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ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

**Geneva, Switzerland
21-22 October 2024**

Contribution by Indonesia

to the CSTD 2024-2025 priority theme on “Diversifying economies in a world of accelerated digitalization” and “Technology foresight and technology assessment for sustainable development”

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PRIORITY THEME 1: Diversifying economies in a world of accelerated digitalization

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

Dear CSTD Member

The [27th CSTD annual session](#) selected “Diversifying economies in a world of accelerated digitalization” as one of the priority themes for its 28th session (2024-25 period). This theme directly addresses SDG 9 “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation” at the 2030 Agenda.

Although the contribution of science, technology and innovation (STI) to the achievement of other sustainable development goals (SDGs) is discussed in every session of the CSTD, its role in upgrading and diversifying industrial capabilities and the linkages with industrial policies have not been specifically addressed for several years in the Commission. Economic diversification, including through the upgrading of industrial capabilities, is an essential component of economic development and a key area of SDG 9, which aims at enhancing scientific research and accelerating technological upgrade of industries through innovation, particularly in developing countries.

Under this priority theme the Commission could discuss challenges and opportunities brought about the rise of new digital technologies, as Artificial Intelligence, for industrial and innovation policies aiming at increasing productive capacities and diversifying the industrial structure toward higher value productions to benefit all while preserving cultural identity, including indigenous knowledge. The accelerating pace at which frontier technologies emerge and develop makes policymakers struggle to navigate and design responsive policies. Under this theme, the Commission can examine the challenges and opportunities specific to countries at different level of development, and what can least developed countries do to face the disproportionate challenges they face; work to identify best practices and inform inclusive policies for innovation and economic diversification; discuss how to leverage international cooperation to guarantee that uneven technological capabilities will not worsen inequality.

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 in the second half of 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.

1. What are the specific challenges your economy is facing to develop or adapt frontier technologies and AI?
 - a. Firm capabilities to adopt and change from their previous business processes. These activities need both human capital and physical capital. In term of human capital, the need to support digital transformation is not only providing labour with digital skill, but also management skill to change the firm to adopt new technology. Moreover, Indonesian business still needs to increase investment in digital infrastructure and the managerial skill is also the main challenge in implementing digital transformation.
 - b. Government capabilities to build policy design in supporting innovation policy. The capabilities of government to provide effective and efficient policy instrument are still weak: (i) Strong sectoral ego in our government becomes high barrier to build digital transformation policy; (ii) Data policy in term of open data, data availability, and data restriction.
 - c. Research capabilities on creating new technology is still limited.
 - d. Recognizing that data as an important source of innovation (data driven innovation) are still weak.
 - e. Making frontier technology and AI embedded with research and development in the context of economic development.
 - f. Ensure the concept of "human on the loop" in AI, meaning central human intervention in decision making, use and feedback in AI systems, for the benefit of improvement and progress.
2. Can you provide successful examples of AI and other frontier technologies uptake in your country?

INA Digital/ GovTech; The existence of INA Digital/ GovTech as an integrated platform that plays a role in supporting ministries/agencies and local governments to create quality public services. Ina Digital is a form of Electronic-Based Government System (SPBE) which integrates 9 priority services: Education, Health, Social, Police, State Apparatus, Basic Digital Identity, Data Exchange Platform, Digital Payments, and Public Service Portal.

3. Has your country put in place inclusive policies for innovation and economic diversification specifically tailored to diffusion of digital technologies and AI?

Indonesia has many road maps related to digital economy, they are (i) Indonesia Digital Vision 2045; (ii) National Strategy for the Development of the Digital Economy of Indonesia 2030; (iii) AI National Strategy, and (iv) Master plan for Digital Industry Development.

The forth of documents currently are being synchronized, and in future will formulate (enacted) into one regulation (presidential decree). This regulation will tailor the initiative from all ministries related to digital economy.

Recently, some ministries also have specific policy instrument related to innovation and economic in digital technology, such as:

- a. Making Indonesia 4.0 by Ministry of Industry. By this policy, they build Centre for Digital Industry 4.0, that provide facilities including incubator business, and other activities to upgrade business digital capabilities.
- b. BRIN also has research center for digital technology (Research Organization for Electronic and Information) which creates and develops innovation on digital technology.
- c. BRIN also provides general innovation program that also facilitated digital innovation in terms of utilizing infrastructure, funding and human resources for researchers.
- d. Some universities also provide innovation centre in general sectors. Digital technology could be in that programs.

4. Do you have examples of policy instruments in place to favour the diffusion of frontier technologies in the economy and targeting specific sectors?

Indonesia has policy instrument to encourage diffusion of innovation in specific sectors, i.e.

- a. Finance Sectors; Circular Letter from OJK No. 21/SEOJK.02/2019, about regulatory sandbox in Digital Finance Innovation.
- b. Health sectors; Ministerial Decree of Indonesia Ministry of Health Number HK.01.01/MENKES/1280/2023 about The Development of Health Digital Innovation Ecosystem Through Regulatory Sandbox.
- c. Presidential Decree No. 78 of 2021 on National Research and Innovation Agency; the existence of Badan Riset dan Inovasi Nasional (BRIN) gives implications to the research and innovation sectors, as follow (i) the merger of national (government) research institutions that manage science and technology; (ii) the integration of government research funding, infrastructure, and science and technology human resources; and (iii) the re-emergence of an era of research and innovation objectives being directed for national ideology and economy.

5. Has your country put in place mechanisms to strengthen industrial capabilities through partnerships among different stakeholders (e.g., university-industry, or private-public)?

Some innovation collaboration programs have been conducted by many stakeholders, such as:

- a. Ministry of Industry: PIDI 4.0 (Centre for Digital Industry 4.0)
- b. Universities provide innovation centre
- c. BRIN also promotes so many mechanism to push triple-helix collaboration. Science, technology, and innovation (STI) promoted as triple-helix collaboration between university, private/industry, and public sectors. Therefore, the mechanism needs to focus on improving things, as follow:
 - the management of science and intellectual property deriving from scientific research;
 - research ethics approval, research data and publication repository;
 - research and technology innovation depository for patent or other types of intellectual property rights derived from scientific processes;

- prepares researchers to create output or innovation that are readily available for marketization in collaboration with business and industry – with concern to society and environment issues.
- d. BRIN Provides funding schemes for Start-up related to :
- Pengembangan Aplikasi Ternak Berbasis Machine Learning
 - Pengembangan Sistem Mandiri
 - Pengembangan UAV VTOL Bermuatan Sensor Multispektral untuk Optimalisasi Koreksi Radiometrik Guna Pemanfaatan di Berbagai Bidang Aplikasi
 - Wisata Anyer Aplikasi e-Commerce Oleh-oleh dan e-Ticketing Wisata Anyer
 - Komersialisasi Teknologi Terapi Robotika Sebagai Solusi di Era Digital Health
 - Qrivity POS dan PPOB Digital Product
 - Pengembangan Sistem Pengingat Mandiri Jatuh Tempo dan Perpanjangan Izin Tertentu.
6. How can international cooperation support the uptake of new technologies and the development of technological capabilities in your country and ensure that industrial policies will benefit all and do not worsen inequality?
- International cooperation could support the development of Indonesia's research capabilities in the form of equal partner in providing advance policy recommendation, research collaboration/publications, and funding/donor agencies, without long and complicated bureaucratic procedures, to follow the rapid change in technology and social phenomena.
- It is important for international cooperation to help Indonesian government to strengthen their capabilities to develop policy design in digital area. Furthermore, international cooperation should promote to build solution in digital divide.
7. What can do the UN CSTD to support an economic transformation that enhances your country productive capabilities and foster an inclusive digital transformation?
- a. Assessment for digital innovation policy and advocacy.
 - b. Capacity building about managerial skill of business to implement change management in adoption digital technology, and how public research institution may collaborate to enhance digital transformation process in business.
 - c. Strengthen rules and policy in an inclusive digital transformation to be an effective tool to accelerate progress towards achieving the Sustainable Development Goals (SDGs) to solve society's most challenging issues, like in advancing global health, food security, education, energy, and the fight against climate change, with robust multi stakeholder input from fellow Members of UN CSTD.

Please indicate contact person(s) responsible for projects/policies and international collaboration in this context 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 **7 August 2024**. We look forward to receiving your valuable inputs.

Sincere regards,

CSTD secretariat

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 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.

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

ForSTI has been applied in the formulation of national policies, particularly in the White Book 2005-2025, across six research areas: defence, information & communication, transportation, renewable energy, food, and health & medicine. Currently, BRIN is preparing the Long-Term and Mid-Term Master Plan for STI. ForSTI is applied in the formulation of the Long-Term Master Plan for STI 2025-2045 and Mid-Term Masterplan for STI 2025-2029 to ensure a strategic approach. This involves identifying key indicators that will measure progress, setting specific targets to guide the implementation, and outlining detailed strategies to achieve these targets.

The application of ForSTI helps in enhancing strategic planning by identifying future trends and disruptions, which informs better decision-making and risk management. It ensures the plan aligns with future needs and improves stakeholder engagement by aligning interests with long-term goals, making the plan more adaptable and sustainable.

On the other hand, TA (Technology Assessment) has not been implemented at the national policy level yet. It has only been applied sectorally within each relevant agency.

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

Currently, the agency responsible for ForSTI and TA is BRIN, specifically the Deputy for Research and Innovation Policy.

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?**

Currently, BRIN have responsible for implementing the ForSTI and TA at the national government level as on Presidential Regulation No. 78/2021 on the Organization of the National Research and Innovation Agency (BRIN). This regulation outlines BRIN's responsibilities, including conducting technology foresight as part of its mandate to support national science and technology development. This regulation provides the framework for BRIN's role in integrating technology foresight into national policy and planning.

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?**

Bappenas is currently preparing the National Mid-Term Development Plan (RPJMN) 2025-2029, which translates the vision, mission, and campaign promises of the elected President into development programs. Concurrently, BRIN is also developing the Medium-Term Master Plan for STI 2025-2029, which elaborates on six priority research agendas.

The Medium-Term Master Plan for STI 2025-2029 is being developed in synergy with the National Long-Term Development Plan (RPJPN) 2025-2045, which has been drafted by Bappenas and is currently under discussion in the DPR (People's Consultative Assembly). In preparing the Medium-Term Master Plan for STI 2025-2029, ForSTI is applied to plan six priority research agendas: food, energy, health, knowledge-based economy, environment, and social resilience.

These six priority research agendas outlined in the Medium-Term Master Plan for STI 2025-2029 support all Sustainable Development Goals (SDGs). The implementation of the research requires collaboration with various stakeholders to achieve the desired outcomes (SDG 17 - Partnership for the Goals).

Matrices for Aligning Priority Research Agendas with Supporting SDGs

Priority Research Agenda	SDGs	Explanation
Food	(2) Zero Hunger	The need for research on nutritional food supply/production for all to achieve zero stunting from an early age
	(12) Responsible Consumption dan Production	The need for sustainable production processes and post-consumption practices
	(13) Climate Action	Need prompt action to tackle climate change issue to maintain continuous food supply
	(14) Life Below Water	Marine food ecosystems need to be preserved because they are a vital source of food
	(15) Life on Land	Terrestrial food ecosystems need to be preserved because they are a crucial source of staple foods
Energy	(7) Affordable and Clean Energy	Energy is a basic necessity in life, so the availability of affordable and clean energy is a priority. Affordable means that everyone can access energy in affordable prices and can cover remote areas Clean energy means to ensure that the resources to produce energy is sustainable and environmental friendly
	(9) Industry, Innovation, and Infrastructure	Energy research drives advancements in industrial processes and infrastructure, fostering innovation and sustainable economic growth
	(11) Sustainable Cities and Communities	Sustainable energy solutions are essential for developing resilient cities and communities that reduce environmental impact and improve quality of life
	(13) Climate Action	advancing clean and renewable energy research is crucial for reducing greenhouse gas emissions and combating climate change
Health	(3) Good Health and Well-Being	Research in health is critical for advancing medical knowledge, improving treatment methods, and ensuring equitable access to healthcare, thereby enhancing overall well-being and life expectancy
	(6) Clean Water and Sanitation	Investigating health issues related to water and sanitation is essential for preventing waterborne diseases, ensuring safe drinking water, and promoting better hygiene practices to protect public health
Knowledge-based Economy	(1) No poverty	Research into a knowledge-based economy drives innovation and creates high-value job opportunities, which are essential for economic growth and poverty reduction

	(4) Quality Education	A knowledge-based economy relies on high-quality education to equip individuals with the skills and knowledge needed for innovation and problem-solving, thereby enhancing educational outcomes and lifelong learning opportunities
	(8) Decent work and economic growth	Prioritizing a knowledge-based economy drives economic growth by creating high-value jobs, fostering innovation, and enhancing productivity, which contributes to decent work conditions and sustainable economic development
	(9) Industry, Innovation, and Infrastructure	A knowledge-based economy fuels industrial advancement and infrastructure development by promoting research, technological innovation, and the efficient use of resources, leading to resilient and future-ready industries
Environment	(6) Clean Water and Sanitation	Environmental research is critical for ensuring the sustainability of water resources, improving sanitation systems, and preventing water pollution to safeguard public health and ecosystems
	(7) Affordable and Clean Energy	Environmental research helps develop clean energy technologies that are sustainable and reduce ecological impact
	(9) Industry, Innovation, and Infrastructure	It supports eco-friendly industrial practices and infrastructure by promoting sustainable innovations and reducing environmental footprints
	(11) Sustainable Cities and Communities	Research ensures cities are resilient, reduce pollution, and manage resources sustainably
	(12) Responsible Consumption and Production	It aids in developing strategies for reducing waste and improving resource efficiency
	(13) Climate Action	Understanding environmental impacts is crucial for mitigating climate change and enhancing resilience
	(14) Life Below Water	Research protects marine ecosystems and addresses issues like pollution and habitat loss
	(15) Life on Land	It is essential for conserving terrestrial ecosystems, combating deforestation, and promoting biodiversity
Social resilience	(1) No poverty	Research on social resilience helps develop effective strategies to alleviate poverty and support vulnerable communities
	(4) Quality Education	It ensures educational systems are robust and inclusive, even during crises
	(5) gender equality	It promotes gender equality by addressing disparities and strengthening support systems

	(10) reduce inequalities	It identifies and addresses factors contributing to inequality, fostering more equitable societies
	(16) peace, justice and strong institutions	It enhances social cohesion and helps build strong institutions capable of managing conflicts and crises

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

Methods and methodologies : Global megatrends, expert and stakeholder consultation, scenario planning, delphi method. However, scenario planning and delphi method have not yet been applied in the development of the Medium-Term Master Plan for STI 2025-2029.

The methodologies used in the development of the Long-Term Master Plan for STI 2025-2045 and the Mid-Term Master Plan for STI 2025-2029 include Global Megatrends Analysis and In-Depth Analysis to identify future challenges and prospects in society. Following this, the results are further analyzed to discover future needs and STI measures in consideration of the Indonesian situation

Global Megatrends Analysis:

The analysis involves comparing data and insights from renowned research institutions and consulting firms such as CSIRO, PWC, Siemens, and Roland Berger with Indonesia's Vision 2045. The selection of these global entities ensures accuracy, credibility, and a multidisciplinary perspective. Here are the six global megatrends that influence Indonesia:

The following six global megatrends significantly impact Indonesia:

1. Demographic Changes: Shifts in population composition, including population growth, aging demographics, and migration patterns.
2. Climate Change: The environmental, economic, and societal impacts resulting from climate change.
3. Technological Advancements: Developments in technologies such as artificial intelligence (AI), automation, and connectivity that affect various sectors.
4. Geo-Economic Shifts: Changes in the distribution of economic power worldwide, including the roles of emerging nations and shifts in economic centers.
5. Geopolitical Transformations: Shifts in international relations, foreign policies, and global conflicts.
6. Competition for Natural Resources: Intensified competition for natural resources, including energy, water, and minerals.

Indonesia's Vision 2045 must consider these factors to effectively address challenges and capitalize on opportunities in the future.

After conducting megatrend analysis, the subsequent steps involve several actions:

- defining the research agenda for global megatrends through periodic surveys and Focus Group Discussion (FGDs). These methods allow for bottom-up input to the research centre. The aim of this activity is to prioritise research areas that can offer solutions to national challenges, with a focus on high-priority research outcomes;
- entails data verification through consultation sessions and FGDs with experts from universities, industries, and technical ministries related to research programs. The aim of this activity is to build the relevance of research programs with the direction of Indonesia's Vision 2045.

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?

Challenges :

- Understanding and capabilities related to ForSTI and TA among human resources are limited
- Active involvement of the private sector in ForSTI and TA processes remains insufficient
- Implementation of ForSTI involves complex processes which need big financial support and take a long time
- ForSTI has not yet been prioritized within Indonesia's research and innovation ecosystem, so using it as the foundation for policy formulation in these fields may still be challenging. BRIN is the only research agency in Indonesia, and technology foresight is one of division
- Data availability, lack of data regarding :
 - industry research needs
 - research and innovation product
 - research activities or topics at research institutions
 - experts at research institutions

Based on our challenges in undertaking ForSTI and TA exercises, the specific capacities needed by Indonesia to advance the implementation and utilisation of ForSTI and TA include:

1. **Enhancing Understanding and Skills:** Improving the understanding and skills of human resources related to ForSTI and TA, including in-depth training and education on the urgency, methodology, and step-by-step analysis. This also involves studying benchmarks from countries that have successfully implemented ForSTI and TA to adopt best practices.
2. **Infrastructure Development:** Improving supporting infrastructure such as data, analytical tools, and information systems necessary for the implementation of ForSTI and TA.
3. **Increasing the Role of the Private Sector:** Developing strategies to enhance active private sector involvement in ForSTI and TA processes to ensure that policies and technology assessments are relevant to industry and market needs, based on benchmarks from countries that have successfully implemented these practices.
4. **Enhancing collaboration among stakeholders:** Strengthening collaboration between BRIN and other stakeholders such as government, universities, industries and national and international research institutions can provide additional support and resources for utilizing ForSTI and TA in policy development.

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?

There is currently **no policy** that combines ForSTI and TA in Indonesia

Benefit:

- Provides a comprehensive understanding, ranging from future scenarios, future technologies, and their societal impact, to evaluating the feasibility and impact of specific technologies on the environment and the economy.

Challenge:

- Involves a complex process that requires multi-stakeholder engagement.

9. Are you involved in any international cooperation or partnerships for ForSTI and TA?

Yes, we are involved in ASEAN Foresight Alliance (AFA). AFA is a platform to facilitate evidence-based future planning and assist the ASEAN Member States (AMS) in developing their national policies, strategies, and action plans.

Their benefits:

- Enhanced Collaboration Among ASEAN Countries
- Investment in Education and Training
- Awareness Campaign for Decision Makers and Bureaucrats
- Educate decision makers about the benefits of the AFA to inform program planning and strategies.
- Highlight how AFA recommendations can bolster economic growth, empower communities, and promote environmental sustainability in ASEAN.
- Partnerships with the Private Sector and International Organizations
- Engage private sector entities, research institutions, and international organizations in advocating for the AFA report.

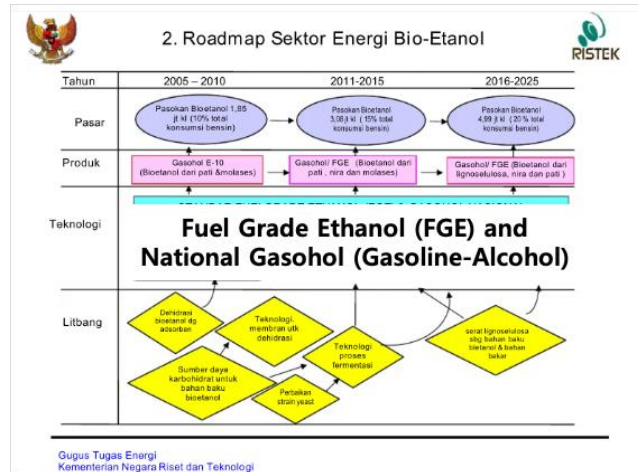
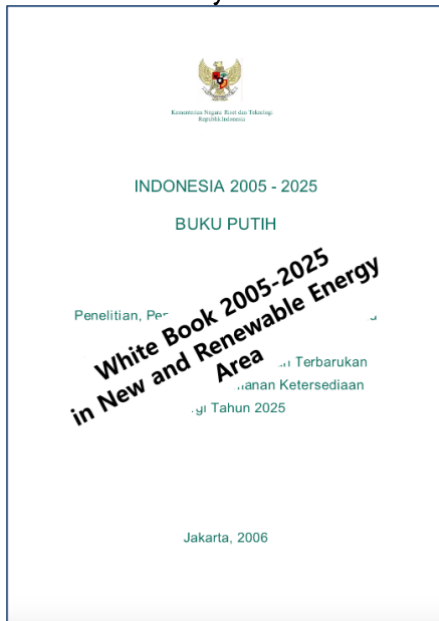
10. What role(s) can international cooperation, and the CSTD, play in promoting ForSTI and TA?

More enhanced collaboration among member countries:

- Actively encourage collaboration among member countries to share knowledge related to technology foresight practices.
- Facilitate the exchange of best practices, data, and insights to strengthen the Science, Technology, and Innovation (STI) ecosystem.

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

Example of national policy, applying ForSTI is **White Book 2005-2025 : New and Renewable Energy and National Policy**



- **Vision and Mission:**
supports the national vision and mission to achieve energy availability backed by national capabilities in science and technology
- **Strategy and Policy:**
formulates research, development, and application strategies and policies at both central and regional levels to support and ensure energy availability, in line with the National Energy Policy as stipulated in Presidential Regulation No. 5 of 2006. Some strategies that have been applied include Resources, institutional and networking framework dan Stakeholders role mapping.
- **Energy Diversification and Efficiency:**
emphasizes the importance of diversifying energy resources and improving energy use efficiency, which are also key focuses in the National Energy Policy.
- **Collaboration and Implementation:**
encourages collaboration between the government, private sector, universities, and research institutions to utilize research and development outcomes in sustainable energy management, in accordance with the directives of the National Energy Policy.
- **Technology Roadmapping Method :**
 - Expert and stakeholder consultation
 - simple scenario planning : based on national doomsday scenario
 - critical technology
- **Priority Framework**
 - Short Term (2005-2010)
 - Mid Term (2011-2015)
 - Long Term (2016-2025)

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

Based on the experience of using ForSTI to develop a long-term science and technology master plan by identifying Indonesia's key future challenges, we can ultimately guide forward-looking research programs that provide solutions to Indonesia's future issues. ForSTI has significantly impacted STI decision-making and policy implementation. Here's how:

- Anticipating trends and changes enables policymakers to identify and foresee future developments in science and technology, technological advancements, and social needs. This foresight assists in determining relevant and impactful priority research areas for the future.
- By understanding potential future scenarios, organizations can allocate their resources more efficiently, prioritizing projects with the greatest potential for success and long-term impact.
- Strategic innovation is encouraged by opening new opportunities for research and development, creating a foundation for discoveries and innovative solutions to complex problems.
- Building foresight involves collaboration across disciplines and sectors, promoting strategic partnerships that can enhance the quality and relevance of research and enable the implementation of STI policies.
- In the face of uncertainty, having a research strategy allows organizations to adapt and remain resilient to unforeseen changes.
- It can influence policy making by providing the necessary evidence and insights to support strategic decisions and research funding allocations.

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.

Mr. Khairul Rizal S.T., M.P.P., Ph.D.

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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