

Knowing is not enough- engaging
the knowledge Economy

➤ **Interfacing Indigenous Knowledge
with other knowledge Systems in the
knowledge Economy: The South
African Case**

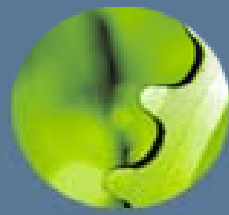
➤ **Yonah Seleti**

➤ **DST, SA**

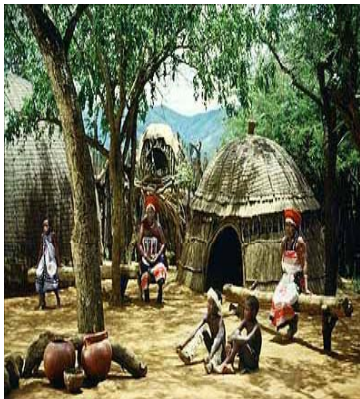


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Outline of Presentation



1. Economic Transformation towards a Knowledge Economy
2. DST's Valorization of IKS
3. National Recordal System
4. Conclusion

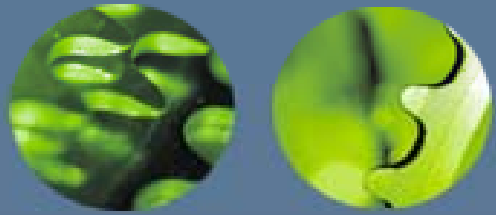
2010 FIFA World Cup Final Game

Full time: 93minutes

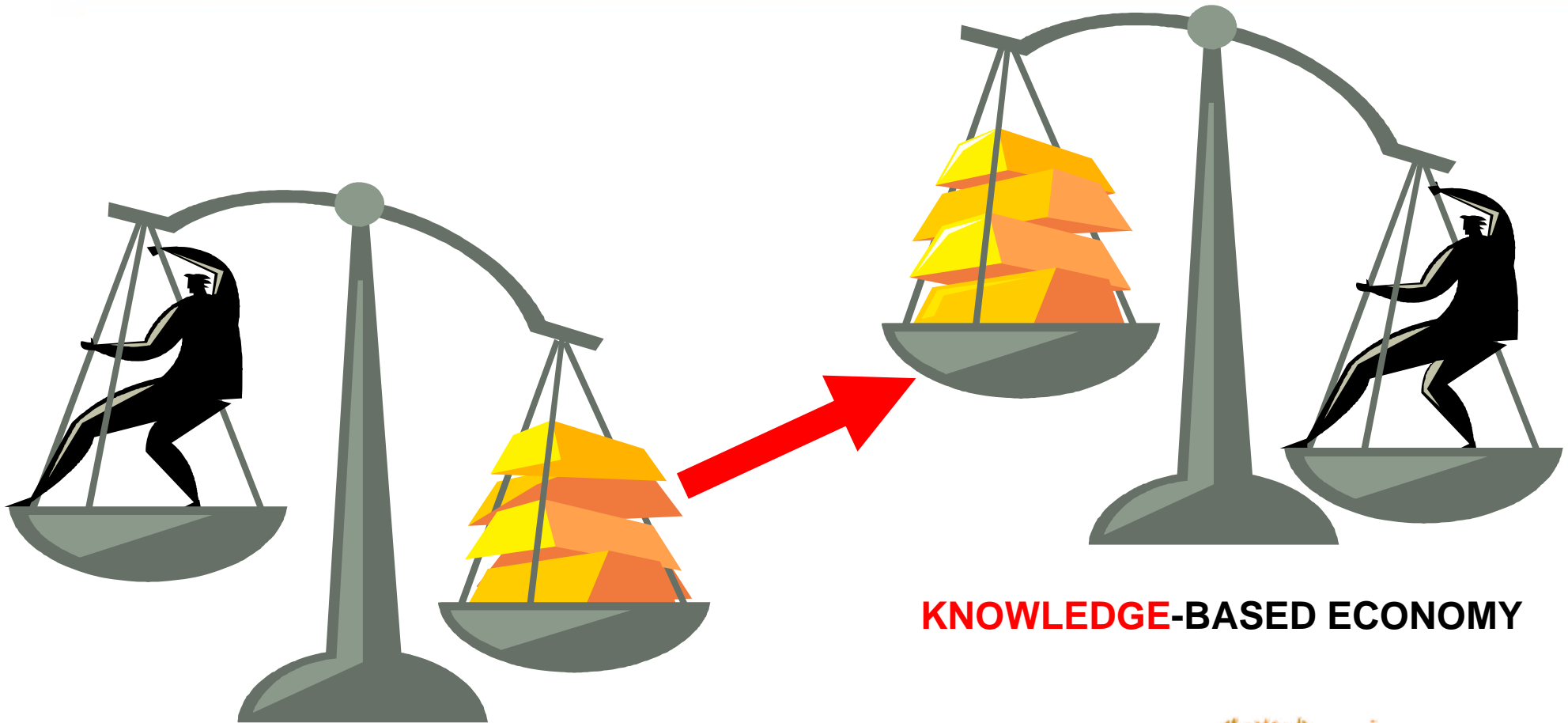
Final Score: - South Africa

- Brazil





Towards a Knowledge Economy



RESOURCE-BASED ECONOMY

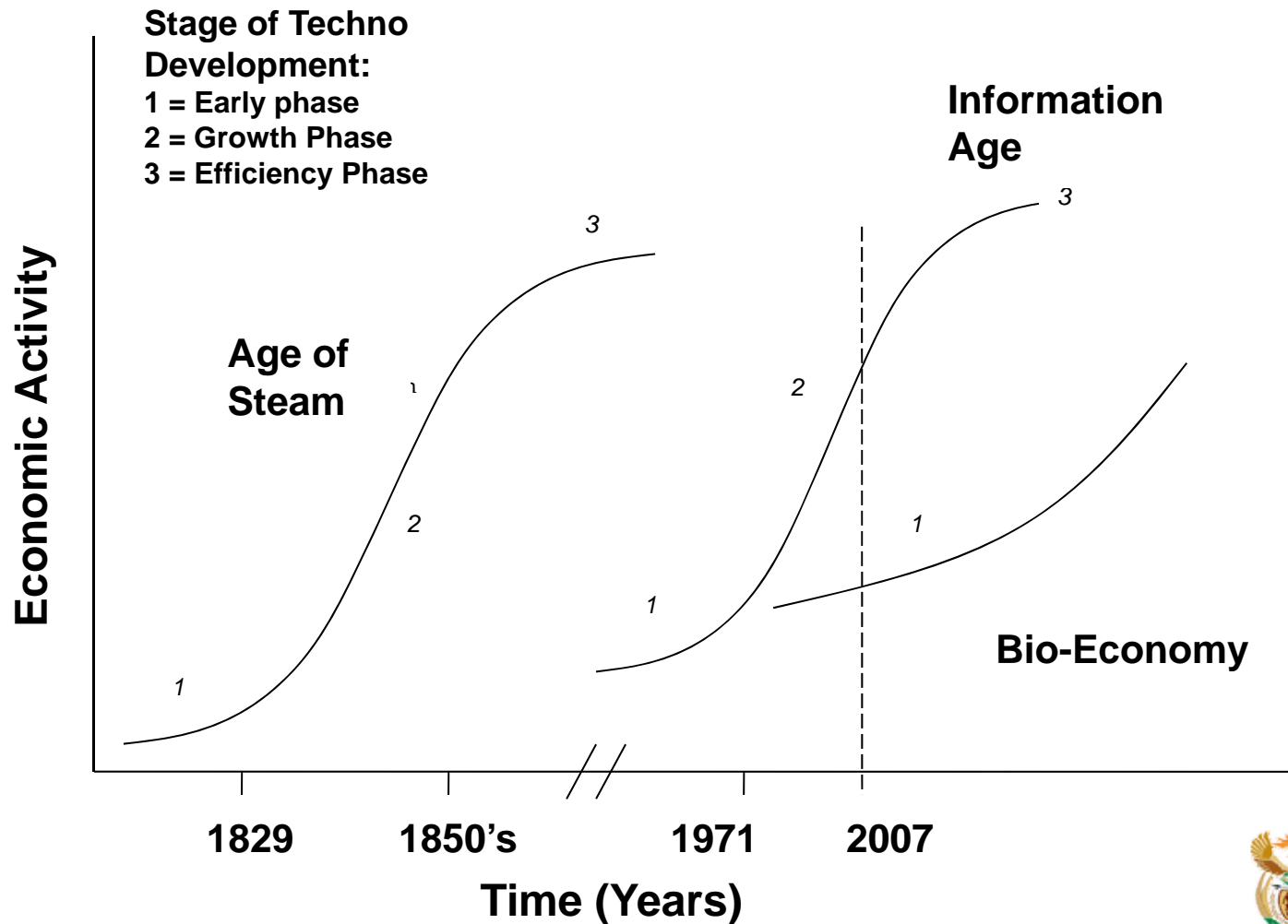
KNOWLEDGE-BASED ECONOMY

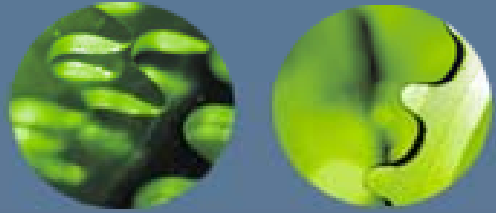


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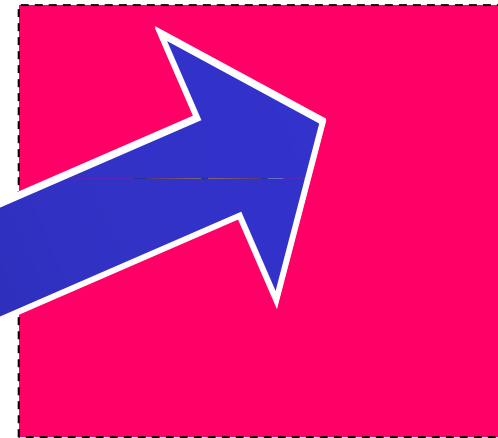
Economic Transformation



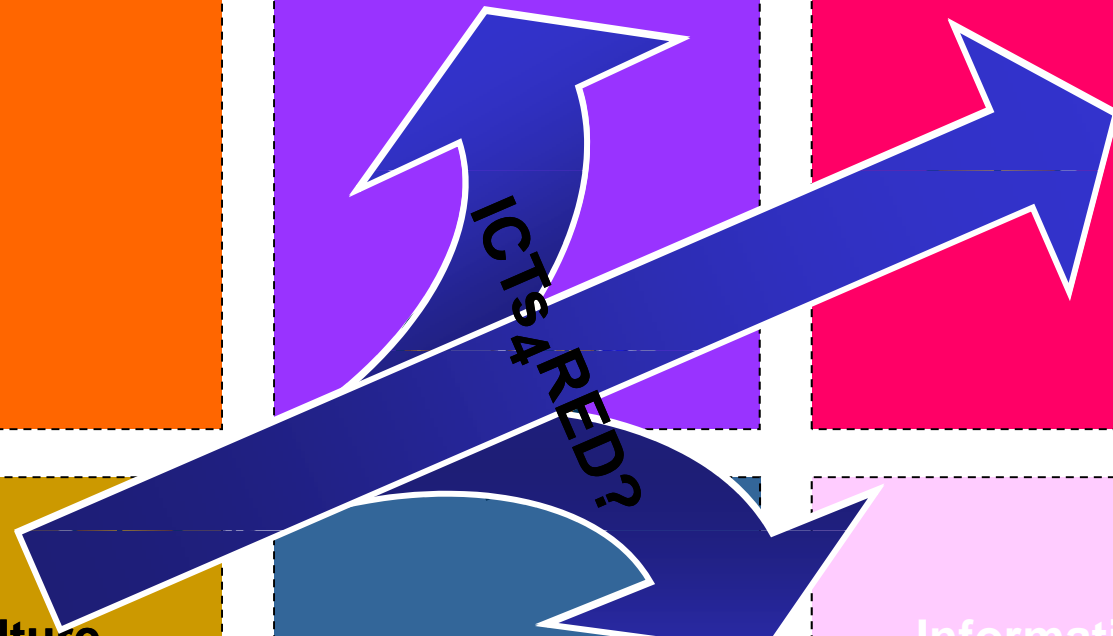
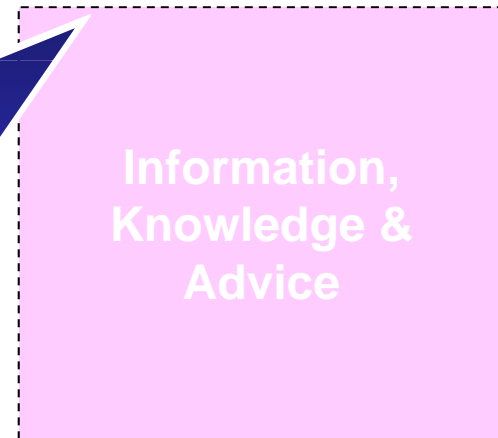


A Place **Beyond?**

Export
Orientation



Consumer
Orientation



Agricultural
Society

Industrial
Society

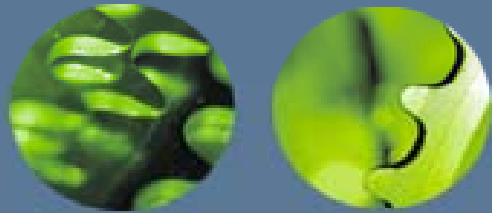
Information
Society



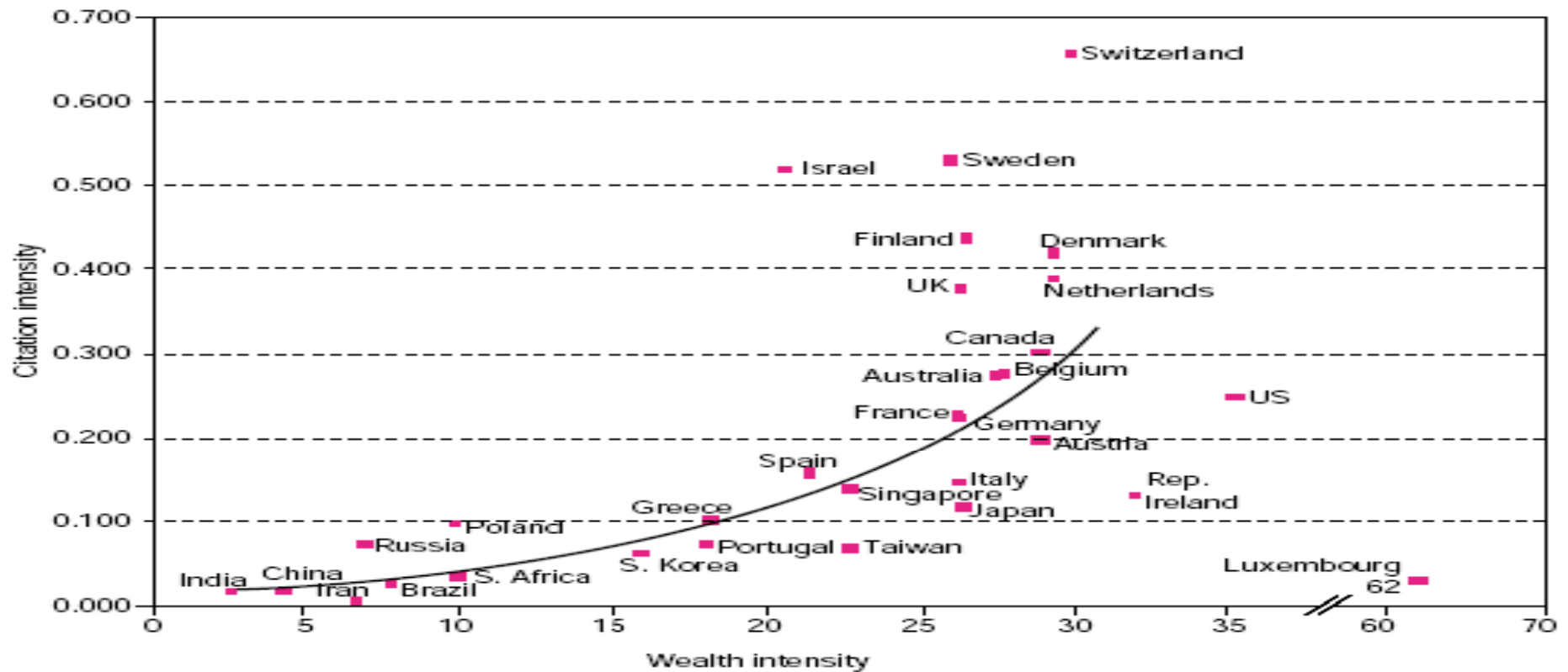
Nature



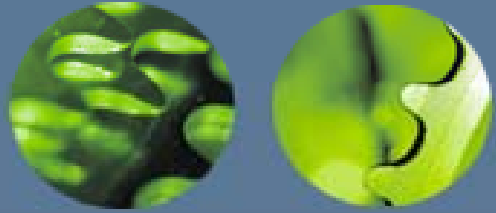
Learn



Economic & Scientific Wealth

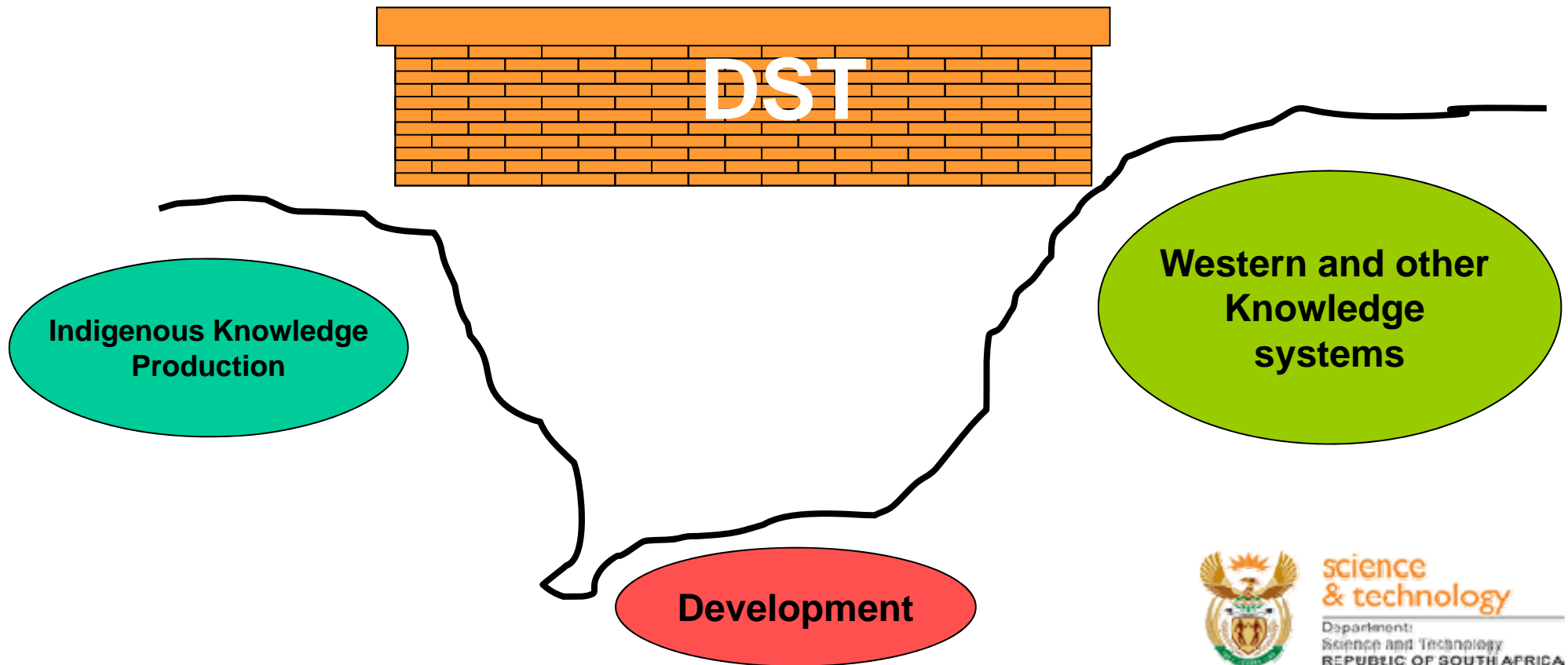


Source: DA King, Nature 430 (2004) 311 (15 July 2004)



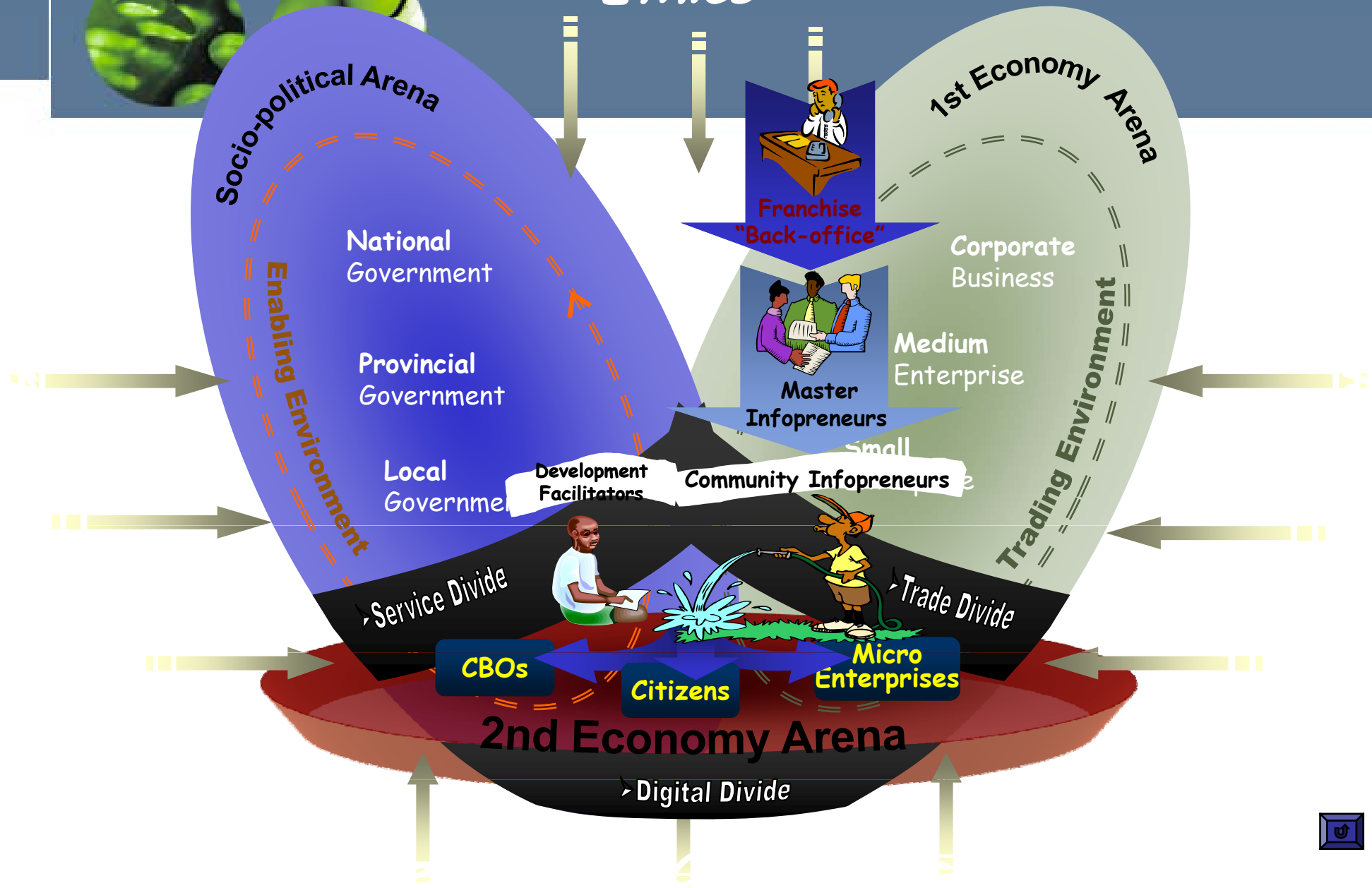
Knowledge Chasm

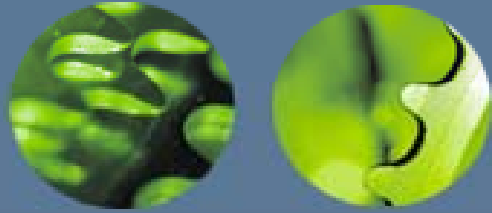
Bridging the “Knowledge Chasm”



Problem & Solution Components

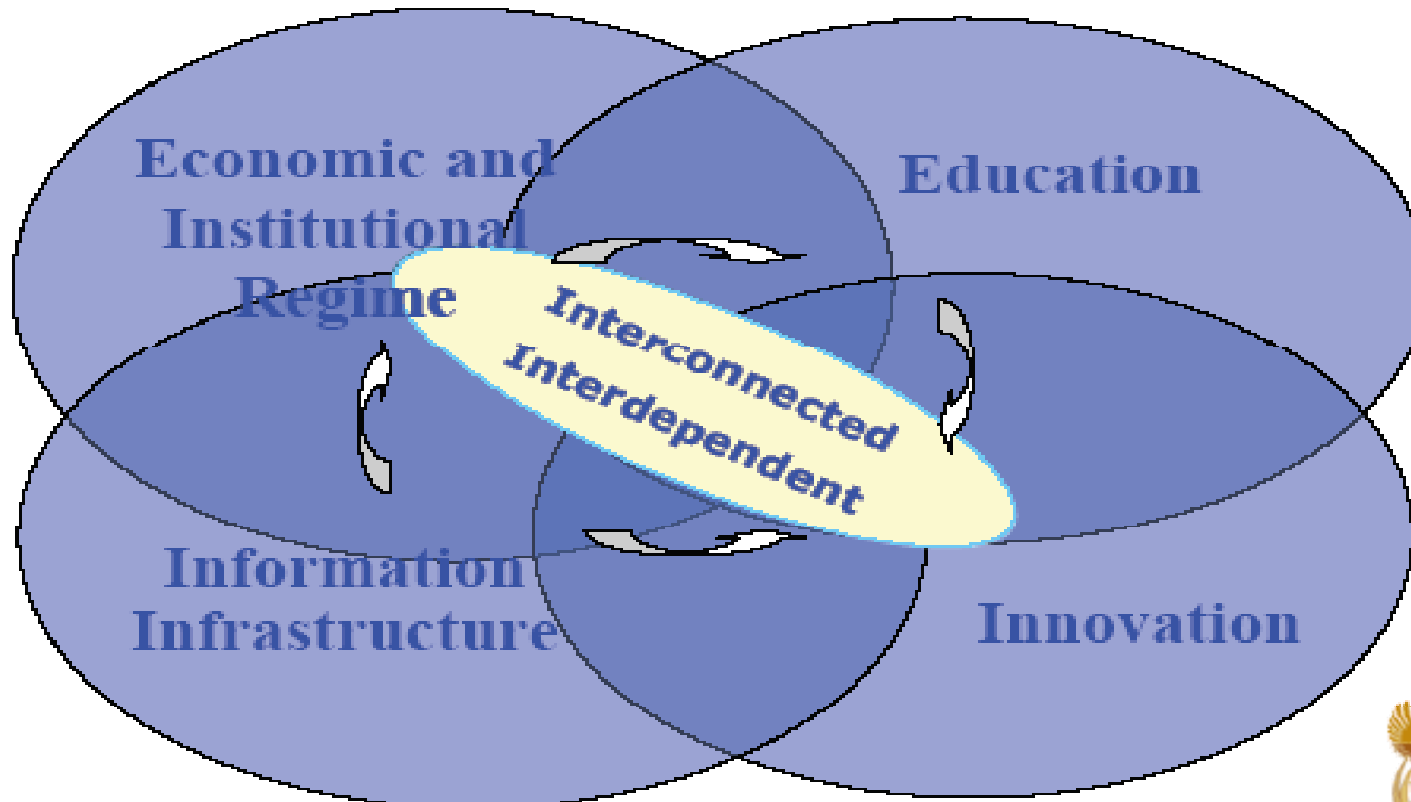
Ethics





The Knowledge Economy

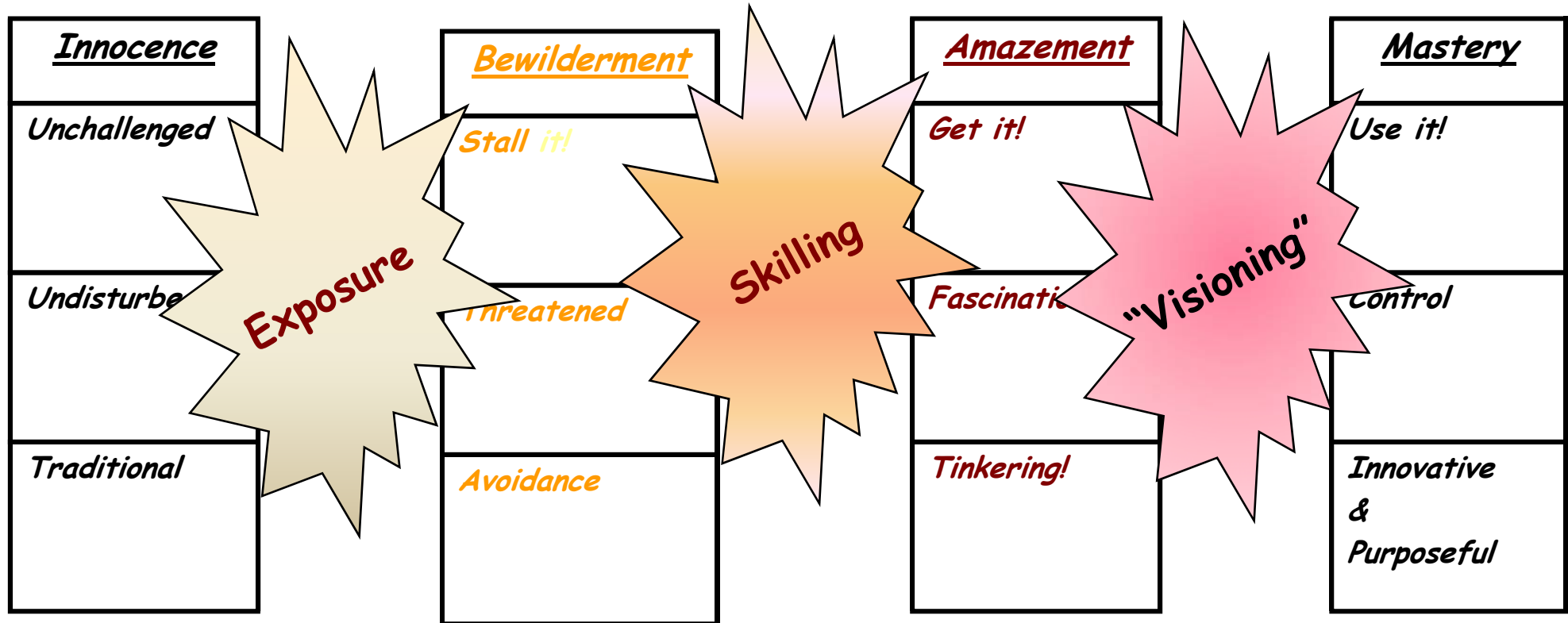
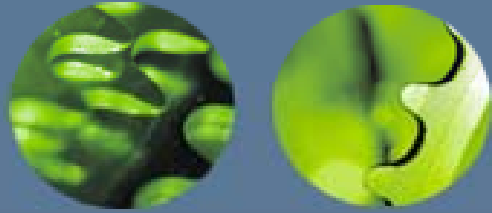
The Four Pillars of the Knowledge Economy



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Technology Adoption Phases



Vision: A clear, internalised picture of a preferred future (Myles Munroe)

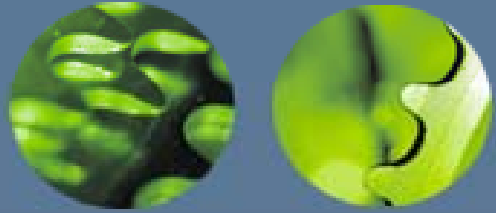
➤ Solomon: "Where there is no vision, the people perish..."





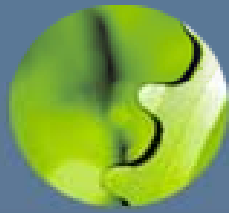
Wealth Creation and National Development

- Leadership today is determined by creating and harnessing knowledge
- Nation's ability to convert knowledge into innovations and wealth- is a determinant factor of position among other nations



Successful IP Dispensation in Knowledge Economy

- A dynamic and effective IP dispensation has become a focal area and integral feature of strategic importance for a successful economy
- Level of IP creation and protection recognized as a critical factor and incentive for economic activity
 - Promotes direct foreign investment and economic growth
 - Enhances technology transfer and industrial development
 - Stimulates research activity and product development



Local is Lekker!

- We intend to intensify the development of local, South African content in the creative industries. This is to promote growth and to enable us to export 'Proudly South African' products and thus ignite national pride."
- "The development and promotion of indigenous artistic products requires synergies with other organisations that share our vision. Over the last few years we have strengthened relations with the DTI, Department of Communications, National Film & Video Foundation, the International Marketing Council, Independent Development Corporation and the South African Broadcasting Corporation, to name a few."
- Minister Pallo Jordan, Parliamentary Media Briefing Economic Cluster, 10 February 2006"



Towards a Knowledge Economy: The Policy Landscape

White Paper on S &T (1996)

SA National R&D Strategy (2002)

National Biotechnology Strategy (2001)

Indigenous Knowledge System Policy (2004)

**Ten Year Innovation Plan
2007**

Farmer to Pharma

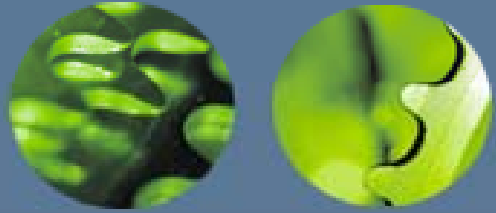
Space Science

Energy Security

Climate Change

H&S Dynamics



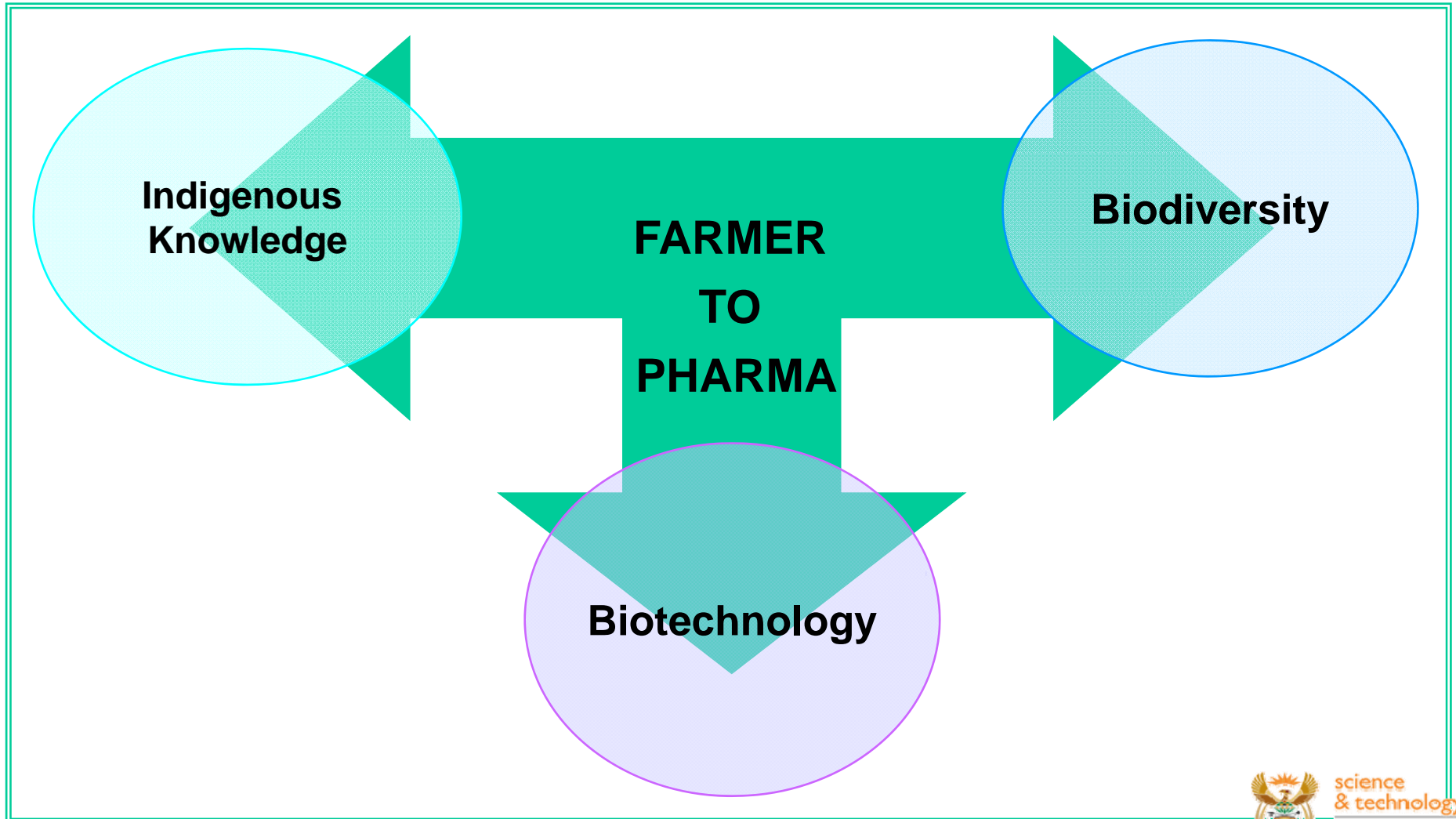


F2P Deliverable Outcomes

- Be one of the top three emerging economies in the global Pharmaceutical industry, based on an expansive innovation system using the nation's indigenous knowledge and rich biodiversity
- Designed and created the appropriate technology platforms, and R&D and innovation infrastructure that facilitate diagnostic and medical solutions
- Created and funded five theme-specific consortium-based centres of competence that focus on the five top national health priorities, linked to the growth of the local Pharmaceutical industry
- Increased foreign investment in South African health-related R&D through reinvigorated health research, with particular emphasis on pharmaceutical R&D;



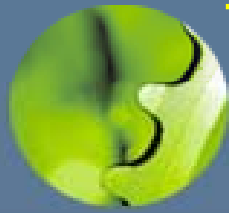
DST Vision: Interfacing IKS in F2P



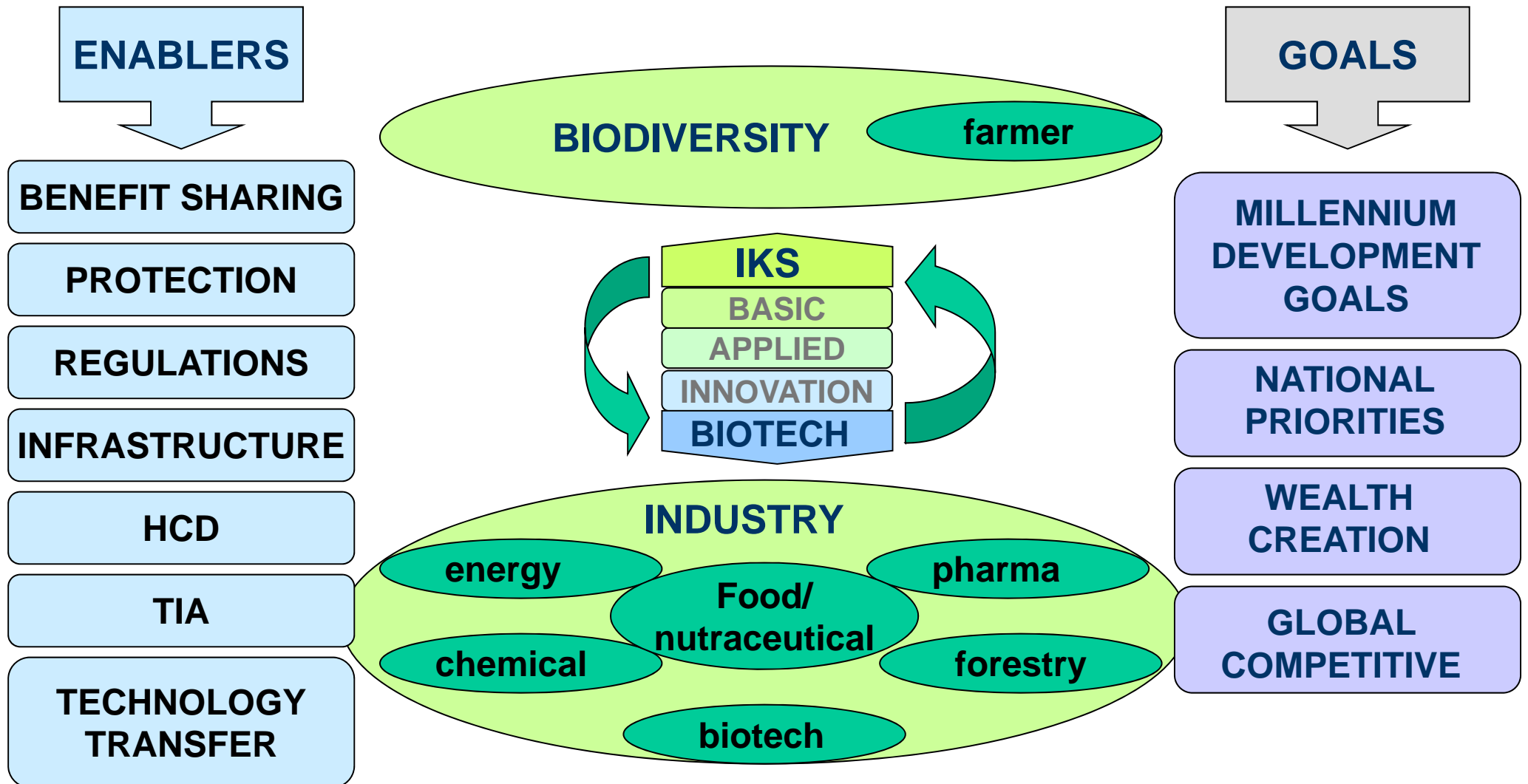


Challenges in Interfacing IKS in the knowledge Economy

- Contextual rhetoric and simplistic views of IK application
- The focus on the knowledge content and assumption that IK is out there ready for harvesting
- Superficial and weak IKS research methodologies
- Inability to mainstream IKS within the Education system at primary and tertiary levels
- Failure to accommodate IKS within the knowledge frameworks in private and public institutions
- The lack of demonstrable success stories
- Piracy, misappropriation and misuse

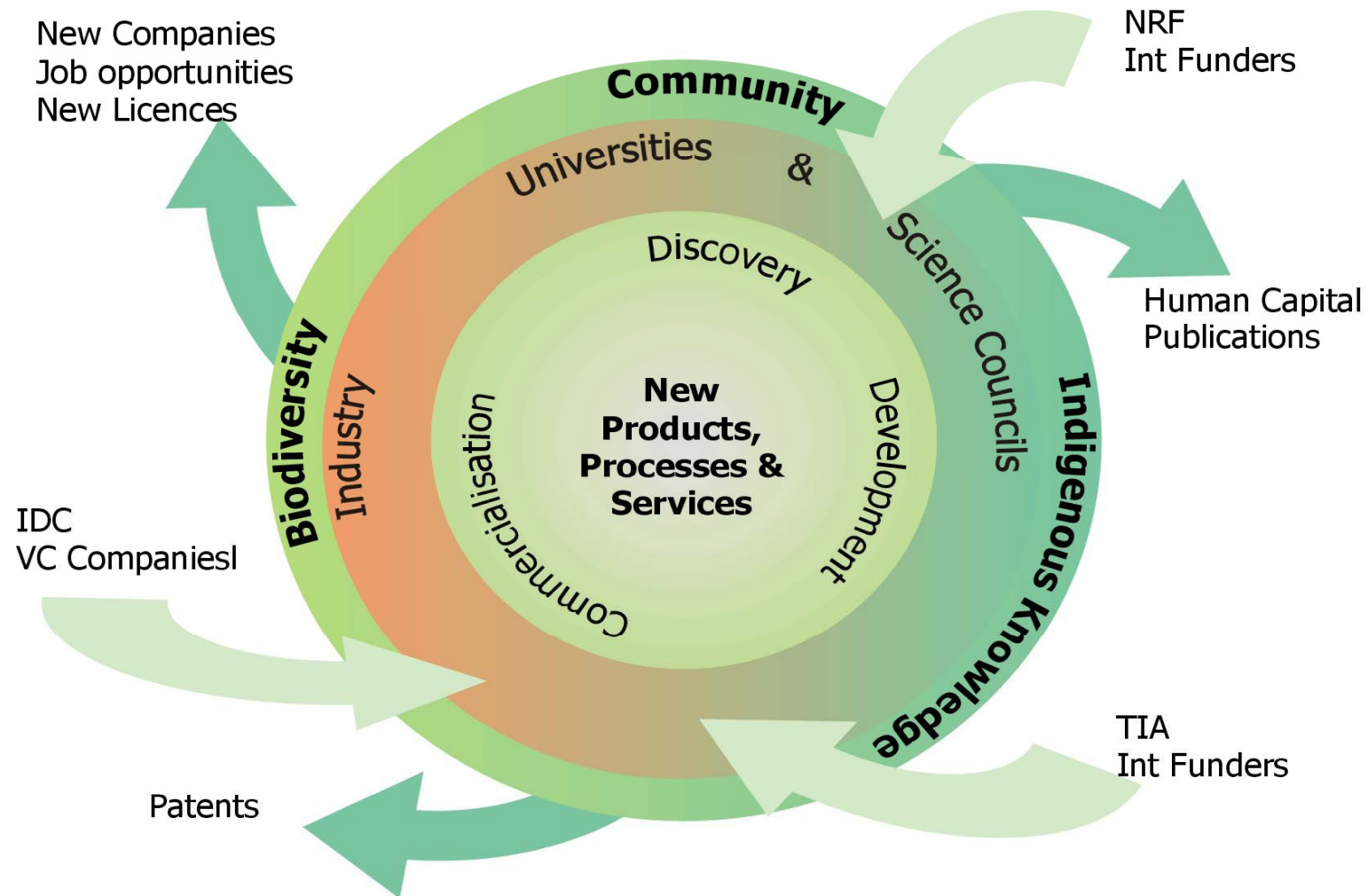


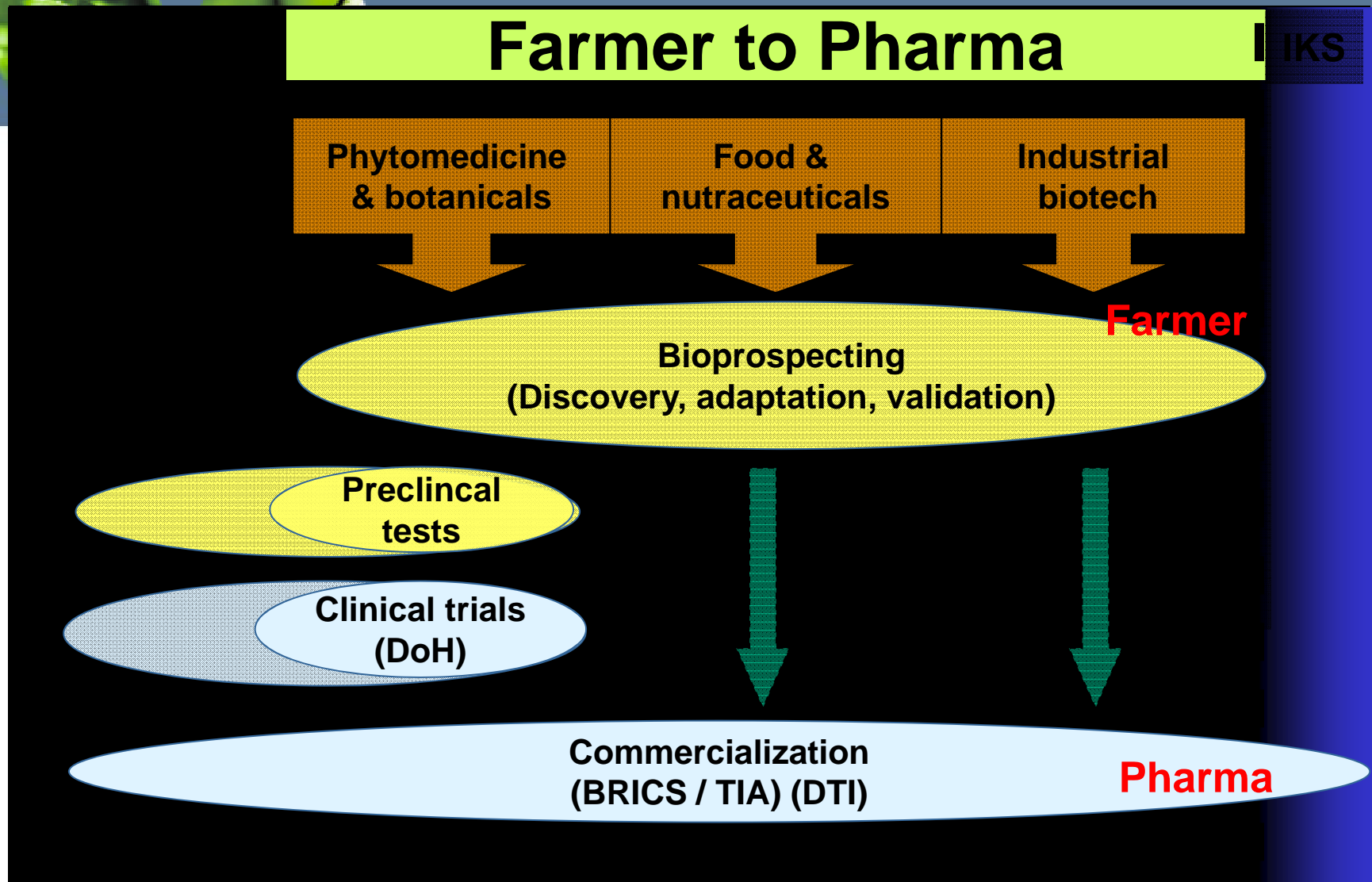
The Farmer to Pharma Integrated Model

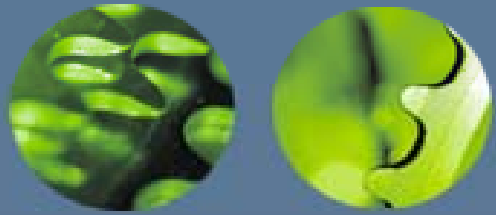




Scoping the innovation cycle for the IKS within the Farmer to Pharma G. Challenge







IKS Value Addition Consortium



IK Holders

Government

Researcher

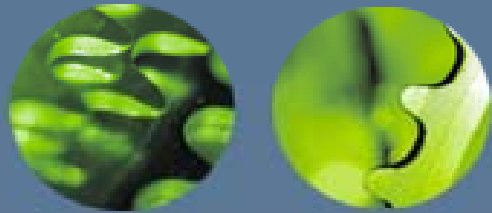
Private

Partnership



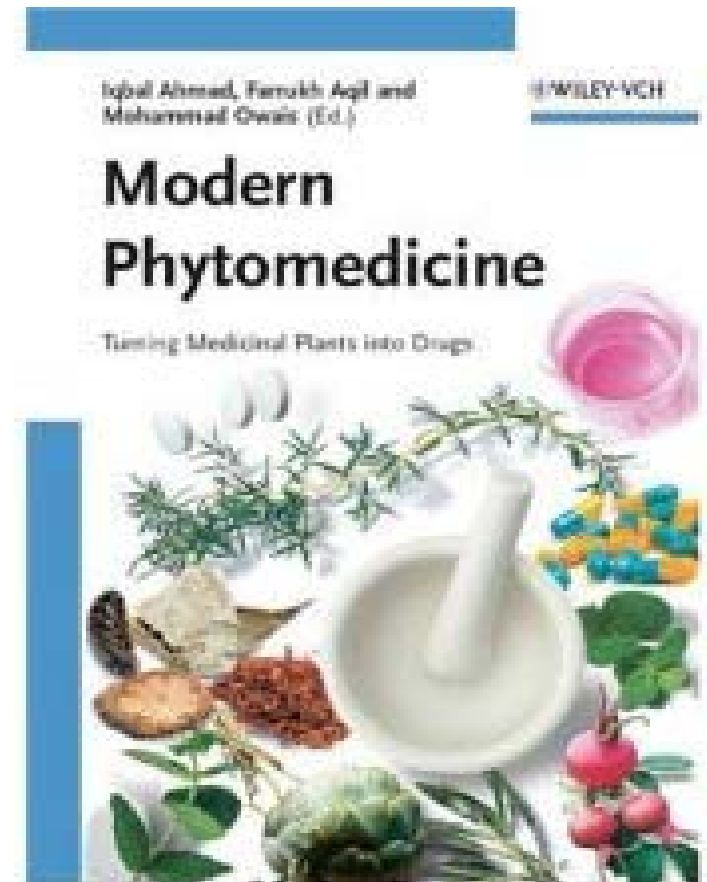
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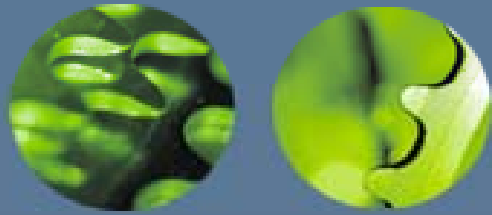
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Phytomedicines and Botanicals

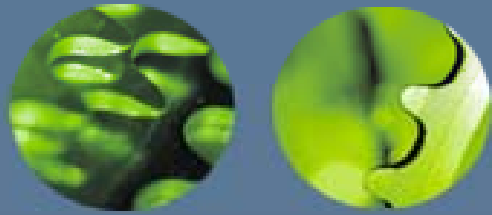
- Phytomedicine or herbal medicine is the science, art, and exploration of using herbal remedies to treat illnesses or diseases of humans and animals
- Botanicals are defined as drugs, medicinal preparations, or similar substances obtained from a plant(s).





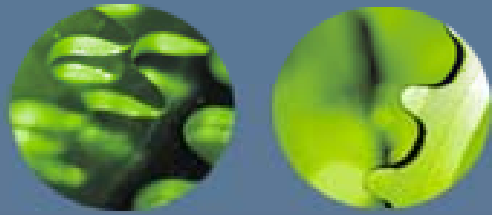
Phytomedicines and Botanicals

- Phytomedicines and botanicals are now used as licensed medicinal products in many countries
- Traditional medicines & IKS (undocumented and documented)
- Cosmoceuticals- IKS and natural beauty/health products
- Other – not linked to IKS / not yet documented
- Reverse pharmacology
 - phytomedicine + phytopharmacology
 - Phytotherapies



Traditional Medicines/phytotherapy

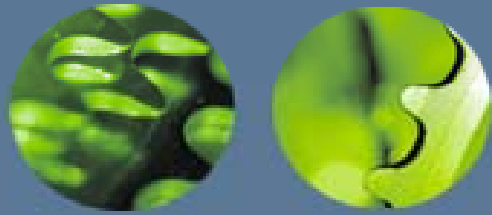
- Depending on the condition being treated or the plant chemistry, infusions, decoctions, tablets, capsules, pessaries, creams, gels, vinegars, ointments or poultices are made and prescribed by the phytotherapist for his/her patient.
- This process requires in-depth knowledge of plant-chemistry, biochemistry & pharmacology (how the active constituents interact with the human body and how they potentially interact with conventional drugs the patient may be taking), extraction processes and medicinal diagnostic skills.



Food and Nutraceuticals

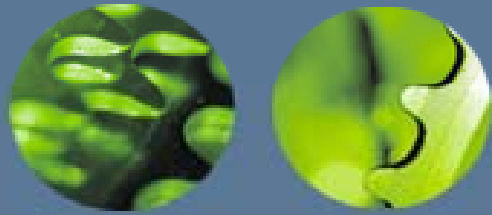
- A nutraceutical is defined as any food supplement that has health benefits in addition to its nutritive value. Nutraceuticals are also called botanical supplements, ergogenic aid, functional foods, herbal, medical food, or nutraceutical.
- Enhanced foods/nutraceutical
- Enhancement of traditional food
- Functional foods and beverages
- Pharmaceuticals (naturaceuticals)
- Additives
- Biomass





Food and Nutraceuticals

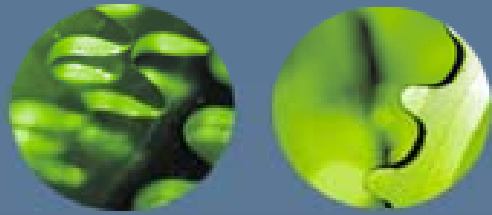
- IKS and Biotechnology are envisaged to play a significant role in this focus area of the Farmer to Pharma Grand Challenge.
- A Food and nutraceutical Centre of Competence will be established (by NIKSO).
- The following indicate possible areas where bioprospecting, as well as IKS and biotechnology can play a role in ensuring improved and sustainable food and nutraceutical production:
 - Food Technology Agriculture and Nutraceuticals
 - Improve yield from crops
 - Reduced vulnerability of crops to environmental stresses
 - Increased nutritional qualities of food crops
 - Improved taste, texture or appearance of food
 - Reduced dependence on fertilizers, pesticides and other agrochemicals
 - Production of novel substances in crop plants



Industrial Biotechnology

- use of renewable raw materials (biomass) to replace raw material derived from fossil fuels
- use of biological systems such as cells or enzymes (agents or catalysts) to replace conventional, non-biological methods
- A third area = biocomposites





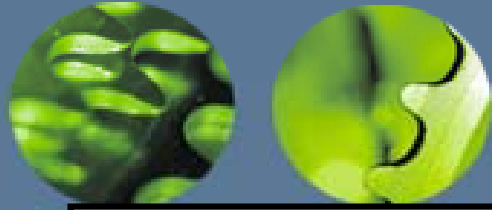
Industrial Biotechnology

Proposed Platforms or Centres Competence

- Biomass
- Biocatalysis
- Biocomposites

Objectives

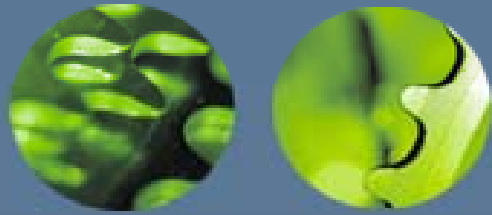
- Effective use of natural resources and waste material
- Improved, less harmful bio-processes (vs chemical processes)
- Benefits to the environment



Matrix

	Health	Agriculture	Industrial
Bioprospecting			
PCDDP			
Biosafety Platform			
Bioinformatics and Functional Genomics			
Structural Biology			
Pilot plant Manufacturing Facility			





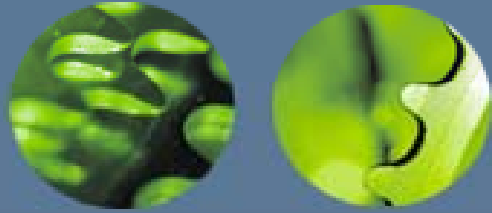
Supporting Platforms

Preclinical drug development platform – toxicology, ADME

Bioprospecting platform (IKS and non-IKS)

Supporting Platforms and CoCs within Biotechnology

- Functional Genomics & Bioinformatics Platform
 - Structural Biology Platform
 - TB CoC
 - HIV Prevention and Treatment Platform
 - SAMI
 - Pilot plants and Manufacturing Platforms
 - Cancer CoC
 - Diabetes CoC
 - Human and Animal Vaccine Initiative
- The National Recordal System to Capture IKS

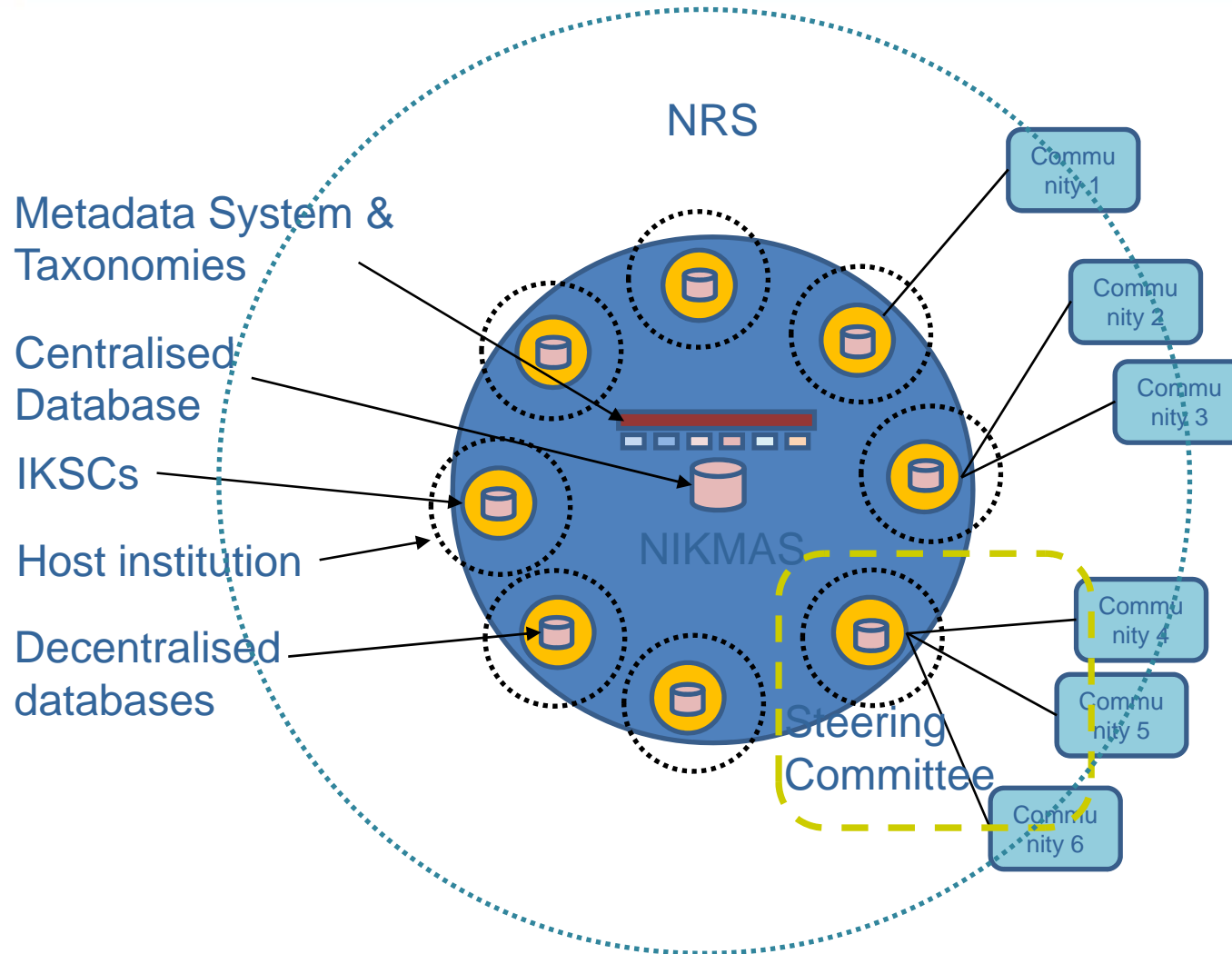


NRS Background

- IKS Policy (2004)
 - Created a platform for the recognition, affirmation, development, promotion and protection of IKS.
 - **Implementing the policy:** Chapter 1.4, 6 and 8
- A **development function**; including, academic and applied research, development and innovation in respect of IKS
- A **recordal system for indigenous knowledge and indigenous knowledge holders**; where appropriate, to pro-actively secure their legal rights;
- The **promotion of networking structures** among practitioners, to be located in the Department of Science and Technology; and
- Creation of legal benefit sharing framework.



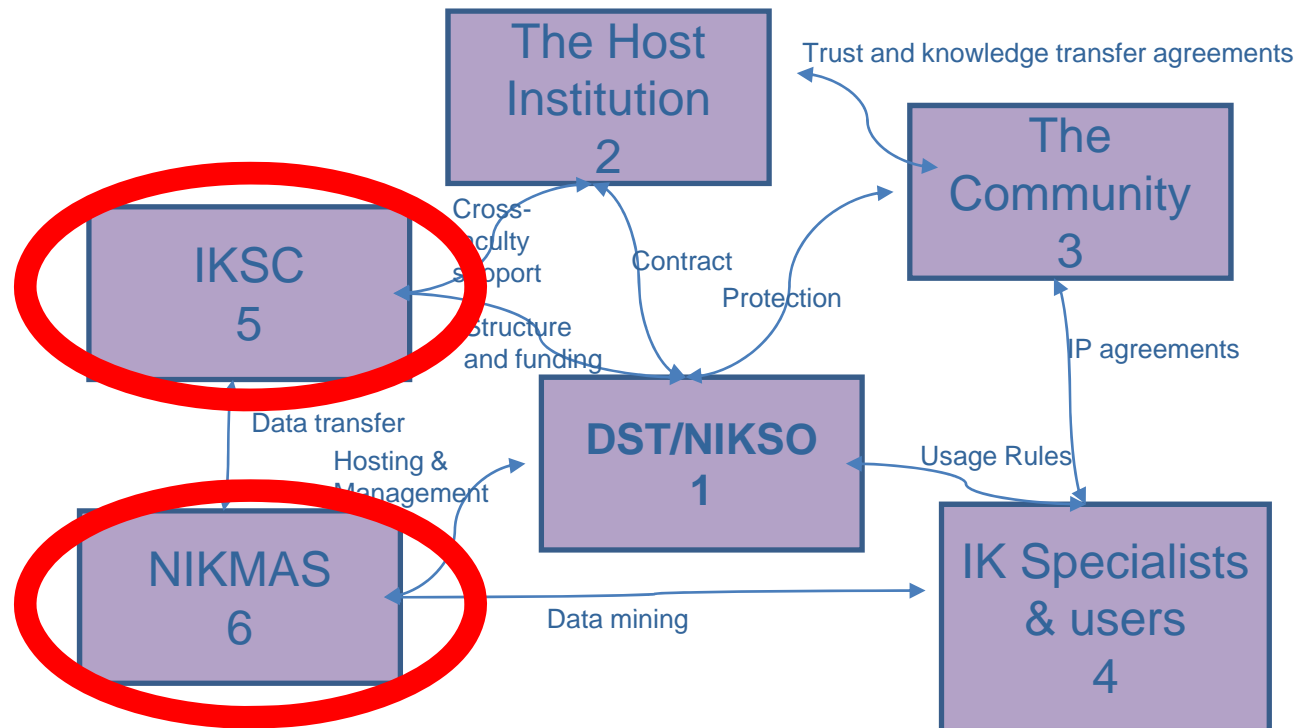
NRS Components

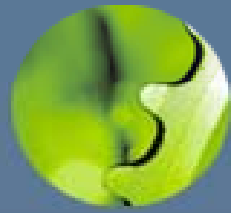


- The NRS support the NIKMAS in standardising the management and protection of IK in SA by supplying a multi-media IK information management system and documentation that is focused on capturing IK in identified spheres.



NRS Role Players & Relationships

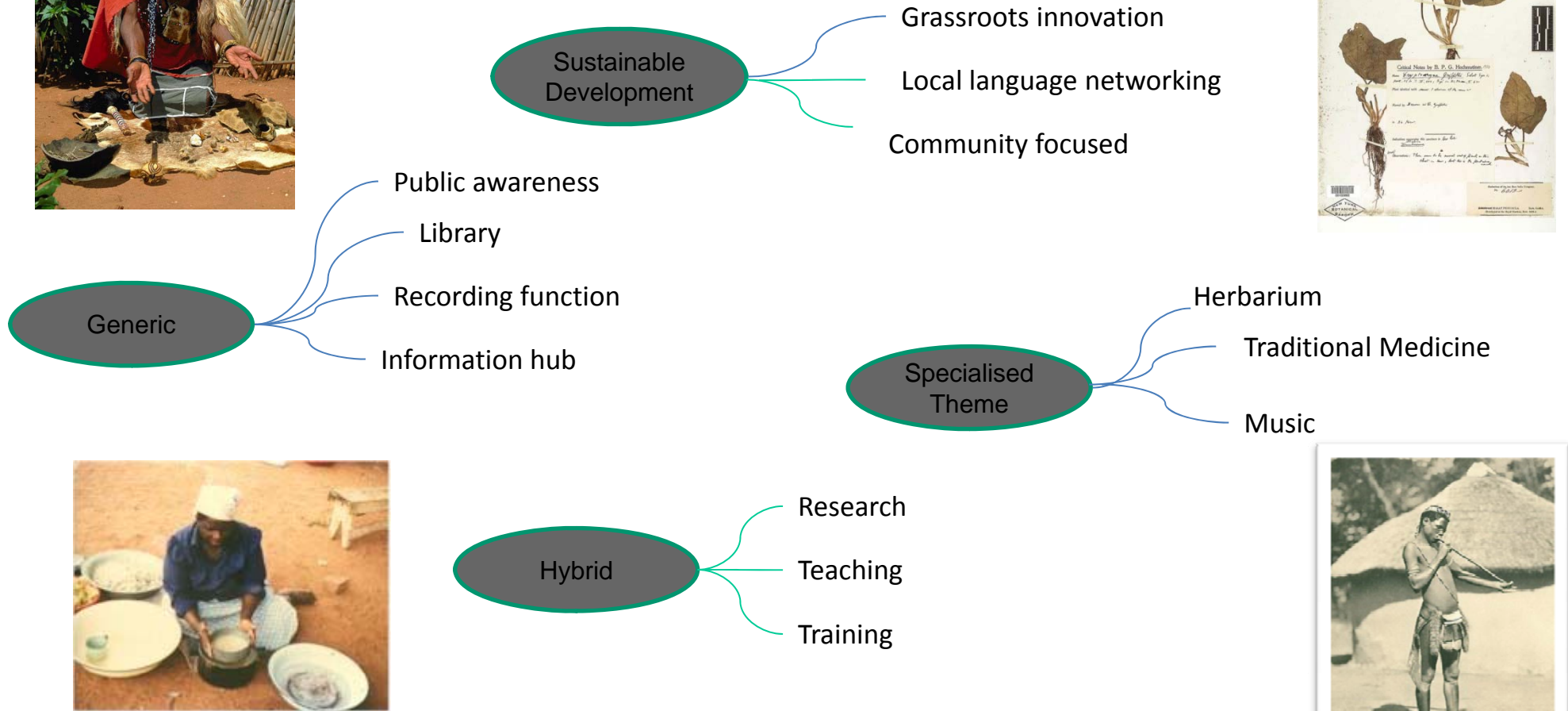
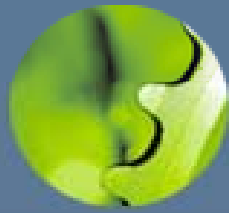


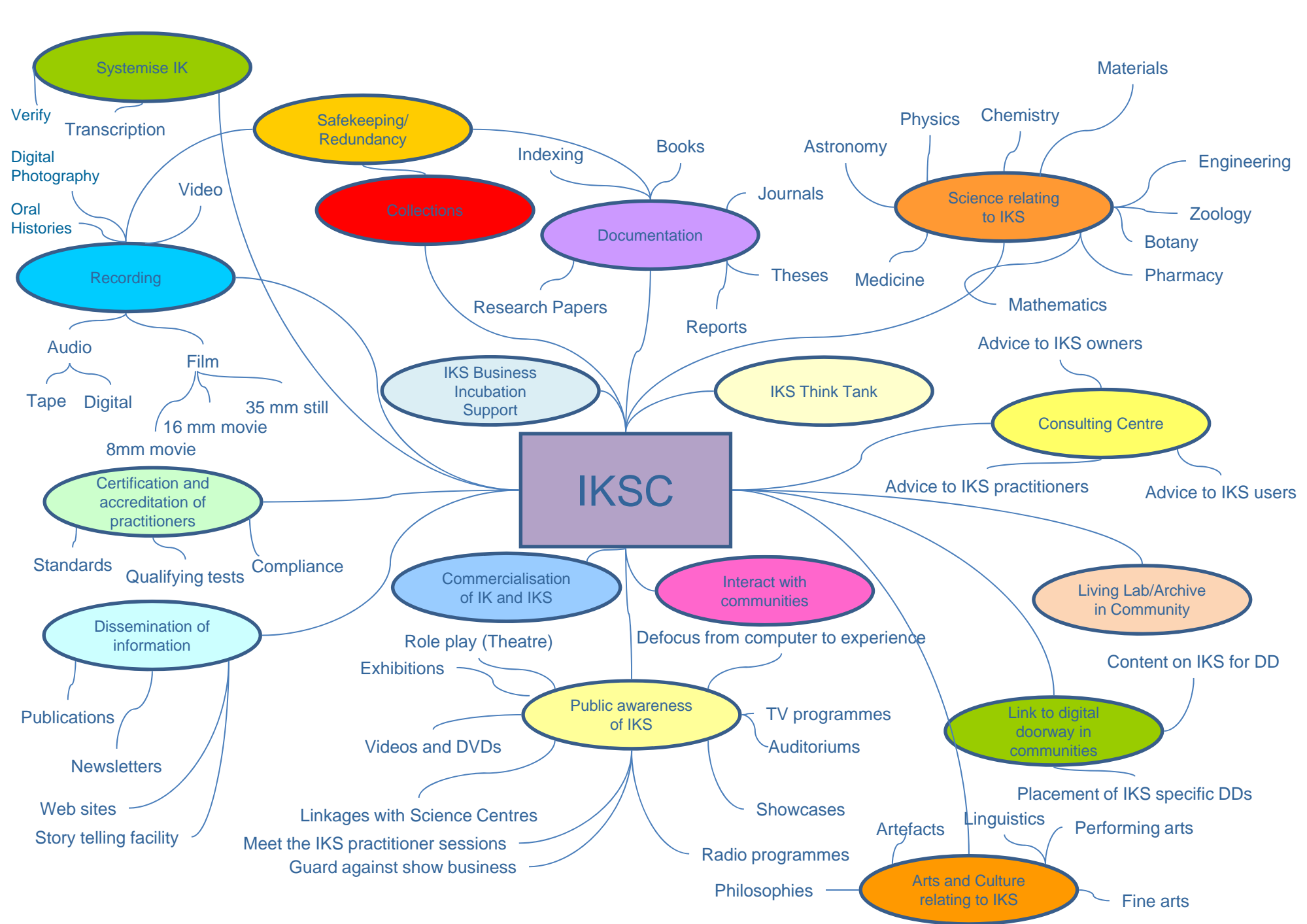


What is an IKS Centre (IKSC)?

- ***A place where IK is identified, recorded, stored, processed and disseminated on behalf of and for the benefit of its owners***
- It recognises the value of IK
- It focuses the debate on IK
- It liaises with the owners of IK to share the IK
- It records IK
- It stores and protects IK practices and technologies
- It disseminates IK
- It makes communities proud of their IK
- **Location**
 - Preferably in community
 - Mixture of management frameworks applied
 - Existing institutions: universities, national parks, botanical gardens, science centres, etc.

Possible IKSC Types and their Functions (supported by different databases)

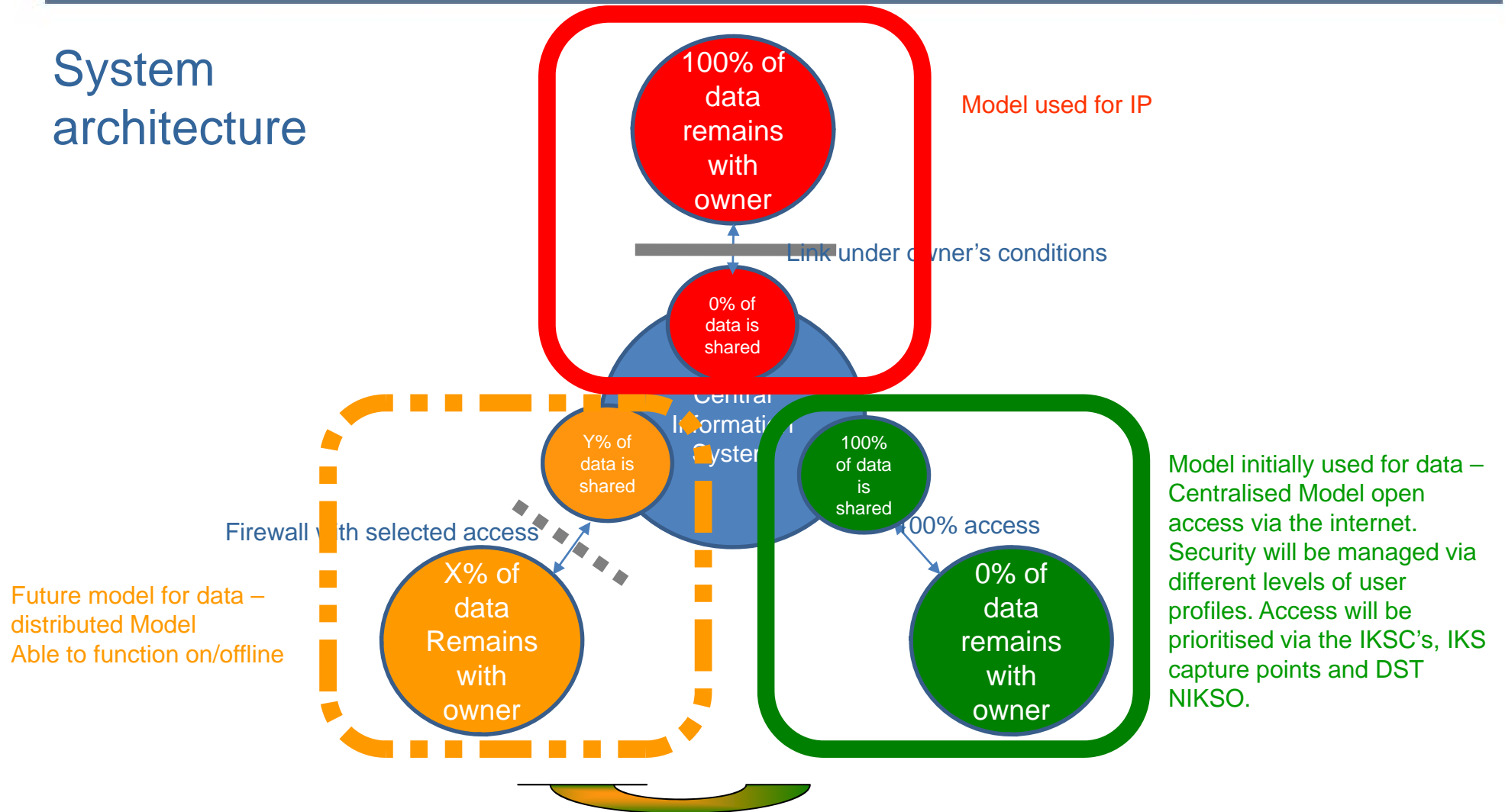






National IK Management System (NIKMAS)

System architecture

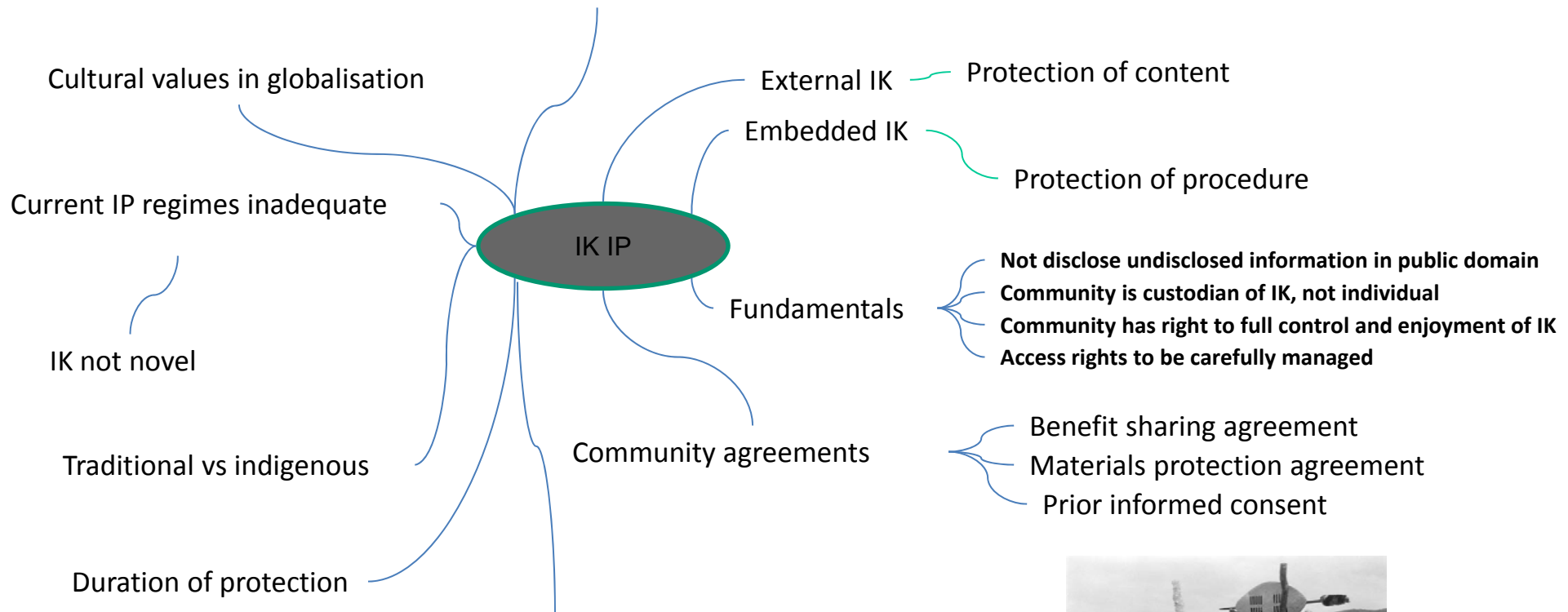




IK IP



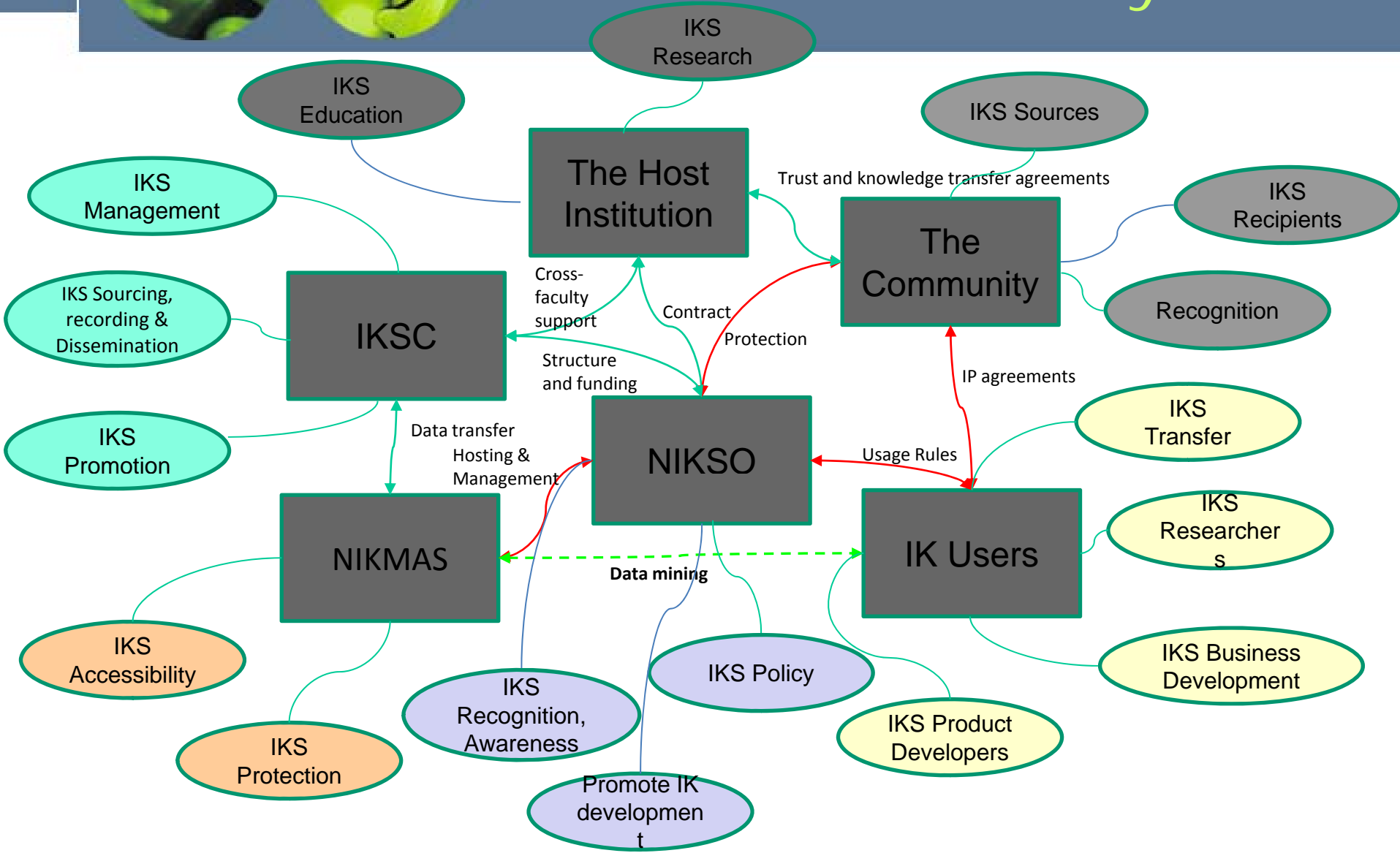
Protecting IK IP in open community

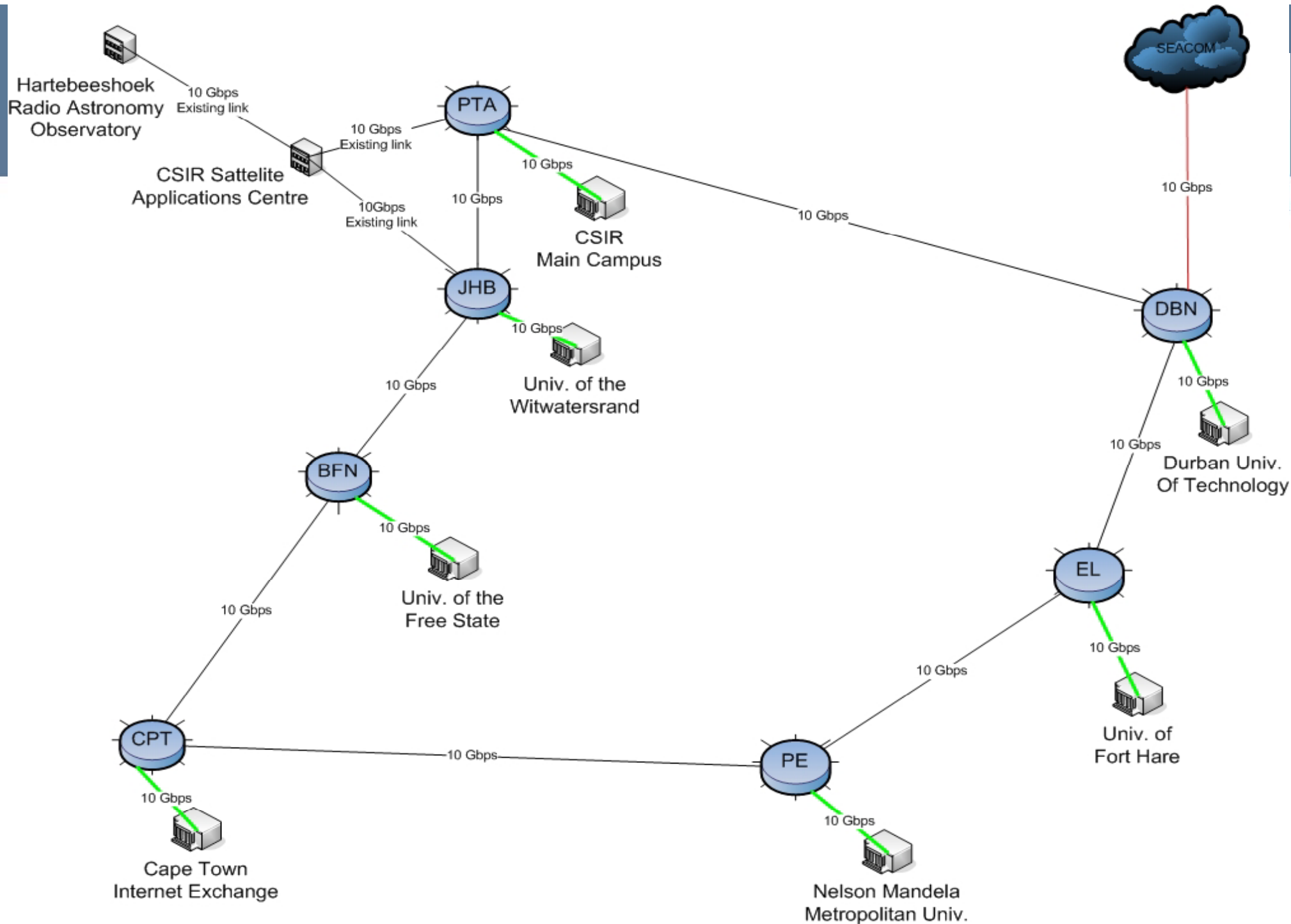


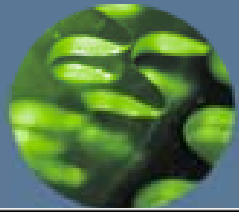
Holistic nature: part science, part social, part spiritual



The National Recordal System

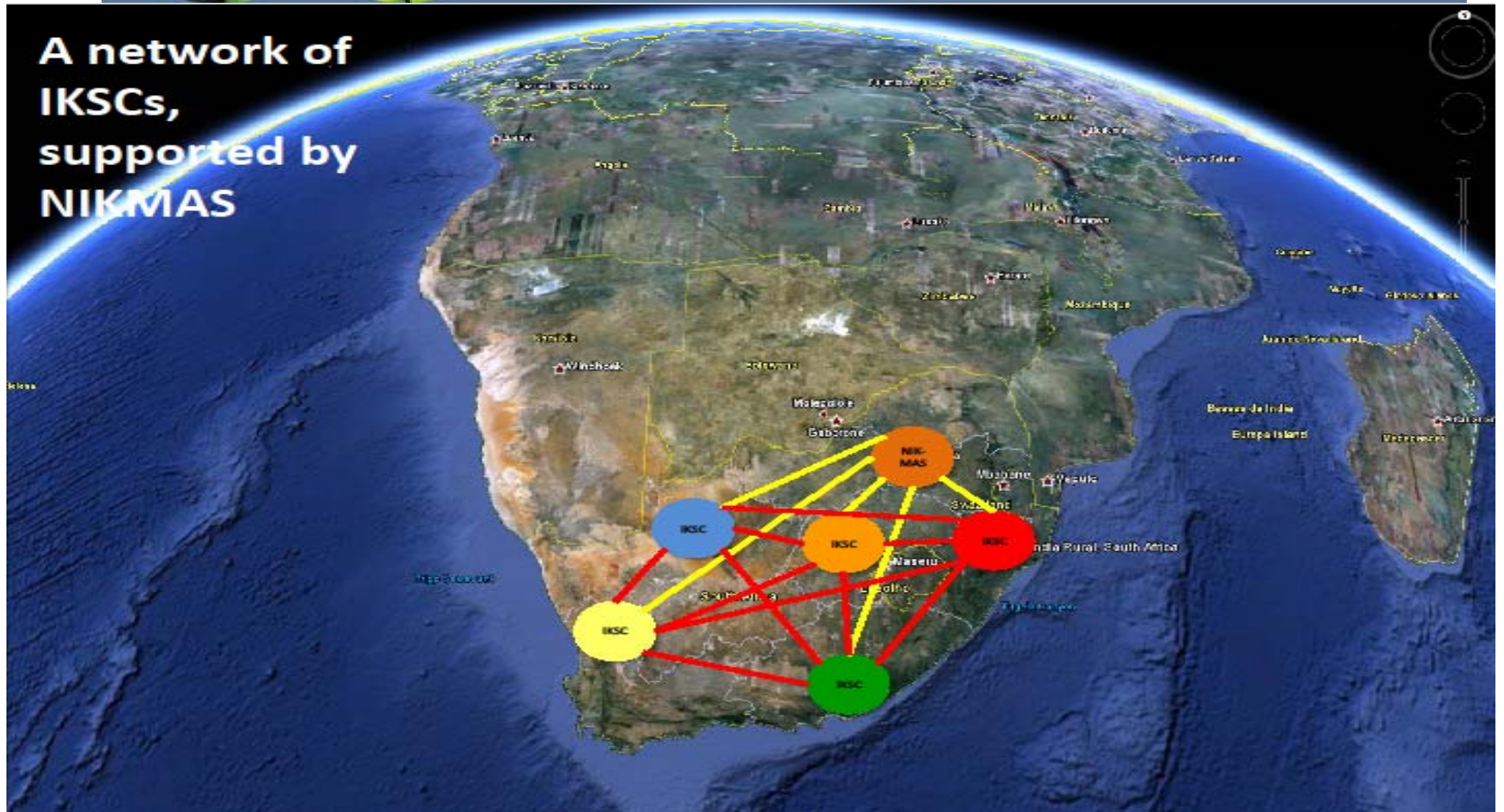






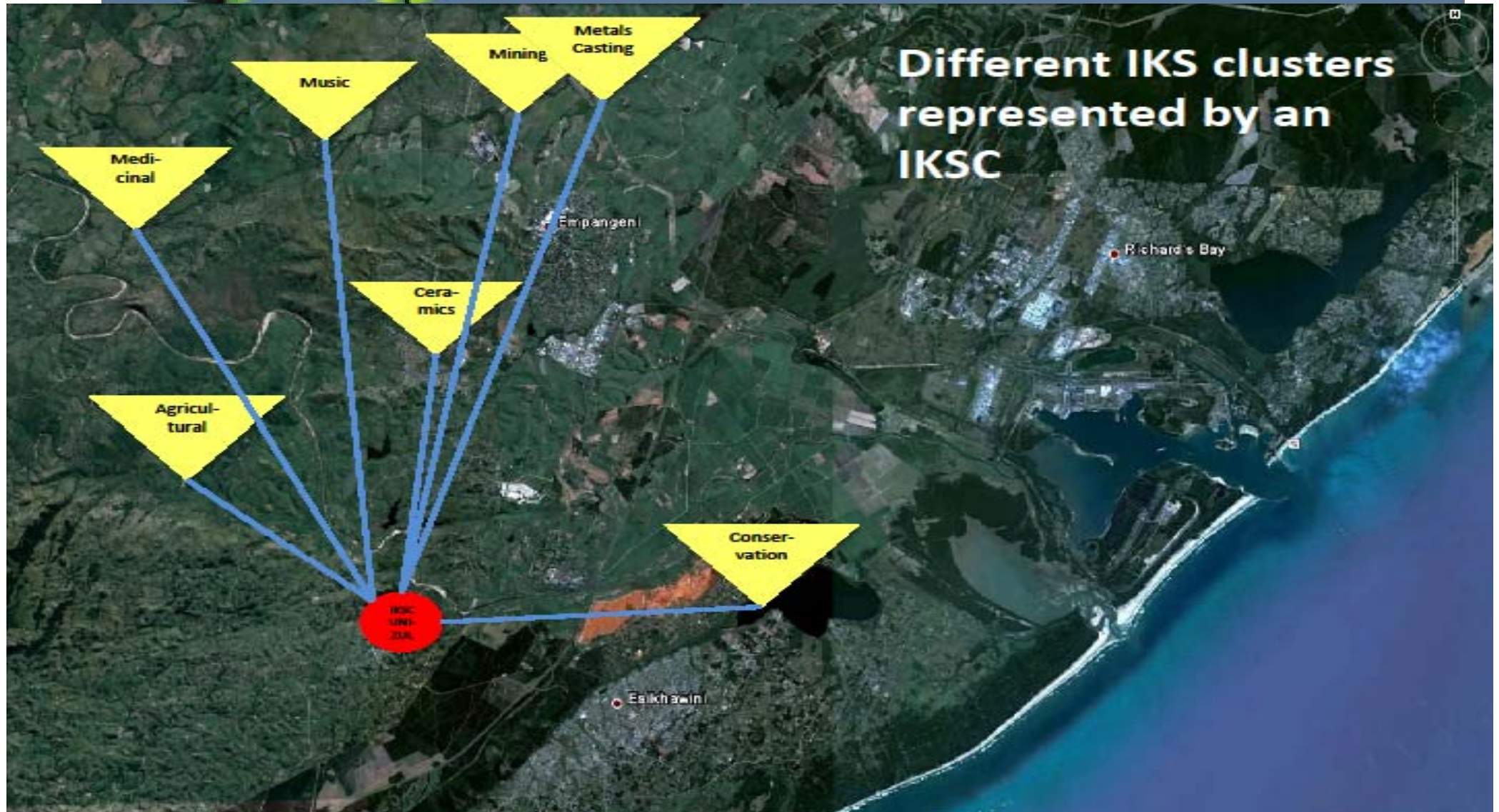
A Network of IKSC

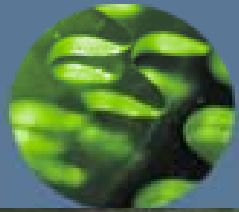
**A network of
IKSCs,
supported by
NIKMAS**





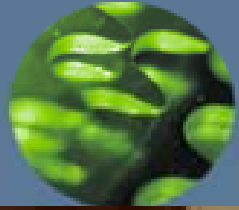
Functions of an IKSC





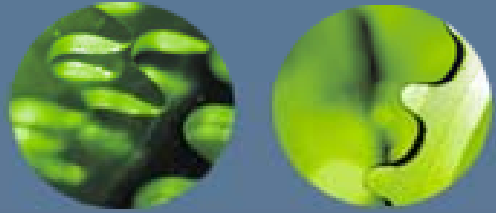
IK Holder Community



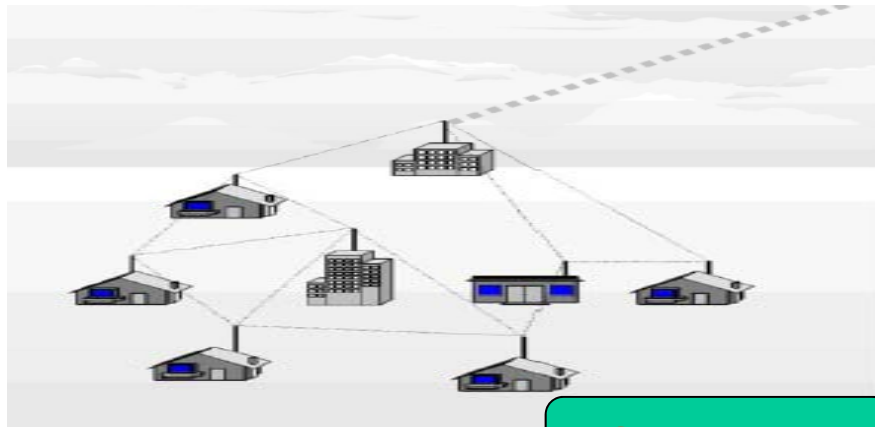


Deployment of Digital Doorways by NIKSO





Wireless Mesh Network Technology Description



- Wireless Mesh Network (WMN) is a communications network made up of radio nodes organized in a mesh topology
- Allows buildings to be linked that are in line of sight of each other (with distances more than 7 km)
- Broadband connectivity (more than 5 megabits/second), at very low cost, and no need for centralised infrastructure such as high masts and “base stations”
- Large geographic areas are covered
- Ideal for rural settings and other poor communities



Conclusion

- Inter-departmental collaboration- networking
- Community participation and ownership- trust
- Shifting mindsets in the country- buy-in
- Role of the LIS Sector in the collection, development, storage and dissemination of IK
- Sustained support through other instruments; i.e. research chairs, centres of excellence etc.
- An appropriate legal framework
- Need for dissemination of success stories



The future of IKS in SA

- Let us commit ourselves to using libraries to unlock the minds of our nation, become repositories of our cultural heritage, showcase our literary talent and become an active role player in bridging the digital divide.
- In the words of Ray Bradbury, the famous science fiction writer, "without libraries what have we? We have no past and no future." (*Pallo Jordan, 14 March 2009*)
- “Without the NRS to capture, codify, store and disseminate IK what have we? We have no past and no future”

2010 FIFA World Cup Final Game

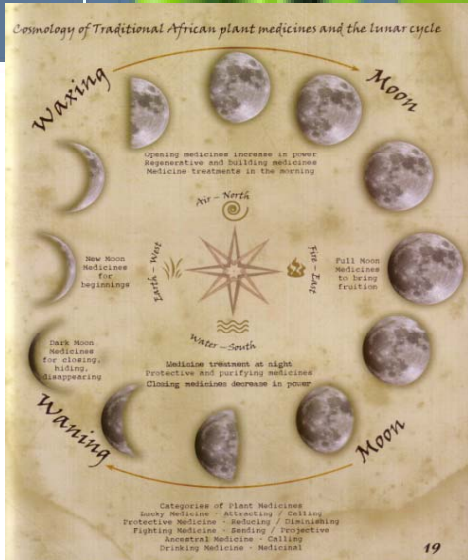
Full time: 93minutes

*Final Score: **3 - South Africa***

1 - Brazil



Thank You and Welcome to the DST



From Muthi & Myths, Heather Dugmore and Ben-Erik van Wyk



Cosmology

Social ecology



Public health and medicines

Biodiversity



Indigenous technologies

Indigenous food and food technologies

