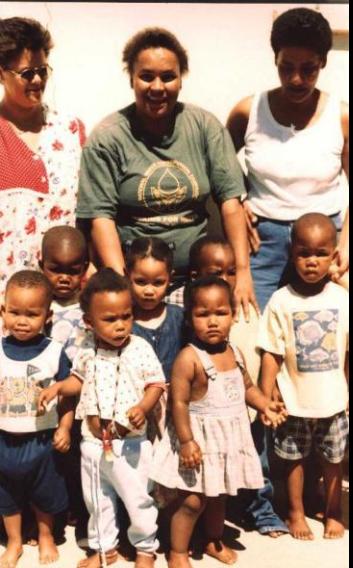


Some South African Experiences with Green Economy and Climate Change Mainstreaming



Guy Preston, Department of Environmental Affairs, South Africa





The *Natural Resources Management Programmes* are providing work for almost 40,000 previously unemployed people (including its sibling KwaZulu-Natal *Invasive Alien Species Programme*). The programmes focus upon opportunities for the most marginalized, including women (target of 60% of wages), youth (45%) and the disabled (2%). Social development foci have included wellness issues, HIV and AIDS, sexual and reproductive health, childcare for the children of workers, substance abuse, financial management and other efforts to empower the workers, including through peer educators.





The Environmental Programmes are part of the South African Government's Expanded Public Works Programme, which addresses developmental needs in labour-intensive ways.

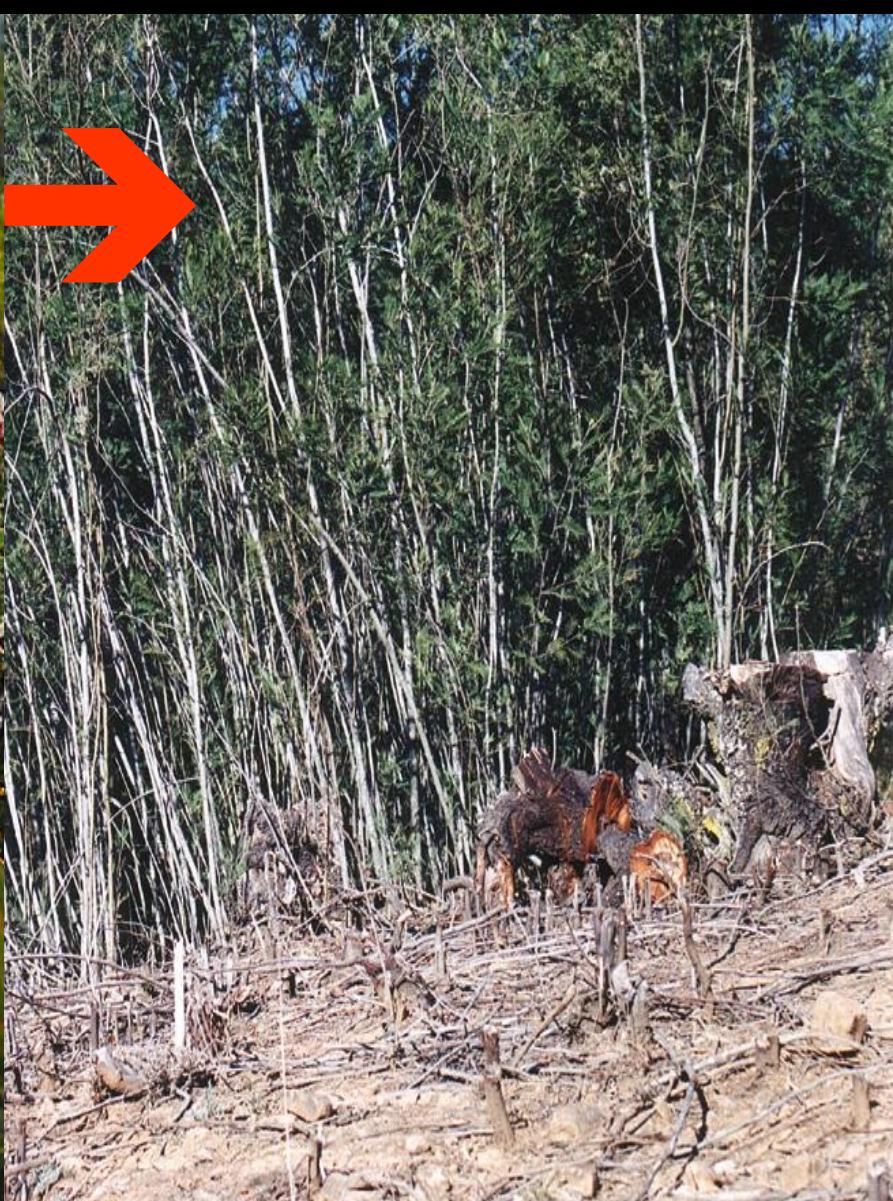


Species produce sufficient offspring to ensure the survival of the species, given the prevailing threats and competition in their natural habitats – in general, that they are replaced by their offspring. When moved to new habitats, they may both escape their predators and be able to out-compete the indigenous species, leading to an invasion where each individual produces massive numbers of offspring that themselves live to reproduce.





Rich biological diversity in the fynbos, and the species it supports (left), can quickly be replaced by a green desert of invasives, with all their problems.



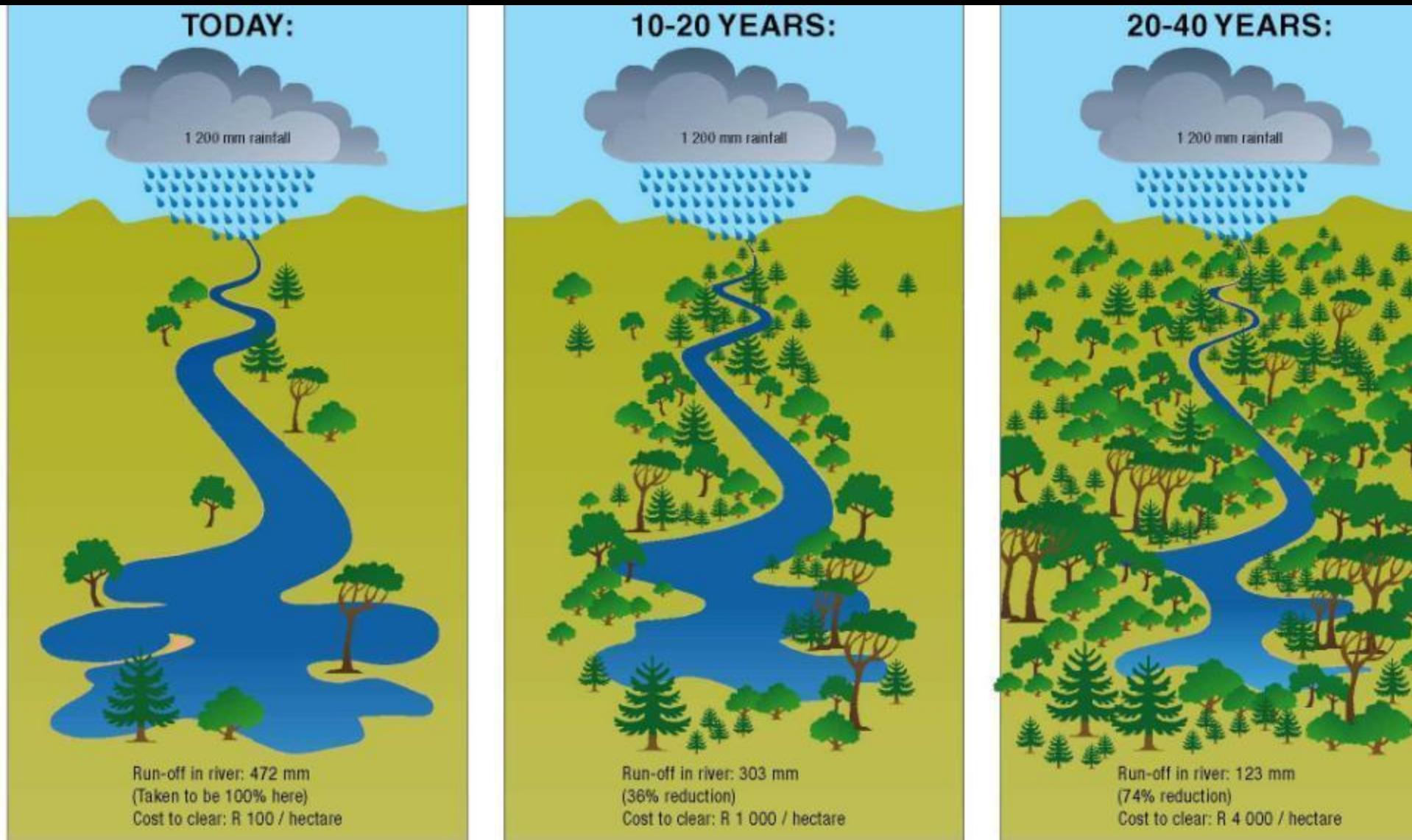
CATEGORY / AREA

Indian house crow (*Corvus splendens*)

Category 1a



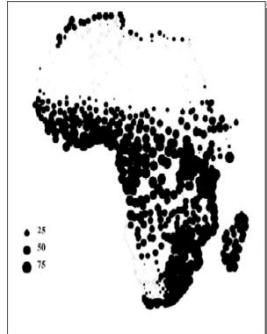
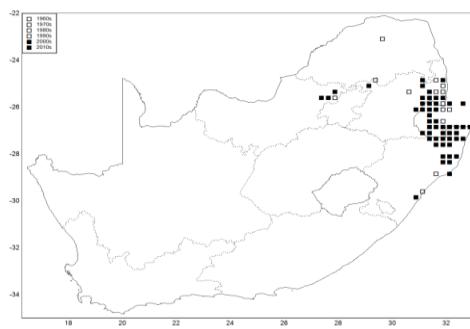
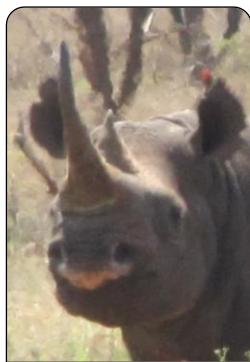
Recent research has indicated that *Chromolaena odorata* may have impacts on water similar to those of large invasive trees like gums, pines and wattles. It is also known as the “paraffin bush”, for the intensity with which it burns.



CATEGORY / AREA

Famine weed (*Parthenium hysterophorus*)

Category 1b



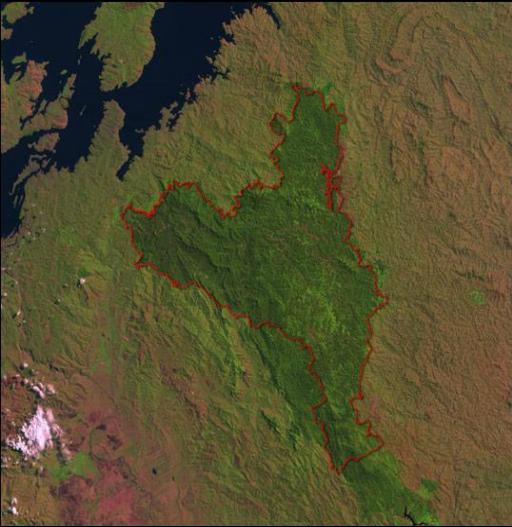


Water hyacinth (*Eichhornia crassipes*) on Roodeplaat Dam, near Pretoria/Tshwane.

It leads to an increase of about 40% in evaporation levels; exacerbated water quality costs (including toxic algae problems); damage to infrastructure; eutrophication and fish deaths; loss of recreational activities; diseases problems, and more.

In the growing season, water hyacinth can double the surface area it invades in just one week.

The “Lethal Cocktail” of Environmental Change



Habitat destruction:

Nyungwe National Park, Rwanda



Invasive Alien Species:

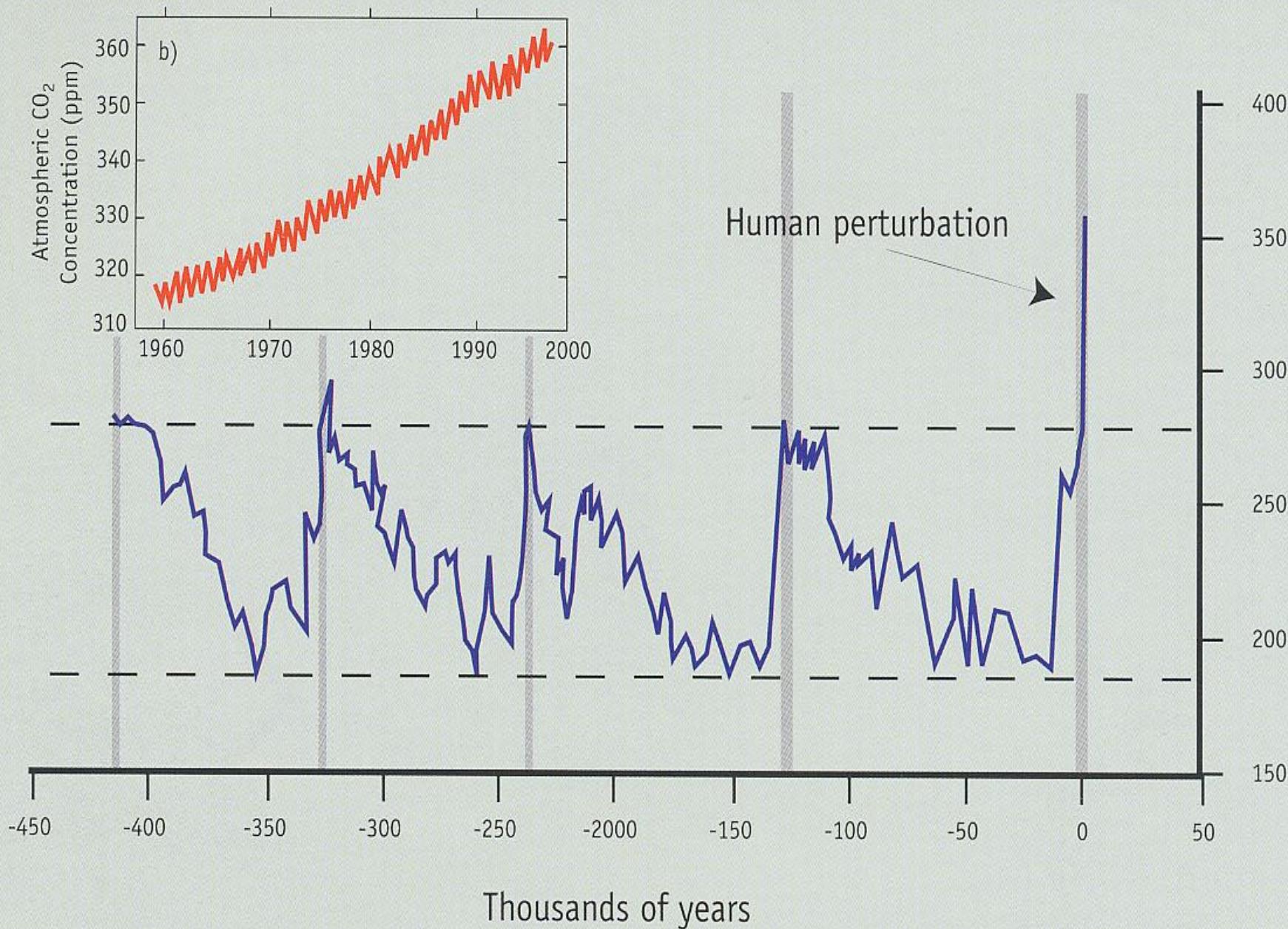
invasive grass in China



Climate Change: Melting glaciers:

Torres del Paine National Park, Chile

The recent human influence on the carbon cycle



Research by Dr Barney Kgope, Dr Guy Midgley and a visibly concerned Professor William Bond (below) confirmed a potentially catastrophic link between climate change and habitat modification – and one that will be exacerbated by woody invasive alien plants.



Root and shoot growth of sweet thorn (*Acacia Karoo*) at different parts-per-million of atmospheric carbon dioxide (CO₂).

This will lead to massive impacts on a productive use of land, water security, wild fires, biological diversity, and more.

The already problematic mesquite (*Prosopis* species) in the Northern Cape are well-adapted to take advantage of climate change, with disastrous implications for rivers, keystone ecological species, groundwater and human livelihoods.



The impact of the clearing of invading alien plants on the value of water

- “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).

It's not whether we can afford to do it; it's whether we can afford not to do it!

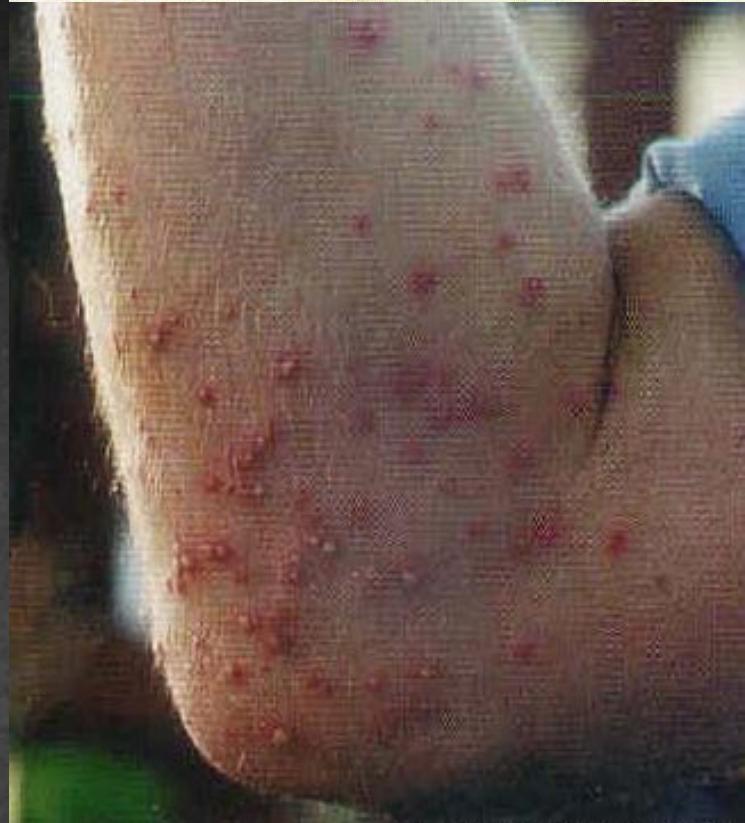
“Based on an estimated \$31 trillion in world GNP,
the \$1.4 trillion in losses from invasive species
represents nearly 5% of the world economy.”

Pimentel, D (Ed). *Biological Invasions: Economic and Environmental Costs of Alien Plant, Animal and Microbe Species*. CRC Press, Boca Raton.

Even if these figures are 50% out, when using simplistic economic measures, they are unaffordable – for invasives are invading, and rapidly.
(But the resource-economic externalities – the social costs, opportunity costs, synergistic and cumulative impacts – better suggest the looming catastrophe.)

Bio-security – Prevention and Control of Invasive Aliens Species

- **Prevention Services:** Protection at airports, harbours, border posts & postal service.
- **Risk Assessment:** Ascertaining the risk of actual and potentially invasive species.
- **Competent Authority:** Compliance with laws (with enforcement by LACE Branch).
- **Issuing Authority:** Issuing of permits and .
- **Early Detection:** Detection of emerging invasive species, for rapid responses.
- **Advocacy Services:** Promoting appropriate behaviour to prevent /manage invasives.
- **Regulatory Services:** Support B&C and LACE Branches in enhancement of Lists and Regulations.



Pines invading the southern Cape mountains. If not controlled, they will destroy the watersheds, and any dams in the area would be fruitless expenditure!



Pines and hakea invading on private land. It has effectively been abandoned for productive use, and for its ecological services.

Photo: Dr Brian van Wilgen.



Value-added Industries



In partnership with the
KwaZulu-Natal Invasive Alien Species Programme

Eco-coffins can help to reduce the exploitation of the poor at the time of bereavement. Here 89 jobs have been created making coffins and caskets from invasive alien wood.





Professor Kader Asmal, who gave life to the Working for Water programme, and all that has followed, chose to use a basic, rope-handled, pine Eco-Coffin for his funeral.

The “Eco-desks” for schools is a major initial focus of the Eco-Furniture Factories – creating jobs, making high-quality, low-cost products from invasive alien wood.



Indoor or outdoor benches are made from invasive wood (here, river red gum).



10/11/2010

Chess Table

A multi-purpose work station for schools, where Learners can study, but where chess, Sudoku and other intellectually challenging games can also be played.



15/06/2011

Built into the Chess Table will be other games that stimulate logical thinking and promote recreational activities and education.

The purpose of the game on the left is to replace the invasive species (pegs) with the indigenous species, whilst only moving forward one hole at a time, or jumping one “tree” at a time. There are many other similar games that will be built into the desk, with the pieces stored in drawers below the table top.

Umsholozi Walking Sticks

Nineteen previously unemployed people in Nkandla, KZN are making walking sticks from invasive wood, and the sticks are given to the elderly and others in need of support.

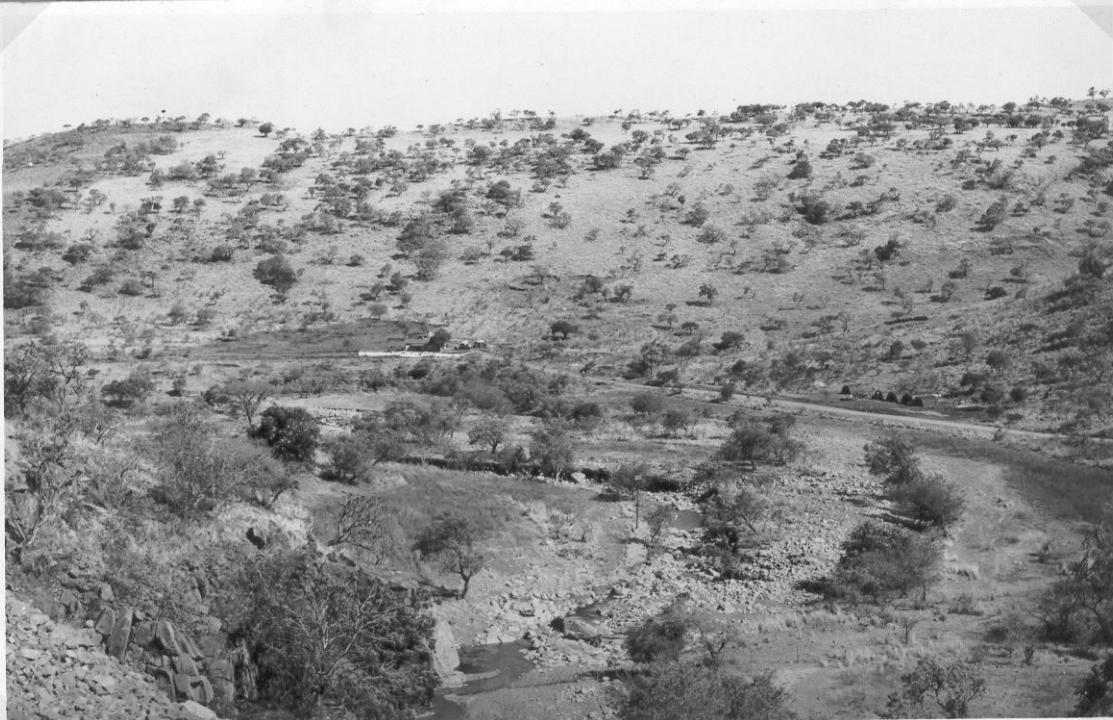


The *Working for Land* Programme



The *Working for Land* programme (aligned with Payments for Ecosystem Services, LandCare and Combating Desertification) is potentially the biggest of the Natural Resource Management programmes, restoring the ecological integrity of land and water, and their productive potential.





From pre-industrial
to current CO₂ levels?
Trees have increased
world-wide in savannas

Open savanna, S. Africa
1955



Same place, 1998

(from T. Hoffmann, IPC)

Upper Umzimvubu

Storage Space (m ³)	500 000
Catchment size (ha)	77 100
% Silted Up after 4 year	70%
Volume Silted Up after 4 year	350 000
Years since completion	4
Siltation/Year	87 500
Soil Loss per Hectare per Year (m ³ /ha/year)	1.13
% of Catchment Degraded	30%
Area Degraded	23 130
Soil Loss per Degraded Hectare per Year (m ³ /ha/year)	3.78

Working for Forests



The management of plantation forestry has improved regarding where and how trees are planted, but the impact of invasions from the plantations remains a massive problem in too many cases, where the costs are imposed on others, the environment, wild fires, and certainly water security.





A principal initial focus of Working on Forests is to convert suitable wattle jungles into managed plantations, both as woodlots for poor communities and potential saw-log plantations.



The *Working on Fire* Programme



The *Working on Fire* programme is providing work as fire-fighters for over 5,000 previously unemployed people. Spread across eight provinces, these teams have had exceptional success in managing wild fires: to limit their destructive impacts (saving the country billions of Rands) – but also to harness their nurturing qualities for ecosystem health and productive potential of land.



The *Working on Fire* programme is an important auxiliary capacity for search-and-rescue work (and especially as the programme is so active in mountainous areas), and other disaster management needs.

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 bn] in my report.”

Mike Edwards
CEO
Forestry South Africa
17 August 2007

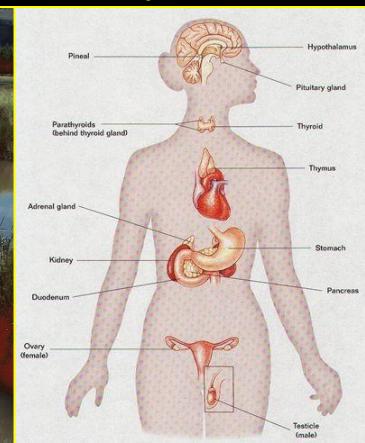
Note: This was just to the Forestry Industry. There was far greater damage in these fires, including over 30 deaths. The Working on Fire budget in 2007/8 was R123 million.

The *Working for Wetlands* Programme



Zoar Wetland, Piet Retief (D. Lindley)

The *Working for Wetlands* programme is providing work for almost 2,000 previously unemployed people, in all nine provinces. These teams rehabilitate wetlands (above), and address issues of flooding, water quality, disease management and water quantity – and thus bio-diversity (below).

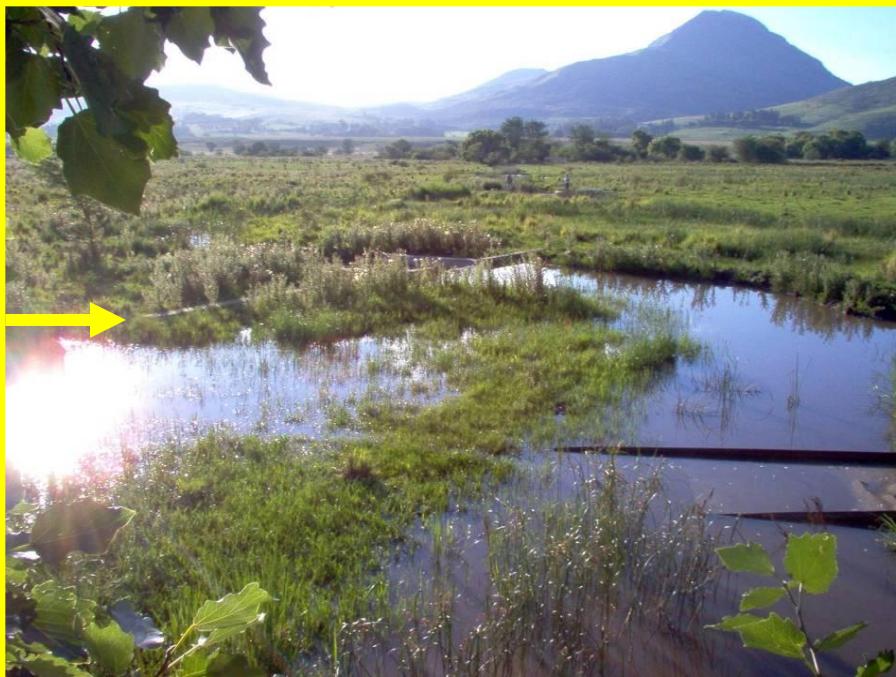




Zoar Wetland, Piet Retief (D. Lindley)



The *Working for Wetlands* Programme



95 wetlands (out of 114,000).
2,000 people employed.

Penny Park Wetland, Kokstad (J. Dini)
(149 hectares, 3 million cubic metres)





Working Wetlands: Flood Management

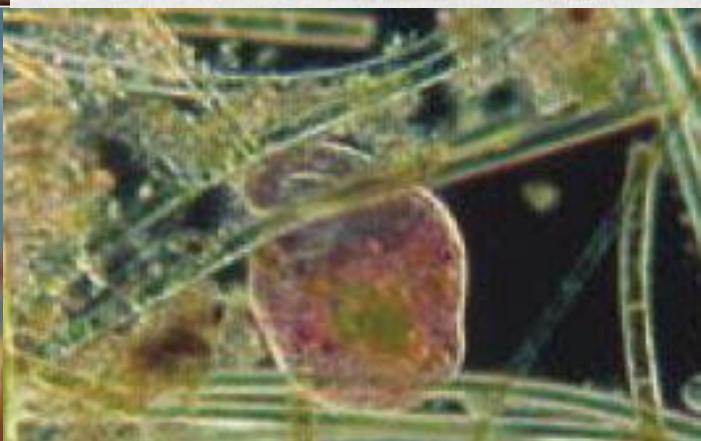
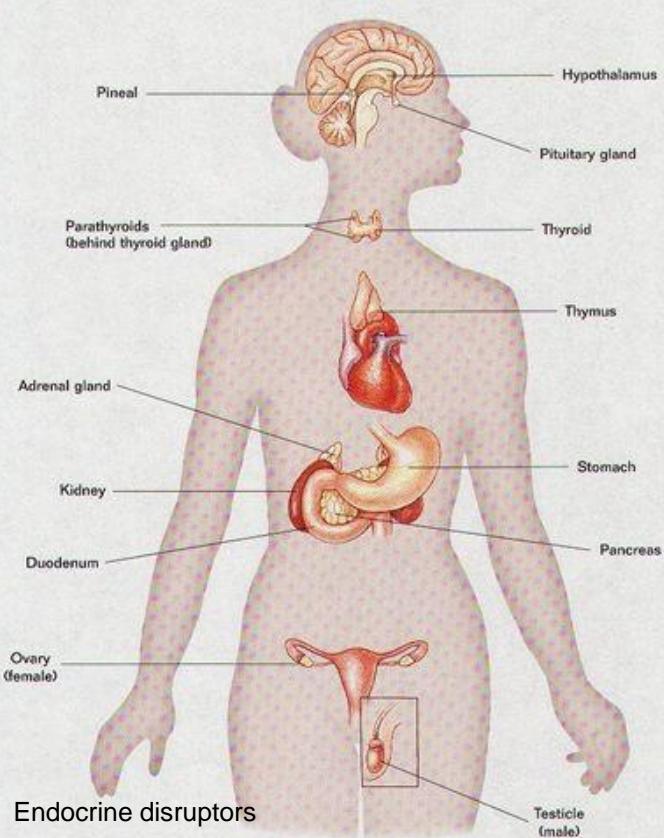


Working Wetlands: Water Quality



Nature's kidneys

Working Wetlands: Disease Management



Working Wetlands: Water Quantity



Working for Energy



(... and Water)

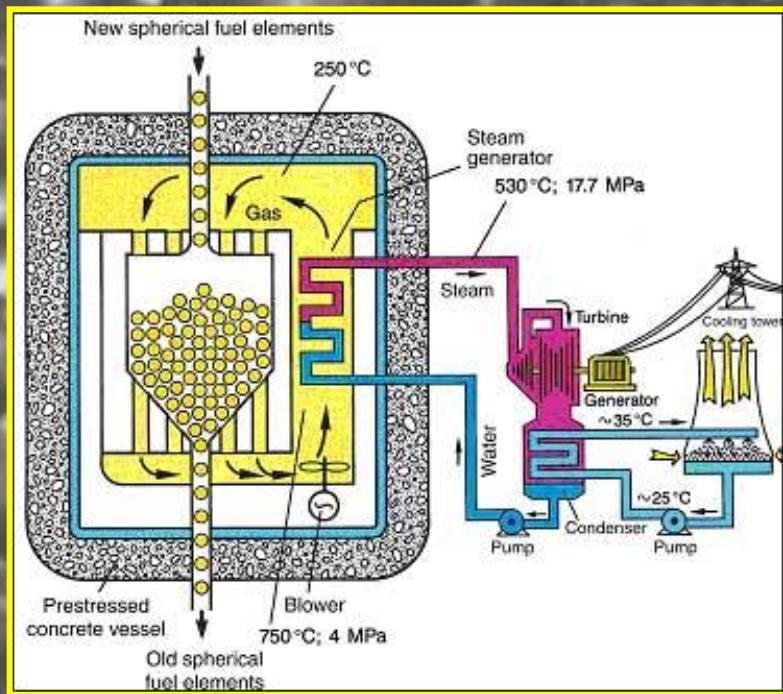


The *Working for Energy* Programme



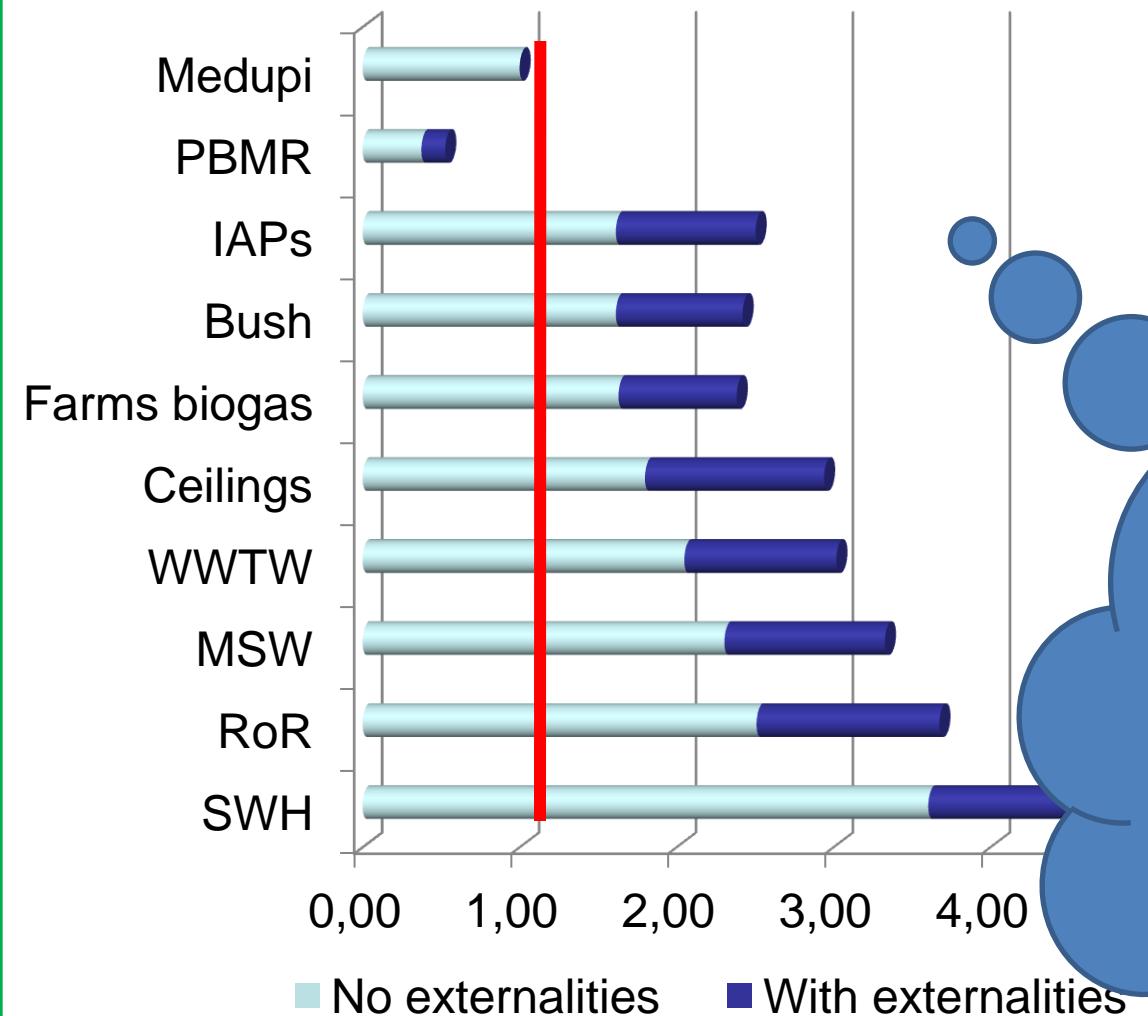
The *Working for Energy* programme is the newest initiative (led by the Department of Energy) – *inter alia*, turning invasive biomass into energy (above left and centre); waste to energy (above right, human and animal waste), & labour-intensive energy and water demand-side management.





Electricity generated by a Pebble-bed Reactor may cost more than 100 times the price (without externalities) to save the same amount of electricity by using compact fluorescent lamps.

Benefit-cost ratio with Medupi = 1, taken over 20 years and a SDR 6%



Insert 1:

Household biogas: 5,4 & 12.0
DSM: 19.0 & 31.2

Insert 2:

Overall economy (with externalities): BCR = 4,9

Externalities include:

Water quantity, carbon & jobs

Externalities exclude:

Water quality, bio-diversity, acid rain, flood attenuation, fires, health considerations, opportunity cost of coal, etc.

GREATER HERMANUS WATER CONSERVATION PROGRAMME

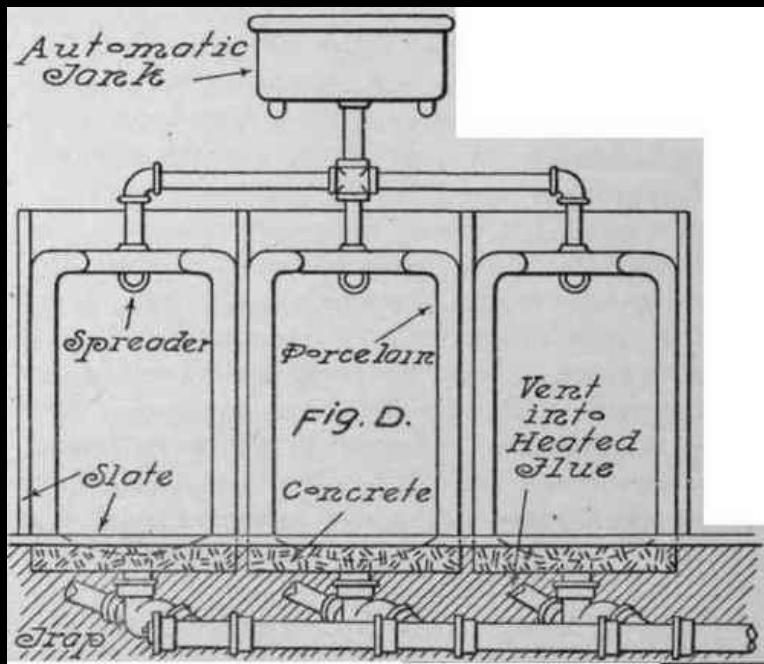
Year	Litres	Erven	Litres/Erf	Rainfall
1993/4	11 900	7 900	1 506	140 mm
1994/5	12 075	8 200	1 473	120 mm
1995/6	10 842	8 600	1 261	192 mm
Average	11 606	8 233	1 410	151 mm
1996/7	8 644	9 000	960	168 mm
Savings:	25,5%	[9,3%]	31,9%	[11,3%]



Hely Hutchinson & Woodhead Dams on Table Mountain



Hely Hutchinson Dam





**Low-flow showerheads
use $\frac{1}{4}$ to $\frac{1}{2}$ of water and electricity
used by conventional showerheads**

Greening and Open-Space Management Programme



- Promotion and creation of community conservancies
- Rehabilitation and re-vegetation of landscapes to conserve natural resources
- Creation of livelihood opportunities through the sustainable utilization of natural and cultural heritage .
- Open space management, i.e. establishment of community parks and associated services .

Greening & Open Space Management



The *Working for the Coast* Programme



- Rehabilitation of coastal environment (e.g. dunes, estuaries, coastal erosion, etc.)
- Cleaning up of beaches.
- Monitoring and compliance (e.g. safety, environmental degradation, littering, water quality, etc)
- Upgrading and maintaining of facilities and infrastructure along the coast.
- Support towards demolition of illegal structures.

The People and Parks Programme



- Focus on protected areas to conserve natural resources and cultural heritage .
- Development and upgrading of infrastructure in and around protected areas .
- Development of benefit sharing models for communities living around parks and protected areas .
- Creation of ancillary industries and SMME / BEE development complimentary to the protected areas.



People and P

The *Wildlife Economy* Programme



The *Wildlife Economy (Working for Wildlife)* programme provides work for 1,000 Environmental Monitors, where the focus has been on combating poaching. There is a significant demand for these services, with our funding only the wage component, and the partners paying for training, equipment and management. There is, however, a far broader focus to the programme, which seeks to promote optimal land-use practices, where the wildlife economy can promote job creation, BBBEE, food security, ecosystem services and land reform – and saving existing jobs.

The Working on Waste Programme



- Create mechanisms for the protection of environmental quality.
- Create sustainable livelihoods through recycling of waste (waste collection & minimization).
- Support use of environmentally friendly waste disposal technologies.
- Capacity building for municipalities to develop Integrated Waste Management Plans.
- Rehabilitation of polluted areas.

Working on Waste / Youth Job





- Task-based work and roads.
- Dignity of work.
- Sense of purpose.

Livelihoods That Matter ...



... in whom they target.

Livelihoods That Matter ...



... in what they deliver.

Outcomes that not only create jobs,



but ensure that existing jobs are not lost.

Job projects bear ample fruit

Programmes record many successes, despite DA's criticism

RECENT articles by Professor Wilmot James and Western Cape Premier Helen Zille regarding the jobs created through the Expanded Public Works Programme (EPWP) are unfortunate and misguided, if not mischievous.

This may be a time for political point-scoring, but this should not be at the expense of what is truthful or the dignity and self-worth of those who have secured jobs.

Delivering the State of the Nation address, President Jacob Zuma noted the significance of the Expanded Public Works Programme and the Community Work Programme in effectively cushioning the poor and the youth.

Our various Extended Public Works Programmes (EPWP) under the Department of Environmental Affairs, are rightfully well known for their ability to give the resources and dignity of work to previously unemployed people – with a strong focus on the most marginalised (by race, gender, age and disability), particularly in rural areas.

Often when arguments are presented on the work programmes, what is overlooked, is that this work leads to vital benefits for life and livelihoods. These jobs are valued by the beneficiaries.

All surveys conducted have indicated that the vast majority of beneficiaries see the experience as a platform on which to build and as a crucial lifeline to the dignity of earning a basic wage.

Our programmes play a dual role of creating employment opportunities while ensuring we deliver on our mandate of protecting the environment.

What is also important in the jobs our environmental programmes are creating, is the outcomes of these jobs. The Working on Fire programme is an example. It has created 4 409 jobs in this financial year.

These firefighters had fought 2 924 fires by the end of January.

They have also had controlled burning of 37 982 hectares of land, 20 724ha of fire belts created, and mammal fuel-reduction of 4 566ha.

By any yardstick, these are valuable and valued jobs that have been created through this works programme.

A calculation done in the last financial year was that up to 85 percent of the fire-fighting capacity for wild fires in the West-



Edna Molewa

ern Cape came from the Working on Fire programme.

I can only hope Professor James and Premier Zille would echo the praise heaped on the pivotal work of this programme in the province by MEC Anton Bredell.

To build on what Deputy Public Works Minister Jeremy Cronin has said about the Working on Fire programme, the former chief executive of Forestry SA has said the impact of fires in 2007 on the forestry industry would have been double – that is about R3.6 billion – had it not been for the Working on Fire programme.

We need to do more to quantify the benefits and impacts of our various programmes, but this is a clear indication that this work programme has exceptional returns on investment.

I would like to invite Wilmot James and Helen Zille to join me at the Working on Fire programme, and to meet the beneficiaries.

They will find that these previously unemployed people have an exceptional sense of pride in the work they are doing, and are a model of fitness, discipline and effectiveness.

The Working for Water programme is the biggest of our environmental programmes – with good reason.

The threat of invasive alien species is one of the major factors that will determine our economic, ecological and social development in the country.

The programme will clear invasive plants from more than 1 million hectares of land in this financial year, creating jobs for more than 30 000. Again, it is the outcomes that are critical.

The programme has not been able to re-evaluate a previous assessment by the CSIR of the value of the work of controlling invasive alien plants.

This had put the value at an astonishing R453bn, and then only for the value it contributed to water quantity (R400bn thereof), biological diversity and grazing.

A later meeting of specialists concluded this figure was too high, and we are awaiting a reassessment of the benefits of the

work. What is important, though, is the figure is certain to be massive – and reflect an exceptional return on investment.

This would be more so if many of the other impacts were able to be estimated – deterioration of water quality, wild fire damage, impacts on soil erosion, siltation and sedimentation, problems of diseases and decline in the productive use of land and water.

As with Working on Fire, the bottom line is that this programme is one that is creating exceptionally important jobs.

And, it is probably now the most recognised and internationally lauded programme of its kind in the world.

The Working for Wetlands programme also has exceptional returns on investment, but these, too, still need to be quantified.

There is no doubt that its work is vital for water quality, water quantity, biological diversity, flood attenuation, disease management, food security and protection of existing jobs – and creation of new jobs through the ecosystem services.

It too would show that its 1 323 jobs are adding real value to the economy, and which are valued by the beneficiaries.

Our People and Parks programme has had extraordinary success in building infrastructure, including tourism accommodation, ranger accommodation, offices, roads, fences and hiking pathways. Once again, we have not quantified benefits as we should, but our workers can certainly look with pride at their accomplishments.

These too are valuable, dignified jobs.

Our Eco-Furniture Programme is seeking to use wood from invasive alien plants to make school desks for more than 300 000 pupils in disadvantaged schools, by the end of the 2014/15 financial year.

This is an exceptional contribution, where more than 3 200 previously unemployed people are learning skills that can sustain their jobs, making much-needed equipment from biomass that is otherwise an unwanted fire risk.

There are naturally ongoing challenges in all programmes, but that is probably true of all employment.

The commitment to task-based work, where appropriate, enhances productivity.

Our programmes are anything but a “digging of holes and filling them up again”, that are understandably maligned. These EPWP jobs should not be dismissed in the way that James and Zille have done.



Working on Fire helicopters battle a blaze in the Wemmershoek Mountains near Franschhoek. The writers says the Working on Fire programme has created 4 409 jobs in this financial year.

PETER BRENTON GEACH

the benefits of these programmes, I have tried to show that these are jobs of which the government – and beneficiaries can be truly proud.

• Edna Molewa is Minister of Water and Environmental Affairs

DBSA Analysis of Green Job Opportunities

	2012		2017		2025	
	Number of FTE's	Total budget requirement	Number of FTE's	Total budget requirement	Number of FTE's	Total budget requirement
	#	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

A professional portrait of Ms. Edna Molewa. She is a Black woman with short, curly hair, smiling warmly at the camera. She is wearing a dark blazer over a patterned blouse with a diamond-like geometric design. A small, colorful brooch featuring the South African flag is visible on her left lapel. The background is a warm, textured reddish-brown.

Political Championing is
essential for the Natural
Resources Management
Programmes to succeed.

Ms Edna Molewa
Minister of
Water and Environmental Affairs



Ms Rejoice Mabudafhasi

Deputy Minister of
Water and Environmental Affairs

The Honourable **Rejoice Mabudafhasi** (Deputy Minister of Environmental Affairs and Tourism)
and Professor **Wangari Maathai** (Nobel Peace Prize winner, 2004)
meet staff and workers from the Working for Water, Working on Fire and Working for Wetlands programmes.
Newlands, Cape Town, 21st July, 2005.

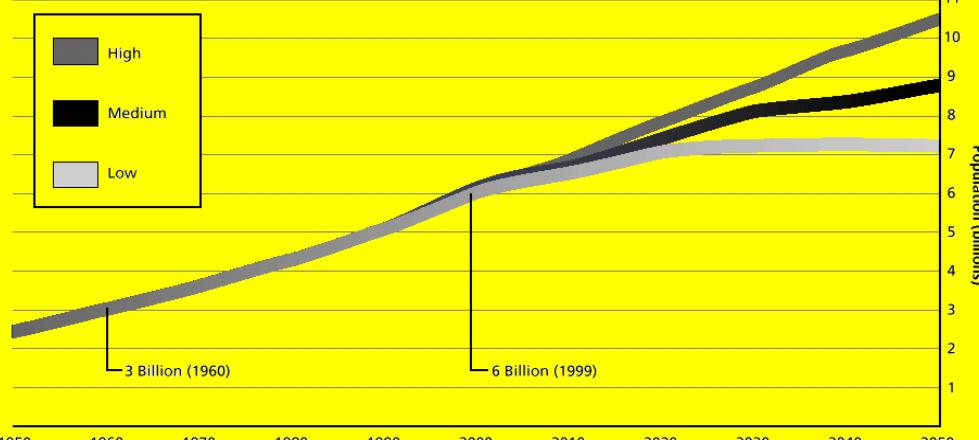


There can be no
“Green Economy”
without addressing
poverty and inequity

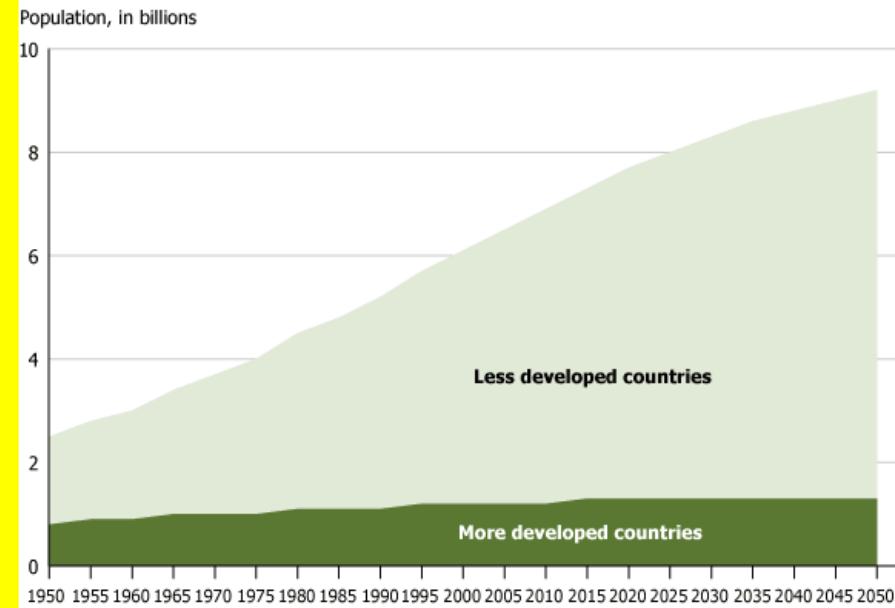
Human Population Growth and Settlement



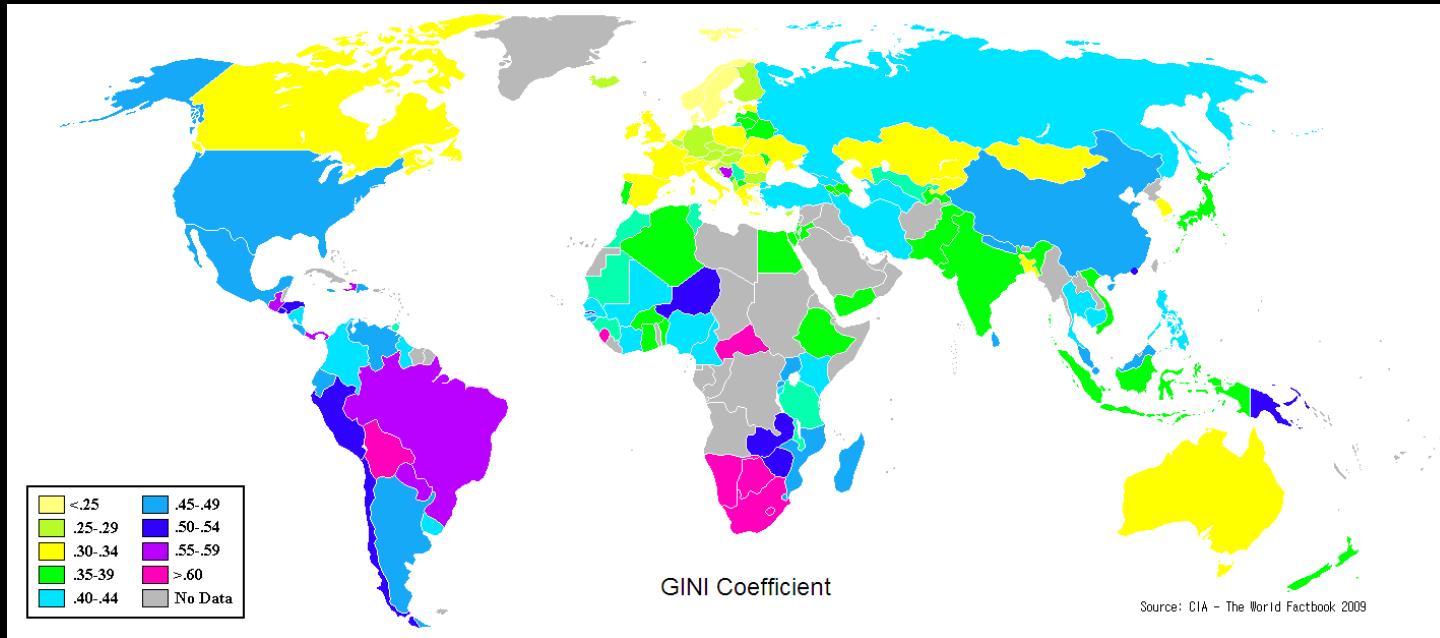
**World Population Growth,
Actual and Projected, 1950-2050**



Source: United Nations, 1998, *World Population Prospects (The 1998 Revision)*.



Inequity – the “Haves” and the “Have-nots”



**Within a context of a rapidly growing,
increasingly urbanized,
human population;**

the challenges of poverty and unemployment;

**and an escalating gap between
the “super-haves”
and the “have-nots”,**

**the CEO of a major insurance company
said that their Actuaries
are focusing on four main risks:**

energy security, ...



... water security, ...



Christian Pretorius

www.vanderkloofdam.co.za

... food security, ...



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and ... pandemics.



Thanks to PENICILLIN
...He Will Come Home!



Thank You



Dr Guy Preston

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E-mail: gpreston@environment.gov.za