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Opportunities for strengthening Interdisciplinary Research on water in South Africa

Achuo Enow

Knowledge Fields Development,

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South Africa's Fresh Water Resources and Use

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- South Africa is a water-scarce country in terms of availability of fresh water
- Surface water accounts for 77% of fresh water, ground water accounts for 9%
- Agriculture consumes 62% of the country's fresh water, urban consumption accounts for 23%
- 4% of the fresh water is consumed in rural areas, the main source being ground water

Threats to Water Security:
Human Factors

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- National water act sets aside fresh water reserves for human consumption and healthy ecosystems
- Nearly all of the available fresh is currently allocated for consumption and other uses – little or no reserve
- Demographic pressure on water allocation – conflict between human consumption and ecosystem heath
- Population growth calls for more food production, hence higher water demand for agriculture
- The need to improve quality of life requires stretching the already scarce water to deprived rural communities

Threats to Water Security:
Human Factors

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- Wasteful and inefficient water supply technologies (rain harvesting, water storage and distribution)
- Wasteful and inefficient water use practices (e.g. irrigation methods and timing)
- Pollution of the available water resources with pesticide residues and other wastes (industrial, mineral, domestic)
- Direct damage on catchment areas through deforestation – intensified urbanisation

Threats to Water Security:
Climatic Factors

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- Changing rainfall patterns alter the concentration and timing of high and low stream flows, thus disrupting water management decisions
- Declining rainfall implies a decrease in fresh water supply – about 50% of river systems are endangered, ground water recharge is compromised
- Extreme climatic events (floods and droughts) lead to wasteful excess supply at times and deficit at others
- Temperature rise is predicted to reduce water availability in vulnerable areas by 20 – 30% within the next 50 years

National Priorities for Water Research

- Developing dynamic predictive models for reliable and efficient water management planning
- Understanding the secondary impacts of CC on water security
- Understanding the limits within which fresh water ecosystems can maintain their integrity and where these limits can be exceeded
- Managing transboundary water resources
- Innovative technologies for waste water recycling (collection, treatment and re-use) at various scales

National Priorities for Water Research

- Changing human behaviour with regard to wasteful and inefficient water consumption
- Improving water harvesting, storage and re-distribution technologies
- Improving water use efficiency in Agriculture
- Exploring the role of market mechanisms in facilitating water security – payment for ecosystem services, water trading
- Innovative strategies for building resilience and capabilities for adaptation to water scarcity and related global change impacts

Opportunities for Collaborative Research

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- **The 10 – year Global Change Research Plan for South Africa**:
  - Four major knowledge areas
  - 18 research themes (several of them dealing directly or indirectly with water-related issues)
  - Synergies and overlaps among the research themes
  - Need for multi-and trans-disciplinary approaches
  - Several research networks involved, room for more to get on-board

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A Understanding a changing planet	B Reducing the human Footprint	C Adapting the way we live	D Innovation for Sustainability
1. Observation and monitoring 2. Dynamics of the oceans around southern Africa **3. Dynamics of the complex internal earth systems** 4. Linking the land, air and sea **5. Improving model predictions at different scales**	**1. Waste minimization methods and technologies** 2. Conserving biodiversity and ecosystem services 3. Institutional integration to manage ecosystems and ecosystem services **4. Doing more with less**	**1. Preparing for rapid change and extreme events** **2. Planning for sustainable urban development in a South African context** **3. Water security for South Africa** 4. Food and fibre security for South Africa	1. Dynamics of transition at different scales - mechanisms of innovation and learning **2. Resilience and capability** 3. Options for greening the developmental state 4. Technological innovation for sustainable social ecological systems. **5. Social Learning for sustainability, adaptation, innovation and resilience**.

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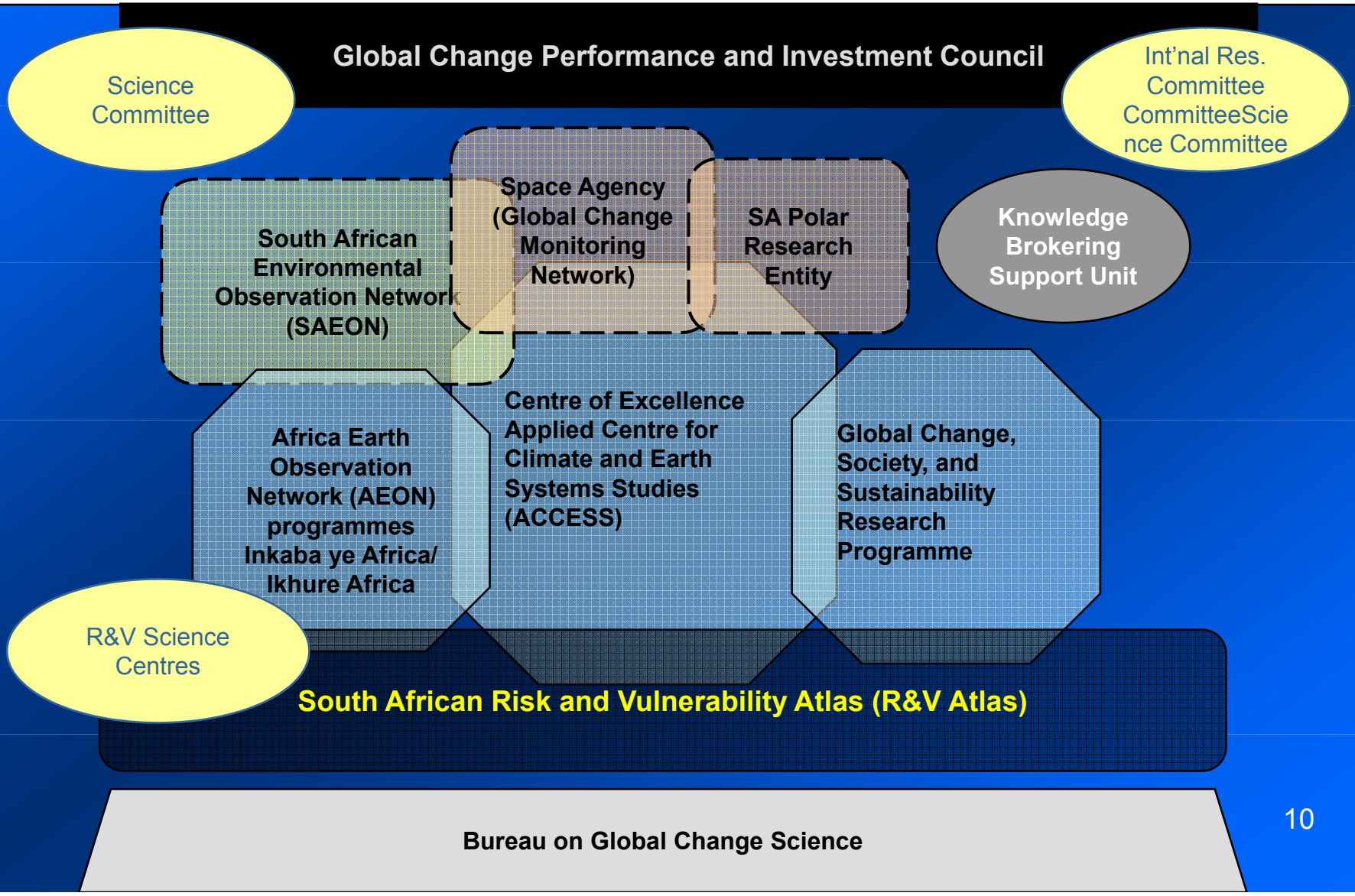

Opportunities for Collaborative Research

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- **The Belmont Forum**:
  - Aims to mobilise international resources and expertise for global environmental research
  - Emphasis on the need to generate earth systems knowledge at the appropriate time and space scales to support effective decision-making
  - The Belmont Challenge: **To deliver knowledge needed for action to mitigate and adapt to detrimental environmental change and extreme hazardous events**

Opportunities for Collaborative Research

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- **The Belmont Forum:**

  Aspects of the Belmont Challenge

  - ❖ Information on the state of the environment (observing systems)
  - ❖ Assessment of risks, impacts & vulnerabilities
  - ❖ Inter- and trans-disciplinary research, taking account of coupled natural, social and economic systems
  - ❖ Effective integration and coordination mechanisms to address interdependencies

Opportunities for Collaborative Research

- **The Belmont Forum:**

  Priorities of the Belmont Challenge

  - ❖ Coastal vulnerability
  - ❖ **Fresh water security**
  - ❖ Ecosystem services
  - ❖ Carbon budgets
  - ❖ Most vulnerable societies

Opportunities for Collaborative Research

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- **The Belmont Forum:**

  Responding to the Challenge

  - Integrated conceptual framework to change the way GEC research is supported and conducted
    - Collaborative Research Actions
    - Collaboration with G8HORCs to deliver on two priorities of the challenge
      - Fresh water security
      - Coastal vulnerability
    - First call will be launched on 28 March 2012

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Thank You