UNCTAD TECHNONOLOGY ASSESSMENT PROJECT ON ENERGY AND AGRICULTURE: A TWO DAYS SOUTH AFRICAN NATIONAL STAKEHOLDERS CONSULTATIVE WORKSHOP

Dates: 4-5 November 2021 (Virtually)

Introduction

Technology assessment (TA) is gaining currency as a powerful toolbox for making strategic choices on the procurement, development, introduction, and governance of new technologies. It is about critical and participatory assessment of social, economic and environmental benefits and risks of a particular technology.

TA is still in its infancy in Africa. Its application as a vital tool for technology policymaking is just starting to attract the attention of academics, technocrats and policymakers as well as legislatures on the continent. However, there have been various TA-like initiatives in health, energy, water, agriculture, and some TA on specific technologies such as biotechnology and nanotechnology in Africa.

Demand for TA is likely to grow in Africa for at least three reasons. First, African countries are increasingly putting emphasis on the role of new technologies in sustainable development. This is reflected in the kinds of national science, technology and innovation (STI) policy frameworks that many countries in the continent are adopting. Second, countries are exposed to a large and growing pool of technologies and technological options making it critical for them to adopt specific tools and approaches for making wise technology choices. In this regard, TA is recognised as a vital ‘methodological toolbox’ for guiding the choice of specific innovations from the large global pool of technologies.

The capacity of African countries to design and use TA largely determines the quality of their policies and programmes for technology and innovation in a wide range of sectors such as health, energy, agriculture, mining, fisheries, security and transport. It is critical in policymaking on Foreign Direct Investment (FDI), technology transfer and acquisition, domestic investment in research and innovation (R&I), technology prospecting and

procurement, environmental regulation, and many aspects of sustainable development. TA capacity is more critical and urgently required during times of crisis and uncertainty such the current COVID-19 pandemic and related systemic socio-economic crises. Government, private sector and even civil society organizations are expected to make decisions urgently on what technologies (particularly medical or health ones) to procure and deploy in health and economic systems that are fragile or under constant pressure.

To develop Technology Assessment capacity in South Africa, the Department of Science and Innovation will participate in the pilot phase of the United Nations Conference on Trade and Development's (UNCTAD) project on Technology Assessment in Agriculture and Energy sector in Sub-Saharan Africa. Seychelles and Zambia are also participating in this project.

The project will seek to strengthen capacities of national Science, Technology and Innovation (STI) policymakers and other stakeholders in Sub-Saharan Africa and propose policies and mechanisms (know-how) that support the learning, diffusion and adoption of technologies in the energy and agricultural sectors and help build resilience to and recovery from the COVID-19 pandemic and future health emergencies.

The national workshop will take place in two days with each day dedicated to Agriculture and the other for Energy.

Background/ Rationale

DSI Activities in the Energy Sector

The Department of Science and Innovation will be developing an Energy Science, Technology and Innovation Plan for South Africa in support of the implementation of the Decadal Plan. One of the key elements of the Energy Science, Technology and Innovation Plan is a coherent RDI strategy which is based on priorities for funding. The current draft of the Energy Science, Technology and Innovation Plan includes the energy RDI focus areas based on priorities set by the Department of Science and Innovation and the National Research Foundation. The technology assessment project would allow the

DSI to engage with a broader range of stakeholders to allow the priorities of other stakeholders to be identified and included within the Energy Science, Technology and Innovation Plan using transparent and structured process. The team from the Department of Science and Innovation that would be involved in the process would gain valuable experience that could be recreated in the future.

DSI activities in the Agricultural sector

Covid-19 has definitely found the world wanting in terms of preparedness to deal with the disease, and especially in terms of robust systems to be able to respond effectively to deal with crisis. Whilst in South Africa, the focus in agriculture has been on preserving supply chains to avoid food shortages, there is high level of uncertainty on outcomes, and experts have emphasised the long-term impact on nutrition, people's livelihoods, inequality, threats to SMMEs, and the need for governments to deal with recovery and specifically biosecurity. The collaboration of all relevant role players, especially national departments on preparedness to deal with disasters is critical. The Agricultural Bio-economy Innovation Partnership Programme (ABIPP) contributes to food and nutrition security as well as socio-economic impetus in its implemented programmes.

The Agriculture Bioeconomy Innovation Partnership Programme (ABIPP) was established an instrument to contribute towards the objectives of the Department of Science and Innovation's (DSI) Bioeconomy Strategy (where the agricultural sector was identified as one of the three crucial elements) and White Paper on Science and Technology and the decadal plan. Therefore, SA has a strong policy to support innovation. However, lacks implementation model at ground level foe efficient translation and uptake of such technologies.

The Bioeconomy Strategy's objective for agriculture is to strengthen agricultural biosciences innovation to ensure food security, enhance nutrition and improve health, as well as enable job creation through the expansion and intensification of sustainable agricultural production and processing. The principles for development of the Agricultural Bio-economy are namely; coordination, partnerships, co-funding, a value chain approach and inclusivity.

ABIPP is a mega-programme that funds, co-funds, coordinates, facilitates and actively manages multi-disciplinary, multi-institutional research programmes focusing on agricultural bio-innovation, product processes and services contributing to increased productivity, food security and sustainable rural development. The programme encourages collaboration on national priorities and promotes global competitiveness of the agricultural sector.

Through this platform, we have conducted some form of technology assessment through our value chain analysis approaches in areas identified as gaps e.g. the Cassava study, marula study, the sorghum study, cape aloe, canola, nixtamalization and digital technology. There are other programmes established e.g. Biosecurity research hub, climate change resilience consortium, Agroprocessing, bioinnovation for farmer development support, etc. that seek to ensure the translation of technologies to where they are needed the most. However, there is a need for continued evaluation of efforts in terms of relevance and crafting the next steps or level in relation to the kinds of technologies that would be critical in these value chains. The key issue is how we proceed in unpacking and supporting the implementation of such projects for uptake by farmers based on their short, medium and long-term needs.

The focus therefore, should be on building capacities also beyond the policy-makers level. There are many layers of interventions below that of policymakers but the mechanism of implementation (for all actors) beyond policies is critical.

Objective

To better organize a coordinated participation for South Africa in the project, through engagement with the South African role players. To action the objective, the Department of Science and Innovation of South Africa plans to organize a national stakeholder workshop. The workshop is meant to do the following:

- To identify gaps in TA especially in Agriculture and Energy
- To better understand the concept of TA

- To identify priority areas for TA in Energy and Agriculture for South Africa
- To develop a workplan for South Africa's participation in the UNCTAD project
- To design the SA TA methodology in partnership with UNCTAD

To guide the discussion, the following areas may be highlighted:

Agricultural Sector

Agricultural Bioeconomy: Implementation or transfer of such technologies in all nine provinces of South Africa.

- Crop/plant improvement, molecular breeding and genome engineering: Crop Improvement:
- (Wheat, Maize, Potato, Cotton breeding, fruits), Climate Resilience research; Smart and Precision Agriculture, Biosecurity Research Hub – diagnostics, monitoring, genotyping and phenotyping.
- Animal Improvement, molecular breeding and genome engineering**:** Animal Improvement, Animal vaccines, Livestock Identification and Traceability Systems (LITS), Beef Genomics Programme, Aquaculture Bio-innovation Cluster, Dairy Breeding programme, Wet Carcass Syndrome (WCS)
- Agroprocessing value chain development: marula, honeybush, maize, Cape Aloe, fruits, vegetables, soya, bambara, beans and legumes and hemp.
- Bio-innovation in support of Food and Nutrition and farmer innovation support: Nixtamalisation
- Value chain analysis: Sorghum, Canola, Dryland Rice, Cassava
- Small scale farmer technology diffusion: Grapes, Low-chill apples, Urban Agric
- Digital and precision Agriculture, Agroinnovation hubs
- Energy usage and energy efficiency in agriculture.
- GIS and earth observation for decision making in agriculture

- New, existing, and emerging technologies that can address the four dimensions of energy and food security (i.e., food availability, access, use/utilization, and

stability). For example, genetic modification, methods for improving soil fertility, and irrigation technologies can increase food availability. New and emerging technologies, including synthetic biology, artificial intelligence, and tissue engineering, may have potential implications for the future of crop and livestock agriculture.

Energy Sector

- The main focus of the Energy Sector will be on following areas
  - Hydrogen Fuel Cells and Green Hydrogen
  - Energy Storage
  - Renewable Power (Solar and Wind)
  - Carbon Capture and Use
- Industrial clusters are groups of industries such as cement, steel and chemicals physically located in the same location. The industries in these clusters are heavy users of fossil fuels and account for some of the hardest-to abate emissions in our economy. One of the benefits of industrial clusters is that energy demand across industries creates opportunities for systemic efficiencies, electrification, demand optimisation and storage (Carbon Capture and Use) as well as an internal market for hydrogen – the most promising energy carrier for decarbonizing hard to abate sectors of the economy. One of the negative consequences of the industrial clusters is that due to the fact that industry is co-located, the areas are often found in more socially disadvantaged areas. Decarbonisation of industrial cluster is poised to create significant jobs through the production of blue and green hydrogen. Hence the industrial cluster is a way to decarbonise, generate new jobs in underserved areas, and deliver vital benefits like better air quality and health.
- Power and Building Sector- The decarbonisation of the electricity generation sector should be informed by opportunities for embedded generation which affects the building sector.
- Transport Sector- Battery electric vehicles and fuel cell electric vehicles will play a critical role in the decarbonisation of road which is responsible for the majority of emissions in the transport sector. Fuel cell trains can also play a role in

decarbonizing the rail sector. Fuel cell trains are best placed to displace diesel as the risk of rolling black outs affect the reliability of electric trains.

- Use of clean energy in rural and informal settlements. Based on the General Household Survey, 20% of households in Gauteng Province, Western Cape Province and North West Province are considered informal due to in-migration. This is a problem that leads to increased service delivery protest however renewable and clean energy solutions could play a role with regards to mini and micro-grids.
- There many sectors of the economy which depend upon energy consumption and production and the technology needs assessment will assist with understanding the role of technologies to move towards a net zero economy. The following policies (some current and others in progress) will have to the most impact on a move towards a net zero economy. The most relevant policies for the following sector departments are as follows:

  Science and Technology

  - Decadal Plan (Energy Sector is included as a focus area)
  - Energy Science, Technology and Innovation Plan
  - National Hydrogen and Fuel Cell Research Development and Innovation Strategy
  - Coal Co2 to X Research Development and Innovation (RDI) Roadmap
  - Energy Storage RDI Roadmap
  - Solar Energy Technology Roadmap
  - Hydrogen Society Roadmap

  Energy

  - Integrated Resource Plan -2019
  - Just Energy Transition Strategy
  - Solar Energy Masterplan

  Environment, Forestry and Fisheries

  - Low Emission Development Strategy
  - National Climate Change Response White Paper

  Transport

  - Green Transport Strategy
  - Automobile Masterplan

Trade, Industry and Competition

- Chemicals Masterplan

- The expansion of renewable energy and new and emerging technologies applied to the energy sector could contribute to ensuring universal access to affordable, reliable and modern energy services, as well as other sustainable development objectives such as reducing poverty, health, gender equality and climate action.

- Women and girls play a significant role in the energy and agricultural sectors in developing countries. Access to electricity can also increase gender equality through increasing the likelihood of girls finishing primary school, increasing the incomes of self-employed women, and increasing employment opportunities for women by increasing the efficiency with which household tasks can be completed.

Expected Outcomes

The expected outcomes of the workshop are as follows:

- List of key stakeholders to participate in the TA project
- List of TA priority areas in both energy and agriculture sector
- Proposal on the preferred methodology for the TA project
- Timelines for the TA

Stakeholders/Partners

- United Nations Conference on Trade and Development (UNCTAD)
- Department of Science and Innovation (DSI)
- Department of Energy (DoE)
- Department of Agriculture, Land Reform and Rural Development (DALRRD)
- Department of Forestry, Fisheries and the Environment (DFFE)

- National Agricultural Marketing Council (NAMC)
- Forestry and Agricultural Biotechnology Institute (FABI)
- South African Biodiversity Institute (SANBI)
- Agricultural Research Council (ARC)
- South African National Energy Development Institute (SANEDI)
- Council for Scientific and Industrial Research (CSIR)
- National Research Foundation (NRF) CoE Food and Nutrition Security
- National Intellectual Property Management Office (NIPMO)
- Technology Innovation Agency (TIA)
- Department of Trade, Industry and Competition (DTIC)

Stakeholders from the Agricultural sector

Government agencies:

Council for Scientific and Industrial Research (CSIR), Agricultural Research Council (ARC), Technology Innovation Agency (TIA); Water Research Commission (WRC); National Agricultural Marketing Council (NAMC); Industrial Development Cooperation (IDC) and South African National Energy Development Institute (SANEDI).

Non-profit organizations & non-governmental organisations:

Grain South Africa

AgriSA

Protein Research Foundation

Oil and Protein Seeds Development Trust

Eden Social Foundation

Ukhanyo Farmer Development Foundation

Grain SA Farmer Development Programme

Bureau for Food and Agricultural Policy (BFAP)

Academic Communities

University of Pretoria - Forestry and Agricultural Biotechnology Institute; Centre of Excellence on Food Nutrition and Security

Stellenbosch University

Western Cape University

University of Fort-Hare

University of Free State

North-West University

Mpumalanga University

University of Zululand

Vaal University of technology

Ministries (national and provincial):

Department of Science and Innovation

Department of Agriculture, Rural Development and Land Reform

Western Cape Department of Agriculture (WCDoA)

Eastern Cape Department of Rural Development and Agrarian Reform

Eastern Cape Department of Economic Development and Environmental Affairs

Northern Cape Department of Agriculture

Department of trade and Industry

Private sector:

ABInbev

Agri SETA

Tiger brands

Farmsol

Maize Trust; Winter Cereal Trust

Red Meat Research Development South Africa

South African Poultry Association

Civil society:

Community members/small-holder farmers in selected communities in various provinces.

FABCO

Stakeholders from Energy Sector

Ministry

- Department of Trade, Industry and Competition
- Department of Transport
- Department of Mineral Resources and Energy
- Department of Environment Forestry and Fisheries
- Department of Public Enterprises
- Department of Public Works and Infrastructure
- Department of Land Reform and Rural Development
- Energy and Infrastructure Departments of the largest Metros (City of Cape Town, eThekwini, Ekurhuleni, Durban, City of Tshwane, City of Johannesburg)

Government Agency/Parastatals

- Eskom

- Central Energy Fund
- Petro SA
- Transet
- South African National Energy Development Institute
- Council of Geosciences
- South African Local Government Association

Existing Private Sector

- Oil and Gas Sector - Sasol)
- Mining Sector - Anglo American Platinum)
- Cement Sector - PPC Cement)
- Paper and Pulp Sector - SAPPI
- Waste Sector – Enviroserv
- Water Sector – Rand Water

Academic Community

- Hydrogen South Africa Programme
- Coal CO2 to X RDI Consortium
- Renewable Energy Hub and Spokes Programme
- Energy Storage RDI Consortium
- Historically Disadvantaged Institutions

Civil Society

- Fossil Fuel Foundation
- South African Renewable Energy Council
- South African Photovoltaic Industry Association
- South African Energy Storage Association
- South African Wind Energy Association
- National Business Initiative

- Green Building Council for South Africa
- Energy Intensive Users Group
- South African Iron and Steel Initiative
- Association for Cementitious Materials Producers
- Mining Council for South Africa
- South African Smart Grid Initiative
- South African Mini Industry Association (informal economic sector)