchange of experts between Mexico-Latin American and Japan.

Ramos, Mexico:

At present, Mexico doesn' t exist works for control of sediments at active volcanoes, because the authorities don' t understand the complete problem. About two years ago, I sent a project for apply this technique on western side of Popocatepetl Volcano to National Coordination of Civil Protection of the Federal Government, and answered more than seven month later, saying that the project is not possible because there is not human resources for do it. I think that with the political changes (next year), maybe can change the situation of the new authorities understand the importance for work with this technology of sabo works.

Carlos, Nicaragua:

At this time the volcanic situation of my country change a little bit because the volcanic activity increase a bit, but know we are a little bit more prepared than 15 years ago. I say that because our seismic network for example and now is improving more and more, now we are working together civil defense, red cross, fire group and so on. It group of collaborative together now is call "SINAPRED" which mean national system of prevention and attention of disaster of course when I say we work I try to say "INETER" which is the institution responsible to give the science data about the a correspondent event we can say an earth quake, flood, and so on, to give response to the people affected by it event.

Emilio, Nicaragua:

In this moment the volcanic situation is relatively stable but we need more studies and instrumentation more number of stations, other methods of vigilance.

Jorge, Peru:

We are preparing hazard maps and also improving the monitoring network in some volcanoes (like Misti), but because of budget problems the progress is little now. In the case of the sediment-related disaster management field. We have prepared some hazard maps but homeless people occupies prohibited areas or high risk areas putting their lives in great risk, so big efforts have to be done in this sense. I think that the knowledge of disaster prevention in Peru is in acceptable conditions so we need to meet with the specialist such as the participants (Peruvians) of this course, in order to give some solutions for the problems that we have. I think that we have to find the solutions according to our reality and not to wait that others do the things for us. Of course that we need technical assistance and also to get some financial help, but as I say before we have to get the solutions. I'm going to foster the integration of this Peruvian group to present some solutions.

Juan, Peru:

The present situation of the country in the volcanic and sediment-related disaster management field is in a transition stages in where the involved organizations must unite efforts. For the specific case of volcanology, institutions like IGP, INGENMET, CISMID and the Arequipa universities (San Agustin and the Catholic) are becoming jumbled in inter-institutional projects. In my case, as representing of the IGP, we are contributing in those efforts of mutual collaboration between the involved institutions. In Peru we have not had experiences of severe volcanic crises in the last years.

Zenon, Peru:

In recent years Peru didn't have volcanic eruption crisis, therefore no much research activities were carried out in this field, it does not mean that there is no people at risk, but not much attention is put on it. Recently a high seismic activity very close to the Ticsami volcano. Since no information was available to confirm or discard that hazard the government recognize the importance of volcanic monitoring and some projects are been drawn to implement them. Sediment-related disasters are more common not only in volcanic area but all over the country. Debris flows, landslides and floods occurred every year in the rainy season. Therefore, sabo works for sediment control and slope stabilization need to be implemented to mitigate the disaster. Only few cases were implemented to date.

Jaime, Peru:

Our expenses with the prevention of disasters in phenomena related with volcanic eruptions are a little. On the other hand in Sabo engineering exist different experience in there years because are phenomena with more recurrent. According my training in Japan and the present follow-up seminar, I can to improve the present situation through the following items: (1) Propose the installation of CCTV in different locations of the infrastructure of more importance in the country (Peru) and with bigger risk and vulnerability. (2) to carry out through the cooperation international basic studies of Prevention and attention of disasters. (3) Take like reference the experiences in other countries in Latin America included Japan in volcanic and sediment related with disaster management field and assimilate the new concepts in mitigation and prevention that actually are applied in these countries.

Enrique, Peru:

I think the management of volcanic and sediment related field are not seriously taken as a first priority among others aspects and problem that my country has. If we analyze the context of what really occurs volcanic activity, the cause and effects, then we probably react after it occurs; that is why the lack of structural measurements. So I think it is not well developed on it should be. A clear example is the Arequipa city, if I could contribute, I would firstly let the population know the real condition of how they being threatened by both volcanic and sediment-related risk by using the local TV red presenting spots and simulated country several times in order to make aware of the risk.

Katherine, Peru:

I think that for a good management of the volcanic-related disasters is very important to keep people (authorities, civil defense and general public) informed about the risk they are exposed to. This will be possible only if there is a good monitoring of the volcanic edifices that will make possible the developing of hazard maps. Unfortunately not all dangerous volcanoes in Peru

are being monitored, because lack of funding, so that is shy volcanic related disaster management will be limited. What I should do is try to show the authorities the importance of volcano monitoring in order to make them to invest in this monitoring. Also we should promote international cooperation in order to get funding and be able to apply new methodologies and technologies for volcano monitoring.

Visentina, Peru:

The present situation in my country about volcano disaster is not very developed because it has not occurred a big volcanic eruption in the last years in my country. I think that to improve this situation is to start with the **senibilization** of people specially of authorities in charge.

Venezuela:

The organization diagram is working good but I think is necessary to train more people – technically speaking – in Sabo works. The field of work is huge, projects as JICA, in Caracas city should be done in every city or region affected today by the different natural events that are changing our risk management development.

4. How do they generally define the role of government, people and disaster management experts like you on non-structural measures for volcanic and sediment-related disaster?

回答者数 : 18 名

Chile:

The ONEMI is the responsible institution for the elaboration of the methodologies regarding with the work on volcanic risk management on all levels, taking in mind the find response has to come from the local level. The geological survey (SERNAGEOMIN) and volcano observatory (OVDAS) has the responsibility for the geological studies and hazard maps elaboration. The municipalities have the task of making the contingency plans and the communication of them to the community including activities.

Gomez, Colombia:

I will answer this question in different ways:

(1) The common people has different points of view about the topic. Most of the people think, that the role of government, National Disaster system and experts are very important, and very well organized. However, other people doesn' t believe in the government, because they think these measurements are just political and they are not based on people' s level of live. Some amount of people thinks that for example, the equipments are not enough or sophisticated as wish and/ or the hazard maps are too complicated to understand or apply.

(2) The government has few budgets for prevention activity most of them are focused on attention and definitively the budget is always low, particularly taking in mind that each time more people is living in risk zones.

(3) In Colombia, INGEOMINAS as the geological service has a good believe among the people, government and community which is very important in terms of hazards like: volcanic, seismic, and sediment- related.

Raigosa, Colombia:

The disaster management programs most be in charge of the local, regional and national government, through the officers for the prevention and attention of disasters at all levels, local, regional and national also. The role of experts in this programs is related with the assessment of the institutions that are part of the national system for prevention and attention of disasters. People must attend all the recommendations related with the management of a crisis and must be open to the measures adopted in order to attend the disaster.

Rodolfo, Costa Rica:

I do not work on disaster management. Government: There is in Costa Rica a National Committee of Emergency, that takes care of disaster management. They have limited resources and their role is basically coordinate works and efforts of many sectors (as the scientific advise of volcanologists) like health, public works, education, etc. People has been little by little been educated in disaster countermeasures, but much efforts have to be made in order to teach the people about disasters. I do not know about sediment-related disaster!

Soto, Costa Rica:

The question is obscure, but if you mean about the use of measure not using built structure, there are no actual definitions, but a wide spectrum of possible measures as piled-up dykes, terraces supported by grasses and shrubs for slope reinforcement and so on. The role of government is in some cases to assess and managing their use in public works or treated areas. Private institution do as well into their properties or mandatory by environmental-impact agreements under governmental supervision or advise.

Remigio, Ecuador:

Central government should lead the process of defining non structural measures to reduce volcanic and sediment-related disasters with the help of universities as research centers to understand the mechanisms of their initiation as well in defining appropriate relations between people who may be affected from these disasters and in providing simple and costless non-structural measures, as in the case of appropriate watershed management.

Francisco, El Salvador: (no comment)

Byron, Guatemala: (no comment)

Roberto, Honduras:

We can see annually the increase of vulnerability zones and there are no some much budget for attend. The non-structural measures are very important and isn't necessary high budget. This matter is attend by the government but I believe is necessary more enforces and more non-structural projects. This year se have very good answer in emergency time but is necessary develop low cost non-structural projects and better communication for advise the people living in risk zones.

Claudio, Honduras:

The role of government, people and disaster management on now structural measures is very important for prevention the human lost.

Carlos, Mexico:

In the case of Colima state, for more of 10 years, the Colima volcano observatory together with the civil protection authorities have plans and programs that help to understand the volcanic and seismic phenomenon with talks, pamphlets, poster and hazard map of Colima volcano. We explain to the authorities the different volcanic processes and the possible scenarios. We enface the challenge of lahar monitoring, because actually we don't have this type of monitoring system, for the possible scenario of **only sub-r****. For the another hand we explain the hazard map to the communities and small villages around the volcano with talks, videos and photos that explain the volcanic process and the history of Colima volcano. In order to understand this phenomenon.

Ramos, Mexico:

The non structural measures for disaster management is good in Mexico, like at Colima ad Popocatepetl volcanoes. For sediments control there are not any works, because the authorities don't understand the phenomenon. They need experiment and suffer disaster of this type for give support like case of popocatepetl and Cloma volcano or like 1985 earthquake. On the other hand, is necessary continue to working and proposing projects, because the prevention is cheapest than a disaster, like the recent case of debris flow at Chiapas State.

Carlos, Nicaragua:

Now a play a role on making hazard maps. Of course using information of all workers in geophysic direction of department which belong to "INETER", at time or present time I am working with two different projects. One of this is "Basics maps and hazard maps for GIS of the western part of Nicaragua". This project is financed or sponsored by JICA, and at this time we are preparing together of JICA-team the final maps.

Emilio, Nicaragua:

In Nicaragua we are working experts, government, institutions and civil society to reduce the risk.

Jorge, Peru:

The government I think is playing and important role, but it is needed more spreading of the things that civil defense is doing. For example, they have prepared (with the aid of other institutions) several maps but most of the people included some specialists don't know these

maps. In the institutions or enterprises that I have worked I usually explain (when I do field work) the risk conditions that the people have in relation with those phenomenon. Also I have prepared several hazard maps to be used in some small areas triggered by debris flows, rock fall, land slide and other phenomena.

Juan, Peru:

The national system of civil defense has an wide structure for the attention and prevention of disaster of natural origin, as case of the volcanic phenomena. So, each organization (institution) knows its roll in the system. On the non-structural measures for volcanic and sediment-related disaster also it is designed so that the affected local part to work at the different level: district, provincial and regional. Its necessary a better preparation and education of the population for to know and understand the volcanic phenomena.

Zenon, Peru:

By law the national system of civil defense (CINADECI) is in charge to define the role of each institution in the disaster management, however since no funds are given by the government, technical and scientific institution work individually trying to get funds from international agencies to carry out such a kind of activities. In this sense, I think that the main problem is that besides we have laws and regulations that specifies the function of each institution, there is no good implemented system that allow them to accomplish that functions. The only way to change this situation is to get the government to implement a serious program for disaster management.

Jaime, Peru:

Is very necessary to find the mechanism and government adviser with contacts in the top level of the government, who decide the performance of different projects (high level). Only by this way I can propose non-structural measures for sediment related disaster for example. Of course I will have to explain my background and experiences about this kind of disasters. Also, I will become in a good salesman in disaster management with experiences in this topics. Maybe an MBA or another specialization course can help me in this purpose in Japan so on.

Enrique, Peru: (no comment)

Katherine, Peru: (no comment)

Visentina, Peru:

Generally the government gives money when occurred the disaster but it doesn' t give money for monitoring, investigation and prevention. For another hand, when occurred disaster people contributed with the authorities like civil defense, but before the disaster people are not take conscious about the risk. The role of exerts is give information about the risk situation also their work with the institution in charge.

Venezuela:

Due to the 1999' s disaster in Vargas state, the government assumed a responsible attitude, reflects in the increase of budget for risk management and the different disciplines involved (science, university, civil protection, seismological survey and others)

5. Who is taking the initiative in promoting non-structural measures among government, people and disaster management experts? Please note its reason(s) also.

回答者数 : 21 名

Chile:

Mainly the ONEMI has the responsibility regarding to civil protection from the national level and from there to regional and local levels.

Gomez, Colombia:

This is part of the national system for disaster prevention and mitigation which encourage the efforts of the scientific and non scientific persons/ institutions in order to have at first a knowledge about the hazards and then to see prevention actions and or mitigation actions. Finally in this scheme, one of the relevant points are related with people education about risk management as a critical point in disaster management.

Raigosa, Colombia:

Some years ago, in my country, the "national system for the prevention and attention of

disasters” was creation. This institution has the responsibility of taking all the measures for the prevention of disasters and in the case of any disaster occur, they have the responsibility of the coordination of all the system, in order to attend the disaster.

Rodolfo, Costa Rica:

I do not belong to the group of disaster management group of experts, but to the scientific group that advise them in active monitoring. The initiative is a coordinated effort of national committee of emergency with the cooperation of the different sectors involved: education, works, health, scientific group, etc.

Soto, Costa Rica:

The Ministry of Environment and energy. Reasons usually cheaper, faster and easier. And more friendly with environment.

Remigio, Ecuador:

At this time little is been done regarding non-structural measures to decrease the degree of impacts due to sediment-related disasters. Some actions are been taken by international non governmental organizations which promote integral watershed management but in a small scale.

Francisco, El Salvador:

We think that this task is actually mainly assumed for no governmental institutions. Frequently supported for international agency of cooperation.

Byron, Guatemala: (no comment)

Roberto, Honduras:

In Honduras we have the permanent committee for disaster attendance, the institution annually work in promoting non-structural measure sin coordination with the municipalities and the assistance of disaster management experts.

Claudio, Honduras:

The initiative in to promote non-structural measures is the government of Japan because is a country with many experience and the reason is for avoid human lost.

Carlos, Mexico:

The local civil protection authorities take the initiative. The staffs follow this route: 1) The local civil protection authorities are part of Colima government, 2) The Colima university (public university) have a scientific committee for volcano monitoring that give some recommendations and data of the actual volcano activity. This scientific committee for Colima volcano (observatory members) have frequently meeting with civil protection and military corps to explain the volcano activity. 3) After, we go with civil protection to the villages around the volcano to explain the volcano activity to the people. The principal reason is to create consensus between the people.

Ramos, Mexico:

Now structural measures are proposed by experts, who are working for instance al National Center of Disaster Prevention, Civil Protection Institute of Mexico state and in general for the workers of the civil protection units for each state o the country.

Carlos, Nicaragua:

Who take the initiative was the government after the occurrence of Mitch Hurricane which hit to Nicaragua in 1998 and induce so many disaster event, we can mention the disastrous or catastrophic avalanche of Casita volcano which kill 3000 people living in two small villages which was destroyed completely. After this the government decide to create “SINAPRED” which mean national system of prevention and mitigation of disaster considering every disaster event.

Emilio, Nicaragua:

In Nicaragua there is an structure government that have all institutions. In 1999, after Mitch hurricane was created the Sistema Nacional de Atencion y Prevencion de Desastros (SINAPRED). In this institution is INETER. When occur an event the INETER give to know to SINAPRED, and SINAPRES active his emergency plans.

Jorge, Peru:

INDECI (The National Institute of Civil Defense) is doing some efforts but more budget is needed in order to distribute the information (related to disaster prevention, such as plans, hazard maps, etc.) to more people so they can know the hazards that their communities have and make

them to involve in the problem and to collaborate with the actions taken. Also INDECI with the help of the Ministry of Education is preparing students from the kinder u to university in order to improve their behaviors and understanding of natural disasters as a culture prevention plan.

Juan, Peru:

The one in charge of this function is the national institute of civil defense (INDECI) and also non governmental organizations. In same case, the research institutions and universities involved in the subject take part through the courses, seminars, about volcanic phenomena, measures of prevention, vulnerability studies results and others related to the volcanology and disaster management.

Zenon, Peru:

Recently, INDECI is taking the initiative to promote non-structural measures, but still there is no good system implemented on it, that there are institution that do activities without coordination and duplicating efforts. INDECI is promoting structural prevention measures to, but they can not integrate all the initiatives that technical and scientific organization has. Therefore, I think that the scientific committee of INDECI should take that action, integrating the research activities among the cooperating organization and helping them to get funds for developing that projects.

Jaime, Peru:

The multi-sectional commission for disaster prevention and response, as taking the initiative in this ambitious program, find the agreement among government, people and experts. According local regulation in Peru (DS. 081-2003-PCM), this commission is in charge of coordinating, evaluating prioritizing and supervising the measures to prevent damage, respond to and rehabilitee the areas of the country that are in imminent danger or affected by disaster of great magnitude by natural or technologic disasters. It is composed of Ministry of Economy and Finance, Agriculture, Production, Transport and Communications, Education, Defense, Energy and Mining so on. Its main function is evaluating the execution of contingency plans; give directives to prepare any contingency plans and defining the guidelines and coordinating any actions required to face the effects of potential disasters of great magnitude.

Enrique, Peru:

INDECI which means national institute of civil defense is in charge of promoting and educate through pamphlets, magazines, etc.

Katherine, Peru:

One year ago volcanic disasters were not considered as important as they are now. I think the initiative was taken by the French organization Volcan Explpr Action VEA, which started with a "journey" of sensibilisation (in Oct 2004) of local authorities and civil defense offers Arequipa to show them the importance of taking into account volcanic hazards in their natural disasters management and mitigation programs. After the non-governmental organization volcan-Explor-Accion-Peru (VEAP) and INGEMMET started the sensibilisation of people (specially at scholar level) and the developing of volcanic hazard maps respect very; both in order to make more effective the natural disaster mitigation programs of the civil defense.

Visentina, Peru:

The institutions in charge in the study and prevention of disaster. Also the civil defense national institute. Actually there are many no governmental institutions that taking the initiative in promoting non-structural measures.

Venezuela:

Mostly, the regional governments are promoting disaster countermeasures. As a direct responsibility with the people, each governor and mayor is trying to follow the example of Caracas and Vargas disaster prevention system.

6. What kind of multilateral partnership with Japan/ JICA do you think is needed to further develop the capacity of disaster management, especially in the volcanology and sabo field, in the region?

回答者数 : 22 名

Chile:

Particularly, around Villarrica volcano, some mitigation works are needed due to the possibility of lahars, besides this area is very important in terms of tourism. Support in equipment for volcanic monitoring in different for volcanic monitoring in different areas such as: seismology, deformation, etc.

Gomez, Colombia:

There are some regions in Colombia in which the sabo works for example will apply perfectly; so specific projects related could be established which includes experiences from Japan and technical and financial support for such kind of structural measurements. Other important point for me could be to know the experiences that Japan has achieved in relation with volcanic hazard maps "application", volcano monitoring and community response. I mind, most of people has Japan an example of organization, culture and preparedness in relation with volcanic management. To know there aspects and particularly the non positive things will be very important for the scientific community, the authorities and the "normal" people. So projects related with these aspects can be proposed at different levels. Finally, the exchange of different monitoring techniques and to have the possibility of equipment will be also required.

Raigosa, Colombia:

I think Japanese people have very good experience in disaster prevention and management, as well as in the investigation of the processed related with natural disaster, so capacitating programs for sharing the experience and knowledge in disaster management is a good way to bring support to our countries.

Rodolfo, Costa Rica:

Personally I am interested on science, not disaster management!

(a) strength local and regional capabilities on volcano research,

(b) More and more research projects by Japanese experts on active volcanoes monitoring: GPS, InSAR.

(c) Financial resources for regional (multi-national) research (collaborative research) in active volcano monitoring. (training and graduate studies) on transference of technology (equipment and training)

(d) Two experts of proposals: 1-) Specific visits of Japanese volcano experts to Central American active volcanoes trying to homogenize and support regional capabilities, 2-) Regional training workshops located by Japanese and local volcano experts. This must by done on an specific volcano case. 3-) Japanese support to establish a active volcano data base covering several subjects (deformation, geochemistry) in order to link common interests of the scientific groups of the region and Japanese volcano experts. Link this initiative to research projects.

Soto, Costa Rica:

An "open-line" through the net, where use people working on this at WA could ask specific questions which could be quickly replied from experts contacted by JICA, having to wait until bureaucracy works. This in case of crisis, emergencies or so. For a more "passive" situation, follow-up courses, 1-2 weeks long on specific issues would be organized in any country of LA every year or every 2 years.

Also, a cheap and useful way is introducing a system at the net, where JICA would send an electronic bulletin to people scribed (we all ex-participants) with news on publications, technologies, projects ongoing and going to be.

Remigio, Ecuador:

JICA should start an international program in defining a Volcanology and SABO engineering network in which, based on the expertise gained by Japan/ JICA in the field, they lead this network. Japan/ JICA should help in organizing also national networks in the said field and provide technical and economical assistance to strength them. Some of the courses that are already given in Japan can be organized in Latin American countries (or elsewhere) with the scientific contribution of experts from Latin American (or elsewhere) and Japan.

Francisco, El Salvador:

We need to have a regional project (supported for JICA and our institutions) that permit us put together all our potentialities for to strength the regional monitoring program. With this project we could study the most important phenomena related with volcanic eruptions in Latin

America. Therefore, we would have in the future more and better information. This information will can be used for improving the actual hazard maps and to contribute to disaster prevention. The new hazard maps constructed based on new information would be the main document for to develop future educational projects.

Byron, Guatemala:

Upgrading the knowledge and technical, and information above to geochemical monitoring in Japan (research).

Roberto, Honduras:

I believe is necessary increase the cooperation for non-structural measures maybe sending experts in the field to the institution in charge of the disaster attendance.

Is necessary more capacitating in preparation of hazard risk maps, training courses.

Claudio, Honduras:

I think which team of experts is needed to further develop the capacity of disaster management.

Carlos, Mexico:

With the visits of JICA experts and possible equipment donations, for specific problems. For example at Colima we need the monitoring or detection in real time of the lahars or debris flows that are triggering by heavy rain, in order to give to civil protection one warning for the people that live near or inside of the channel rivers near to the volcano. And for another hand with the visit of JICA experts after field of Sabo engineering that give some recommendations in the control of this sediments.

Ramos, Mexico:

I think that is necessary more cooperation among the countries of the regional joined with JICA for realize more studies; but we need more resources and specialized personnel for interchange experiences with other countries. But is very important (maybe more) that the politicians understand the problems in our countries for take good decisions and give supplies (of resources).

Carlos, Nicaragua:

At this time in our country we have assistant coming from United Kingdom on satellite observation of volcanoes of Nicaragua and the region too. And also we work with other multilaterals partnership.

Emilio, Nicaragua:

In our country, we have assistant committee from United Kingdom on Satellite observation on volcanoes of Nicaragua, and Central America. Also we work with other multinationals partnership.

Jorge, Peru:

I think that we have to do this kind of follow-up seminar once a year or maybe twice a year. But with JICA sponsoring we have to draw same conclusions and also to distribute same tasks. JICA, with coordination with Peruvian experts should help to developed cheaper technology and also to improve the meterological network or monitoring system in Peru in those fields.

Juan, Peru:

In the region will be better the support JAPAN/ JICA to the improve the monitoring of active volcanoes. In the case of Peru, we must implement a seismic network as like to Misti volcano, in Ubinas and Sbancaya volcanoes, that are after the Misti those of high potential to the occurrence of a volcanic crises. Also a good training of the researchers in the new techniques of study of volcanoes is required, as the numerical modeling of volcanic events and interferometry studies. Finally, to implement courses for the population that lives in susceptible zones to volcanic phenomena in order that they know well these cases.

Zenon, Peru:

There are two main activities that could be carried out with Japan/ JICA. One is the sensibilization of local authorities and governmental institution to work in the prevention aspects of the disaster management. It is well known that unless a disaster occur they do not take any action and not include the hazard maps in they regulation for use of land. Another aspect is continue the support with the technical and scientific research to understand those phenomena and produce accurate hazard maps and vulnerability of urban and rural areas. This is a very important activity that will help, at list, to develop an emergency plan to attend

the disaster.

Jaime, Peru:

I propose to create a work notebook for 2006 with the following items objectives:

- Find the standard method to prevent and mitigate of disasters that we have in our countries
- Find new method to prepare hazard map with new parameters in volcanology and sabo engineering
- establish an universal protocol to identify the disaster and the actions to carru out at the different action levels from common population until institutions that decide the procedures.

I intend to prepare hazard map and other documents that take the time of response as parameter most suitable for each type of emergency. With this document I can work the non structural measures and contrast the results with other experts in disaster management. Obviously, JAPAN/ JICA will support us to get this objective a short and long term.

Enrique, Peru:

I think, an interchange of multidisciplinary people from Japan and Peru (civil engineering, volcanologist, geologist, etc.) must have in order to exchange idea and formulations to several pros** for a good management at disasters. Also, Japan through JICA would continue the training of people from Peru.

Katherine, Peru:

The actual problem of Peruvian institutions related to volcano monitoring is that they work individually and are not used to work together. An ideal situation is to create a unique institution in charge of volcano monitoring but so far it has not been possible. However, I think it should be created a committee conformed by the offices of each institutions that under the supervising of experienced Japanese officers, it should be designated the responsibilities of each Peruvian institution. This way it will be avoided the duplicity of functions and so it could be established some regulations based on the Japanese experience.

Visentina, Peru:

I think that all Peruvian institution incharges in disaster management should make projects on collaboration with Japan/ JICA in order to improve the disaster management.

Venezuela:

(1) Hazard maps in main cities of the country, (2) Early warning system in one important and potentially dangerous river close to Caracas city or Vargas state. (3) Mass movement numeric modeling related to instability areas, (4) Radon measurement related to earthquake warning systems.

7. Inquiry on computer usage in your country

7-1 Do you have your own e-mail address?

- ①Yes, domestic provider : 9 名
- ②Yes, yahoo, hotmail : 7 名
- ③No : 2 名

7-2 Do you have your own or common computer?

- ①I have my own computer personally : 12 名
- ②I have my computer occupied by my office) : 2 名
- ③My office has common computers : 4 名
- ④Either office or me don' t have a computer, but I can use computers in inter-net café or my friends house : 0 名
- ⑤I don' t use any computer now : 0 名

7-3 How often do you check e-mail in a week?

- ①Everyday : 16 名
- ②Once a couple of days : 4 名
- ③Once a week : 1 名
- ④Once a month : 0 名

7-4 Is there some kind of restriction to use inter-net?

- ①No restriction : 17 名
- ②Can' t connect inter-net so often because charge is expensive : 1 名

- ③Can use only e-mail and can't use other contents like watching web page : 1 名
- ④Can't use a common computer of the office so often : 1 名
- ⑤Others : 1 名 (Visentina, Peru: coffee-internet, the INGEMMET in Arequipa is new)

7-5 How high is the transmitting rate per second in your line?

- ①Narrowband (9600bps, 22.8kbps, 33.6kbps, 56kbps) : 4 名
- ②Broadband ADSL (8Mbps, 20Mbps) : 4 名
- ③Broadband Optical Fiber (10Mbps, 20Mbps, 30Mbps, 100Mbps) : 6 名
- ④Unknown : 5 名

7-6 Please kindly note special situation about inter-net usage in your country, if any.

回答者数 : 20 名

Chile:

The internet use in Chile is spreading each time more and more now is in use of a very common people in schools, rural areas, etc.

Gomez, Colombia:

At present in Colombia the internet is wide spread known and distributed. You can find in the very small towns at least a point for internet connection. Particularly the young people are using this tool very much. All the universities has it.

Raigosa, Colombia:

Only that internet has becoming in an very useful tool for sharing information among scientists of all areas and a way to get information of all kind.

Rodolfo, Costa Rica:

Electrical frailer are so common, server too busy (narrow band + too many users)

Soto, Costa Rica:

Widely used, easy, quick, cheap.

Remigio, Ecuador:

I have good access to internet.

Francisco, El Salvador:

Although we have not restrictions for to use internet in our institution, frequently the velocity is low and we can not use it during weekend because private service is expensive for us.

Byron, Guatemala:

The situation we have in Guatemala is that we do not connection to internet for the moment. But in the future we expect to get a connection which a sponsor coming from government.

Roberto, Honduras:

Internet usage have very high development in the country actually - the problem is the charge is expensive.

Claudio, Honduras:

The internet usage in my office is limited for reason budgetary.

Carlos, Mexico:

All the people at Colima have the possibility to use internet because exist a lot of internet-café, and the university have the service at low prices for students and general people.

Ramos, Mexico:

The internet in my country at present is very common in all offices and almost in the homes.

Carlos, Nicaragua: (None)

Emilio, Nicaragua:

In this moment, the internet is good.

Jorge, Peru:

It's rapidly being used for common people. The problem of its usage is in the rural areas.

Juan, Peru:

The internet use is intensive in my country. In the case of the IGP we also have a dedicated line of 24 hours and in particular form I use internet in my house also.

Zenon, Peru:

Internet system is very popular and relatively good. That many people have access to it.

Jaime, Peru:

It is a facility very common in my country. There are many cabin computer with e-mail service in Peru since 1980. Actually you can find with high velocity and capacity at low cost.

Enrique, Peru:

Internet is widely used by people in Peru, for setting information, getting in touch with others cultures and/ or for load new releases.

Katherine, Peru: (none)

Visentina, Peru:

In my country the internet is very good. There are many coffee-internet and is very cheaper.

Venezuela:

The use of internet is growing each day in a normal day.

8. Free space

Any comments, suggestions or opinions for this Seminar are most welcomed.

回答者数 : 16 名

Chile:

This seminar has let me to know the works carries out at Latin American level from the different ex-JICA participants in the volcanology and volcanic SABO work training courses supported by JICA. The experiences interchange has been very important to me.

Gomez, Colombia:

It would be important to have the chance of more meetings like this (short-term), in which other different and/ or specific topics could be discussed in relation with the training course we received in Japan. Most of the ex-JICA participants have not seen each other for more than 15 years. Such kind of meetings in a regular period of time (let said every 1-2 years) with a main subject (let said seismology, geochemistry, etc) will be very helpful, I think.

Raigosa, Colombia: (No comment)

Rodolfo, Costa Rica:

Thanks a lot for this excellent opportunity to evaluate the impacts of JICA cooperation and to let you know our expectative. Resources are very limited in our countries and we appreciate too much the cooperation of JICA and Volcano experts from Japan. Any collaborative, specially regional initiatives will be welcome. A good idea is to distribute documents or newsletters from volcano experts, (through JICA) in order to know about opportunity of cooperation: lists of contacts on volcanology, possibilities of joint research, project proposals, data base of common Japanese-regional scientific interests, ets.

Soto, Costa Rica: (No comment)

Remigio, Ecuador:

JICA has done an excellent job along all there years. I did learn a lot in the training course 15 years ago but I would like to keep updated and go back to Japan to strength the basic formation you did provide me. I do also have something to show to you because I have participated in several sediment-related projects and I have gained good experience in mathematical modeling and designing structural measures to reduce sediment-related disasters. I would like to see what Japan has done in non-structural measures to reduce these disasters.

Francisco, El Salvador:

This seminar was necessary specially because our region (Latin America) needs to coordinate all actions that permit to strength regional capabilities for volcanic monitoring.

Byron, Guatemala: (no comment)

Roberto, Honduras:

Consider more time because five days with field trip is very short, daily we have not enough time for attend complete all the activities on time, and is necessary to use night hours for travel and check in hotel and international flight.

Consider more participation for Sabo engineering experts and participants.

Claudio, Honduras: (no comment)

Carlos, Mexico:

I am completely grateful to the JICA for this opportunity to show the status and challenges in the motoring system at Colimavolcano.

Ramos, Mexico:

I think that we can collaborate in projects of the Latin America Region, interchanging experiences with JICA support, and surely the Mexican governors will understand the importance of this technology.

Also of this seminar, now I have integral vision of the problems and statues in all participant countries and surely we will can to work in the close future, supported by JICA and our governments.

Carlos, Nicaragua: (None)

Emilio, Nicaragua:

This seminar is excellent and very important to our countries and to know new methods and process in the field of volcanology and sabo engineering. I' m very happy by this seminar I hope that this course will to be major every year by JICA.

Jorge, Peru:

I think JICA for giving me the opportunity to participate in this seminar which gave me the opportunity to refresh my knowledge on disaster prevention and also to exchange ideas and information with the Japanese group and participants from my own country as well as from other countries.

Juan, Peru:

The seminar on volcanology and sabo volcanic in Peru has been very beneficial for me, because it has allowed to as much know the advanced in this field in Japan as in the countries of the region. Also to interchanges experiences with the attending colleagues to the seminar. JICA must continue support these events that serve to evaluate the situation of the county in this field.

Zenon, Peru: (no comment)

Jaime, Peru:

I suggest prepare protocols for any kind of disasters and consider the TIME of RESPONSE like new important parameter for the elaboration the hazard map. Also I propose review marketing concepts with focus in disaster management.

Enrique, Peru:

I am very pleased for this meeting that JICA organized, it contributes and helps the development on volcanic and sabo engineering field in our country. I hope more activities like this in the future.

Katherine, Peru:

It should be considered the participation of at least one or two civil defense officers in the seminar. In this way they could compare our system with other countries.

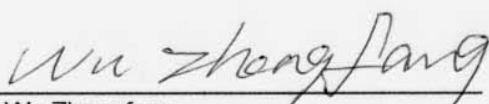
Visentina, Peru:

The seminar was necessary for interchange of experience and to learn about the different method in the research of the volcanoes.

以 上

MINUTES OF DISCUSSIONS
ON
THE FOLLOW-UP SEMINAR
FOR
THE JICA GROUP TRAINING COURSE
"VOCANOLOGY AND (VOLCANIC) SABO ENGINEERING"
HELD IN
THE REPUBLIC OF THE PHILIPPINES

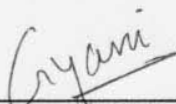
Sulo Hotel, Matalino Road, Diliman, Quezon City
December 10, 2004



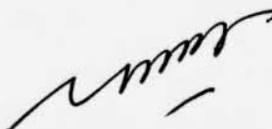
Dr. Wu Zhengfang
Professor, Collage of urban and
Environmental Sciences,
Northeast Normal University,
Peoples Republic of China



Mr. Hooshang Hemmati Far
Assistant Manager,
Hormozqan Jihade e-Agriculture,
Islamic Republic of Iran



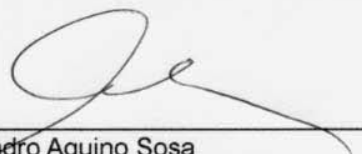
Mr. Gyani Raja Chitrakar
Seismologist,
Department of Mines and Geology,
National Seismological Centre,
Nepal



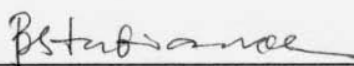
Mr. Hariyono Utomo
Project Manager, Sabo Technical Centre,
Directorate General of Water Resources
Ministry of Public Works, Indonesia



Mr. Muhamad Hendrasto
Chief, Central Java and East Java Section,
Directorate of Vocanology and Geological
Hazard Mitigation, Indonesia



Mr. Alejandro Aquino Sosa
Project Manager 1,
Project Management Office for Major
Flood Control, and Drainage Projects,
Department of Public
Works and Highways, Philippines



Ms. Bella S. Tubianosa
Science Research Specialist II,
PHIVOLCS
Philippines



Dr. Hiroyuki Hamaguchi
Leader,
JICA Follow-up Mission

1 Introduction

JICA held a follow-up seminar for the participants of the Group Training Course "Volcanology and (Volcanic) Sabo Engineering" in the Asian region from December 6 to 10, 2004 at the Sulo Hotel, Quezon City, the Republic of the Philippines. The objectives of this follow-up seminar were

- (1) to exchange field techniques in geophysical and geochemical monitoring;
- (2) to understand how to utilize hazard map with public involvement in mind;
- (3) to discuss and propose a system for a more effective and efficient partnership among countries to enhance capacity to manage disasters; and
- (4) to motivate participants to play a more active role in disaster management efforts in each country.

2 Participating Countries

27 ex-participants for the Group Training Course "Volcanology and (Volcanic) Sabo Engineering" from the following 5 countries, together with 4 member JICA mission, participated the seminar.

- (1) People's Republic of China
- (2) Republic of Indonesia
- (3) Islamic Republic of Iran
- (4) Kingdom of Nepal
- (5) Republic of the Philippines

3 Result

The seminar consisted of lectures/discussions, field trips, presentations, and plenary session. Through this seminar, following main points were discussed and agreed upon.

Organization strengthening and systems building process

- (1) Sharing structural and non-structural information –volcanic hazard map- with other ministries and agencies are necessary within each country.
- (2) Continuous effort for preparation of hazard map needs to be taken by concerned agencies and technical experts.

Suggestions for the improvement of the training course

- (1) Individual course should be more specific.
- (2) Individual course needs more practical idea, for example to deal with actual cases.
- (3) The content of the course is good enough for six months.
- (4) There should be some kind of supplementary assistance to improve the individual course to ensure continuous support for the participants.
- (5) Some of the Japanese technology is too expensive to apply to their home

countries, hence, it is also necessary to consider low cost technology/non-structural measures.

- (6) During the training course in Japan, providing short term observation visit to other countries for comparison studies should be considered.
- (7) Each participating country is capable of organizing the observation visit.
- (8) Require each participant to submit an annual report after leaving Japan to update the JICA/lecturers.

Network

- (1) Continuous communication is important among participants.
- (2) Establishing Mailing list was agreed upon.
- (3) Contents of the email must be brief information.

Follow up seminar

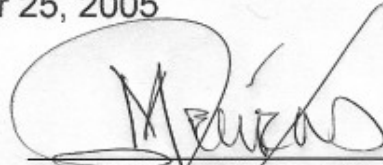
- (1) Continuous follow-up seminar in different countries should be taken into consideration.
- (2) Exchange of experiences, knowledge and techniques on the latest development in the field of disaster management has been concluded beneficial in this seminar.

MINUTES OF DISCUSSIONS
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"VOLCANOLOGY AND (VOLCANIC) SABO ENGINEERING"
HELD IN
REPUBLIC OF PERU

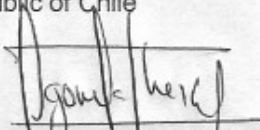
Garden Hotel, R.Rivera Navarrete 450, San Isidro, Lima
November 25, 2005



Juan Antonio CAYUPI YAÑEZ
Seismologist/Volcanologist, Civil Protection Dep.,
National Emergency Bureau, Ministry of Interior,
Republic of Chile



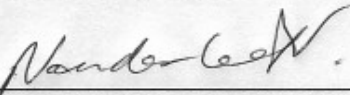
Martín Roberto PEREZ LARA
Head, Hydraulic Work Department, Public Works
General Direction, Ministry of Public Works,
Transport and Housing
Republic of Honduras



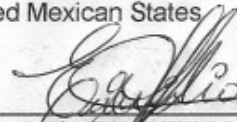
Diego Mauricio GÓMEZ MARTÍNEZ
Coordinator of the Volcanological Observatory of
Pasto, Geohazard Area, INGEOMINAS,
Republic of Colombia



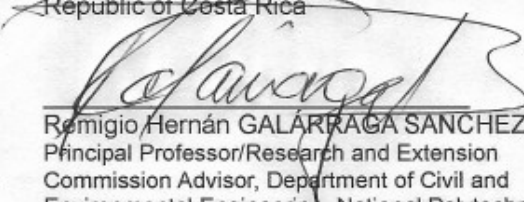
Esteban RAMOS JIMENEZ
Research Subdirector, Civil Protection Institute of
Mexico State
United Mexican States



Rodolfo VANDER LAAT VALVERDE
Professor/Researcher, Volcanology and
Seismology Observatory, National University,
Republic of Costa Rica



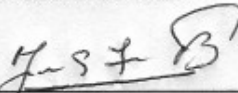
Emilio Adán TALAVERA MARTÍNEZ
Seismological Director, Seismology Div., Nicaragua
Institute of Territorial Studies (INETER)
Republic of Nicaragua



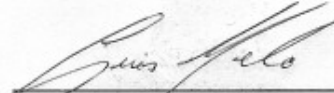
Remigio Hernán GALARRAGA SANCHEZ
Principal Professor/Research and Extension
Commission Advisor, Department of Civil and
Environmental Engineering, National Polytechnic
School
Republic of Ecuador



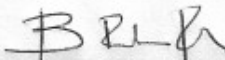
Vicentina CRUZ PAUCCARA
Scientific Assistant in Volcanic Geochemical,
Geological, Mining & Metallurgical Institute
(INGEMMET)
Republic of Peru



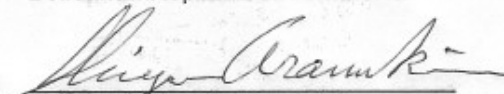
Francisco Antonio BARAHONA
Professor, School of Physics, Faculty of Natural
Sciences & Maths., Univ. of El Salvador
Republic of El Salvador



Luis Ernesto MELO GARCIA
Geologist, Geological Operations, Eastern
Exploration, PDVSA rock physics Lab
Bolivarian Republic of Venezuela



Byron Rubén PEREZ ALVAREZ
Head, Laboratory of Soil & Materials, National
Institute of Electricity
Republic of Guatemala



Shigeo Aramaki
Leader
JICA Follow-up Mission

1 Introduction

JICA held a follow-up seminar for the participants of the Group Training Course "Volcanology and (Volcanic) Sabo Engineering" in the Latin American region from November 21 to 25, 2005 at Garden Hotel, Lima, the Republic of Peru. The objectives of this follow-up seminar were

- (1) to exchange field techniques in geophysical and geochemical monitoring;
- (2) to understand how to utilize hazard map with public involvement in mind in each respective context;
- (3) to discuss, propose and adopt a system for a more effective and efficient partnership among countries to enhance capacity to manage volcanic and sediment related disasters;
- (4) to establish a permanent network of volcanic observation and sabo experts to share information and discuss issues related to volcanic and sediment related disasters; and
- (5) to motivate participants to play a more active role in disaster management efforts in their respective countries.

2 Participating Countries

23 ex-participants for the Group Training Course "Volcanology and (Volcanic) Sabo Engineering" from the following 11 countries, together with 4 member JICA mission, participated the seminar.

- (1) Republic of Chile
- (2) Republic of Colombia
- (3) Republic of Costa Rica
- (4) Republic of Ecuador
- (5) Republic of El Salvador
- (6) Republic of Guatemala
- (7) Republic of Honduras
- (8) United Mexican States
- (9) Republic of Nicaragua
- (10) Republic of Peru
- (11) Bolivarian Republic of Venezuela

3 Result

The seminar consisted of lectures/discussions, field trips, presentations, and plenary session. Through this seminar, following main points were discussed and agreed upon.

Hazard maps

- (1) Making hazard map requires much manpower and cost. However, it is important to mitigate disasters.

Sabo engineering and Volcano monitoring

- (1) This seminar discussed importance of the sabo engineering and volcano

monitoring as very significant tools for disaster prevention and mitigation.

Promotions for increase the number of applicants

- (1) Promote future applicants with former participants network.
- (2) Promote application of participants from private companies and NGOs.

Improvement for JICA group training course

- (1) If possible, each participants should have the opportunity to know who will be his/ her adviser before to leave for Japan in order to establish e-mail communication.

Follow-up seminar

- (1) This seminar is a good opportunity to share experiences and continuous communication.
- (2) This seminar gives us opportunity to present opinions about JICA training course and the way to improve it in the future.
- (3) If possible, this kind of seminar would be held regularly, every 2 or 3 years.
- (4) Participants would like to have specific subject discussion.
- (5) This seminar is useful to discuss with neighboring countries, which have common issues.

Network

- (1) Continuous communication is important among former participants.
- (2) Establishing a mailing list was agreed upon.

