ANNUAL MEMBER COUNTRY REPORT

Country: PAPUA NEW GUINEA Period: 1 July 2016 – 30 June 2017

GEO-RESOURCES SECTOR

1. MINERAL PROGRAMME

1.1. Summary

Recruitment to key MRA Geological Survey positions saw strengthening capacity in the geological mapping and mineral exploration programs. This comes about at a time when the Mining Industry was shedding its workforce due to declining commodity prices. But the recruitment will now slowly enhance MRA Geological Survey’s capacity to efficiently deliver its key programs, especially in geological mapping and mineral exploration.

The World Bank TA II programs ended during the period putting an emphasis on MRA Geological Survey to now bear more responsibility in sustaining some of the projects. Training programs and staff research through CCOP, and other collaborating organisations, have assisted in building knowledge of the Geological Survey geoscientists.

With declining commodity prices the MRA Geological Survey is now being challenged to help deliver a diversified mineral base for the country by finding new commodities which are being demanded globally. There is also continued emphasis on alternative energy, especially renewable energy such as geothermal, by continuing its exploration programs.

The digital capture of archival library data continued during the period, proving to be a worthwhile program in generating interest from the industry.

1.2. Annual Review of Individual Technical Activities

During this period, The Geological Survey Division concentrated its efforts in delivering the three remaining World Bank funded programs, and also one collaboration program with China Geological Survey. The remaining World Bank funded programs included (1) A Desk-top Geothermal Resource survey, (2) Capture of surface and drill-hole geochemistry and PNG geology from exploration reporting (3) Map rectification and stratigraphic lexicon development. The other project, The Assessment of a Geotechnical Laboratory Development, was completed and reported in last year’s Annual CCOP report.

The Desk-top Geothermal Resource Survey was completed successfully, with the consultant providing training and analysis of samples collected from two geothermal sites in Papua New Guinea. Geological Survey Division staffs were tasked to do the sampling and mapping of the geothermal sites, one in West New Britain Province and the other in Milne Bay Province, after undergoing training at the Geological Nuclear Sciences facilities, Wairakei, New Zealand. Preliminary assessments of the geochemistry suggest reservoir conditions are appropriate for steam generation. Further investigations have been recommended for the two areas. Further details are provided below under Energy.

The capture of surface and drill-hole geochemistry data was completed at the end of 2014, after running for a year. Captured data included drill-hole, whole rock and stream sediment data from company reports and other records archived by the Mineral Resources Authority Library. The image below highlights the coverage of the project, at the end of the consulting period.
Geological Survey Division staff have since taken on the task of continuing the project.

The 1:250 000 Map Rectification project was completed successfully with the consultant developing a template for rectifying adjacent map sheets. A Geological Survey Division staff member was attached with the consultant on a full-time basis to take over the project when the consultant term came to an end.

The China Geological Survey/MRA Geological Survey Division collaboration on geochemical sampling commenced in early 2014 and by the end of 2014 had acquired 302 samples within the selected 1:100 000 Kainantu map sheet. Results are being jointly assessed for interpretation by both parties.

Within the reporting period, the Geological Survey Division (MRA) also delivered two major projects from its own funding. The two are: (1) The Wau and Biaru Geological Mapping and Mineral Exploration program and (2) Western PNG airborne geophysical survey. Completed maps of the Wau and Biaru 1:100 000 have now been released for critique and assessment by stakeholders. These will be followed by the release of the accompanying Explanatory Notes. The Western PNG airborne geophysical survey has also been concluded with the acquisition of over 30,000 line km of magnetic and radiometric data, between the giant Ok Tedi Copper-gold mine in the south and the Frieda River Copper-gold project in the north.

One Cartographer completed an MSc program from Kingston University, United Kingdom. One geologist doing MSc program on mineral prospects also successfully completed her program at Clausthal University. The Division is hoping more staff are enrolled for higher degree courses in the next few years.

Since taking on geothermal studies in Iceland, MRA Geological Survey Division has had so far trained three staff at the United Nations University’s Geothermal Training Program. Currently a fourth staff member is undergoing the 6-month training program, concentrating on Reservoir Modelling.

Work continues on compiling a catalogue of all air photography and note book data from 1:250 000 geological mapping in PNG by Geoscience Australia, which have now been scanned and delivered to Mineral resources Authority. Currently air photos are being geo-referenced to create a mosaic to be used in the compilation of new 1:100 000 geological map sheets. This is being used together with IPSAR data collected by DIGO in 2006, and delivered to MRA in September 2011. Staffs have been adequately trained in ERDAS Imaging, under World bank funded training in ArcGis, and other appropriate GIS software.

MRA Geological Survey Division did not send any of its officers to any CCOP-sponsored training during the reporting period.
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Table 1. List of Technical Notes produced by the Geological Survey Division, MRA

Papua New Guinea ranked just outside the top 10 destinations for mineral exploration and development (E&MJ & Raw Materials Group Annual Survey, 2012). The Mineral Resources Authority (MRA) continues its mandated function by regulating the mining industry in PNG and make readily available information on geology, exploration, tenements and mining to investors. There is significant interest by foreign companies for Exploration Licenses (EL). The Mining Advisory Council (MAC) meets regularly to deliberate on several applications and renewals.

As at July 2013/14, the Exploration Licenses stood at:
171 current licenses; inclusive of the 14 offshore licenses
77 licenses under renewal; inclusive of 55 offshore licenses
95 new applications; inclusive of 50 offshore licenses

Figure 1: Mineral Exploration Licence Status

Projects gaining international interest and moving towards production in the next few years in PNG are Xstrata’s Frieda River, Harmony Gold & Newcrest’s Wafi-Golpu, Marengo’s Yandera and Woodlark. Woodlark and Nautilus’ Solwara 1 projects have already been given ML’s and should commence mining operations within the next reporting period. All other projects have already commenced consultative processes with the Government and other relevant stakeholders in the country with regards to their respective operations.

Operating mines in the country continue to sustain the National Government’s budget, with more than 65% of the revenue, although there’s been a downturn in exploration and production due to the low commodity prices. Mining will continue to contribute revenue for the development of the country for the next 4-5 years. This percentage contribution currently experienced may increase with the export of LNG starting 2014/15. This period will also be the time the above mentioned mining projects will start production or are in the final stages of their constructions.
Mine | Copper (tonne) | Gold (Oz) | Silver (Oz) | Nickel (T) | Cobalt (T) | Chromium (T) |
--- | --- | --- | --- | --- | --- | --- |
Ok Tedi | 75,907 | 264,812 | 654,742 | - | - | - |
Newcrest Lihir | - | 755,847 | - | - | - | - |
Porgera | - | 411,767 | 79,517 | - | - | - |
Tolukuma | - | 7,215 | 1,3850 | - | - | - |
Hidden Valley | - | 206,705 | 1,951,675 | - | - | - |
Simberi | - | 53,084 | 10,585 | - | - | - |
Sinivit | - | 0.0 | 0.0 | - | - | - |
Ramu | - | - | - | 17,685.00 | 1,798.00 | - |
TOTAL | 75,907 | 1,699,430 | 2,710,369 | 17,685.00 | 1,798.00 | - |

Table 2. 2014 Mineral production figure from operating mines

1.3. Proposed Future Activities

The Geological Survey Division is currently conducting geological mapping and mineral exploration at the scale of 1:100 000. The areas being targeted as priorities are covered by existing airborne geophysical surveys. Also in conjunction with the mapping is the sampling for geochemical analysis. The National Geochemical sampling program is currently being conducted in collaboration with China Geological Survey’s Nanjing Institute for Geology and Mineral Resources. The integration of all these datasets will ensure more informative maps are compiled for the public. There are certain areas in the country that have yet to be covered by any airborne geophysical surveys. We have these areas targeted for future mapping.

The MRA Geological Survey Division also proposes to allocate time to assist rural miners in small-scale mining, especially in estimating resource size and in demarcating land tenures. Alongside small-scale alluvial mining, Geological Survey Division will also be attempting to investigate the potential of low-value minerals such as gemstones.

1.4. Assistance Required from CCOP/Other Member Countries in Support of Future Activities

Require assistance in enhancing and interpretation of geophysical images in association with other available geological and geochemical datasets.

CCOP may also be asked to support geochemical projects being planned for the country.

1.5. Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

It may be possible that our experiences in processing and interpreting of geophysical datasets, especially airborne magnetic and radiometric, and their usefulness in field geological mapping, can be highlighted or presented in a workshop to other CCOP members particularly related to interpreting such data along an active plate margin.

Others Comments

There is a strong need for the procurement of appropriate tools (eg., software and hardware) to enable integrated interpretation of geophysical datasets. Current configurations do not allow for smooth processing of the large datasets generated during the MSSP program in PNG. New configurations are being planned with updated hardware and software subject to funding.
2. PETROLEUM PROGRAMME

2.1. Summary

The Petroleum Division of the State Department of Petroleum and Energy (DPE) administers, regulates, monitors and promotes the Oil and Gas business in PNG through the Oil and Gas Act and its related policies and regulations, and corresponding laws of PNG.

Despite the Challenge of Lower Commodity Prices especially the sudden drop in oil and LNG prices since December 2014, PNG remains a strong contender for future World Class Gas and Mineral Projects.

The US$19 billion PNG LNG Project has proved to be one of the best LNG start-ups anywhere in the world following the long-term decline of oil production in PNG. With nameplate capacity of 6.9 million tonnes annually, the project was able to ramp up production to 8 million tonnes per year in 2016. Oil production is at an average of 30,000 barrels per day (bpd) in the last year, declining from 150,000 bpd in 1992. However, the condensate production from the PNG LNG Project and the Hides gas-to-electricity venture gave a grand total of liquids output of 59,268 bpd in 2016.

The PNG LNG project represents a game changer on PNG’s energy scene, PNG’s oil and gas production hit a new record of 245,097 barrels of oil equivalent per day (BOE/D), rise of 64.84% over the reporting period.

Figure 2: Papua New Guinea Petroleum Licences Map
By mid-2017, over 250 LNG cargoes have been shipped to Asian markets earning exports of over K15 billion. Refined petroleum product earnings from Puma Energy’s Napa Napa oil refinery in 2016 contributed K350 million.

Petroleum exploration was at a low ebb, but five (5) wells were drilled: Strickland -1 and 2, Muruk -1, Antelope 5 and 6 on the Elk-Antelope Gas Field. Muruk -1 well was a discovery located near the Juha Gas field and the producing Hides Gas Field.

There are five (5) types of concessional petroleum licences in PNG. They are: a) petroleum prospecting licence (PPL), b) petroleum development licence (PDL), c) petroleum retention licence (PRL), d) petroleum pipeline licence (PLL), and e) petroleum processing facility licence (PPFL). As at June 2017, there are 89 PPLs, 48 Applications for PPLs, 10 PDLs, 12 PRLs, 3 applications for PDL, 3 PPFLs, 2 applications for PRLs and 10 PLLs.

2.2. Annual Review of Individual Technical Activities

The Ministry of Petroleum and Energy engaged UK based Nexfex Petroleum Consultant to do a study on the Shale oil and gas potential in PNG. Following on from the study was the enacting of Shale Oil and Gas legislation by the PNG Parliament in 2015. The new legislation is called the Unconventional Hydrocarbons Act, 2015. This allows for shale oil and gas exploration to take place after a thorough review process by the DPE.

During the past year, review of the new applications continues including three applications for production licences over the Elevala-Ketu gas field, Pasca gas field and the P’nyang gas field.

Other onshore 2D surveys, LiDAR and geological exploration including seismic data reprocessing took place as per the work program commitment of each PPL.

2.3. Proposed Future Activities

Minister for Petroleum and Energy has also granted consents to five (5) geophysical companies to conduct 2D/3D seismic surveys in the southern offshore areas of PNG. One survey will cover both southern and northern offshore areas. Two companies have indicated to commence survey before end of 2017.

P’nyang South 2 appraisal well located in the southeast of the P’nyang field in PRL 3 permit is expected to be drilled soon. The drilling program is currently been reviewed by DPE. Antelope Deep carbonate exploration target in the Elk-Antelope field could be deepened and tested. Preparations are underway for drilling of Kalangar – 1 well in PPL 339 permit. The prospect is on trend with Total operated Elk-Antelope field. This has the potential to open up a new prospective trend in the Gulf Province.

Pasca A4 well is currently drilling offshore Gulf of Papua. Pasca A4(A-1D) will evaluate the properties of the Pasca A reservoir and test the known gas resource prior to suspension of the well for later re-use as a production well.

2.4. Assistance Required from CCOP in Support of Future Activities

PNG’s DPE would like to be involved in petroleum related activities within the CCOP member countries as collaborative projects and share experiences.

2.5. Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

PNG’s new legislation on Unconventional Hydrocarbons Act 2015 can be shared amongst CCOP member countries as a template and can be amended to suit each country’s
preferences. PNG has a concessional licensing system that can share with CCOP member countries.

Other Comments
DPE anticipate CCOP invitation to partake in all relevant petroleum related activities.

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3. ENERGY PROGRAMME

3.1. Summary
The MRA Geological Survey Division is currently involved in three energy-related projects; geothermal, hydro-power and coal. Geothermal resource sector continues to attract a lot of attention in the country. However lack of appropriate policy to regulate the resource continues to be an obstacle in moving forwards. The Geological Survey Division presented results of its 2013/14 geothermal sampling program at the World Geothermal Congress meeting, 2015 (WGC2015). The Division was also heavily involved in the development of hydro-power development projects. A compilation of coal occurrences is currently being compiled by the Division.

3.2. Annual Review of Individual Technical Activities
Papua New Guinea, through its relevant policy development agencies, continues to work on its geothermal policy to guide and regulate the exploration and development of the geothermal resource sector. The current policy, being developed through the Department of Mineral Policy and Geo-hazard Management (DMPGM), has now been submitted to the Office of the State Solicitor, for its clearance before it goes to Parliament for deliberations. All Exploration License applications made through the Mineral Resources Authority, and granted under the Mining Laws, have since been put on hold, as per advice from the Department of Attorney Generals, and will be reconsidered when the policy is passed.

But as part of its geoscientific investigations program, the Mineral Resources Authority continued to conduct research to better understand our geothermal systems. The projects carried out under the World Bank TAII have since been completed. Sampled geothermal water, gas and rocks, were analysed at the Geological and Nuclear Sciences facilities in New Zealand. The areas sampled for water, gas and rocks include the Talasea and Hoskins areas of West New Britain and the Deidei and Iamalele geothermal areas of Milne Bay Province. Initial geothermometric temperatures indicate deep temperatures ranging between 300 – 320 °C. Results of these investigations were highlighted in the CCOP 2014 thematic session and also at the recently-concluded WGC2015 conference held in Melbourne.

Geotechnical Engineering geologists from the Division were also heavily involved in the preliminary investigations and design stage of two hyro-power projects in the country. Engineering geologists were involved in geological mapping and drilling supervision of the Hela-Tagali Hydro-power project in Hela Province, and also at the Purari River hydro-power project.
The Mineral Resources Authority has commenced compilation of the occurrence of coal throughout the country. Two private companies did their compilations in 2013/2014 and the Authority has decided it is best for the country to have its own compilation. Regional basin studies on coal is set to commence in the later part of 2015.

3.3. Proposed Future Activities

The Mineral Resources Authority will continue geothermal sampling in other areas of the country to enhance our database of the resource. GSD will also pursue down-hole sampling for temperature and other related physical properties necessary for heat flow studies. The Department of Mineral Policy and Geo-hazards Management will finalize the Geothermal Policy for endorsement by the National Government by 2014. As a way forward there will be attempts to strengthen collaborations between key government agencies that will be involved in geothermal resources development, such as MRA, DPE, DMPGM, and the Department of State and Public Enterprise.

The Authority will continue its efforts in participating in its renewable energy development programs. Sampling and geological mapping will continue in other geothermal fields while geological mapping and geotechnical investigations will continue in hydro-power development projects.

3.4. Assistance Required from CCOP in Support of Future Activities

CCOP may assist in designing an appropriate geothermal database for the country and providing technical expertise in development of a case study. Providing funding for lab analysis will also be highly appreciated for all requirements, i.e. water and rock samples for geothermal analysis and also cores for geotechnical analysis.

3.5. Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

As a collaborative project, our officers can share the experiences and exchange ideas in conducting geothermal water sampling and direct current resistivity methods, magnetics and seismic refraction surveys around geothermal areas.

Other Comments

Our officers need more exposure to geophysical field exploration techniques in geothermal and mineralized terrains, and training in mapping of different mineral deposit styles in mineralized areas. PNG requests assistance from Member Countries who have had experience in the extraction of Geothermal Resources and to shed light on laws and policies that governs these particular resources.

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4. GROUNDWATER PROGRAMME

4.1 Summary

Groundwater investigations were carried out in several parts of the country during the reporting period. Most of the investigations were conducted for individual clients, working on different water supply projects with Water PNG. Several investigations were also carried out by the Division, as part of urban geology mapping programs for new townships. Direct-current resistivity surveys were
done together with hydrogeological assessments as part of urban town mapping in the Madang Province. Similar program is planned for Kokopo, East New Britain Province.

4.2 Annual Review of Individual Technical Activities

Groundwater investigations, comprising direct-current resistivity surveys combined with hydrogeological assessments were done for Grace Memorial Secondary High School in the Morobe Province, and Pangia Secondary High School in the Southern Highlands Province. These investigations were done in an attempt to define drill site for the location of new groundwater bores for the supply of groundwater to the two schools. A similar program was conducted in the Central Province, but in collaboration with the Department of Agriculture. This project was conducted to find suitable areas for bore water development to supply water to a farm being developed as part of the Pacific Adaptation to Climate Change, a UNDP program being conducted region-wide within the Pacific.

The MRA Geological Survey Division has also commenced conducting groundwater potential studies, in parallel with geotechnical engineering studies, as part of urban geological mapping. These investigations are aimed at helping town planners in infrastructure development for new urban areas. Such programs have commenced in Walium and Basamuk in Madang Province, and will continue in Kokopo, East New Britain in 2015.

4.3 Proposed Future Activities

Groundwater potential studies in urban towns will continue, but some attention will also have to be given to low-lying coral atolls and islands. These communities suffer from lack of clean, sustainable fresh water and the Division plans to put some emphasis in conducting groundwater studies in these islands for developing so that communities have access to clean fresh water all year around.

4.4 Assistance Required from CCOP in Support of Future Activities

CCOP may assist in designing groundwater retention schemes in low-lying atolls and islands. The Division also needs some training in developing shallow aquifers, and in the installation of manual water pumps that will serve rural communities.

4.5 Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

Experiences on the challenges faced by Papua New Guinea hydrogeologists in conducting groundwater studies can be shared with other member countries.

Other Comments

The MRA Geological Survey Division missed out on the KIGAM-sponsored groundwater training in 2013/14 and therefore would very much appreciate it if the training can be offered again soon.

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GEO-ENVIRONMENT SECTOR

5. COASTAL ZONE PROGRAMME

In 1999 a coast plan report titled “Geology and Natural Hazards of Lae city and surroundings, “Papua New Guinea” was produced. It was a joint project undertaken by CCOP TS, The Ministry of Foreign Affairs of the Netherlands Government and the Department of Mineral Resources of Papua New Guinea. Since then no coastal zone studies have been undertaken.

Nothing to report for the reporting period.

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6. GEOHAZARDS PROGRAMME

6.1 Summary

The Department of Mineral Policy and Geohazards Management (DMPGM) is new and emanated from the former Department of Mining and is responsible for (1) formulating policies and reviewing legislations related to the mining industry and (2) monitoring of geohazards activities in PNG and the region. The latter responsibility of DMPGM falls under the ambit of Geohazards Management Division and will be discussed further here. The Geohazards Management Division’s primary role is to monitor and assess geological hazards, like earthquakes, tsunamis, volcanoes, landslides and mass erosion events, in PNG and the region. The Division provides advice on the mitigation measures to relevant authorities and communities and where possible it provides early warnings of the effects of these hazards. Through applied research the Division aims to improve the capabilities to monitor, assess and where possible predict geological hazards in PNG. The Division comprises three Branches; the Rabaul Volcanological Observatory, Port Moresby Geophysical Observatory and the Engineering Geology and they are responsible for the monitoring of volcanoes, earthquakes, tsunamis and landslides/mass erosions in PNG respectively.

6.2 Volcanic Hazards

6.2.1 Annual Review of Individual Technical Activities

Routine monitoring of monitored volcanoes continued. The two Australian Government-funded projects through its international aid agency AusAID continued during the reporting period.

Civil works and construction of CTBTO IMS stations IS40 and AS76 commenced in May 2012.
Volcanic Activities

Manam, Tavurvur, Langila and Bagana had eruptions during the reporting period. Manam’s Southern Crater was active for most part of the period. Eruptive activity ranged from emissions of variable amounts of ash to small to moderate pyroclastic flows. The airborne ash drifted to the northwest and southeast parts of the island causing nuisance to the livelihood of communities in downwind areas. Pyroclastic flows, more explosive in nature, produced scoria fall mainly between southwest and northwest part of the island. About three sub-terminal vents formed on the eastern side of Southern Crater. All these vents produced lava flow. All the lava, small in volume, were restricted to the southeast valley only and terminated about 500m above sea level.

Tavurvur volcano in Rabaul erupted once during the reporting period. The eruption was small and near-vulcanian type. It occurred on 19th January 2013 and it was sustained for about two months. Ash particles from the eruptive activity got into flight paths of the Provincial airport resulting in suspension of flights into the province for 2-3 weeks during the northwest monsoon period.

Bagana, considered as the most active volcano in Papua New Guinea due to its sub-continuous effusive activity, continued to erupt effusively during the reporting period. Lava breaking away from the nose of the main lava flow rolled down the western flanks of the volcano. The volume of lava was too small to cause any concern. Besides the ongoing lava effusion a one-off small ash eruption occurred on 13th December 2012. Ash from the eruption was blown in the south east direction resulting in downwind areas, including Arawa, affected by light ashfall.

Langila volcano, located on the western end of New Britain island, produced mild vulcanian-type eruption from Crater 2 between October and December 2012. A slight increase in activity was noted in December for a short period.

Monitoring Activities

RVO persevered to maintain its monitoring equipment at Rabaul and the selected high-risk volcanoes including Ulawun, Manam, Lamington and Pago.

Work at Rabaul included ongoing maintenance of seismic and GPS stations,

The monitoring stations at Ulawun, Pago, Garbuna, Manam and Lamington, consisting of single seismic stations operated below satisfactory levels, mainly due to technical problems associated with power problems, lack of parts etc. At some places like Ulawun, local recordings are done on site but data transmission to RVO could not occur due to faults in some of the system components. Despite these shortfalls, daily reporting of volcanic information by the volcano observers, which also included Bagana, using HF voice radios are maintained at a satisfactory level. Two stations in West New Britain have ceased data transmission and work has been undertaken to restore operation.

Special Projects/Programs

Activities for RVO Twining Program and Strengthening Natural Hazards Risk Assessment Capacity Program, both funded by AusAID, continued.

Activities for the Twining Program involved work at Rabaul, Manam and Ulawun. Outcomes for the Risk Program have been finalised and its results will be presented at a small workshop on 9th August 2013 in Kokopo, East New Britain Province.

Due to pending outcomes on review of AusAID-funded programs in Papua New Guinea the deadline for both programmes were extended to September 2014 from September 2013.

Civil and construction works for the two CTBTO IMS stations, IS40 and AS76, commenced in May 2012. Some of the construction work was completed by October 2012 resulting in partial installation of some equipment during that month by visiting CTBTO and RVO personnel. Further equipment installation was conducted in May 2013, also by CTBTO and RVO personnel, resulting in 98% of the facility being completed with real-time data streamed to CTBTO data headquarters in Vienna. Some outstanding works, including element array H1, will be finalised during the next reporting period.
Community/Public Education

Community and public education on volcano and other geological hazards like earthquakes, tsunamis, landslides, etc., continued to feature strongly in RVO’s activities for the current reporting period. These activities were focused in Rabaul area with visitations to RVO by a wide range of visitor background, including educational institutions. Posters and leaflets were given to the visitors.

RVO also conducted a major 3-week volcano hazard and risk awareness program in vulnerable communities around Lamington volcano. The program was funded by AusAID under the RVO Twining Program. Oro Provincial Disaster Office provided assistance in the program.

6.2.2 Proposed Future Activities

Future activities for RVO will be guided by the mandatory responsibilities of the observatory and the overall 5-year strategic plan for the Department of Mineral Policy and Geohazards Management.

Some planned specific activities include carry-over of ongoing activities from previous work period as listed below:

- Continue to restore and upgrade monitoring equipment at Rabaul and the other high-risk volcanoes.
- Upgrade data transmission mechanisms from the remote high-risk volcanoes to RVO at Rabaul. The current system uses modem-configured HF radios. Upgrade of this system is year-marked for the next two years; however, there are plans to phase this out with VSAT systems. The outcome of this will depend on funding.
- Improve power supply systems for volcano monitoring at selected high-risk volcanoes including and Lamington with the installation of solar farms.
- Relocation of the Volcano Observatory to a new location and fitted with a state of the art volcano monitoring system.

6.2.3 Assistance Required from CCOP/Other Member Countries in Support of Future Activities

RVO receives its core operational funding from its mother department, the Department of Mineral Policy and Geohazards Management, however, it has also benefited immensely though aid funding from the Australian Government through its international aid agency, AusAID and UNDP/ SOPAC.

With donor funding RVO will continue to achieve the following:

- Improve the monitoring systems at Rabaul and selected high-risk volcanoes,
- Upgrade the GPS network
- Upgrade the modem-configured HF radios for transmission of volcanic data from the remote high-risk volcanoes to RVO.
- Increase in computer hardware

However, there is still more to be done and RVO certainly would welcome any assistance with funding and technical experts of the proposed activities outlined in (5.2.2) from CCOP, Co-operating Agencies/Countries and Member Countries.

6.2.4 Assistance offered to CCOP in Support of Future Activities

No assistance was provided to CCOP during the reporting period.
Other Comments

The main issues that affect the work of RVO are lack of sustained timely funding and Manpower in some of its key sectional functions. For example, restoration of some of the monitoring equipment at other high-risk volcanoes dragged on due to lack of qualified technical staff in the Electronics Section. Lack of adequate funding and properly skilled personal are major setbacks.

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6.3 Earthquake/Tsunami Hazards

6.3.1 Annual review of Individual Technical Activities

Port Moresby Geophysical Observatory (PMGO) continued to fulfil its role of monitoring earthquake and tsunami activity in the PNG region. During this reporting period (Sept. 2012 to July 2013) a total of 502 earthquakes occurred within the PNG region. Of the 502 earthquakes, two earthquakes had magnitude 7, 10 had earthquake magnitude 6.0 to 6.9 and 84 earthquakes had magnitudes 5.0 to 5.9, while the rest were of lesser magnitude. The two major earthquakes (magnitude 7 earthquakes) which occurred did not cause any significant damage within the epicentral region. The first major earthquake, a magnitude 7.0 event occurred in the central part of Papua Province of Indonesia on 06 April 2013 at 66km depth. The second major earthquake was a magnitude 7.3 event that occurred at a depth of 386 km underneath Feni Island in the New Ireland region of PNG. From these earthquakes no tsunamis were generated.

Apart from the routine monitoring of seismic activity, work on the EU funded (EDF9) replacement of seismic network physically commenced in December 2012 and ended in July 2013. All 10 stations of the network are now fully operational and adjustments and fine tuning is currently under way at the central hub facility. This is to ensure that the network is able to acquire seismic data and to locate earthquake satisfactorily. One issue that needs attention is the acquisition of an information dissemination system. This issue may be resolved soon. The project is expected to be commissioned before the end of the year.

PMGO was also involved with the pilot natural hazard and risk assessment project in East New Britain Province of Papua New Guinea since 2010. This pilot project was sponsored by the Australian Government through its Development Assistance Programme (AusAID) to assist with institutional strengthening and capacity building in natural disaster and risk assessments. This pilot project is in its final year of operation.

6.3.2 Proposed Future Activities

PMGO is seeking funding from PNG Government to support and maintain the new Seismic Network referred to above and to rehabilitate the PMGO Office and T/Top Seismic Station in Port Moresby. Submission for these requests is in train at the time of reporting.

One of the main elements of seismic hazards is to utilize information from active faults to evaluate hazards at location of interest. Currently PNG does not have such a database in place for easy access. PMGO would like to seek future support to develop an Active Fault Database for PNG. This will not only benefit PMGO for seismic hazard studies but will be useful for assessment of other natural hazards (eg; landslides) as well as for various development purposes.
6.3.3 Assistance Required from CCOP for Future Activities

Additional funding is required for training of staff with the relevant software (and hardware) applications and tools for the new seismic network as well as for the maintenance of network components and facilities.

Further collaborative support is required to initiate development of an Active Fault Database for PNG.

6.3.4 Assistance Offered to CCOP in Support of Future Activities

Annual membership fees/contributions.

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6.4 Landslide Hazards

6.4.1 Annual review of Individual Technical Activities

The annual review covers only the ongoing activities undertaken for the period 2012-2013 by the Engineering Geology Branch.

The Engineering Geology Branch commenced operation in the beginning of 2009 and not much has really happened.

However, strategic mapping and assessment of landslide affected areas has been a priority task of the branch. Since 2009, a big portion of the main Highlands Highway linking the coast to the inland areas failed due to an unusually high rainfall. The landslide was mapped and assessed and a report was produced for relevant government agencies to take corrective measures. Since then normalcy has been restored on the highway. Early year another major landslide occurred at Waingar in Simbu Province that affected the only route for supplies from the Port town of Lae to the interior which hosts the Petroleum and mining activities for over a week with exponential economic losses. Site visit was undertaken and a landslide assessment report was produced and circulated to relevant stakeholders. Library search on all previously reported landslides is ongoing.

The main project activity is the GoPNG - UNDP/SOPAC funded Pilot Landslide Hazard Mapping along the Simbu section of the Highlands Highway. A Contract was signed between the DMPGM and the Geoxmin Consultants for duration of one year (Jan-Dec 2013). Feature identification, awareness and reconnaissance of the critical unstable areas were progressed to be mapped by 2013.

Presently there is no data base and a landslide map covering all of PNG on any scale therefore the branch aims to create a landslide data base and produce a landslide hazard map at the smaller scale (1:250,000). It is envisaged that technical capacity within the branch would be boosted with hands on field exposure on pilot areas to be mapped on the most vulnerable sections of the Highlands Highway. Sustainability of this one off assistance to our major activity and professional help is adamant to achieve the Department vision.
The World Bank has also come on board to assist with re-equipping the engineering geology laboratory. Funding for this exercise was initially promised to be made available in September 2011 but further deferred to March 2012.

A funding to the tune of K250,000 US Dollar was allocated for the upgrading of the Engineering Geology Laboratory equipment through the Disaster Risk Management and Climate Change Program of the World Bank. Priority list laboratory and field equipment was submitted for procurement. A MOA is due to be signed early August 2013 with the Facilitating agency (The Department of Works) to procure and deliver these supplies to us.

6.4.2 Proposed Future Activities

Besides carrying out landslides investigations the branch is also embarking on the following activities:

- Have a user friendly data base for landslides. Currently there is none.
- Carryout landslides mapping by using remote sensing methods.
- Purchase new equipment for the laboratory for rock and soil tests.
- Develop landslide hazard maps at 1:20,000 scale.
- Carry out studies on the Engineering Geology of towns in PNG.

6.4.3 Assistance Required from CCOP of Future Activities

Assistance from CCOP TS will be required in the areas of;

1. Creation of a Landslide Data Base and provision of technical expertise
2. Provide training in Remote Sensing and to acquire satellite imagery interpretation software and hardware to aid in landslide mapping.
3. Installation of basic landslide monitoring instruments if any on high risk critical unstable features.

6.4.4 Assistance offered to CCOP in Support of Future Activities

No report.

Other Comments

Any assistance in the areas mentioned above will be highly appreciated.

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7. ENVIRONMENTAL GEOLOGY PROGRAMME

7.1 Summary
The only activity in this section was a radiometric survey of part of Sudest Island in the far southeast of PNG.

7.2 Annual Review of Individual Technical Activities
A study of possible radioactive sources on Sudest Island, Milne Bay Province proved no significant sources of high radioactivity at the areas indicated by locals in the area (TN2/2011).

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GEO-INFORMATION SECTOR

8. GEO-DATA AND INFORMATION MANAGEMENT PROGRAMME

8.1 Summary
The Mineral Resources Authority (MRA) through its Geological Survey Division is the manager of all mineral resources and geological information in Papua New Guinea. It is the custodian of all exploration, scientific, technical and other earth sciences publications on Papua New Guinea.

8.2 Annual Review of Individual Technical Activities

Data Digitization
The data digitization project under the WBTA 2, by Terra Search Ltd (from Australia) ended in December, 2014. The project has become an ongoing activity of the Geological Survey Division (GSD) in MRA. A team of three officers from GSD are continuing the activities, from scanning, data digitising to loading to Explorer 3 database system. MRA Mining Bulletin

The biannual Mining Bulletin magazine produced by the Mineral Resources Authority is now rescheduled to be an annual magazine until such time the recession in the industry picks up. It features brief updates of mines, advanced and brown field exploration projects in Papua New Guinea. The current edition in circulation is January-December 2014. The 2015 one is being compiled.

PNG Stone Heritage Book
The PNG chapter of the stone heritage book is completed; initial editing and proof reading is facilitated by CCOP Editors on this book.
8.3 Proposed Future Activities

Papua New Guinea Mining Museum project. This was reported in the last report. To date, this project has not progressed from the conceptual plan produced by an Australian company in 2013.

Predictive Mapping & Resource Modelling

The GSD is trialling predictive mapping from available geochemistry, geophysics and geological data in MRA. Gratitude to KIGAM for the training given to one of MRA geologists in utilising the features of ArcGIS to do predictive mapping.

The GSD has recently acquired Leapfrog, a software for resource modelling from drill core data. There is still a great deal of training to skill GIS officers and geologists on this subject.

8.4 Assistance Required from CCOP/Other Member Countries in Support of Future Activities

The plan to model known mineral resources is significant for PNG to make more spatial information available to assist investors and explorers. The division has the tools, but requires effective training in the areas of resources modelling to produce useful data/information.

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