

SUSTAINABLE INTELLECTUAL COMMUNITIES: BEST PRACTICE IN ENGAGING AFRICAN COUNTRIES IN HIGH TECHNOLOGY PARTNERSHIPS



Further opportunities for USA - RSA Cooperation in Geospatial Sciences

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Theme:
**Successful practice in long term
international S&T partnerships USA
and RSA**



Case study: SAFARI 2000 Regional Science Initiative
Enabling conditions for successful partnerships

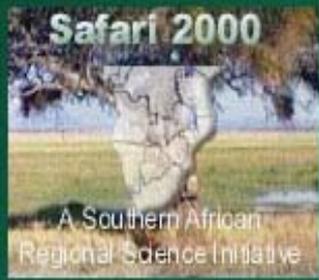
On-going activities and opportunities for further
partnerships

VISION:

**Creation of a SUSTAINABLE INTELLECTUAL
COMMUNITY IN SOUTHERN AFRICA**

The Southern African Regional Science Initiative - SAFARI 2000





SAFARI 2000



Focus on key linkages between the physical, chemical and biological processes, including human impacts, essential to the functioning of the southern African biogeophysical system. Specifically, regional aerosol and trace gas emissions, transports and transformations, deposition and impacts will be determined and quantified.

Emphasis on vertical stacking and nesting of observations at different scales for targets such as towers, AERONET and EOS validation sites





Satellite Imagery

[Met-7 \(Africa\)](#)

[Met-7 \(S.Africa\)](#)

[AVHRR GAC](#)

Flight Trk Overlay

[NASA ER-2](#)

UW CV-580

Orbital Predicts

[NOAA-14](#)

[NOAA-15](#)

[TRMM](#)

[TERRA](#)

[ERS-2](#)

[RADARSAT](#)

[LANDSAT-7](#)

[TOMS-EP](#)

[ORBVVIEW-2](#)

GIF/JPEG Archive

[Met-7 Africa](#)

[Met-7 S.Africa](#)

[AVHRR GAC](#)

[Predicts\(GIF\)](#)

[Predicts\(ascii\)](#)

NASA LaRC Links

[Patrick Minnis](#)

[CERES](#)

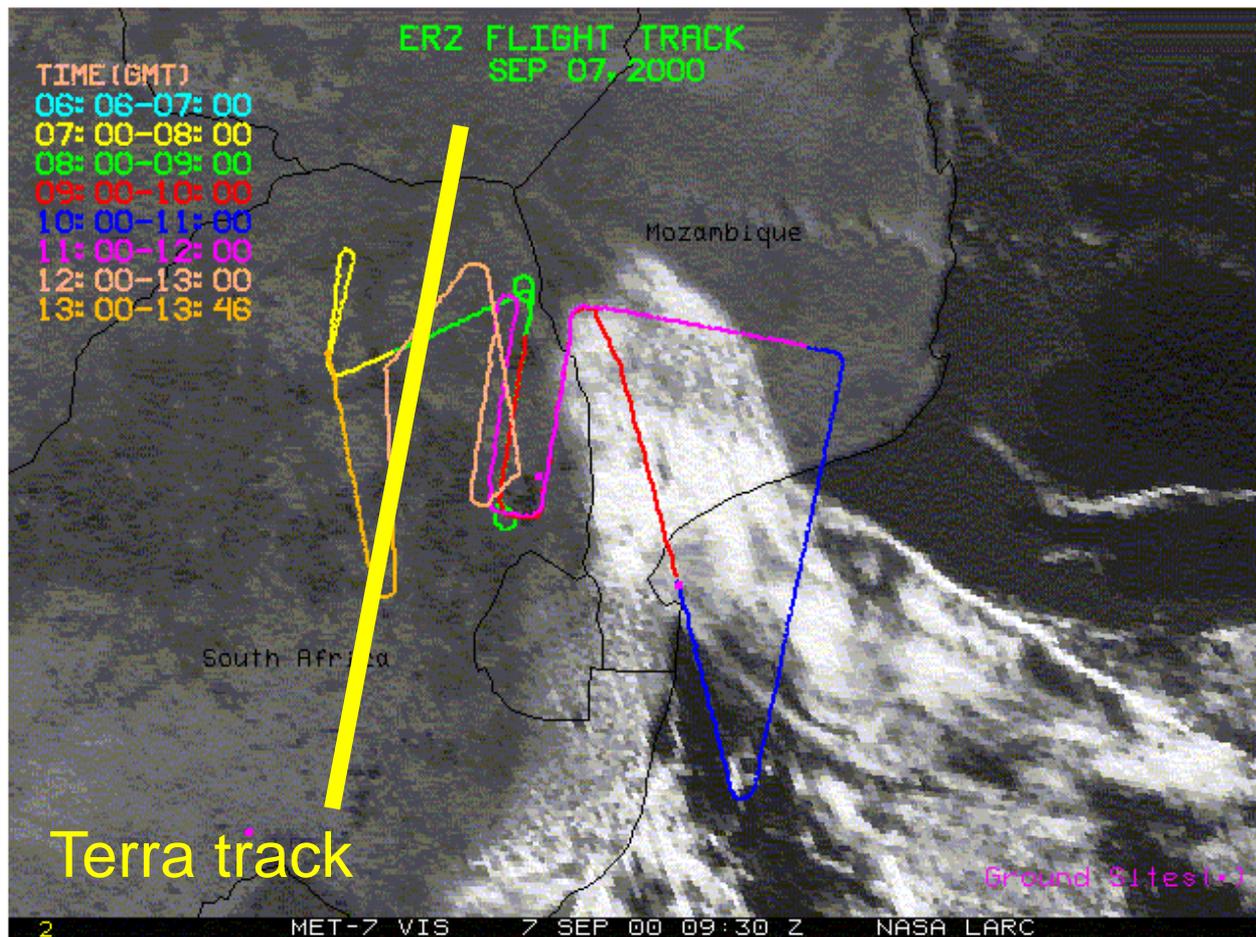
Related Links

[SAFARI 2000](#)

[SAFARI GDS](#)

ER2 Flight Track Overlay

September 07, 2000

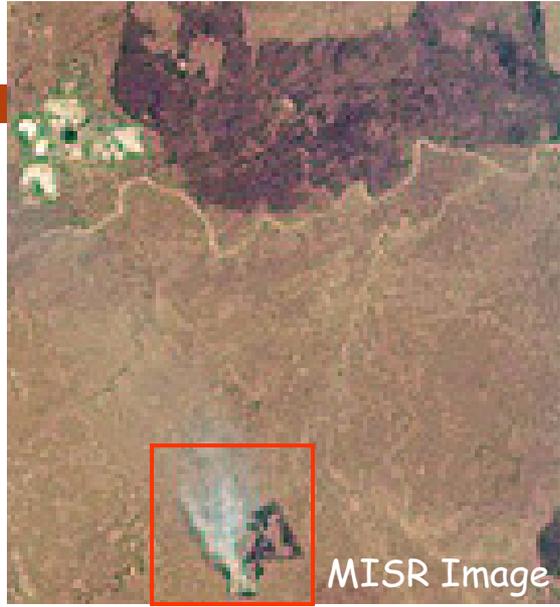


- 40 minute flight track segment centered on each visible image time

Sept. 7, 2000, Overpass of the Timbavati 1000-3000 hectare controlled burn (~24° 21' 56" S, 31° 15' 40" E). The ER-2 observations were collected seven minutes earlier than the Terra overpass time



MODIS, composite 6, 5, 2



MISR Image



AirMISR Image



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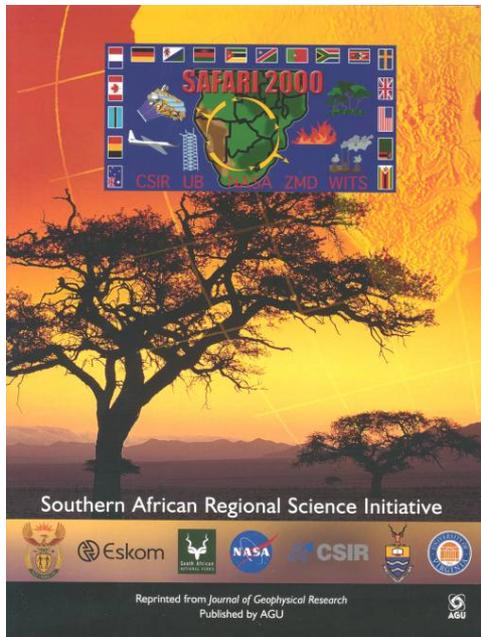


MAS, composite 20, 7, 1,

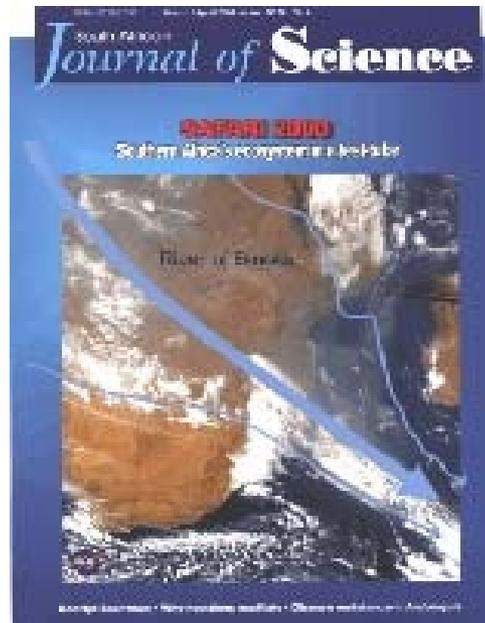
Presently more than a 125 peer-reviewed scientific papers published



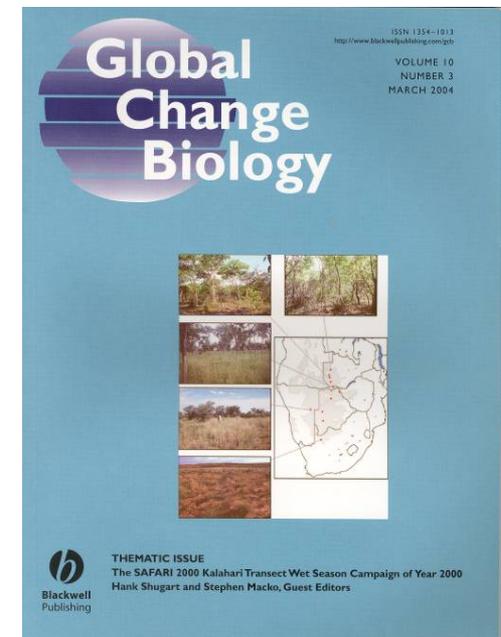
Some Examples of SAFARI Special Issues



45 papers
290 authors



*4 papers
38 authors



12 papers
52 authors

*The first results appeared in a regional journal in early 2002

Program Approach and Philosophy

Bottom-up science initiative

Participation was open to all but - it was BYOB
(Bring Your Own Budget) - using the **SAFARI 2000 Science Plan** as leverage to access national, regional and international funding sources

NO HIT AND RUN SCIENCE!

Emphasis on International Collaboration - Used IGBP BIBEX as an international framework that also allowed for bilateral and regional initiatives

Developed a broad umbrella for regional research, making it 'inclusive' - but with a focused 'Core Experiment', agreed upon **data policy** and planned **scientific synthesis**.

Distribution of venues for planning and reporting meetings among participating countries; in-region planning and consultation



Approach and Philosophy Continued (cont.)

Incorporated following sentiments of regional partners:

- African environmental research needs to have societal relevance
- Regional environmental research results need to be policy relevant
- Enhance regional science capacity and recognition
- Lay the foundation for longer-term regional observations and environmental monitoring

Success of SAFARI 2000 depended upon:



Regionality

- Open lines of communication
- Community of trust
- Ability to leverage and collaborate
- Willingness to pursue value added science
 $1+1 \neq 2$; $1+1 = \gg 2$
- Commitment to capacity recognition (or awareness) enhancement, and development of intellectual legacy



Institutional and Educational Products of SAFARI 2000



The Southern African Virginia Networks and Associations Consortium - SAVANA

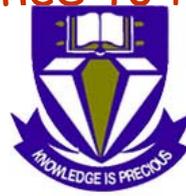
- University Consortium Initially Based on Environmental Research, Education and Outreach in Southern Africa
- Southern African Virginia Networks and Associations -
 - University of Botswana - Gaborone Botswana
 - University of Eduardo Mondlane - Maputo Mozambique
 - University of Venda - Thohoyandou, South Africa
 - University of Virginia - Charlottesville, Virginia
 - University of the Witwatersrand - Johannesburg, South Africa
- Started in 2000, formalized in July 2002, announced publicly at the WSSD in Johannesburg, August 2002

The Southern African Virginia Networks and Associations Consortium - SAVANA



With science focus on:

- Regional Response to Global Change (due to Natural and Anthropogenic Forces) and how that relates to sustainability
- State Change/Integrated System Response across Interactive Time and Space Scales up to that of the Region
- Study of human systems (social, economic, political and public health) as they impact regional environmental functioning
- Consequences of Policy on Environment at Regional Scales — the Translation of Science to Policy.



The practice of our consortium science has changed somewhat as SAFARI 2000 results have pointed to the need to incorporate research on **human systems and livelihoods to understand regional environmental functioning.**

Accordingly consortium activities have broadened from environmental sciences to other branches of knowledge to include other near-term high priority research projects, especially community health and sustainable development.



TPARI - Transboundary Protected Area Research Initiative - social science collaboration

GEOSS - Co-hosting of two African GEOSS workshops - Pretoria/Tshwane 2004, Burkino Faso 2006

Interdisciplinary course for the non-specialist - students have the unique opportunity to gain insight into the role the environment plays in shaping the people and culture of southern Africa within the enabling framework of SAVANA. Participants have come from a variety of undergraduate majors.



Ethics, Protocols and Practice of International Research - January Term Course



- Course designed as comprehensive introduction of best practices of ethical engagement and mutually respectful protocols
- Course collaboratively designed, presented and mentored with colleagues from SAVANA in interactive seminar / discussion format
- Students collaboratively develop international project proposals



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Student Service Learning, Outreach and Research in Southern Africa related to SAVANA



- At least 46 undergraduate and graduate students from UVA Schools of Architecture, Arts and Sciences, Engineering, Medicine, Nursing, have participated in international research and or service learning activities. from 09/03 to present. This includes students from Engineering Students without Borders, Nurses without Borders, the Center for Global Health, the Global Development Organization, and Students for Students International.



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Regional graduates and other achievements



- Graduate students from earlier SAFARI'92 and SAFARI 2000 campaigns now completed their degrees and working in government agencies, industry and academia throughout southern Africa.
- Academic grand children are numerous!
- Development of a near real time fire detection and warning system for national power utility Eskom. Based on MODIS and other RS imagery.

Enabling conditions for effective long term S&T partnerships



Lessons learned about large scale collaborative research and challenges with the way forward....



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Reciprocity...

Funding



- Bilateral partnership rather than donor aid funding model
- SAFARI 2000 received a substantial grant from DST/NRF under the innovation fund through the CSIR.
- Further grants from NRF to individuals and from industry - ESKOM
- Enabled the South African team to substantially fund their own participation
- Enabled South Africans to host international visitors (15 countries) as hosts rather than donor recipients, changing the dynamics of the relationships

Science and Education



It is cutting-edge science, science that addresses in-region needs that will attract and sustain in-region political, institutional, faculty, and student interest.

Vision of a **SUSTAINABLE INTELLECTUAL COMMUNITY IN AFRICA**

Given the differences between southern African and northern hemisphere ecosystems, and given the differences southern African traditional uses of land and more recent northern hemisphere conceptions of nature/ecology, northern hemisphere scientists have a great deal to learn from in-region partners.

Ethics



From start to finish, in region partners must be stakeholders in research that takes place in their region;

Collaborative research must build in-region capacity and research results must stay in the region.

This ethical imperative has important consequences for communication and project management.

Specifically responsibility to report back to countries, communities, groups that have cooperated with or participated in field activities - single largest issue of concern identified by rural communities regarding outside researchers

History and Culture

The social and economic histories of southern African countries are extremely complex; the rate of social and economic change is accelerating rapidly.

Thus, it takes some time to develop trust and good working relationships, because there is so much to sort out in professional and institutional relationships.

Project Scale and Follow-on

Large-scale multi-year regional environmental science projects are ideal for developing strong collaborations because they provide a large forum for developing trust, demonstrating results, and building in-region capacity.

Needed are sustaining funds for established partnerships. Too many opportunities for getting to know one another type workshops, insufficient for sustaining liaisons.
(Not equivalent to competitive science project grants)

Programmes need to be driven by bottom up science involvement, not top-down agency strategic objectives.

- In order for research, education and outreach about the region to move forward it has to be of benefit to the region

The only way to know if it is of benefit to the region is to find out if it is of value to the region

This is done by establishing a respectful relationship and engaging in meaningful dialogue with the region



CURRENT INITIATIVES AND OPPORTUNITIES FOR FURTHER USA - RSA COLLABORATION IN GEOSPATIAL AND SPACE SCIENCES

**Acknowledgement to Alex Fortesque, Business Development
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Prof Sias Mostert, Sunspace, Stellenbosch**



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Academic perspectives on South African policies and plans in space sciences



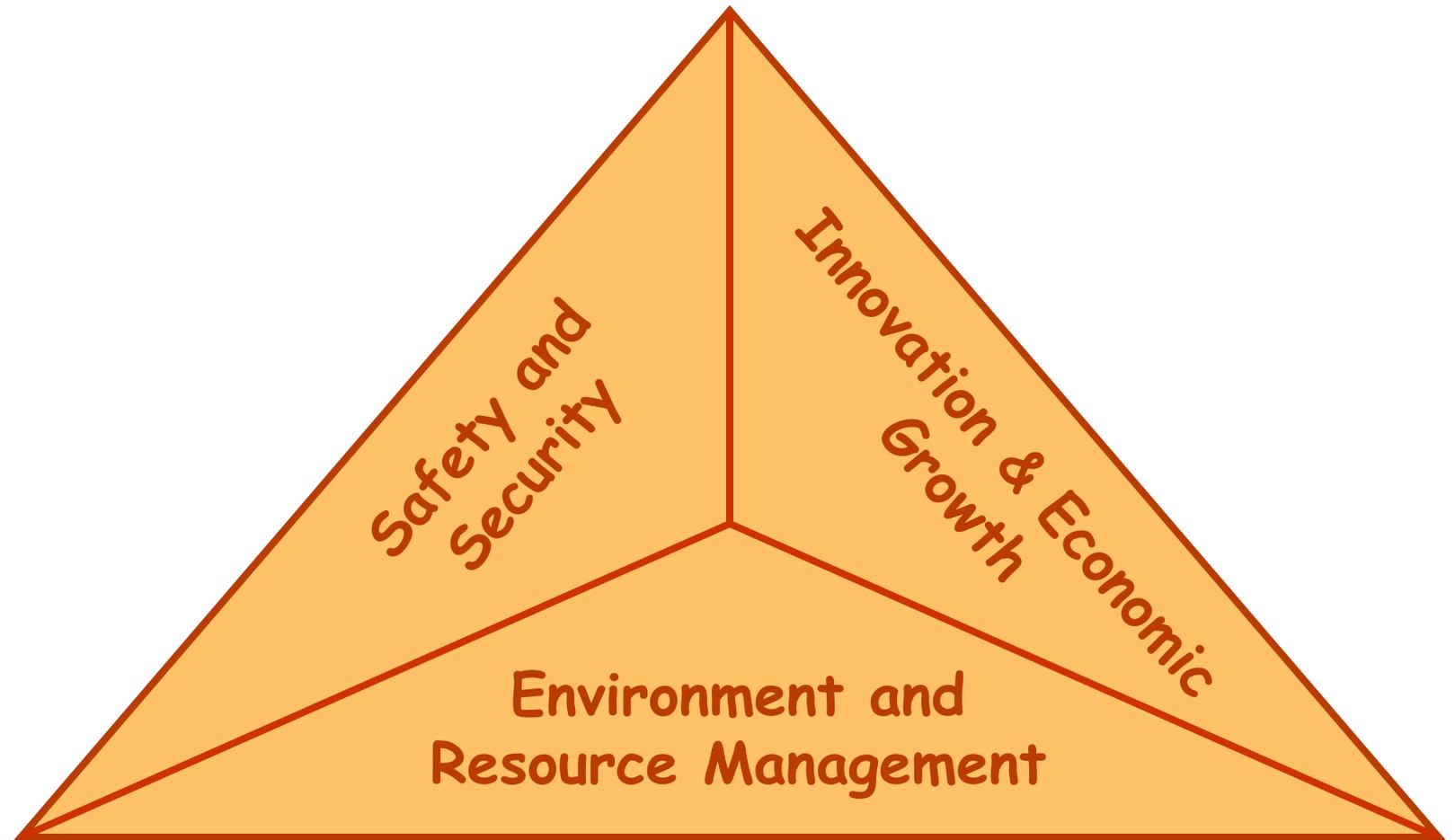
- Space Agency - to be incorporated 2008
- DST 10 Year Innovation Plan for Space Sciences
- National Space Science & Technology Strategy (NSSTS)

Mission



To address and inform national imperatives and policies through stimulating a sustainable space science and technology capability, growing human capital and applying scientific knowledge

Key Focus Areas



10 YEAR PLAN: Projected Impacts



1 Year

- Seed interim arrangement for the Space Agency
- Approval and rollout of the National Space Science and Technology Strategy
- **Ongoing technology programmes & partnerships**

5 Years

- Fully established space agency
- Appropriate technology platforms in place
- **Advances in human capital development**
- **Strategic international partnerships and projects**

10 Years

- Space agency globally positioned
- Resident space capacity in place
- Appropriate services and products relating to space applications
- **WE HAVE ARRIVED**

Human Resources Development in Geospatial and Remote Sensing Science



International network support:

- **IEEE Geosciences and Remote Sensing Society Conference IGARSS'09** to be held in Cape Town, **July 2009** – linear descendent from SAFARI 2000

Co-hosting and participation in African regional conferences leading up to this event:

- **AARSE** - African Association for Remote Sensing of the Environment: Nairobi 2004, Cairo 2006, Accra 2008
- **Africa GIS Conferences**: Tshwane 2005, Burkino Faso 2007
- **GDEST** - Global Dialogues for Emerging Science and Technologies - Cape Town, March 2008 - exploring opportunities for cooperation in geospatial sciences and remote sensing

Human Resources Development in Geospatial and Remote Sensing Science contd



Training Courses:

- **UNEDRA** - University Network for Disaster Risk Assessment Using Geospatial Analysis
Training courses in Kenya, South Africa, Senegal, supported by ITC, Netherlands, and UNOOSA Spider Programme, Vienna
- **European Space Agency TIGER** programme (Water, hydrology)
- **University of Wisconsin SSEC & Nasa** remote sensing courses in RSA 2006 - Use of MODIS and other direct download RS imagery
- Partnership with German Space Agency - DLR - planning stage



Human Resources Development in Geospatial and Remote Sensing contd

- Remote Sensing Institute Africa - RSIA
- A virtual college presenting accredited course in topics on remote sensing and geospatial sciences
- Partnership programme between (southern and east) African university partners
- Shared courses and mutually recognised credits
- Expertise sources locally and from international partners e.g. Univ Wisconsin SSEC and Nasa.
- Addresses training needs of RSA Space Sciences Institute
- Strengthens regional science cooperation in support of ICSU African programmes
- Already extensive goodwill and cooperation between regional universities - positive legacy of SAFARI 2000

Activities in support of GEOSS and CEOS



Implementing Millennium Development Goals

National programme under development
spearheaded by the
University of Stellenbosch

What is the problem?



- The UN's Millennium Development Goals are intended to improve life for the world's poorest citizens by 2015.
- However, according to the UN's "Africa and the Millennium Development Goals 2007 Update", **sub-Saharan Africa is not on track to achieve any of the goals by 2015.**

Global African Implementation Network for the Millennium Development Goals - **GAINMDG**



- University of Stellenbosch working towards creating the following development-focussed research groups:
 1. **GAINMDG** - Global African Implementation Network for the Millennium Development Goals and Other Developmental Objectives.
 2. **UNU-EHS-SU-CUSA** - United Nations University: Institute for the Environment and Human Security and Stellenbosch University Cooperation Unit for Southern Africa on Vulnerability Assessment and Risk Reduction Research.



Take home message

- Creation of a **SUSTAINABLE INTELLECTUAL COMMUNITY IN AFRICA** is a necessary condition for any other sustainability of the region.
- Proven long term partnerships between USA and South Africa have contributed substantially to this goal and will continue to do so.
- The mechanisms for best practice partnership have been demonstrated in **SAFARI 2000** and other regional peer-driven collaborative programmes.
- Support and commitment from *Government agencies* on both sides is a necessary condition for these partnerships to flourish.



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