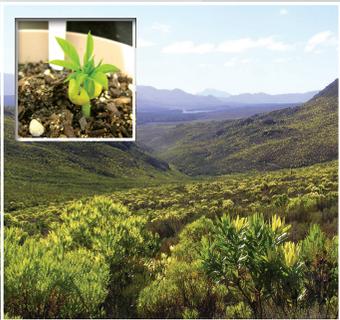


Indigenous Knowledge-based technology innovation

Linking with the three priority sectors is cross-cutting indigenous knowledge-based technology innovation programmes. In order to ensure that the wealth of indigenous knowledge is used for the benefit of the people of South Africa, IKS activities will focus on strategic programmes in African traditional medicines, cosmeceuticals, nutraceuticals and health beverages. A holistic IKS-based research, development and inclusive innovation model will be followed. This will support community-based technology demonstration, manufacturing and Ubuntu-inspired marketing and commercialisation models for improved quality of life and sustainable livelihood. This inclusive innovation and holistic model will form strong linkages with the three sectors of the Bioeconomy Strategy, e.g. the cultivation and propagation of indigenous plants (agriculture), the disease-controlling potential of IK-based bioprospecting products (health) and the industrialisation of all IK-based innovative products.



6



Strategic intervention areas

The national programmes to implement the strategy include:

- South African Malaria Initiative
- South African HIV and AIDS Research Programme
- Nuclear Technologies in Medicine and the Biosciences Initiative
- Biopanning Programme
- IKS Bioprospecting and Product Development Platform
- Centre for Proteomics and Genomics Research

- National Genomics Platform
- Novel Vaccine Platform
- CSIR Protein Expression System
- Drug Delivery Platform
- Biodesign Initiative
- Public Understanding of Biotechnology
- Bioinformatics and Functional Genomics Programme
- Biosafety Platform
- Preclinical Drug Development Platform
- Metabonomics Platform
- Metagenomics Platform
- Process and Product Incubator (Bioprocessing Platform)
- Drug Discovery and Development
- Institute of Diagnostic Research
- Biocatalysis Platform
- Agro-Innovation Hubs
- National Wheat Pre-Breeding Programme

Enabling Initiatives

For a successful bio-economy, South Africa must:

- develop and sustain human capital;
- achieve world-class research standards;
- access next-generation technologies;
- close gaps in the innovation pipeline;
- improve incentives and funding;
- access global intellectual property (IP) and knowledge;
- align research including grassroots innovation;
- align regulations with needs; and,
- implement the ethical framework.

Co-ordination

Co-ordination across government departments and role players in the value chain is vital.

- Government stakeholders include:
- Science and Technology
 - Health
 - Trade and Industry
 - Agriculture, Forestry and Fisheries
 - Environmental Affairs
 - Higher Education and Training
 - Economic Development
 - Energy
 - Mineral Resources
 - Rural Development and Land Reform
 - Water Affairs
 - Social Development
 - Human Settlements
 - Traditional Affairs

8

9

Achievements

- **XSIT:** Shell's moth pest of the citrus industry. First release 2007 over 1400 ha now increased to 8500 ha. Reduced fruit infestation by 95%.
- **KapaBioSystems:** Company established with Cape Biotech grant in 2006, offering next-generation PCR reagents. Sustainable; global orders; staff complement now over 50.
- **Eucalyptus Genome Programme:** International collaborative project sequenced the Eucalyptus Genome. SA Forestry industry already benefiting (speeded-up breeding programmes) from the identification of genetic markers associated with various beneficial traits (biomass, disease, new biomass qualities).
- **Resyn Biosciences:** CSIR/Novco with an extraction technology significantly better than best-available products.
- SA ranked 8th globally in terms of land area planted with **biotech crops** – an indication of progressive regulatory systems.
- **Forestry Industry:** a significant grant (SIF) to revitalise forestry industry in SA. Excellent example of a functional multi-stakeholder partnership programme, coordinated by Forestry South Africa (FSA), and representing the entire cross section of the forestry industry (including small and emerging timber growers).
- **Strategic Health Innovation Partnerships (SHIP):** a DST/MRC (Medical Research Council) venture on HIV and TB, which has leveraged R249m co-funding (DST R122m).
- **HIV broadly neutralising antibody:** breakthrough in understanding HIV instrumental in developing passive immunity, which could lead to a vaccine with broad-spectrum efficacy.
- **MMV290048:** A new anti-malarial compound developed at University of Cape Town (UCT), currently in phase I trials, which shows greater potency than frontline drugs chloroquine or artemisinin.
- **Atis Biologics:** World-class, local insurance-approved bone-regeneration product/technology, seeking support for clinical trials for FDA approval.
- **SATRI (@SHIP)** invited to become part of the TB Accelerator project.
- **IKS Bioprospecting and Product Development Platform.** A consortium-based Research, Development and Innovation Platform launched in 2013. The platform conducts innovative research in African traditional medicines, cosmeceuticals, nutraceuticals and health beverages.

9

South Africa launches its Bio-economy Strategy



Government's newly launched Bio-economy Strategy provides a vision to guide biosciences policy as well as research, development and innovation (RDI) investments, with the aim of the bio-economy contributing 5% to South Africa's GDP by 2050. It represents a shift from developing the biotechnology sector to developing a bio-economy, which is cross-disciplinary, and promotes holistic solutions and world-class innovation. "Bioeconomy" refers to activities that make use of bioinnovations, based on biological sources, materials and processes to generate sustainable economic, social and environmental development.



Three sectors

Three sectors, namely Agriculture, Industrial and Environmental Bio-innovation and Health were prioritised to drive the bioeconomy, with Indigenous Knowledge Systems (IKS) as an important crosscutting contributor to the activities within these three sectors.

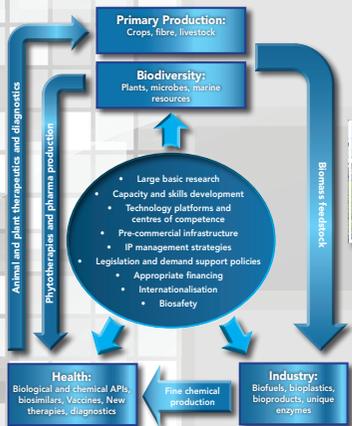


Figure 1. Adapted OECD, 2009. The Bioeconomy to 2030: Designing a Policy Agenda, Paris: Organisation for Economic Cooperation and Development (OECD)

Within the context of the Bioeconomy the focus of these sectors will be:

Agriculture

The focus for agriculture is to strengthen innovation to ensure food security, enhance nutrition, and enable job creation. This includes: a) establishment of agro-innovation hubs that promote development of new crops/animals (for increased nutritional quality, drought tolerance or pest and disease resistance, etc.), enhance technology transfer and mainstream indigenous crops for job creation and local benefit; b) support for ongoing improvement of commercial varieties of plants and animals for global competitiveness (including animal vaccines), c) commercialisation of bio-control and bio-fertiliser products to reduce chemical pesticide and fertiliser usage; and, d) investment in soil conservation and water resource management initiatives. Capacity development and research-driven skills to strengthen the innovation value chain are key drivers.



Health

The focus for health is to support and strengthen the country's local RDI capabilities to manufacture active pharmaceutical ingredients (APIs), vaccines, biopharmaceuticals, diagnostics and medical devices to address the disease burden while ensuring security of supplies of essential therapeutics and prophylactics.

Industry

The focus for industry and the environment is to prioritise RDI in biological processes for the production of goods and services, while enhancing water and waste-management practices in support of a green economy. These include strategic science initiatives related to strengthening and developing bio-manufacturing capacity and capabilities, strengthening local bioprocessing capabilities and developing integrated biorefineries from bio-based feedstocks. Biomass beneficiation and creating an enabling environment for increased industrial competitiveness within the bio-based NSI are key drivers.



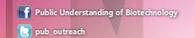
The Bio-economy Strategy can be downloaded from <http://www.pub.ac.za/files/Bioeconomy%20Strategy.pdf> OR

<http://www.dst.gov.za/index.php/resource-center/strategies-and-reports>



The PUB Programme is an initiative of the Department of Science and Technology and is implemented by The South African Agency for Science and Technology Advancement. The mandate of PUB is to promote a clear, balanced understanding of the potential of biotechnology and its current and potential applications. For more information visit www.pub.ac.za or contact: info@pub.ac.za, tel: 012 392 9300 or fax: 012 320 7803.

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