

ROLES OF TRADITIONAL & WESTERN SCIENCES IN ENVIRONMENTAL MANAGEMENT



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The Roles of Traditional and Western Sciences in Mining Rehabilitation in Papua New Guinea

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Abstract

Environmental impact assessments and management plans draw heavily on findings of scientific investigations. A major disadvantage with many of these studies is that they generally have a narrow focus from an ecological viewpoint. In developing countries in the tropics, indigenous communities have a different environmental language and value system to that addressed by western science. It is therefore not surprising that resource developers and regulators encounter enormous environmental difficulties with indigenous communities. The inter-linkages concept promoting holistic and integrated approach to environmental management is consistent with traditional philosophies and practices of many indigenous communities in developing countries from the humid tropics. A close examination of these practices indicates a strong bias towards the use of biological indicators for monitoring environmental health. Western Science is now beginning to appreciate the importance of biological indicators in environmental management. In many indigenous communities from developing countries, such knowledge has been around for a long time and is relatively well advanced. Both western and indigenous sciences have important roles to play in environmental management in the tropics, particularly in developing countries. Research in this area warrants urgent and serious attention. Such research projects have the possibility to enhance the sensitivity of indices used for monitoring environmental health. Hopefully, it would also stimulate synergistic interaction among western and traditional scientists in managing environments in the tropics. The benefits of such interactions would naturally flow into policy and regulatory areas. Options for combining both traditional and western sciences in managing mining environments in PNG are discussed in the presentation.

PAPUA NEW GUINEA

CLIMATE & ENVIRONMENT



- Annual Rainfall
 - <500 - >8000 mm
 - Mean: 3000-4000 mm
- Mean Annual Temp.
 - 22 – 30°C
- Many variable charge soils
 - Most - volcanic soils.
 - Dynamic & complex.



PNG - FLORA & FAUNA



- ~ 20000 species of higher plants.
- New Guinea: Has one of the world's richest fauna.
- Indigenous people use many flora and fauna daily.



TRADITIONAL PHILOSOPHY

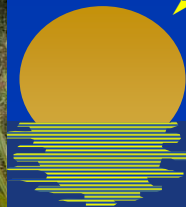
Early Fallows (20-60 yrs)



Current Fallows (2-10 yrs)



- Sustainability:
 - *controversial*
- Differing opinions due to:
 - *Differences in context, language, methodology, analysis.*
- Pre-contact philosophies
 - *Pro Sustainability*
 - ✓ *Low population densities*
 - ✓ *No cash economy*
- Current philosophies
 - *Pro Production*
 - ✓ *High population densities*
 - ✓ *Big cash economy*



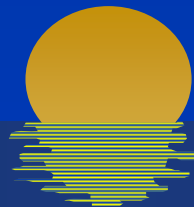
TRADITIONAL PHILOSOPHY



- *“Land inherited from past generations by today’s generation to be held in trust for tomorrow’s generation” (PNG)*
- *“Land belongs to a vast family of which many are dead, few are living and countless members still unborn”, (Nigeria)*

SUST. DEV. PHILOSOPHY

- *“Development which meet the needs of present without compromising the ability of future generations to meet their own needs.” (Brundtland 1987).*
- *“For PNG natural resources and environment to be conserved and used for collective benefit of us all and be replenished for the benefit of future generations.” (PNG 4th National Goal)*



WESTERN PHILOSOPHY

- Early philosophies

- *Pro Production*



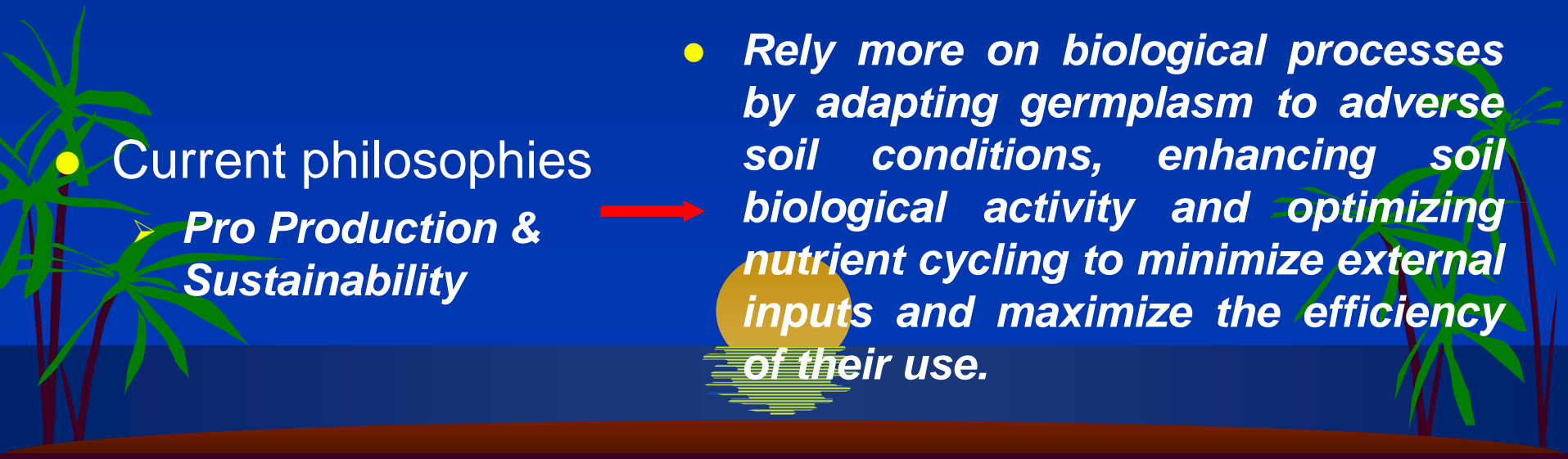
- *Overcome soil constraints through the application of fertilizers and amendments to meet plant requirements.*

- Current philosophies

- *Pro Production & Sustainability*



- *Rely more on biological processes by adapting germplasm to adverse soil conditions, enhancing soil biological activity and optimizing nutrient cycling to minimize external inputs and maximize the efficiency of their use.*



WESTERN PHILOSOPHY

Company 1 Environmental Policy

Achieve a high standard of environmental care ... Our approach is to seek continuous improvement in performance by taking account of evolving scientific knowledge and community expectations.



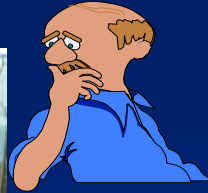
Company 2 Environmental Policy

We recognise that excellence in managing environmental responsibilities is essential to the long-term success of the project. ...minimise any adverse environmental impacts.



TRADITIONAL ATTRIBUTES

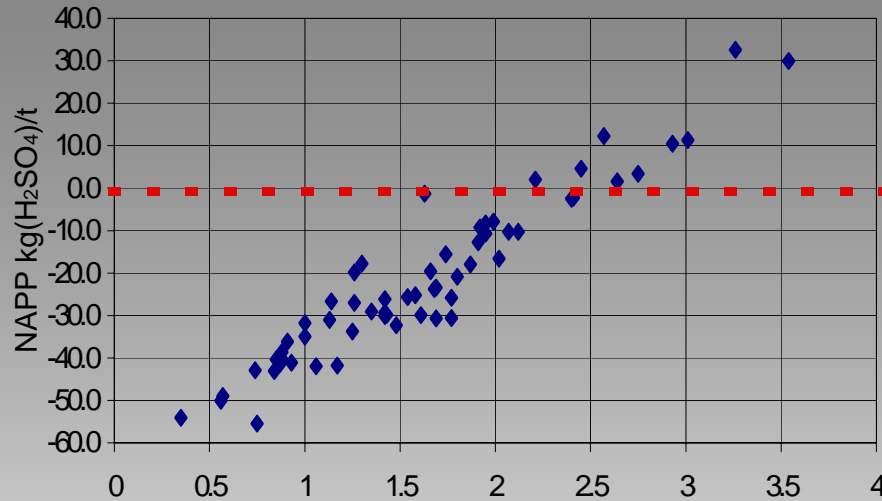
Is it TOXIC?



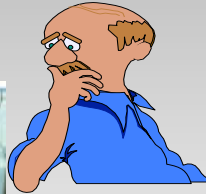
- Survival is the motivation
 - Only practically useful data kept
- Long-term trials (decades)
 - Passed on through generations
- Holistic approach
 - Well developed biological indicator knowledge
 - Integrates people, science and environment
- Highly developed observation skills
 - Derived from direct experience of the environment
- Less advanced analytical skills
- Oral records



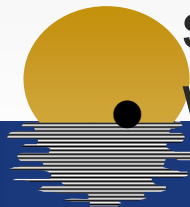
WESTERN ATTRIBUTES



Sulphur %S
Is it TOXIC?



- New knowledge is the motivation
 - Scope very limited
- Short to medium term trials
 - One to ten years.
- Narrow approach
 - Discipline based
 - Focus on components in systems (large extrapolations)
- Observation skills less developed
 - Target selected parameters
- Well advanced analytical skills
- Well kept written records



WESTERN SCIENCE

- **Ants as bio-indicators**

- Groundwork 6/98



- **Grasshoppers as bio-indicators**

- Groundwork 6/99



- Accepting importance of bio-indicators
- Focus on systems research
- Encouraging community participation
- Sadly - attitude problem
 - Western Science has nothing to learn from Traditional Science



PARTNERSHIP

TRADITIONAL
SCIENCE

WESTERN
SCIENCE

HOLISTIC APPROACH

MICRO APPROACH

OBSERVATION SKILLS

INTERPRATIVE &
ANALYTICAL SKILLS

PRACTICAL/REALISTIC

INNOVATIVENESS

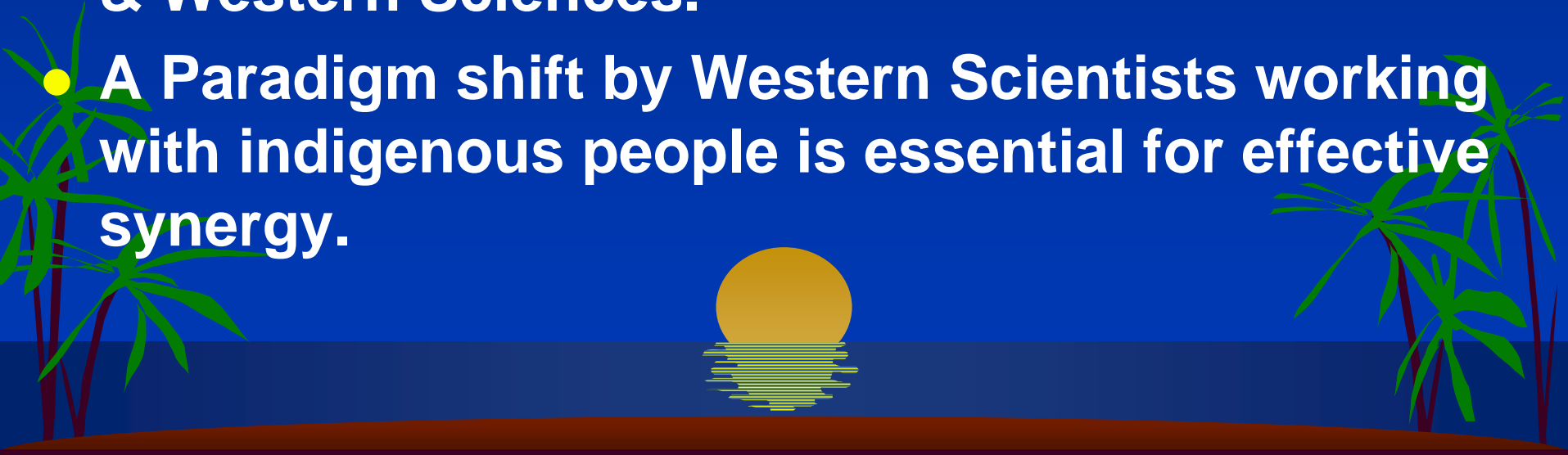
GOOD WRITTEN RECORDS

OUTCOME

Sustainable Development Balancing Environmental,
Social & Economic Benefits in Natural Resources &
Mining Industries

CONCLUSIONS

- **Climate & environment in the Humid Tropics are very different to most western countries.**
- **Many Traditional Philosophies & current Western Philosophy embrace conservation & sustainability.**
- **Clearly room for SYNERGY between Traditional & Western Sciences.**
- **A Paradigm shift by Western Scientists working with indigenous people is essential for effective synergy.**



ENVIRONMENT: EVERYONE'S BUSINESS

Traditional Science



+

Western Science

