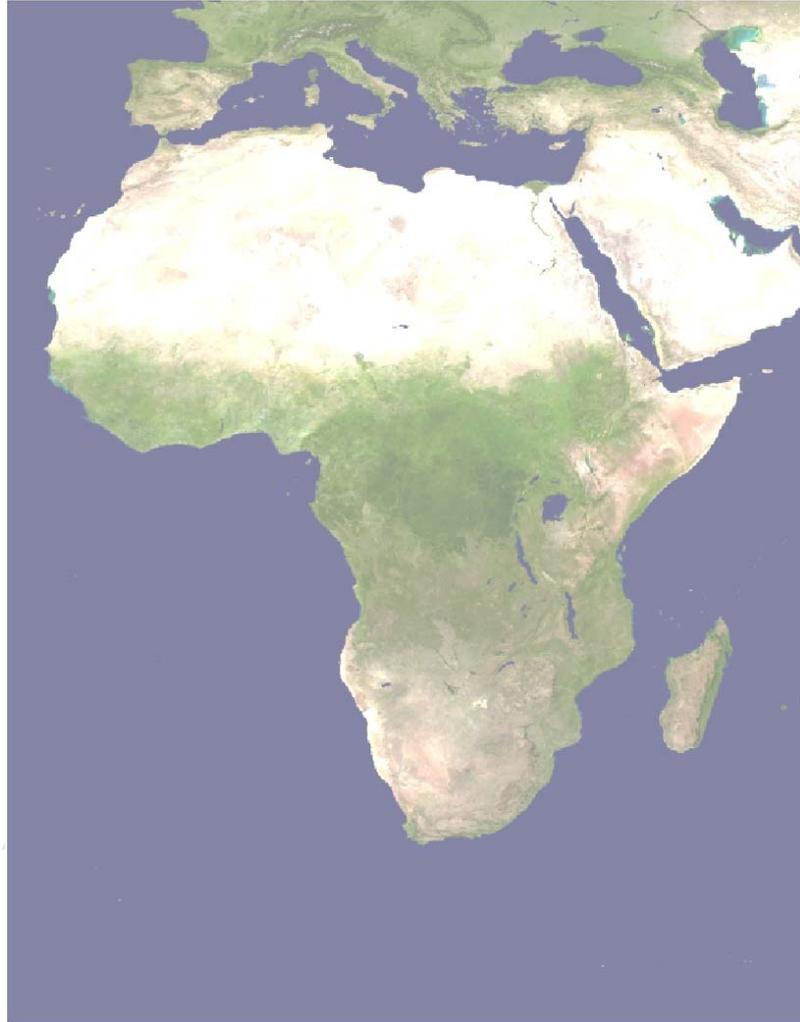


# **GIS (GEOGRAPHICAL INFORMATION SYSTEMS) AS A FACILITATION TOOL FOR SUSTAINABLE DEVELOPMENT IN AFRICA**

a presentation by Elizabeth Hicken





## Origins of the Study

- An MSc Research Study: *GIS as a facilitation tool for Sustainable Development in Africa*

**Case Study:** South African Municipal Environment

: Primary research

: Municipalities, Districts, Provinces and GIS Vendors – primarily rural

: SA, includes first and third world paradigms

, likely to meet 2015 MDGs on the whole

, but local government not delivering on their constitutional mandate of sustainable service delivery

, SA in transition (income inequalities, poverty, slums, lack of basic services and infrastructure)

= inherent socio-economic and developmental issues and biological degradation

= unsustainable development

**Africa: the reason we are here today**

- Changing Global Environments: Globalisation (positive / negative influences)

: shocks, biological degradation, climate change, natural disasters, conflict and terrorism

- Third world Africa vulnerable: natural resource rich

: high poverty / low human development indices

: corruption and conflict

: growth rate outstrips economic development

: poor health, education and infrastructural systems

: .....



# Defining Sustainable Development

## What is Sustainable Development?

...development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1984)

...development meeting the triple bottom line of ecological integrity, economic growth and adherence to social conditions and living standards, underpinned by governance – People, Prosperity, Planet (Rio de Janeiro Earth Summit, 1992)

Sustainable Development is the progression of humanity towards a lasting condition of peace whereby economic growth, human expansion and changing social conditions adhere to basic human rights, the preservation of our natural environment, and planet Earth as a whole.

## How is it being implemented and measured?

### Global Commitments: Agenda 21

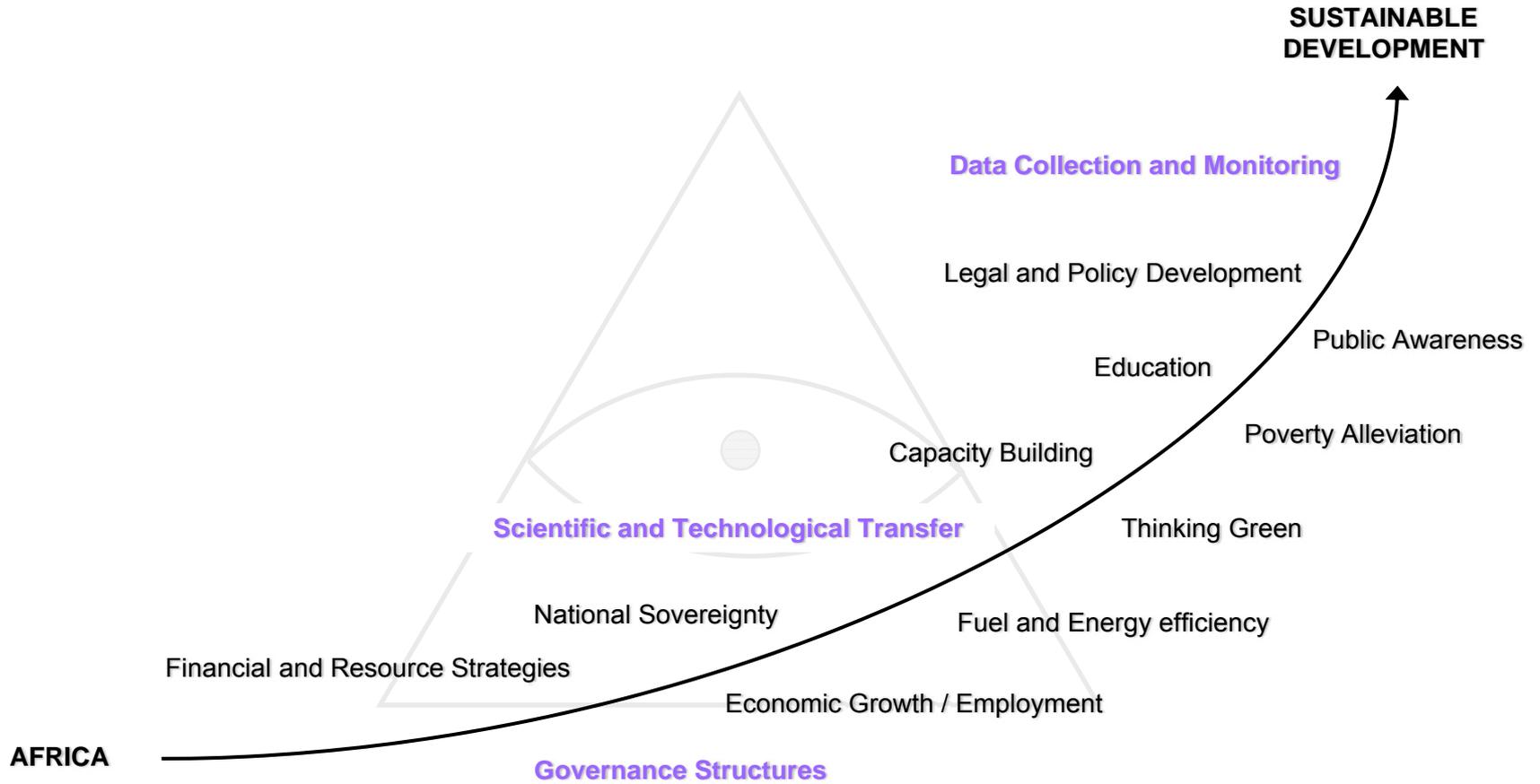
- : The Rio Declaration on Environment and Development
- : Millennium Development Goals (MDGs)
  - : MDG Targets and Indicators
- : The JHB Plan of Implementation
- : UN-CSD and recently formed IAEG

### African Activities: SD policies and frameworks showing signs of formulation

- : NEPAD objectives working in parallel
- : not yet integrated sufficiently at local levels
- : 2007 UN mid-term report; Sub Saharan Africa is unlikely to meet the MDG targets

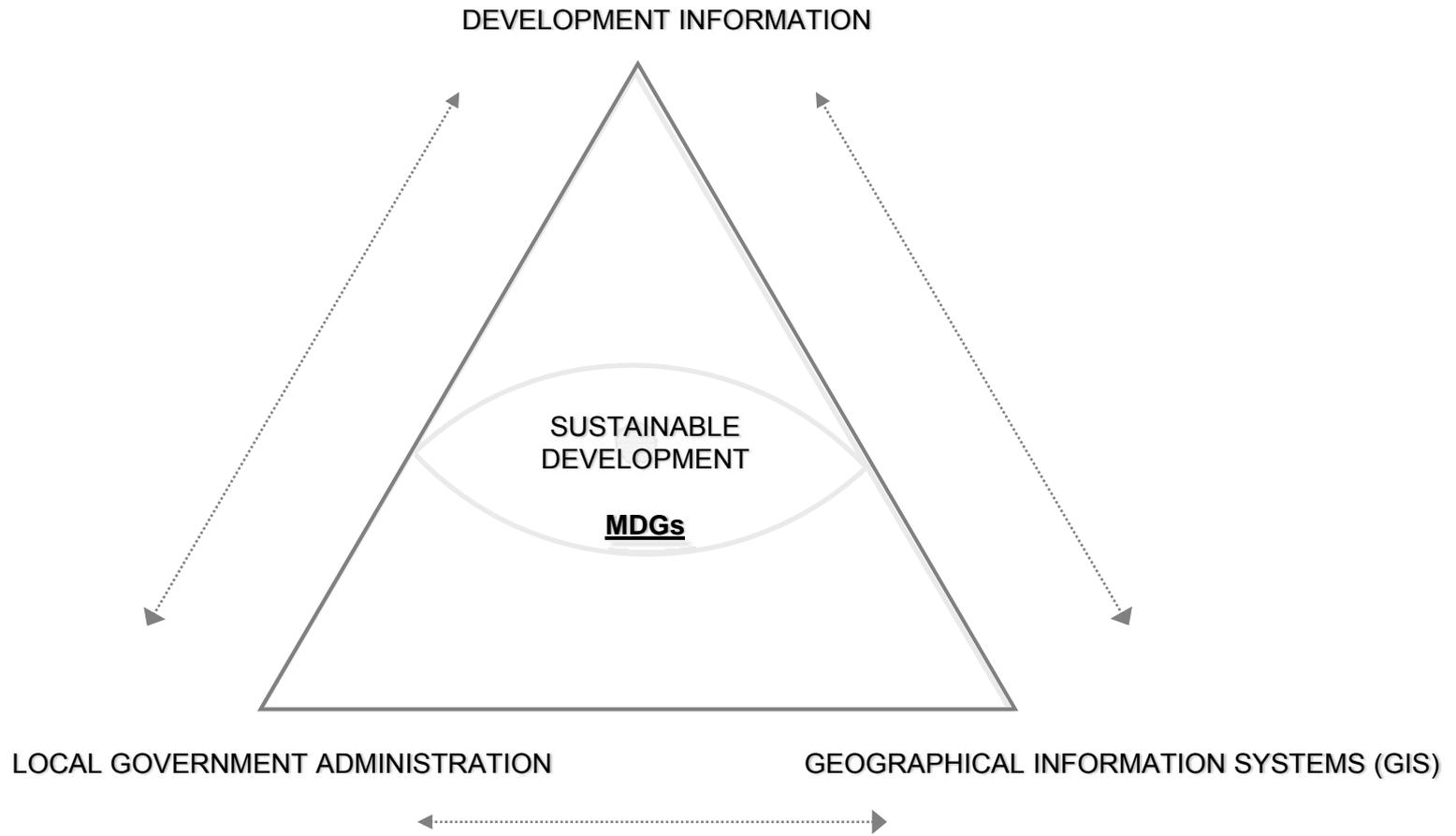


# How do we do this?





# Focus of this Research





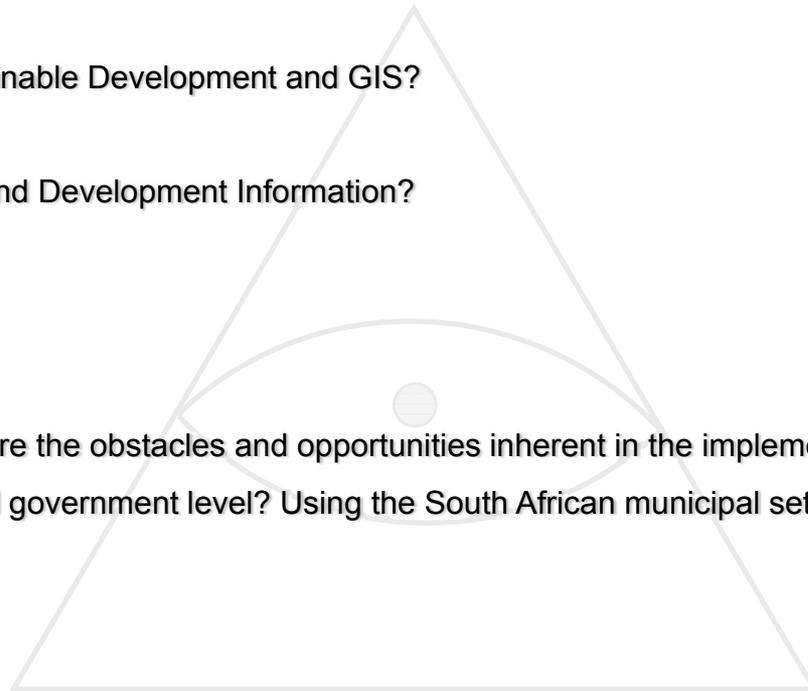
## GIS as a tool for Sustainable Development in Africa – a Twofold Vision

1. Is there in fact a positive facilitating relationship between:

- Sustainable Development and GIS?

- GIS and Development Information?

2. If so, what are the obstacles and opportunities inherent in the implementation of these concepts at an African local government level? Using the South African municipal setting as a case in point.





## GIS as a tool for Sustainable Development in Africa – Supporting Evidence

Is there in fact a positive facilitating relationship between:

- Sustainable Development and GIS? **YES**
- GIS and Development Information? **YES**

- Significant existing evidence (Agenda 21, JPOI, GISD, GEOSS, GSDI Africa)
- MDG Indicators are the Global paradigm for SD  
= numerical / data based by geographic location  
= easily used with GIS
- Governments administrate by jurisdiction (area) = spatial,  
90% of local government's business is land (property)-based  
Local governance activities : resource and human issues by  
virtue of their location
- GIS as an Information System – ICT infrastructure / e-  
governance integration (cross-cutting tool), can form the  
substructure of various government sections
- Development Info / Statistics and GIS have a reciprocal  
relationship

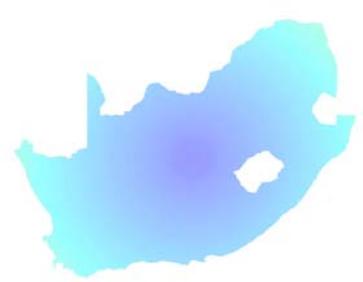
132. Promote the development and wider use of earth observation technologies, including satellite remote sensing, global mapping and geographic information systems, to collect quality data on environmental impacts, land use and land-use changes, including through urgent actions at all levels to:

- (a) Strengthen cooperation and coordination among global observing systems and research programmes for integrated global observations, taking into account the need for building capacity and sharing of data from ground-based observations, satellite remote sensing and other sources among all countries;
- (b) Develop information systems that make the sharing of valuable data possible, including the active exchange of Earth observation data;
- (c) Encourage initiatives and partnerships for global mapping.

133. Support countries, particularly developing countries, in their national efforts to:

- (a) Collect data that are accurate, long-term, consistent and reliable;
- (b) Use satellite and remote-sensing technologies for data collection and further improvement of ground-based observations;
- (c) Access, explore and use geographic information by utilizing the technologies of satellite remote sensing, satellite global positioning, mapping and geographic information systems.

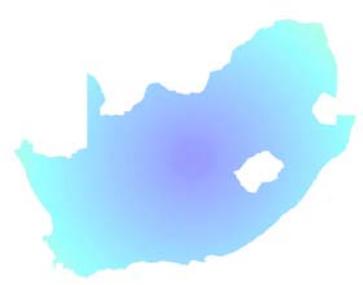
**JHB Plan of Implementation,  
Chapter 10: Means of Implementation**



## What are the Primary Problems and Opportunities?

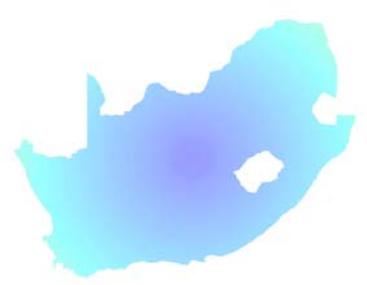
### Based upon the South African Local Government case study:

- √ Resources for GIS are sufficient or improving – along with awareness and general user training
- x Uncoordinated GIS activities
- x No specific guidelines as to HOW GIS should be used for municipal business or to solve problems
- x Lack of understanding or integration of Sustainability Principles and practices at a local level
- x General Administrative Inefficiencies and Weak Management
- √ Local Integrated Development Planning
- x A top-down or ad-hoc Data Approach
- x Environmental (biological) governance remains reactionary and project orientated
- x Spatial information standards and procedures are not yet specified at local levels
- x Lack of detailed and standardised specifications for planning data
- x Lack of a coordinated spatial information substructure for Municipalities



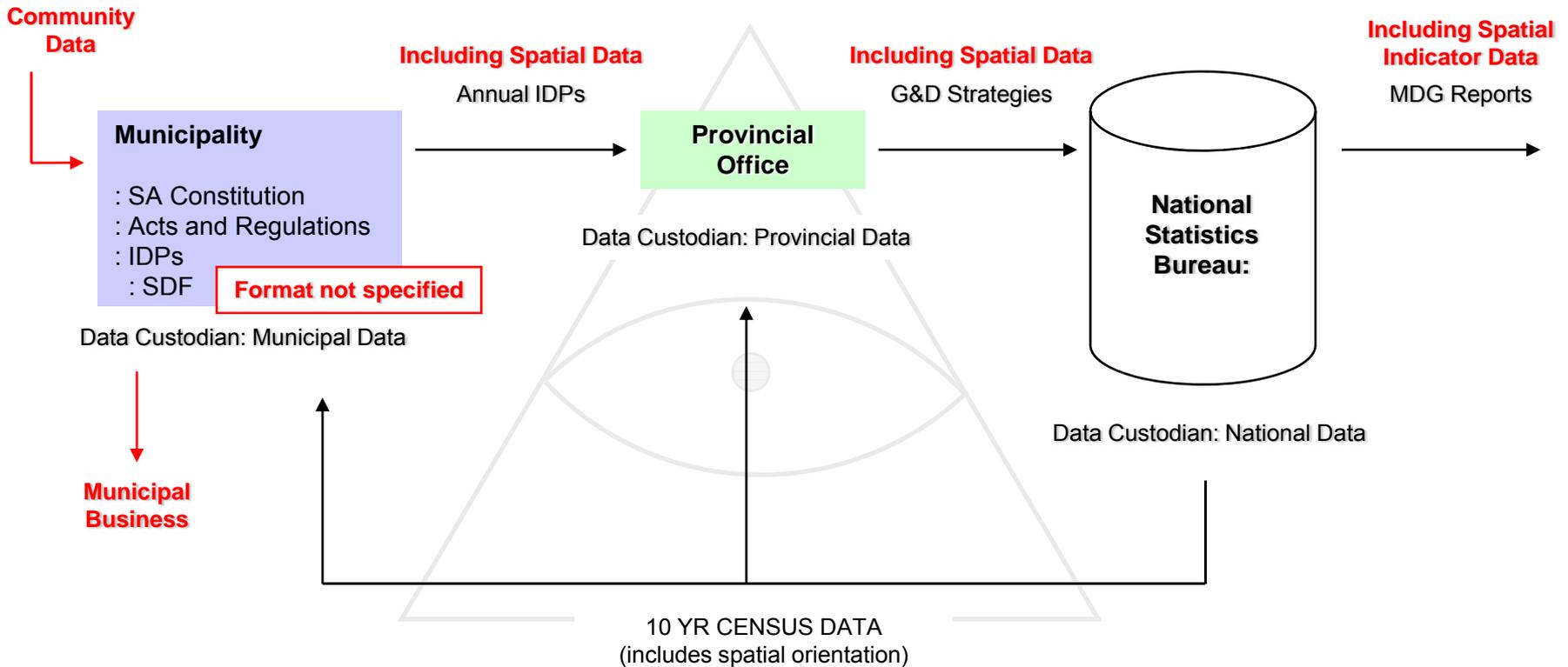
## What are the Trends emerging from this?

- GIS is being implemented as part of a larger Information / Content Management system
  - multiple skill level usability
  - multi departmental application
  - data sharing and aggregation
- This could potentially snowball into full municipal ICT solutions
- Solutions follow general IT industry trends (i.e. SOA) 
- GIS being used in municipal Service Delivery
- Intra and Inter District and Municipal Shared Services
- GIS solutions becoming more corporate
- In general, a growing technological society and increased rate of transfer



# Recommendations

## GIS SUBSTRUCTURE: NSIF Framework / Spatial Data Infrastructure Act



**IDP:** Integrated Development Plan  
**SDF:** Spatial Development Framework  
**G&D:** Growth and Development  
**NSIF:** National Spatial Information Framework

**INFORMATION IS A RESOURCE WHICH NEEDS TO BE MANAGED – IT IS CRITICAL TO SUCCESSFUL GOVERNANCE.**



## Conclusion

Technology does not exist as a solution in itself to solve environmental, social and economic problems, but rather it is a medium through which to effect transparent reporting on the status and change in issues relating to the principles of Sustainable Development. Societal imbalances and environmental degradation require the direct application of their own particular solutions according to a complex set of causes within their cultural, infrastructural, legal and governance settings. Sustainability in the context of this study means self reliance, and correct information management is critical to this concept. From the perspective of an African country, the provision of bottom line planning data is key to Sustainable Development. Geographical Information Systems as a member of the Geomatics or *Earth Observation* systems is a tool which could significantly contribute to the attainment of the required information substructure, if used to its full potential.

The argument that humanity needs to live a sustainable existence has been won, what remains is how to do this.