



*DST-NRF CENTRE OF EXCELLENCE  
FOR INVASION BIOLOGY*

**SAEON SUMMIT  
Summary and Closing  
Remarks**

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# ***SAEON Summit***

The human race is passing through a time of crisis, and that crisis exists, so to speak, on two levels - an upper level of political and economic crisis and a lower level of demographic and ecological crisis...the problems on the upper level cannot be solved without reference to the problems that are shaping up in the cosmic and biological basement.

Aldous Huxley  
1952



# *From the SAEON Home Page*

SAEON is a research facility that establishes and maintains nodes (**environmental observatories, field stations or sites**) linked by an **information management network** to serve as research and education platforms for long-term studies of ecosystems that will provide for incremental advances in our understanding of **ecosystems and our ability to detect, predict and react to environmental change**. The core research programme will strive to distinguish between anthropogenic and natural change as well as to unravel the relations between **social change and ecosystem change**.

SAEON will bring **better cohesion** between research programmes nationally and internationally and will ensure that **LTER data is archived and accessible** as a national asset for generations to come.



# ***SAEON Summit***

## ***The political statements***

- Harness environmental change observations for science and society
- Science contributes tools, technologies and information to enable sustainable development and to monitor effects on ecosystems
- Cooperation (cooperative governance) is essential
- Suicidal to restrict access to data
- Partners in all sectors are critical



# ***SAEON Summit***

## ***Some desirables***

- Co-owned, transparent systems make for better global management
- International and national cooperation is essential
- Observations must move down the pipeline of use
- Need financial sustainability



# ***SAEON Summit***

**There is a need to undertake and coordinate long-term research and observation efforts, and to make long-term environmental data and its downstream interpretation broadly available for the benefit of science and society**

**The community has jointly decided that SAEON is one vehicle that will help serve this purpose**



# ***SAEON Summit Approaches***

- Require multiple spatial and temporal scales of observation
- Need multiple spatial and temporal scales of experiment
- This is an important message
  - Wiens, J.A. (1989). Spatial scaling in ecology. *Functional Ecology* 3, 385-397.
- Integrated science: approaches and systems
- Question driven science and monitoring is essential

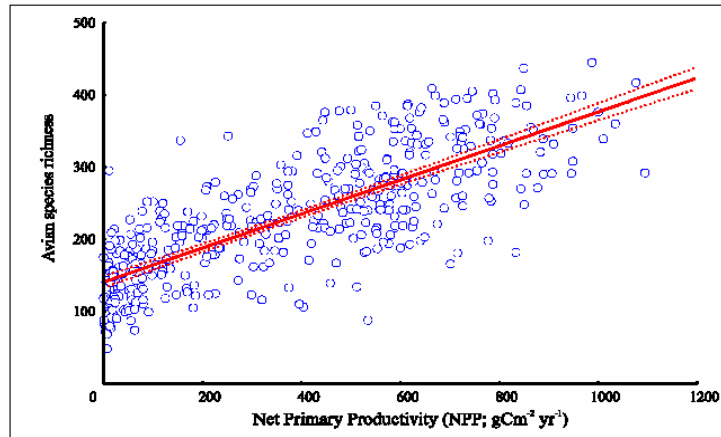


# ***SAEON Summit Approaches***

- Tension between science for understanding and science for prediction
  - Short-term public good
  - Long-term public good
  - Unpredictable public good
- Cross-cutting themes fundamental
  - Ecosystem service delivery and its sustainability
  - Land use, tenure, governance, human health, and other social-natural environment interactions



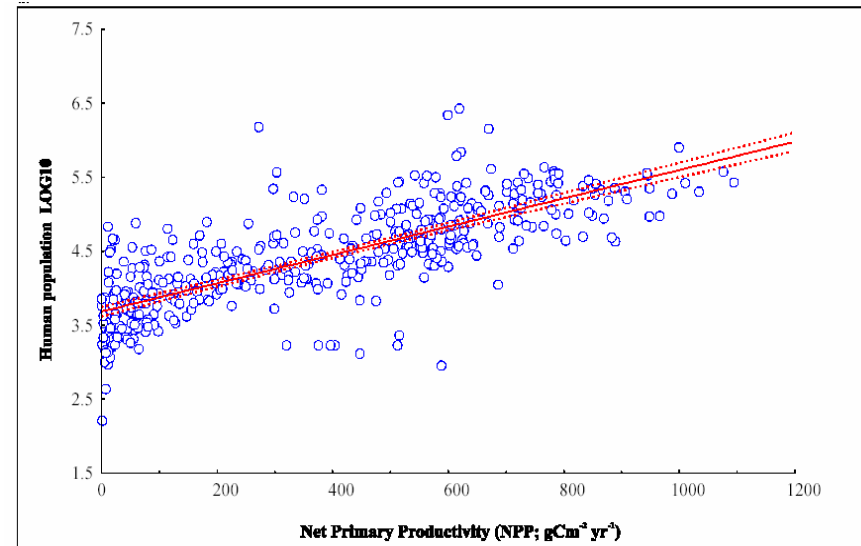
# Examples of social and natural dimensions



(A)

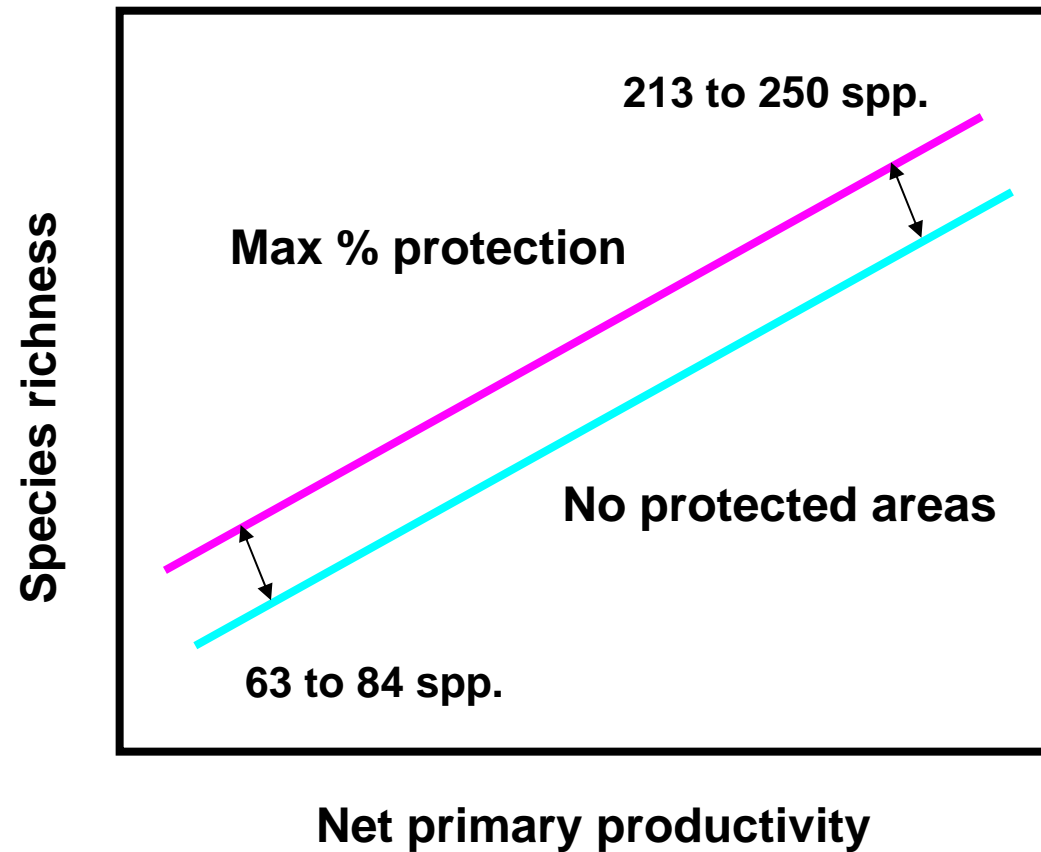
**Bird richness and NPP**

**Human density and NPP**





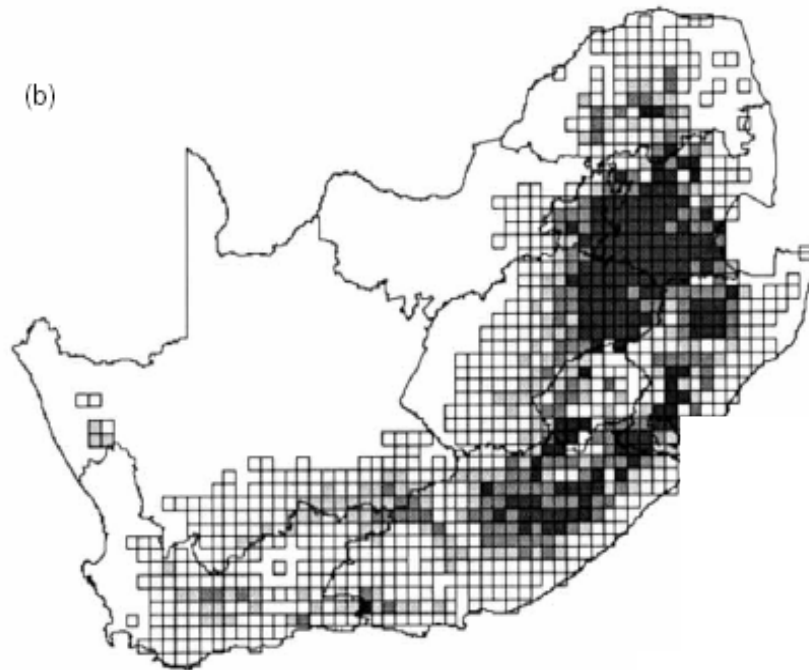
# Protected and unprotected areas SABAP Data



Evans *et al.*, in press, *Biology Letters*



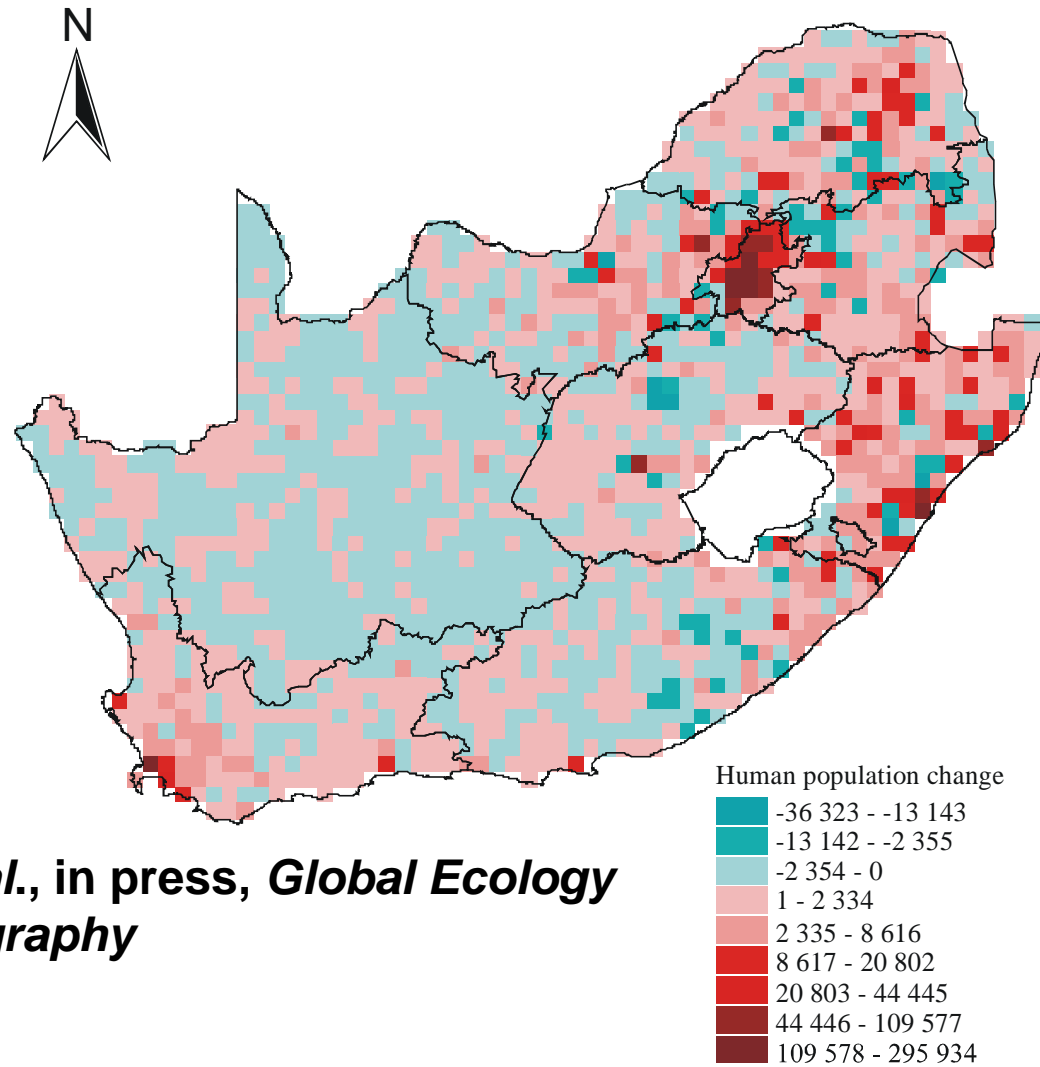
# ***SABAP data and the future***



Erasmus *et al.* 2002, *Global Change Biol.*



# SA Census Data Population Change 1996-2001



Evans *et al.*, in press, *Global Ecology & Biogeography*



# Social dimensions



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)



AGRICULTURAL  
SYSTEMS

Agricultural Systems 83 (2005) 1–26

[www.elsevier.com/locate/agry](http://www.elsevier.com/locate/agry)

Agent-based social simulation: a method  
for assessing the impact of seasonal  
climate forecast applications among  
smallholder farmers

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## Abstract

Seasonal climate forecasts provide probabilistic information on future climate on time-scales of two to three months. Where this information is not presently used it is difficult to evaluate the impact it might have. In order to justify disseminating the information to marginal groups it is important that the potential impact of the forecast is explored so that the negative and positive effects are at least partially appreciated before use of the information is widely promoted. We use an agent-based social simulation model, based on empirical evidence from field work in Lesotho, to assess the impact of using seasonal forecasts among smallholder farmers. The impact of using the forecast depends on the agents' initial household characteristics, what options they choose in responding to the forecast and the trust they place in the forecast (which in turn depends on their ability to learn and to follow their neighbours). Interaction of climate, crop productivity and social factors determines how much household-agents benefit or lose, evaluated in terms of crop yields and likelihood of exhausting food storage. Adoption of the forecast has the potential to decrease starvation among marginal household-agents but poor forecasts may do more harm than good. This work suggests that if forecasts are not correct more than 60–70% of the time, then they are unlikely to benefit

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# SAEON Approaches

- ✓ Nodes are excellent for long-term ecological research
- ✓ Large-scale monitoring important
- ✓ Environmental Observation Systems
  - Observation is not just about space agencies and satellites
  - *In situ* observations common and very useful
  - Experimental work at small and large scales used to test observational approaches and predictions – fire, CO<sub>2</sub> increase
- ✓ Need a system of systems
- ✓ This is what SAEON draws on, coordinates data from, and makes available to users in support of science and society



# ***SAEON Agreement***

- Observation, monitoring, and experimentation are essential
- Spatial and temporal scales are important
- Ask the right questions, but be aware that future 'right' questions will be different to current ones
- Stay aware of the political dimensions
  - routes to policy makers might already be in place and need to be used



## National Water Act 36 of 1998

- Monitoring, recording, assessing and disseminating information on water resources is critically important for achieving the objects of the Act.

## NEM:BA Act 10 of 2004

- The Institute must monitor and report regularly to the Minister on—
  - (i) the status of the Republic's biodiversity;
  - (ii) the conservation status of all listed threatened or protected species and listed ecosystems; and
  - (iii) the status of all listed invasive species





# ***SAEON Agreement***

- Observation, monitoring and experimentation are essential
- Spatial and temporal scales are important
- Ask the right questions, but be aware that future 'right' questions will be different to current ones
- Stay aware of the political dimensions – routes to policy makers are already in place and need to be used
- Routes to inform local government (who make decisions regarding land use) need developing, but work is being done in this area



## ***What's available (For science)***

- Good data and monitoring for conventional biodiversity resources, such as crops and some marine fish, and the systems supporting them
- Land, water and atmospheric data and monitoring systems available too
- Satellite data availability good and will improve via several systems
- Biodiversity data lagging behind, in scope, visibility and accessibility



## ***What's available for society?***

- Weather forecasting (7 days, 60%)
- Biodiversity spatial planning from national to regional to local levels (NBSAP process)
- Water resources decision-making
- Few additional products discussed, and perhaps a function of delegate mix



## ***What needs development (For science)***

- Data, metadata, and product visibility and accessibility
- Analytical and technical skills and capacity
- Data management skills, quality information, and policies
- Data-model-data feedbacks for marine and terrestrial systems
- Facilitation of natural and social science interactions
- Long-term financial security for monitoring
- Band width and infrastructure
- Inter-operability



## ***What needs development (For science)***

- A further structured assessment of what observations, analyses, and experiments would be of most benefit across the board
- A science and implementation plan to give effect to the identified needs and approaches
  - Institutional arrangements need to be discussed
- Short-term, high profile integrated products



## ***What needs development (For society)***

- The feed forward to, and feed back from policy
- Community outreach interacting with science
- Learner development in collaboration with DoE
- Partnerships to provide data and interpretation for policy development, land use planning, and environmental monitoring



# ***SAEON Nodes (What's missing)***

- The Neural Node
  - Synthesis and analysis
  - Modelling
  - Re-posing the questions
  - Policy intervention assessment
  - Scarce skills and research chair opportunities



# *General issues*

- Physical and chemical oceanography of the Southern Ocean and its coupling to the biological oceanography
- Ships, fixed moorings and autonomous floats
- Large-scale, long-term field and 'indoor' experiments – infrastructure
  - Free air CO<sub>2</sub> and O<sub>3</sub> enrichment





# ***SAEON Resolution***

- The delegates at the SAEON Summit
  - Recognize that long-term environmental observation is essential for achieving sustainable growth and development strategies in South Africa;
  - Agree that environmental data visibility, availability, and sharing are critical issues that will form a key component of their joint participation in SAEON;



# **SAEON**

## **Resolution**

- The delegates at the SAEON Summit
  - Agree that substantial growth in human resources through outreach, education, capacity development and transformation is essential for the successful implementation of long-term environmental observation;
  - Recommend that a substantial investment in observational, experimental, and analytical infrastructure be made to implement the integrated approach required for identifying, understanding and predicting environmental problems that threaten sustainable growth and development, and for informing policy interventions to address them.



# ***SAEON Approaches***

**If the questions don't make sense neither will the answers.**

***Kurt Vonnegut, The Sirens of Titan***



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