Science, Indigenous Knowledge and Innovation: Implications for ACP Agriculture

Promoting Indigenous Knowledge in the Biosciences for the Development of the Bio-economy: Challenges and opportunities –

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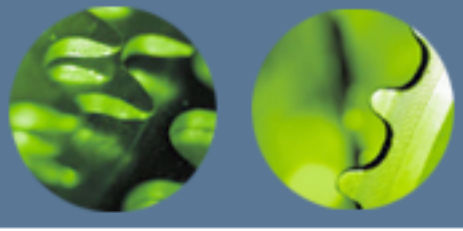
Outline of Presentation

- The African Predicament
- Historical Genesis of IKS in South Africa
- The DST Mandate
- Challenges facing IKS Development in SA
- Policy issues of IKS Genetic Resources
  - Institutional Collaboration
  - Research Ethical Issue
- Knowledge Development and Innovation
- IKS Information and Research Infrastructure



What African view informs the presentation

My neighbour and I have the same origins

We have the same life-experience and a common destiny

We are the obverse and reverse sides of one entity

We are unchanging equals;

We are the faces which see themselves in each other;

We are mutually fulfilling complements

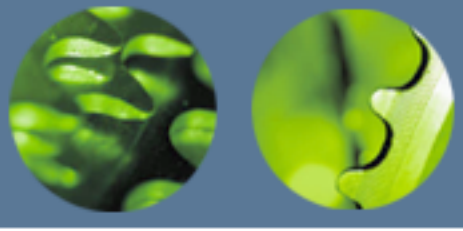
We are simultaneously legitimate values

My neighbour's sorrow is my sorrow;

His joy is my joy

He and I are mutually fulfilled when we stand by each other in moments of need

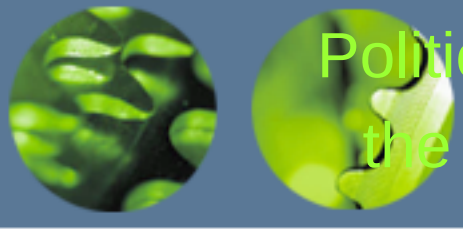
His survival is a precondition of my survival.



Demand for Transformation

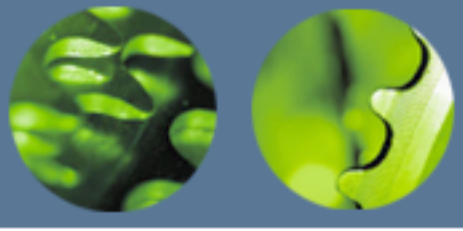
The African predicament

- a comparative review of the six regions of the world on basis of fourteen selected indicators of social and economic development, Obikeze (2003) found that the African Region ranked the lowest in virtually all indicators of human development and progress, while ranking the highest in socio-political insecurity, ignorance, and disease.



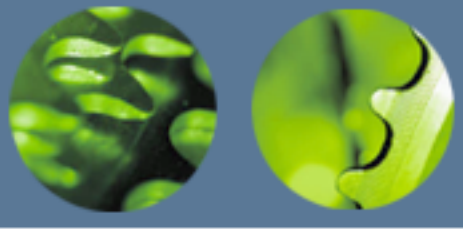
Political and Historical context of the move from the resource to the knowledge economy

- The developing countries have gained their political independence, but in most cases they are still trapped in an asymmetrical economic, power and knowledge relationship with the former colonial powers that continue to dominate the process of globalisation, and the institutions of global governance (the IMF, the World Bank, the WTO, WIPO, WCO,OECD, EU Commission, etc).



Shifting the Conception of the knowledge agenda for development

- For far too long the debate on development has been constrained by conceptual traps and the limitations of the paradigms provided by the North.
- If the countries of the South are to own the development process, as present trends in the development literature suggest, then the conceptual reframing of the issues must itself change its location from the North to the South.

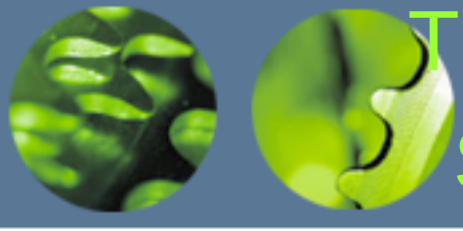


The three Power asymmetries

- It is argued here that the present knowledge agenda and development architecture at the international level is an obstacle to the realisation of the national project.

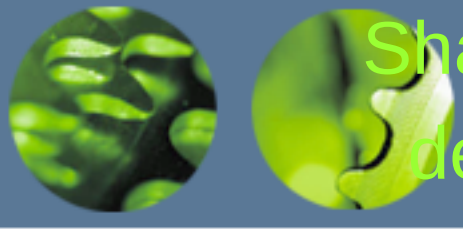
- Three power asymmetries –
  - economic power,
  - political power and
  - knowledge power –
- are deeply embedded in the existing structures.

- It is a continuing battle for the developing countries to try and secure policy space within the constraints imposed by these asymmetrical structures.



The Historical Conjuncture for Self determination

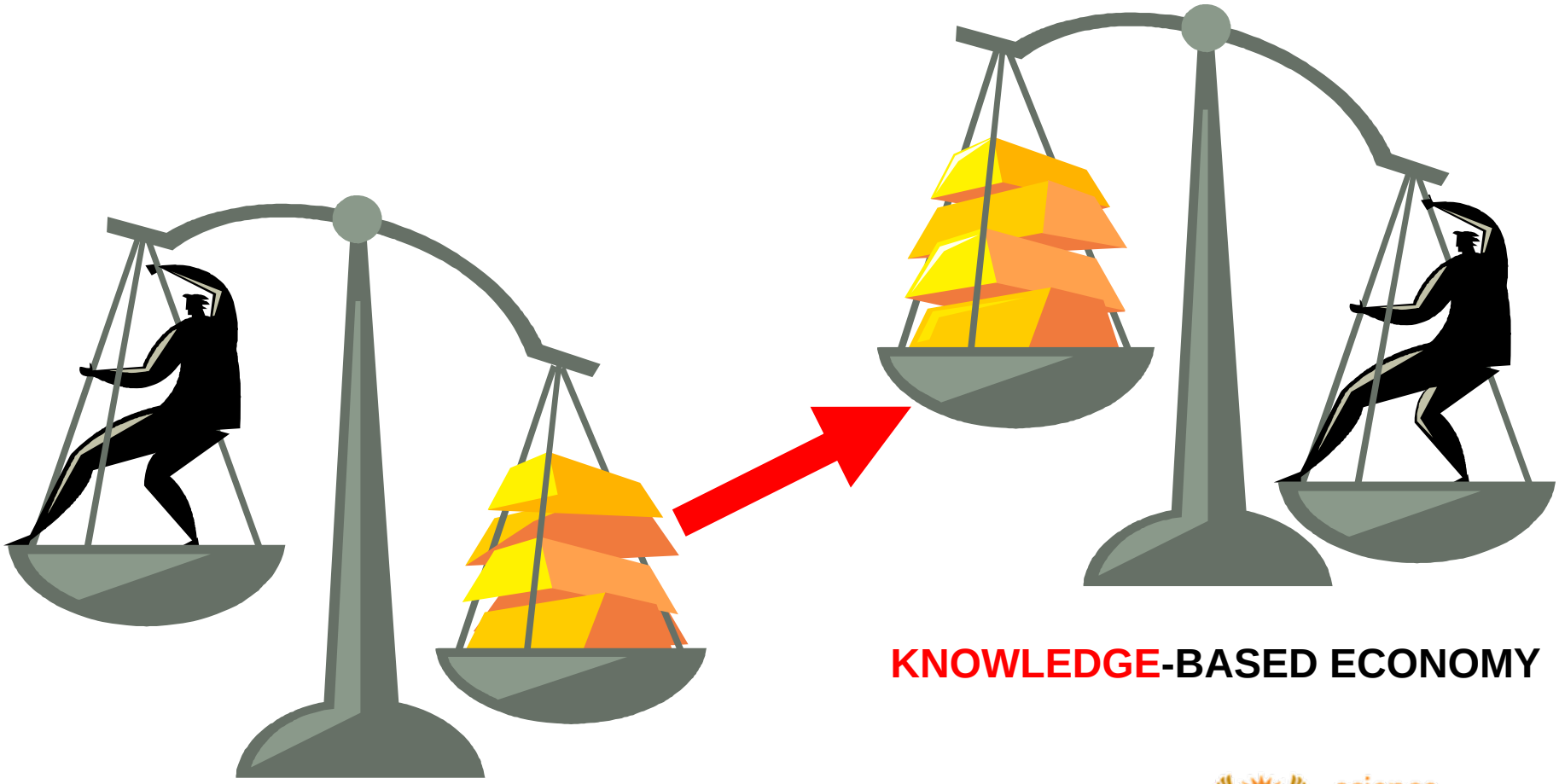
- The project for self-determination, is still on the agenda of political action for developing countries.
- Its counter, the imperial project, is also still alive, but gradually weakening.
- Its ideology the Washington consensus and globalisation crafted after the dominant paradigm of free market liberalism and Western systems of governance, democracy and the rule of law, is slowly losing its credibility and legitimacy.



Shared values and fruits of historical development

- At the end of the day, we need a truly heterogeneous, pluralistic global society that is based on the shared values of our civilisation, and the shared fruits of the historical development of the productive forces of science, technology and human ingenuity. Only on this basis can we build a global society that is free from want, exploitation, insecurity and injustice.

Towards a Knowledge Economy



KNOWLEDGE-BASED ECONOMY

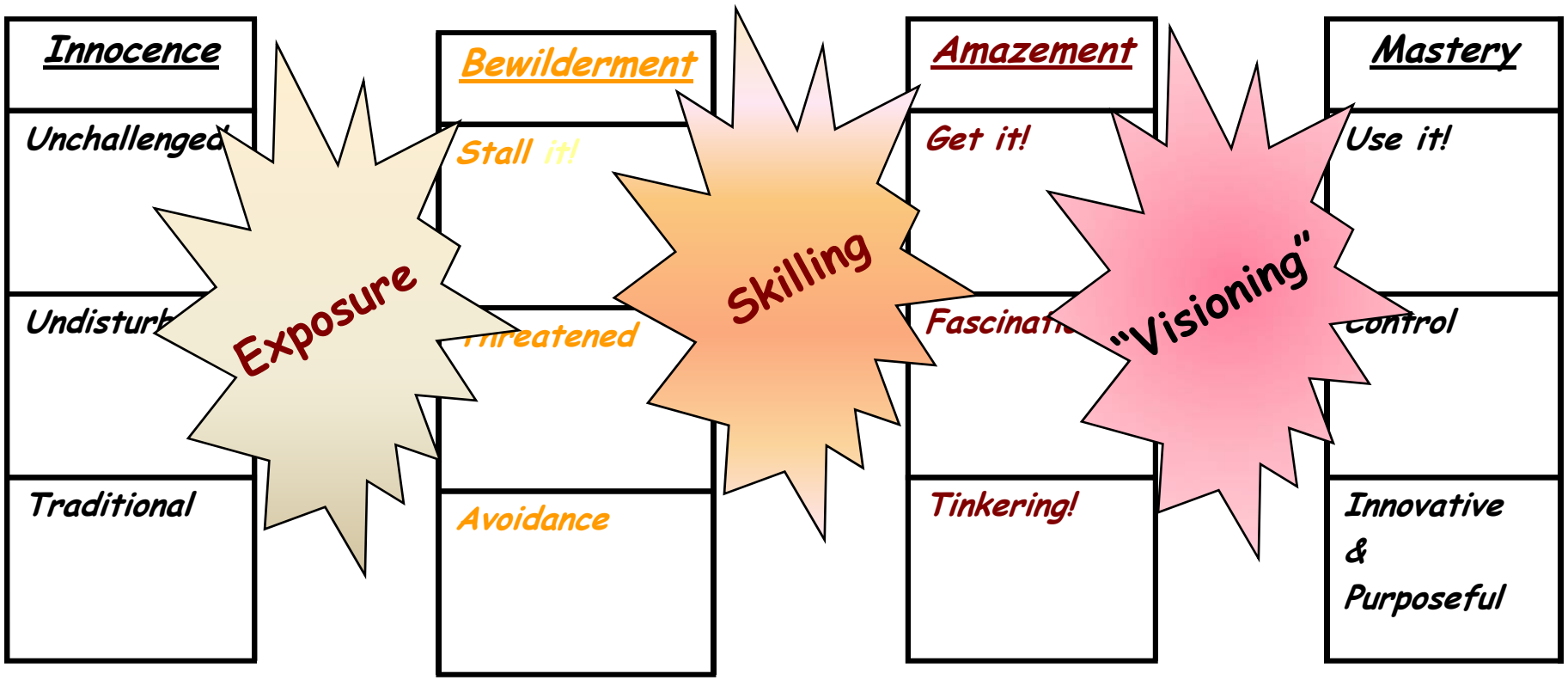
RESOURCE-BASED ECONOMY

Aspiration to IKS Leadership

- 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

Technology Adoption Phases



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

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

The Historical Genesis of IKS

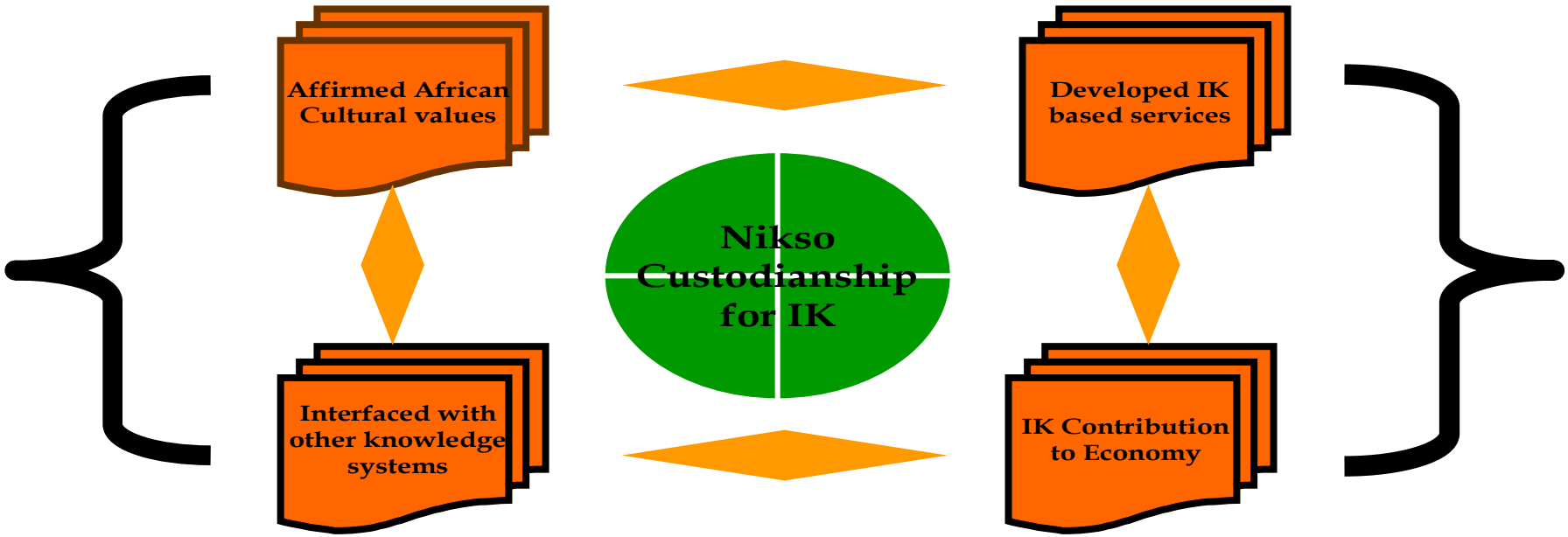
- The changing landscape in Higher Education
- The articulation of the African Renaissance and NEPAD
- The birthing of IKS
- IKS emerged outside the leading academic institutions
  – a product of intellectual activism and political elites
- Its leadership was political and championed by Dr Serote as chair person of Portfolio Committee on ACST
- Historically disadvantaged universities – North West University (Mafikeng Campus) and University of Venda
- Epistemological shifts

Purpose for Raising the Quest for IKS Debates

1. New moral and cognitive spaces within which constructively dialogue between people and between knowledge systems can occur
2. Knowledge has become an intrinsic part of a democratic politics
3. The role of society in raising issues of governance of knowledge- the knowledge politics
4. The role of the knowledge generators in welfare of local communities
5. The need to create a holistic framework for societal development
6. Africa's continued dependence on external epistemologies and the perpetuation of intellectual dependence
7. The need for new ethics that take cognisance of indigenous concepts of justice
8. Rising momentum and pressure from below for change
9. The danger of new knowledge to the continued stability of the earth
10. The need for an inclusive knowledge network

IKS Policy Framework in SA

NIKSO'S STRATEGY CONTEXT



Internal Strength

Batho-Pele Principles

Internal Communication

IK development in SADC & Africa

Customer Focus

Increase flow of IK products

Increase SA IK patents

Database and databank

Initiate and facilitate IKS Act

Stakeholder Relations

Stakeholder relations strategy

Value Chain Management

Community Participation

Platform for participation

IKS Centers among communities

Improve public understanding

Market Position

Brand communication strategy

Trusted & capable IK custodian

Challenges Facing the Interfacing of IKS in NSI

1. The Knowledge domain of IKS as an emergent field of study
   - Multi-disciplinary and inter-disciplinary nature
   - Challenges with definitional clarity
   - Ethical Issues

2. Contextual Rhetoric
   - Public Policy support versus material support
   - Inability to mainstream IKS within the education system
   - IK constitutes a set of beliefs about the world that there is not one but many forms of knowing that give form to scholarship

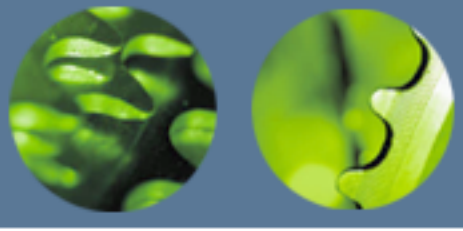
3. Working within Uncritical Epistemological Frameworks
   - Hegemony of western forms of knowledge production
   - Superficial and weak IKS epistemic theories behind IKS
   - Indigeneity versus universalism
   - What is crucial is that scholars pursuing debate on the interface of science and IK explore the grounds for distinguishing between ‘‘being right’’ and ‘‘satisfying conditions of rightness’

Challenges Facing the Interfacing of IKS in NSI (2)

4. Inadequate Legislative Framework
   - Limits of the Convention Intellectual Property Rights Regime
   - Fragmentation of legal instruments
   - Inadequacy of our legal system

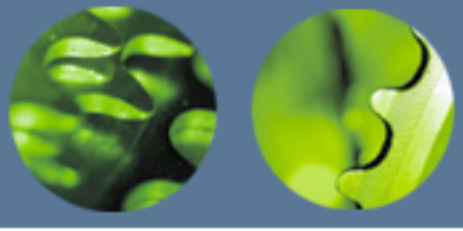
5. Inelastic Knowledge Governance Structures
   - Limited challenges to the architecture of Western Hegemony
   - Determination of what constitutes knowledge and who decides
   - The National Qualification framework
   - The National Research Foundation
   - The Medicines Control Council
   - The IPR regimes
   - Slow transformation of existing universities and science councils to reflect an African personality

6. **Knowledge Management and social networks**
   - The focus on the knowledge content and assumption that IK is out there ready for harvesting
   - Malnourishment or neglect of African Indigenous Knowledge Archives



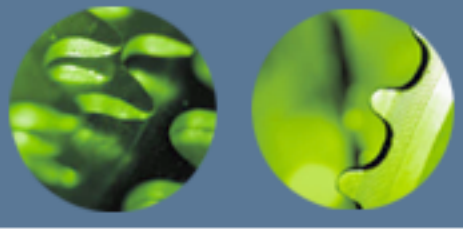
Policy mandate for NIKSO

- NIKSO was established to nurture national IKS priorities through proactive engagement in the field of science and technology.
- Through an interdisciplinary and multidimensional approach, the activities of NIKSO are aimed at opening new vistas for academic, practices for greater scientific understanding, promotion, protection through intellectual property rights of communities, recognition, affirmation and development of IKS that will ensure fair and equitable benefit sharing of IK resources to indigenous communities.
- These initiatives aim at fostering better understanding of the interface of IKS with culture and science, culture and technology in a manner that gives recognition to traditional customs and practices. In essence, it will provide the bedrock for the generation of new knowledge and new consciousness.



Policy Debates on the protection of IKS

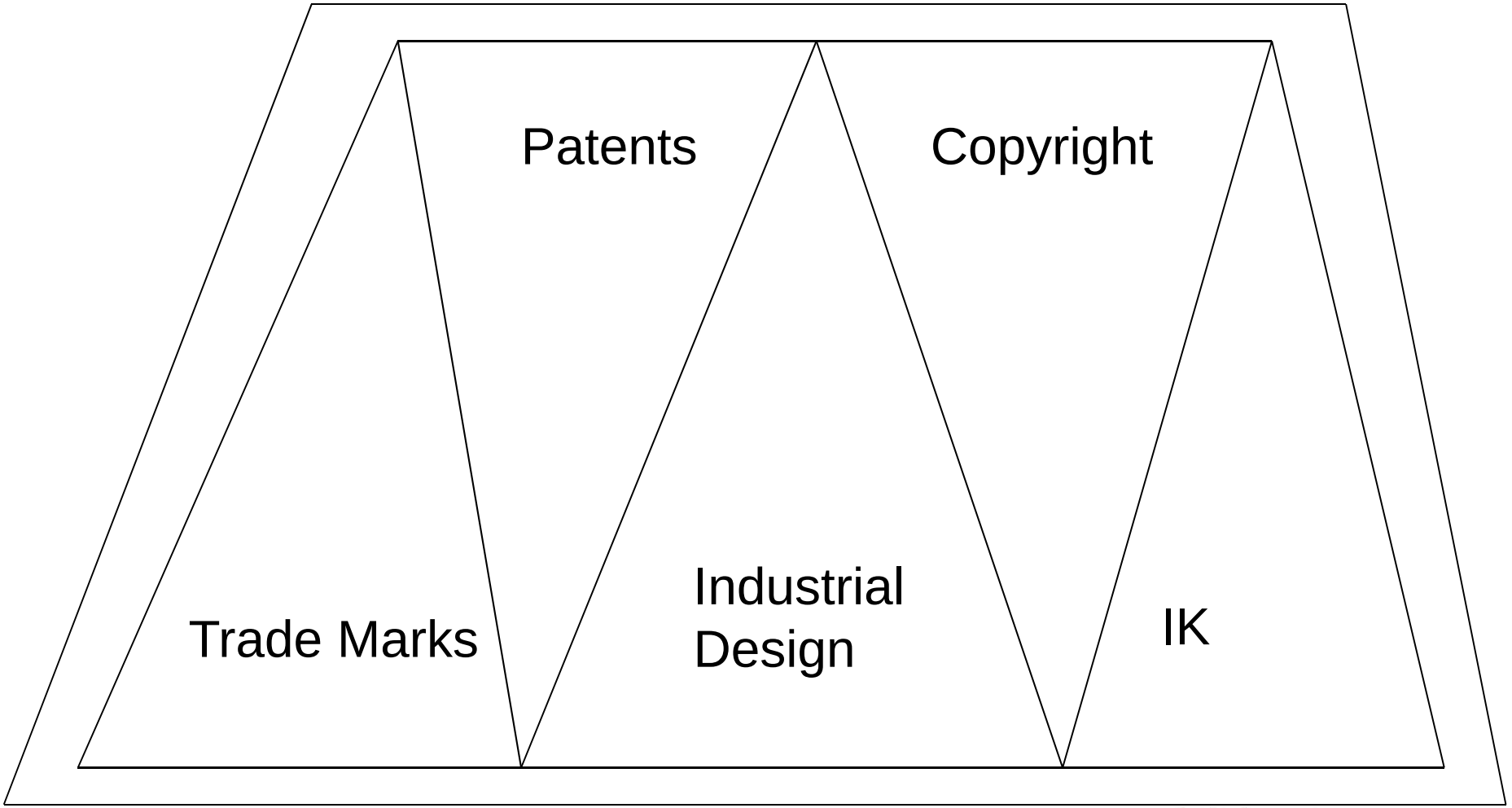
- 1. Definition of indigenous knowledge and traditional cultural expressions (TCEs)/expressions of Folklore
- 2. Who should benefit from any such protection or who hold the rights to
- protectable IK,TCEs/EoF?
- 3. What objective is sought to be achieved through according intellectual property protection (economic rights, moral rights)?
- 4. What forms of behavior in relation to the protectable IK, TCEs/EoF should be considered unacceptable/illegal?
- 5. Should there be any exceptions or limitations to rights attaching to protectable IK, TCEs/EoF?
- 6. For how long should protection be accorded?
- 7. To what extent do existing IPRs already afford protection? What gaps need to be filled?
- 8. What sanctions or penalties should apply to behavior or acts considered to
- unacceptable/illegal?
- 9. Which issues should be dealt with internationally and which nationally, or what
- division should be made between international regulation and national regulation?
- 10. Should newly recognized rights in IK and TCEs have retrospective effect?

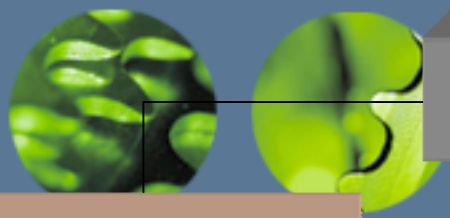


Current Policy issues of IKS and Genetic Resources

- Impact of intellectual property regimes on access to and use of genetic resources and scientific research;
- Role of customary laws and practices in relation to the protection of genetic resources and indigenous knowledge, innovations and practices, and their relationship with intellectual property rights;
- Consistency and applicability of requirements for disclosure of country of origin and prior informed consent in the context of international legal obligations;
- Feasibility of an internationally recognized certificate of origin system as evidence of prior informed consent and mutually agreed terms; and
- Role of oral evidence of prior art in the examination, granting and maintenance of intellectual property rights.
- The effectiveness of two funds supporting the exploitation of genetic resources

LOGICAL APPROACH





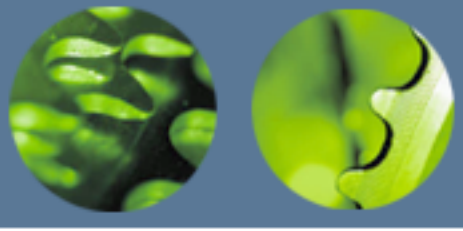
INTELLECTUAL PROPERTY

PRIVATE RIGHTS

- ECONOMIC BENEFITS
- INDIVIDUAL OWNERSHIP
- LIMITED TERM
- **TOOLS**
  - COPYRIGHT
  - TRADEMARK
  - PATENT
  - INDUSTRIAL DESIGN
- **CRITERIA**
  - MATERIAL FORM
  - TRADEMARK DISTINCTIVENESS
  - PATENT NOVELTY INVENTIVE STEP
  - INDUSTRIAL DESIGN INDUSTRIAL/ AESTHETIC USE

SUI GENERIS

- ECONOMIC BENEFIT
- MORAL BENEFIT
- CUSTOMARY BENEFIT
- COLLECTIVE OWNERSHIP
- PERPETUITY
- **TOOLS**
  - FOLKLORE
  - DATABASES
  - GENETIC RESOURCES
  - IK
- **CRITERIA**
  - EMBEDDED IN A LOCAL COMMUNITY
    INTERGENERATIONAL CONTEXT
    COLLECTIVE OWNERSHIP



INSTITUTIONAL COLLABORATION

- IKS requires an active coordination and regulatory measures hence the need for institutional collaboration nationally, regionally and internationally without limiting such to donor funding but using the latter as a means to an end.

- At a national level the centralization of DST poses a compelling argument for the establishment of Provincial Nodes to serve as conduits in the implementation of IKS activities.

- The expected private/ public / community and business partnerships with communities will ensure community involvement at implementation and at decision making levels, however positioning NIKSO under any government department limits and subjects NIKSO to government red tape I a lack of dedicated funding as some programmes within may struggle to utilize its budget while NIKSO, still fighting for space may be subjected to limited or no funding at all and may be a hindrance in achieving the mandate to the fullest.

- Given the above NIKSO becoming an independent institute with a dedicated funding may be something worth considering as this will enhance stakeholder participation.

IKS RESEARCH ETHICS

- The policy is driven by the fact that cultural and biological diversity continues to be damaged, misappropriate and misrepresented by unauthorised research;
- Researchers have not taken into account customary values and practises into the research process;
- T he policy is guided by customary principles and protocols of mutual respect; equity, prior informed consent, material transfer agreements, access and benefit sharing, collective ownership etc that will limit and prevent damage to community property
- The policy debate would focus on the inclusion of communities as equal research partners, issues of collective versus individual ownership, benefit sharing, and the issue of defensive and positive protection of research results

National IKS EXPO

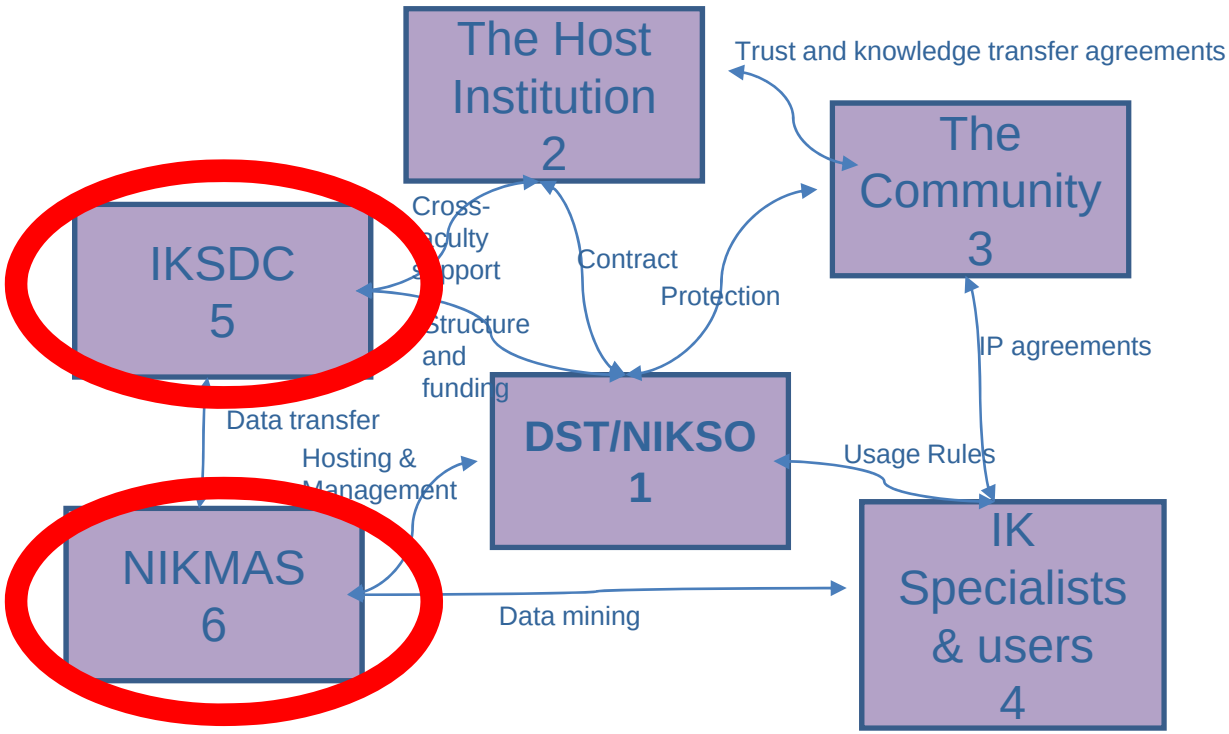
- The public understanding and awareness of IKS is served by the IKS Expo and the National Science Week
- The main objective of the Expo is to promote the economic potential of IK and how it can contribute to economic development locally and globally for sustainable livelihoods
- Three annual Expos in different Provinces have been held thus far ensuring that communities especially in rural areas appreciate and value the importance of their indigenous knowledge as an innovative resource.
- The policy issues would centre around the decentralisation of Expos to provinces, whether the Expo be an annual event, given the trans-border nature of IK should the Expo then be a regional event, to what extent do we initiate a global Expo?

National Recordal System

- NRS is an IKS policy mandate aiming to record, document, preserve, protect, and promote IK and to where appropriate pro-actively secure Knowledge holders and practitioners legal rights;

- It is a conglomeration of different institutions and government departments IK projects.

NRS Role Players & Relationships

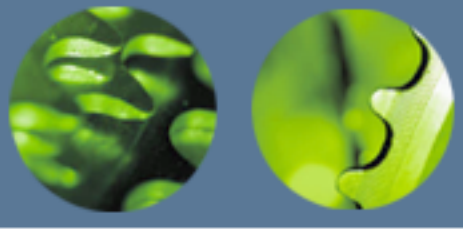


NRS and Policy implications

- Database Protection Policy- aims to protect unauthorized access to data from commercial exploitation, misappropriation and misrepresentation and to govern the use of IK at institutes;
- Issues around ownership of the national database- governance, management and administration of the national database as it aims to serve a number of government departments. Identify lead departments.
- Standardization of IK information storage and capture onto a common IT infrastructure platform e.g. currently no IK taxonomy exist. Identify lead departments.
- Location of the national database.
- Language and translations- language can serve as a protection mechanism.
- Authentication/verification and validation of IKS.
- Levels of access to the national database- decisions who gets access to the national database and at what level.

Accreditation and Certification of Indigenous Knowledge Holders

- The IKS Policy (Chapter 3.3) mandates the DST to implement the Accreditation and Certification Framework for IK Holders and Practitioners
- The main aim of the IKS Policy imperatives is to reverse the injustices of the past
- The implementation should bring harmonization amongst IK Holders and Practitioners
- The recognition of many different IK domains
- The governance of A&CF should be vested in the IK Holders and Practitioners



WHAT IT INTENDS TO DO?

- Lack of recognition of existing IKS communities of practice as part of the global body of knowledge and innovation;
- Lack of understanding of IKS and its importance in sustainable community livelihood and development;
- IKS communities of practice lack institutional platforms and policy frameworks to leverage their practices;
- Lack of coherent policy frameworks to harmonize and integrate the various communities of practice.
- The absence of regulatory mechanism to enhance and empower IK holders and practitioners in their diverse fields.

Epistemological Foundation for IKS Implementation

1. **Universal Construction of Knowledge**
   - Claim to objective knowledge
   - Regarded local knowledge as qualitatively inferior, traditional, irrational and superstitious
   - Exclusionary stance labeling and classifying other KS as non-formal, uninformed and non-contemporary and hence unscientific
   - Projection of Western Science as superior to other knowledge systems
   - A Western discourse about the "Other" (Odora Hoppers; 2002)

2. **Social Construction of Knowledge**
   - Claim that knowledge is a social construct and an expression of relations of power
   - All knowledge (IK or Scientific) is inherently local
   - Different knowledge systems may differ in their epistemologies, methodologies, logics, cognitive structures and socio-economic contexts
   - IKS is a way of knowing as valid as other ways of knowing
   - Deconstruction, decentering of knowledge
   - The Post-modern moment
   - The Neo-Liberal conjuncture

   - (source: Philip Higgs, "In Defence of local knowledge: A theoretical reflection", *Indilinga* vol 5, 1 June 2006)

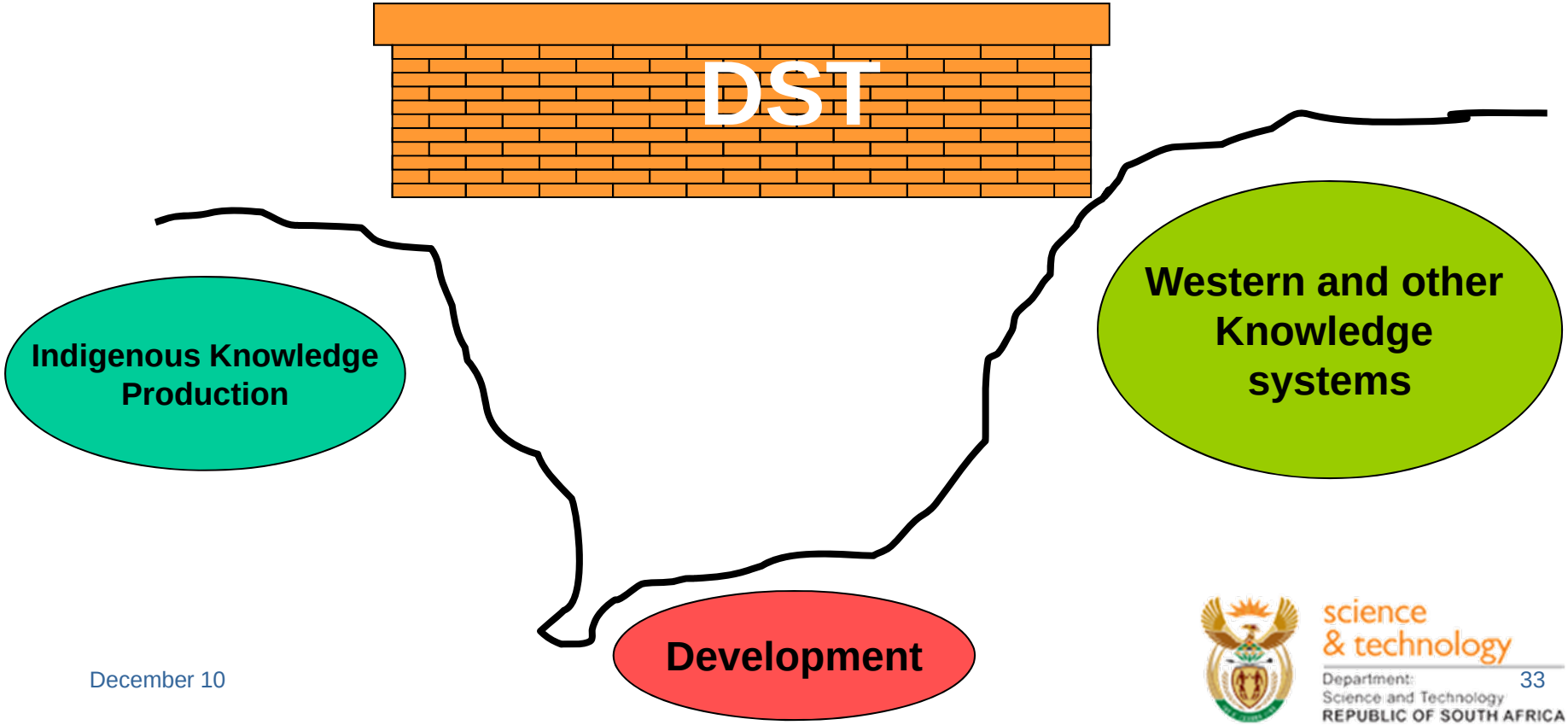
Epistemological Foundation for IKS Implementation (2)

3. Asymmetrical Extension of Knowledge

- Bruno Latour's asymmetrical extension of knowledge suggests the interdependence of African indigenous Knowledge systems with global network of local knowledge systems in the pursuit of knowledge production
- Sees the world as a plurarity of local practices
- The universal is nothing more or less than an extension of a particular local practice
- Beyond every local practice we will find another local practice and never a practice that can be considered to universal
- Asymmetrical extension of knowledge denotes that some networks are bigger and stronger than others
- Latour's asymmetrical extension of local knowledge practices provides us with a framework for interfacing IKS with other knowledge systems
- Latour's concept of metrology is key to understanding the nuanced contribution of his theory of knowledge production.

Knowledge and Innovation Chasm

Bridging the "Knowledge and Innovation Chasm"



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National Science and Technology Policy Evolution

White Paper on S & T [1996]

National Biotechnology Strategy [2001]

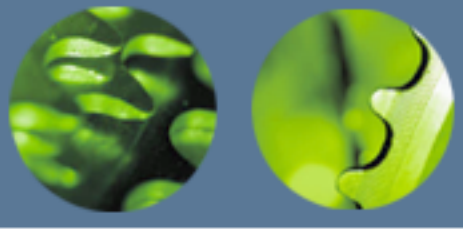
National Research and Development Strategy [2002]

Indigenous Knowledge System Policy [2004]

DST's Ten Year Innovation Plan [2008]

- Space
- Global Change
- Energy
- Farmer to Pharma
- Human and Social Dynamics

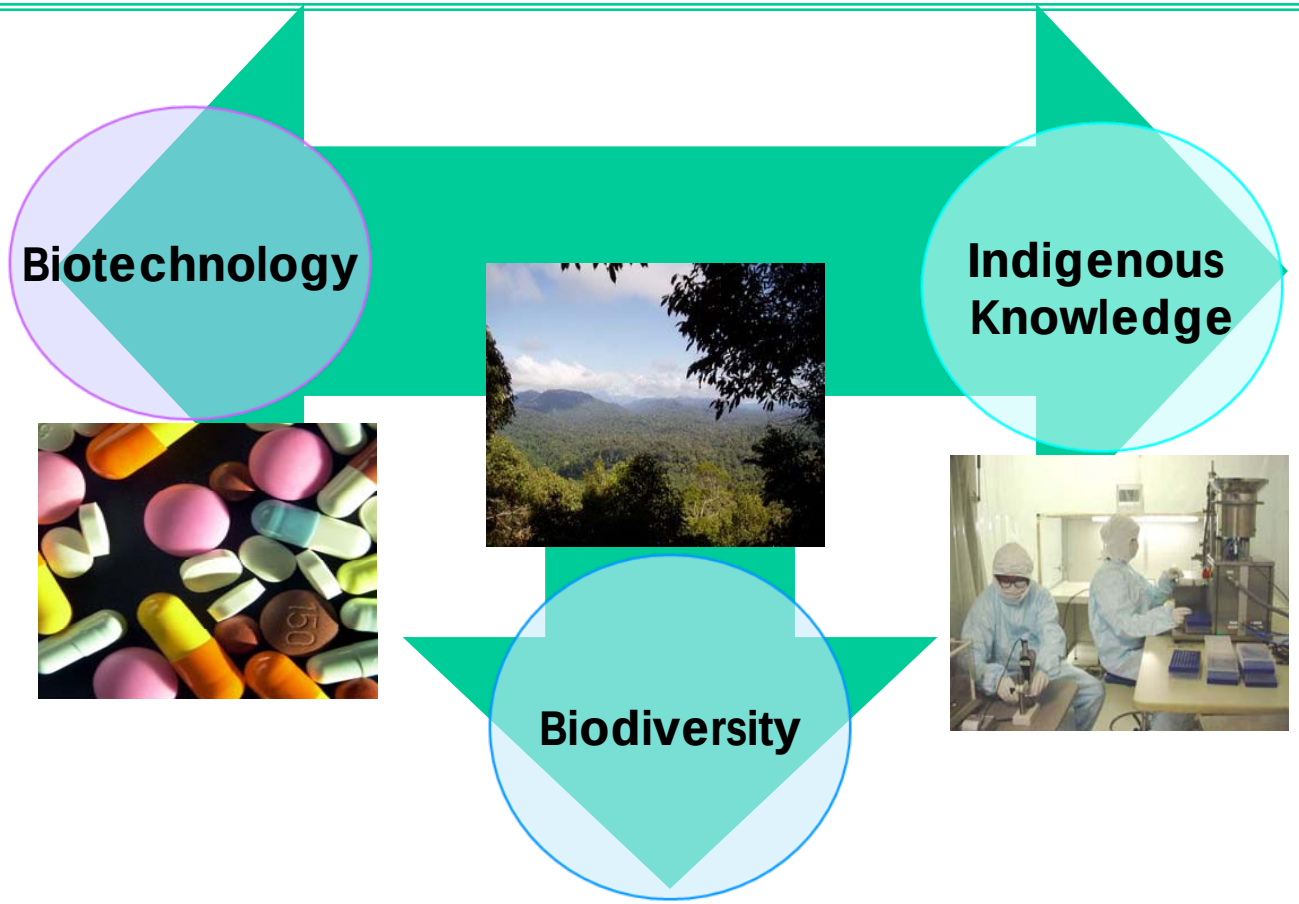
BioEconomy



BioE^2 Grand Challenge

- a value chain to strengthen the bioeconomy
- The bioeconomy represents economic activities that use renewable bio-resources and bioprocesses to produce energy, industrial and functional foods and nutraceutical products
- ”South Africa must become a world leader in biotechnology and the pharmaceuticals, based on the nation’s indigenous resources and expanding knowledge base”

IKS-Biotech-Biodiversity Interface



BioE^2 Concept

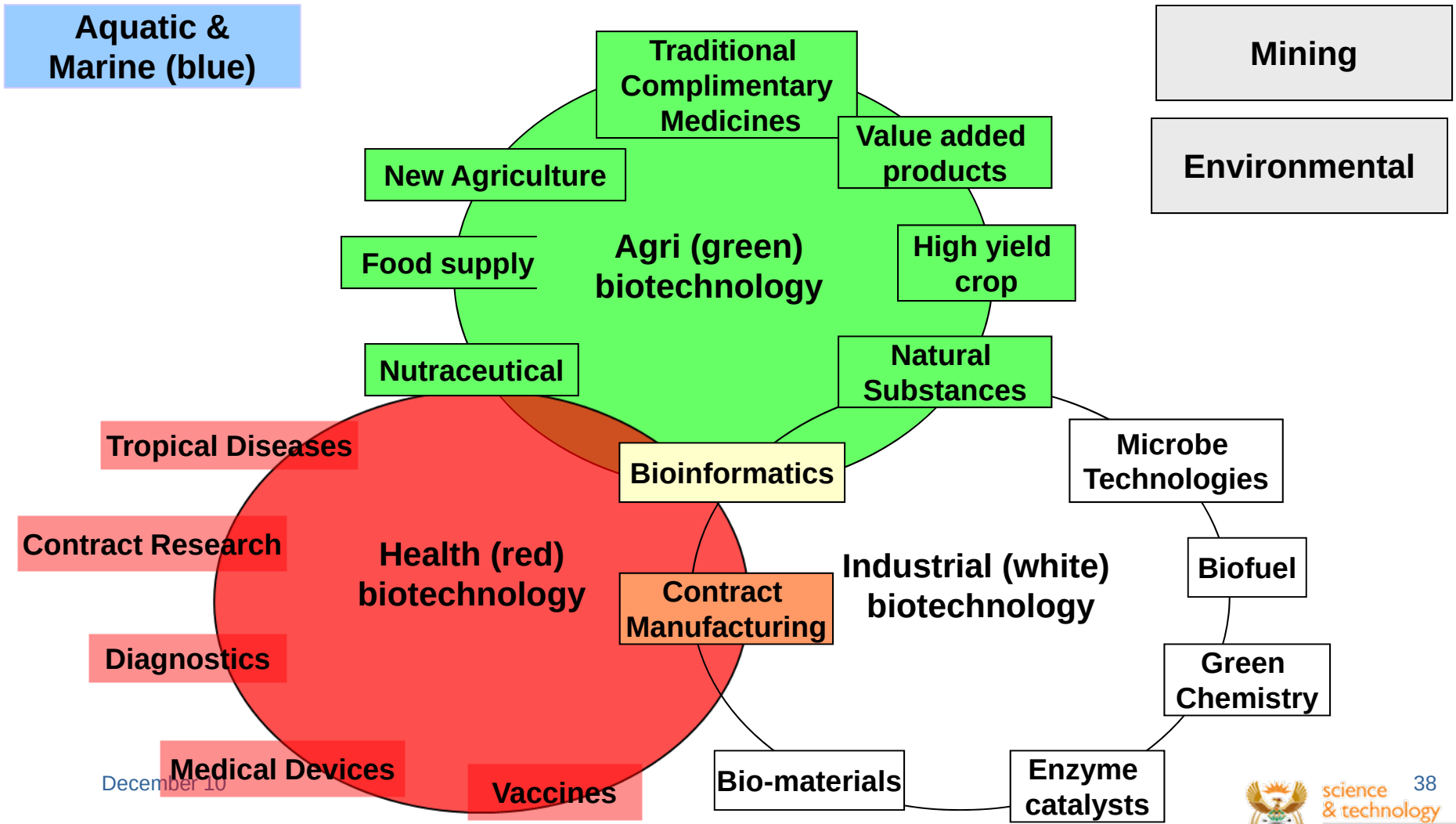
Interface

- Biodiversity
- Indigenous Knowledge Systems
- Biotechnology

Focus Areas

- Phytomedicines and Botanicals
- Food and nutraceuticals
- Industrial Biotechnology

IKS and Biotechnology MAP



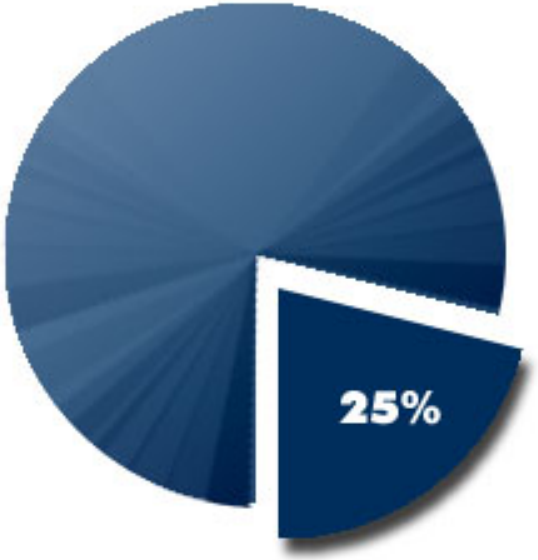
South Africa's plant biodiversity

- 24 000 indigenous plant species
- High endemism
- Mainly unexplored as source of natural medicines

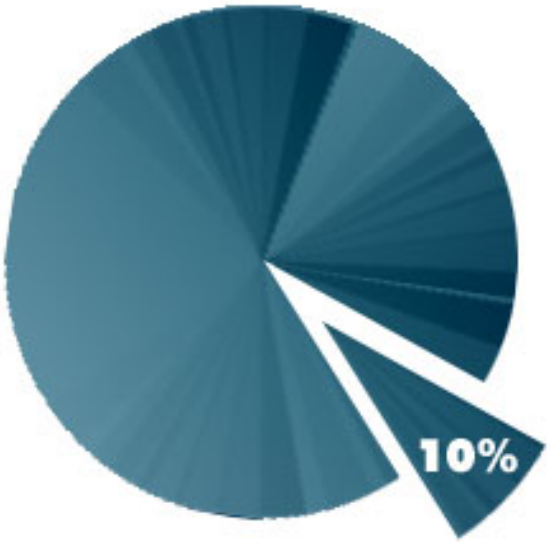
Biodiversity

Indigenous Knowledge

Scientific innovation

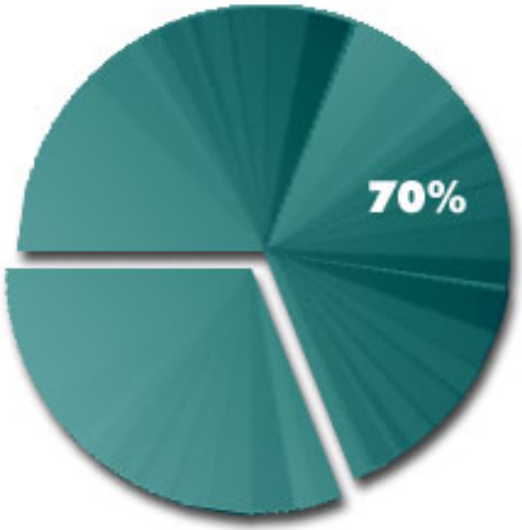


25% of world's pharmaceuticals derived from plants



SA has 10% of world's plants

Indigenous Knowledge and Medicinal use in SA



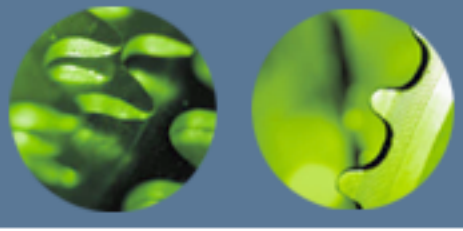
70% of South Africans consult a Traditional Healer

Biodiversity

Indigenous Knowledge

Scientific innovation

- South Africa has long tradition of medicinal use of indigenous plants
- >200 000 Traditional Healers active throughout country
- At least 3 000 plants are used medicinally



BioE^2 Grand Challenge

- a value chain to strengthen the bioeconomy
- The bioeconomy represents economic activities that use renewable bio-resources and bioprocesses to produce energy, industrial and functional foods and nutraceutical products
- ”South Africa must become a world leader in biotechnology and the pharmaceuticals, based on the nation’s indigenous resources and expanding knowledge base”

IKS Research and Development

IKS Research Management Review at National Research Foundation

Developed and Implemented the New IKS Research Management Model

Identified and Funding New IKS Research Priorities

- **Applied and Innovative IKS Research**
- **IKS Curriculum Studies and Epistemologies**
- **Medicinal Food and Nutritional Medicines**
- **Indigenous and Appropriate Technologies**

IKS Human Capital Development

Establishment of the Centre of Excellence on African-IKS

Bachelor of Indigenous Knowledge Systems

Establishment of IKS Research Chairs

University of KwaZulu-Natal Indigenous Health Chair and Lab

Walter Sisulu University Knowledge Systems Studies Chair

Establishment of IKS Research Laboratories

CSIR Biosciences and MRC IKS Laboratories

IK Innovation

Political Will

Scientific and Technological Know-How

Indigenous Knowledge And Systems

Biodiversity

National Disease Priorities

Communicable Diseases

Tuberculosis
HIV/AIDS
Malaria
Epidemic-Prone

Chronic Diseases

Diabetes
Hypertension
Cancer
Asthma

National Priorities Alignment

Health and Food Security

Rural Development and Job Creation

Human Capital Development and Infrastructure

Research, Development and Innovation

Traditional Medicines

Food Technology

Cosmeceuticals

Commercialisation
5 Products by 2018
3 Spin-Off Companies
R3bn Trust Fund

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Bioprospecting and Product Development Platform

B.P.D.P. Consortia

Flagships

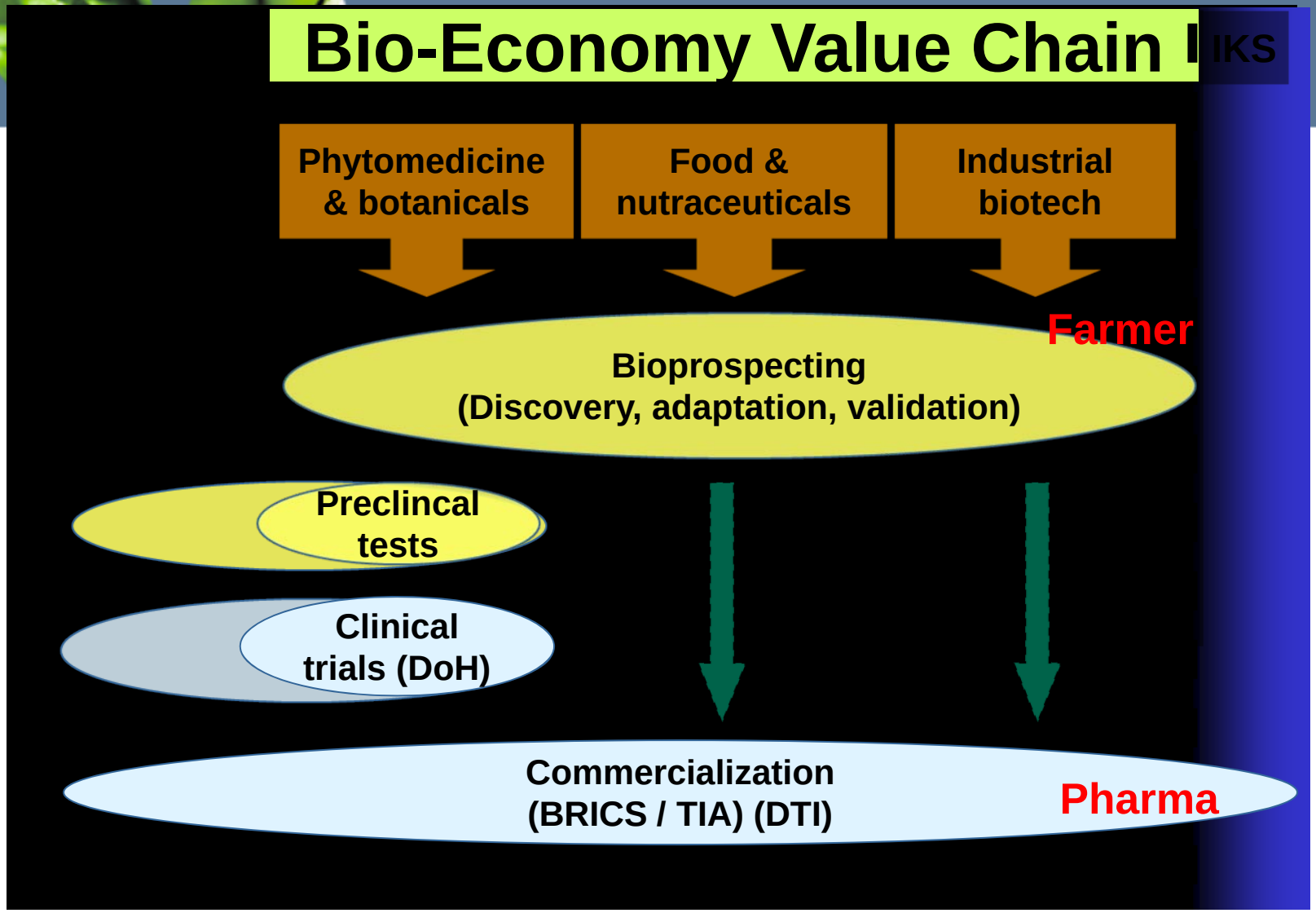
Traditional Medicines

Cosmeceuticals

Nutriceuticals

Bio-Economy

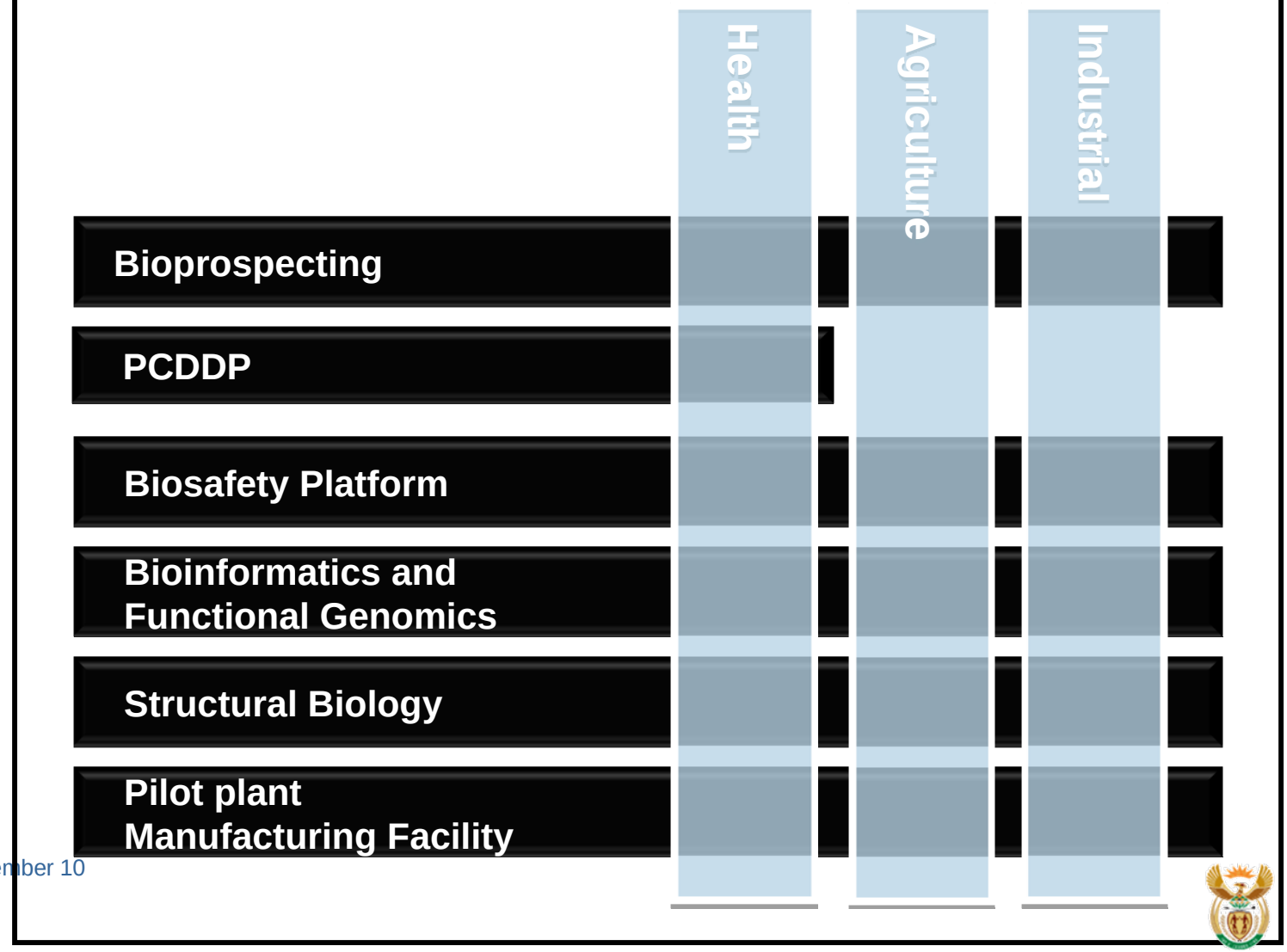
Bio-Economy Value Chain I



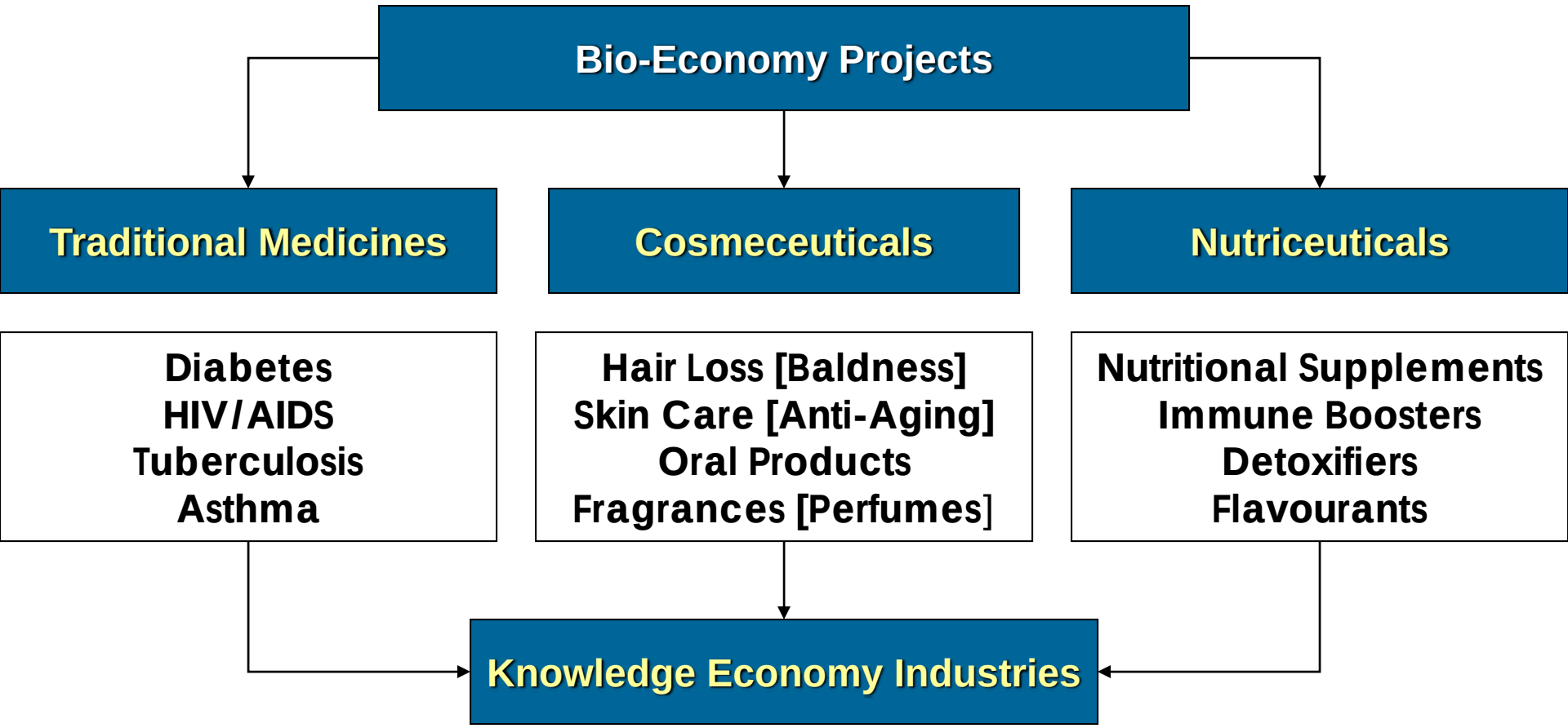
IKS Value Addition Consortium

- IK Holders
- Government
- Researcher
- Private
- Partnership

Matrix



Bioprospecting Flagships



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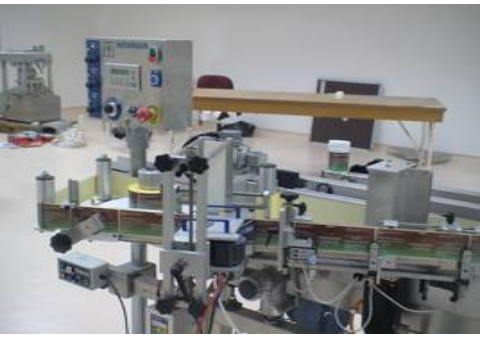
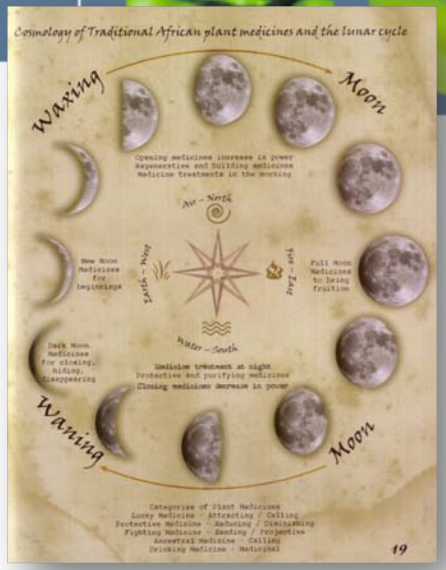
IKS Research, Development and Innovation Infrastructure



Thank You for the opportunity



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

Cosmology

Social ecology

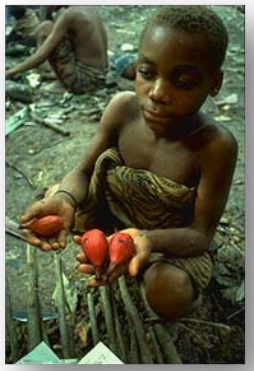
Thank You

Public health and medicines

Biodiversity

Indigenous technologies

Indigenous food and food technologies



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