Evidence base
Global Perspectives for Pacific Extractive Industries
Ever Growing Population Results in More Mouth to Feed

Future of palm oil is driven by growth in demand for food, oleochemicals and bio fuel due to population and economic growth
Relentless rise

Middle-class population as % of world total

Source: Surjit Bhalla, “The Middle Class Kingdoms of India and China” (forthcoming)
Growing dominance of Asian middle class with time.
"So, while up until now less than one billion people have accounted for three-quarters of global consumption, over the course of the next two decades, the new Chinese, Indian, Indonesian, Latin American and African middle classes will bring an additional two billion consumers with similar needs and aspirations as today's North American, European and Japanese consumers."

"Beyond growth in demand for finished products, the most spectacular effect likely to be brought about by the stronger development of the emerging economies will be the enormous rise in demand for raw materials."

Societe Generale July 2011

<table>
<thead>
<tr>
<th>Commodity</th>
<th>China % of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>53.2%</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>47.7%</td>
</tr>
<tr>
<td>Coal</td>
<td>46.9%</td>
</tr>
<tr>
<td>Pigs</td>
<td>46.4%</td>
</tr>
<tr>
<td>Steel</td>
<td>45.4%</td>
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<tr>
<td>Lead</td>
<td>44.6%</td>
</tr>
<tr>
<td>Zinc</td>
<td>41.3%</td>
</tr>
<tr>
<td>Aluminum</td>
<td>40.6%</td>
</tr>
<tr>
<td>Copper</td>
<td>38.9%</td>
</tr>
<tr>
<td>Eggs</td>
<td>37.2%</td>
</tr>
<tr>
<td>Nickel</td>
<td>36.3%</td>
</tr>
<tr>
<td>Rice</td>
<td>28.1%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>24.6%</td>
</tr>
<tr>
<td>Wheat</td>
<td>16.6%</td>
</tr>
<tr>
<td>Chickens</td>
<td>15.6%</td>
</tr>
<tr>
<td>PPP GDP</td>
<td>13.6%</td>
</tr>
<tr>
<td>Oil</td>
<td>10.3%</td>
</tr>
<tr>
<td>Cattle</td>
<td>9.5%</td>
</tr>
<tr>
<td>GDP</td>
<td>9.4%</td>
</tr>
</tbody>
</table>

China’s 2011 commodity consumption
Thomson/Reuters CRB Raw Materials Index
Global Population Impacts on Earth: environment & consumption

Source: Will Steffen – International Geosphere-Biosphere Programme (IGBP)
Norgate & Nahanashani, 2012, Minerals Engineering:

Ore grades through time

Growing Consumption
Harder to find Resources

Copper Production
1800-2000
Petterson 2007
Principle 1: World population growth; rapid increase in middle class; The rise (again) of Asia; The growth of strong players (e.g. China);

= Increased consumerism and resource competition

+ New approaches in partnerships & long-term national Natural Resource strategies by rising Asian giants in particular
Minerals & Development Context

Question:

If development of Natural Resources in the poor world merely produces empowered elites and high levels of social inequality,

why should they bother?
Figure 8  Life expectancy at birth vs average annual income

Pacific Countries
GapMinder: Context for Evidence Base

Rich ‘Western’ World

Emerging World

Poorest world

Rich ‘Western’ World

United Kingdom 2007

France 2007

Botswana 2007

Guyana 2007

Myanmar 2007

Pakistan 2007

Mongolia 2007

Suriname 2007

Solomon Islands 2007

Papua New Guinea 2007

Ethiopia 2007

Zimbabwe 2007

AFRICA

1980

1990

2000

2010

1.36 B
Figure 2.2 Health and social problems are closely related to inequality among rich countries.
Principle 2: Lasting Natural Resource Partnerships should offer sustainable, tangible economic & social benefits for Resource Rich Poor Nations: or why bother?
Natural Resource Ownership: *an owners market*: to be awarded to the most *favourable partner*

Pacific Issue: Ownership
Mineral Ownership

‘In a surprise announcement Papua New Guinea on Friday introduced a plan to hand state ownership of mineral and energy resources to landowners, a move that may prove disastrous to foreign miners developing massive projects and pushing into new regions of the resource-rich country’ Aug 2011

‘Reuters reports Zimbabwe could take over mines that fall short of laws requiring them to sell majority stakes to locals by September, a government minister said on Wednesday’. July 2011
Principal 3: Resource Rich Poorer Nations own their Natural Resources. They can be taken by force or stealth (wars, (neo-) colonialism) or ‘smarter’ means can be employed for healthy, lasting partnerships of mutual benefit.
Principle 4:
Relationships between poor nations and resource hungry giants and/or global corporations are not equal: Can this be mitigated?
Characteristics of Resource Rich, Poorer Nations: A Natural Resource Governance Perspective
Geological Survey Organisations (GSO’s) + host Government Departments of Natural Resources are key to resource-rich poorer nations: they are the hub of Natural Resource management (negotiators, Liaison officers with government depts, lawyers, landowners...etc.)

But – issues are many:

• Priority and position in national government
• Provincial and regional government/tribal rivalry
• Quality/motivation of Minister
• Knowledge base & ability to interpret & process knowledge base
• Quality/motivation/retention of qualified & experienced staff
• Salaries & status
• Fiscal, equipment, office, laboratory, and field work resources...etc...etc
Afghan minister accused of taking bribe

$30 MILLION PAYMENT ALLEGED
Massive mining project awarded to Chinese firm

Wednesday, November 18, 2009
KABUL -- The Afghan minister of mines accepted a roughly $30 million bribe to award the country's largest development project to a Chinese mining firm, according to a U.S. official who is familiar with military intelligence reports.

Corruption: he who has no name
Spectrum of Geological Survey Organisations re Natural Resources

- **Hardware**: Facilities, budget, knowledge base, cadastral & legal etc.

- **Software**: People, leadership, ability, experience, influence

<table>
<thead>
<tr>
<th>Resource rich, poorer nations</th>
<th>rapidly emerging nations</th>
</tr>
</thead>
<tbody>
<tr>
<td>small nations, few current in-country Natural Resource projects</td>
<td>Resource Rich, richer nations</td>
</tr>
<tr>
<td>‘Ex Colonial’: large data legacies, few appropriate staff</td>
<td></td>
</tr>
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- **‘Hardware’** Facilities, budget, knowledge base, cadastral & legal etc.
Principle 5: Resource Rich Poor Nations require assistance with their ability to strategically manage and make decisions re Natural Resource Development without making them more vulnerable.
Conclusion: less bottom line profit, more genuine mutual partnerships: A social enterprise way forward?

Success Indicators: Mutual Benefit

- Significant profit,
- Long mine life,
- Resilience (gov’t, economy)
- Long lasting partnerships
- Maximise employment
- Investing in futures
- Sustainable resource harvesting

What is Optimal Balance?

- Maximise usage of NR wealth,
- Community involvement,
- Transparency, employment,
- Infrastructure, health & education training, entrepreneurship

Increased Social & Economic Resilience: Host Partner Benefit

- Access to NR security.
- Key strategic geo-political partnerships & influence.
- Money/ sustainability of industry & services

Consuming Partner Benefit

Maximise usage of NR wealth, Community involvement, Transparency, employment, Infrastructure, health & education training, entrepreneurship

Conclusion: less bottom line profit, more genuine mutual partnerships: A social enterprise way forward?
• Big ocean Pacific Island Countries and Territories (PICTs);

• Pacific Island Countries (PICs) have a total area of 38.5 million km$^2$ of EEZ in comparison to a land area of around 550,000 km$^2$, (a ratio of 70:1).

• For some PICTs, deep sea minerals may represent the only exploitable natural resource sector apart from fish.
Deep Sea Minerals Occurrence

- Back arc Basin
- Mid-ocean Ridge
- Seamount
- Ocean Floor
- Island Arc
- Trench
- Subduction

Depth ranges:
- 350-5,000m
- 4,000-6,000m
- 400-4,000m

- SMS Deposit
- Manganese Nodules
- Cobalt-rich Crust
Economic Issues

- SMS deposits are higher in mineral content than on-land deposits:

<table>
<thead>
<tr>
<th>Metal</th>
<th>On-land</th>
<th>SMS</th>
</tr>
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<tbody>
<tr>
<td>Copper</td>
<td>0.5-2%</td>
<td>5-15%</td>
</tr>
<tr>
<td>Gold</td>
<td>0.6-8g/t</td>
<td>2-20g/t</td>
</tr>
<tr>
<td>Zinc</td>
<td>5-20%</td>
<td>5-50%</td>
</tr>
<tr>
<td>Lead</td>
<td>5-20%</td>
<td>3-23%</td>
</tr>
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- Typical value of a tonne of SMS ore: US$800-1500.

- One full mining operation could produce export revenues of up to US$500m pa and taxes/royalties of up to US$50m pa.
Recent Development in DSM

- Three exploration companies are active in the region (Nautilus Minerals, Neptune Minerals, and KIOST); Others are interested.

- PNG granted Nautilus Minerals with a sea mining lease in January 2011

- Nautilus Mining Technology Development ready to mine Solwara 1 Project: *but some current dispute issues*

- Growing interest in Seabed Manganese Nodules and Crusts

- This may involve all of the PICs.
Benefits of Offshore Mining

- Host country and the region will benefit:
  1. Wealth worth millions of dollars will be generated.
  2. Significant share of the wealth shall be returned to government and the people through tax revenues, royalty and employment.
  3. Mining revenue will enable government to stimulate other economic sectors.
  4. Indirectly supporting other local economic activities.
  5. Contribute to a well educated labour force.
  6. Increase in labour mobility.
Exploration Interest in Clarion-Clipperton Fracture Zone

- Nauru (NORI), and Tonga (TOML) registered companies have been granted exploration licenses in the “Clarion-Clipperton Fracture Zone (CCFZ) in 2011 by the ISA.

- Marawa Research and Exploration Limited (MREL) of Kiribati has been granted exploration licenses in the CCFZ in 2012.

- PICs such as Fiji and Tuvalu have shown interest to participate in exploring “the Area”.

Legend:
- Continental Areas
- CSSOS (China)
- DOCF (Japan)
- Government of Korea
- KOREM (France)
- KIGE (Korea)
- West/McCormick (Australia/Taiwan)
- Tonga Ocean Mining Limited
- Nauru Ocean Resources Inc
- Reserved Area
- Exclusive Economic Zones
- Sedimentation (Draft V10, 2011)