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

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Contribution by IAEA

to the CSTD 2023-2024 priority theme on "Data for Development"

PRIORITY THEME 1: Data for Development

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

To whom it may concern

The 26th CSTD annual session selected "Data for Development", as one of the priority themes for its 27th session (2023-24 period).

Data, including for scientific and research purposes, are becoming a key strategic resource for sustainable development. If well managed, data can help overcome major global development challenges, such as poverty, food security, climate change, disaster risk management, and pandemics. If badly handled, they can generate unequal development outcomes. General Assembly's resolution 77/150 of 14 December 2022 noted that the Commission on Science and Technology for Development could explore the connection between data and sustainable development, including data governance, while taking into account the multiple dimensions of data. The development implications of data, including data quality, data capabilities, and responsible data handling should also feature prominently in discussions about the Global Digital Compact and in the Summit of the Future, adding to the relevance of the CSTD's perspectives on this issue as the UN focal point for STI for development.

Under this theme, the Commission will consider issues such as major contributions and risks of data in relation to the achievement of the 2030 Agenda for Sustainable Development; how to ensure that developing countries benefit from the data revolution while considering risks; national and international policies and support measures that can help address the challenges of the developing countries in the area of data relevant for sustainable development, while taking into account the multiple dimensions of data.

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 2023 in Portugal. In this context, we would like to solicit inputs from international organizations, UN entities and agencies, and regional commissions on this theme. We would be grateful if you could kindly answer the following questions based on your organization's work at the global, regional, and/or national levels:

1. What are the major contributions and risks of data in relation to the achievement of the 2030 Agenda for Sustainable Development?

2. How can developing countries benefit from the data revolution while considering risks?

3. What national and international policies and support measures can help address the challenges of the developing countries in the area of data relevant for sustainable development, including scientific and research purposes, data quality, data capabilities and data governance, while taking into account the multiple dimensions of data?

4. What could be the role of the CSTD as part of the overall work on the UN in the field of digital data?

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

Please send your responses and any further inputs on the theme to the CSTD secretariat (stdev@unctad.org) by **15 August 2023**. We look forward to receiving your valuable inputs.

Sincere regards,

CSTD secretariat

1. *What are the major contributions and risks of data in relation to the achievement of the 2030 Agenda for Sustainable Development?*

Quality data play a fundamental role in the optimisation of existing processes and in the capacity to innovate sectors that are key to support the socio-economic development of countries. In a world asked to address complex challenges, nuclear scientific data can provide, by their essence, the accuracy (at atomic level) and reliability necessary to support informed decisions.

When tackling global developmental challenges, harmonisation of data can be a game-changer in so far as enabling the establishment of reliable, objective and usable databases, enhancing knowledge sharing and identifying solutions to inform global policy resolutions. Especially under such circumstances, not harmonising data increases the risks of delays in the definition and implementation of actions which are critical for the progress/achievement of the 2030 Agenda.

In relation to the single SDGs, nuclear science and technology contributes to the acquisition of quality data by, for instance:

- *SDG 2 – Zero Hunger/Target: End Malnutrition*
  Data provided by stable isotopes applied to nutrition (such as the protein intake of infants through breastfeeding) can allow countries to develop food fortification programmes to compensate for critical deficiency in their population. This has been the case, for instance, of the National Fortification Alliance programme developed by Morocco to enrich wheat flour to combat iodine deficiency.

  SDG 2 – Zero Hunger/Target: Increase Agricultural Productivity
  Data provided by neutron sensors assessing for example the nitrate contents of agricultural soils can inform fertigation systems, allowing for the right amount of water and fertilizers to be used, thus resulting in cost savings and increased agricultural productivity. A recent example is offered by Namibia, now using a combination of nuclear techniques and a water-saving irrigation technology, known as small-scale drip irrigation, for watering the fields in the northern regions of Kavango East, Kavango West, Omusati, Oshikoto and Tsumeb.

- *SDG 3 – Good Health and Wellbeing/ Target: Reduce mortality – NCD*
  Data obtained through nuclear medicine and medical imaging helps in the early detection of noncommunicable diseases such as cancer, diabetes, cardiovascular diseases, but also infectious diseases such as COVID-19 and neurological disorders such as Alzheimer. Early detection couple with adequate treatment such as radiation oncology for cancer contributes to reducing mortality.

The IAEA has established the Rays of Hope initiative to support the establishment and expansion of radiotherapy services, with a particular focus on the more than 20 IAEA Member States that completely lack facilities for radiation treatment.

Adhering to the concept of One Health, the IAEA launched in 2020 the Zoonotic Diseases Integrated Action (ZODIAC) project, aimed at building the capacity in Member State to detect, monitor and diagnose zoonotic diseases outbreaks, using nuclear and nuclear derived techniques.

– *SDG 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*

The IAEA Marie Skłodowska-Curie Fellowship Programme (MSCFP) aims to encourage women to pursue a career in nuclear-related fields by providing highly motivated female students with scholarships for master's programmes and an opportunity to pursue an internship facilitated by the Agency. Since its launch in 2020, 360 students have been selected representing 110 Member States, studying in 65 countries worldwide. Under the MSCFP, by end of July 2023, 130 students completed their master's programme; from these graduates, 83 have been confirmed for an internship facilitated by the IAEA at IAEA headquarters, labs, Collaborating Centres, as well as at private sector companies and other partner organizations. The remaining have pursued PhD studies or obtained employment in the field. MSCFP is currently in its fourth year of implementation. The fourth application period opened on 14 July 2023 and will close on 30 September 2023. The review and selection activities will conclude by end of 2023.

The Agency's Lise Meitner Programme (LMP) was launched on 8 March 2023 to boost the career development of women in the nuclear sector. It provides early- and mid-career women professionals with opportunities to participate in a multi-week visiting professional programme and advance their technical and soft skills. The LMP focuses on retention and includes professional visits to various nuclear facilities, such as those under construction, operation or decommissioning, research centres, scientific institutions, laboratories, industry and start-up companies. In addition, the participants have an opportunity to broaden their individual professional relationships with a range of leaders and experts in the field. The first visiting professional programme (LMP1_USA) was hosted at the North Carolina State University in Raleigh from 5 to 16 June 2023 with a cohort of 13 participants. Specific to this programme was the objective of supporting continued growth of community of nuclear professionals by strengthening their individual technical expertise focusing on nuclear power plant operation. The second visiting professional programme (LMP2_USA) is expected to take place from 16 to 27 October 2023. The first week will be hosted by the Oak Ridge National Lab and the second week will be hosted by the

Idaho National Lab. Specific to this programme is the objective of supporting continued growth of community of nuclear professionals by strengthening their individual technical expertise focusing on nuclear reactor modelling and simulations and virtual environments.

- *SDG 6 – Water and Sanitation/ Target: Achieve Universal Access to Safe and Affordable Drinking Water*

Data provided through isotope hydrology can provide accurate information on the location, volume and age of underground freshwater resources thus allowing decision makers to take long term decisions regarding water resource management in a given region/country. Today the IAEA is helping more than 60 countries around the world to protect and manage their water resources through the use of such technologies.

The IAEA also launched, at the UN 2023 Water Conference, the Global Water Analysis Laboratory (GloWAL) Network, aimed at empowering Member States to generate their own chemical, biological and isotopic water data.

SDG 6 – Water and Sanitation/ Target: Wastewater Treatment

The use of electron beam for industrial wastewater treatment (such as water coming from dyeing industry) can efficiently degrade organic and microbiological pollutants, thus resulting in organically and chemically clean water rejected in the environment. An example to this end is the treatment of wastewater from textile dyeing in Brazil.

- *SDG 7 – Energy/ Target: Ensure Universal Access to Energy Services*

Nuclear technologies can contribute to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, as well as promoting investment in energy infrastructure and clean energy technology. Furthermore, energy planning can support the supplying of modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective national plans.

The Agency supports Member States towards the safe and secure deployment of small modular reactors, which can enhance energy security while helping to achieve global climate goals. To this end, the IAEA has launched two interconnected mechanisms: the IAEA Platform on Small Modular Reactors and their Applications and the Nuclear Harmonization and Standardization Initiative (NHSI). Serving as the focal point for the Agency's activities in the field of small modular reactors and their applications, the Platform provides coordinated support and expertise from across the

entire Agency, encompassing all aspects relevant to the development, deployment and oversight of small modular reactors. The Platform is designed to facilitate cooperation and collaboration among Member States and other stakeholders, supporting the safe and secure deployment of small modular reactors worldwide. It supports Member States in the early deployment of small modular reactors, including in accelerating their technology development and demonstration, enhancing their readiness level, and analysing the competitiveness of small modular reactors with respect to other clean energy technologies. Since its inception several requests for assistance have been received by the Platform from Member States.

The Nuclear Harmonization and Standardization Initiative (NHSI), launched in 2022, reflects the need for the harmonization of regulatory, and the standardization of industrial, approaches for small modular reactors. NHSI aims to advance the effective, safe and secure global deployment of advanced nuclear reactors, in particular small modular reactors, which are expected to play an important role in achieving net zero targets. Under NHSI, regulators, designers, operators and international organizations work together, consistent with respective roles and responsibilities, to harmonize regulatory and standardize industrial approaches.

In addition, Atoms4NetZero aims to help unleash the full potential of nuclear energy to contribute to net zero energy systems by providing the technical expertise and scientific evidence needed to advance the use of nuclear technologies in decarbonizing energy production and consumption, including for high-emission industries. The initiative seeks to support policymakers and industrial actors to harness the potential of nuclear energy, including through the innovative technologies, ideas, and policies needed to transition to a carbon neutral future. Atoms4NetZero encompasses specific workstreams to assess and highlight the role of nuclear in decarbonizing energy systems via:

o   National and regional energy scenario modelling to assess the full potential of nuclear technologies, including small modular reactors, towards net zero energy systems, while ensuring sustainable development, favourable economic impact and job creation;

o   Ad-hoc IAEA expert missions to support the development of long-term energy strategies and updates of Nationally Determined Contributions (NDCs) that consider nuclear energy;

o   Collaboration through workshops, seminars, training and tailored capacity building activities in net zero transition planning;

o   Engagement of stakeholders, including industrial partners, regulators, and policymakers, to address various challenges, including the decarbonization of hard to abate sectors, through the supply of low carbon heat and/or hydrogen, and the development of advanced reactor technologies;

o   Outreach activities, communication, and multi-stakeholder engagement, to highlight the key role of nuclear energy in achieving net zero goals for the clean energy transition.

- *SDG 11 – Cities/ Target: Disaster Risk Reduction*

Data collected through the use of non-destructive testing techniques (NDTs) can inform on the structural integrity of major buildings following an earthquake or a flood for example, thus allowing a safe return of populations and/or considerable savings in buildings that can still be safely used. NDTs use has been evaluated also to assess the structural damage of buildings impacted by the tremors in the aftermath of the Türkiye and Syria earthquake.

- *SDG 13 – Climate Action/ Target: Strengthening Resilience and Adaptive Capacity*

Data provided using radiolabelled markers in molecular biology can inform breeding selection (for salt, heat, drought tolerance for example) of vital crops seeds (wheat, sorghum) at the basis of staple food. Same is true for the selection of traits in animal breeds (cattle, lama, sheep, goats) for increased milk/meat production in climate change affected areas. Bangladesh, for instance, has been able to developed over 59 new crop varieties using nuclear technology and 23 varieties of 12 different crop species using marker-assisted and other breeding techniques. With reference to livestock, a specific Coordination Research Project engaging developing countries is ongoing, with a view to enhance the efficiency of national dairy breeding programmes (cattle, buffalo and camel) to improve productivity and adaptability of local genetic stock.

Data accumulated for decades through the Global Network of Isotopes in Precipitation, a database established and managed by the IAEA since 1960, allows climate change specialists around the world to develop models for the evolution of climate change and its impacts.

- *SDG 14 – Life below Water/ Target: Marine Pollution*

Nuclear data can allow tracing and identifying the geographical origin of marine pollution such as, for instance, in the case of oil spills; nuclear data can also inform decision makers through monitoring ocean pollution by microplastics, but also new pollutants of concern such as flame retardant. To this end, the IAEA has launched a flagship initiative, NUTEC Plastics, to address the global challenge of plastic pollution.

SDG 14 – Life below Water/ Target: Ocean Acidification

Data collected through nuclear techniques help collecting information on ocean acidification (an indirect impact of climate change), thus allowing informed decisions by relevant authorities on

the future of fisheries around the globe. The IAEA, through its Ocean Acidification International Coordination Centre (OA-ICC), supports several networks of scientists, such as the Ocean Acidification Africa (OA-Africa) and its research agenda, aiming to understand what acidification means for countries in Africa where the status of such process and its impacts on local species are not yet well understood.

SDG 14 – Life below Water/ Target: Protect Ecosystems
Data collected through nuclear techniques allow for the assessment of carbon in coastal ecosystems such as mangroves (Blue Carbon), thus allowing for an informed planning of carbon sequestration in the relevant areas of the globe. To date, such techniques are utilised in Blue Carbon projects in more than 30 countries, aiming to assess the rates of carbon sequestration in vegetated coastal areas and to aid in data collection. On the African continent alone, the IAEA is working with 12 countries to build capacity on Blue Carbon, training scientists and assisting with the establishment of laboratories that could accurately measure carbon sequestration rates.

- *SDG 15 – Life on Land/ Target: Land Management*
Data generated through nuclear techniques applied in soil can for example inform on soil degradation in mountainous areas (where soil is being washed down to the valley areas), allowing decision makers to better plan for land management or, for example, the lifespan of a dam. The use of such technology can, for instance, enable to assess the impact of climate change in high mountain ecosystems, such as glaciers, wetlands and others; by measuring via nuclear techniques sedimentation rates in natural and artificial water bodies, scientists can find out critical data on soil degradation and understand past and current changes in climate and the landscape.

- *SDG 17 – Partnerships*
South-South and Triangular Cooperation mechanisms are a key component of the IAEA projects and programmes supporting developing states, as a way to enhance sustainability of results and to strengthen access to nuclear science, technology and innovation via capacity building and continuous knowledge sharing. Examples to this end include the followings:
  - The establishment of a Data Sharing Committee (DSC) in Latin America and the Caribbean, aimed to facilitate the international trade of food products and to ensure food safety in national and regional markets. The initiative will enable the official food safety laboratories of 17 countries in the region to share analytical data for public health with the long-term goal of establishing a regional preparedness system for food safety. The

laboratories use nuclear and related techniques to analyse food samples, providing valuable information that can shed light on the safety of food that is traded and consumed. Properly functioning laboratories and strengthened controls and inspections can help identify types of hazards in food and contribute to minimizing opportunities for food fraud and contamination. Improved testing and access to comprehensive and accurate data will enable authorities throughout the region to manage and mitigate risks and improve risk-based monitoring programmes.

- o Through the Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA), the IAEA supports the capacity building of Arab countries in the early detection, diagnosis and treatment of cancers by organizing regional and national workshops, working closely with Ministries of Health, scientific organizations and civil society, and helping to procure laboratory consumables and critical equipment.

- o With the support of the IAEA, Djibouti has recently established a new facility, the Regional Research Observatory on the Environment and Climate (RROEC), a research observatory to study the impact of climate change by using nuclear and related techniques to produce data and climate models that can inform political decisions on climate adaptation and resilience for the whole East African region.

- o The IAEA put in place a Sub-Regional Approach to the Pacific Islands (SAPI) to address challenges faced by the Pacific Islands, including those related to nutrition, agricultural productivity, non-communicable diseases (specifically cancer), marine and coastal environments, water resource management and radiation safety. SAPI provides a platform to increase sub-regional collaboration and amplify the impact of the use of nuclear technologies for development.

Furthermore, the IAEA welcomes collaboration with international and regional organisations, private sector and other stakeholders as a way to ensure cohesive and sustainable support to its Member States. The IAEA is a member of several UN Interagency Task Force mechanisms, such as the Prevention and Control of Non-communicable Disease (UNIATF). Another example relating to partnerships within the UN system is represented by the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture that is managing five R&D laboratories in Seibersdorf, Austria. Through its Joint Centre, the IAEA is supporting its Member States in increasing agricultural productivity through climate smart agriculture.

2. *How can developing countries benefit from the data revolution while considering risks?*

Developing countries can benefit from nuclear science and technology data by:

– Identifying suitable solutions to development needs and challenges related to key sectors such as health, food security, energy and water provision;

– Capitalising on knowledge and information sharing to enable science based and informed decision making;

– Enhancing capacity building.

3. *What national and international policies and support measures can help address the challenges of the developing countries in the area of data relevant for sustainable development, including scientific and research purposes, data quality, data capabilities and data governance, while taking into account the multiple dimensions of data?*

The establishment and implementation of South-South and Triangular cooperation mechanisms could provide good measures to address the challenges of developing countries in the area of data for sustainable development. To this end, the IAEA supports its Member States directly and through a system of regional cooperative agreements:

o African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA);

o Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA);

o Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL);

o Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA).

In addition, the Agency engages developing countries through a system of laboratory networks aimed to nurture the common understanding of science that will help us to overcome the current crises. Such approach is at the core of the Agency's flagship initiatives Zoonotic Disease Integrated Action (ZODIAC) and NUTEC Plastics.

More than 30 networks at regional and global levels are also supported by the IAEA to facilitate data and information sharing, learning and exchange of best practices; examples to this end are the African Network for Education in Nuclear Science and Technology (AFRA-NEST) and the Asian Network for

Education in Nuclear Technology (ANENT), aimed to facilitate human resource development and nuclear knowledge management.

4. *What could be the role of the CSTD as part of the overall work on the UN in the field of digital data?*

‒ Raise awareness about the solutions offered by the nuclear STI for development;

‒ Facilitate the identification of complementary STI for development;

‒ Support partnership and networking actions.