VALUE-ADDED INDUSTRIES – A CASE STUDY
Innovative Linkages for a Sustainable Future

[Image of a sustainable building with various environmental impacts in the background]
1. Demand-side Management
### Kruger Park Visitors’ Water and Electricity Use
#### Per Person Per Day

<table>
<thead>
<tr>
<th></th>
<th>Litres</th>
<th>N</th>
<th>Mean</th>
<th>Kwh</th>
<th>N</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Winter:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group:</td>
<td>124 707</td>
<td>844</td>
<td>148</td>
<td>2 929</td>
<td>630</td>
<td>4.65</td>
</tr>
<tr>
<td>Experimental Group:</td>
<td>30 416</td>
<td>798</td>
<td>38</td>
<td>1 797</td>
<td>798</td>
<td>2.25</td>
</tr>
<tr>
<td>% Saving:</td>
<td></td>
<td></td>
<td>74%</td>
<td></td>
<td></td>
<td>52%</td>
</tr>
<tr>
<td><strong>Summer:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group:</td>
<td>184 794</td>
<td>1 186</td>
<td>156</td>
<td>8 403</td>
<td>1 186</td>
<td>7.09</td>
</tr>
<tr>
<td>Experimental Group:</td>
<td>41 723</td>
<td>960</td>
<td>44</td>
<td>2 368</td>
<td>980</td>
<td>2.42</td>
</tr>
<tr>
<td>% Saving:</td>
<td></td>
<td></td>
<td>72%</td>
<td></td>
<td>66%</td>
<td></td>
</tr>
</tbody>
</table>

Visitors paid for their own use of water and electricity on meter. Conservation fittings used, & each measured (e.g. 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.
2. Catchment Management
Left alone, invasive alien plants will spread and grow, with an increasing impact on water security (and many other impacts), and an increasing cost to clear.
The Impact of Invasive Waterweeds on Water Security

• Water hyacinth can double the area it invades on a dam in 10 days.
• It increases evaporation levels by over 40%.
• It adds to water quality impacts and costs (and exacerbates risks of toxic algae).
• It causes damage to infrastructure (insert: *hydrilla* impact on a pump, that cost R1.6m).
• It leads to eutrophication (oxygen depletion) and fish deaths – and bad smells.
• It results in a loss of recreational activities (e.g. fishing, rowing, sailing, swimming).
• It worsens diseases problems, such as bilharzia and (in malaria areas) malaria.
• It has caused people and cattle to drown.
• Hartbeestpoort Dam reputedly has up to 12 metres of goo-like sludge at the bottom, from invasives – depleting water-storage capacity.
• Herbicides are often necessary to contain the water hyacinth, with secondary impacts.
Invasive plants have devastating impacts on water supply, on the productive use of land, on the intensity of wild fires, on soil erosion, on flooding, on disease and many other negative impacts. Their impacts are measured in hundreds of billions of Rands.

Photo: Dr Brian van Wilgen.
Loss of life, damage to land and property through high intensity fires.

Wild fire on the slopes of Table Mountain in January 2000.

Over 80 houses and other structures were destroyed or damaged.

Every one was surrounded by invasive plants.
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 m$^3$ (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) $^{1,2}$

New York’s investment in Catskill Watershed

Risk of development, agricultural run-off, impervious surfaces, wastewater. Invested US$1.3 billion to protect 830,000 hectares in Catskill catchment. 5 million m$^3$ of naturally filtered water to 9 million people in New York per day. Cost saving of US$8 billion for new filtration facility. Up to US$300 million savings per year in Operational and Maintenance costs.
3. Value-Added Industries
The “Eco-Coffin Programme” was initiated by the Working for Water programme, working in partnership with the KwaZulu-Natal Invasive Alien Species Programme and the Alliance for Religion and Conservation. It won the World Bank’s “Development Marketplace” Award for innovation in 2005.

Wood from invasive trees is used to make coffins and caskets (and creating jobs in the process) to reduce the cost of bereavement for the poor.
Our target in 2015/16 is to put 430,000 Learners behind new Eco-desks (that will last).
Over 430,000 learners have been put behind a school desk for the first time in their school careers, by the Department of Basic Education, through the Eco-Furniture Programme – enough people to fill the Soccer City Stadium five times over.

Soccer City (FNB Stadium, Johannesburg)
Capacity: 94,700 people
Eco-Furniture

The Eco-Furniture Programme is making high-quality furniture for Government’s office needs, and other furniture, from invasive alien wood. As with the Eco-desks, it is possible to make these products at a substantially lower cost than Government is paying currently, and usually for products that (being solid wood) will last for a long time, enhancing the value of the work.
Value-added products using invasive alien wood are being manufactured for crafts, toys, games and other products. Not only is there scope to expand this (e.g. with supply for Early Learning Centres), but there is also scope to provide crafters with invasive wood, rather than their harvesting valuable indigenous trees.
Biomass from invasive plants (and bush-encroachment) can be used to turn waste into useful products like wood-wool blankets (to address erosion and stability) and bio-char (for soil fertility and carbon storage benefits). Waste from sawmills and the Eco-Furniture Programme factories can be used, and chipped wood in the field.
Invasive alien plant biomass (and bush-encroachment species) can be used to generate energy through firewood, charcoal, pyrolysis, pelletization, gasification, direct feedstock into coal-fired power stations, and other methods.

It is estimated that 2% of the country’s energy needs could be met for over 25 years, using biomass, and turn the tide against the ever-increasing problems of invasive alien plants and bush-encroachment.
VAI: By building houses; putting children behind school desks; facilitating early childhood development; and other VAI products, we:

clear invasives to:

prevent billions of Rands of damage by wild fires;
VAI: By building houses; putting children behind school desks; facilitating early childhood development; and other VAI products, we: clear invasives to: prevent billions of Rands of damage by erosion and siltation;