

Pc water 120606

## Climate Change and the Work of the Environmental Programmes Branch



Presentation to the Parliamentary Portfolio Committee on Water and Environmental Affairs



environmental affairs  
Department  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

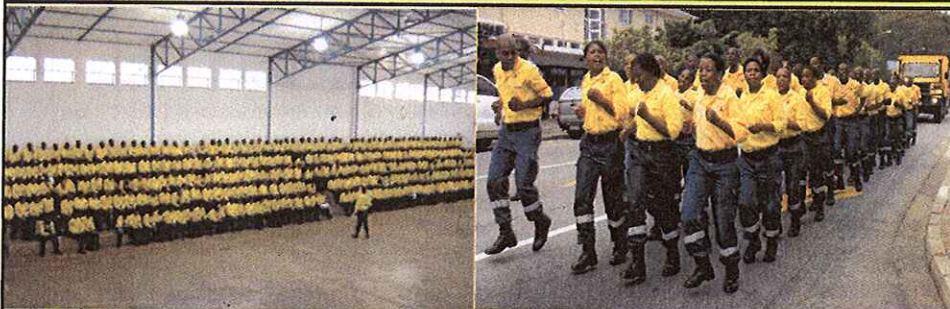
Guy Preston

16h00, 6 June 2012

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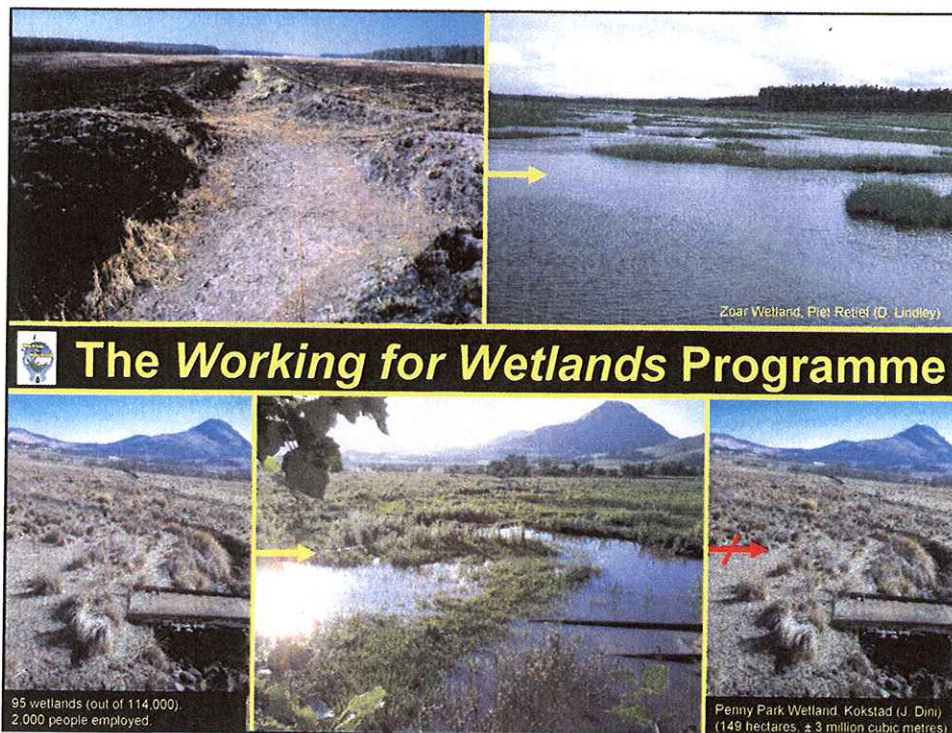
## The Working on Fire Programme



The *Working on Fire* programme is providing work as fire-fighters for over 4,800 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.





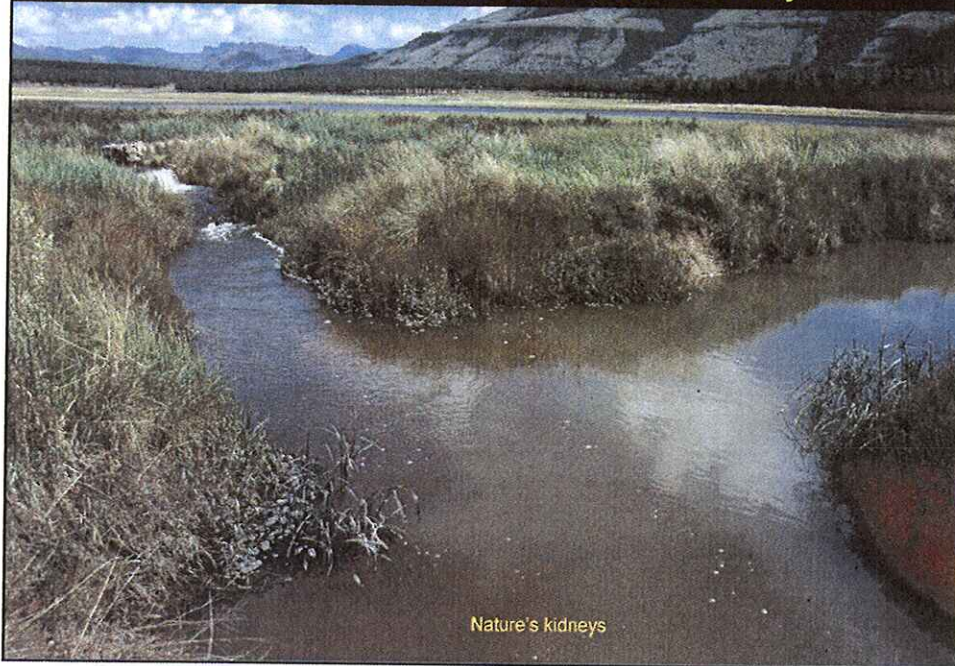


## Climate Change and Wetland Conservation

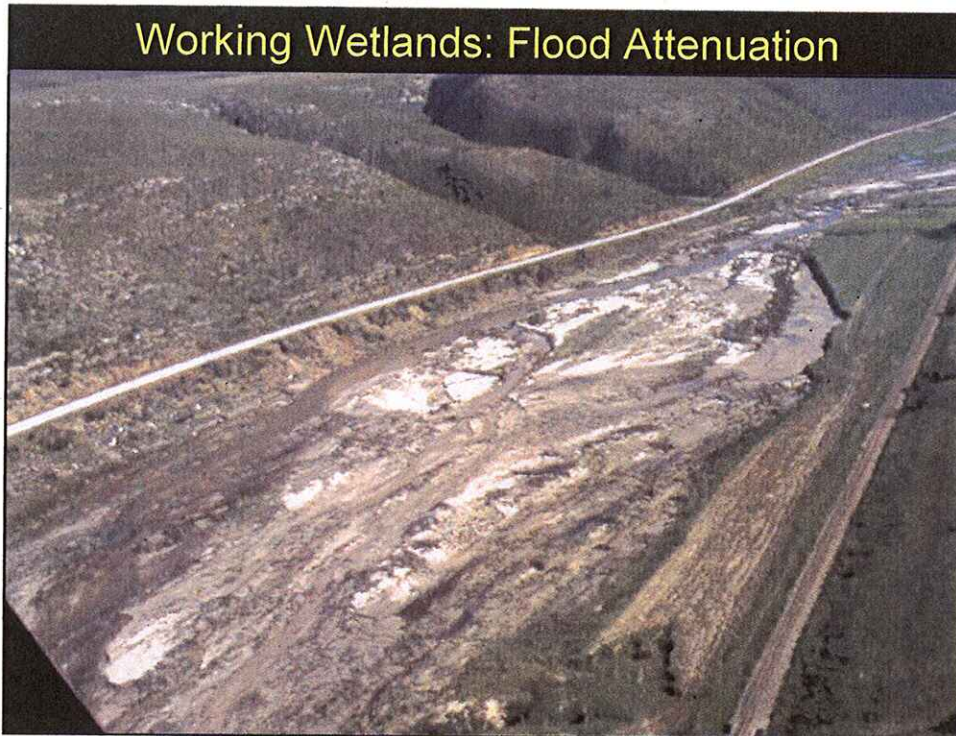
- Wetland rehabilitation and protection critical in adapting to (and in mitigating) climate change.
- The projected effects of climate change, including increasing mean temperatures, changes in precipitation, sea level rise, and increased frequency and intensity of some extreme climatic events, will impact wetlands, their dependent species and the ecosystem services they provide. A combination of more intense and more frequent drought events coupled with heavier precipitation events are projected in many areas. Persistent drought in many regions of the world is already seriously affecting the ecological character of wetlands and climate change, along with other land use and land management activities, is projected to exacerbate such problems (van Dam, *et al* 2002).
- It appears that climate change will have its most pronounced effect on wetlands through alterations in hydrological regimes: specifically, the nature and variability of the hydroperiod and the number and severity of extreme events. Overall, it is generally accepted that aspects of climate change, such as longer and more frequent droughts and increased incidence of fire will have negative effects on the carbon balance of wetlands (Gitay *et al* 2001).
- Gitay, H., Brown, S., Easterling, W., Jallow, B. *et al*. 2001. Chapter 5. Ecosystems and Their Goods and Services. In: *Climate Change 2001: Impacts, Adaptations, and Vulnerability*. Contribution of Working Group II to the Third Assessment Report of the International Panel on Climate Change. McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J., White, K.S. (eds), pp. 235-342. IPCC/Cambridge University Publication Press
- van Dam, R., Gitay, H. & Finlayson, M. 2002. Climate change and wetlands: impacts, adaptation and mitigation. Information paper prepared for Ramsar Conference of Parties. Ramsar COP8 – DOC. 11.



## Working Wetlands: Water Quality



## Working Wetlands: Flood Attenuation

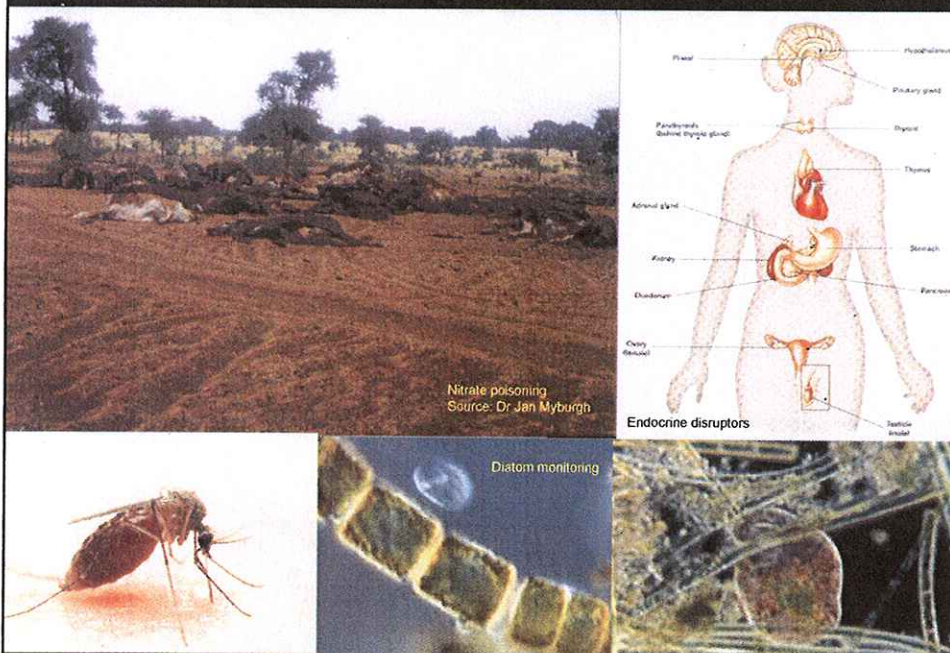




## Working Wetlands: Food Security

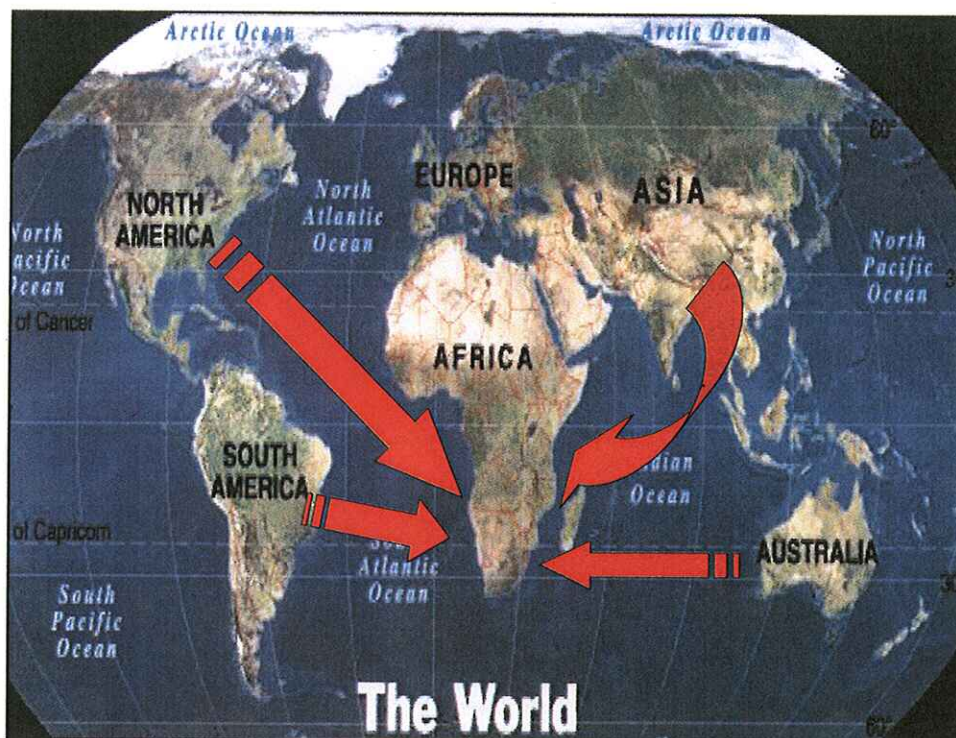


## Working Wetlands: Disease Management



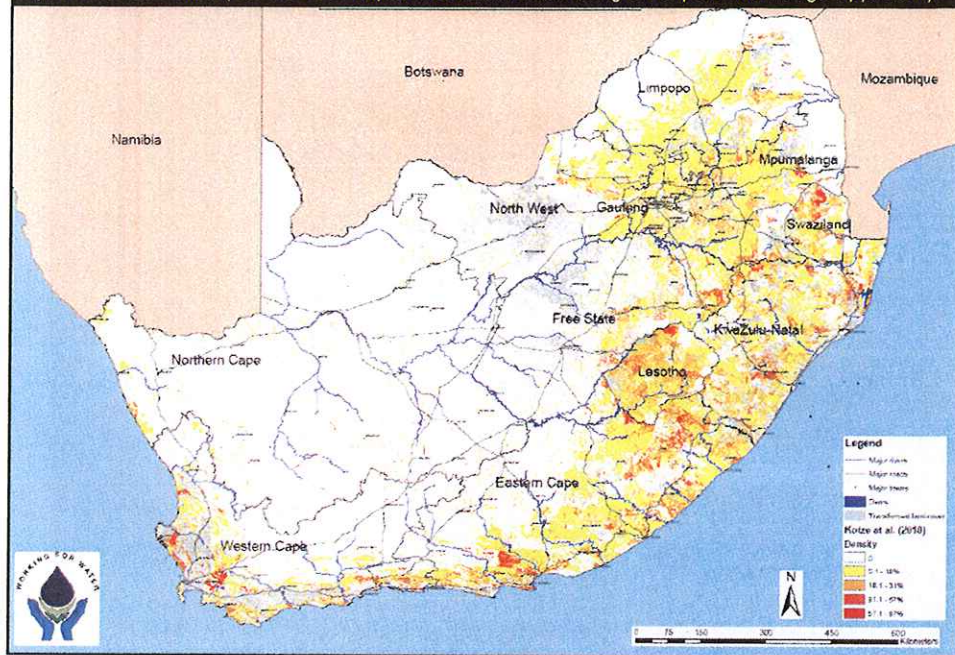


## Working Wetlands: Water Quantity





Twenty million hectares of South Africa were found to be invaded – an area twice as large as previous estimates (i.e. the 1997 rapid reconnaissance using an expert-knowledge approach).



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.



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.



## The "Lethal Cocktail" of Environmental Change



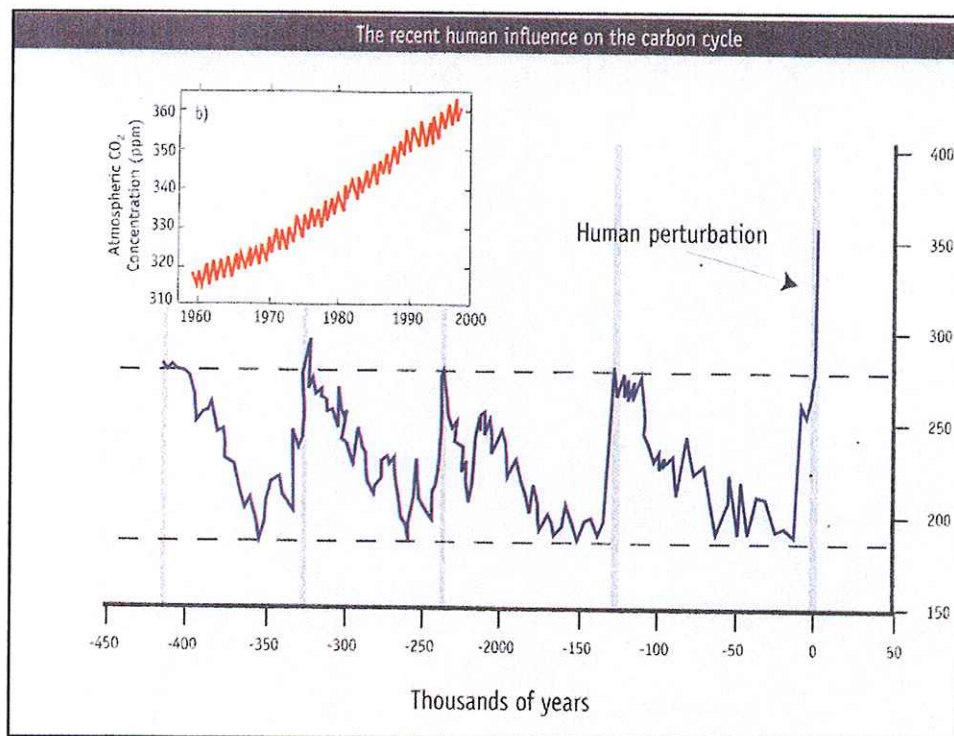
**Habitat destruction:**  
Nyungwe National Park, Rwanda



**Invasive Alien Species:**  
invasive grass in China

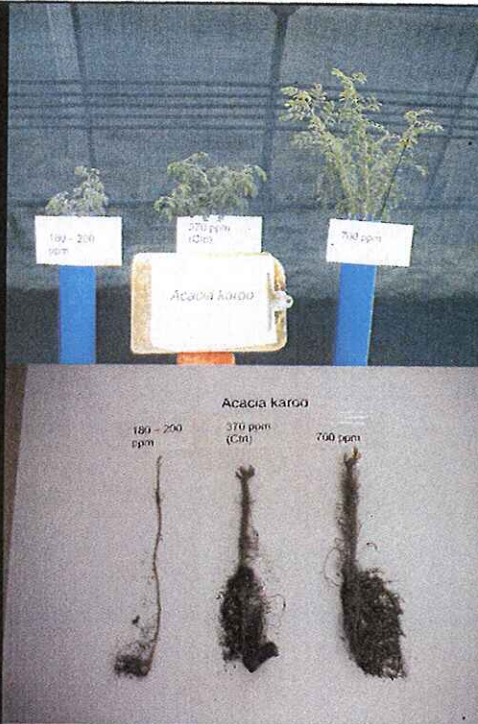


**Climate Change: Melting glaciers:**  
Torres del Paine National Park, Chile





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 Karroo*) at different parts-per-million of atmospheric carbon dioxide ( $\text{CO}_2$ ).

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 m<sup>3</sup> (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." Dr Brian van Wilgen and Dr Willem de Lange (CSIR) <sup>1, 2</sup>
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).

*Prior to human arrival, a new species  
successfully colonized Hawaii once  
every 25,000 to 50,000 years.*



*Nowadays a foreign species  
becomes established in Hawaii  
about once every 18 days.*

Pat Bily (The Nature Conservancy)



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."

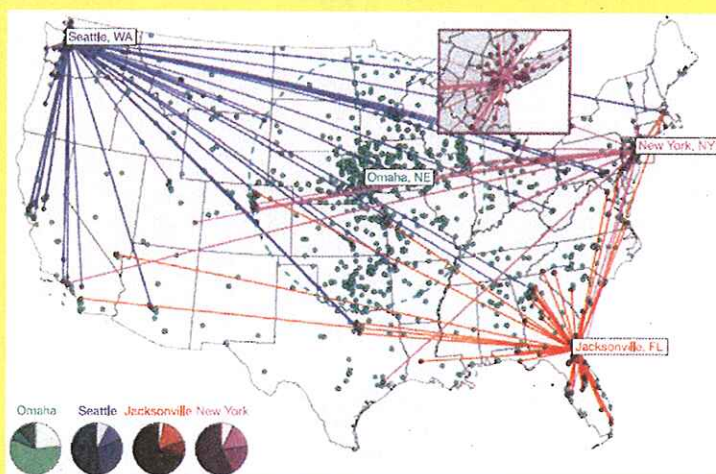
Pimentel, D (Ed). *Biological Invasions: Economic and Environmental Costs of Alien Plant, Animal and Microbe Species*. CRC Press, Boca Raton.

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.)

## The scaling laws of human travel


D. Brockmann<sup>1,2</sup>, L. Hufnagel<sup>3</sup> & T. Geisel<sup>1,2,4</sup>

**Figure 1** Dispersal of bank notes and humans on geographical scales.



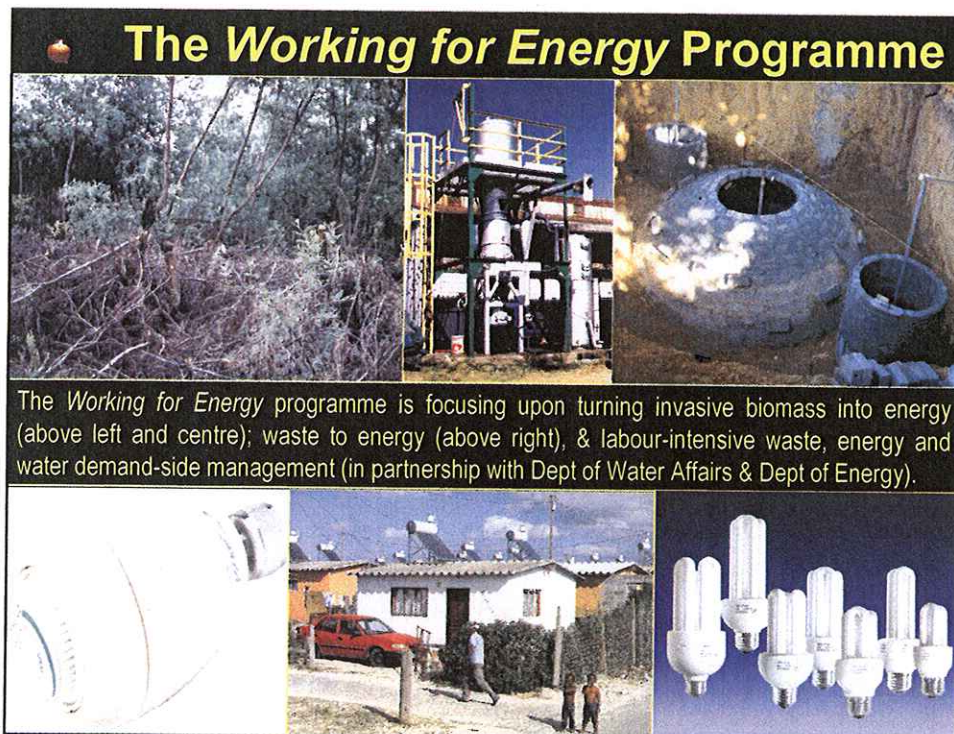


## Value-Added Industries



*Clearing invasive plants, and using the wood in Eco-Furniture Factories to make products that help the poor (e.g. Eco-coffins and Eco-desks) – and providing jobs for previously unemployed people.*

## The Working for Energy Programme



The *Working for Energy* programme is focusing upon turning invasive biomass into energy (above left and centre); waste to energy (above right), & labour-intensive waste, energy and water demand-side management (in partnership with Dept of Water Affairs & Dept of Energy).





## The Working for Land Programme

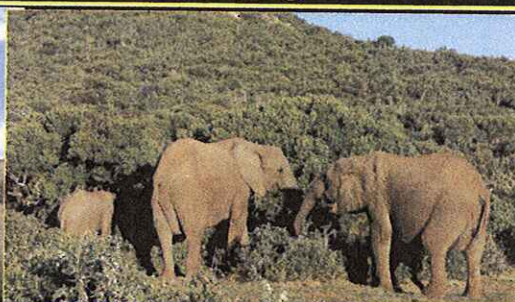
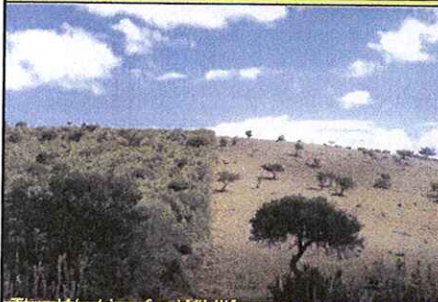


The *Working for Land* programme (aligned with Payments for Ecosystem Services, LandCare and Combating Desertification) is potentially the biggest of the Natural Resource Management programmes, restoring the ecological integrity of land and water, and their productive potential.

Catskill Watershed serving New York, USA



## The Working for Wildlife Programme



The *Working for Wildlife* programme seeks to secure optimal land-use practices, low ecosystem-service impacts, food security, black economic empowerment, tourism & jobs as major outcomes. The restoration of spekboom, wildlife corridors and buffers, and game breeding, are examples.







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.



# THANK YOU



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