

SUMMARY REPORT



NUTEC Plastics A nuclear solution to plastic pollution

ROUNDTABLE

FOR THE AFRICA REGION

2 September 2021, Vienna, Austria



IAEA

International Atomic Energy Agency
Atoms for Peace and Development



The sea as seen through a discarded plastic bottle by the beach. (Photo: Karuvacography/Pixabay)

NUTEC Plastics Roundtable

FOR THE AFRICA REGION

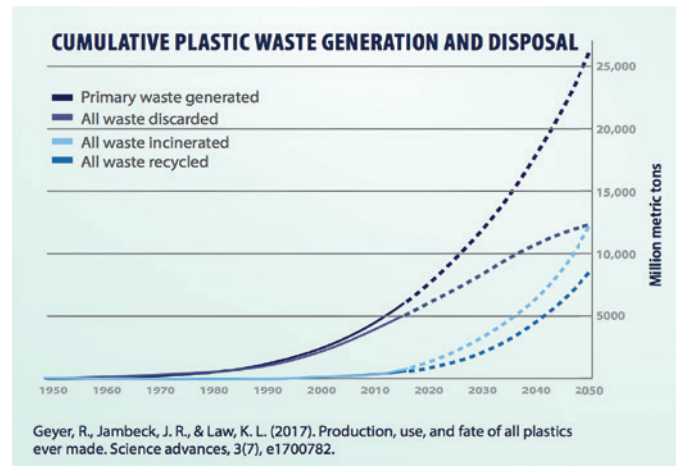
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Background on NUTEC Plastics

Following current trends, the oceans are expected to contain one tonne of plastic for every three tonnes of fish by 2025, and by 2050, there will be more plastic than fish.¹ Approximately 70% of all plastics produced to date is now waste and of this only 9% is being recycled globally. In many places, plastic waste is mismanaged and ends up in unregulated landfills or open dumps from where it enters the ocean.²

Plastic waste pollution not only has adverse effects on the oceans, but also on terrestrial environments such as soil and groundwater. Even as waste, plastic does not decompose due to its durability and longevity. When it reaches the ocean, it can remain there for hundreds of years, and over time it fragments and turns into micro- and nano-plastic. The problem of plastic pollution is increasingly receiving global attention, but gaps in addressing the problem remain due to the lack of sufficient awareness, knowledge, technology, financing and effective policy.



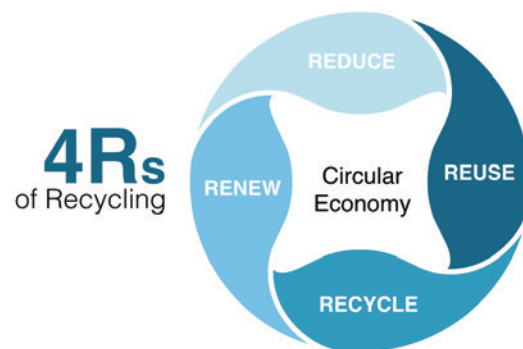
70% of all plastics produced to date is now waste.

Only 9% is being recycled globally

Towards a circular economy

The linear model of producing, using and disposing plastic is unsustainable. A global approach is needed that establishes a circular economy and focuses on the ‘4Rs’: reduce, reuse, recycle and renew. Analysis and evidence show that nuclear applications can complement existing technologies and thus accelerate the transition towards a circular economy for plastics.

However, the potential contribution of nuclear science and technology for addressing the plastic waste problem is not well known, and hence is rarely integrated into proposals for sustainable, scalable solutions. A change is needed to increase the knowledge and awareness of these techniques and technologies. More importantly, they need to be applied more broadly in practice in order



to use the full potential of nuclear techniques in reducing the global plastic waste burden.

For this to happen, and based on its previous and existing work, the IAEA has developed NUTEC Plastics to assist IAEA Member States in integrating nuclear techniques in their efforts to address challenges of plastic pollution –

1 World Economic Forum, ELLEN MacARTHUR Foundation, MCKINSEY Center for Business and Environment, The New Plastics Economy – Rethinking the Future of Plastics, WEF, Cologne (2016).
 2 GEYER, R., JAMBECK, J.R., LAW, K.L., Production, use, and fate of all plastics ever made, *Sci. Adv.*, (2017).

making IAEA's contribution to solving this global problem more apparent and perceptible. The IAEA supports research and uptake of nuclear techniques in two main areas: monitoring and assessment of marine plastics and plastic/polymer waste recycling and upcycling.

Radiation technology in plastic waste recycling

Radiation technology for industrial purposes, such as gamma and electron beams, offers unique advantages for reducing plastic and polymer waste and therefore fill existing technological gaps in dealing with such waste. Irradiation can address sorting challenges experienced by mainstream mechanical recycling methods by enabling effective sorting of plastic wastes to feed into recycling streams, thus improving the quality and value of the recycled plastics.

Radiation technologies can be used to transform or recycle plastic waste into other products, such as fillers and binders for construction materials. They can also be used to break down or convert waste plastic polymers into smaller components, fuel or monomers to generate chemical feedstocks to produce consumer products, with or without the addition of virgin polymers. Reduction of plastic waste is also possible by replacing petroleum-based plastics with biodegradable biopolymers obtained through radiation-driven processes.

Furthermore, radiation technology offers cleaner production and recycling processes, thus reducing the use of potentially harmful additives and solvents, as well as delivering energy savings.

NUTEC Plastics will integrate radiation technologies for plastic waste recycling into national, regional and global initiatives. Ongoing laboratory scale activities are paving the way for pilot plastic recycling plants to establish the volume, energy and financial balances associated with using radiation technologies to recycling various plastic wastes. Based on the proof



Radiation technology can help in the effective sorting of plastic wastes thus improving the value of the recycled plastics. (Photo: D. Jekic/123rf)

of principle and experience gained from the pilot(s), the technology will be scaled up to a large-scale plastic waste recycling demonstration plant(s)³.

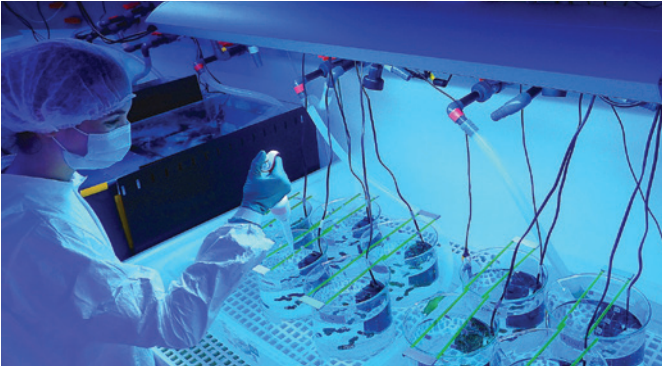
Protecting the oceans

Oceans are the final repository of mismanaged and unrecycled land-based plastics, and there is a lack of sufficient knowledge and understanding of the abundance and impact of microplastics in the ocean. More accurate data are needed to assess the effect that microplastics and associated contaminants have on marine organisms that are part of the global food chain, such as food for human consumption, and therefore on seafood exports, food safety and human health. Isotopic techniques offer unparalleled precision and complement conventional techniques in tracking the abundance and



Photo: R. Quevenco

3 IAEA Brochure: NUclear TEChnology for Controlling Plastic Pollution (2021).



Researchers at the IAEA Environment Laboratories model realistic scenarios to examine how and to what extent microplastics can transfer contaminants to marine organisms and eventually to humans. (Photo: Francois Oberhaensli and Hugo Jacob/IAEA)

distribution of nano- and microplastics in the marine environment.

Isotopic tracers, imaging techniques and gamma and beta counters have unique abilities to assess the impacts of micro- and nano-plastics on marine biota. These techniques provide important markers for studying the toxicity of plastics on living organisms, to reveal in detail the impacted organs and systems, and allow to trace the actual toxicological stress and their possible propagation in food chains that can ultimately impact humans through consumption of seafood.

NUTEC Plastics will strengthen and scale up the development of reliable and cost-effective techniques to assess the spatial and temporal abundance and character of marine plastics to better understand their origin, transport mechanisms, as well as fate and impact. This includes the establishment of harmonized, standardized protocols to identify microplastics in environmental samples, analytical techniques that are in line with best practices and state-of-the-art science, and training for scientists and technicians in their use.

Global partnership needed

A holistic and sustainable solution to the global plastic burden requires an integrated and comprehensive approach that can only be achieved in partnership with organizations that have complementary roles and

expertise. Working within existing national, regional and international initiatives, including private-public partnerships is essential. This includes collaboration with United Nation entities, multilateral development banks, philanthropies, existing large-scale initiatives and multistakeholder platforms, private sector, and scientific and research institutions. The private sector will be a critically important partner in making the transition to a circular plastic economy, underpinned by strong governmental action and ownership through enabling policies and supportive legal environment.

NUTEC Plastics' two main components – monitoring and assessment and plastic recycling – are logically intertwined as both represent a contribution to the solution of the global plastic pollution problem. However, implementation of the two components is not contingent on each other.

Taking this connected but not co-dependent relationship into account, NUTEC Plastics adopts a modular approach. This approach offers the advantage of facilitating the implementation of certain activities according to resource availability, while offering Member States and partners the opportunity to engage in activities linked to their profile, preferences and priorities.

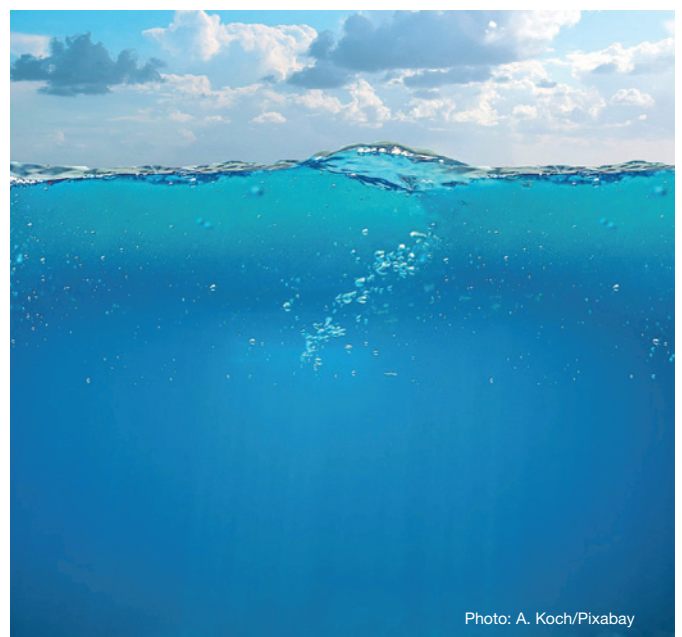


Photo: A. Koch/Pixabay

Summary of the NUTEC Plastics Roundtable for the Africa Region



The NUTEC Plastics Roundtable for Africa, ‘NUclear TEChnology for Controlling Plastic Pollution’, was organized to provide a platform for presenting and discussing new solutions to address global plastic pollution, with a particular focus on the unique contributions of nuclear technologies and the promotion of partnerships for an integrated, coordinated and solution-oriented approach in the global fight against plastic pollution. As a result, new partnerships for NUTEC Plastics were established and ways of cooperation in Africa were outlined.

The Roundtable provided a platform to discuss ongoing efforts, innovative solutions and partnerships to confront plastic pollution from a African regional perspective.

IAEA staff, along with policy makers, researchers and scientists from the region shared their knowledge of, and expertise in, technologies for recycling plastic waste and monitoring marine plastic pollution. They also exchanged information on existing programmes and practices to explore opportunities for cooperation.

IAEA Director General Rafael Mariano Grossi chaired the first session which included the participation of honourable Ministers of the Environment from Djibouti, Ghana, Kenya, Nigeria and Senegal, Keynote speaker ‘UN Secretary-General’s Special Envoy for the Ocean’, and distinguished panellists from the United Nations Environment Programme, and the United Nations Economic Commission for Africa.

The Roundtable event highlighted how plastic pollution adversely affects the marine environment, the food chain and, ultimately, human health. Participants also learned how the plastic pollution problem may hinder the achievement of some Sustainable Development Goals (SDGs) such as SDG 6 ‘Clean Water and Sanitation’, and SDG 14 ‘Life Below Water’. Discussions highlighted the urgent need to move away from the common use of plastic today, and from the linear ‘take-make-waste’ model towards a sustainable circular economy for plastics built on the 4R principles: reduce, reuse, recycle and renew.

Participants were informed about various initiatives, programmes and projects to apply sustainable solutions to plastic pollution launched at national levels, and by international and regional institutions in Africa. Furthermore, speakers at the Roundtable emphasized the critical role of science, technology, innovation and collaboration in addressing the issue.

Through NUTEC Plastics, the IAEA supports and contributes to these global, regional and national responses. It builds on the IAEA's efforts to deal with plastic pollution through its portfolio of existing and planned research projects and activities. IAEA technical cooperation projects help to strengthen the recycling process using radiation technology and support marine microplastic monitoring with the use of isotopic tracing techniques.

In summary, the Roundtable presented activities under NUTEC Plastics that will support the continuing development of new solutions to address plastic pollution, with a particular focus on the unique contributions of nuclear technology. It highlighted the need to strengthen partnerships for an integrated, coordinated and solution-oriented approach to tackling plastic pollution.

Attendance Per Affiliation	
Government	77
Industry/private sector	4
IAEA	58
National nuclear institutions	106
Permanent missions	38
Research institutions	123
Other	5
Total registrations (including 19 external panelists)	411

Roundtable Participants



411 total attendees
58 IAEA + 353 external participants



49 countries represented
46 of which are African countries



5 international/regional organizations



19 panelists
internal and external senior level officials



3 roundtable sessions

Attendance Per Country			
Algeria	5	Malawi	5
Angola	6	Mali	4
Austria	59	Mauritania	6
Benin	2	Mauritius	3
Botswana	3	Morocco	28
Burkina Faso	14	Mozambique	2
Burundi	10	Namibia	10
Cameroon	5	Niger	10
Central Africa Republic	4	Nigeria	34
Chad	7	Republic of Congo	2
Comoros	2	Republic of Guinea	1
Côte d'Ivoire	8	Rwanda	3
Democratic Republic of the Congo	5	Senegal	12
Djibouti	11	Seychelles	2
Egypt	6	Sierra Leone	1
Eritrea	1	South Africa	8
Eswatini	3	Sudan	8
Ethiopia	12	Tanzania	13
Ghana	18	Togo	8
Jordan	1	Tunisia	10
Kenya	22	Uganda	6
Lesotho	8	UK	1
Liberia	4	Zambia	5
Libya	5	Zimbabwe	3
Madagascar	5		
Total (including 19 external panelists)			411

Introduction



Photo: O. Sushko /Unsplash

Global plastic pollution has become one of the major environmental challenges of the 21st century. Many factors such as human population growth, urbanization and industrialization⁴ contribute to the rising rates of plastic pollution in the world, and these are also applicable in Africa.

Large volumes of waste end up in open and uncontrolled dumpsites. Eighteen of the 50 largest dumpsites are located on the African continent. In 2015, five African countries (Algeria, Egypt, Morocco, Nigeria, and South Africa) were listed among the top 20 countries with the highest levels of mismanaged plastic waste, each generating between 0.31 and 0.97 million tonnes per year⁵. More recent scenarios have suggested that by 2060, due to end-user demand for plastic products on the continent, eight African countries would be in the top 10 nations with the highest plastic waste generation rates. The issue is, therefore, high on the political agenda both regionally and nationally.

Decision makers at all levels are involved in adopting measures to prevent and reduce plastic pollution in an integrated land-to-sea approach. Entry points for action include scientific developments to provide effective and accurate methodologies to monitor plastic pollution and prevent it at its roots on land, reduction of plastic waste

through broader and intensified recycling efforts, and evidence-based support for holistic decision making for healthy marine and terrestrial environments.

The role of the IAEA

The IAEA is the world's central intergovernmental forum for scientific and technical cooperation in the nuclear field. It works for the safe, secure and peaceful use of nuclear science and technology, contributing to international peace and security and the attainment of the Sustainable Development Goals.

The technical cooperation (TC) programme is the IAEA's primary mechanism for building capacities in the peaceful application of nuclear technology in Member States, supporting their efforts to address key development priorities.

The IAEA technical departments provide the nuclear scientific and technological expertise for the TC programme in transferring proven nuclear techniques, as

⁴ How Innovation and Emerging Technologies Are Addressing Plastic Waste Pollution in Africa (www.nepad.org/blog/how-innovation-and-emerging-technologies-are-addressing-plastic-waste-pollution-africa#_ftn1).

⁵ Pan-African research networks are needed to manage continent's plastic pollution threat (<https://theconversation.com/pan-african-research-networks-are-needed-to-manage-continent-plastic-pollution-threat-168244>).

NUTEC Plastics...

... builds on a portfolio of IAEA research and technical cooperation projects in plastic recycling using radiation technology, and in marine monitoring of microplastics via isotopic tracing techniques. With NUTEC Plastics, the IAEA seeks to engage and expand dialogue with Member States, partners, industry and civil society. It provides a vision for the solutions that the IAEA offers to support better management of plastic waste. Implementation of activities will take place through established IAEA delivery modalities, such as technical cooperation and coordinated research projects and other programmatic activities.

well as conducting research and development and providing training and analytical services to IAEA Member States.

The IAEA undertakes research and development (R&D) activities in its own laboratories in Seibersdorf and Monaco, as well as through its extended research networks of research institutions, academia and reference laboratories around the world, and its Coordinated Research Projects and Collaborating Centres.

Roundtable for the Africa Region

To raise awareness of NUTEC Plastics among Member States and partners, a three-hour virtual Roundtable for the Africa Region titled ‘Atoms Contributing to the Search for Solutions to Plastic Pollution’ was organized on 2 September 2021. The Roundtable provided a platform for presenting and discussing new solutions to address the global plastic pollution challenge. The event focused on the unique contributions that nuclear technologies can make in addressing plastic pollution, and promoted partnerships for an integrated, coordinated and solution-oriented approach to the global fight against plastic pollution.

Member States in Africa have developed adequate infrastructure and R&D capacity in the application of radiation technology for polymer processing. A four-year regional project for 2022-2025 on ‘Reutilizing and Recycling Polymeric Waste Through Radiation Modification for the Production of Industrial Goods (AFRA)’ (RAF1010) has been developed to accelerate the transition towards a circular plastic economy by adopting and applying nuclear science and technology solutions. It will help to support the efforts of Member States to recycle waste and improve their pollution reduction programmes and energy consumption by prioritizing the use of radiation technologies with effective approaches, better implementation and enhanced competencies. Through this regional project, optimum benefits from radiation technologies may be achieved in a cost-effective manner, by building the necessary human resources as well as the programmes in the utilization of radiation technologies with better approaches, and competent personnel in relation to the recycling of plastic waste. Member States equipped with adequate facilities for the implementation of the project will be asked to facilitate the provision of product development and the necessary technical assistance to other MSs.



A three-hour virtual Roundtable for Africa Region titled “Atoms Contributing to the Search for Solutions to Plastic Pollution” was organized by the IAEA on 2 September 2021. (Photo: Dean Calma/IAEA)

Proceedings of the Roundtable

Session One

Plastic Pollution: Challenges and the Need for Global Action

Opening Remarks



Mr. Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA. (Photo: Dean Calma/IAEA)

Mr Shaukat Abdulrazak, Director of the Division for Africa, Department of Technical Cooperation, IAEA, welcomed the participants, distinguished panellists and speakers to the regional NUTEC Roundtable for the Africa Region on addressing plastic pollution using nuclear technology. He introduced the set-up of the Roundtable, which consisted of two Sessions. Session 1, 'Plastic Pollution: Challenges and the Need for Global Action', was chaired by IAEA Director General Rafael Mariano Grossi with the participation of honourable Ministers of

the Environment from Djibouti, Ghana, Kenya, Nigeria and Senegal, Keynote speaker 'UN Secretary-General's Special Envoy for the Ocean', and distinguished panellists from the United Nations Environment Programme, the United Nations Economic Commission for Africa, and the Head of the Environmental Affairs Agency of Egypt . Session 2 was on 'Partnerships for Sustainable Solutions to Plastic Pollution', with the participation of IAEA experts and distinguished specialists and experts from the region. The event wrapped up with the support of Deputy Director General and Head of the Department of Technical Cooperation Liu Hua, determining the way forward through collaborative programmes and activities.

Mr Abdulrazak explained that the focus of Session 1 was on key policy and socioeconomic issues, regulatory frameworks and initiatives for strengthening partnerships and synergies to address plastic pollution from its source to the sea, while the focus of Session 2 was on nuclear technologies for recycling and for marine microplastic monitoring, on providing a programmatic overview of NUTEC Plastics at the IAEA, and on presenting national and regional project results on marine microplastics monitoring and experiences on the use of radiation for transforming plastic waste materials into valuable goods.

Remarks from IAEA Director General Rafael Mariano Grossi

Director General Rafael Mariano Grossi opened Session 1 by welcoming the participants to discuss and share ideas about NUTEC Plastics. In addition to the important initiatives and policies to confront plastic pollution already in place in many African countries, the IAEA brings the contribution of nuclear science and technology to the table to help in tackling this serious problem and providing more solutions in an efficient way.

Mr Grossi commended the wide participation at the roundtable, including ministerial level representation from many countries, which demonstrated commitment and conviction to lead the way in finding solutions to the problem of plastic pollution.

He emphasized that plastic pollution is one of the major environmental issues of the century, adversely affecting marine populations, wildlife habitats, and humans. While important progress has been made in the past few years and there is a growing awareness of the problem and how to deal with it, unmanaged disposal still results in plastic pollution. At the global level, 1 million plastic drinking bottles are purchased every minute, and 5 trillion single-use plastic bags are thrown away each year. Approximately 70% of all plastics produced to date is now waste and only 9% of this has been recycled. This is a clear indication of the need to speed up and take urgent actions.

Mr Grossi pointed out that the IAEA NUTEC initiative can add value to ongoing efforts on plastic identification and diagnostics, and can contribute to efforts to find a solution to the issue. Nuclear techniques, through the utilization of isotopic tracers, allow us to know with incredible precision the amounts and characteristics of micro- and nanoplastics in seas, marine environments and fish. Other nuclear techniques can be used to contribute to plastic waste recycling.

There are many initiatives ongoing to address plastic pollution around the world, and the IAEA is reaching out and consulting with partners within the UN system, the private sector, and other areas, to join forces.



IAEA Director General Rafael Mariano Grossi addressing the Roundtable event. (Photo: Dean Calma/IAEA)

“Global problems need global solutions and we can only solve big issues when we come together.”

— IAEA Director General Rafael Mariano Grossi

Keynote Address by Mr Peter Thomson (UN Secretary General's Special Envoy for the Ocean)

In his speech, Mr Thomson highlighted the combined challenges posed by ocean acidification, deoxygenation and warming, all of which are exacerbated by the growing plastic pollution problem. He stressed that the state of the oceans' health is scientifically measurable and is in decline. One of the greatest tasks of our time is to stop that decline and to restore the good health of the oceans, which is necessary for a healthy planet.

He urged all to participate in the Glasgow Climate Change Conference (UNFCCC) held in November 2021, to demonstrate the political commitment and climate finance necessary to reach Net Zero pollution by 2050. If efforts are not concerted by 2050, there will be more plastic in the ocean than fish.

Mr Thomson said that many people around the world are raising their voices about the problem and that solutions are being sought. He praised the Governments of Ecuador, Germany, Uganda and Vietnam, which convened a ministerial meeting of interested parties seeking to drive plans to establish an international treaty to stop marine plastic pollution. Mr Thomson was encouraged that the NUTEC Plastics Roundtable for the Africa region was exploring opportunities for cooperation and partnerships, including resource sharing and resource mobilization with the IAEA and its nuclear techniques capabilities.



Participants at the Roundtable watching Mr Thomson's keynote speech. (Photo: Dean Calma/IAEA)

Mr Thomson highlighted that the UN Ocean Conference will be organized in cooperation with the Governments of Kenya and Portugal in Lisbon in mid-2022. Marine pollution will be one of the focuses of the conference, including consideration of the progress made to address it so far, and identification of ways and means to support implementation of SDG 14.1.

“To get Sustainable Blue Economy, we have much work to do, much to mitigate, much climate adaptation to invest in, and acting on the moral logic of intergenerational justice.”

— Peter Thomson, UNSG's Special Envoy for the Ocean



“Together, we can overcome the plague of plastic pollution. The IAEA's NUTEC Plastics initiative is a smart step in the right direction.”

— Peter Thomson, UNSG's Special Envoy for the Ocean

Roundtable Discussion

Mr Grossi chaired the Roundtable discussion which included interventions from distinguished panellists on topics such as international, regional, and national instruments and initiatives to tackle plastic pollution, socioeconomic issues, opportunities for strengthening partnerships, resource mobilization, and synergies between the public and the private sectors. Panellists also considered achievements and gaps in policy and regulatory frameworks that can be addressed through cooperation at regional and international levels. High-level speakers, including ministers and representatives of governmental agencies and international organizations, shared views and best practices on how to tackle plastic pollution and adapt to a more sustainable economic model based on circularity.



HE Mr Kwaku Afriyie, Minister of Environment, Science, Technology, and Innovation of Ghana,

noted that it is estimated that 50 tonnes of plastic are produced in Ghana annually, while more than 1 million tonnes of plastic are imported from outside the country, and only 2% to 5% is collected for recycling. Immediate actions have been taken to demonstrate the government's commitment towards waste management. Ghana adopted legislation to reduce the impact of plastic waste. This legislation was approved to reduce plastic use in commerce and its pollution of the environment.

He added that nuclear technology has been recognized as one of the critical technologies that can complement existing technologies in the plastic space to manage pollution and to improve recycling protocols. Nuclear technology can also be used to monitor coastal and marine ecosystems by carefully determining and quantifying microplastics.

Ghana will implement a national project in cooperation with the IAEA in the 2022–2023 TC cycle to train staff and provide equipment for managing and tracing plastic waste using nuclear technology.

“Nuclear technology is one of the critical technologies that can complement existing technologies to manage plastic pollution and to improve recycling protocols.”

HE Mr Kwaku Afriyie, Minister of Environment, Science, Technology, and Innovation of Ghana

Session One Panelists



HE Mr Kwaku Afriyie
Minister of Environment, Science, Technology, and Innovation, Ghana



HE Mr Mohammad Mahmood Abubakar
Minister of Environment, Nigeria



HE Mr Keriako Tobiko
Cabinet Secretary, Ministry of Environment and Forestry, Kenya



HE Mr Abdul Karim Sall
Minister of Environment and Sustainable Development, Senegal



HE Mr Yonis Ali Guedi
Minister of Energy in charge of Natural Resources, Djibouti



Dr Aly Abou Senna
Head of the Environmental Affairs Agency, Egypt



Ms Juliette Biao Koudonoukpo
Director and Regional Representative, Regional Office for Africa, United Nations Environment Programme (UNEP)



Mr Jean Paul Adam
Director, Technology, Climate Change and Natural Resource Management Division, UN Economic Commission for Africa (UNECA)



HE Mr Mohammad Mahmood Abubakar, Minister of Environment, Nigeria, noted that plastics are essential to our daily lives, making our modern lifestyle possible, and that this has resulted in their large-scale production for use in different ways in various industries. Currently, the population of Nigeria is about 200 million and generates 1.5 million tonnes of plastic, less than 10% of which is recycled.

He stated that Nigeria is serious about tackling plastic pollution through the circular economy approach, and is taking a leading role in this. Nigeria is a founding member of the African Circular Economy Alliance (ACEA) and has established a national circular economy programme and circular economy working group with membership from both the public and private sectors. Early in 2021, Nigeria officially became the fourth country in the world to join the Global Plastic Action Partnership and is in the process of incorporating a similar plastic action partnership approach at the national level.

Nigeria is taking action to tackle plastic pollution by developing national policies for the management of solid waste and plastic waste, approved by the Federal Executive Council in 2020. These policies aim to establish at least one recycling centre in each of the 774 local government areas in the country, and to encourage the involvement of local communities in

modern waste management practices. As part of these efforts, the establishment and implementation of an extended producer responsibility programme is planned. Most recently, Nigeria concluded a study on available, sustainable alternative materials to plastic with innovative recycling technologies in Africa to reduce plastic leakages to the environment.



HE Mr Keriako Tobiko, Cabinet Secretary, Ministry of Environment and Forestry of Kenya, highlighted that microplastics and nanoplastics are building up along the food chain, affecting human health and marine life. Since all plastics are produced from fossil fuel and petrochemicals, there is a direct correlation between plastic pollution and the global climate crisis, as the plastic production process emits millions of tonnes of greenhouse gases into the atmosphere.

Mr Tobiko shared that his country consumes more than 260 000 tonnes of plastic packaging each year, most of which is designed for single use, and that less than 15% is recycled. Kenya has developed national policies and legislation related to sustainable waste management, plastic management, extended producer responsibility, chemical waste management and e-waste. In the management of plastic waste, the Kenya National Environment Management Authority has licensed 279 plastic waste transporters and 16 plastic recycling facilities.

Following the request by Peru and Rwanda, Kenya plans to co-sponsor the resolution for a global agreement on plastics. At the regional level, most of the East African Community member states (Kenya, Rwanda, South Sudan, Tanzania, and Uganda) have domestic legislation either to ban or to reduce the use of various types of single-use plastics.

Despite the significant achievements made by Kenya on plastic pollution, Mr Tobiko identified a number of challenges still to be faced:

- » Human reliance on plastic as a cheap, durable and versatile material.
- » Increasing population and expansion of manufacturing sector leading to more demand for plastic.
- » Inadequate public education and awareness on the harmful effects of plastics.
- » Lack of alternatives to plastic.
- » Inadequate infrastructure and technologies for recycling plastic waste.
- » Inadequate financial and other incentives to promote private investment in plastic recycling.
- » Lack of credible data and information.

Mr Tobiko expressed appreciation to the IAEA for organizing the roundtable, stating that Member States are counting on the NUTEC Plastics initiative and are keen to know more about the utility, safety, cost-effectiveness, scalability and impacts of radiation technology in recycling plastic waste and monitoring microplastics in the oceans.

“Member States are counting on the NUTEC Plastics initiative to help in recycling plastic waste and monitoring microplastics in the oceans.”

*HE Mr Keriako Tobiko, Cabinet Secretary
Ministry of Environment and Forestry of Kenya*



HE Mr Abdul Karim Sall, Minister of Environment and Sustainable Development of Senegal, highlighted

his country’s efforts to manage and fight plastic waste. Senegal produces about 200 000 tonnes of plastic waste every year, of which only around 10% is recycled. The rest is dumped into nature and causes plastic pollution with very harmful consequences for the environment, the economy and public health.

In 2015, Senegal adopted a law banning the production, import, storage, distribution and use of plastic waste. This law was replaced by a new law in April 2020, moving towards a circular economy to prevent and manage environmental damage caused by plastic pollution. It encourages the management of plastic waste, bans the utilization and production of plastic bags and products which have a significant impact on the environment, and imposes a plastic tax on products created using non recycled plastics.

Fighting plastic pollution requires the implementation of comprehensive and global measures involving all producer and user countries. Therefore, Senegal advocates for the implementation of a multilateral legally binding treaty to reduce the use of single use plastic and to strengthen the recycling industry. Ensuring the management of plastic waste, particularly in developing countries, can be achieved by encouraging technological innovation, raising awareness and promoting best practices.

The Minister thanked the Director General and the IAEA for the NUTEC Plastics initiative and proposed the establishment of a centre of excellence to localize nuclear technology and applications contributing to tracking and recycling plastic waste in Africa. The centre would serve to train relevant stakeholders and offer support and the necessary equipment at regional level.



HE Mr Yonis Ali Guedi, Minister of Energy in charge of Natural Resources of Djibouti, highlighted initiatives in Djibouti to collect and recycle plastic launched at various levels to deal with this environmental challenge, supported by Djibouti NGOs, associations, different industrial sectors and local communities. Measures have been taken by the government of Djibouti to prohibit the use of non-biodegradable plastic. In 2020, the Ministry of the Environment and Sustainable Development created a national policy for the preservation of the environment and particularly the fight against plastic waste. As a long-term solution, the Ministry of Energy is encouraging biomass and has established a large-scale project to produce energy from collected waste. Mr Guedi voiced the full support of the Djibouti government for the IAEA NUTEC initiative, asserting that it is important to mobilize all technical institutional partners moving forward.



Dr Aly Abou Senna, Head of the Environmental Affairs Agency of Egypt, shared that, in addition to traditional factors, the COVID-19 pandemic increased the consumption of single use plastic bags. Egypt consumes more than 14 billion plastic bags annually.

During the last few years, Egypt has made many efforts at the national and regional levels to find solutions to plastic waste. Egypt intends to sign the prepared regional plan on marine litter management for Mediterranean countries. At the national level, Egypt developed its national waste management strategy, which led to the adoption of the first waste management law in Egypt, in 2020, to promote scientific research, technological development and innovation in waste management, including plastic pollution.

A new agency for waste management has been established to deal with the wide spectrum of waste, setting regulations and criteria in cooperation with relevant national stakeholders. The national solid waste strategy has been adopted and is being implemented. The first strategy for single use plastic minimization has been finalized and approved. Egypt is also working on developing a strategy for financial incentives to promote environmentally friendly alternatives for plastic bags, in partnership with different stakeholders, the biggest private sector producer and consumers. The objective of this strategy is to minimize plastic production and consumption, switching to a circular economy.

Mr Abou Senna expressed appreciation for the IAEA NUTEC Plastics initiative and expressed Egypt's

willingness to enhance partnerships and collaboration with the IAEA to tackle plastic pollution with nuclear technology and applications. He also underscored the importance of continuing to build capacity and mobilize resources to address plastic waste and other global environmental climate change issues.



Ms Juliette Biao Koudenoukpo, Director and Regional Representative, Regional Office for Africa, UN Environment Programme (UNEP), highlighted that plastic pollution costs US \$13 billion in economic damage every year, including to the fishing and tourism industries, through losses of fish and the cost to clean up beaches.

The increasing trend in per capita consumption, urbanization and pollution growth in Africa is worrying when combined with the lack of sufficient infrastructure to deal with the mounting waste generation. Solutions focus on collecting plastic and avoiding its use, with little emphasis on the development of waste treatment options.

Ms Koudenoukpo explained that, in response to the environmental threat posed by plastic waste, UNEP focuses on real actions such as advocacy, raising awareness, enhancing the interface between policy and

science, building global partnerships and alliances, and undertaking large scale initiatives to highlight unique national efforts in African countries. The next critical steps to facilitate collaboration to tackle marine pollution are to establish an African marine waste network and to develop regional and national action plans.

She added that more than 20 countries in Africa have now introduced bag bans and taxes for plastic use. Additional African countries such as Benin, Côte d'Ivoire and Nigeria have also signed a pledge with UNEP to eliminate plastic waste from their water ecosystems.

Ms Koudenoukpo concluded her statement with the following key messages:

- » Momentum is building: UNEP hosted a digital platform for global partnerships on marine litter connecting more than 400 stakeholders, and is facilitating evidence-based action, including an action plan, source inventories and capacity building. In 2018, UNEP in cooperation with Ellen MacArthur Foundation, launched the new plastic economy global commitment.
- » We must take all an 'all hands on deck' approach across government, private sector, civil society and the public to move toward sustainable production and consumption patterns for people and the planet.
- » A systems approach to change can only occur through global ambition and action.
- » UNEP, with other sister agencies, stands ready to support countries to find sustainable solutions to address plastic pollution.

“If nothing changes, Africa is expected to be the most polluted continent on earth. The good news is that the momentum is building to address marine litter and plastic pollution.”

— Ms Juliette Biao Koudenoukpo, Director and Regional Representative
Regional Office for Africa, UN Environment Programme





Mr Jean-Paul Adam, Director, Technology, Climate Change and Natural Resources Management Division, UN Economic Commission for Africa (UNECA),

highlighted that UNECA has commissioned a report on unleashing the potential of the private sector in driving green growth and job creation. The report focuses on the adoption of strategies that empower the private sector, including micro, small and medium enterprises, to embrace sustainable value chains, reduce waste associated with plastic, and create recycling business opportunities.

Some of the important and urgent actions identified for Africa to tackle plastics through the circular economy include:

- » The development of regional and national green economy policies with guiding principles and supportive legislative frameworks;
- » The integration of existing rules and regulations into a comprehensive regional green economy policy framework;
- » The operationalization of fiscal measures such as incentivisation for the private sector and introducing taxes on non-optimal resource consumption;

- » Ensuring that there is appropriate investment in educational curriculum level interventions; and
- » Appropriate monitoring and evaluation frameworks.

Mr. Adam indicated that the African Union committed to improving investment in the green economy through its green stimulus programme, which includes commitments to develop the circular economy. There is also an opportunity to tackle plastic use through regional trade agreements such as the African Continental Free Trade Area (AfCTA), as trading rules represent an ideal opportunity to provide incentives for the circular economy principles of production and consumption, in line with empowering sustainable national and regional supply chains.

The African Climate Policy Centre within UNECA currently provides support and advice to African Member States on the revision and implementation of their nationally determined contributions under the Montreal Protocol and the Paris Agreement, which includes components on waste reduction. Several African countries have already passed legislation to either ban plastic bags or tax their use.

Mr Adam acknowledged the IAEA for convening this event and for bringing so many partners to the table to tackle the issue of plastic pollution, which can only be resolved through concerted action.

“Technological nuclear solutions under consideration will be of particular importance for African countries, not only to address the persistent problem of plastic pollution, but also to turn challenges into opportunities.”

*—Mr Jean-Paul Adam, Director, Technology, Climate Change and Natural Resources Management Division
UN Economic Commission for Africa (UNECA)*

Session One: Concluding remarks



IAEA Director General Rafael Mariano Grossi Concluding remarks of Session 1 (Photo: Dean Calma/IAEA)

IAEA Director General Rafael Mariano Grossi wrapped up Session 1, noting that the IAEA NUTEC Plastics initiative is intended to provide technological and practical solutions, focusing on projects and action-oriented efforts to help in solving the plastic pollution problem. The absolute convergence of views among the high-level panellists covered and diagnosed the current situation, including legislation and policy decisions being adopted in many African countries.

Mr Grossi stressed that despite the actions being taken, the problem still exists, and this should be an alert for all of us to take concrete actions and to share our efforts to find sustainable solutions.

He affirmed the IAEA's readiness to continue to support and collaborate with all stakeholders in tackling plastic pollution. Concerted, synergised efforts are necessary, including partnerships among various initiatives, mobilization of required resources, and ensuring effective interventions to address both mitigation and monitoring of plastic pollution.

Proceedings of the Roundtable

Session Two

Partnerships for Sustainable Solution to Plastic Pollution












Mr Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA.

Session 2 of the Roundtable, on 'Partnerships for Sustainable Solutions to Plastic Pollution' consisted of a panel discussion with distinguished panellists, chaired by Mr. Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA, on behalf of Ms Najat Mokhtar, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications. The session aimed to:

- » Highlight available nuclear technologies for plastic waste recycling and marine plastic monitoring for science-based decision-making in Africa;
- » Exchange information on existing programmes and practices (e.g., R&D, industrial practices, regional initiatives, and activities for capacity building and advocacy); and
- » Explore opportunities for cooperation and partnerships in NUTEC Plastics, including resource sharing and mobilization.

Session Two Presentations

-  **Innovation to Mitigate Plastic Waste**, Ms. Melissa Denecke, Director, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications, IAEA.
-  **Nuclear Techniques for Tackling Marine Plastics**, Ms. Florence Descroix-Comanducci, Director, Environmental Laboratories, Monaco, IAEA.
-  **Recycling of Plastic Waste: An Alternative Use of Radiation Technology in Ghana**, Dr Harriet Danso-Abbeam, Nuclear Chemistry and Environmental Research Centre, Ghana Atomic Energy Commission.
-  **Radiation Technology for Tackling Plastic Pollution: Greener Approaches for Polymer Wastes (Re) Valorization**, Dr Noha Mohamed Deghidy, National Centre for Radiation Research and Technology, Egyptian Atomic Energy Authority.
-  **Tackling Marine Litter Pollution in Kenya: Progress Made and Challenges Encountered**, Dr Eric Okuku, Kenya Marine and Fisheries Research Institute.
-  **Towards Better Governance of Plastic Pollution and International Trade Policy: The West African Agenda**, Mr Sherif Sheek, Environmental Protection Agency of Liberia.
-  **A West Africa Regional Response to Plastics**, Mr Peter Kristensen, Lead Environmental Specialist, The World Bank.
-  **Mobilizing Partnerships for Plastic Action in Africa – The GPAP Experience**, Mr Clem Ugorji, NPAP Advisor for African partnerships (Ghana and Nigeria), Global Plastics Action Partnerships (GPAP).
-  **Remarks** by Mr Rachid Farady, Director, Partnerships, Communication and Cooperation in the Ministry of Energy, Mines, and the Environment, Morocco.



Ms Melissa A. Denecke, Director Division Physical and Chemical Science, IAEA, presented on innovation to mitigate plastic waste. Only 9% of plastic waste generated is being recycled globally. Everyone can take part in reducing the amount of plastic waste, for example by reducing personal use of single-use plastic. Ms Denecke explained how radiation technologies can help replace petroleum-based plastics with bio-based ones, improve recycling, and be used to renew end-of-life plastics.

Radiation can support and complement conventional recycling strategies by enabling better sorting of recycled

plastic pellets according to the polymer type, and by breaking down polymers to generate new secondary products. Other innovative forms of recycling include converting plastic into fuel and feedstocks through irradiation-assisted chemical recycling. Treating plastic to make composite materials with tailored properties is yet another innovative recycling strategy. See Figure 1 on nuclear innovation in the plastic value chain.

Ms Denecke explained that ionizing radiation can be used to make and modify polymers in an energy-efficient green chemistry process.

Through technical meetings, publications, coordinated research projects (CRPs) and the TC programme, the IAEA enhances Member States' capacities to apply innovative radiation techniques to reduce the amount of plastic waste. The IAEA also plans to support Member States in strengthening their capabilities to develop, construct, and operate pilot recycling plants, focusing on the conversion of plastic waste into novel/functional materials. Ms Denecke expressed the need to form partnerships and expand activities to tackle the global plastic pollution problem.

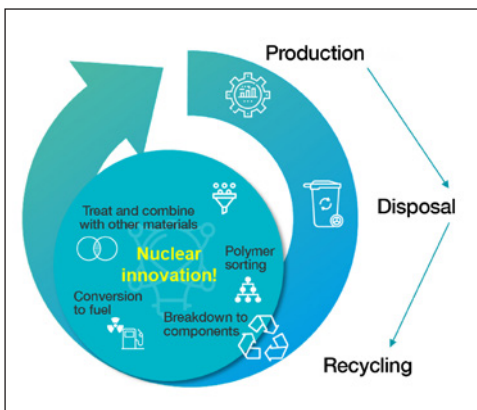


Figure 1. Nuclear innovation in the plastic value chain

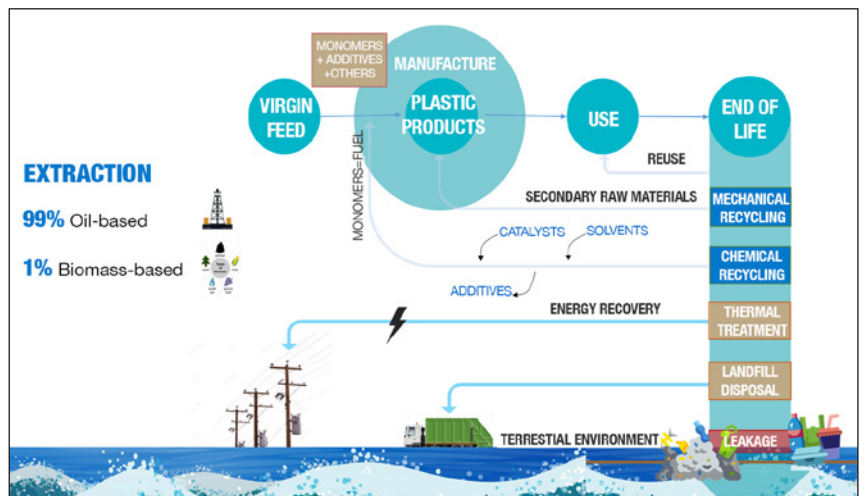


Figure 2. Ionizing radiation can modify or breakdown polymer materials and thus contribute to mechanical or chemical recycling methods.



Ms Florence Descroix-Comanducci, Director of the IAEA Environmental Laboratories, spoke about NUTEC Plastics and the role of nuclear technology in marine microplastic monitoring. She stated that microplastics are everywhere – air, water, dust and food are all important exposure routes. The smallest particles are the most dangerous.

Ms Descroix-Comanducci stressed the need to assess the sources, transport and sinks of marine microplastics in oceans; gain information on the fate of microplastics following ingestion by marine animals and humans; and understand how microplastics interact with marine life. Nuclear science and technology can contribute to closing these knowledge gaps.

Ms Descroix-Comanducci explained how to identify marine plastics hotspots. She noted that nuclear and isotopic techniques can be used to characterize and monitor marine microplastics. Once plastics are discarded, they enter oceans from various ways, for example via rivers or wastewater treatment plants.

Microplastics are found in the water column and also in sediments. These are known as legacy plastic pollution. Nuclear and isotopic techniques can be used to characterize and monitor plastics, which can help to identify marine microplastics hotspots by, for example,

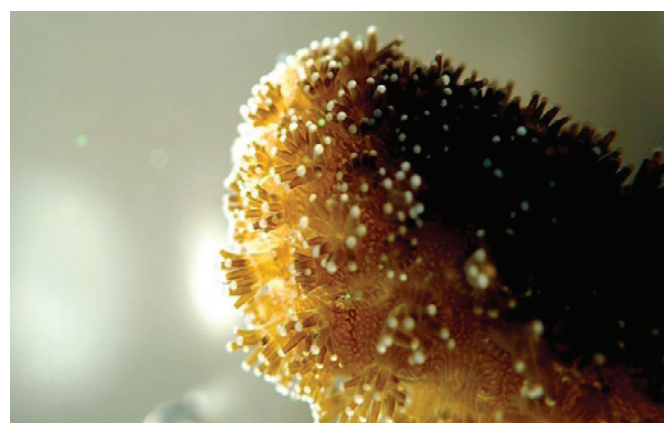
evaluating transfer from microplastic sources and how microplastics are carried by currents.

Ms Descroix-Comanducci explained how stable isotopic and radiotracer techniques complement conventional methods to:

- » Quantify atmospheric and riverine inputs to the ocean;
- » Test and validate microplastics transport and transfer models;
- » Characterize processes in sediment and establish chronologies of environmental decay and impact; and
- » Test the effectiveness of measure to improve management of plastic waste.

She warned that chemicals leaching from plastics can affect coral reefs. Radiolabelled chemicals can help in evaluating sorption and leaching from microplastics, and stable isotope labelling can improve data accuracy.

Ms Descroix-Comanducci further explained that radiotracing and radio-imaging microscopy can track the fate and transfer of microplastics in the food chain, and also assess the stress that microplastics can present for marine biology.



Coral exposed to microplastics: Tropical coral *Stylophora pistillata* in the presence of fluorescent microplastic. (Photo: Francois Oberhaensli/IAEA)



Ms Harriet Danso-Abbeam, Nuclear Chemistry and Environmental Research Centre, Ghana Atomic Energy Commission, presented ‘Recycling of Plastic Waste: An Alternative use of Radiation Technology in Ghana’. There are 24 recycling companies in Ghana, but their production capacity is extremely low with only 2-5% of plastic waste being recycled. Radiation technology may provide innovative ways for recycling plastic and cooperation with IAEA is key in this area.

Ms Danso-Abbeam highlighted Ghana’s participation in the IAEA’s coordinated research project (CRP) on ‘Application of ionizing radiation technology as a complementary treatment in recycling hard-to recycle plastic waste in Ghana.’ Through this CRP, Ghana plans to use ionizing radiation as part of the recycling process for plastic trash, resulting in innovative degraded materials with improved functional properties for secondary use in the country. She indicated that many stakeholders from the government, private sector, academia and research institution are involved.

Dr Noha Mohamed Deghidy, National Centre for Radiation Research and Technology, Egyptian Atomic Energy Authority, presented ‘Radiation Technology for Tackling Plastic Pollution: Greener Approaches for Polymer Wastes (Re) Valorization’. She noted that Egypt is the seventh largest country in the world to dump plastic waste in the ocean, the largest source of open dumping among its neighbours, and the top polymer consumer in Africa.

Egypt has launched a new initiative aimed at protecting the environment, preserving the value chain and keeping plastics outside the natural environment. This can be done effectively by transforming the waste into useful materials. Plastic waste could be modified by ionizing radiation technology (gamma or electron beam located at Egyptian facilities) to optimize its physical, chemical, electrical, optical and structural properties and increase its compatibility in composite material.



Egypt launched new initiatives to protect the environment (Photo: Dr Noha Mohamed Deghidy, Egypt)



Mr Eric Okuku, Kenya Marine and Fisheries Research Institute, presented ‘Tackling marine litter pollution in Kenya: Progress made, and challenges encountered’. He emphasized the importance of understanding the plastic pollution problem clearly through research. This research can generate information to guide the identification of marine litter hotspots targeted for source reduction and launch marine litter clean up initiatives. Mr Okuku explained that his institute conducted many investigations and surveys in different Kenyan hotspot locations like beaches, rivers and floodplains. A study on the impact of COVID-19 on marine litter, conducted 100 days after the first reported case in Kenya, showed that 79% of streets sampled had COVID-19 related litter. Nevertheless, COVID-19 related items were low in density (0.1 items/m²) representing 0.43% of the total litter items, and no floating COVID-19 related litter was reported.

Kenya developed its first Marine Litter Management Action Plan and recently expanded producer responsibility regulations. Remaining challenges include:

- » Gaps in research: tracking movement of plastic and risk and impact assessment of microplastics;
- » Weak enforcement of legislation; and
- » Inadequate capacity of counties to handle waste.

Mr Sherif Sheck, Environmental Protection Agency of Liberia, presented ‘Towards Better Governance of Plastic Pollution and International Trade Policy: The West African Agenda’. He explained that establishing a circular economy is a key approach for tackling plastic waste pollution. It is vital to have stakeholder collaboration, science-based targets, and follow-up actions.

Mr Sheck added that an analysis on integrating plastic recycling into a circular economy identified gaps in:

- » Information and Knowledge: an absence of quality data and knowledge both in the upstream and downstream of plastic value-chains;
- » Technical Capacity: limited technical training, lack of infrastructure for preventing environmental leakage of plastics, and limited capacity for R&D and innovation;
- » Policy and Governance: unclear or overlapping mandates, roles and responsibilities at different levels of government agencies; and
- » Markets and Finance: a need for shared and accepted standards for recyclables, better access to markets for recyclables, and uncertainty in the transition from a market-driven recycling systems to more formalized systems.

Mr Sheck recommended the following:

- » Make use of new opportunities in marine plastics and enhance policy collaboration and coordination for a circular economy in the region;
- » Economic Community of West African Member States should take a lead and donors should collaborate to coordinate international efforts in the region;
- » Build on existing efforts and regional initiatives to respond to country needs and explore synergies among stakeholders;
- » Identify issues and priorities to be translated into national and regional action plans that can be implementable among the ECOWAS Member States given their different institutional settings and levels of interest; and
- » Establish mechanisms to engage stakeholders across different sectors, with special emphasis on youth and their environment curricula.



Circular economy is a key mechanism for tackling plastic waste pollution (Photo: Mr Sheck SHERIF, Liberia)



Mr Peter Kristensen, Lead Environmental Specialist, The World Bank, spoke on the topic ‘A West Africa Regional Response to Plastics’. His presentation focused on the World Bank Program ‘West Africa Coastal Areas Management Program (WACA)’ to help West African countries on plastic waste, Coastal erosion, flooding and pollution. WACA has been launched in 2018 and works in a collaboration with regional institution and key partners in the region. He added that, the World Bank grants or loans countries from West Africa, through this program, in the order of US \$400 million including what in the pipeline for next year for activities related to pollution and plastic waste. Mr Kristensen added that some new partners that are interested in enhancing circular economy like; Finland, and plastic recycling like; Denmark and France also cooperate with the World Bank to support West African countries. The World Bank also aims to partner with the IAEA and other UN agencies in support of nuclear technology to address the plastic pollution challenge in Africa.



Mr Clem Ugorji, National Plastic Action Partnership (NPAP) Advisor for African partnerships (Ghana and Nigeria), Global Plastics Action Partnerships (GPAP) presented on the topic ‘Mobilizing Partnerships for Plastic Action in Africa - The GPAP Experience’. He showed it is estimated that Africa and the Middle East will overtake the world in the consumption of plastics by 2100 in view of population increase, industrialization and other forms of development. An estimated 10.5 million metric tonnes of plastic waste is mismanaged annually in Africa, and that has many implications and challenges that must be dealt with today.

Mr. Ugorji added that to achieve a circular plastics economy, it is necessary to synergize efforts and work using a multi-stakeholder approach, bringing governments, private sector, civil society, plastic producers and consumers to the table to deal with this very critical issue on a sustainable basis. Through its impartial global and national platforms, GPAP is equipped to bring stakeholders together to develop joint solutions that can address the plastic pollution crisis in a pragmatic and systematic manner. NPAP provides a platform that convenes national leaders to drive the transition to a circular plastics

economy. NPAP has been operational in Ghana since 2019 and in Nigeria since early 2021. Significant progress has been achieved in Ghana as the national plastic action roadmap has been developed and finalized, and a baseline report on plastic waste flows has been launched. In Nigeria, the government agreed that NPAP will be integrated into the national circular economy programme to become the central platform for synergies and taxing.

Mr Rachid Farady, Director, Partnerships, Communication and Cooperation in the Ministry of Energy, Mines and the Environment, Morocco, explained that as part of the implementation of the national strategy for sustainable development measures, Morocco has adopted a law on the preservation and conservation of the environmental ecosystem to fight against plastic pollution. This law bans the production, import, sale or distribution of single-use plastic bags and encourages waste management and a circular economy. Morocco is in the process of finalizing the national action plan for the reduction of marine plastic pollution. Mr Farady expressed his country’s appreciation to the IAEA for launching the NUTEC Plastics initiative to deal with pollution from plastic waste.

“A circular plastics economy can turn this crisis into opportunities as we can clean up the environment, attract new investment, create job quality, promote skills and innovation, and build and improve household incomes.”

Mr Clem Ugorji, National Plastic Action Partnership (NPAP) Advisor for African partnerships (Ghana and Nigeria), Global Plastics Action Partnerships (GPAP)



Session Two: Summary and Remarks

Mr. Shaukat Abdulrazak summarized and concluded Session 2 with the following remarks:

- » It is clear that countries and institutions in the Africa region are already addressing the plastic pollution problem in different ways, at national and regional levels. This is very promising and is a good sign for making NUTEC Plastics a success. We need strong and engaged partners to jointly address a problem of truly global scale.
- » NUTEC Plastics offers a framework through which the IAEA, Member States, research institutions, international and regional organizations, as well as civil society and the private sector, can work together. NUTEC Plastics does not work in isolation but is built on our firm belief in strong partnerships. The IAEA stands ready to support existing and ongoing initiatives against plastic pollution. We are convinced that nuclear science and technologies add value to existing programmes and initiatives addressing plastic waste pollution.
- » It is also clear that knowledge gaps still exist and they need to be filled. For this we need strong institutions and networks that support each other. Through NUTEC Plastics, the IAEA will continue to support its Member States in strengthening their capacities in using and applying nuclear technologies to strengthen their efforts against plastic pollution.
- » It is now time to identify specific areas in which we can cooperate to strengthen our joint efforts against plastic waste pollution. These efforts will of course be based on the specific needs of Member States but also the technology readiness level of results from research and development. Again, the IAEA stands ready to support its Member States and partners through NUTEC Plastics – be it with regard to enhancing national marine monitoring capacities and establishing a marine microplastic monitoring network, or regarding plastic waste recycling using radiation technology.

Mr. Abdulrazak called for continuing the dialogue and keeping up momentum, working in partnership on this global challenge, and finding solutions to plastic pollution that complement other international and regional efforts to support transitioning towards a circular economy for plastic. Plastic pollution is a transboundary issue that no single nation or organization can solve alone.



“We can make a difference if we join forces, through partnerships, within and beyond NUTEC Plastics, to improve our knowledge and develop sustainable solutions.”

Mr. Shaukat Abdulrazak, Director, Division for Africa
Department of Technical Cooperation, IAEA

Proceedings of the Roundtable

Session Three Wrap Up and Way Forward



Mr Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation (Photo: D. Calma/IAEA)

Mr Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation, provided closing remarks to the Roundtable, outlining the way forward and a number of follow-up actions based on the roundtable discussions.

The Roundtable presentations were insightful, inspiring and motivating. Over 400 participants joined, from a wide range of research institutions, universities, government institutions, and regional and international organizations. Among the participants there were Ministers, scientists, engineers and policy makers, heads of institutions and high-level decision makers. The IAEA counts on the support of all, as we move forward with the follow-up

actions to the Roundtable. Plastic pollution is clearly a challenge to sustainable development and negatively impacts the oceans, the food chain, human health and the environment.

The discussions highlighted the urgent need to move away from the way plastic is used today. It is necessary to step away from the linear 'take-make-waste' model, and move towards a sustainable circular economy for plastics, built on the 4R principles: reduce, reuse, recycle and renew.

“This Roundtable marks the start of activities under NUTEC Plastics that will support the continuing development of new solutions to address plastic pollution, with a particular focus on the unique contributions of nuclear technology.”

*Hua Liu, IAEA Deputy Director General
and Head of the Department
of Technical Cooperation*

Mr Liu pointed out that various initiatives, programmes and projects launched at international and regional levels, and by countries in the region are converging on this approach. All are gearing up to find and apply sustainable solutions for plastic pollution. The Roundtable's distinguished speakers emphasized that science, technology, innovation and partnerships are key to finding sustainable solutions.

Through NUTEC Plastics, the IAEA will contribute to the global response to plastic pollution, building on the comparative advantages and added value of nuclear techniques. Radiation technology has the potential to improve plastic recycling; and isotopic tracing techniques can play a major role in monitoring the behaviour and fate of microplastics in the seas and oceans.

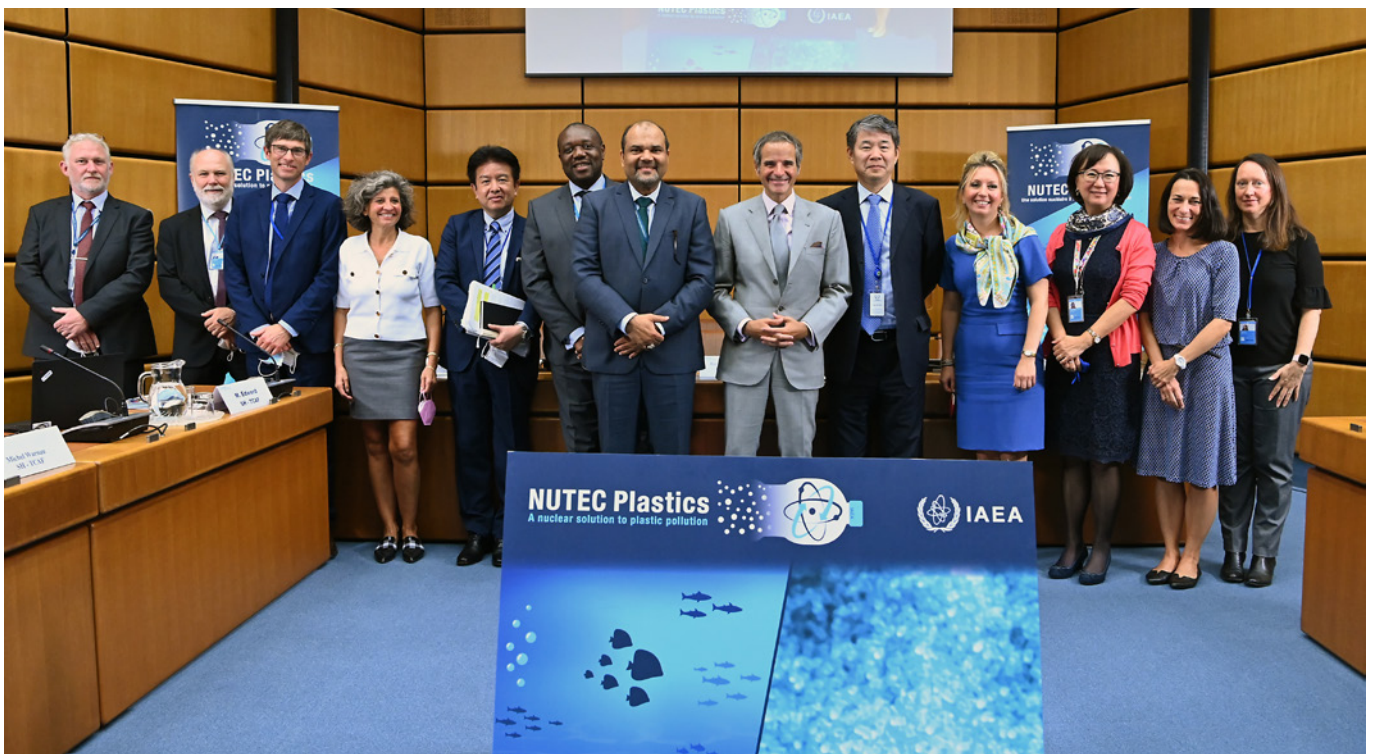
Through NUTEC Plastics, the IAEA seeks synergies and partnerships with other international efforts to address

plastic pollution. NUTEC Plastics will also provide a solid platform for North-South, South-South and triangular cooperation on marine plastic pollution and recycling.

Mr Liu reminded participants that the IAEA already has various modalities in place that can support these efforts, including coordinated research projects, field application of research results, capacity building and technology transfer. The IAEA foresees several follow-up actions from the Roundtable discussions (see below).

In concluding, he acknowledged the cooperation of IAEA Member States and partners in making the NUTEC Plastics Roundtable for the Africa region a reality, and acknowledged the coordinated efforts of the various IAEA Departments and Divisions.

Finally, Mr Liu reiterated his appreciation for the support of the participants and their important contributions.



The coordinated efforts of staff from various IAEA departments and divisions helped make the Roundtable discussion a reality. (Photo: Dean Calma/IAEA)

Follow-up Actions from the Roundtable Discussions

- » Finalise the development of national and regional technical cooperation projects to support Member States in marine plastic monitoring, and promote pilot plants to support the demonstration of irradiation technologies for recycling in Africa for eventual commercial scale dissemination, based on Member States needs and requests.
- » Launch the implementation of a new technical cooperation project on monitoring microplastics in the marine environment. This region-specific project on the marine environment, proposed for Africa, aims to enhance regional understanding of the abundance and impact of marine plastic pollution by strengthening the capacities of existing laboratories and institutions to monitor the marine environment. The project will contribute in supporting ongoing microplastics monitoring programmes in Africa and will address gaps in capacity building and analytical capabilities in the region.
- » Enhance awareness and address plastic pollution using different fora, engage with new partners at the national, regional and international levels, and promote greater collaboration for upscaled, impactful projects in the region that build on synergies with ongoing initiatives to focus efforts on our common goal: a healthy planet for today and for the future generations.



Mr. Shaukat Abdulrazak, Director of the IAEA Technical Cooperation Division for Africa with IAEA Director General Rafael Mariano Grossi. (Photos: D. Calma/IAEA)





Photos 1-4: NUTEC Plastics Roundtable event was held at IAEA headquarters in Vienna, Austria on 2 September 2021

Agenda of the Roundtable for Africa

10:00–11:20 Session 1: 'Plastic Pollution: Challenges and the Need for Global Action'

- Opening and welcome remarks by Mr. Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA.
- Remarks by Mr Rafael Mariano Grossi, IAEA Director General.
- Keynote speech by Mr Peter Thomson, UNSG's Special Envoy for the Ocean.
- Roundtable discussion with distinguished panellists, chaired by IAEA Director General.

Panelists:

- HE Mr Kwaku Afriyie, Minister of Environment, Science, Technology, and Innovation, Ghana.
- HE Mr Mohammad Mahmood Abubakar, Minister of Environment, Nigeria.
- HE Mr. Keriako Tobiko, Cabinet Secretary, Ministry of Environment and Forestry, Kenya.
- HE Mr Abdou Karim Sall, Minister of Environment and Sustainable Development, Senegal.
- Mr Yonis Ali Guedi, Minister of Energy in charge of Natural Resources, Djibouti.
- Mr Aly Abou Senna, Head of the Environmental Affairs Agency, representing the Minister, Egypt.
- Ms Juliette Biao Koudenoukpo, Director and Regional Representative, Regional Office for Africa, United Nations Environment Programme (UNEP).
- Mr Jean-Paul Adam, Director, Technology, Climate Change and Natural Resource Management Division, UN Economic Commission for Africa (UNECA).
- Concluding remarks to Session 1 by Mr Rafael Mariano Grossi, IAEA Director General

11:20–11:25 Break and slideshow on NUTEC Plastics

11:15–12:45 Session 2 Partnerships for Sustainable Solutions to Plastic Pollution

Presentations and discussion chaired by Mr. Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA.

- Opening remarks by Mr Shaukat Abdulrazak, DIR-TCAF.
- Innovation to Mitigate Plastic Waste by Ms. Melissa Denecke, Director, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications, IAEA.
- Nuclear Techniques for Tackling Marine Plastics by Ms. Florence Descroix-Comanducci, Director, Environmental Laboratories, Monaco, IAEA.
- Recycling of Plastic Waste: An Alternative Use of Radiation Technology in Ghana by Dr Harriet Danso-Abbeam, Nuclear Chemistry and Environmental Research Centre, Ghana Atomic Energy Commission.
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- A West Africa Regional Response to Plastics by Mr Peter Kristensen, Lead Environmental Specialist, The World Bank.
- Mobilizing Partnerships for Plastic Action in Africa - The GPAP Experience by Mr Clem Ugorji, NPAP Advisor for African partnerships (Ghana and Nigeria), Global Plastics Action Partnerships (GPAP).
- Remarks by Mr Rachid Farady, Director, Partnerships, Communication and Cooperation in the Ministry of Energy, Mines, and the Environment, Morocco.
- Questions and Answers.
- Summary and Remarks of Session 2 by Mr. Shaukat Abdulrazak, Director, Division for Africa, Department of Technical Cooperation, IAEA.

12:45–13:00 Session 3: Wrap Up and Way Forward by Mr Hua Liu, Deputy Director-General, Head of the Department of Technical Cooperation, IAEA

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September 2022

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