Assessment of ecosystem goods and Services and the value of biodiversity in KwaZulu-Natal (KZN)

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Background & Context

• **KZN nature body told to fund itself**
  
  “The nature conservation agency was under pressure to operate independently as other departments like health and education needed more resources to deliver services.”

• March 2011, the Board discussed a preliminary assessment of ecosystem services and endorsed the development of a proactive programme to demonstrate and support; (1) the importance of biodiversity in providing services to people in KwaZulu-Natal, and (2) the role and value of Ezemvelo in providing these services.
Study Objectives

• Identify and communicate the role of biodiversity/ecosystems towards (significant) service provision in the province.
• Illustrate and highlight the consequence of ecosystems decline and lose in delivering services to people.
• To build a better understanding of the urgency for biodiversity conservation and accounting in society.
• Quantify them in monetary terms.

Changing mindsets on the role of ecological infrastructure in society.
The Four Capitals

• **Built capital** is the infrastructure (buildings, roads, houses, etc.) that make up the material structure of human society.

• **Human capital** is the physical bodies of individual humans, their health and education, and the information stored in their brains.

• **Social capital** is the web of interpersonal connections, institutional arrangements, rules and norms that facilitate human interactions.

• **Natural capital** is the land, the biodiversity and the resources it contains, including ecological systems and services.
Grasslands
Good natural capital – many diverse services

Mountain: tourism and scenic beauty

Forests: carbon sequestration, carving & building, fuel wood, etc

Water: drinking & agriculture

Grasslands: water catchment, soil formation, grazing, erosion reduction, pollination etc
Partly functional natural capital – some services

Grasslands in poor conditions: Grazing, soil protection (erosion reduction)
Depleted natural capital – one service only
Business as usual: we assume the natural environment is infinite.

- Infinite source of resources
- Infinite sink for wastes

Growing Economy and society
- Separate from environment
- Free of biophysical constraints

Energy and Resources

Wastes
A safe operating space for humanity. *Nature* 461:472-475

**Figure 1 | Beyond the boundary.** The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.
How is this affecting KZN?

some **news headlines** to consider

- Flood costs of R715m reported for KZN in 2011
- KZN storm damage hits R40m
- R617m for KZN flood damage
- Storms, floods, tornadoes and weather conditions never seen in KwaZulu-Natal before cost the provincial government close to R4-billion in 2007.

>> resulting in deaths, loss of homes, loss of livelihoods, damage to crops
WHY IS NATURAL CAPITAL IMPORTANT?

>> GREEN INFRASTRUCTURE
>> NATURAL ASSETS
>> GREEN ECONOMY

IT OFFERS:
- Mitigation and protection
- Supply of essential services

ECOSYSTEM GOODS & SERVICES (EGS)
Pollination (important for agriculture) estimated value added to crops through honeybees pollination is excess of R4 billion p/a (Allsopp 2005).

Note: Loss of bees have caused collapses in crop production in other parts of the world.
Examples of value of natural resources, or “ecosystem goods and services” to people

- **Water**
  Ukhahlamba Drakensberg Park provides 25% of SA’s water, adds value of at least R2.6 billion

- **Medicine**
  Approx. 750 medicinal plant species traded annually, valued at R305 million.

- **Energy source**
  **Forests** Rural and Urban people use natural source of fuel
Coastal storm damage control
Carbon sequestration – buffering climate change
Economic Analysis
KZN Habitat Types

Legend
- Coastal and dune vegetation
- Coastal grassland and thickets
- Estuaries and mangroves
- Forests
- Grasslands
- Nearshore environments and reefs
- Riparian and floodplain veg and swamp forests
- Sand forests
- Sandy beach, rocky shores and surf zone
- Savannas
- Wetlands

0 15 30 60 90 120 Kilometers
How we went about evaluating them…

- **Interactive learning process (Eco-Futures)**
  Workshop to identify supply of, demand for and changes in ecosystem services

- **Population estimates for rural and urban ecosystem services – based on Stats SA data** (Census 2001 & Community Survey 2007) and interpreted by the project team.


  - Value of ecosystem services supplied at present were **estimated by multiplying the area of habitat extant** in KZN by a **generic global value per habitat** published by Costanza et al. 1997 – this value was further weight against the condition of the habitat

- **In assessing the future land transformation scenarios;**
  The possible land cover in ten and 20 years’ time based on current land transformation trends

- **Estimation of the value of about 26 goods and services from 17 ecosystems/habitats**
So what are these services worth?

- The overall value of ecosystems services is calculated at **R149 billion per year**
- To put the figures in perspective;
Benchmark with other studies

- An independent study by Ethekwini values their ecosystems services at R 4.0 billion (Ethekwini Municipality 2010).
- City of Cape Town its R4.2 billion and R1 billion as the value of the animals that could be valued (City of Cape Town 2009).
## Valuation of Ecosystems Goods & Services in KZN

<table>
<thead>
<tr>
<th>Habitat type</th>
<th>ES value per ha ( R )</th>
<th>Ecosystem Services value 2011 ( R )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasslands</td>
<td>4,985</td>
<td>11,383,226,762</td>
</tr>
<tr>
<td>Forests</td>
<td>42,776</td>
<td>2,523,915,661</td>
</tr>
<tr>
<td>Rivers (km)</td>
<td>181,032</td>
<td>18,720,604,702</td>
</tr>
<tr>
<td>Savannas</td>
<td>8,545</td>
<td>16,665,552,108</td>
</tr>
<tr>
<td>Coastal and dune vegetation</td>
<td>42,776</td>
<td>595,949,056</td>
</tr>
<tr>
<td>Wetlands</td>
<td>417,228</td>
<td>38,375,792,812</td>
</tr>
<tr>
<td>Estuaries and mangroves</td>
<td>486,338</td>
<td>10,764,223,764</td>
</tr>
<tr>
<td>Riparian and floodplain veg and swamp forests</td>
<td>417,132</td>
<td>43,519,497,633</td>
</tr>
<tr>
<td>Sand forests</td>
<td>25,661</td>
<td>308,409,845</td>
</tr>
<tr>
<td>Coastal grassland and thickets</td>
<td>8,228</td>
<td>2,305,878,705</td>
</tr>
<tr>
<td>Sandy beach, rocky shores and surf zone</td>
<td>34,298</td>
<td>274,775,636</td>
</tr>
<tr>
<td>Nearshore environments and reefs</td>
<td>34,298</td>
<td>4,232,933,446</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>149,670,760,130</strong></td>
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Are these services assured?

Rate of loss of natural assets
## PROJECTED LOSS OF SERVICE VALUE DUE TO TRANSFORMATION OF NATURAL ASSETS

<table>
<thead>
<tr>
<th>Habitat type</th>
<th>ES value per ha (R)</th>
<th>Ecosystem Services value 2011 (R)</th>
<th>Ecosystem Services value 2021 (R)</th>
<th>Ecosystem Services value 2031 (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasslands</td>
<td>4985</td>
<td>11 383 226 762</td>
<td>9 946 642 266</td>
<td>5 794 238 278</td>
</tr>
<tr>
<td>Forests</td>
<td>42 776</td>
<td>2 523 915 661</td>
<td>2 205 392 786</td>
<td>1 927 068 094</td>
</tr>
<tr>
<td>Rivers (km)</td>
<td>181 032</td>
<td>18 720 604 702</td>
<td>8 720 604 702</td>
<td>18 720 604 702</td>
</tr>
<tr>
<td>Savannas</td>
<td>8 545</td>
<td>16 665,552 108</td>
<td>14 562 328 277</td>
<td>8 483 023 484</td>
</tr>
<tr>
<td>Coastal and dune vegetation</td>
<td>42 776</td>
<td>595 949 056</td>
<td>520 739 171</td>
<td>303 347 276</td>
</tr>
<tr>
<td>Wetlands</td>
<td>417 228</td>
<td>38 375 792 812</td>
<td>33 532 696 020</td>
<td>19 533 871 398</td>
</tr>
</tbody>
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### TOTAL SERVICES PROVIDED BY BIODIVERSITY

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<tr>
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<th>2011</th>
<th>2021</th>
<th>2031</th>
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<tr>
<td></td>
<td>R 149 billion</td>
<td>R 132 billion</td>
<td>R 89 billion</td>
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If current rate of loss continues Treasury will need to find an additional R17 billion to compensate for the loss of essential services biodiversity is providing for free.
Important to reverse this trend of value loss through:

>> rehabilitation, prevent transformation of pristine habitats, effective management and expand protected area estate

The economic sense in Protected Area Expansion – just over 8% of KZN is protected, yet protected areas account for a large proportion of the value of services provided.
What does that mean in real terms?

Biodiversity offers **R150 billion worth of services**

Ezemvelo is given a budget of **R512 million to conserve biodiversity**

The return on this is **R292.36 for every R1 invested** by the province in Ezemvelo (with contributions from other relevant organisations)

This value could also be taken as the amount that Treasury would have to fund should there be no ecosystems services provided
CONCLUSION

In the next decade important decisions are going to be taken in terms of large-scale infrastructure, resource planning and economic development.

Government has recently unveiled a Trillion Rand infrastructural plan – unless natural capital is factored in this plan, it will be unsustainable.

It is important to increase the resources and support for biodiversity conservation so that the essential services that our natural assets provide can be protected and improved for the benefit of the people of the province.
Thank You!

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