Instituto do Petróleo e Geologia – Instituto Público
(IPG)

4th IPG International Geosciences Conference on
Timor-Leste Geological Data and Information for Economic Diversification and Development
Dili 23-26 October 2018

Note Taker's Document

Date: 26 /10 / 2018 **Time: 09:25-09:50** **Conference Day: 4**

Venue: CCD **Conference Speaker: Dr. Asep Karsidi (BPPT)**

Presentation Title/Topic: The Importance of Geospatial Information for Development

Presentation Notes	Q&A
• Indonesia iha ai laran tuan barak no lokalija iha plata tektonika tolu nia klaran, mak hanesan plata Pasifiku,Eurasia no Indo-Australia. • Konteudu kona ba informasaun spatial nee bele indika fatin objektu ka fenomena balun nebe akontese ih arai leten. • Papel informasaun geospatial ba desemvolvimentu nian mak atu utilija ba: *site sellection, disaster, settlement, mining, forestry, agrucultur no social economic analysis.* • Ohin loron era dijital servisu ho komputador bele kria kualker mapa tematika atu suporta plano dezemvolmentu, bele identifika área agrikultara, hela fatin no seluk tan. • Uja teknolojia satelit atu suporta servisu. Liu husi Satelit/GPS bele hatene fatin no movimentu iha rai leten no mos satelit komunikasaun atu halo fasil komunikatsaun. • Kria informasaun kona ba informasaun tematiku gestaun desastre. • Plataforma digital ida nee para bele konfundu informasaun lolos, entaun persija kolaborasaun entre parseiru sira hotu. • Iha *one policy map* ida atu bele uja objetivu hotu hotu, no sai hanesan mapa baziku no referência. *One Map policy* nee maka hanesan: geo-reference, geo-standard, ge-database no geo-portal. • Mapa baziku iha layer lubuk ida nebe kria husi agencia ida deit no institutu ka ajensia relevante uja utiliza deit ona ba nesesariu no ajensia seluk la kria tan ona mapa baziku foun tan. • Utilija mos ba Konsensi fronteira hanesan: e*nergy &NR, forestry, land*	**Name: Zilberto Moniz** **Institution: DIT** **Question/Clarification:** Geospatial hanesan fenomena ida, entaun oinsa atu identifika bainhira fenomena nee akontese? **Answer:** Sim, geospatial hanesan fenomena ida, atu identifika fenomena sira nee husi fenomena fisikal. **Name: Jacinto Soares** **Institution: Timor Resources** **Question/Clarification**: oinsa difikuldade ka problema wainhira komesa ho prosesu *One Map Policy?* **Answer:** klaru katak servisu tuir One Map policy nee la fasil iha interese barak liu husi ajensia no intitusaun relevante sira hotu maibe importa mos katak nee sai hanesan mapa baziku hotu.

authority no transmigration.	**Name: Adalberto de Jesus** **Question/Clarification:** tamba sa mak Indonesia nee akontese rai nakdoko no tsunami? **Answer:** Indonesia hanesan nasaun boot ida iha lina *ring of fire* nian no lokalija iha plata tektonika 3 nia klaran, bainhira entre plata 3 nee maka ida book aan maka bele hamosu desastre hanesan rai nakdoko no tsunami.

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Date: 26/10/18 **Time: 09:55-10:10** **Conference Day: 4**

Venue: CCD **Conference Speaker: Luis Teofilo da Costa (IPG)**

Presentation Title/Topic: Tsunami Modelling of Dili City

Presentation Notes	Q&A
• Tsunami Hazard Analyses of Timor-Leste • Introduction Timor is an Island that located in between Australia and Indonesia. Timor Island lies between three large active plates and close to the ring of fire. Earthquake monitoring and catalog of IPG shows that Timor Island is categorized as an active seismic activity. All earthquake occurrences related with the tectonic plate activity and fault systems in surrounding Timor Island: Southeast : Aru Trough West : Savu Thrust, Notrh : Wetar thrust, Suture and Kisar thrust South : Timor Trough Those earthquakes can be generated Tsunami. This study focused on tsunami hazard analysis which has high possibility impact to Timor-Leste. • Objectives of the study Estimate Time of Arrival (ETA) Estimate of Tsunami Wave height Tsunami Inundation Map • Historical Tsunami of Timor and Surrounding Islands Tsunami Impact for Timor Island: Tanibar Tsunami in 1629, Wetar Tsunami in 1857, Flores Tsunami in 1992 and 1814, Alor Tsunami in 1818, Sumbawa Tsunami in 1977,	**Name: Nico** **Institution: Luta Hamutuk** **Question/Clarification:** Tuir istoria tsunami ne'ebe iha barak liu lokalija besik iha illa Timor no halo komparasaun mos hanesan Palu iha Indonesia, karik IPG iha ona preparasaun wainhira akontese tsunami tanba ita hare iha Palu ne'ebe foin lalais akontese tsunami sira iha ema expert barak mas numero ema nebe mate aumenta aas? **Answer:** Preparasaun sim entermus husi parte seintifiku nian nafatin halo observasaun. **Name: Isabel** **Institution: Feto Engineria** **Question/Clarification:** Husi ita nia apresesntasaun ita dehan musipiu Dili mak posibilidade ba tsunami,impaktu husi tsunami ne'e rasik saida no oinsa ho area pantai kelapa? **Answer:** Impaktu husi tsunami bot tebes. Por ezemplu : *Ita investe osan husi fundus mina rai bot ba infrastutura ho tempo nebe naruk maibe kauza

Atapupu Tsunami in 1908 • Methodology COMCOT (Cornell Multi-Grid Coupled Tsunami Model) Software Numerical Modelling • Flow chart for modelling Earthquake and Tsunami Historical Data Collection→Data Input→Parameters Set-up and Simulation run→Simulation Result • Earthquake and Tsunami Historical Data Collection in Wetar Island • Parameters Set-up and Simulation Run To gain the data for ETA and Estimated Tsunami wave height, we need to observe the tsunami wave around the coast. We applied 10 municipalities in East Timor: Ainaro, Covalima, Manufahi, Viqueque, Lautem, Baucau, Manatuto, Dili, Liquiça, Bobonaro, Oecussi • Simulation Result and Discussion Wetar Thrust: Earthquake at Wetar Thrust in 1857 generate Tsunami and propagate closely to Timor-Leste and generate initial wave 3 meter. • Wetar Thrust Tsunami Propagation For: Liquica, Dili, Manatuto, Baucau, Bobonaro, Lautem, Oecusse, Viqueque, Manufahi, Ainaro, and Covalima. Tsunami in Wetar Trust in 1857, 40 people had become victims along with 3.1 m initial tsunami wave height observed in Dili. (Latif et al, 2000). • Tsunami Inundation in Dili City Low land will be flooded by 3 meters and the inundation can reach 2.4 km • ETA (Estimate Time of Arrival) and Estimate Tsunami wave height For Manatuto 18 Minutes, for Dili 11 minutes, for Liquiça 7 minutes, for Bobonaro 44 minutes.	husi tsunami estraga iha minutu balun deit, ne signifika katak atu reinfrastrutura precisa investe osan bot tan no lori tempo mos. *Impaktu seluk mak hamate ema nia vida, ita bele lakon ita nia familia mos * Bele afeita ba inundasaun no mos bele halo kauza ba moras. Atu dehan deit katak tsunami akontese laos lor-loron maibe sekali akontese nia impaktu bot tebes. **Name: Libania** **Institution: CSIL** **Question/Clarification:** Why some municipality has a possibility for tsunami does it because of the localization of the municipality or something else? **Answer :** Sim, Iha. Uma nebe besik deit iha tasi ibun neba mos ninia fundasi namlele ona, sa tan tsunami akontese. Nebe hau sente area neba laos hau dehan labele hela maibe risku ntao nia solusaun mak nee infrastutura iha coastal tenke hare mos ba parte entermus seismisidade.

Estimated Initial Inundation of Dili City based on Wetar Thrust earthquake in 1857, most area along Dili coast are get flooded. • Conclusions Timor-Leste is categorized as an active seismicity although very weak intensity. Big earthquake can be occurred in Timor and Surrounding Islands and generate Tsunami. Tsunami hazard analysis for Timor-Leste based on historical event scenarios show that an earthquake in Wetar Thrust in 1857 has a major impact to Timor-Leste. The area that will be flooded from Wetar tsunami is coastal area of Liquica Municipality within 7 minutes while Dili city takes around 11 minutes and Manatuto takes 18 minutes. For other municipalities such as Bobonaro, Baucau, Lautem and Oecusse take more than 40 minutes. The initial waveheight estimated 3 meters and the inundation can reach 2.4 km.	

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Date: 26/10/18 **Time: 10:15-10:30** **Conference Day: 4**

Venue: CCD **Conference Speaker: Oktoviano Viegas Tilman de Jesus (IPG)**

Presentation Title/Topic: Identification of Coastal Erosion and Coastal Inundation Prone Areas in the North Coast of Timor-Leste (A Preliminary Study)

Presentation Notes	Q&A
Identification of Coastal Erosion and Coastal Inundation Prone Areas in the North Coast of Timor-Leste (A Preliminary Study) • Introduction Timor-Leste Island located between the Australian Continent and Banda terrain, Timor-Leste in general, has about 783 km length of coastlines (Global CAD and ITB-CCC, 2017). There are only 11 Municipalities (including RAEOA) related to the coastal areas in Timor-Leste. Approximately, 66% of the population lives in coastal and lowland area below an elevation of 500m (USAID, 2015). Main Coastal Geo-Hazard occurrences: Coastal Inundation and Coastal Erosion. Aside, from Coastal Geo-Hazard, there are some areas along the North Coast of Timor-Leste also prone to Landslide and sediment-Related Hazard. Global sea level rise contributes to increased coastal inundation, coastal erosion and losses of ecosystem affecting many urban beaches and facilities. • Objectives	**Name: Luis** **Institution: DIT** **Question/Clarification:** Currently IPG has done study on the north coast of Timor-Leste, what about South Coast? **Answer:** For the South Coast detail study and investigation IPG, through the Geo-Hazard division has already plan to conduct the study by next year.

Timor-Leste Northern Coastal Field Validation from previous preliminary study using LIDAR data for, potential coastal flooding areas. Generating the coastal instability map of areas affected by coastal flooding, using field data collection combined with the LIDAR Analysis. Recommending some possible measures on minimizing/reducing the coastal hazard occurrences in the hazard prone areas. • Location of the Observation Area The Study Area considered all areas along North Coast of Timor-Leste, including: Lautem, Baucau, Manatuto, Dili, Liquica, Bobonaro and RAEOA Municipalities, which consists of 43 Sucos. • Methodology GIS Interpretation→ Field Survey for validation/Confirmation and Identification → Coastal Instability/Hazard Map Production. The interpretation of the data is validated from the Map of coastal flooding, where identified areas potentially affected by the coastal flooding/coastal instability occurrences, based on the physical characteristics and land use in the field. • Result and Discussion - General Coastal Geo-Hazard causes along North Coast of Timor-Leste **Natural/Physical Factors** Geological and Geomorphological Condition, including the slope processes. (IPG, 2016) Waves, tides, Storm-surge (Extreme winds). (tropical storm (63-118km/hr)). (ADPC, 2012). Global Sea level rise	

Probably Seismic Activity **Social Factors** Human Intervention - Deforestation Vegetation Clearing from upper hill (ADPC, 2012) Upstream River Water Regulation works (ADPC, 2012) Excessive groundwater extraction along coastal areas (Marcal, 2018). • Physical Condition-Geology along the north coast of Timor Leste Some of the Lithological materials along the north coast of Timor-Leste, are prone to coastal erosion and coastal flooding. (IPG, 2016). The Geological Condition consists dominantly of: Alluvial Deposits, Suai Formation, Baucau Limestone and Aileu Formation. • General Slope Map of Timor Leste The northern coast of Timor-Leste, mainly consists of steep slopes/topography mountain, which falling directly into the sea. Areas potentially affected to the Coastal Inundation and Coastal Erosion Mostly at the 0-6, 6-13 degrees, based on the Map. • Seismic Hazard Map of Timor-Leste and Surrounding (IPG, 2016), shows a lot of seismic activity in the north part of Timor-Leste. • Map Potential Occurrences of Coastal Flooding in Timor-Leste Shows several areas in Timor-Leste coastal areas were identified using the GIS (LIDAR) Interpretation are prone to to coastal flooding/inundation. • Coverage of survey and waypoints There are 147 points were observed along the north coast area of Timor-Leste, which consists of municipalities such as; Baucau, Bobonaro, Dili including the Ataúro Island, Lautem and Jaco Island, Liquiça, and RAEOA.	

Maps identification of coastal geo-hazard of each municipality along north coast of Timor-Leste shows, several areas are prone to coastal inundation and coastal erosion, due to the both physical and social condition/impacts of the. • The coastal Geo-hazard assessment also been done along the north coast of Timor-Leste, shows several areas are prone to the coastal geo hazard. • Coastal Instability Analysis Ranking based on Lithology From very loose to fair. • Regional Coastal Instability Map of North Coast Timor-Leste Shows based on the different color type. The Brown Line Shows; Poor to Fair Lithology the Blue Line in the figure shows the Areas is prone to Coastal Inundation (Loose Materials). The Yellow Line shows Unstable Coast/Erosion. • Possible Solution for Managing the Coastal Geo-Hazard **Non-Structural** There must be a Law to manage the coastal Landuse, Coastal Hazard Areas Zoning, Disaster Education and Coastal Hazards Drills in Coastal Areas, Beach Nourishments, Mangrove and Coastal forest re-planting, Early Warning System (EWS) **Structural** Sea Wall, Breakwaters, Revetments, Storm Surge Barriers, and Elevated Housing. • Conclusion General Impact/causes of coastal geo-hazard in north coast of Timor-Leste are both physical/natural and social. Through the result of this study, the coastal Instability Map will serve	

as the basic guideline, which can be used by the Government and other institutions to implement the plan and management. Active processes of shoreline erosion and sedimentation in the north coast of Timor-Leste poses serious consequences for local communities and infrastructure, now and in the future. It results, in the degradation of functions and values of the coastal system. • Future Work Material strength is also influenced by structures, both primary and secondary. Thus, continued work on mapping fractures within the Quaternary units is imperative. Consider Estuary inundation Tidal Gauge Equipment Installation and data sharing is needed for further detail study. Beach Profiling, in order to determine the detail gradient of the slope along the coastal areas.	

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Date: 26/10/18 **Time: 11:00-11:15** **Conference Day: 4**

Venue: CCD **Conference Speaker: Marçal Ximenes (IPG)**

Presentation Title/Topic: Initial Study of Shallow Groundwater Quality by Using some Physico-Chemical and Microbiological Parameters in Debos and Sorrunding Areas- Suai Municipality

Presentation Notes	Q&A
INITIAL STUDY OF SHALLOW GROUNDWATER QUALITY BY USING SOME PHYSICO-CHEMICAL AND MICROBIOLOGICAL PARAMETERS IN DEBOS AND SURROUNDING AREAS-SUAI MUNICIPALITY • Introduction Shallow Groundwater is an essential and vital resource for people in Debos and Surrounding area to fulfill their need for drinking and washing. In early of 2016, IPG received an information from the local authority that several dug wells and boreholes in the region have been contaminated by petroleum. IPG through the Geological Investigation and Geohazard Division in 2016 performed an investigation to identify the main factor that caused this issue and to assess the general groundwater quality in the area. • Objectives of the Study To know the affecting factor on groundwater quality in study area. • Expected Result Results obtained were compared with permissible values for drinking water stated by World Health Organization for Timor-Leste (WHO, 2000) for drinking purposes. • Study Area Administratively, Debos area is in Suai Sub-district, Kovalima District	**Name: Gaspar Naser** **Institution: Ministry of Health** **Question/Clarification:** • Suggest having a good coordination from IPG with the Ministry of Health and Environment to have a cooperation and socialization for the groundwater quality in Suai area. Based on the result of study done by the IPG, hence the water quality is important for human life.

with coordinate: 125° 11' 9'' E - 125° 18' 40''-9° 15' 40'' S - 9° 21' 14'' S. Based on Hydrogeological Map, the area lies under the Intergranular aquifer, Fissured aquifer, and localized aquifer. • Methods and Equipment Literature Review→Hydrogeological Study, including Geological Data Compilation→ Resulted to the preliminary study. Equipment including: Water Level Meters, pH meter, GPS, Bottle Sample, Spectrophotometer and Brunton Compass. • Results shows on the shallow water table map. The groundwater level in Suai Loro area is range from 0.40 m to 8.6 m below surface. The groundwater level in Camanasa area is range from 13.8 to 19.6 m and Aidila laran area (Suku Debos) with average 16.70 m The relationship between shallow groundwater with surface water in the study area is influent, which is river flowing into the groundwater. The Physical properties results: water class is Brackish, TDS & Drinking water is Poor and Unacceptable. The result of the T. Hardness and Sulfate, shows the water hardness in most groundwater is naturally occurring from weathering of limestone, sedimentary rock and calcium bearing minerals. Can also influence by excessive application of lime to the soil in agricultural areas (British Columbia Groundwater Association, 2017). • Results-E. Coly and Total coliform based on Results-Laboratory analysis of physical and chemical parameters of Study Area and WHO standards, for all the dugwells • Summary Subsurface geological data interpretation is highly required for	

groundwater drilling in Debos and surrounding area to minimize the contamination risk by petroleum. The quality of the groundwater in the study still healthy for the drinking purpose, except in some areas (Asumaten-Debos and Matai area), which have been contaminated by the petroleum microbiology, and the Suai Loro area which has been contaminated with the sea water. • Recommendation Refer to geological condition in study area which is covered by unconsolidated sediments, the dug wells are required casing to prevent shallow groundwater contamination by human activity. The local government or relevant stakeholder needs to socialize to community regarding with the maximum and minimum distance between septic tank, livestock and dug wells. • Limitation Limited subsurface data to delineate aquifer and aquiclude distribution in Debos and surrounding area. Due to the lack of laboratory equipment, this study did not included analyses for chemical major elements and some minor elements. • Future Work Detail study using Resistivity method for Aquifer A, confined bed, Aquifer B, and Bed Rock to have Surficial geology and hydrogeological data.	

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Date: 26 /10 / 2018 **Time: 11:20-11:35** **Conference Day: 4**

Venue: CCD **Conference Speaker: Delio Manuel (USJTL)**

Presentation Title/Topic: Identification of Geotourism Potential: Touristic Zone of Oriental, Central and Occidental

Presentation Notes	Q&A
• USJTL hanesan unidade sientistajeolojista husi junior jeolista Timor oan. Unidade ida nee independente no nonprofit nebe maka fo garante atu partisipa iha dezemvolvimentu nasioanl liu husi estudu jeolojiku. • Idenifikasaun potensial jeoturismu nee foin hahu iha municipiu neen mak hanesan municipiu Lautem, Baucau, Dili, Ainaro, Ermera no Bobonaro. No sei kontinua mos iha municipiu sira seluk. • Jeoturismu hanesan fatin nebe maka seniku ka furak ba turismu natureza ho nia objetivu prinsipal maka identifika jeodiversidade sira hanesan jeolojika nebe bele atrai turismu, siensia edukasaun natural no konservasaun envaironmentu. • Exemplu fatin jeoturismu maka hanesan: morfolojia, fatuk kuak, lagua, fatuk lenuk, lagua tasi tolu, bee tiris, tasi ibun, bee manas, gas matan, no fatuk makerek. • Koalia kona ba jeoturismu iha Timor Leste, iha pontus balun nebe persija hare maka hanesan: *Timor-Leste is geological complex*, liu-liu kona ba modelu tektonika ilha Timor husi peskijador peritus jeolojista hahu husi 1968 too 1993 nebe sempre hamosu konseptu diferente, *Geodiversity and geoconservation* kona ba estudu mapamentu jeolojika no identifikasaun fossil iha Timor Leste, *Knowledge of geotourism* hanesan fatuk, fossil, strutura jeolojia, no fenomena jeolojia sira seluk, no mos *Enhancement of community-based economies* nebe persija servisu hamutuk entre komunidade, autoridade no governu kona ba oinsa atu halo dezevolvimentu ba potensial jeoturismu iha Timor Leste.	**Name: David Haig** **Institution: UWA** **Clarification / recommendation:** • Topiku potensial jeoturismu nee hanesan topiku nebe maka interesante no *highlight* iha konferensia internasional bad ala hat ida nee. • Potensia balun nebe maka boot liu hanesan mineral iha Timor Leste. • Timor Leste iha objetu jeoturismu no objetu turismu barak tamba nee persija kria kondisaun iha portu atu nunee cruise ship bele mai. • Identifika ona objetu jeoturismu barak tamba nee ba future persija halo Museum jeolojia ida hodi tau sasan ka amostra balun kona ba jeoturismu nee rasik. Hanesan iha xanana reading room iha museum jeolojia kiik oan ida iha neba maibe sasan ka amostra sira nee laos husi Timor maibe lori husi nasaun sira iha liur. • Iha area Venilale iha *fossil Fish* nebe maka identifika iha 2008, iha formasaun Wailuli

• Metodolojia husi pekija nee hahu ho: literatura, observasaun iha kampu no proseu mapa. • Rejultadu husi estudu *Identification of Geotourism Potential* nee identifika ona objetu potensial jeoturismu hamutuk 116 maka hanesan: 25 objetu iha municipiu Lautem, 22 objetu iha municipiu Baucau, 19 objetu iha municipiu Dili, 16 objetu iha municipiu Ainaro, 18 objetu iha minicipiu Ermera no 16 objetu iha municipiu Bobonaro. • Husi 116 objetu nee idetifika iha destinasaun jeoturismu area walu (8) maka: PNNKS, foho Legumau, foho Matebian, planaltu Baucau, foho Ariana & Ossuala, ilha Atauro, Foho Ramelau, no foho Leolaco.	nian ho idade early Jurassic. Persija ba hare mos ida nee. • Ba future karik harii museum jeolojia nasional bele loke mos nia filial iha fatin seluk. ✓ Delio Manuel : peskija ida nee foin halo iha municipiu neen no municipiu seluk sei kontinua no sei ba hare mos fatin sira nebe iha fosil no kona ba museum jeoljia nee hanesan tarjetu ida hotu ba future tamba nee mak agora dadauk ami sei akumula uluk dadus. **Name: Pedro Neves** **Clarification / recommendation:** karik bele hare mos sinais antropolojia iha area Vemase, no fosil iha Laclo atu nunee akumula hotu informasaun hirak nee.

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Date: 26/10/18 **Time: 12:00-12:15** **Conference Day: 4**

Venue: CCD **Conference Speaker: Dr. Hidehiko KAZAMA (JICA)**

Presentation Title/Topic: Development and Application of database system of geological and Geotechnical Information

Presentation Notes	Q&A
Development and Application of database system of Geological and Geotechnical Information • Concept of Database Data→Analog DB (Document) → User → Digital DB (Magnetic Disk), DB System Management • Geotechnical Information Database - Purpose of Geo-DB System To digitally stock geotechnical information obtained, and to utilize them for various analyses - Role of Geo-DB System Quickly search, pick up and display necessary data from accumulated data in the past Managing on Web-GIS is desirable. (GIS=Geographical Information System) • Contents of Geotechnical Information including; Site Location, Boring Log, Result of Soil Test, Result of SPT, Results of CPT, Results of Geophysical Logging, Geophysical Exploration, Geological Map, Topographical Map, Active Fault Map, and Old Map. • Geotechnical Information Database (Geo-DB) • Methodology for Building Geo-DBA System - Data items and contents Boring log, Results of soil tests - Data Format - Attention Points	**N/A:**

• Sample Boring log (Dili Port), Result of Soil Test (Dili Port) • Existing Geo-DB System in Japan • Estimated status of Geo-DB in other countries (after Todo and nonaka,2012). • Utilization of Geo-DB System - Construction Work and Disaster Prediction and Mitigation • Advance of Geotechnical Information Database The Latest Geo-DB System in Japan National Geotechnical Information Database (NGID). • Background of the Establishment of the NGID • National Geotechnical Information Database (NGID) • Challenges and Issues of Geo-DB • Conclusion - Attention is called for the following points from the construction to the utilization of the databases. To make clear the purposes of the database construction and the utilization, in consideration of future needs. To study the challenges and issues (a to f) listed in the preceding section 6, and to resolve them as much as possible To properly use and the data and analyses considering that the accuracy and reliability of the geo-information data are not consistent	

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Date: 26/10/2018 **Time: 14:00-14:15** **Conference Day: 4**

Venue: CCD **Conference Speaker: Osorio Xavier da Costa (IPG)**

Presentation Title/Topic: Concept and Design of IPG SDI's

Presentation Notes	Q&A
*There are 3 important points: 1.Data 2.Human Resource 3.Technology Data Center *Spatial data infrastructure is technology system integrated to manage, generate and to communicate spatial data and it's applications of spatial data in interpretation process to gain support in development plan. In context of how to share the data within stakeholders to support in decision making. *There are 3 mayor Functions of IPG's SDI concept: 1) Create spatial data harmonization 2) Register spatial data in systematic – Data Center 3) Publication *Why do we need MANAGE OUR SPATIAL DATA ? Reality that we are facing right now, Timor Leste didn't decided yet base map *Spatial Data Infrastructure. The SDI definition link to the 5 aspects of SDI above, indicated that those aspects as integrated system for establishment of Spatial Data Center in IPG and also can be respond to the ideal condition in spatial data management in integrated and systematic. SDI will takes us to ONE NATION ONE MAP REFERENCE in Timor Leste. * SPATIAL DATA Utilization Spatial data as evidence and reflection of real condition of the country.	**N/A:**

Utilization of spatial data as a tools to do some interpretation and spatial analysis before implementing national development plan for the country. Nowadays the technology of spatial data has been used in many countries around the world, especially to support decision maker in planning. *Application of SPATIAL DATA for : 1. Geological survey 2. Spatial Planning 3.Environmental monitoring 4. Engineering planning – Buffer 25m from river bank 5.Population Density Map 6. Geohazard and Mitigation planning 7.ESTATAL – Define Suco Boundaries & Toponymy 8.Identify Agriculture area 9.Military Strategic Plan * IPG Geodatabase Management System design into 3 categories : Wire house, Production, and Publication. *What are the benefits? 1. Understand well our Spatial Data 2. Support Government Plan in decision making 3. To Anticipate overlapping activities 4. Reduce Cost / Budget for spatial data investment 5. Overcome conflict about the Spatial DATA 6. Easy to access and sharing the Spatial Data within line Ministries 7. Access information for the Public	

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Date: 26/10/18 **Time: 14:20-14:35** **Conference Day: 4**

Venue: CCD **Conference Speaker: Daniel Hunter (Cardno Timor Leste)**

Presentation Title/Topic: Environmental Data Management for Sustainable Development

Presentation Notes	Q&A
Environmental Data Management for Sustainable Development • Introduction Industry diversification to ensure long-term economic stability Timor-Leste is dependent on good management of its other precious natural resources Enabling business environment + sound environmental practice = beneficial environmental & social outcomes Dual challenge – creating an enabling business environment while building and implementing robust regulatory frameworks to protect T-L interests. Timor-Leste is seeking to establish best practice as the norm • Biodiversity Hotspot Globally significant ecosystems Region of high plant biodiversity, estimated 41, 000 plant species 70% species endemic to the region Timor-Leste has 30 declared protected areas Significant ecosystems: Tropical forests, Mangroves, Wetlands and Marine reserves. Approximately 35% of the land area has some type of forest cover Part of the Coral Triangle • Key environmental issues Water Scarcity, Pollution, Loss of Biodiversity, Deforestation/Land Degradation, Erosion, and Waste Management.	**N/A:**

• Experiences Delivery of several Category A Environmental Impact Statements Both privately funded and government projects Many lessons learnt • Lessons Learnt Collaboration & Communication Early engagement with Government & community Local people have a wealth of knowledge to offer • Community Engagement Development of Community Engagement Plans, Identify and consult stakeholders early, Engage a diverse cross section of the community - Focus Areas Build trust, manage expectations, promote community buy-in • Natural Resources Data Natural Resources are the cornerstone of local and national development in Timor-Leste, Data and information are key ingredients for development, Sharing of data and information promotes integrated decision making and good governance of natural resources, Environmental Impact Studies should not be considered as box-ticking bureaucratic exercises, Data collected during EIS have intrinsic and enduring value beyond the context of individual projects, Timor-Leste has limited baseline data, Private industry helping to build national baseline, Collaboration with local institutions when undertaking baseline investigations is KEY. • Importance of comprehensive baseline data The more comprehensive the baseline data is, the better we can understand the potential impacts of a development and identify the most appropriate mitigation measures we can put in place	

Timor-Leste lacks adequate pre-development baseline data Comprehensive regional baseline datasets are essential to underpin the assessment of the possible impacts of any new industry and to inform the site-specific quantitative impact risk assessments. • What data are we talking about? Hydrology, Marine Biology, Soils, Spatial data, Public Health, Historical data, Hydrogeology, Regional geology, Census data, Terrestrial ecology, Protected areas, Meteorology, Traffic, Cultural Heritage, Fisheries, Socio Economic, Contaminated sites, Geomorphology. • The importance of integration, coordination & dissemination of data The absence of robust baseline data constrains infrastructure development, The lack of an integrated strategic and coordinated approach to data collection over large geographic regions can result in unnecessary data duplication, Let's learn from the mistakes other countries have experienced, Regional assessments provide a foundation for a planning framework, Data needs to analyzed, unlocked and converted into information and knowledge, Accurate, consistent and sufficient data leads to better informed decisions, Short-term, incomplete or flawed data can lead to irreversible harmful environmental and social effects. • Robust & coordinated data capture = better environmental & social outcomes Secure and store data when projects are finished Many Government Departments in Australia now mandate the sharing of baseline data EIS documents should be freely available to review in the public domain	

Data should be treated as a National Asset. • Conclusion Timor-Leste offers many opportunities based on its precious natural resources. Best practice is needed to drive sustainable development, including: Good science, Sound design & engineering, Robust technical and quality reviews, Transparent communication, Good data and information management. Need to balance the equation between sustainability and development	

Instituto do Petróleo e Geologia – Instituto Público
(IPG)

4th IPG International Geosciences Conference on
Timor-Leste Geological Data and Information for Economic Diversification and Development
Dili 23-26 October 2018

Note Taker's Document

Date: 26/10/2018 **Time: 14:40-14:55** **Conference Day: 4**

Venue:CCD **Conference Speaker: Oktoviano Viegas Tilman de Jesus (IPG)**

Presentation Title/Topic: Slope Stability and Rockfall Hazard Analysis along Karimbala Road, Liquiça Municipality Timor-Leste

Presentation Notes	Q&A
Slope Stability and Rockfall Hazard Analysis along Karimbala Road, Liquiça Municipality, Timor-Leste • Introduction Timor-Leste is a small and mountainous island country, located between Indonesia and Australia, it has the population of about 1.5 million. Timor-Leste in general, consists of different types of Geological condition (Geological structures), which made some areas prone to geological hazards, such as; landslide, flooding and coastal erosion. Generally, the study area is affected by frequent slope failures, causing difficulties and great danger to the drivers using the road. The slope failures occurring in this area consists of Rockfall, Plane Failure, Wedge Failure, Rock Topple. In analyzing the Slope Stability and Rock Toppling it is required to compute for the Factor of Safety (FoS) using SLIDE and ROCTOPPLE program. Where, the recommended Factor of Safety (FoS) for permanent slope is 1.50 (Samarawickrama, Amarasinghe and Bandara, 2014). In analyzing the Rockfall it is used the Rockfall Hazard Rating system	**N/A:**

(RHRS) classification Table and using the ROCFALL program for Rockfall hazard stability analysis.

- Objectives of the Study
  - The main objective of this work is to Perform the Slope Stability Analysis (SSA) and Rockfall Hazard Rating System (RHRS) for five selected road slopes in the study area.
  - Analyze the other probable causes the landslide/slope failure (Geology and Geomorphology, Hydrogeology, Seismicity/Earthquake events).
  - Study/analyze and propose stabilization (hard measures) on the road slope failures.
- Location of the study area
  Located in the NW part of Timor-Leste, along the Karimbala Road, Administrative post of Maubara, Liquiça Municipality.
  ~1.5 hrs. drive from Dili (Capital of Timor-Leste) to the study area.
- Methodology
  Desk Study/Preparation →Field Work and Data Collection→Solution, Mitigation and Recommendation
- Geology and Geomorphology
  The Local Geology of the study area belongs to the Formation of Aileu
  Phyllite, schist, amphibolites, slate, metasandstone, shale, few volcanic rocks. (Audley Charles, 1968).
  Geomophology of the sstudy area lies in a Moderate Topography
- Hydrogeology
  The study area is a part of localized aquifer (high fracture).
  The lithologies are impermeable towards the water, it has low porosity and low permeability.

The study area is controlled by the geological structures and discontinuities, including: Faults, folds and fractures influencing the water infiltration. • Seismicity The seismic activity occurrences nearby to the study area are ranging from 3.2-5.9 in its Magnitude and 0-88.1km in Depth. The PGA value used in this study is 28 gal or 0.28m/s^2. • GIS Analysis for General Landslide/Slope Failure Susceptibility Zonation Study Area lies in a Moderate to High Susceptibility Zone • Results and Discussion Using Rock Mass Rating System Classification, Slope Mass Rating Classification and Rockfall Hazard Rating System Classification. Results shows all slopes have poor quality based on the RMR, SMR and RHRS. Slope Materials Determination: Silty Gravel and Clayey Gravel For Slope 1 the FoS for Dry/Natural Condition, Saturated Condition, and Additional Seismic Load Condition are 1.637, 1.185 and 0.666 respectively. After slope stabilization using Wiremesh and Bioengineering and Rockfill the FoS become 1.518. Areas also prone to the Rockfall, after analysis for the stabilization using ROCFALL program, where installing the 2m barrier protection at the bottom of the slope. The slope is said to be in a safe condition. For Slope 2 the FoS for Dry/Natural Condition, Saturated Condition, and Additional Seismic Load Condition are 1.486, 1.153 and 0.706 respectively. After slope stabilization using Wiremesh and Rockbolts and Rockfill the FoS become 2.190. Areas also prone to the Rockfall, after analysis for the stabilization using ROCFALL program, where	

installing the 2m barrier protection at the bottom of the slope. The slope is said to be in a safe condition. For Slope 3 the FoS for Dry/Natural Condition, Saturated Condition, and Additional Seismic Load Condition are 1.204, 0.776 and 0.441 respectively. After slope stabilization using Wiremesh and Rockbolts and Rockfill the FoS become 1.588. Areas also prone to the Rockfall, after analysis for the stabilization using ROCFALL program, where installing the 2m barrier protection at the bottom of the slope. The slope is said to be in a safe condition For Slope 4 the FoS for Dry/Natural Condition, Saturated Condition, and Additional Seismic Load Condition are 1.603, 1.214 and 0.736 respectively. After slope stabilization using Wiremesh and Rockbolts and Rockfill the FoS become 1.875. Areas also prone to the Rockfall, after analysis for the stabilization using ROCFALL program, where installing the 2m barrier protection at the bottom of the slope. The slope is said to be in a safe condition. For Slope 5 the FoS for Dry/Natural Condition, Saturated Condition, and Additional Seismic Load Condition are 1.107, 0.842 and 0.514 respectively. After slope stabilization using Wiremesh and Rockbolts and Rockfill the FoS become 1.522. Areas also prone to the Rockfall, after analysis for the stabilization using ROCFALL program, where installing the 2m barrier protection at the bottom of the slope. The slope is said to be in a safe condition. • Conclusion The main causes for the occurrence of instability situations is the geological structures condition: Random and unfavorable orientation of discontinuities Presence of water on slopes.	

The slope failure occurs throughout the years in the study area, the most recent one was in January 2018, where the types of failures were: Rockfall, Rock Topple and Soil Slide The results of the RHRS classification correspond to this situation, which requires the adoption of rapid stabilization measures. • Recommendation To mitigate future slope failures in the post failure vulnerable areas, attempts were made to achieve a minimum Factor of Safety (FoS) of 1.5 by employing different types of improvement techniques such as: Drainage improvement (reduction of pore water pressure). To minimize the failure from the joints, discontinuities and fractures it is recommended to use the Wire Mesh and Rockbolts method. It is considered that the use of rockfill is a good solution, well suited to Timor-Leste because it can benefit from the abundant rock outcrops and does not need high skilled techniques or procedures. The Toppled rock mass generally sustains large strain in its inside, therefore it is recommended to remove the unstable part of rocks and construction of retaining wall at the toe of the slope (rockfall barrier/protection with the 2m in its height). For Soil Materials Improvement of securing using plant materials, by using the Bio-organic/ (Bio-engineering) Method. Rerouting is a possible alternative. If the slope failure would continue for long time the maintenance cost	

may increase. Detail engineering study and design of the road slopes before project implementation must be performed. A detail drilling and core sampling to have suitable subsurface data information for future detail study is highly recommended. This research work could serves as the starting results of study for future recommendation to the Ministry of Public Works of Timor-Leste on having the Factor of Safety (FoS) standardization for slope design, which must be greater than 1.5 for any road slope design along the Geological Condition of Aileu Formation. (Oktoviano, 2018)	

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4th IPG International Geosciences Conference on
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Dili 23-26 October 2018

Note Taker's Document

Date: 26/10/2018 **Time: 15:20-15:35** **Conference Day: 4**

Venue: CCD **Conference Speaker: Felix J. G. Jones (IPG)**

Presentation Title/Topic: A Microtremor HVSR Study for the Estimation of Seismic Site Effects in the Capital of Timor Leste.

Presentation Notes	Q&A
* Timor Leste is one seismically active region, * Timor Leste located between major boundaries plate of Australia and Eurosia, * The Australia plate subducts to the north beneath the Eurosian plate at a rate of about 70-80 mm/year. * The historic earthquakes in the Timor Island 1. Before 1990, Based on the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE, 1985) from 1897 to 1984 (magnitude 6 to 6.9) epicenters located offshore north of Timor Island. A magnitude 8 or greater recorded in 1963 with epicenter located offshore southwest of Timor Island. 2. From 1990 to present (after USGS) 6.3 magnitude earthquake has struck East Timor. The epicenter of the earthquake was 83 km west of the capital Dili (2015), and was 143 km deep, There was minor damage but no immediate report of casualties from the earthquake. * Earthquake damage is generally affected by **:** ✓ Earthquake strength (magnitude) ✓ Depth of source of earthquake ✓ Distance of earthquake source to location ✓ Building quality, etc.	**Name: Juvinal** **Institution: DIT** **Question/Clarification**: Tanba sa mak case study laiha Timor ? **Answer :** Tuir referensia pekijador internasional sira ne'ebe mak uja iha apresentasaun ida ne'e sai hanesan barumetru ida hodi ajusta dados ne'ebe mak kolekta iha Timor, no sai matadalan ba stadarijasaun tuir peritus internasional nian.

* Site effect of earthquakes on building structure : 1. Accelaration of the ground motion 2. Amplification factor of thicknes sediment layers 3. Recording the earthquake wave when earthquake occurs 4. Recording done use Seismometer device installed close to source of earthquake * Definition of microtremor is a low amplitude (in the order of micrometres) ambient vibration of the ground caused by man-made or atmospheric disturbances *Methodology of the study are : Literature review,Field Data collection and recorded automatic is stored in the sd card installed on the device, by using three component seismograph portable device, and 39 data which has been collected in field. *The research was conducted in Dili, with distance of observation point is about 250 – 1000 m. * Why Dili, because Dili is a capital and central of business focus on urban area.	

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Date: 26/10/2018 **Time: 15:40-15:55** **Conference Day: 4**

Venue: CCD **Conference Speaker: João Pedro Amaral (DNEPCC)**

Presentation Title/Topic: A Case Study Conducted on Aituto Landslide

Presentation Notes	Q&A
A Case Study on Aituto Landslide • Location of Aituto landslide Aituto landslide is located near the boundary of 3 districts, such as Ainaro, Manufahi, Aileu, and is administratively under Ainaro District. • What provokes Landslides? By human activities and errors By original fragile condition on the ground Increase of underground water level Existent of natural resources underground • How was the Aituto landslide found? The collapse of the slope occurred during the widening work of National road A05, so that the existence of a large-scale landslide was suspected behind of the slope. • What is the implication of landslide? A picture shows the landslide occurred at La Conchita, California, USA, in 2005. Ten people were killed, destroyed houses, roads, electrical power and paralyzing economic activity. (Photograph by Mark Reid, U.S. Geological Survey.) • Launching of the geological survey with drilling In collaboration with JICA Expects Team through CDRS Project, we conducted the geological survey with drilling to install the casings for inclinometer and groundwater monitoring. • Terminology describing features of landslides	**N/A:**

figure shows a graphic illustration of a landslide, with the commonly accepted terminology describing its features. • Definition of the term "landslide" The term "landslide" describes a wide variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, artificial fill, or a combination of all. The materials may move by falling, toppling, sliding, spreading, or flowing. • Various types of landslides The types of landslides can be differentiated by the kinds of material involved and the mode of movement. Rotational landslide, Translational landslide, Block slide, Rockfall, Topple, Debris flow, Debris avalanche, Earthflow, Creep, Lateral spread. • Flow of investigations on Aituto landslide Preliminary Investigation→Detailed Investigation→Analysis of Landslide Mechanism→Stability Analysis→Examination of Safety Factor→Consideration for countermeasures for landslide prevention • In preliminary investigation it is including: Topographic Investigation, Taking of the aerial photographs, Contour Map, Reconnaissance Survey, Geological Survey. • In Detailed Investigation it is including: Investigation of surface deformation, geological investigation, geological condition of the site. • In analysis of mechanism of the landslide it is including: Mechanism of the landslide, Confirmation of the surface of rupture, and Record the inclinometer. • In Slope Stability Analysis it includes:	

Calculation of the Factor of Safety using given formula. Also considers the cross section of the sliding mass for slope stability analysis, prepared excel file for slope stability analysis and using the method of assumption of cohesion of Japan. The result of slope stability analysis is calculated, and it continues to • Examination of the safety factor Examination of factor of safety for block A and change of the factor of safety after the collapse, as well as change the safety factor with rising of groundwater level. • Consideration on the countermeasures for landslide prevention Damage of the landslide assumed in the future, Impact of rising groundwater level, and countermeasure to drain groundwater.	