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Sustainable Mine Water Management: A Case Study of Namibia's Uranium Industry

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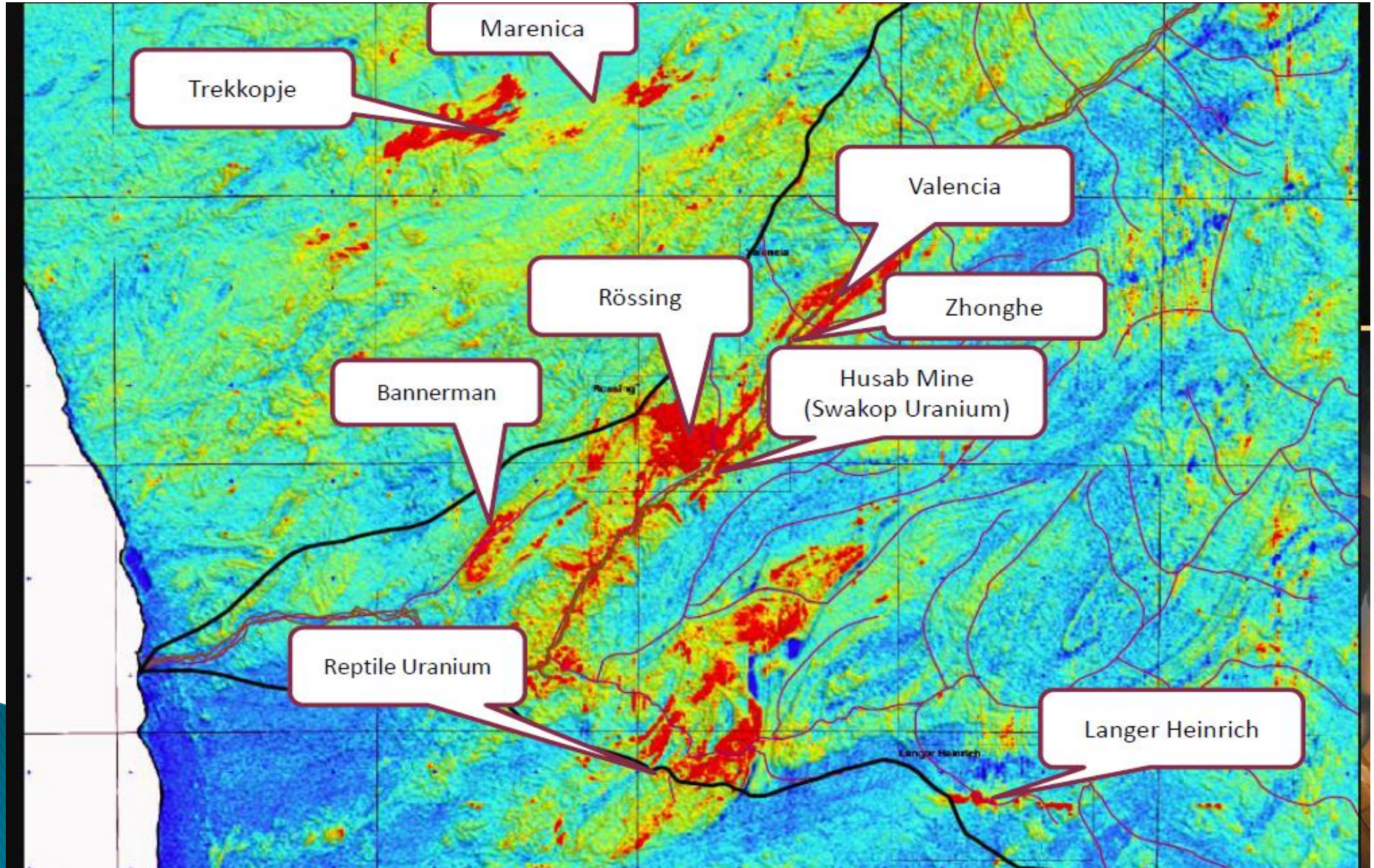
Introduction

- Namibia is known to be a country with a limited amount of fresh water.
  - Use of water is one of the important issues in the country's development agenda since it is important in every economic activity.
- Namibia will become the second largest producer of uranium in the world by end of 2015.
  - All uranium mines are in the Erongo region, which is one of the driest areas in the country

Erongo Region: Uranium Province

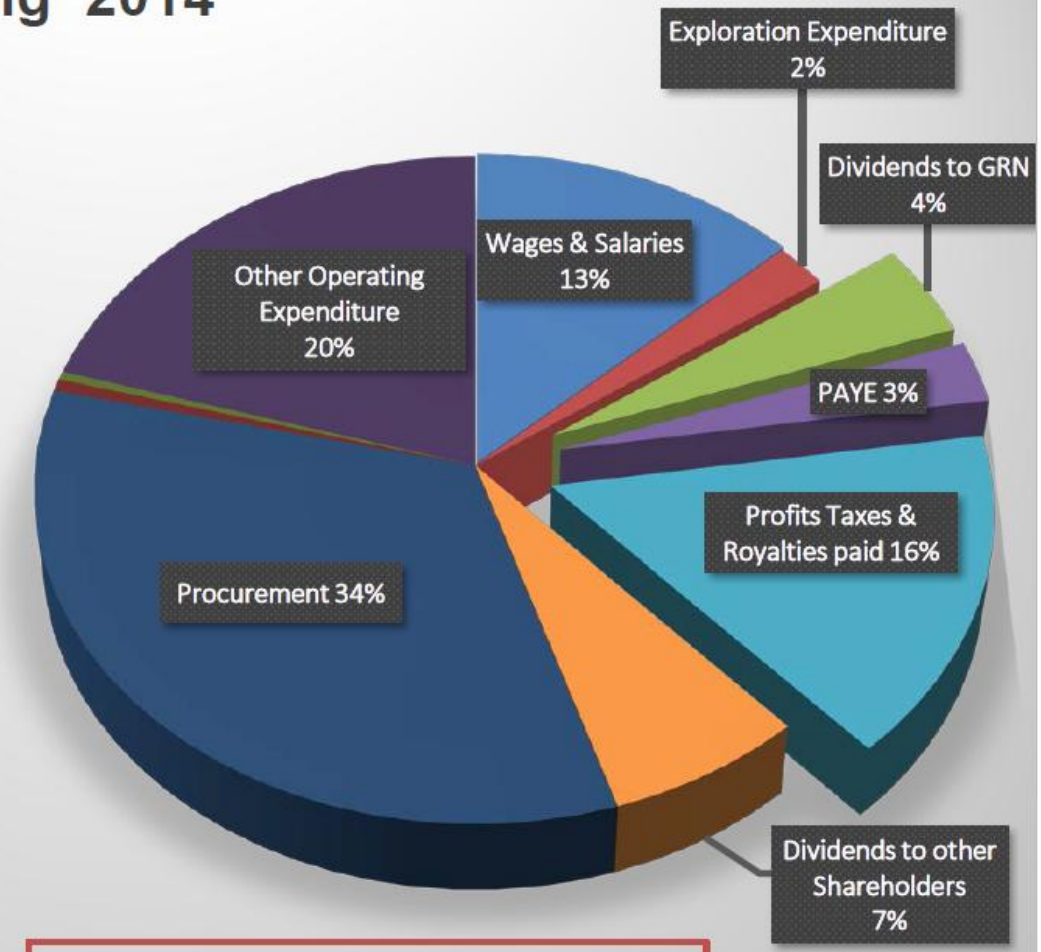


Source: Chamber of Mines Annual Report 2006

Economic Contribution of Mining

Mining industry generated > N$21.6 bn in revenue during 2014

Mining Industry Contribution (N$ bn)	
Wages & Salaries (Net)	2.824 (13%)
Exploration Expenditure	0.454 (2%)
Dividends to GRN	0.963 (4%)
PAYE	0.641 (3%)
Profits Tax & Royalties paid	3.393 (16%)
Dividends to other Shareholders	1.479 (7%)
Procurement (Namibian Spend)	7.255 (34%)
Other Operating Expenditure	4.395 (20%)
CSR	0.122 (1%)
Expenditure on Skills & Development	0.086 (<1%)
Total	21.612



Total Revenue to GRN:N$5 billion

Source: Chamber of Mines of Namibia

Economics-Summary

- The mining industry generally accounts for more than 50 per cent of Namibia's export income. Total employment in the mining industry exceeds 16 700 and, with a conservative multiplier of seven, accounts for approximately 117 000 jobs in the economy.

- The Fraser Institute now ranks Namibia ***as the first most investment friendly destination in Africa***, just pipped Botswana in 2015

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Motivation for the study

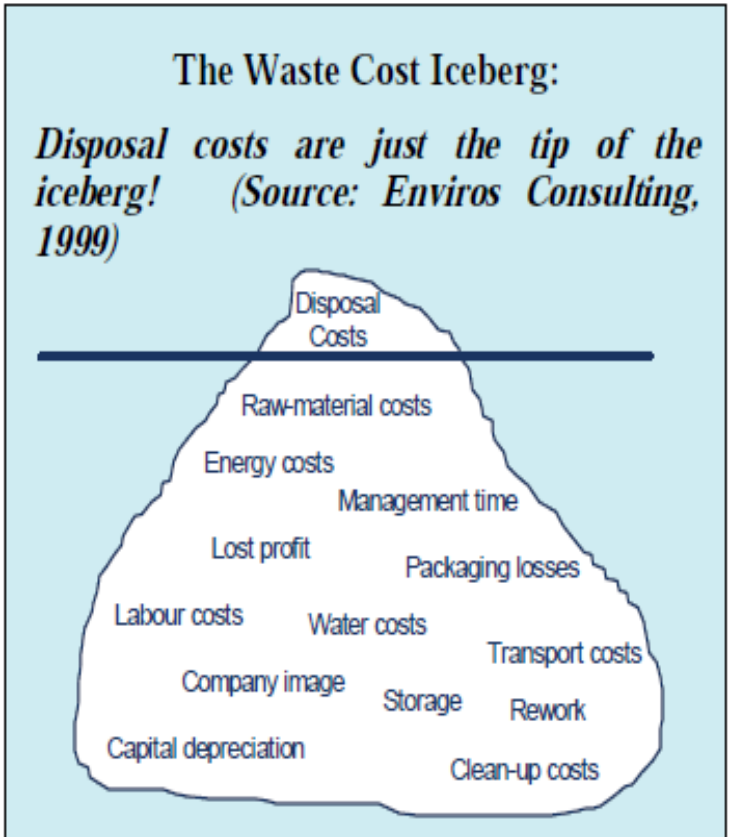
- The future of mining depend**s** on the sustainability of earth's water resources, which are increasingly under pressure.

- Water (supply and quality) –one of the great sustainability challenges of the 21st Century.

- Sound water management/leadership is fundamental for mining operations to achieve environmental compliance.

Waste costs more than you think! **Many companies do not know how much money is wasted because the true environmental costs of a company are not known.**

- Hidden costs of waste include aspects such as:
  - Loss of raw material
  - Loss of water and energy
  - Transport costs
  - Rework costs
  - Labour costs
  - Time costs



ICMM– 2014 Toolkit

- Historically mining has approached water as an operation issue, one that is managed inside a fence with a focus on water efficiencies, and control of effluent discharges to demonstrated good corporate practices and minimizes risk.

- It is now recognised that even the most water efficient operations that stringently manages water discharges can still be subject to significant water risks manifesting from outside the operation fence line at the catchment level.

Water Management & Cleaner Production

Water management is a philosophy whose principal aim is to:

- Reduce water consumption
- Re-use water where possible
- Recycle water where practicable
- Recover raw materials & energy

Cleaner Production means the continuous application of an integrated preventive environmental strategy to processes, products and services to increase overall efficiency.

FOURTH DUBLIN PRINCIPLE

Social and economic value of water

Water is a public good and has a social and economic value in all its competing uses

This relates to the use of true cost and value of water in business decisions.

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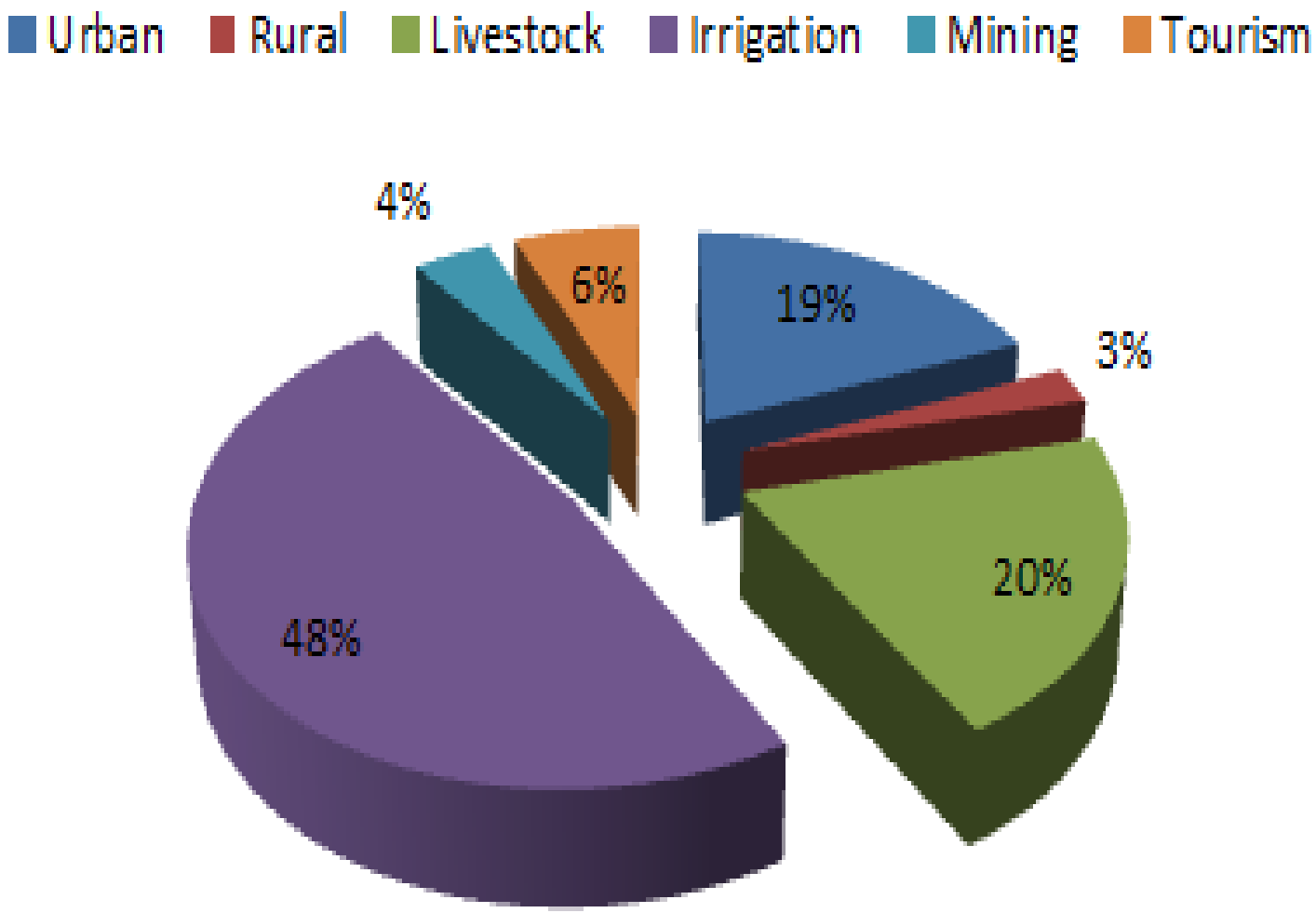
Water Usage by sector in 2015



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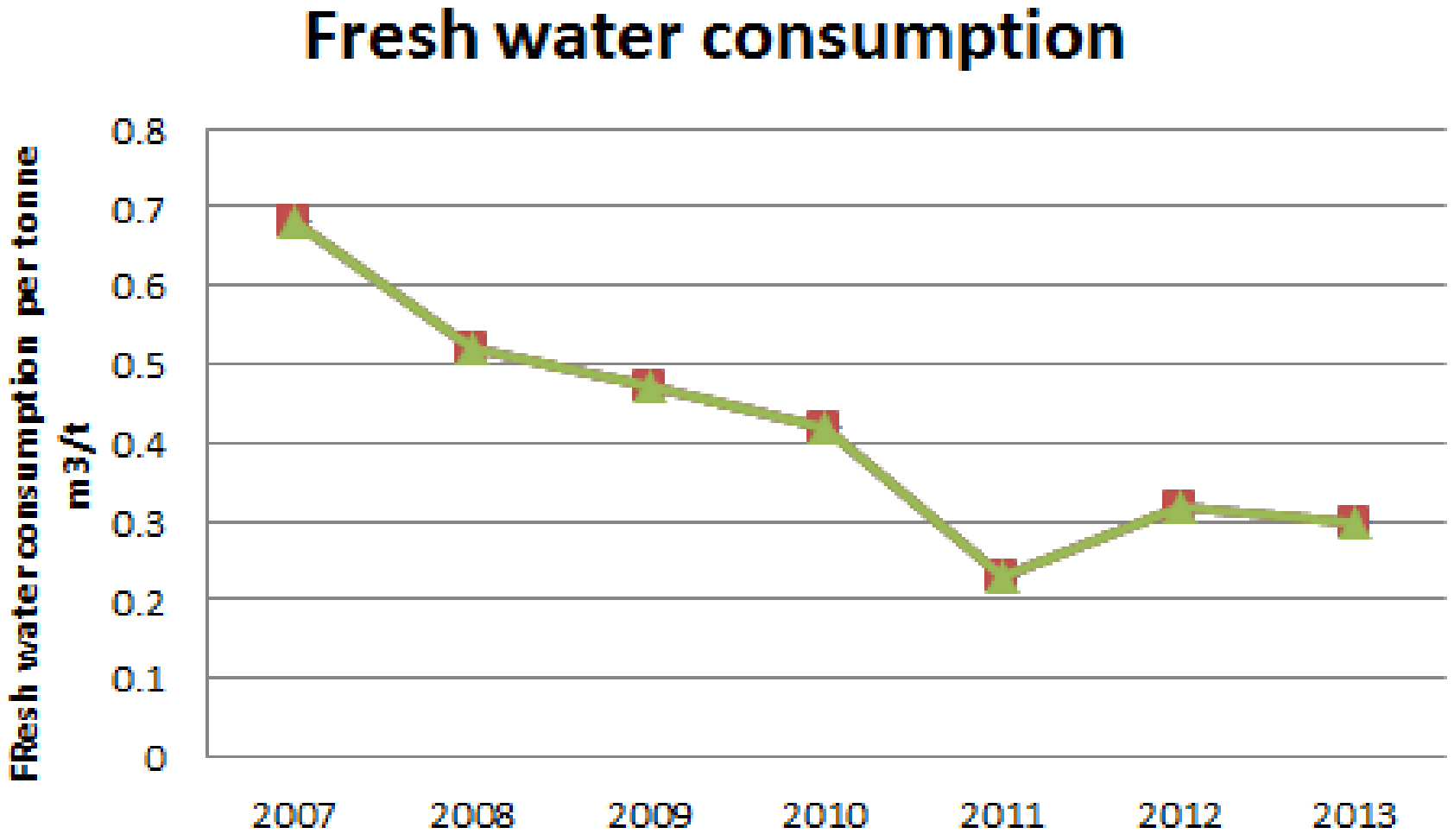
Freshwater Consumption



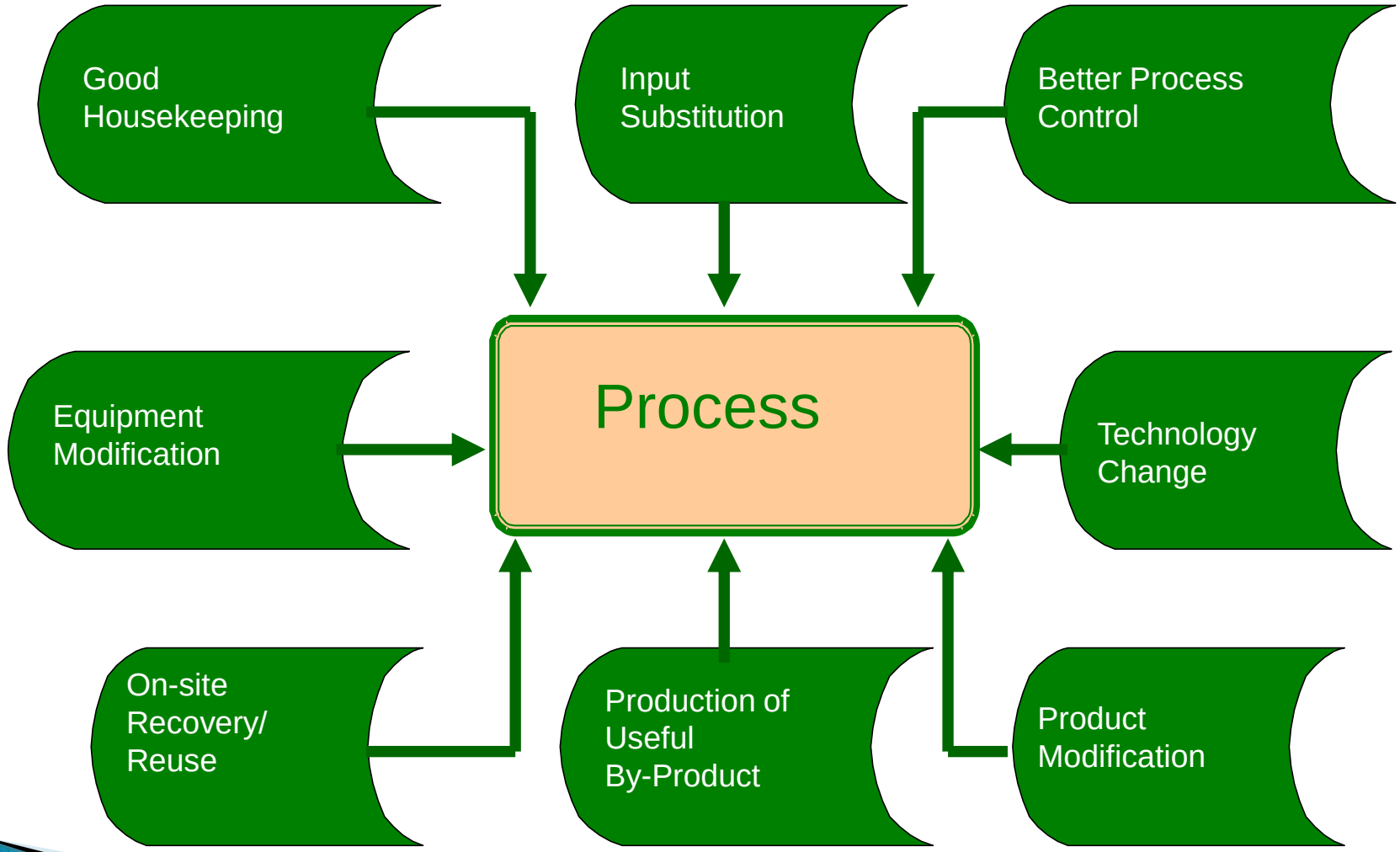
Good Housekeeping Practices

- Utilise the water in process or for services requiring lower quality water i.e. cleaning equipment and dust suppression
- use of high pressure-low volume jets than high volume-low pressure jets for cleaning purposes,
- Installation of automatic shut-off valves,
- replacement of worn out hose pipes and leaks repairs (hoses and pumps must run when only needed)
- good workmanship practices: Realising that the origin of wastewater is water supply

Regional Water Demand

- Projections indicate that the sustainable yield of the aquifers in the region will be exceeded in as more mines come into operation.
- Desalination plants
- Role of Government
- Role of Mining Companies
- Role of Tertiary Institutions

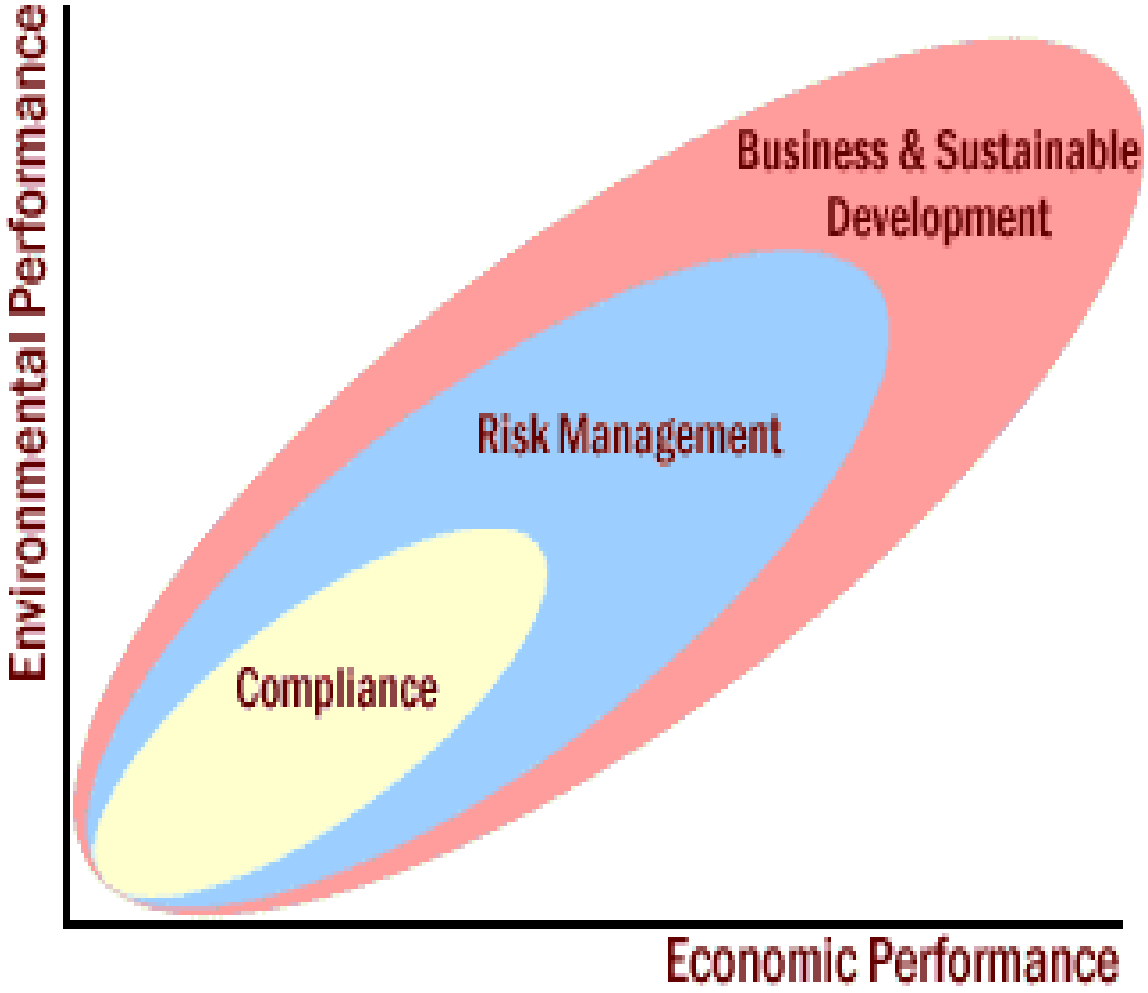
Cleaner Production Strategies



Recommendations

- There is a serious need for uranium mining companies in Namibia to form symbiotic clusters for implementing CP.
  - Alliances or partnerships can go a long way in ensuring steady state and competitive production.
- There is also a need for educationalists to integrate such thinking into the formal education program and engage industry in research

Recommendations-The Sustainable Development Journey



GOOD PRACTICES EMPLOYED

The strategies employed by the Namibian uranium companies:

- Engaging stakeholders and creating awareness,
- Effective Communication with internal and external water users
- Recycling and reuse, and minimisation of water losses.
- Basic good housekeeping aspects.
- Better process control and equipment modification have also been instrumental in saving freshwater.

CONCLUSIONS

The implementation of cleaner production & water demand management leads to radical resource productivity.

- Improving the optimal use of resources (Financial savings)
- Minimising pollution while lowering production and waste treatment/disposal costs. (Financial and Environmental benefits)
- Minimising depletion of the resource-fresh water (Supply for future generations/industry)

References

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THANK YOU

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