

OECD Green Growth and Sustainable Development Forum Inclusive Labour Markets for Green Growth



Guy Preston
South Africa's Working for ... Programmes
13th November 2014

The Programmes of the Department of Environmental Affairs

Natural Resource Management Programmes

- Working for Water
- Working for Ecosystems
- Working for Forests
- Working for Energy (Biomass)
- Eco-Furniture Programme
- Working for Wetlands
- Working on Fire

Biosecurity

Environmental Protection & Infrastructure Programmes

- Working on Waste
- Working for the Coast
- Working for Land
- Greening & Open-Space Management
- People & Parks
- Wildlife Economy
- Youth Environmental Service

**Green Fund
Green Infrastructure**



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



**EXPANDED PUBLIC WORKS PROGRAMME
CONTRIBUTING TO A NATION AT WORK**

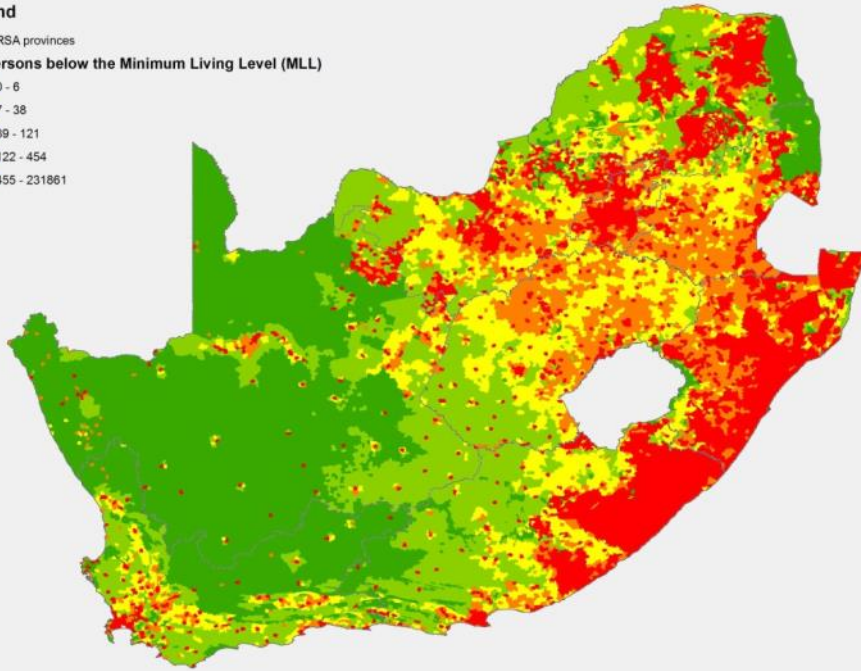


Unemployment, Poverty and Inequity, and the Working For ... Programmes

Legend

□ RSA provinces

No. persons below the Minimum Living Level (MLL)



- 14 “Working for ...” programmes are run by the Department of Environmental Affairs.
- These are not “make work” programmes – all have critical environmental outcomes.
- Over **70,000** people will find work in these programmes this year.
- The application of the Biosecurity regulations will create many more jobs.
- The jobs are aimed at the poor, to help address the scourge of unemployment, poverty and inequity, as outlined in South Africa’s National Development Plan.
- We target the most marginalized (relative to poverty), by race (99% black), gender (55% women), age (65% youth) and disability (2% people with disabilities).



The *Working for Water* Programme

The Impact of Invasive Waterweeds on Water Security



- Water hyacinth can double the area it invades on a dam in 10 days.
- Water weeds, such as water hyacinth on the Roodeplaat Dam (left), lead to an increase of 40% + in evaporation levels.
- It exacerbates water quality costs (including toxic algae problems).
- It causes damage to infrastructure (insert: hydrilla impact that cost R1.6m).
- It leads to eutrophication (oxygen depletion) and fish deaths.
- It results in a loss of recreational activities (e.g. fishing, rowing, sailing).
- It worsens diseases problems, such as bilharzia and (in malaria areas) malaria.
- Clearing costs are paid for by water users, through a Trading Account. 4



Working for Water Programme

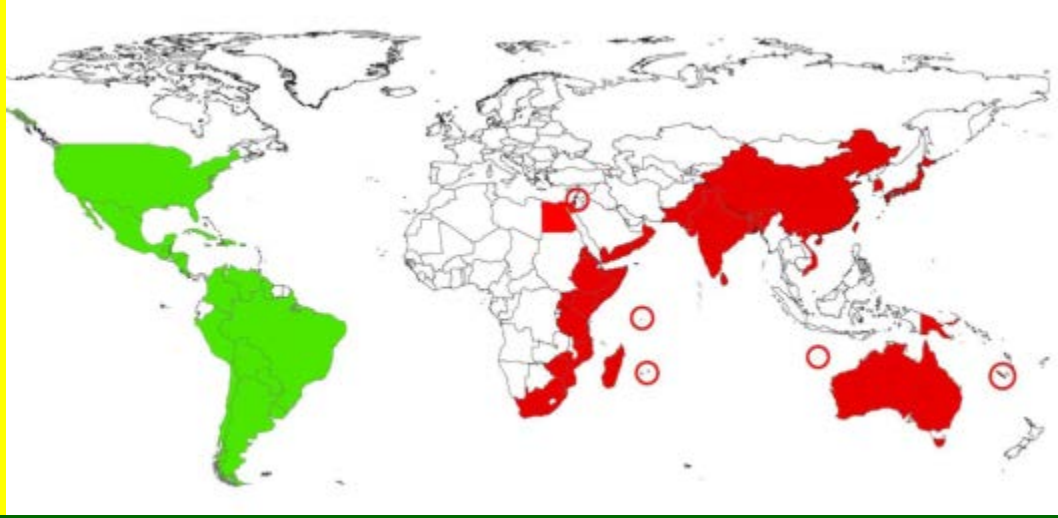
Terrestrial invasive plants (such as the pines escaping from the plantation) can destroy the productive potential of our catchments – already 7% of mean annual runoff and 4% of yield is lost, and this could worsen by four-fold or more (with climate change).

The impacts on erosion, especially after fire, and on siltation of dams and rivers, exacerbate the situation further.

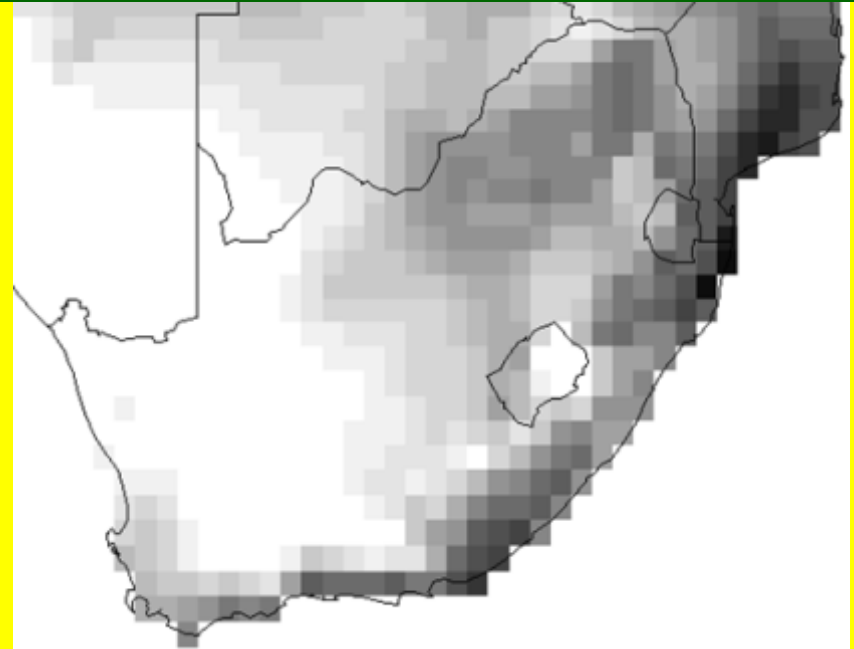
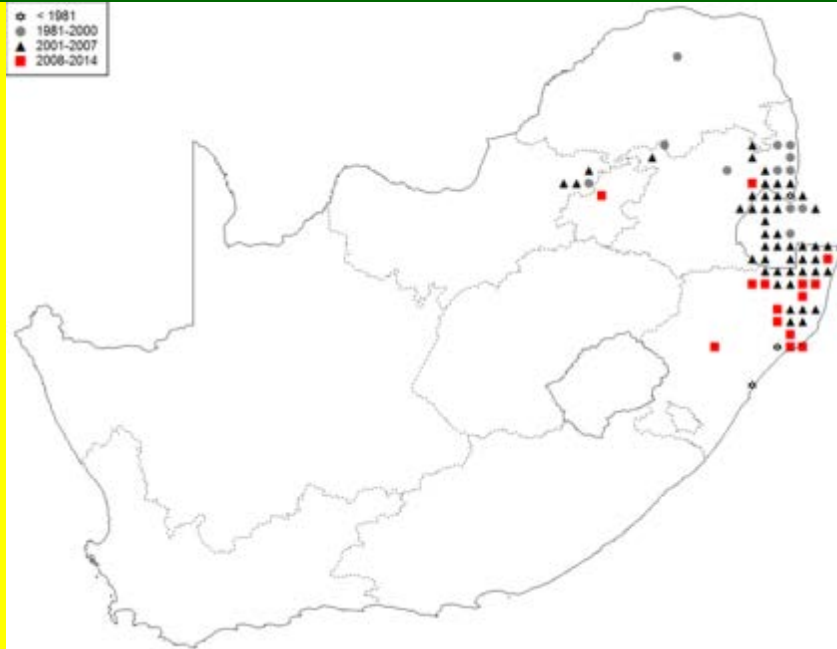
The economy cannot afford the invasions.



FAMINE WEED: CURRENT AND POTENTIAL SPREAD



Indigenous to the Americas, famine weed is invading in 30 countries. All tropical and sub-tropical regions of Africa are vulnerable. Its invasion is accelerating, and could invade all but the driest parts of South Africa.



FAMINE WEED: IMPACTS ELSEWHERE IN THE WORLD

The impacts of famine weed have been estimated in Australia, India and Ethiopia, three of the at least 30 countries in which it is invading. Notwithstanding the rather large ranges in the figures (due to different conditions and limited research), they do indicate how devastating this invasion could be in South Africa.

Table 7: A summary of the impacts of parthenium weed on agricultural productivity, human health and the environment, as reported in the literature and by experts. Detailed explanations and the references for these data are presented in Appendix 6.

| LAND-USE TYPE | IMPACT | COUNTRY |
|-------------------------------------|---|-----------|
| Agriculture | | |
| Sorghum | 45% to 80% yield reduction | Ethiopia |
| | 35% (from 6.5 to 4.3 t ha ⁻¹) yield reduction | India |
| Cattle Pasture/forage | 25 to 80% yield reduction | Australia |
| | 10 to 90% yield reduction | India |
| Environment | | |
| Species loss (forest gaps) | 69 to 95% | India |
| "Total habitat change" ¹ | 100% | Australia |
| Human health² | | |
| Allergies (e.g., rhinitis) | 20% of population in infested area affected | Australia |
| | 7 to 42% of population in infested area affected | India |

¹ *Of grasslands, open woodland, riverbanks & flood plains*

² *Measured as a % of the population in the infested area*



The poor are particularly vulnerable to the invasions by famine weed, and may be forced to abandon their ancestral homes.



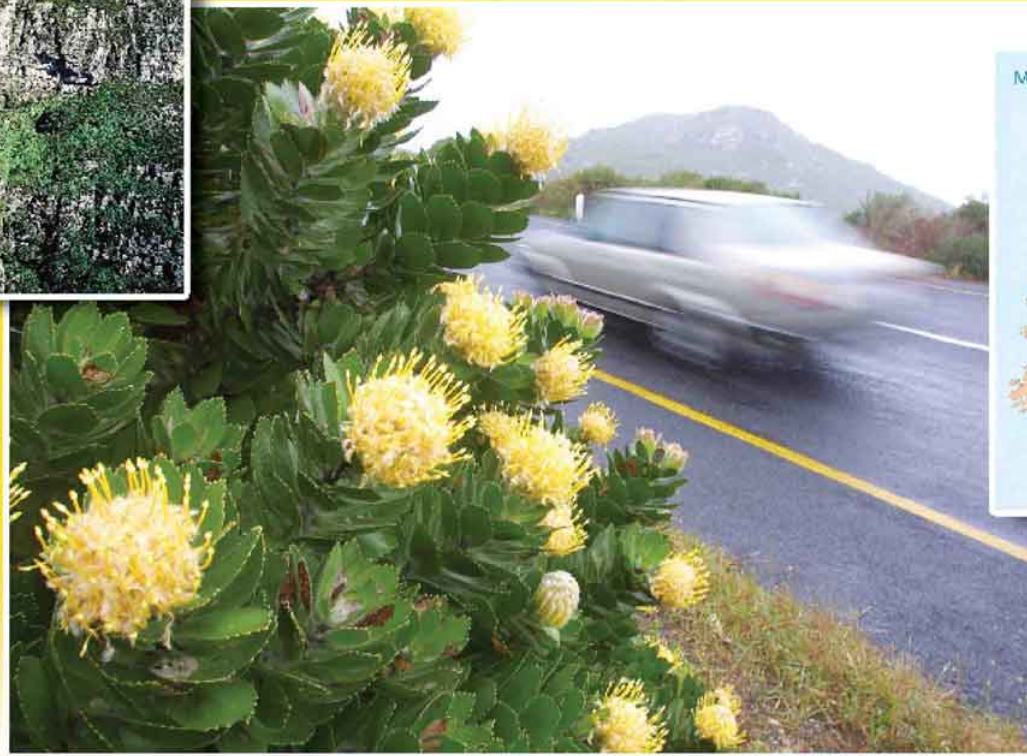
Famine weed & human/animal health – severe respiratory & skin allergic reactions, including stock and game species.

Invasive alien species, biodiversity and tourism in South Africa.

**MORE SPECIES THAN
THE WHOLE OF THE BRITISH ISLES
INVASIVE ALIEN PLANTS COULD WIPE THEM OUT**



**There are
over 2,300
plant species
on the
Table Mountain
Chain**



**The biggest
threat to this
biological
diversity hotspot
is from invasive
alien plants**



Department of Water Affairs and Forestry
Department of Agriculture
Department of Environmental Affairs and Tourism
Department of Provincial and Local Government



**There are more species of plants on the Table Mountain chain than in the British Isles.
Invasive alien species are the single biggest threat to biological diversity in South Africa.**

The Impact of the Clearing of Invasive Alien Plants on the Value of Water, Grazing and Biodiversity

- "Our study showed that reductions in surface water runoff due to current invasions exceeded 3,000 million m³ (about 7% of the national total)."
- "[T]he potential reductions would be more than eight times greater if invasive alien plants are allowed to spread and occupy the full extent of their potential range."
- "Although an estimated R6.5 billion was lost every year due to invading alien plants, this would have been an estimated additional R41.7 billion had no control been carried out. This indicates a saving of R35.2 billion every year."
- "The net present value of all control operations up to the end of 2011 would be in the order of R453 billion." ["About R400 billion of that relates to water quantity."]

Dr Brian van Wilgen and Dr Willem de Lange (CSIR) ^{1, 2}

1. *The costs and benefits of biological control of invasive alien plants in South Africa* (B.W. van Wilgen & W.J. De Lange). *African Entomology* (2010).
2. *An economic assessment of the contribution of biological control to the management of invasive alien plants and to the protection of ecosystem services in South Africa* (Willem J. de Lange & Brian W. van Wilgen). *Biological Invasions* (2010).

Value-Added Industries

- Invasive alien plants biomass is being used to make school desks, furniture, coffins, building materials and more.
- Over 3,200 people will be employed.
- In the next year, our Eco-Furniture Programme anticipates putting over 400,000 school pupils behind a desk for the first time.
- Aside from the jobs and the products that Government needs, the EFP will play an important part in the control of invasive alien plants.





- House crows, from India, kill the young of other birds, spread disease and harass people.
- Zanzibar has over 2 million house crows.
- South Africa had invasions in three port cities – Cape Town, Richards Bay and Durban.
- There were 500 birds in Durban in 2005. Left to invade, there would have been more than 250,000 birds in Durban by now. They appear to have been eradicated in Durban and Richards Bay.
- If South Africa fails to eradicate the house crow, we will be a pathway for an invasion up the west coast of Africa, with devastating impacts. We will eradicate them in Cape Town.

An example of the impact of the Working on Fire Programme

"[W]ere it not for the assistance rendered to the [Forestry] Industry by the Working on Fire Programme, in all its many guises, at a minimum, the damage to the Industry would have been twice what I have assessed it to be [R3.675 billion] in my report ."

Mike Edwards, CEO, Forestry South Africa, 17 August 2007.

Note: This was just to the Forestry Industry. There was far greater damage in these fires, including over 30 deaths. The Working on Fire budget in 2007/8 was R123 million.



Water and Electricity Conservation (Demand-side Management) User-Pays Research

Mopani Camp, Kruger National Park
1989-1994



Visitors' Water and Electricity Use Per Person Per Day

| Winter: | Litres | N | Mean | Kwh | N | Mean |
|---------------------|---------|-------|------|-------|-------|------|
| Control Group: | 124 707 | 844 | 148 | 2 929 | 630 | 4.65 |
| Experimental Group: | 30 416 | 798 | 38 | 1 797 | 798 | 2.25 |
| % Saving: | | | 74% | | | 52% |
| Summer: | Litres | N | Mean | Kwh | N | Mean |
| Control Group: | 184 794 | 1 186 | 156 | 8 403 | 1 186 | 7.09 |
| Experimental Group: | 41 723 | 960 | 44 | 2 368 | 980 | 2.42 |
| % Saving: | | | 72% | | | 66% |

Visitors paid for their own use of water and electricity. Conservation fittings used (individual impact measured – eg low-flow showerhead). Informative billing comparing experimental & control groups.

Average savings of 73% for water, and 60% for electricity. 94% level of approval by visitors.



1996/7 12-Point Plan

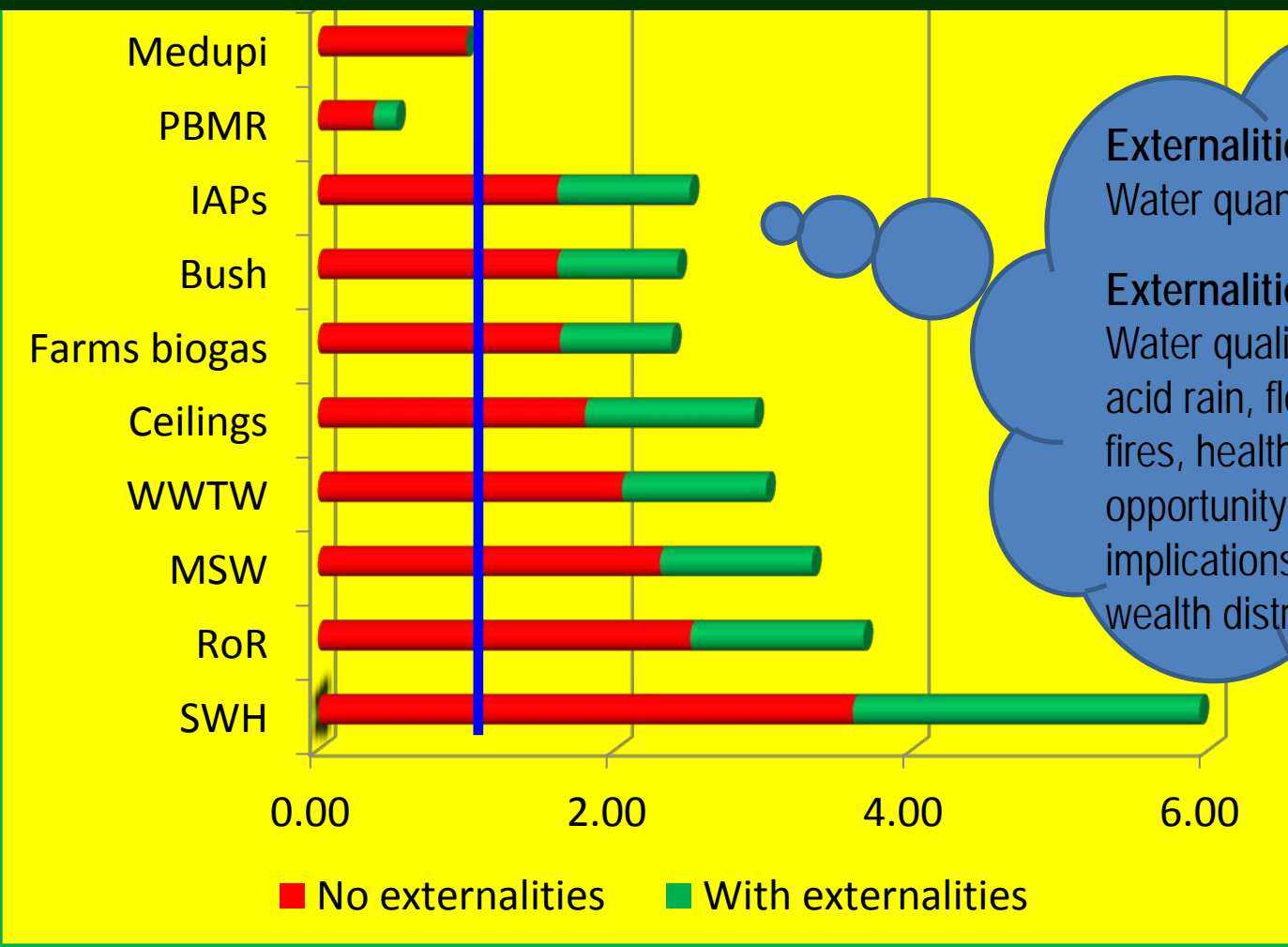
1. An assurance-of-supply tariff
2. 11-point escalating block-rate tariff
3. Informative Billing
4. Intensive Communication
5. Schools' Audit
6. *Working for Water* Project
7. Retrofitting Project
8. Water-wise gardening
9. Water-wise food production
10. National Water By-laws
11. Water-loss Management
12. Pre-payment Meter Project

Greater Hermanus Water Conservation Programme

| <u>Year</u> | <u>Litres</u> | <u>Erven</u> | <u>Litres/Erf</u> | <u>Rainfall</u> |
|-----------------|---------------|---------------|-------------------|-----------------|
| 1993/4 | 11 900 | 7 900 | 1 506 | 140 mm |
| 1994/5 | 12 075 | 8 200 | 1 473 | 120 mm |
| 1995/6 | 10 842 | 8 600 | 1 261 | 192 mm |
| Average | 11 606 | 8 233 | 1 410 | 151 mm |
| 1996/7 | 8 644 | 9 000 | 960 | 168 mm |
| Savings: | 25,5% | [9,3%] | 31,9% | [11,3%] |

32% reduction in water use; 24% increase in revenue from water sales; those who drove marginal cost paid marginal price; no need for new dam; 96% approval by residents.

Benefit-Cost Ratio comparative estimates of labour-intensive green energy options with the Medupi Coal-Fired Power Station in 2008. Medupi = 1. (Calculated over 20 years with a discount rate of 6%.) NB: Medupi's cost subsequently escalated by >50%.



Externalities include:
Water quantity, carbon & jobs

Externalities exclude:
Water quality, biodiversity, acid rain, flood attenuation, fires, health considerations, opportunity cost of coal, implications for food security, wealth distribution, & more.

OFF THE SCALE ...
HH biogas: 5.4 & 12.0
DSM: 19.0 & 31.2

- | | | |
|--------------------------------------|--------------------------------|----------------------------------|
| 1. Medupi Coal-fired Power Station | 5. Energy from Farm Biogas | 9. Energy from Run-of-River |
| 2. Pebble-Bed Modular Reactor | 6. Conservation from Ceilings | 10. Solar water heating |
| 3. Energy from Invasive Alien Plants | 7. Waste Water Treatment Works | 11. Energy from Household Biogas |
| 4. Energy from Bush Encroachment | 8. Municipal Solid Waste | 12. Demand-side Management |

Green Fund Investments

Resource
conservation and
management

Sustainable waste
management
practices

Water
management

Environmental
Sustainability

Green buildings
and the built
environment

Sustainable
transport and
infrastructure

Clean energy and
energy efficiency

Agriculture, food
production and
forestry

Sustainable
consumption and
production

- R722.5 million dispersed to date.
- 25 investment projects approved to date.
- 16 research & development project implemented to date.
- 7 capacity building projects approved & being implemented.

DBSA Analysis of Green Job Opportunities

Indicative figures of green jobs through some “Working for ...” programmes.

| | 2012 | 2012 | 2017 | 2017 | 2025 | 2025 |
|----------------------------------|----------------|--------------------------|----------------|--------------------------|----------------|--------------------------|
| | Number of FTEs | Total budget requirement | Number of FTEs | Total budget requirement | Number of FTEs | Total budget requirement |
| 1 Euro = 13 Rand | | | | | | |
| FTE= Full-Time Equivalent Job | # | R'mill | # | R'mill | # | R'mill |
| Working for Water | 15,416 | 1,238 | 42,979 | 5,438 | 111,632 | 24,010 |
| Working for Energy (Biomass) | - | - | 14,293 | 2,370 | 38,480 | 14,713 |
| Working for Land | 3,485 | 281 | 23,941 | 3,058 | 63,749 | 15,073 |
| Working for Wetlands restoration | 1,266 | 119 | 4,936 | 739 | 6,945 | 1,782 |
| Working for Wetlands prevention | 509 | 25 | 2,115 | 164 | 2,976 | 395 |
| Working on Fire | 3,239 | 220 | 7,042 | 758 | 7,042 | 1,299 |
| Total | 23,915 | 1,882 | 95,305 | 12,527 | 230,824 | 57,271 |

Conclusions

- The programmes of the Department of Environmental Affairs are essential interventions for ecosystem services that sustain the productive potential of our economy.
- They are investments with significant returns for their outcomes.
- Furthermore, they create jobs and training, and promote the dignity of doing relevant work.
- In certain cases, such as the value-added industries (the Eco-Furniture Programme and the biomass-to-energy and biomass-to-building materials), new economic opportunities occur.
- Our green growth can be cost-effective (especially with externalities), and labour-intensive.
- Biosecurity represents as great an economic return on investment as a country can make.
- Political leadership has been pivotal. Minister Edna Molewa (left) and Deputy Minister Barbara Thompson (right) champion these programmes.



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