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**ECONOMIC & SOCIAL BENEFIT ANALYSIS  
OF MINING AND ENERGY PROJECTS IN  
SOLOMON ISLANDS AND PAPUA NEW  
GUINEA**

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# ECONOMIC&SOCIAL BENEFIT ANALYSIS OF MINING AND ENERGY PROJECTS IN SOLOMON ISLANDS AND PAPUA NEW GUINEA<sup>1</sup>

by

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## **Abstract**

The World Bank states that mining encompasses metals and minerals. It includes open-pit and underground mining, large scale operations as well activities of small scale. (World Bank.org). Many big and strong economies of the world have mineral and mining as very important sector in terms of job creation and contribution towards the overall GDP of a country. The economic benefits brought about by the mining industry to many economies, especially the developing countries are substantial. Due to mining activities, infrastructure developments are taking place and governments are able to get tax incomes which eventually go towards improving services to the people. In Recent years, minerals and mining has focused more on the south pacific Island countries in search of gold, copper and other valuable minerals.

Mining has contributed a lot to the economic progress of some of the South Pacific Islands countries. Papua New Guinea has some of the world class mining operations. There are still advanced mining operations in PNG. In the Solomon Islands, the only mining company currently doing mining is the Gold Ridge Mining. There are other mining activities that are still in the prospecting and exploration stages. For PNG, the mining industry contributed significantly to its economy, contributing towards employment, infrastructure building and tax revenue for the government. The trend of mining activities in PNG is growing and is growing fast. However, the negative impacts mining brought about must be considered also.

Negative impacts of mining are perhaps most felt and by pacific islands' small states people. Environmental and social damages can are immense they seem, in short term, to outweigh the benefits. Forests are being cut down and destroyed, communities are losing fishing grounds, rivers and seas are being polluted, all in the name of development or economic activities yet schools and healthcare provision remain unimproved and governance institutions remains very weak. PNG has experiences some of the negative impacts more than Solomon does already. Solomon Islands begin to experience the negative impacts of mining activities with corruption, non-transparency around resource sharing and management and alike. The cyanide link few years back was a cause of concern/panic to the residences who live around the Gold Ridge area.

**Key words-** Solomon Islands, PNG, Mining, Economic and Social Benefits of mining and mineral, Small States, Corruption, Economic Growth, Social progress, Governance,

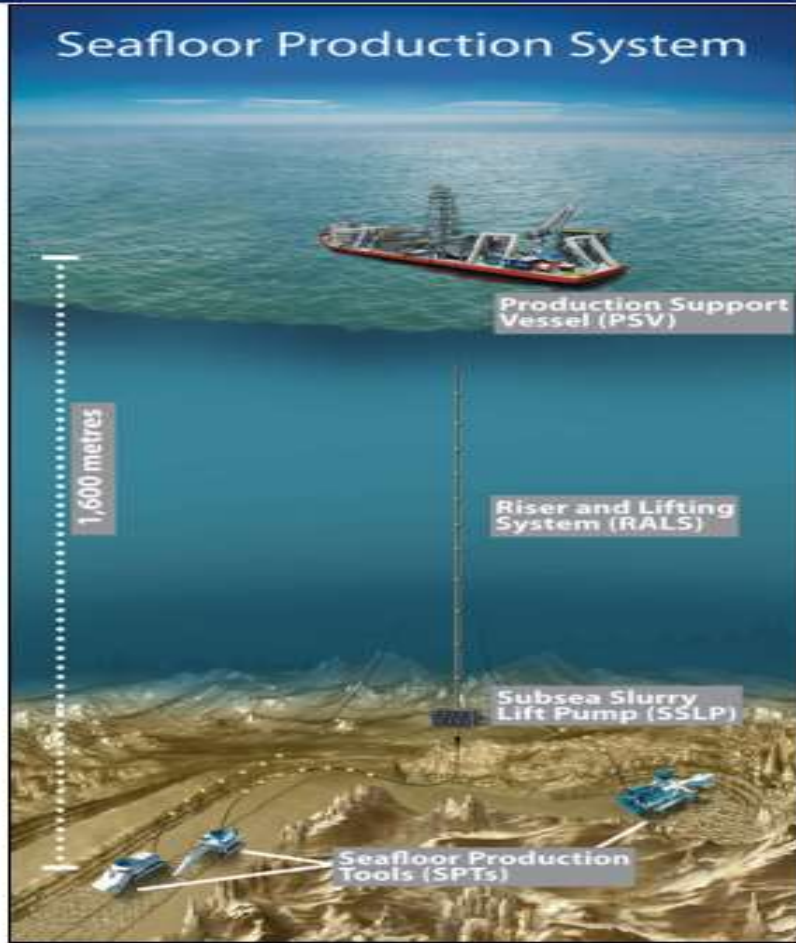


Photo: Deep Sea Mining in PNG- Solwara1 Project. [This project is currently under construction stages- expected operation date 2013]

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## **1 Introduction**

This paper discusses mining and mineral operations in the two countries Papua New Guinea and Solomon Islands with regards to its contribution to the overall Gross domestic Product and the economic development of each country.

Our finding shows that mining is an excellent contributor to economic growth and development as in the case of Papua New Guinea. Tax revenue from PNG Mining industries contributions to the PNG fiscal basket remains strong and growing steadily. The mining and minerals tax revenue remains an important contributor to the government fiscal budget over the last 10 years. This has been a strong contributor to the PNG government fiscal budget. It is anticipated that mining and mineral tax revenue will continue to grow and its proportion to PNG fiscal budget is likely to grow significantly in the coming years, boosted with LNG project tax revenue and other mining projects currently advanced in PNG.

However, though mining may bring positive impact to the economies of a country, if the government of the day does not have the right policies in place to address and deal with land ownership, waste management & disposal and other related social aspects of the industry, the repercussions are huge and can be damaging to both the resources owners, the mining companies, the government and the people related to mining industries.

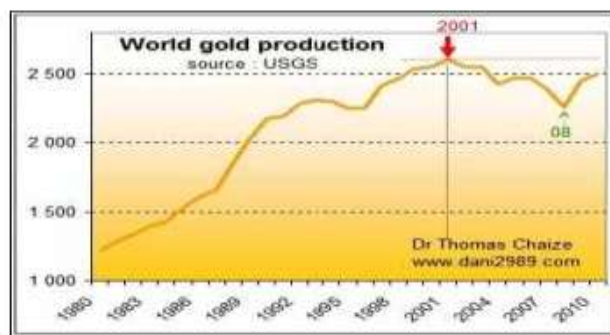
The main objective of this paper is to try and determined if mining contributed to the local economic growth of a developing country such as SI and PNG and what lessons can we or have we learnt from this? This paper will also highlight and identify policies with regards to issuing of licensing, exploration licenses, waste management & disposal, Tax & Royalty policies, relocation policy. Also we recommend a proper research should be done at the initial stages to address land tenure issues and relocation issues that mining can bring about to economic growth to a country.

## **2 Background of Mining and Minerals in the World Economy**

To understand the different contributions and impacts mining has on the economy and also its social impacts. There is a need to understand what mining does and what it involves. According to the World Bank, 'Mining encompasses metals and minerals. It includes open-pit and underground mining, large scale operations as well activities of small scale'. (World Bank.org)

The aim of this paper is to show that mining is an economically vibrant industry that has a lot to offer in terms of developing countries GDP. Other reputable organizations like the World Bank and Ausaid also share the same view. For instance the World Bank states that the way forward in developing the economies of the developing economies is to support the mining industries in those countries. Furthermore the demand for gold and other minerals continues to grow as the demand for it also increases. For example in the past ten years, there was a significant increase in the mining industries as shown in figure 1. This increase is the result of high demand and high price for these minerals.

**Figure 1**



In another World Bank report published in 2005, it states ‘Mining has a lot to offer developing countries besides improving their GDP’; because Mining also provides employment, business opportunities and other related benefits if proper consultation, right policies and open dialogue is encourage by the parties involved.

The Australian Government has the view that (<http://www.ausaid.gov.au/keyaid/mining.cfm>) mining helps in economic growth and poverty reduction”.

However as the saying go all good things has their negative side as well and so does the mining industry. The mining industry has detrimental impacts both socially, environmentally and economically as will later discussed which if not properly addressed, could severely affect the people that it come to develop as a result of conflict and damages to environment. So in order to ensure that sound and positive outcome is achieved through social stability and economic growth by the mining industries, a holistic approach is needed

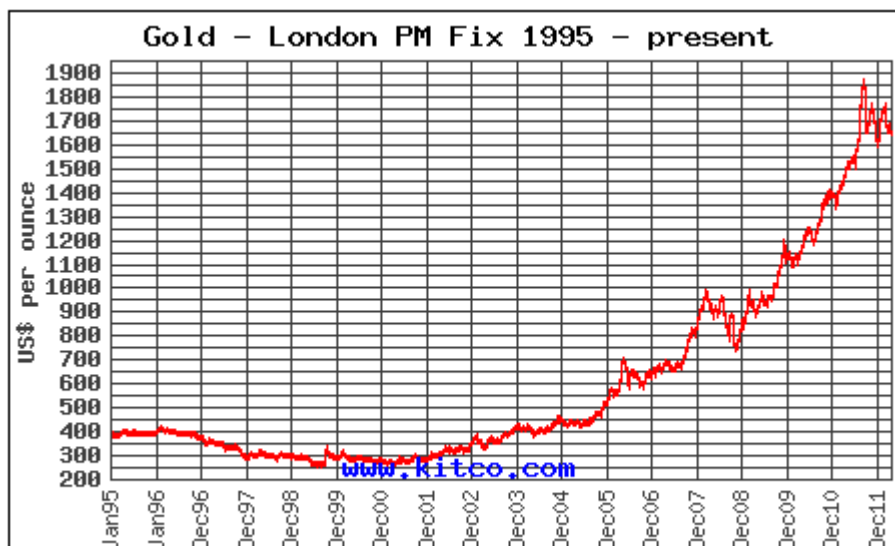
### 3 Mining in the Pacific

This refers to the challenges that PIC's faced as a result of the mining.

#### 3.1 Gold Market Price Trends in international markets

Price fluctuations are a cause of concern to the regional mining industries. For instance when the price of fuel goes up, the people suffer because it affects prices of other goods as well like rice, transport and other basic things. On economies that depended on gold, when gold prices increases economies grow and when gold price reduced, the economy also suffers. The chart below (fig 2) shows the trend of gold prices from 1995 to 2011.

Figure 2



The price of Gold in the international market has grown dramatically since 1995 from an average of USD 400/oz to USD 1650 /oz in December 2011. Gold prices has reached a record high in early 2011 with a record of USD 1850/oz. This is due mainly from the effects of the financial crisis and also driven by US debt crisis and the euro zone crisis in the period leading to 2011. The weak US dollar resulting from this US and euro zone crisis against most of the trading currencies also drives the skyrocketing of Gold prices since 2008.

The rising trend of Gold prices has benefited the pacific island countries especially Papua New Guinea. This is reflected in the rising revenue proportion in terms of export earnings, tax revenue earning for OPNG government and SI in 2011.



### 3.2 Change in policies and regulations e.g. tax

Change in mining policies and regulations can have both negative and positive effects to regional mining industries. For instance, in the case of China, the 17% valued added tax was abolished by Government to encourage Gold production by private enterprise; the result is china become the No.1 producer of gold in the world (345t)

In Papua New Guinea, the Govt has imposed a 0.25% levy on all existing mining companies. This is to promote, exploration and geological data ([www.businessadvantage.co](http://www.businessadvantage.co)) as a result PNG recorded the highest number of mining companies operating in PNG compared to the countries in the pacific region. Other policies include employment opportunities and offshore developments. The PNG government also has the first come first serve policy which grants Exploration license for up to 2,250 sq Km.

### 3.3 Infrastructure availability/accessibility

With regards to infrastructure, mining companies actually help in improving and introducing new infrastructure in local communities. For instance, the Lahir Mining Company builds road access for the local communities. This allows for local communities to have access to medical, health and other basic necessities in life. Other immediate infrastructure includes

Figure 3



- Processing plant,
- Port facilities,
- Airstrips,

- Diesel and geothermal power stations,
- Water supply facilities,
- Camp and town site accommodation,
- Access roads,
- Communication systems.

## **4 Methodology**

In undertaking this project, we do read, researched and analyze academic reports, mining journals and bank of Papua New Guinea and Central banks of Solomon Islands quarterly and annual reports. Group discussions on issues raise and highlight from various reports regarding Gold mining in the pacific and also internet search engine for reports on the web. We were fortunate to be able to get the relevant and required information and data that we need for the project through theses mechanism. We were able to get information and data from the Bank of PNG through our internet search. For the information and data related to Solomon Island mining industry, we got our information from the Central Bank of Solomon Islands. We also get some general information from the officers of the Ministry of Mines and Energy for some general information what is mining and what it involves.

## **5 Research Data and Data Analysis**

### **5.1 The case of mining trends in PNG**

This paper agrees that mining is a way forward for developing countries to achieving economic growth. To understand that, we look at the case of mining in PNG, what policies they have regarding mining, mining contribution to economic growth, the impacts of mining and what are the ways forward.

Over the last ten years mining and mineral companies, mostly owned by world renowned Gold and mining companies flooded PNG market for prospecting and explorations of minerals. As of 2011, PNG major mining operations companies stood at 9 companies fully operational, most are Gold mining, cooper and Silver, One major copper mining (Panguna Mine) closed down due to ethnic war in the 1990's and another major operations (OK Tedi mining) is due to close down due to the operation and mining life completed or resource exhaustion/depletion.

During the last 10 years PNG Mining continued to impact on PNG economy and investment trends in minerals and mines sector continued to grow in PNG. The emergent of mining prospecting and explorations has contributed a lot to employment, through the building and construction sector, transport sector and other services sector and trade industries in the country in one way or the other. According to the Mining Journal special publications report 2009-PNG, 'there is significant interest by foreign companies for exploration licenses in PNG. For instance, In the third quarter of 2009 the mining Advisory Council received and processed a total of 165 application of mining tenements of which 33 new explorations licenses were granted, 29 renewals granted and one alluvial mining license granted and one mining license granted. In 2009 a total of 230 tenements were registered in PNG held by companies from seven different countries (Australia, Canada, China, South Africa, Japan, Singapore, Switzerland, PNG and the US). With the country's economy focused on mining and new resources being found, Papua New Guinea is rated highly by Investors.

**Table 1:**

<b>Current operating mines in PNG</b>		
1980's-2010	Year Commissioned	Status
OK Tedi Mine	1980	Scaling Down Production
Porgera Gold Mine	1990's	Producing
Lahir Gold Mine	1990's	Producing
Misima Mining	1990's	Closed
Simberi Mining	2000	Operation-Producing
Sinivit Mining	2000	Producing
Tolukuma Mining	2000	Producing
Hidden Valley Gold Mining	2008	Producing
Ramu Nickel	2008	On Construction-Producing
<b>Advance and Potential Mining Projects(Explorations and Construction)</b>		
Nautilus Mineral Limited-Solwara1	2010	Under water mining drilling
Yandera Project(Marengo Ltd)	2009-Copper Mining	Drilling & Prospecting
Frieda Project(Xstrata Ltd)	2009-Gold and Copper mine	Prospecting and Drilling
Woodlark Islands(RMB Resources Ltd)	2009-Minerals	Drilling and Prospecting
LNG Project	2009/2010-Gas	Construction in progress

PNG mining operations is rated amongst the top 20 mining operations in the world. According to the mining journal it is ranked 11<sup>th</sup> in the world. Furthermore according to a report from the Canada mining and exploration reports; one of the

PNG biggest gold mining, the Lahir gold mining is ranked ninth of the top ten ranked gold mining companies in the world.

Amongst the world class mining operations operating in PNG, alluvial mining, the oldest form of mining in PNG remains active in PNG and booming in the areas of Morobe province. According to reports from the mining journal Special publication PNG 2009, alluvial mining is still present in 19 provinces of PNG employing around 6000+ employees.

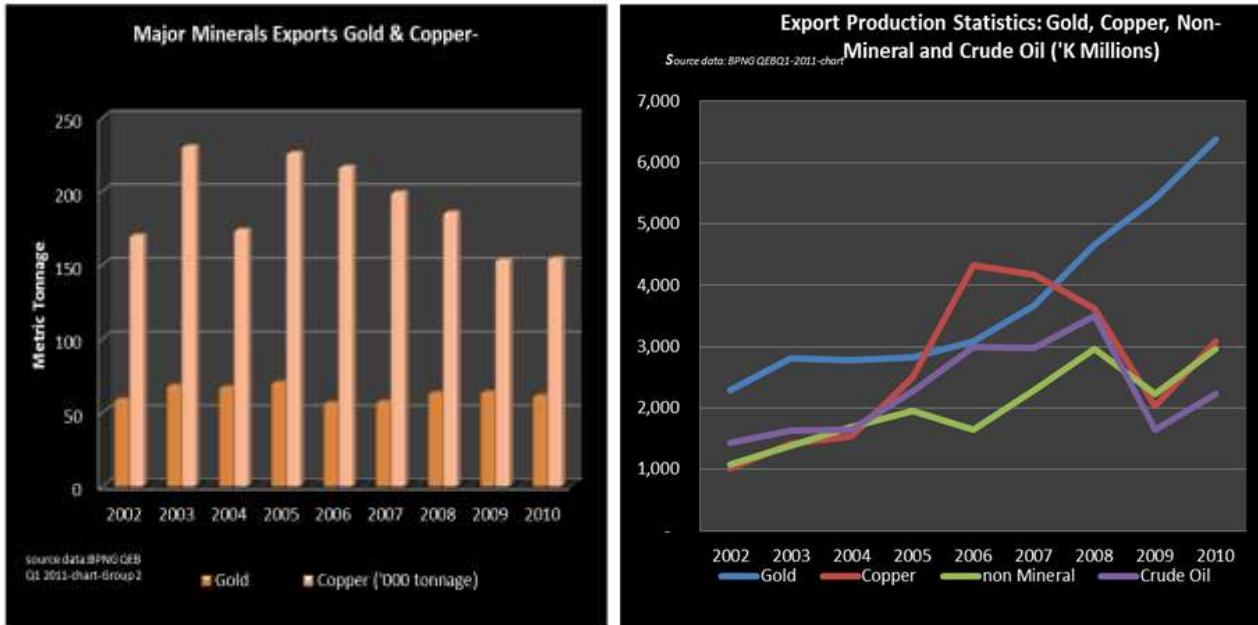
## **5.2 Mining Size and Scope in PNG**

With the current number of mining operations in PNG and additional potential project currently in progress on construction and development stages, the size and scope of mineral explorations and mining in PNG remained strong and growing with a prospect of growing further in year 2012 and onwards. This is in connection to the booming exploration activities and progressive developments of the new Gold mining sites in PNG.

A bar chart below (major minerals export gold & copper) show Gold and Copper exports by quantity from years 2002 to 2010. The figures were derived from the PNG Quarterly Economic Bulletin report March 2011-table 8.6. This chart depicts Gold exports production to remain strong throughout the last 8 years with production of Gold on average hits above 50 Tonnage of Gold per annum for the period. For Copper production the average Copper production per annum hits an average 190,000 tonnage of copper per annum.

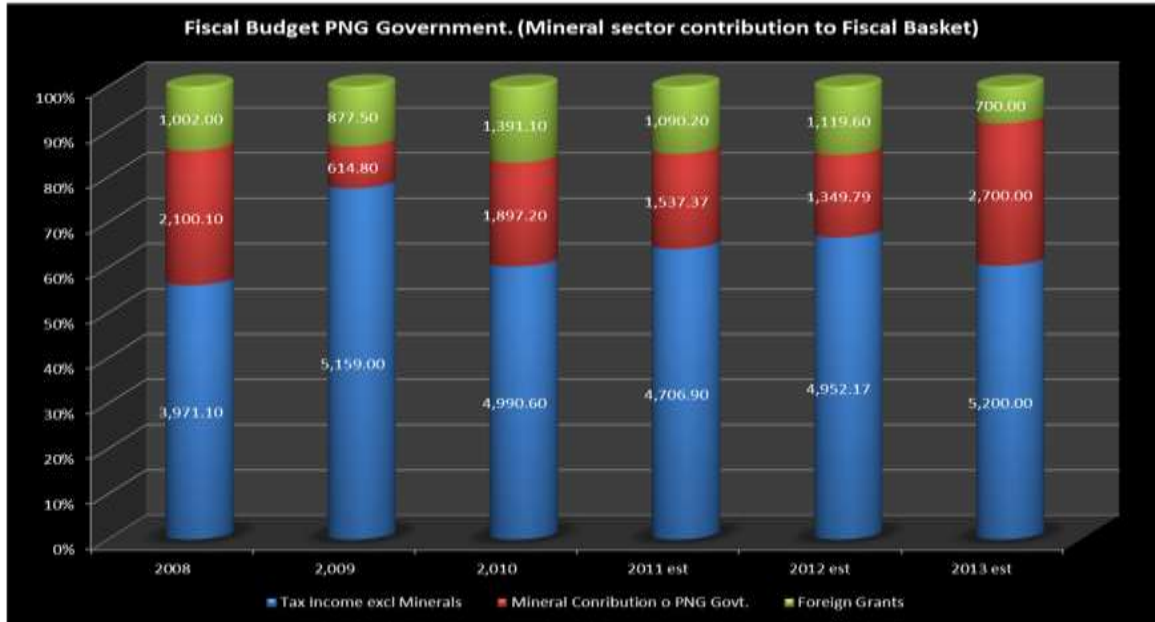
In terms of Export value production levels of Minerals compared with crude oil and non-mineral exports is shown in chart 2 (Export production statistics). Gold Exports has dominated exports earnings amongst all other exports since 2002. For copper mining exports productions-copper exports became the second most export earnings for PNG economy since 2004. This chart shows and reflects how mining industry impacted on PNG economy in terms of exports earning over the last 8-10 years.

Figure 4:



In terms of Tax revenue from PNG Mining industries contributions to the PNG fiscal basket remains strong and growing steadily. The mining and minerals tax revenue remains an important contributor to the government fiscal budget over the last 10 years. See chart below (Fiscal budget chart). The bar chart below with data derived from the BPNG Quarterly Economic Bulletin-March 2011 showed Mining and mineral Tax income remain an important source of Government revenue for Papua New Guinea Fiscal budget. Apart from non-mining sector- Mining revenue remained the second largest Government earner in terms of tax income as far as PNG Fiscal Budget is concern. This has been a strong contributor to the PNG government fiscal budget. The chart show figures from 2008 to 2010, with estimated figure for 2011 to 2013. It is anticipated that mining and mineral tax revenue will continue to grow and its proportion to PNG fiscal budget is likely to grow significantly in the coming years, boosted with LNG project tax revenue and other mining projects currently advanced in PNG.

Figure 5

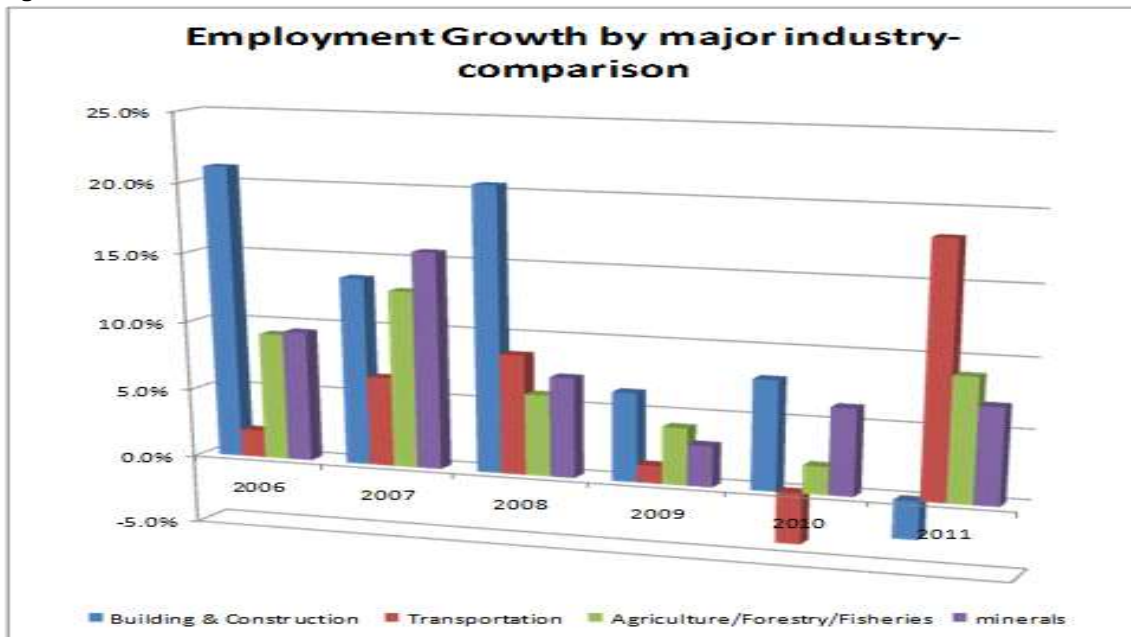


In terms of employment PNG mineral and mining sector remain a dominant sector creating job opportunities and providing employment for PNG nationals. The development of the mining industry in one or the other has also spill over to create and boosted other sectors employment opportunities. An example is the continued increases the construction and transportation industries in terms of employment proportions. These two sectors continued benefitted from the rising trend in mining and explorations activities in and around PNG. The employment chart below shows the employment data by sector in PNG from 2008 to 2011.

Over the past 10 years, employment in PNG is mainly dominated by other services and building & constructions industries. In 2006 Building and construction has dominated job opportunities by providing higher proportion of employment in PNG. Mineral and mining sector also dominated with the second highest proportion providing employment in PNG. In 2007 Mineral and mining sector has dominated the PNG market providing 15.7% of employment to total employment by sector. This is the highest for the year 2007. Minerals and mining remains an important sector in terms of job creation and contribution to employment in PNG. Over the last 5 years to 2011, minerals and mining continued to remain a dominant force or sector contributing to high employment in PNG. The spillover effect of mineral sector among other sectors has contributed towards other sectors especially in building and constructions and transport sectors. In the first quarter of 2011- the mineral sector level of employment increased by 2.6% following a 2.2% increase in December quarter

2010. The increase was largely due to the construction of the LNG project in the southern highlands and Gild provinces of PNG and the establishment of the LNG campsites. In the same period, for the Building and construction sector the level of employment dropped (by 2.4%) the decline is mainly due to the downsizing of manpower, reflecting completion of projects in the islands region and near completion of road maintenance projects in the NCD. The transport sector level of employment increased significantly by 26.3% in the first quarter 2011 mainly from an ongoing construction of LNG projects in all modes of transport in PNG, (Bank PNG QEB March 2011, page 8-10).

Figure 6:



It is anticipated, with the increasing numbers of potential mining operations and mineral explorations, mineral and mining will be a dominant player in PNG economy providing job opportunities and as well as contributing towards high employment in the PNG economy in the future. Based on the employment trends in the mineral sector, it is anticipated that employment proportion in the mining sector in PNG will continue to grow.

### 5.3 Impacts of Mining in PNG

Firstly, we must know that mining anywhere in the world always creates an impact to the communities, the Government and the people.

The Mining industry has contributed a lot to Papua New Guinea's economy over the last 10 years, and as indicated earlier, the mineral sector itself has contributed about twenty one percent (21%) to the PNG's overall fiscal budget for year 2011 refer to chart on Government revenue above (MBA group 2 presentation report chart, 2012, with data derived from BPNG QEB 2011). That is a significant financial and economical impact.

On the other hand, the environment and social impacts are also significant that communities, civil society groups and established NGO's claiming to represent the interest of the local people are now voicing their concerns and are trying working with the Government and mining stakeholders to address these issues.

“..the environmental impacts of the large mines in Papua New Guinea are easily the most controversial aspect of the sector, at least at the international level. It is in terms of these impacts that there is the greatest divergence of perspectives and values amongst stakeholders. There is a clear separation between the scientific monitoring and reporting of impacts (along with predictions of potential impacts) and local perceptions of impacts of mines on the environment. Partly as a consequence, the environmental impacts are the hardest to assess in terms of sustainability (*PNG baseline study*)

A quick overview of mining impacts shows that there are 5 main stages in the mining operation;

- Exploration stage
  - This covers the development and construction of access roads, site preparation & clearing.
- Active mining, example;
  - Open-pit mining
  - Placer mining
  - underground mining
  - reworking of inactive or abandoned mines & tailings
- Disposal of waste rock
  - Burying of metallic ores or waste which can contain high level of toxic substances
- Ore extraction



- Release of toxic dusts from haul roads

The environmental effects of large scale mining in PNG can be classified into 4 main areas, according to *PNG baseline study*;

- The area where the mining operates. This includes the excavated area, roads and other infrastructure built, the plant itself, camps, other buildings and the open pit. A large area of land had to be cleared ...“In the case of the Porgera mine these impacts have been very marked and have involved the conversion of several thousand hectares of a mix of primary and secondary forest and subsistence gardens. The impacts are very visible within the valley and are of such a nature that even with an active rehabilitation programme, many of them will take decades to return to something resembling their original state”.
- Air and water around the area. The obvious ones are the pollution in air and noise generated from the mining operation.

Figure 7



- Waste rocks and chemicals disposed from the mines. “Toxic waste from the mines has polluted many areas of the country. In a typical metal mining operation, tailings consist of crushed rock and ore, after most of the target metals have been removed. Mine tailings are often toxic, and if not contained, are harmful to the environment.”(Mandala Projects undated”).

At the Porgera mines, around 120,000 tonnes of material is mined each day, and only 17,000 tonnes processed (*Papua New Guinea baseline study*). So only 14% of the rocks extracted are processed. If we add all the mining sites in PNG, waste rocks are unimaginable.

- Tailings disposal (Figure 8). In Papua New Guinea, in the case of all the existing mines



and the BCL mine, tailings are discharged directly into the environment (rivers or the Ocean). The reasons for this, as given by the industry and the government, are that high rainfall, unstable landforms, high seismic risk and, in the case of Misima and Lihir, shortage of land, makes the retention of tailings dangerous and unmanageable.

Critics point to issues of cost rather than risk as the main reason for direct discharge of tailings into the environment in Papua New Guinea.

This table shows the summary of tailings and waste disposal for various mines;

**Table 2:**

Mine	Tailings daily average (t)	Method of disposal	Waste rock daily average (t)	Method of disposal	Systems affected
Porgera	17,000	Riverine	100,000	Stable, Eroderable	Local dump areas, Lagaip, Strickland, Fly rivers
Ok Tedi	80,000	Riverine	160,000	Erodible	Local dump areas, Ok Tedi, Fly rivers
Lihir	9,000	STD	30,000	Stable, Marine	Dump areas, ocean 1.5-2km offshore
Misima	16,000	STD, backfill	18,000	Stable, ocean, backfill	Pit areas, ocean
Tolokuma	400	Riverine, backfill	backfill 1,500	Stable	Mine area, Auga River

*Tailing and Waste Rock Summary (Source: updated from Cook, 1996: 233-234)*

Our findings from various sources revealed that the mostly affected or vulnerable are those that live further downstream.

It is also evident over the years that most of these Mining companies are taking advantage of the fact that they knew that there is a flaw in the Government and overall system which allows them to operate and spend very little in waste management control aspects.

The way they dispose their waste in Papua New Guinea could in no way be done in their home country because of their strict law and regulations. However, recently, law suits, compensations, and other legal implications are taken against these mining companies and are costing them lots of money.

The following table will show some of the key impacts we have identified and also some recommendations we believe will help control and alleviate the impacts;

**Table 3:**

<b>Environment impact</b>	<b>Social impact</b>	<b>Economic impact</b>	<b>Recommendation</b>
Waste management – Sedimentation – disturbed the organic material & aquatic ecosystem	Raising living standards (including improving health status and education levels/achievements)	Mining industry represents more than 50% of PNG's export revenue	Do a comprehensive environmental impact plus cost assessment
Acid drainage – kills all life (fish, animal, plants) in the river & all land close to the river	1990 –environment issue raised by communities over mining disaster & spills	Significantly contribute to the overall increase in the country's GDP per capita,	Environmental assessment should be done independently
Metal deposition – plant animal species decrease over time	Business opportunities for the local communities	A total of K7.9 billion was recorded for the mineral export in PNG in 2007,	Implement an effective and comprehensive code of practice for all mining companies
Bio-diversity & habitat – removal of vegetation (food & shelter for wildlife)	People observe discoloration, odour, taste & feel	Forecast of K12 – K16 billion per annum worth of mineral export between 2014 and 2018	Financiers to have some responsibility to ensure projects they are funding are environmentally sound & compliant & abide to this code of practice
Fish leave the area, change their habits, or affect their breeding behavior	Civil war in Bougainville – 1989  Increase militarization	Mining only takes up 5% of the total formal labour force in PNG.	The MIGA should develop criteria to contribute to environmental sustainability

Fish have diseases caused by abrasive action of sediments on their skin, blocking their gill filaments	Battles over benefit & compensation		Government to have a clear policy on Mine Waste Management
Sea predators feeds and carry these toxic metals further & upwards (bring contamination to shallow waters)	Litigations by communities		Creditors need to base their financing of projects on environmentally sound proposals
	Affects 7,100 population who used to survive through subsistence agriculture, cash crops & fish		National & multilateral guarantee institution must respect and protect the public interest
	People move further in (200-300 meters dept) to fish. No longer fish on the coastal area		National & multilateral guarantee institution must respect and protect the public interest
			National authorities, private investors & creditors banks should uphold a high standard for their domestic & international business

#### 5.4 The case of Gold Ridge Mining in the Solomon Islands

- ASG acquired the Gold Ridge in 2004
- Exploration, drilling and export started April 2011.

**(Extracted from ASG Limited web:**

**<http://www.solomonsgold.com.au/goldridge.php>**)

- Gold production of Gold ridge Mining is projected at 55,000 ounces in 2011,
- 105,000 ounces in 2012, and 120,000 ounces during 2013 – 2019
- winds down by 2023.**(Extracted from Joint IMF/World Bank Debt sustainability analysis of Solomon Islands)**
- Gold production of GoldRige Mining is projected at 55,000 ounces in 2011, 105,000 ounces in 2012, and 120,000 ounces during 2013 – 2019 and gradually winds down by 2023.(Extracted from Joint IMF/World Bank Debt sustainability analysis of Solomon Islands) – repeat of the above

## 5.5 Export earnings-Mining in Solomon Islands

Mining exports earnings (especially Gold) in Solomon Islands remained low, as seen in the chart below. All other sectors export earnings has dominated exports earning in Solomon Island in the last 5 years. Of these as we all aware, forestry (Round log exports) is the number one export earner for Solomon Islands. This is depicted in the chart below. Since 2007 mineral exports (Gold) earning in Solomon Islands is seen to be growing and it is anticipated that gold exports will continue to grow beyond 2012.

Figure 9:

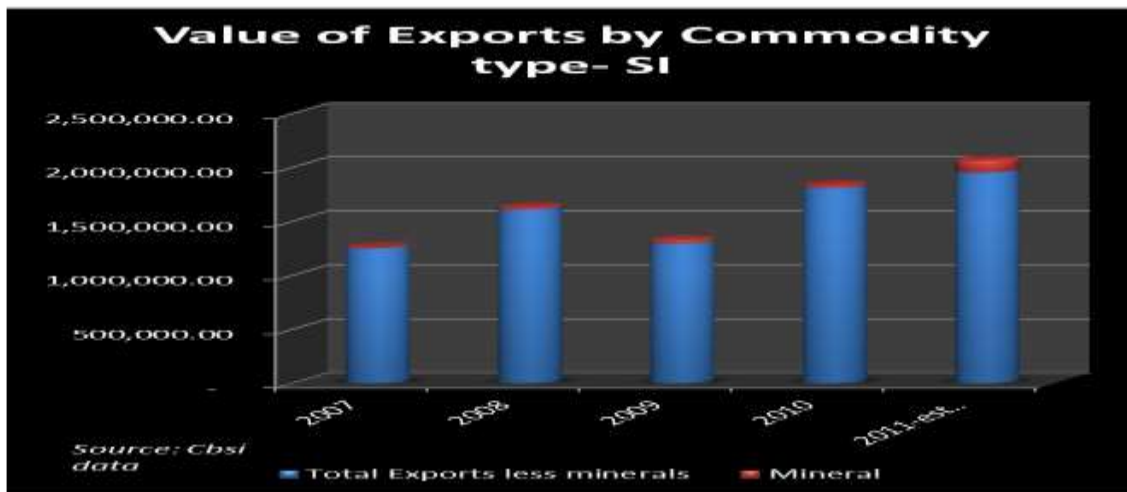
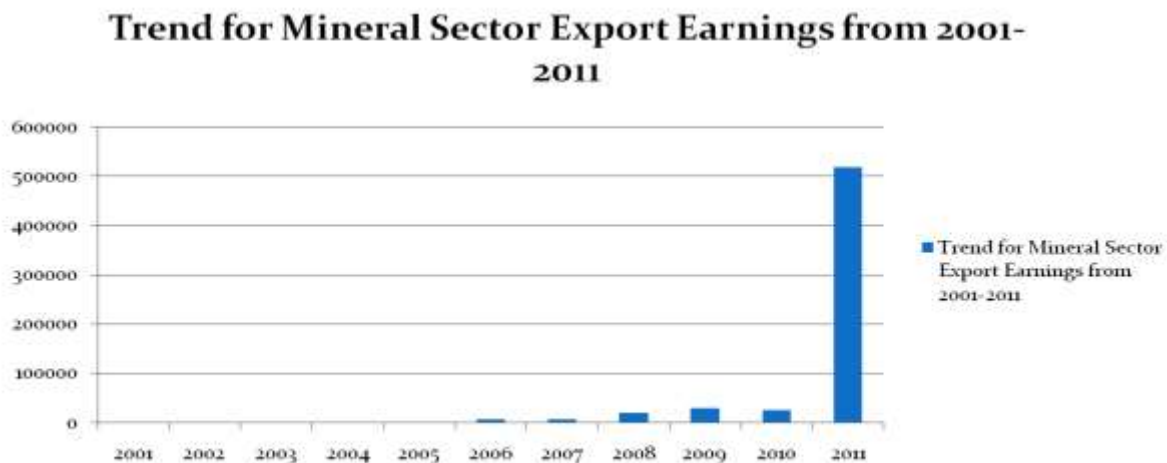


Figure 10:



- The export earnings of mineral sector from 2006 to 2010 are mainly derived from the exports of alluvial gold.

- ASG acquired the Gold Ridge Project in September 2004, and took control of the Gold Ridge Project on May 30, 2005 and from 2006 to 2010 they started exploration and carried out several drilling activities before exporting their first Gold consignment in April 2011.( As shown in the graph that export earnings in 2011 has significantly increased)  
(<http://www.solomongold.com.au/goldridge.php>)

## 5.6 Social Impacts of the Gold Ridge mining

Figure 11:



Fig 1: Locals planned protest for compensation demand over environmental impact

Gold Ridge mining is the only operational mining in the Solomon Islands, while there are a few proposed mining coming up.

We will try to explain the social and environmental impact although the environmental impact could not be fully assessed at the moment due to lack of resources and also the complication of the impact which take quite some time before we realized the impacts.

Some of the impacts seen (*Gold Ridge project social impact assessment*) are;

- Traditional gardening activities have already diminished with the focus on gold panning, and with the establishment of the Gold Ridge mining, that traditional behaviours continue to disappear.
- Health, education and employment has improved but not at a significant rate
- People relocated to a new area

- Mining provides employment. 120 locals already employed at the start of the project. Expected to increase as mining operation progresses
- Improve local infrastructure

Table 4 showing the environment, social, and economic impact and also recommendations for improvement:

**Table 4:**

<b>Environment impact</b>	<b>Social impact</b>	<b>Economic impact</b>	<b>Recommendation</b>
Waste management – Sedimentation – disturbed the organic material & aquatic ecosystem	Raising living standards (including improving health status and education levels/achievements)	Mining industry represents more than 1.7 to SI GDP in 2011	Do a comprehensive environmental impact plus cost assessment
Acid drainage – kills all life (fish, animal, plants) in the river & all land close to the river	1990 –environment issue raised by communities over mining disaster & spills	Gold ridge mine produced about 100,000 – 120,000 p/a, ounces of Gold. The landowners get only 1.2% royalties.	Environmental assessment should be done independently
Metal deposition – plant animal species decrease over time	Business opportunities for the local communities. In the agreement, Gold Ridge will provide 20% equity to start up a business	Mining only takes up .3% of the total formal labor force in SI	Implement an effective and comprehensive code of practice for all mining companies
Bio-diversity & habitat – removal of vegetation (food & shelter for wildlife)	People no longer work in the gardens. Food purchased from Honiara		Financiers to have some responsibility to ensure projects they are funding are environmentally sound & compliant & abide to this code of practice
Fish leave the area, change their habits, or affect their breeding behavior	Food now turns to rice, flour & tinned products		The MIGA should develop criteria to contribute to environmental sustainability
Fish have diseases caused by abrasive action of sediments on their skin, blocking their gill filaments	Landowners demanded \$25 million in compensation for damages inflicted by the mining operations.		Government to have a clear policy on Mine Waste Management
	Income from compensation and employment spent mostly by man on alcohol		Creditors need to base their financing of projects on environmentally sound proposals
	Relocation affects people's traditional & cultural links		National & multilateral guarantee institution must respect and protect the public interest
	The landowners demanded \$25 million in compensation for damages inflicted by the mining operations		National & multilateral guarantee institution must respect and protect the public interest
	Gold ridge mine produced about 100,000 – 120,000 p/a, ounces of Gold. The landowners get only 1.2% royalties.		National authorities, private investors & creditors banks should uphold a high standard for their domestic & international business
	People will no longer do panning in the relocated area. An adverse impact on individual lives		

Map showing the operation area and dump site;

Figure 11:

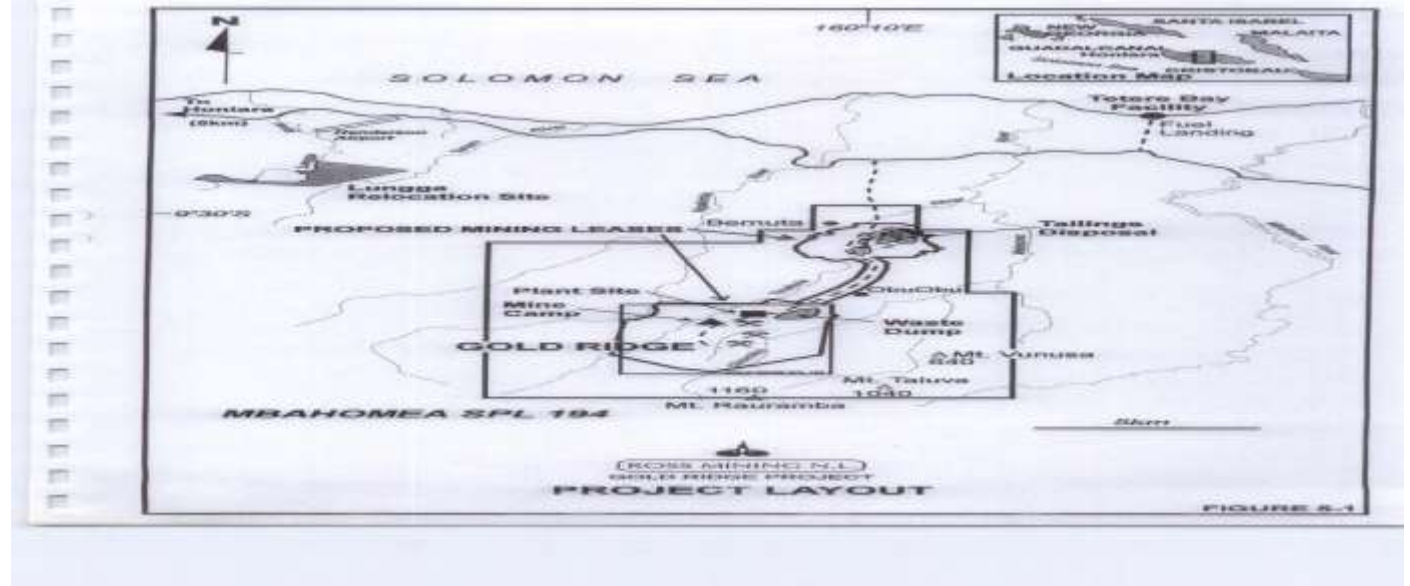


Fig 12 Tailing disposal along the river will have an adverse effect on the ecosystem & environment

Figure 12:



Fig 12: Cyanide leakage at the mining site

### 5.7 What does the data say: PNG & Solomon Islands Mining.

Based on the data analysis in section 5 in PNG and Solomon Islands we see two different and interesting trends of mining in these two pacific island countries. In Papua New Guinea mining and mineral have a significant impact in PNG Economy. Mining has dominated Papua New Guinea economy since pre independent period up to this day. PNG economy has continued to benefit from mineral and mining and will continue to



ride on the gold mining and mineral gains receipts in the future. PNG economy has grown and will continue to grow and its impact to PNG economy will continue to enhance economic growth in years beyond 2012. The continued trend in mining and mineral exploration in PNG will bring fortune for PNG economy, only if the right strategic policy and goal for enhancing economic and social development goals of the economy is harnessed with the aim of achieving MDG's as well as building an economy that is conducive and of middle class level.

The main challenge that is attached with booming minerals and energy project in PNG is the management of the huge revenue for the PNG economy.

In Solomon Islands mining and mineral development is still at its infant stages so to speak. The reopening of the mining industry (GRML) in the economy have an immediate impact on the economy in terms of exports earnings, people's lives and our environment, and these changes will have positive and also negative changes in the economy . Our challenge now is to ensure that the positive impacts are enhanced while trying to minimize the negative impact.

This is a task that requires all stakeholders (the Government, Mining company, communities, authorities, and individual to work together to ensure our common objective is achieved.

The recommendations highlighted in the table is a collective commitment but need the National Government to lead and implement the Policies to protect our mining industry so that both the investors and local people benefits from the operation.

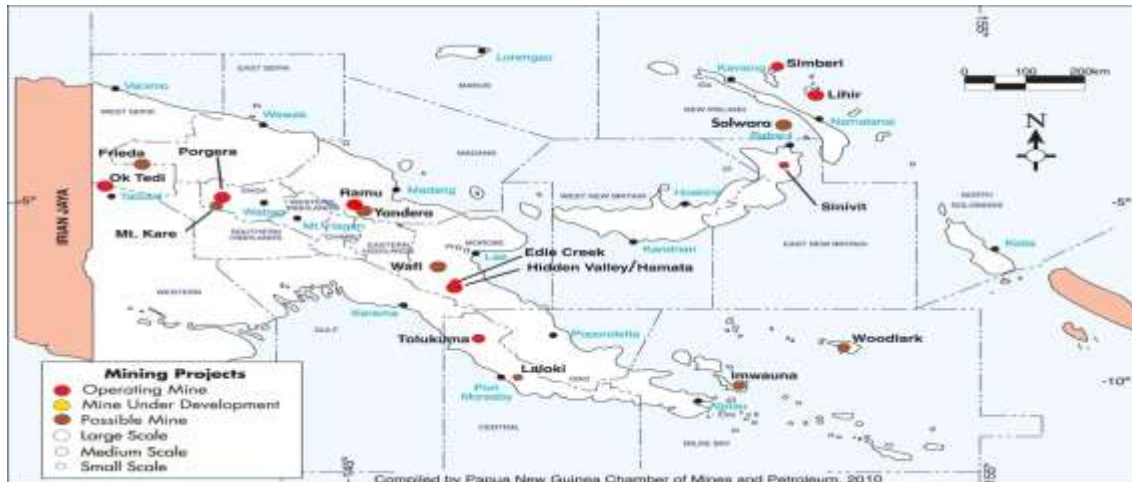
Other crucial aspect is the fact that Gold Ridge is the first mining company to operate in the country. There are other prospecting companies that indicated their interest and some have already commenced their prospecting activities in other parts or provinces in the Solomon Islands.

The Government in collaboration with the Guadalcanal Provincial government and key stakeholders must ensure that a proper standardized policy and regulation is now implemented. Failure to do so will result in other prospect upcoming mining companies coming in, clear the land and operate to maximize their benefit while taking no consideration whatsoever with regard to our environment, social issues, and also our economic benefits.

## 6 Moving Forward

### 6.1.1 Future projects in the planning pipeline

Figure 13



#### Possible Mines

- The Frieda River Project, Sandaun Province of Western Papua New Guinea, is one of the world's largest undeveloped copper and gold deposits. The 2010 feasibility study estimates a mine life of over 20 years for the open pit project. In its first eight years the project is expected to produce 930,000 tonnes per annum of concentrate containing 246,000t copper and 379,000 ounces of gold.  
([http://www.highlandspacific.com/pdf/Frieda\\_A4\\_Ir.pdf](http://www.highlandspacific.com/pdf/Frieda_A4_Ir.pdf))
- MT. Kara Project, Indochine owns a major gold resource at Mt Kare in PNG, which has had prior expenditure of approximately AUD\$60million, including 365 drill holes. An initial JORC - compliant Mineral Resource Statement over the Mt Kare Gold Project was released in December 2011 with 2.1 million ounces gold equivalent or 1.8 million ounces gold.  
(<http://www.indochinemining.com/projects/mt-kare>)
- Yandera Project, The Yandera Project is one of the Asia Pacific's largest undeveloped copper resources. Marengo is currently completing a Definitive Feasibility Study ("DFS") on the Yandera Project, providing the foundation for financing the development of a large scale, long life mining and processing operation. Ore production is anticipated to commence at 25 Mtpa, with an initial mine life of at least 20 years, entering world markets in 2015.  
(<http://www.marengomining.com/reports/ProjectUpdate270711.pdf>)
- Waki Project, Wafi- Golpu Resource is World Class – 1 Billion tonnes for 26.6Moz gold and 9Mt copper.

- 20 – 30 Mtpa throughput
  - 400 – 700oz gold/year
  - 300-400kt copper/year
  - +30 year mine life from 2017
- (<http://www.morobejv.com/files/presentations/Wafi-GolpuPresentation-PNGChamberMinesPetroleum.pdf>)
- Solwara1 Project, Nautilus is the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits and is developing its first project at Solwara 1, in the territorial waters of Papua New Guinea, where it is aiming to produce gold, copper and silver. The company has been granted all necessary environmental and mining permits.
  - Other smaller Projects are at:
    - Laloki
    - Imwauna
    - Woodlark

## **7 Solutions and Recommendations**

- Government must ensure to have in place proper laws, regulations and policies to maximize government revenue.
- Government must ensure to have in place policies to encourage investment.
- Government must ensure to have policies that protect the environment.
- Need to have proper data base to analyze and monitor mining operations in the country.
- Mining should not only focus on economical growth but also on social environmental impacts.

## **8 Future Research and Directions**

More research needs to be done in mining, more specifically in the area of policy development and implementation to ensure that Sound policies are in place to ensure the Miners, the Government, Communities and relevant stakeholder's needs are addressed. This is to ensure that the Mining industry operates in such a way that benefits all those who are involved.

The issue of mineral and mining fund management is another policy area that needs to be developed in developing countries. The issue of building and establishing a trust fund or Sovereign wealth fund is one fundamental area that needs to be addressed. Its is heartening to see booming mineral and mining sector in pacific developing country but yet MDG's and social issues and poverty remained an issue especially in PNG. This is a challenge for pacific island countries.

## **9 Conclusion**

Mining is a vital industry to many countries. Some of the strong economies of the world today reached where they are today because of the contribution of the mining industry towards their economy. Mining has actually contributed to their GDP. For instance China and Australia, two of the strong economies of the world, invested substantially on mining industry and these contributed a lot to the growth of their economy. The world trend in mining activities is growing as need for minerals and material required for infrastructure development and for consumption needs grow. Due to the pressure of the growing world population, minerals, precious stones and materials for building infrastructure are greatly needed. The mining industry has actually benefitted many economies of the world. Notable benefits are infrastructure developments, Tax revenue for the government and employment for the people. It is a source of job creation for any nation. For PNG and Solomon Islands, mining activities is increasing. The industry has already contributed in the GDP and employment for the people. There are many prospecting mining operations still in the pipeline and planning stage. There are positive indications that PNG and Solomon Islands are going to benefit economically from the many more mining activities that will come up. There is a big increase in the export value for mineral in 2011 compared to past years for Solomon Islands as can be seen from the export value earning by commodities in a graph above. This is expected to increase further as more mining activities take place.

While the trend of mining activities is growing, countries must be mindful of the negative impacts mining has for any country. Mining activities has environmental and social impacts. PNG has experienced some of the negative impacts of mining. Solomon Islands is beginning to experience the negative impacts of mining activities as well following the cyanide linkage in 2010. In PNG, mining companies do not spend adequately on managing the environmental and social impacts of mining activities due to weak laws and regulations and their implementation. We recommend that governments must have in place proper laws and regulations for mining activities so as to protect the environment we live in.

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