INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

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Contribution by South Africa

to the CSTD 2024-2025 priority theme on "Technology foresight and technology assessment for sustainable development"

PRIORITY THEME 2: Technology foresight and technology assessment for sustainable development

United Nations Commission on Science and Technology for Development (CSTD)

Dear CSTD Member,

The 27th CSTD annual session selected "Technology foresight and technology assessment for sustainable development", as one of the priority themes for its 28th session (2024-2025) period).

Along with unprecedented opportunities, rapid technological developments present multifaceted challenges and risks, socio-economic disruptions and environmental impacts, among others. STI foresight (ForSTI)[1] and technology assessment (TA)[2] are useful tools for identifying and understanding key emerging trends and the risks and opportunities from the creation and adoption of new technologies, improving the quality of decision-making by making it better informed, more evidence-based and inclusive, promoting inclusive discussion, and identifying strategic priorities for future STI policy at the national level, and thereby enable more effective adaptation to technological and other systemically important future changes. STI foresight is a systematic process aimed at envisaging the future and strategically making decisions on STI policy and the use policy actions in the present to arrive at a preferred future.

Technology assessment is an interdisciplinary process for assessing opportunities and risks of new technologies, informing policymakers, inducing public dialogues and debates, and helping frame supportive policies and instruments. Therefore, they are policy tools that are particularly relevant to ensuring that policymakers can identify STI policy actions and implement more inclusive policy processes that move towards leaving no one behind, which is closely aligned with the theme under consideration for ECOSOC 2025 ("Advancing sustainable and inclusive solutions for leaving no one behind").

The annual resolutions negotiated at the CSTD have consistently underscored the importance of technology foresight and TA exercises and have encouraged all stakeholders to conduct inclusive national, regional and international and foresight exercises on existing, new and emerging technologies to help to evaluate their development potential and mitigate possible negative effects and risks. By integrating these processes into strategic planning and innovation policymaking, countries could navigate better the complexities of technological changes while maximizing its benefits for national development.

Under this theme, the Commission will consider issues such as the methodology for conducting ForSTI and TA, good practices and challenges in conducting these exercises, and the effective integration of the results from these exercises into the design and implementation of STI policies that will drive progress towards achieving the SDGs. The Commission will also consider how international cooperation and the CSTD could play a role in this regard.

The CSTD secretariat is in the process of drafting an issues paper on the theme to be presented at the CSTD inter-sessional panel meeting to be held on 21 and 22 October 2024 in Geneva. In this context, we would like to solicit inputs from CSTD member States on this theme. We would be grateful if you could kindly answer the following questions based on your experience in your country or region. To facilitate your answering, we have made the questions be as specific as possible.

1. **Has your country conducted ForSTI, TA or both? If yes, what were the reasons for undertaking ForSTI and TA?**

[1] Technology foresight is a term that can be usefully broadened to STI foresight to recognize that STI is broader than technology alone, and foresight for national policy related to technology can include STI more broadly defined. This remains narrower than "strategic foresight", which can be applied to many areas of policy and diverse uses, and "futures", which can include many future-oriented studies of a diverse nature.

[2] TA is not the same as technology needs assessment (TNA), which aims to identify technology needs for addressing climate change rather than the impacts of adopting a technology new to the country.

Yes, our country conducted the South African Foresight Exercise for Science, Technology and Innovation 2030 (SAForSTI). This initiative aimed to investigate the future of science, technology and innovation (STI) in South Africa, and the potential of STI to address ongoing societal challenges (including unemployment, poverty, inequality, health and education) and support the creation of inclusive and sustainable socio-economic development. The reason for conducting SAForSTI was to inform the national system of innovation (NSI) and the ten-year implementation plan of the STI White Paper.

While we have conducted SAForSTI, systemic Technology Assessments (TAs) have not been implemented to date. Existing TAs are sectoral and not institutionalised. These are particularly in the energy, biotechnology, nanotechnology and health sectors.

2. **If you have not conducted ForSTI or TA in the past, what were the reasons for this (lack of need or requests for it, lack of familiarity, lack of capacity, lack of funding etc.)? Would you be interested in pursuing either ForSTI or TA as a policy tool in the near future?**

   In the past, the main reason for not conducting TAs has been their novelty. There has been limited familiarity with conducting these exercises at a systemic level. However, the National Advisory Council on Innovation (NACI) has shown keen interest in integrating TAs to complement ongoing ForSTI exercises.

3. **What agency (or agencies), if any, is responsible for ForSTI and/or TA?**

   The National Advisory Council on Innovation (NACI)

4. **Who was responsible for implementing the ForSTI and/or TA undertaken - national government, sub-national levels of government (state/province or other levels), industry, universities, research institutes or civil society?**

   The SAForSTI was conducted for consumption and implementation by all stakeholders/members of the South African national system of innovation particularly the Department of Science and Innovation (DSI).

5. **In which sectors and/or for what policy processes have ForSTI and TA been undertaken, or linked to? What SDGs have they related to?**

   Policy Processes
   - *The 2019 SAForSTI was undertaken to inform and influence the identification and selection of priorities for the Decadal Plan for STI.*

   SDGs
   - *Based on these nine STI domains (and their thrusts) that were identified by the SAForSTI, the related SDGs are:*

STI Domain	*Related SDG*
Circular Economy	*1,2,3,6,7,8,12,15*
Education for the Future	*4, 5, 8, 10 (others, 1, 2)*
Sustainable Energy	*7, 9, 12, 13*
The Future of Society	*1, 5, 8, 9, 10, 16*
Health Innovation	*3, 9*
High-tech Industrialisation	*9, 4, 5, 8, 10*
ICTs and Smart Systems	*8, 9, 10, 12 (others 3, 4, 5)*
Nutrition Security	*1, 2, 3, 6, 9, 12, 13,14, 15, 16, 17*
Water Security	*3, 6, 9, 12,13,14,15, (others 16,17)*

6. What specific methods (tools) and methodologies have been used for ForSTI and/or TA?

a) SAForSTI

- ***Foresight tools used***
  Scenario planning, prioritisation criteria

- ***Methodology***

  The methodology primarily used for SAForSTI was a modified version of scenario planning. This method was used to develop proto scenarios. The prioritisation criteria for domains and thrusts used three considerations. These were i) the vision of the National Development Plan (NDP), ii) potential for new impact, and iii) global and local STI trends. A total of 30 thrusts were identified, each associated with one of the nine STI domains.

  The analysis process entailed the use of big data analytics. This included a bibliometric analysis of scientific outputs produced by South Africa as well as a sematic analysis of large document sets. The analysis was conducted using a proprietary intelligent foresight analytics system called 'iFORA'.

  As part of inputs to the foresight exercise a situational analysis and performance analysis of the NSI were conducted. In addition, for each sector there was an analysis of STI trends, bibliometric information of local research outputs, workshops, online voting, stakeholder interviews and research priorities. A foresight training was also conducted to workshop all participants of the study. Broad stakeholder participation through workshops, interviews and surveys was a strong feature of SAForSTI.

7. What challenges have you experienced in undertaking ForSTI and TA exercises? Does your country have any specific capacity needs to strengthen the conduct and use of ForSTI and TA?

The challenges experienced during the SAForSTI exercise include:
- The elicitation of strong participation by the private sector in the exercise. This was a challenge during both online processes and the workshops.
- The nonfamiliarity of some participants to STI foresight concepts and exercises. This required new skills and a major shift in mindset. This shift can take time to develop, and the gap was particularly evident during the stakeholder workshops.

Capacity needs for South Africa encompass the following key areas:
- Implementation of staff training programs focusing on technical aspects of conducting ForSTI and TA (including methods, tools, and best practices).
- Facilitation of staff exchange programs centered on STI Policy, STI Foresight, and Technology Assessments.
- Co-hosting workshops to explore theories and approaches related to ForSTI and TA.
- Promotion of resource and information sharing initiatives.
- Access to suitable funding for developing infrastructure and procuring resources essential for institutionalising foresight exercises and conducting TA.

8. Have you conducted combined ForSTI and TA in a single exercise at any time? What were the benefits and challenges of combining ForSTI and TA? Do you see this as a useful and feasible approach?

No.

9. **Are you involved in any international cooperation or partnerships for ForSTI and TA? Which ones and what are their benefits?**

   Yes, we are actively engaged in international cooperation and partnerships for ForSTI and TA. Specifically, we have a Cooperation Agreement on Science and Technology Cooperation with the National Research University Higher School of Economics, and a Memorandum of Understanding with the European Commission's Joint Research Center (JRC).

   These partnerships provide significant benefits, including access to resources, facilities, and knowledge. The SAForSTI initiative, conducted in collaboration with the HSE, exemplifies how these partnerships enhance our capabilities. Similarly, our MoU with the JRC facilitates engagements and knowledge-sharing activities focused on foresight and other STI policy areas. These agreements continue to facilitate ongoing access to co-creation processes and partnerships across various mutually beneficial activities within the STI domain.

   Furthermore, we are in the process of finalizing an additional MoU with the Chinese Academy of Science and Technology for Development (CASTED).

10. **What role(s) can international cooperation, and the CSTD, play in promoting ForSTI and TA?**

    The CSTD could enhance knowledge sharing among its members by organising regular masterclasses. These sessions would provide a platform for countries to exchange experiences, share lessons learned, discuss best practices, and develop strategies for fostering inclusive and sustainable processes.

    Moreover, the CSTD could implement capacity building programs, comprising training sessions, workshops, and collaborative projects. These initiatives would focus on enhancing the technical and managerial skills necessary for the effective implementation of ForSTI and TA.

11. **What have been some important ForSTI and TA examples undertaken in your country, especially related to national policy (prioritization, design etc.)?**

    STI Foresight Studies

    a) *National Research and Technology Foresight (NRTF).*
    b) *South African Foresight Exercise for Science, Technology and Innovation 2030 (SAForSTI).*

12. **Based on your experiences, how have ForSTI and TA improved STI decision making and the prioritization, design and implementation of STI policies?**

    The SAForSTI exercise outputs were immediately adopted and utilised in the development of a Decadal Plan for the implementation of the White Paper on STI. The SAForSTI has also influenced a large vaccine programme which was critical and useful during a time of crises. Although it remains difficult to track the benefits of foresight studies globally, it was hoped that SAForSTI would, through assisting in the development of the STI Decadal Plan, influence the realisation of a better future for South Africa through the application of STI.

Please indicate contact person(s) and agencies responsible for projects/policies and international collaboration on ForSTI and TA in case we need clarification on the inputs.

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Please send your responses and any further inputs on the theme to the CSTD secretariat (stdev@unctad.org) by 24 **July 2024**. We look forward to receiving your valuable inputs.

Sincere regards,

CSTD secretariat