IAEA Technical Cooperation Programme: Sixty Years and Beyond — Contributing to Development

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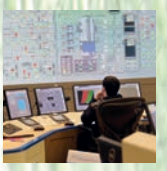

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IAEA TECHNICAL COOPERATION PROGRAMME: SIXTY YEARS AND BEYOND — CONTRIBUTING TO DEVELOPMENT

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FOREWORD

The International Conference on the IAEA Technical Cooperation Programme: Sixty Years and Beyond — Contributing to Development marks the first time in the history of the IAEA that a conference has been dedicated to the technical cooperation (TC) programme. Held on 30 May to 1 June 2017 in Vienna, the conference opened a window into the development work of the IAEA and brought together more than one thousand people, including stakeholders, supporters and partners in the TC programme. The high level of participation reflects the importance IAEA Member States and partners place on the TC programme and on its partnership efforts.

The TC programme offers unique support to Member States in a wide range of development areas, and demonstrates the value of science, evidence and data in decision making and policy. The Sustainable Development Goals emphasize the importance of science and technology in development, in particular Goal 17, which focuses on strengthening the means of implementation and revitalizing the global partnership for sustainable development. Achieving this calls for mechanisms for promoting and facilitating the sharing of technologies between countries and enhancing effective and targeted capacity building, with a particular focus on least developed countries. The TC programme supports knowledge sharing, and builds and reinforces scientific networks. Its capacity building efforts support evidence based policy making and actions in a range of important areas, including climate change, environment monitoring, human health and water resource management. Nuclear science and technology can provide concrete development solutions and data to support the development of policy and to assess the efficacy of interventions.

At the conference, examples were presented of how the TC programme supports States in using nuclear science and technology in areas such as health, food, agriculture, water management and the environment. Other examples demonstrated how States address energy needs, build safety infrastructure and develop industries. A strong message emerging from the conference was the benefits of collaboration, joint undertakings and working in partnership to achieve common goals, which is particularly relevant in the context of Agenda 2030 and its emphasis on working together to achieve the Sustainable Development Goals. More than half of TC programme activities address areas in which the IAEA does not possess the lead mandate, such as human health, food and agriculture, and water and the environment. The IAEA has long recognized the importance of partnerships in scaling up and expanding the impact of its TC programme activities in these areas, and this conference has contributed considerably to achieve this.

This publication provides a summary of the conference and presents the keynote speeches as well as summaries of all the sessions. The accompanying CD-ROM contains the full conference programme, the list of participants, presentations and abstracts and conference photographs. The IAEA appreciates the participation of all those who attended, in particular Member State representatives and other TC programme stakeholders, and the support of permanent missions to the IAEA. The IAEA officer responsible for this publication was N. Mokhtar of the Division for Asia and the Pacific.

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Introduction

Background

The first ever International Conference on the IAEA's Technical Cooperation (TC) Programme: Sixty Years and Beyond – Contributing to Development, was held in Vienna, Austria from 30 May to 1 June 2017. It was attended by more than 1200 participants, including Head of States and Governments and other high level officials, from 160 Member State and 27 organizations. The conference brought together senior decision makers and policy formulators, technical experts at the upper management level, representatives from academia, industry, bilateral aid agencies and foundations, as well as UN system partners and other multilateral entities, including regional development agencies, development banks, the private sector and specialized media.

The TC Conference was an occasion for Member States and the IAEA to celebrate the 60th anniversary of the IAEA, to showcase how the IAEA's TC programme supported Member States over six decades to master and use a wide range of peaceful applications of Nuclear Science and Technology (NS&T) to address safely specific socioeconomic development issues, and to chart a course for the future to meet the imperatives of the new global development Agenda 2030. Participating Member States and partners shared their experiences and practices about the usefulness and relevance of NS&T in development and expressed thoughts about the 2030 Agenda and how best the IAEA's TC programme could contribute to their efforts in the achievement of the Sustainable Development Goals (SDGs).

Summary of the conference

The conference consisted of a high level opening, five sessions and the conference closure.

Mr Yukiya Amano, Director General, IAEA, delivered the introductory statement, followed by statements from His Excellency Mr Tabaré Vázquez, President of Uruguay; Her Excellency Ms Ameenah Gurib-Fakim, President of Mauritius; Her Excellency Sheikh Hasina, Honorable Prime Minister of the Government of the People's Republic of Bangladesh; and His Excellency Mr Tebogo Joseph Seokolo, Chairperson of the IAEA Board of Governors.

The statements recognized the IAEA's past and present contribution to enhancing prosperity, safety and health across the world and highlighted the impact of the IAEA's work on the frontline of human development. This contribution is made through the IAEA's TC programme, responding to the needs and aspirations of the scientific community as well as end users.

In the first session, five key presentations were made by ministers and high officials from Bosnia and Herzegovina, China, Cuba, Egypt and Indonesia. The speakers shared their countries' development journeys over the past sixty years and their evolving partnerships with the TC programme. The speakers highlighted the national socioeconomic impact and results achieved in their countries with the support of the IAEA's technical cooperation programme, and reviewed how the programme has contributed to establishing national nuclear infrastructure and capabilities in support of national development priorities.

This was followed by a deeper dive into individual projects in the second session, where the focus was on the impact of NS&T in key thematic areas, including human health and nutrition, food and agriculture, water and the environment, radiation technology, energy and safety, and linking IAEA's support in these sectors to sustainable development. Concrete examples of how nuclear technology contributed to national development were described.

The speakers in Session 3 examined how the regional cooperative modalities supported by the IAEA through its TC programme, including South–South (technical cooperation among developing countries

(TCDC)), North–South and Triangular Cooperation and Networking, also played a key role in broadening and further sustaining the impact of the TC programme.

The IAEA's approach to and guidelines for building profitable partnerships with Member States and development organizations were examined in Session 4. This included an overview of how the IAEA's TC programme has helped Member States to establish effective strategic partnerships with countries and development organizations, and how these collaborative modalities will evolve to meet the requirements and imperatives in the new development context of Agenda 2030.

Session 5 brought together high level speakers and panellists to examine appropriate approaches and measures to help countries maximize their use of nuclear science and technology in pursuit of the SDG targets.

Her Royal Highness Princess Sumaya bint El Hassan, President of the Royal Scientific Society, Jordan, then gave an address on 'Science for peace: borderless innovation for creative change'. The conference closed with the reading of the Conference Conclusions by Mr Dazhu Yang, Deputy Director General of the IAEA, and Head of the Department of Technical Cooperation.

On the sidelines of the conference, participants at an IAEA-organized roundtable discussion, 'The Role of the Private Sector: Partnership for Development,' explored how collaboration with private sector partners through the technical cooperation programme and other IAEA initiatives can be expanded to increase access to nuclear science and technology.

Several Member States also showcased their work at the conference exhibitions, and through additional side events.

Objective and structure of this report

The objective of this report is to highlight the outcomes and main message discussed during the conference. Summaries of the main ideas and messages expressed and discussed at the conference are presented. The full statements of the opening and first sessions are reproduced in the appendices while the programme, speaker presentations and abstracts, and the list of participants are in the attached CD–ROM.

Opening Address by Mr Yukiya Amano, IAEA Director General

Good morning, Excellencies, Ladies and Gentlemen.

I am very pleased to welcome you all to this conference on the IAEA technical cooperation programme.

In this 60th anniversary year of the IAEA, we have been considering the many lessons we have learned in sharing peaceful nuclear science and technology with developing countries. For me, a fundamental lesson is that science and technology are critical for development. I grew up in Japan after World War Two. My country has limited natural resources. But by making use of all that modern technology has to offer, and investing in education, Japan built up its economy. So I am a great believer in science and technology.

Transferring nuclear technology to developing countries is core IAEA business and one of the most important areas of our work. The IAEA technical cooperation programme is central to delivery of our Atoms for Peace and Development mandate. It has improved the health and prosperity of millions of people. We have been working for decades to make nuclear technology available in areas where it has unique, or added, value.

The TC programme now helps countries to achieve the Sustainable Development Goals, in energy, food and agriculture, industry and water management, as well as in health. I have seen for myself in visits to developing countries all over the world that TC projects deliver huge benefits to individuals, families and entire communities. The fact that we are constantly attracting new Member States indicates that the TC programme is effective in meeting development needs.

Central to our approach is the belief that developing countries should determine their own priorities. They decide in what areas they wish to benefit from nuclear science and technology. We then do our best to provide the support they seek. That support is not primarily about handing over equipment. We focus on transferring knowledge and expertise. High quality technical training helps developing countries to build their own expertise so they can train future generations of nuclear specialists.

Many developing countries have already acquired a high level of expertise in nuclear technology and there are many excellent examples of South–South cooperation. This makes a vital contribution to helping the Agency deliver its technical cooperation programme.

Ladies and gentlemen, nuclear technology has applications in so many areas of our lives that it is not possible for me to list all of them. But I will mention a few examples of areas in which the IAEA is very active.

We have helped to save countless lives in developing countries by improving access to nuclear medicine and radiotherapy for the diagnosis and treatment of cancer and other major diseases. Agency support for Mauritania and Zambia, for example, enabled them to set up their first nuclear medicine and radiotherapy facilities, bringing essential health services to millions of people

Nuclear techniques made available by the Agency are being used to manage water resources, reduce soil erosion, develop new varieties of rice and wheat that grow in difficult conditions, eradicate insect pests such as the tsetse fly, and monitor pollution in the sea. In Europe and central Asia, many countries have been able to improve the yield and quality of food crops by using nuclear techniques. Viet Nam has increased rice production. The IAEA contributed to the eradication of the cattle disease Rinderpest.

After devastating earthquakes in Ecuador and Nepal, we sent experts in non-destructive testing techniques – including radiography – to assess the safety of hospitals and schools in danger of collapse. We demonstrated our ability to respond quickly to emergencies such as the Ebola and Zika viruses,

supplying affected countries with simple nuclear-derived kits so they could detect the diseases quickly and accurately in the field.

Partnerships are an essential element of our work. Together with the Food and Agriculture Organization of the United Nations, the IAEA deploys nuclear techniques to help increase food production, manage pollution, reverse land degradation and restore soils. We work with the World Health Organization to help improve the availability of radiotherapy and nuclear medicine. We train health professionals and sometimes supply equipment for diagnosis and treatment.

Ladies and gentlemen, when the IAEA Statute entered into force in July 1957, the nuclear world looked very different from the way it does today. Few countries had access to peaceful nuclear science and technology and there was little understanding of the potential benefits.

Capacity building was part of our work right from the start. The first 218 IAEA fellowships were awarded in 1958. Over the years, as many countries developed some nuclear capacity, the programme gradually evolved from assistance to cooperation. This was a very important shift in emphasis.

Since 1958, more than 48,000 scientists and engineers have held fellowships and scientific visitor positions through the TC programme, both at the Agency's laboratories, and in the facilities of our partners around the world. Many of these scientists and engineers went on to play a key role in building capacity in nuclear science in their countries. I am especially pleased to welcome a very distinguished former IAEA fellow – His Excellency President Tabaré Vázquez of Uruguay – as one of our speakers this morning.

The IAEA technical cooperation programme is a shared responsibility of all Member States, made possible by the sustained commitment of all to the Technical Cooperation Fund, and supplemented by further contributions by donor countries. Last year, the TC programme delivered support to 146 countries and territories, including 37 Least Developed Countries. In recent years, we have had more staff funded by our regular budget to implement technical cooperation activities. This enabled us to achieve a higher implementation rate for the TC programme.

The Agency's Peaceful Uses Initiative (PUI), launched in 2010, provides additional funds for our work. It has helped to raise over 100 million euros for more than 200 projects that benefit around 150 countries. I am very grateful to all countries which have contributed to the PUI and I hope to be able to continue with this valuable initiative with the support of our Member States.

Ladies and gentlemen, energy is indispensable for development. Huge increases in energy supply will be required in the coming decades to support economic development and lift some 2.6 billion people out of energy poverty. Many countries believe nuclear power can help them to address the twin challenges of ensuring reliable energy supplies, while curbing greenhouse gas emissions.

Nuclear power is one of the lowest-carbon technologies available to generate electricity. Nuclear power plants produce virtually no greenhouse gas emissions or air pollutants during their operation, and only very low emissions over their entire life cycle. The use of nuclear power can also help to alleviate concerns about volatile fuel prices and security of supply.

Some 30 countries are already using nuclear power. Another 30 are considering building their first nuclear power plants, or have started doing so. Most of these possible newcomers are developing nations. The IAEA does not attempt to influence countries' decisions on whether or not to add nuclear power to their energy mix. But if countries decide to proceed, we provide assistance and information so they can use nuclear power safely, securely and sustainably.

Ladies and gentlemen, the IAEA is unique within the UN system in having eight nuclear applications laboratories – not far from here, in Seibersdorf. They assist more than 150 countries in areas such as

food and agriculture, human health and the environment. Many Member States rely on the laboratories for training, technology transfer and analytical services. A long overdue modernisation of the laboratories is underway.

Construction is at an advanced stage on the building that will house the new Insect Pest Control Laboratory. And work has begun on a second building, which will be home to three laboratories managed jointly by the IAEA and FAO. When completed, the laboratories will offer improved scientific services to our 168 Member States. I thank the countries whose generous contributions have made this vital modernisation project possible. I hope that Member States will continue to provide strong support for further work at Seibersdorf in the coming years.

Ladies and gentlemen, yesterday, I spoke at a meeting of National Liaison Officers from IAEA Member States. They help to identify, design, implement and monitor TC projects and have a key role in ensuring their success. It is important that each country should think strategically about the TC support it would like from the Agency. TC proposals should be aligned with national priorities under the SDGs – although they need not be strictly limited to the SDGs.

Capable National Liaison Officers make a major contribution to the success of the TC programme. Ideally, they should not be too junior, because they might not have enough influence in their country to get things done. It is also helpful if NLOs remain in their posts for a reasonable period of time in order to ensure continuity.

Ladies and gentlemen, the IAEA strongly encourages women to participate in every aspect of the TC programme. When I visit Member States, I am struck by the fact that more and more of the scientists, engineers and medical professionals whom I meet are women. This is true all over the world. I am proud that some of these highly skilled women have received training from the Agency, or held IAEA fellowships. Many are already in senior positions in their countries.

In 2016, nearly 4,400 women participated directly in the TC programme, as counterparts, fellows, and scientific visitors, as well as meeting and training course participants. Many women also served as international experts and lecturers. We encourage countries to ensure strong participation by women. At present, around a third of participants are women and we expect that proportion to show a steady increase in the coming years. The aim is equal representation. This helps to build a growing pool of qualified women for the future. In the Agency, the proportion of women in senior management positions is now higher than it has ever been. My intention in the coming years is to appoint more women to very senior positions.

Ladies and gentlemen, the IAEA technical cooperation programme has made a valuable contribution to development in the last six decades. In some areas, such as nuclear energy, safety and security, we are the leading international organization. In others, such as human health and food and agriculture, we play a supporting role – but a very effective one. In all areas of our work, our goal is to achieve concrete results that make a clear difference to the lives of the people we serve. The IAEA delivers.

I thank you all for attending this important conference to share your insights and ideas. I am confident that your work in the next few days will help to strengthen both the IAEA technical cooperation programme and the Agency's contribution to sustainable development.

Thank you.

Summary of the TC Conference sessions

Opening session

The International Conference on the IAEA Technical Cooperation (TC) Programme: Sixty Years and beyond – Contribution to Development opened on 30 May 2017 at the IAEA Headquarters in Vienna, Austria. Mr Dazhu Yang, Deputy Director General and Head of the IAEA's Department of Technical Cooperation, moderated the Opening Session. He warmly welcomed the participants to the first ever international conference on the IAEA's TC programme, taking place to mark the 60th anniversary of the IAEA. He noted that the presence of more than 1200 participants, including Heads of States and Government and other high level officials from 160 countries and many partner organizations and entities, is a strong sign of interest in and commitment to the Agency's development activities.

The conference was inaugurated by Mr Yukiya Amano, the Director General of the IAEA. In his opening speech, Mr Amano highlighted the role of the IAEA in development since its creation in 1957 and how this important dimension of the IAEA's work is central to the delivery of the IAEA 'Atoms for Peace and Development' mandate. Mr Amano briefly described the scope and impact of the IAEA TC programme in Member States, notably to address human basic needs in many key socioeconomic areas such as human health, water and environment, food and agriculture and above all human capacity building and education. Focusing on how the TC programme is achieving impact, he noted: "Since 1958, more than 48,000 scientists and engineers have held fellowships and scientific visitor positions through the TC programme, both at the Agency's laboratories, and in the facilities of our partners around the world. Many of these scientists and engineers went on to play a key role in building capacity in nuclear science in their countries".

Mr Amano emphasized the collaborative nature of the TC programme, a shared responsibility of all Member States, sustained by the commitment of all to the Technical Cooperation Fund. He noted the ownership of the programme by Member States, who remain in full charge of the solutions to their development objectives. Accordingly, he advised that countries have to think strategically about the scope and nature of the TC support they need from the Agency, but where possible, this support should be aligned with the national priorities under the SDGs.

His Excellency Mr Tabaré Vázquez, President of the Eastern Republic of Uruguay, then delivered his keynote statement. He stressed the importance of the IAEA's TC programme, and highlighted the cooperation between Uruguay and the IAEA since 1963. This cooperation evolved with time to cover several socioeconomic areas in human health, agriculture and radiation safety. Collaboration with the IAEA also allowed Uruguay to contribute to the TC programme through national and regional projects in several areas of common interest. Mr Vázquez added: "The fundamental purpose of the programme and the IAEA (is) to make energy and nuclear technology available for the progress and well-being of humanity." Nuclear safety and security was reconfirmed as a priority for Uruguay, and Mr Vázquez noted that his country adheres to the IAEA Basic Safety Standards. He encouraged Member States to work together to make the TC Fund predictable, assured and sufficient. The president assured the conference of his country's position supporting non-proliferation and complete disarmament.

Her Excellency Ms Ameenah Gurib-Fakim, President of Mauritius, also delivered a keynote speech at the opening session. She stressed the important role of nuclear science and technology in assisting Mauritius in fields including human health, agriculture, food security and energy. Ms Gurib-Fakim highlighted the impact of the collaboration between Mauritius and the IAEA's TC programme since 1974, citing examples in several socioeconomic areas of high significance to the country. She noted that over 500 scientists and technicians had been trained by the IAEA in various sectors. Ms Gurib-Fakim added that in order to address challenges in Africa such as poverty and income inequality, Africa needs to move to high-productive sectors, upgrading industry and encouraging technological innovation through the incorporation of science, technology and innovation (ST&I) in development plans.

Ms Gurib-Fakim stressed the important role of the IAEA in contributing to 13 of the 17 SDGs, and linked them to the 2063 Agenda of the African Union. "We are collectively charting the way forward for mobilizing ST&I through the use of nuclear technology for sustainable development," she said, noting that ST&I will provide sustainable solutions to development problems and inform policies and remedial measures, particularly in addressing the challenges of climate and environmental variations. Recognizing the critical role played by the TC programme in supporting regional cooperative activities and initiatives under the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA) Agreement, Ms Gurib-Fakim called for sustained support, in particular to address the specific needs of LDC countries and new Member States in Africa. South-south collaboration with other countries to share learning and initiatives would help build the scientific capabilities in African institutions. Finally, Ms Gurib-Fakim appealed to countries to invest in women to achieve equal access to nuclear science and technology.

In her statement at the opening session, Her Excellency Sheikh Hasina, Hon'ble Prime Minister of Bangladesh, thanked the IAEA for its support to Bangladesh's development over the last 45 years. She noted "The IAEA holds a special place in Bangladesh's development and energy security." She stressed the determination of the country to make full use of ST&I to achieve a 'Digital Bangladesh'. Accordingly, Bangladesh has incorporated nuclear science and technology into the National Science and Technology Policy and the 7th Five Year Plan (2016 to 2021), to find sustainable solutions to emerging problems in the agriculture, food, health and environment sectors, and in regard to climate change.

"Bangladesh enjoys an excellent collaboration with IAEA," said the Hon'ble Prime Minister, noting that this was reflected in the highly relevant cooperative programme, with tangible results in food and agriculture, human health, R&D, education and human capacity building, energy planning and nuclear power development. She recalled that Bangladesh's programme with the IAEA is promoting nuclear education and research in different thematic areas, citing two examples. In the field of crop improvement, 92 improved varieties of 13 crops, particularly rice, have already been developed, and in the field of human health, access to diagnostic medical care has increased tenfold over the last twenty years. The Hon'ble Prime Minister announced that Bangladesh has recently acquired two Russian power plants which will produce 2400 MWe electricity, with the aim to generate at least 4000 MWe from nuclear sources by 2030. Before concluding, she recalled the importance of nuclear science and technology in the achievement of the SDG targets, and called upon developing countries to pursue greater cooperation in order to draw maximum benefits from the peaceful uses of nuclear technologies using IAEA expertise. The Hon'ble Prime Minister also called for resources that would be assured and sufficient for the TC programme, and urged the IAEA to strengthen its efforts to help Member States, particularly LDCs and developing countries as they implement the SDGs.

His Excellency Mr Tebogo Joseph Seokolo, Chairman of IAEA Board of Governors, commended the IAEA for the pivotal role of the IAEA in contributing to peace, security and development. He recalled that the evolution of the Agency's work over the six decades covered different areas and faced multiple global challenges, reaffirming the programme's commitment to harnessing the peaceful uses of nuclear energy for development. Mr Seokolo described how the TC programme gained recognition initially as an important delivery mechanism to promote the peaceful uses of nuclear energy, and more recently as a real partner in development, helping Member States to achieve their SDG targets under the 2030 Agenda for Sustainable Development. The immediate response of the IAEA to emergencies, such as the outbreak of Ebola in Western Africa, is indicative to the support it provides to Member States. Mr Seokolo further stressed that the funds of the TC should be sufficient, assured, and predictable. He expressed his support to the Renovation of the Nuclear Applications Laboratories (ReNuAL) project and asked Member States to consider favourably making financial contributions to this important endeavour.

Session 1: The Evolving IAEA Technical Cooperation Programme

Objective

The overall objective of Session 1 was to set the stage for the TC Conference, with a particular emphasis on how the IAEA's TC programme contributed to the establishment of national nuclear infrastructure and capabilities in support of the national development priorities of Member States.

Structure

Session 1 opened with a film, 'The IAEA TC Programme, the Driving Force for Development', followed by a presentation giving an overview of the TC programme, covering the IAEA mandate, the role of the TC programme, the TC mechanism and achievements. Five statements from senior dignitaries followed: the Minister of Foreign Affairs, Bosnia and Herzegovina; the Secretary General of the China Atomic Energy Authority; the Minister of Science, Technology and Environment, Cuba; the Minister of Electricity and Renewable Energy, Egypt; and the Minister of Research, Technology and Higher Education, Indonesia.

Main Highlights

The film presented the main tools and mechanism of the TC programme, its achievements in Member States, and its contribution to socioeconomic development. The IAEA presentation described the history of the TC programme since 1957 and its evolution over six decades, noting how the programme has addressed the needs of the Member States in line with their developmental needs by building capacity in nuclear science and technology. The role of the IAEA in contributing to the achievement of Agenda 2030 and the SDGs was elaborated.

Each of the following high level statements that followed described national paths to establish viable national capabilities to enable the contribution of NS&T to national development objectives. Speakers noted that government commitment was an essential factor in building national nuclear infrastructure, and presented examples of the establishment and operation of nuclear facilities and the empowerment of regulatory bodies to ensure the safe and secure utilization of NS&T nationwide.

Each statement described key strategic features of national nuclear programmes, all noting the importance of country driven programmes that were fully aligned with national priorities, oriented towards socioeconomic development, and directed at outreach to partnerships to enhance and multiply beneficial results. Speakers stressed the importance of NS&T, particularly in providing sound solutions to specific development problems, complementing conventional methods, and informing decisions, notably in the new development context which is affected by new imperatives such as climate change, natural disasters and emerging diseases.

The role played by the TC programme in the establishment and utilization of the national nuclear capabilities in the five Member States was recognized. The speakers highlighted the impact achieved through their national nuclear programmes, giving concrete examples of achievements that provided a wide range of socioeconomic benefits.

In Bosnia and Herzegovina, TC programme support helped enhance access to cancer care through the upgrade of radiotherapy and nuclear medicine capacities in five medical centres. An Act on Radiation and Nuclear Safety was promulgated, and a disease control strategy for transboundary animal diseases was developed. Two hundred and fifteen professionals were trained in different nuclear science and technology domains and networks of environmental monitoring laboratories were established.

Cuba is now able to produce practically all of the radiopharmaceuticals and labelled compounds required by its nuclear medicine facilities. Cuba has also increased its capacity to conduct clinical and pre-clinical studies for the development of new drugs. The TC programme has contributed to the implementation of national programmes related to improved agricultural yield, efficient soil use, new crop varieties, and food preservation. A national network of analytical laboratories has been established to provide services for environmental conservation and management. In addition, the application of nuclear and isotopic techniques has contributed to improved management of the country's major river basins, and to the monitoring of air pollution and industrial waste.

Over 100 Chinese institutions have been engaged in the TC programme since 1984, with activities in almost all fields of nuclear industry. With the support of the TC programme, China has established a robust nuclear agriculture system, and has been able to develop 958 mutant varieties. The International Nuclear Power Construction Training Center was established, where over 200 professionals from 38 countries were trained. China also became the third largest donor to the Technical Cooperation Fund.

The TC programme supported Indonesia in developing and releasing improved varieties of rice, soybean and sorghum. TC programme support has also contributed to a reduction in the percentage of malnourished infants, from 4.7% in 2014 to 3.4% in 2016. Air pollutants in 15 of the 34 provinces in Indonesia have been investigated, and studies conducted on the potential use of nuclear energy in the national energy system.

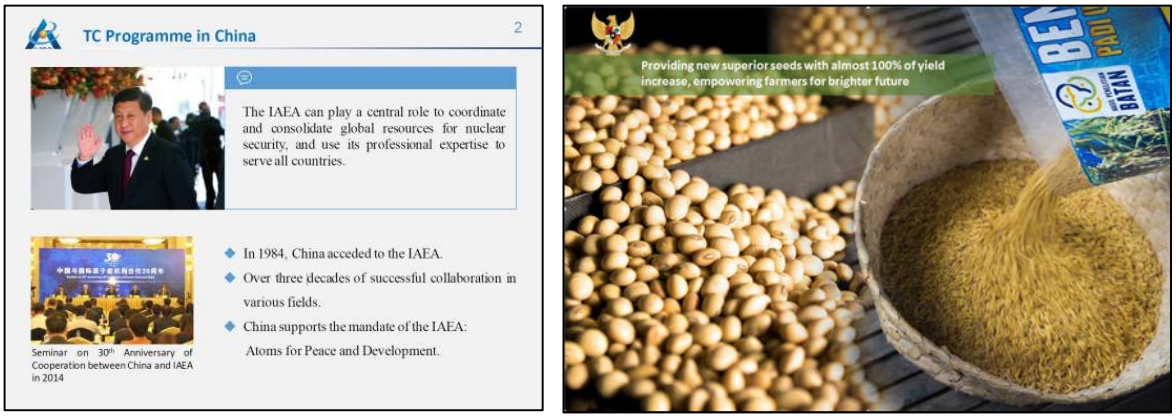

Fig. 1: China has provided support to the technical cooperation programme for over 30 years. In Indonesia, 10% of superior varieties of national food are produced using the mutation breeding technique.

Egypt has enhanced national capacity for a nuclear power programme with TC programme support, and has established a High Dose Reference Dosimetry Laboratory, one of seven reference laboratories worldwide to implement a quality management system for the radiation processing sector adopted by the ISO. Agricultural productivity has increased, and the use of radiation and isotopes for diagnosis and health care applications has been enhanced. In addition, TC programme support has helped to upgrade the national facility for radiopharmaceutical production to meet the international quality standards.

Moreover, four countries become nuclear service providers, helping the TC programme to focus on the needs of new Member States, and supporting activities in human capacity building, radiopharmaceutical production and utilization, dosimetry, and food and agriculture.

Alongside national programmes, speakers stressed the need for sound regional cooperation, such as the IAEA-supported regional agreements. The support provided by the TC programme to enhance and further enlarge the scope of regional cooperation between Member States was well acknowledged.

Looking forward, the speakers expressed a strong commitment to continue working with the TC programme and, noting future challenges, particularly in view of Agenda 2030, appealed for a more

robust TC programme with more diversified and predictable funding, which can help Member States maximize the use of NS&T in support of their national SDG targets and, at the same time, achieve the common goal embedded in the IAEA's current motto: '*Atoms for Peace and Development*', for the benefit of all countries.

Session 2: The IAEA TC Programme: Contributing to Member States' National Development

Objective

The objective of Session 2 was to present Member States' experiences in leveraging the support of the TC programme to address pressing development challenges. Six sub-sessions focused on the impact of nuclear science and technology in key thematic areas, covering human health and nutrition, food and agriculture, water and the environment, radiation technology, energy and safety, and linking IAEA's support in these sectors to sustainable development.

Structure

Session 2 consisted of six interrelated sub-sessions, each one dealing with a specific theme: i) Human Health and Nutrition; ii) Food Security; iii) Water and Environment; iv) Innovative Solutions in Industry; v) Energy Planning and Nuclear Power Infrastructure; and vi) Radiation and Nuclear Safety Infrastructure. In each area, the TC programme helps Member States to use appropriate nuclear technologies, in combination with some conventional methods, to address priority development needs. Human capacity building remains the cross-cutting priority need in all thematic areas to enable the recipient countries make effective and efficient use of their nuclear infrastructure and expertise, and to achieve tangible results.

Each sub-session began with an IAEA presentation outlining the main nuclear technologies used to address the development priority needs of Member States in a thematic area. Presentations by speakers from each region showcased how the TC programme helped countries to address their development priorities using appropriate nuclear technologies. A discussion panel, comprising panellists from Member States, development agencies and banks, and the UN system, then elaborated on the sub-session theme.

Main Highlights of sub-session 2.1: Human Health and Nutrition

The IAEA's Director of the Division for Human Health introduced sub-session 2.1, Human Health and Nutrition, with an overview of the IAEA programme in this area. This was followed by presentations from Estonia, Malaysia, Peru and Senegal. Panellists comprising decision makers and experts from Benin, Japan, United Nations Children's Fund (UNICEF) and the World Health Organization (WHO)/Pan American Health Organization (PAHO) further discussed the theme.

The country speakers recognized that human health and nutrition challenges are growing, particularly in developing countries. The world's population is increasing, life expectancy is rising, and economic development and globalization are altering the way people live, leading to serious malnutrition health issues. Speakers highlighted the absence of sound strategies and the lack of appropriate infrastructure and skilled human resources to address these health issues, and recognised the important role of nuclear science and technology. The speakers shared concrete experiences, and reported that the response of the TC programme had been decisive in helping their countries to face challenges in the health sector over decades, through:

- training specialists in radiation oncology, medical physics, nuclear medicine, nutrition and tissue grafting;
- providing fit-for-purpose equipment and supplies to hospitals, R&D laboratories and universities; and advice on the use of radiation medicine, radiation technologies and isotopic techniques to manage non-communicable diseases, develop and use tissue grafts and carry out studies to identify causes of malnutrition in specific national population groups.

Estonia faced a major challenge in the 1990s: two-thirds of the country had no access to radiotherapy due to a lack of modern equipment and a shortage of trained personnel. With the help of the TC programme, gaps were identified, staff were trained and new equipment was installed and commissioned. This allowed the introduction of modern radiotherapy techniques and increased the number of patients treated. Furthermore, the safety and quality of radiotherapy improved to meet international standards.

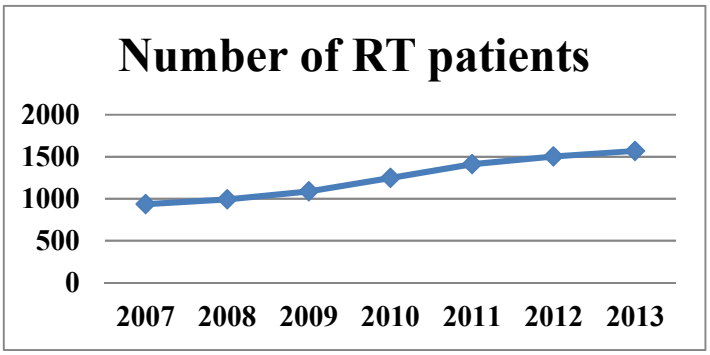

Fig. 2: TC programme assistance improved Estonia's health sector services through staff training. New equipment was acquired through government cost sharing.

In Malaysia, the TC programme supported academic and on-the-job training which improved the quality of national radiology by incorporating hybrid imaging into the training syllabus and encouraging positron emission tomography–computed tomography (PET–CT) research through Masters and PhD programmes in molecular imaging. The TC programme expanded the role of clinical PET–CT beyond oncology imaging by supporting the introduction of PET–CT in the diagnosis of infections and inflammatory conditions, and in cardiology and neurology, at the Centre for Diagnostic Nuclear Imaging of Putra University, Malaysia.

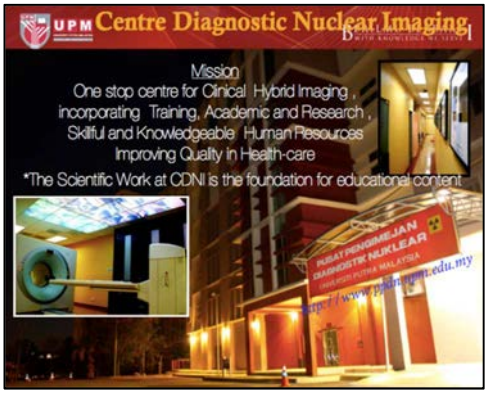

Fig. 3: Centre for Diagnostic Nuclear Imaging, Malaysia.

Fig. 4: From the presentation of Malaysia.

In Peru, the TC programme helped the National Institute for Child Health to develop the First National Tissue (skin) Bank. This tissue bank currently provides medical treatment to around six hundred children every year, using thousands of pieces of irradiated pig skin and irradiated human amniotic membrane, giving the patients not just the possibility to survive but the chance to totally recover. The TC support enabled Peru to build capacity for radiation sterilization of tissue allografts, and to create a network for tissue banks in the region.

In Senegal, the assistance provided by the TC programme enabled the Nutrition Laboratory of the Cheikh Anta Diop University (UCAD) to assess the impact of supplementation on mothers and on infant growth. The scientific information generated contributed significantly to broadening the scope of the

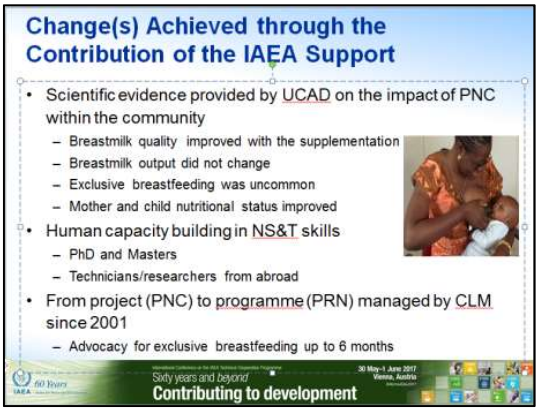

Fig. 5: TC programme supported Senegal in addressing malnutrition through isotopic techniques.

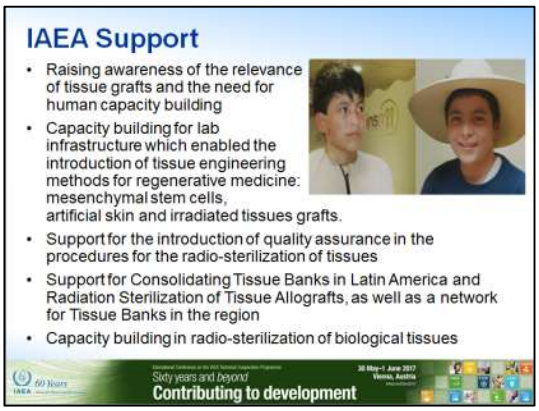

Fig. 6: TC programme supported Peru in establishing the nation's first tissue bank.

Laboratory's study, which subsequently became a national programme under the oversight of the Prime Minister. The presentation from Senegal noted that science-based evidence is crucial for policy makers to address malnutrition in all its aspects. Technicians and researchers from other African countries are now receiving training in the application of isotope techniques in UCAD.

The panel discussion that followed the speaker presentations noted the determinant role that the TC programme plays in strengthening radiation medicine infrastructure and human resources in Member States, thus allowing increased access to quality and safe treatment. The panellists highlighted the alarming prevalence of non-communicable diseases, and mentioned the role that the TC programme has played in cancer management. Panellists stressed that a comprehensive strategy to combat cancer, together with commitment to translate the strategy into concrete action, was essential for sustained impact. "This is why I feel it is the time to talk about 'Atoms for Medicine' as a holistic tool for the therapy of intractable cancer by integrating nuclear physics, nuclear technology, and nuclear medicine," said Prof. Jun Hatazawa, President of the Asia and Oceania Federation of Nuclear Medicine and Biology, and Professor at Osaka University, Japan. Much emphasis was placed on education and training as well as radiation safety in the workplace. The discussion concluded that more attention ought to be paid to resource mobilization to help countries enhance access to cancer treatment, and to nuclear medicine for its role in diagnosis and follow-up on the efficacy of cancer treatment.

Panellists stressed that making scientific evidence available to decision makers to enable them to develop policies and take concrete measures was essential for addressing malnutrition in all its aspects. The role of isotope techniques was highlighted. "Benin is committed to the use of the atom for medical purposes to strengthen its technical platform and relieve the population," said Mr Alassaner Seidou, the Minister of Health, Benin.

The speakers and panellists agreed that Human Health and Nutrition is a flagship area for the TC programme, with demonstrated successes, experiences and partnerships, but noted that many challenges remain. Training adequate teams of specialists and acquiring sophisticated equipment represent serious challenges for both Member States and the TC programme. Government engagement and investment in health contributed to the attainment of the Millennium Development Goals and will contribute also to the achievement of SDG 3, Good Health and Well-Being. "New opportunities and avenues should be explored to build and maintain strong and resilient health systems," said Mr Pablo Jiménez, Regional Advisor, WHO/PAHO.

It was noted that this area of TC work is attracting more and more partners who are willing to share the burden with Member States and the TC programme through pooling of resources and know-how. This is particularly pertinent in the context of Agenda 2030, which accords high importance to partnerships, and to human health and nutrition.

Main Highlights of Sub-session 2.2: Food Security

Sub-session 2.2, on Food Security, began with an overview of the joint FAO/IAEA programme in the field of food and agriculture presented by the Director of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. This was followed by four presentations from Bangladesh, Benin, Guatemala and the United Republic of Tanzania. The subsequent panel was composed of experts from International Cooperation Centre of Agricultural Research for Development (CIRAD), France, Pakistan Agricultural Research Council, the US Department of Agriculture (USDA) and the International Center for Biosaline Agriculture (ICBA).

Most IAEA Member States receive technical support through the TC programme to develop or expand their capabilities to use nuclear techniques and other conventional methods in many areas of food and agriculture. This includes crop improvement, soil/water/fertilizer management, pest control and eradication, livestock health and production, food control and preservation and pesticide residues analysis and control. This support is provided through the Joint Division of the IAEA and Food and Agriculture Organization (FAO) of the United Nations.

The four presentations highlighted the important role played by the TC programme in helping their countries to achieve remarkable results in food and agriculture. This was particularly notable, given that specific food problems were further exacerbated by climate change, competition for fertile land and water, and threats caused by pests. The applications of nuclear techniques together with conventional methods proved to be effective in addressing many problems in this topic area. Presenters highlighted how leveraging complementarities between nuclear techniques and conventional methods leads to better impact, and appreciated TC programme actions to facilitate this complementarity through partnerships.

Fig. 8: In Bangladesh, through the TC programme, high yielding mutant varieties such as Binamog-8 (mungbean) were developed..

Fig. 7: In Benin, with TC support, the area covered by soybean increased from 2200 ha in 1999 to 400 000 ha in 2016.

For example, Bangladesh used mutation breeding and other advanced techniques supported by the TC programme to develop several improved crop varieties, including salt tolerant and high yielding rice mutants, which were disseminated to farmers and succeeded in alleviating occasional hunger and increasing productivity nationwide. Improved varieties of groundnut resolved salinity problems and increased yield by 40%, while rice straw application reduced the use of potassium fertilizer by about 25%, and improved lentil and mung bean mutant varieties increased yields by 80%. The dissemination of 6000 tons of improved seed to farmers required the training of 30 000 farmers and 3000 extension personnel and the implementation of 30 000 demonstrations and 150 workshops. The speaker concluded that replication and upscaling of successful TC project results to increase agricultural production contributed to food security and attracted other partners, including the private sector.

Benin addressed rural poverty and child malnutrition by introducing appropriate soil and water conservation practices and producing affordable biofertilizers. This significantly increased crop yield. With TC programme support, the maize yield increased by 50% and legumes by 100% without additional mineral fertilizer, saving an estimated USD 13.5 million from importing mineral fertilizers over 400 thousand ha. In addition, 5000 farmers were trained, which led to an increase in their annual

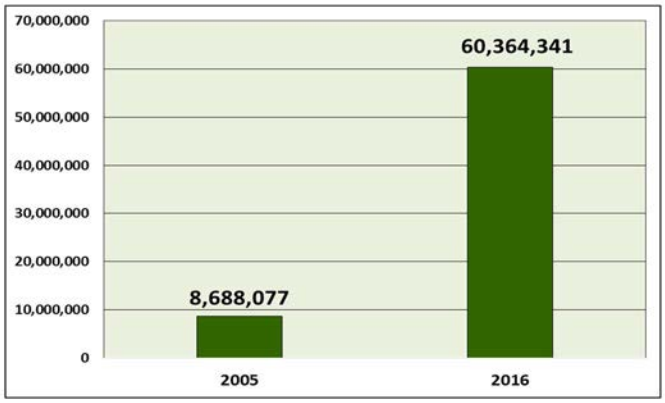

Fig. 9: Guatemala's annual exports of papaya, tomato, sweet pepper and mango: Combined value to all destinations (in US dollars).

income by an average of USD 600.

In Guatemala, the Mediterranean fruit fly (medfly) causes serious damage to the country's economy by damaging fruit and preventing its export. With the support of the TC programme and other partners, the country successfully eradicated the pest from several regions using integrated pest management techniques, established El Pino Medfly rearing facility (the largest of its kind in the world), and consequently increased exports by a factor of seven in a single decade. The establishment of pest-free areas has increased fruit production, food security, and income for local communities and the country. Through the TC programme, Guatemala and other countries are now able to produce and export tomatoes, bell peppers and papayas from medfly-free areas. Today, Guatemalan fruit exports generate over UED 50 million per year.

The island of Zanzibar, United Republic of Tanzania, celebrates its 20th anniversary of being a tsetse-free island in 2017, thanks to the intensive assistance provided by the TC programme during the period 1994–1997. The eradication of the tsetse fly, and associated animal diseases such as trypanosomiasis, enhanced livestock production in Zanzibar, and allowed the introduction of exotic breeds of cattle, which have also benefitted from the use of artificial insemination techniques, improving milk production (an average of 10 litres per cow per day in cross bred cattle, compared to 2 litres of milk per day from zebu cattle). This has improved income, nutrition and food security in the country (meat and milk). The Zanzibar dairy sector also received a donation of 300 heifers through the TC programme. It was noted that an integrated, multidisciplinary and multisectoral approach to disease control was key for success.

The following panel discussion emphasized the magnitude of impact that can result from a judicious combination of nuclear and other advanced techniques to address agricultural development challenges. In particular, the panellists stressed the need to address food and agriculture challenges holistically through integrated, multidisciplinary and multisectoral approaches, whether to control animal disease, improve crop varieties or manage climate change effects.

Panellists also noted that government and national stakeholder commitment was essential to ensure the sustainability of capacities for food security and hunger eradication that had been built through the TC programme.

Solid partnerships with national stakeholders, development partners and international R&D institutions were considered important for large scale food and agriculture programmes. CIRAD, ICBA, the USDA and Pakistan discussed how intensifying collaboration with the TC programme to expand the use of nuclear and advanced techniques in food and agriculture could support collaborative efforts to manage climate change effects and to contribute more effectively to the achievement of the SDGs. "These programmes would not be possible without IAEA collaboration in development and transfer of technology for improvement of sterile insect techniques (SIT). Regional cooperation benefits all partners," said Ms Rebecca Bech, Associate Deputy Administrator at the US Department of Agriculture.

The capability of the TC programme to respond to emergency situations was praised. "In any emergency situation, like arrival of dengue fever or bird flu, IAEA TC under its emergency programme provided immediate relief grants (up to US$ 50 000) to cope with the situation. Availability of international experts and infrastructure laid strong foundation for epidemiology and surveillance," said Mr Kauser Malik, Ex-Chairman, Pakistan Agriculture Research Council.

Main Highlights of Sub-session 2.3: Clean Water and Environment

Sub-session 2.3, on Clean Water and Environment, started with an overview of the IAEA-supported programme in the field of water and environment, presented by the Director of the IAEA Environment Laboratories in Monaco. This was followed by four presentations from Colombia, Morocco, the Philippines and Tajikistan, and a panel discussion attended by experts from the National Nuclear Energy Agency (BATAN), Indonesia, the National Oceanic and Atmospheric Administration (NOAA), USA, United Nations Environment Programme (UNEP) Vienna Office, and the Intergovernmental Oceanographic Commission (IOC), United Nations Educational, Scientific and Cultural Organization (UNESCO).

The IAEA's TC programme has successfully supported Member States in developing or expanding capacities to address challenges related to water resource availability, flooding, storm frequency, the effects of climate change and manmade pollution. This support has helped Member States to develop effective strategies for the rational management of surface and ground water resources. The TC programme promotes effective management of water resources, protection of the environment, and supports the scientific understanding of climate change and its effects on the land, oceans, and atmosphere. Nuclear applications and isotope hydrology provide vital data to inform decision making and to help countries design and implement remedial measures. This work is supported by two specialized laboratories in Vienna and Monaco.

The four presentations brought to the forefront the significant role played by the TC programme in building national capabilities and in promoting a conducive environment at the regional level in support of national and regional programmes focused on the challenges and opportunities posed by water and environmental issues. The TC programme has also mobilized the scientific community and partners to tackle water and environment issues holistically, has helped to inform policies and remedial measures, and has also sensitized decision makers on the need to act at both national and regional levels. In some areas, support provided through the TC programme played a key role in elucidating water resource phenomena, and in providing data and information that enabled decision makers and water administrations to design and implement sound strategies for the rational management of water resources.

The speaker from Colombia illustrated how a lack of knowledge about groundwater resources and inadequate planning for their rational use led to intensive exploitation of key aquifers, increased the risk of contamination and threatened the supply of water to populations that use these aquifers as their sole source of supply. As a result of the assistance provided by the TC programme under national and regional projects since 2003, the main aquifers have been characterized and sound exploitation plans have been developed, while the relationship between surface and ground water has been elucidated.

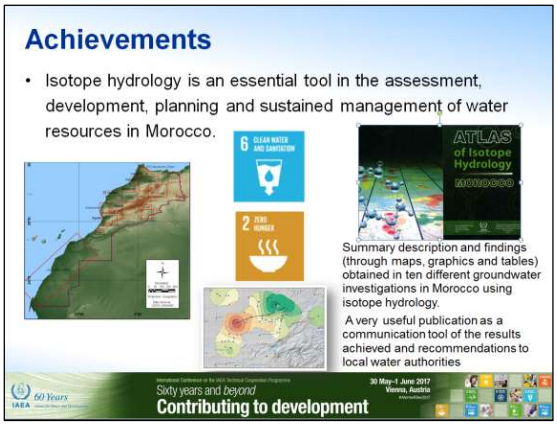

Fig. 11: Achievements of the TC programme in Morocco in water resource management.

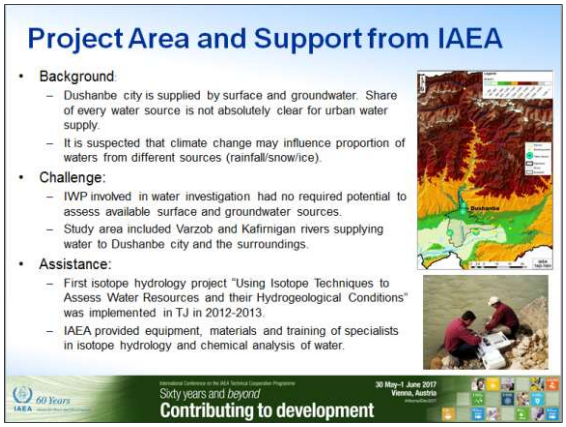

Fig. 10: The TC programme also assisted water resource management in Tajikistan.

In Morocco, collaboration between National Centre for Nuclear Energy, Sciences and Technology (CNESTEN) and the TC programme helped the country to acquire a better understanding of the location of groundwater, its age and its recharge rate. This scientific evidence has been used to support sound decision-making about water use, and in the protection of the water quality of Morocco's main aquifers. The results of the investigations were published as the 'Isotope Hydrology Atlas of Morocco', which is used as a national and international reference for sustainable groundwater management. CNESTEN is now providing analytical services, training and expertise to several IAEA Member States.

Tajikistan's capital, Dushanbe, is supplied by surface and groundwater from rainfall, melted snow and ice. Recent climate change has influenced the quantity of water from different sources, resulting in a deficiency of water during the summer. Assistance provided through the TC programme helped the country to assess the effects of climate change, and the water potential in the Pamir region. The findings are being used to design sound solutions to ensure the continued supply of water to the capital. The results of the study were published in the scientific magazine *Geography, Environment, Sustainability*[1]. The speaker noted that an integrated, multidisciplinary and multisectoral approach to tackle climate change issues is key to sustainable solutions.

In the Philippines, harmful algal bloom (HAB) is a marine environmental problem and resource management issue recognized in 1983 as a catastrophic phenomenon, affecting public health and the national economy. Assistance by the TC programme and other partners improved the country's capabilities to assess and monitor the extent of contamination and to issue early warnings about HAB toxicity. These capabilities are being integrated into the national regulatory monitoring programme. The expertise and facilities established are now used to support other countries affected by HABs in Asia, as well as countries in Africa and Latin America.

Fig. 12: The IAEA is helping Member States to address Harmful Algal Bloom through the TC programme.

Speakers on the subsequent panel recognized the importance of nuclear technology, particularly isotope techniques, which play a unique role in the evaluation of water resources, and in assessing, mitigating and predicting environmental effects and their potential consequences. In order to advance understanding of the complex interactive processes of water and environment, the TC programme applies tools that focus on filling gaps in data and information that are vital for informing policies and for taking sound measures. The panellists gave examples to illustrate the role of nuclear and isotope techniques in water and environment issues, discussing how both areas still urgently need stronger international cooperation to help many countries address challenges related to freshwater resources, the oceans, the terrestrial environment, and climate change. Panellists stressed the need to develop an interface between decision makers and research organizations in environmental and human sciences on the effects of climate change and water. "Nuclear analytical techniques have been applied to airborne

[1] http://www.rgo.ru/sites/default/files/upload/gi316_web.pdf

particulate matter (APM) sample characterization in national scale through sampling in almost 16 cities in Indonesia and the results have supported the evaluation of the effectiveness of the unleaded gasoline programme, and encouraged the revision of government regulation," said Ms Muhayatun Santoso**,** Senior Researcher, Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency (BATAN), Indonesia.

In particular, the Panellists stressed the importance of strengthening partnership and enlarging the scope of cooperation to address water and environment challenges holistically through integrated and multidisciplinary approaches, especially since the associated development issues do not recognize borders. HABs and climate change affect many countries around the globe, and global solutions supported by scientific evidence are needed to address the consequences. "Global solutions to environmental threats to human health and economies are available through peaceful use of nuclear technology; the HAB Program is one small example of how that works," said Mr John Ramsdell, Chief, Harmful Algal Bloom Research and Analytical Response Branch, National Oceanic and Atmospheric Administration (NOAA), the United States of America.

The speakers and panelists called for concerted and intensified actions to help Member States achieve their SDG targets under Agenda 2030. Close collaboration with key stakeholders, together with more predictable and assured resources, is necessary to address common challenges in water and environment effectively, and to help Member States achieve their SDGs. "In the case of the IAEA and the Intergovernmental Oceanographic Commission of UNESCO, our cooperation in developing capacity in Member States for better management and mitigation of harmful Algae is an example of how mandates complement each other, of how networks of expertise become linked and of how resource investment is coordinated so both agencies deliver better to Member States," reported Mr Henrik Enevoldsen, Head, Science and Communication Centre on Harmful Algae, Intergovernmental Oceanographic Commission (IOC), UNESCO.

The TC programme, particularly through regional projects, can play a pivotal role in maximizing the use of available expertise to promote effective management of water resources, protection of the environment, and scientific understanding of climate change and its effects on the land, oceans, and atmosphere. Strengthening participatory governance and improving consistency between the adaptation policy of the water sector with the adaptation policy of water related sectors (agriculture, energy, etc.) is seen as necessary. Common targets to be achieved collectively include: advancing scientific understanding and protection of oceans and marine ecosystems; assessing and protecting terrestrial and atmospheric environments, including monitoring and analysis; and contributing towards the achievements of the SDG targets using ST&I.

Main Highlights of Sub-session 2.4: Innovative Solutions in Industry

Sub-session 2.4, Innovative Solutions in Industry, was introduced with an overview of the IAEA-supported programme for the industrial applications of radiation technology, which was presented by the Director of the Division for Physics and Chemistry. This was followed by four presentations from Brazil, Cameroon, China and Poland, and a panel of experts from the Jules Horovitz Research Reactor, French Alternative Energies and Atomic Energy Commission, Bhabha Atomic Research Centre, India, Korea Atomic Energy Research Institute (KAERI), Republic of Korea, and the Foreign and Commonwealth Office, United Kingdom.

The technical cooperation programme assists Member States to investigate the composition and integrity of materials, art objects and machinery; to improve industrial processes and quality control in industries such as petrochemicals, chemicals and minerals; to reduce atmospheric and river pollution; and to produce radiopharmaceuticals for medical and R&D purposes. Given the complexity of these techniques, not all Member States have the same capacity or resources to apply them safely and effectively. The TC programme provides assistance to national nuclear institutions for human capacity

building, and the establishment and operation of physical facilities, to enable Member States to gradually develop capabilities and acquire relevant knowledge and expertise.

Four stories of how the TC programme has successfully supported Member States in applying radiation technology in industry were presented. In Brazil, the TC programme has been working with the country since 1959, helping establish a state of-the-art radiopharmaceuticals industry, building capacity in radioisotopes and radiopharmaceuticals production for diagnosis and therapy in nuclear medicine, and contributing to the improvement of the quality of life of many patients. Today, Brazil is providing its training services to other Latin American countries, and promoting TCDC.

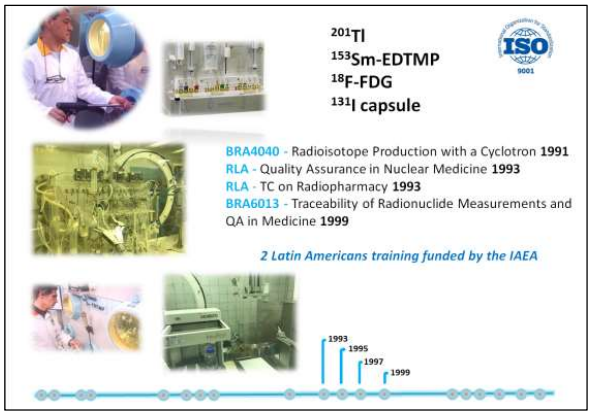

Fig. 14: With TC programme support, Brazil can produce radiopharmaceuticals for diagnosis and therapeutic nuclear medicine.

Fig. 13: The TC programme has helped Cameroon to become a regional hub for non-destructive testing services.

In 1997, Cameroon decided to establish the country's first non-destructive testing (NDT) facility in anticipation of the services that would be required for the quality control and inspection of the 1070 km Chad–Cameroon oil pipeline. Since 1999, the TC programme has supported the national institution HYDRAC through various projects to establish the country's first NDT capabilities. Specifically, the IAEA contributed towards the design of HYDRAC's NDT laboratory, provided some NDT equipment as well as training and qualification examination courses at Levels I and II in various NDT techniques, and in radiation safety and radiological emergency preparedness. The NDT centre became fully operational, with national certification capability in industrial NDT, which enabled HYDRAC to provide NDT services for the Chad–Cameroon pipeline and pumping stations. HYDRAC subsequently became a self-reliant institution, able to respond to national needs for NDT inspections, and to extend its NDT services to several other African countries. The creation of a new profit centre increased HYDRAC's turnover by about 12% in 2013.

In China, the Institute of Nuclear and New Energy Technology (INET), Tsinghua University, collaborated with the TC programme to develop and apply gamma irradiation technology for wastewater treatment using linear accelerators. Support started with a laboratory scale investigation of the use of electron beam accelerators in industrial wastewater treatments (e.g. paper mill, textile and dyeing), and in March 2017, China's first industrial scale wastewater treatment plant was commissioned in Jinhua, using electron beam irradiation in combination with conventional biological methods. The current capacity is 1500–2000 m3/d with one injector. The operational cost, including energy consumption, chemicals and worker salaries, is 0.35 US$/m3 for wastewater reuse.

Fig. 15: Achievements of the IAEA TC programme and China collaboration in wastewater treatment using radiation technology.

In Poland, radiation technology is well established and used routinely in several industrial applications, such as flue gas cleaning in the power industry, radiation sterilization and polymer processing. The TC programme helped introduce PC based automation systems and developed modern gas composition monitoring structures, significantly enhancing the performance of the flue cleaning system. The innovative systems and acquired knowledge were used in other power stations in the country and were also transferred to Bulgaria, Saudi Arabia, Malaysia and other countries. In addition, a Radiation Sterilization Plant was established 20 years ago with the assistance of the IAEA TC programme. Today, more than 6.4 million units per year of pharmaceutical products, 40 million units per year of medical products from 50 companies, and 5000 units per year of cosmetics are being sterilized. New products such as hydrogel wound dressings have been developed for the local market and for export. Poland's all tissue graft banks are using the services of the Radiation Sterilization Plant. More than 12 000 pieces are sterilized annually, and used in orthopaedic surgery for 50 000 patients.

The panel discussion provided additional insights into the economic importance of radiation technology and its affordability for developing countries in providing necessary services such as radiosterilization of medical supplies, NDT inspections and the improvement of industrial processes, as well as many other profitable industrial applications which can generate income while serving national needs. Mr Gautam Kumar Dey, Director, Materials Group, Bhabha Atomic Research Centre, India, suggested that successful industrial application of radiation technology depends on the setting up of facilities for isotope production, customized packaging of the radiation sources for various applications, development of peripheral infrastructure to support the deployment of the technology, vendor development through technology transfer and agreements with public and private partners, the availability of trained human resources and public acceptability. The role and responsibility of Member States is a key success factor in the promotion and dissemination of radiation technology nationwide and in linking R&D institutions with the public and the private industry for lasting partnerships. "International scientific cooperation has been shown to deliver the strongest results. We should all, developed and developing Member States alike, be exploring opportunities to work together to our mutual benefit," said Mr Robin Grimes, Chief Scientific Adviser, Foreign and Commonwealth Office, United Kingdom.

Views were expressed on concerted and intensified actions to build awareness of the potential of radiation technology in industry. In particular, panellists were of the opinion that it was desirable that national nuclear institutions endeavour to partner with academia, R&D peers, and the public and private industry, and that they adopt a business-like mindset to be able to attract and retain customers. It was recognized that this area of work can be a profitable source of income for many national nuclear institutions, which often need additional income to be able to expand and to keep pace with the rapid

evolution of the technology. Agenda 2030 and the SDGs offer opportunities for nuclear institutions to maximize their contribution to national development goals, and to enhance their relevance and sustainability.

Main Highlights of Sub-session 2.5: Energy Planning and Nuclear Power Infrastructure

Sub-session 2.5: Energy Planning and Nuclear Power Infrastructure opened with an overview of the IAEA-supported programme in the field of energy planning and nuclear power infrastructure, presented by the Department of Nuclear Energy. Four presentations by speakers from Argentina, Belarus, South Africa and the United Arab Emirates followed, and then a panel discussion by experts from the Permanent Mission of the People's Republic of China to the IAEA, Jordan Atomic Energy Commission (JAEC), the Hungarian Atomic Energy Authority (HAEA), and the Department of Energy, the Philippines.

In this area of TC work, most Member States require technical support to investigate all possible options for ensuring sufficient energy for their socioeconomic development. The TC programme supports Member States in energy planning, helping them to analyse energy options and develop energy strategies (energy mix). For countries that have decided to pursue nuclear power programmes, the TC programme provides assistance for the introduction of nuclear power, helping countries to build national nuclear power infrastructure and meet requirements, plan and operate nuclear power plants, and produce energy and electricity. TC support is also provided for nuclear fuel cycle development, ranging from uranium production to the management of spent fuel and radioactive waste, and advanced and innovative nuclear power systems. The focus of the TC programme is on human capacity building, advisory assistance to help countries take informed decisions, and mentorship to enable them develop gradually capabilities and acquire the knowledge and expertise needed to embark on a nuclear power programme.

The four speakers focused on concrete areas of energy planning and nuclear power development programmes from the perspective of developing countries. For example, Argentina which has received extensive assistance under the TC programme over decades to develop and manage its nuclear power programme, shared its experience with the complex issue of life extension of some of its nuclear power plants.

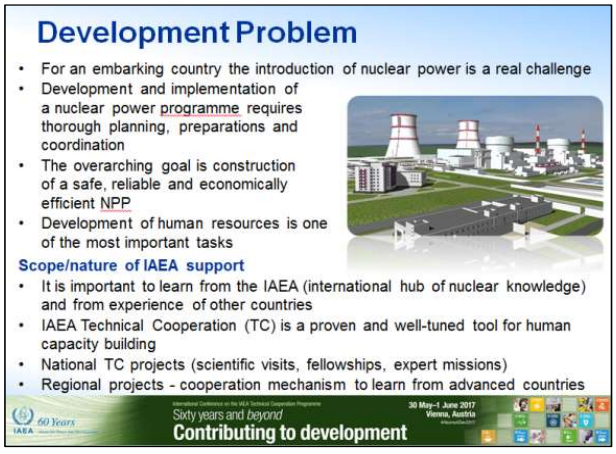

Fig. 16: The TC programme has helped Belarus strengthen its regulatory infrastructure to embark on a nuclear power programme.

Belarus, as one of the most advanced 'newcomer' countries, with a nuclear power plant to be commissioned in 2019, also shared its experience in establishing a viable nuclear regulatory body and related operating organizations. Since 2007, the IAEA has helped the country through national projects in two areas: strengthening the regulatory body, and developing nuclear power infrastructure and human resources.

South Africa is a nuclear power country, and shared its experience with the development of its national energy policy in collaboration with the TC programme. The Integrated Resources Plan for Electricity (2010–2030), which includes deployment of 9600 MWe of nuclear power (23% of South Africa's electricity generation mix by 2030), was promulgated in March 2011. Following this, the South African Cabinet endorsed the National Development Plan 2030 (NDP). The IAEA's TC programme supported national human resource building. In its preparation to undertake a nuclear new build programme, South Africa also welcomed IAEA Integrated Nuclear Infrastructure Review (INIR) and Emergency Preparedness Review (EPREV) missions, the outcomes of which were factored into its policy and institutional arrangements.

Fig. 17: The IAEA, through TC programme, is helping Member States to build infrastructure for introducing nuclear power. Barakah Nuclear Power Plant, United Arab Emirates.

Fig. 18: Koeberg Nuclear Power Plant, South Africa.

The United Arab Emirates, currently building four nuclear power units, shared its experience with its ambitious nuclear power programme, and described how continuous and focused support in the areas of nuclear safety and human capacity building provided by the TC programme over years has been instrumental in successfully managing the various milestones of the nuclear power programme.

The complexity and challenges of a nuclear power programme were further elaborated in the panel discussion. China has 36 nuclear power units in operation, with another 20 nuclear power units under construction. China has mastered the technological, safety and security aspects related to nuclear power planning, development, operation and maintenance. Jordan is contemplating the introduction of nuclear power for electricity generation, and has undertaken various steps to ensure the participation of its national industry at all levels of programme planning, development and construction. Based on its experience with the establishment and operation of its first research reactor, the country is enabling various technical support organizations from academia, industry and R&D institutions so that they can play a role in supporting Jordan's long term nuclear power programme. The Philippines, which had been contemplating nuclear power for electricity generation, is now facing the challenge of developing a national position before the end of the year. The national position is expected to indicate how energy security and self-sufficiency could evolve if the country decides to go nuclear, and how nuclear power can contribute to the country's objective to achieve a more resilient energy system.

The role and responsibility of Member States in the decision to 'go nuclear' has been heavily emphasized, as it is key to a successful nuclear power programme. Human resource development and skill retention as well as safety, security and financial matters were highlighted by several speakers. Overall, the role played by the TC programme in all aspects of a nuclear power programme, but particularly in the areas of energy planning, human capacity building, nuclear safety and different review missions was praised.

Looking forward, both speakers and panelists agreed that countries use different approaches when examining their energy futures and deciding whether to pursue nuclear power. However, there are key

issues that need to be taken into consideration at an early stage, including climate change, economic and strategic viability, and global safety and security. All influence the national decision to embark on a nuclear power programme. Speakers held the view in common that assistance provided through the TC programme remains the sole source of knowledge for all countries wishing to develop national energy strategies or to investigate the nuclear power option. The need to help countries take informed decisions about the nuclear power option was highlighted, particularly in the context of the opportunities offered under Agenda 2030 for clear, sustainable and affordable energy.

Main Highlights of Sub-session 2.6: Radiation and Nuclear Safety Infrastructure

Sub-session 2.6, Radiation and Nuclear Safety Infrastructure, was introduced with an overview of the IAEA-supported programme in the field of radiation and nuclear safety, delivered by the Programme Coordinator of the Department of Nuclear Safety and Security. This was followed by five presentations by speakers from Paraguay, Indonesia, Morocco, Nigeria and Romania, as well as a panel discussion between experts from the Nuclear Regulatory Authority, Ghana, the Thailand Institute of Nuclear Technology (TINT), the Nuclear Regulatory Commission (NRC), United States of America, the European Bank for Reconstruction and Development, and WHO/PAHO.

Radiation and nuclear safety is a prerequisite for the safe and secure utilization of nuclear technology for socioeconomic impact. The TC programme provides technical support to Member States to build capacity to establish, operate and maintain viable radiation and nuclear safety and security infrastructure and legislative frameworks. The goal of this support is to help Member States to fulfil their basic legal responsibilities for ensuring the safe and secure use of nuclear and radiation technologies, and to take measures to detect and respond to malicious use of radioactive material. The overriding aim is to foster efficient operations and to protect people and the environment from any harmful radiological effects. The assistance provided to Member States through the TC programme includes human capacity building (including education and human resource development), provision of nuclear safety standards and security guidance, international peer reviews and advisory services, advice and guidance to ensure strong, effectively independent and sustainable national regulatory infrastructures, and networking among different organizations involved in nuclear safety.

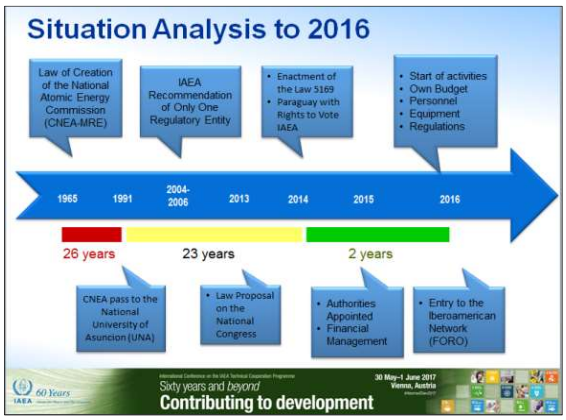

Fig. 19: Paraguay received support from the TC programme to establish its regulatory authority.

Fig. 20: Excerpts from 'Supporting Radiation Safety for Occupational Exposure: Case of Nigeria'.

Concrete examples were presented, highlighting experiences drawn from the countries' own set up and environment. With TC programme support, Paraguay established and empowered its Radiological and Nuclear Regulatory Authority (ARRN) in 2014 with responsibilities for regulation and control of the uses of ionizing radiation and protection of the public and environment in Paraguay. ARRN is now a member of the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (Ibero-American Network – FORO).

The Indonesian Nuclear Energy Regulatory Agency (BAPETEN) is an independent body established in 1998 with the support of the TC programme. BAPETEN is mandated to develop regulations, issue licenses, conduct inspections and take enforcement measures to ensure compliance with safety and regulation standards. Indonesia is now extending its training services to the IAEA and other countries, and fielding experts.

The TC programme also provided extensive assistance to Nigeria to develop and promulgate the Nuclear Safety and Radiation Protection Act in 1995 and to establish and empower the Nigerian Nuclear Regulatory Authority (NNRA) in 2001. With this support, NNRA successfully performs both its core and ancillary functions, such as promulgation of regulations, establishment of the Nigerian Institute of Radiation Protection and Research in 2007, and secondary standards dosimetry laboratory (SSDL) for both radiation protection and radiotherapy in 2007 and 2008.

Morocco presented the model project approach that evolved in 1995 to help Member States build their basic radiation safety infrastructure using an integrated and proactive strategy. Using a four step process of design, planning, prioritization and delivery, the TC programme succeeded in upgrading radiation protection infrastructure in 91 countries, supported the training of 4719 training course participants, 871 fellows and 304 scientific visitors, recruited 1401 international experts and lecturers and supported the attendance of 1093 participants at management meetings. Building on the success of the TC programme model project approach, international basic safety standards were developed, regional networking and cooperation was enhanced, the 'train the trainer' approach was promoted, and Member States were encouraged to conduct self-assessment and periodic appraisals fostering ownership and engagement.

In Romania, the TC programme supported the establishment of the Romanian Nuclear and Radioactive

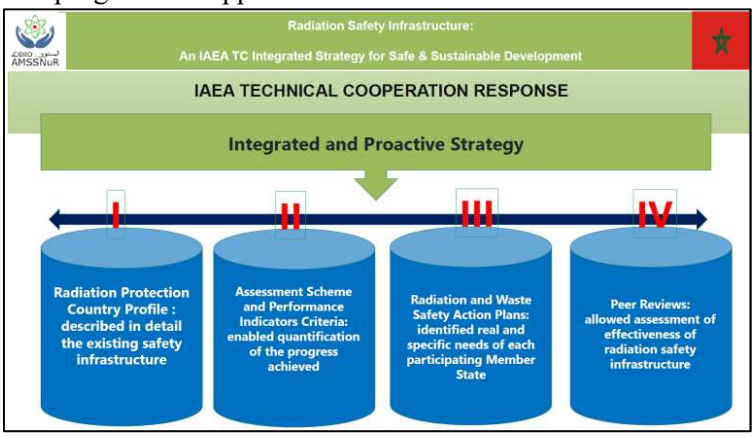

Fig. 21: The model project approach succeeded in building sound safety infrastructure in 91 Member States.

Waste Agency (ANDR) in 2004. Subsequently, ANDR and the IAEA joined efforts to find disposal solutions for spent nuclear fuel and radioactive waste. IAEA–ANDR cooperation has strengthened the competence and relevance of ANDR, increased its visibility and galvanized the energies of its scientists.

Using the regional mechanism to address issues with global dimensions, the TC programme assisted countries in all regions to address gaps in their regulatory frameworks, and promoted mutual collaboration between advanced and less advanced countries in the field of radiation safety. This strengthened regional expertise, networking and sharing of knowledge, best practices and experience, and increased the engagement of governments, regulatory authorities and end users in efforts to comply with the requirements of the IAEA basic safety standards.

The panel discussion further investigated and clarified the key role played by the TC programme in helping Member States to develop, promulgate and enforce nuclear legislations and empower their regulatory bodies. It examined the role of the programme in establishing and maintaining viable

radiation and nuclear safety infrastructure and above all in developing human capacities through education, training and mentorship. The role of the IAEA in providing standards and codes of practice was also discussed. Panellists noted that the establishment and operation of a viable regulatory infrastructure entails many challenges and requires time and effort to materialize. The experiences and lessons shared by the panel reflected the extent of support provided under the TC programme as well as the pressure exerted by the IAEA and the international community on Member States to have them comply with the international basic safety standards. "The need for independent regulatory oversight is a cornerstone of international nuclear safety and security engagement. The Department of Technical Cooperation plays a critical role in supporting such international engagement," said Dr Jack Ramsey, Senior Advisor, Office of International Programs, Nuclear Regulatory Commission (NRC), United States of America. Panellists agreed that cooperation and partnerships are essential elements in any international engagement to consolidate radiation and nuclear safety and to help less advanced Member States achieve basic safety standards. Several examples were given, including the remediation of uranium sites in Central Asia and lands around Chernobyl, illustrating the close collaboration between the European Bank for Reconstruction and Development, the IAEA and other partners.

Looking to the future, the speakers and panellists agreed that radiation and nuclear safety is a prerequisite for the safe and secure utilization of nuclear technology to achieve socioeconomic impact. Activities carried out under the TC programme have proved to be instrumental in the establishment and operation of regulatory bodies and radiation and nuclear safety infrastructure worldwide. It was recognized, however, that some Member States are still lagging behind in terms of legislative frameworks. It would therefore be desirable that additional assistance be channeled to them through the TC programme and/or through bilateral assistance from more advanced countries or development agencies. Finally, new IAEA Member States represent another category of countries that need intensive assistance to help them build and operate their legislative and regulatory frameworks.

Session 3: Taking a Regional Approach: Cooperation to Address Common Development Issues

Objective

The objective of this session was to present the TC regional programme approach to addressing common issues. Discussions focused on the advantages and modalities of regional cooperation, how the IAEA and Member States could enhance regional cooperation for better delivery of the TC programme, and the role of South–South and North–South cooperation in contributing towards sustainability.

Structure

Session 3, Taking a Regional Approach: Cooperation to Address Common Development Issues, consisted of five interrelated sub-sessions. These highlighted how the four regions covered by the TC programme (Africa, Asia and the Pacific, Europe and Latin America and the Caribbean) and the interregional component of the programme used different regional cooperative modalities to further help Member States to address development issues of regional and global significance. Each sub-session introduced one example of a regional project, focusing on cooperative modalities to address development issues with a regional dimension. The presentation was followed by a panel for each sub-session, bringing together different stakeholders who contributed to regional cooperation.

Main Highlights of Session 3

The session opened with a presentation describing the main regional modalities and mechanisms used by the TC programme. The IAEA has established modalities and mechanisms for regional cooperation to address common issues and enhance South–South cooperation, North–South cooperation and triangular cooperation to address the socioeconomic development needs of Member States. Through regional and interregional projects, the IAEA uses the TC programme to help countries design, formulate, implement and evaluate regional cooperative activities. The regional agreements in place today in Africa (AFRA), Asia and the Pacific (Co-operative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA) and Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA)) and Latin America and the Caribbean (Regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL)) promote collaboration for scientific and technological integration at the regional level, and increase the

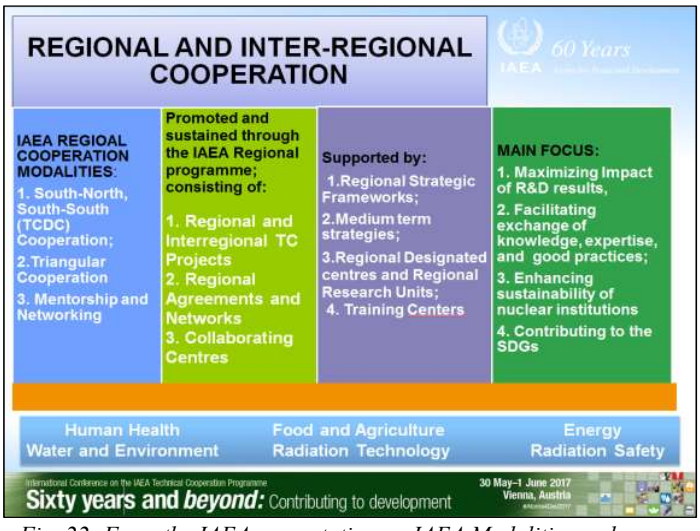

Fig. 22: From the IAEA presentation on IAEA Modalities and Initiatives for Enhancing South–South and North–South Cooperation between IAEA Member States.

number of trained professionals on nuclear applications. The agreements underpin cooperation in research, development, and training. National development objectives are taken into account in regional projects but are developed according to regional development priorities as established by regional cooperative agreements, strategies and frameworks. Interregional projects deliver support across national and regional boundaries, and address the needs of several Member States in different regions.

Highlights of Regional Cooperative Modalities in Latin America and the Caribbean

The speaker from the University of São Paulo, Brazil, presenting 'Regional Efforts for Combating Zika Virus in Latin America', explained how the region still faces major health threats from *Aedes* mosquitoes, which transmit diseases through their bite, resulting in the spread of Zika, chikungunya and dengue to 45 countries. Zika can cause severe neurological complications, including microcephaly and Guillain–Barré syndrome.

Fig. 23: The TC programme has supported regional efforts to combat Zika Virus in Latin America and the Caribbean and in Africa.

In a global effort to combat the Zika virus outbreak, Member States of the region and the IAEA took prompt action to support affected Member States, using a regional mechanism based on mutual assistance and sharing of information, facilities and expertise. Through the TC programme, the IAEA focused its contribution on two major components: i) provision of appropriate equipment for rapid detection and identification of the Zika virus; and ii) vector control using the sterile insect technique (SIT). The TC programme also promoted the building of a coalition to help affected countries face the outbreak. This helped affected countries to organize their response in a coordinated manner so as to gain in efficacy and to upscale and replicate best practices and successful results. Strategic partnerships, including with WHO/PAHO and FAO, were crucial for the success of the response to this emergency situation. South–South collaboration across the region, within the framework of the regional cooperative agreement ARCAL, was also crucial. Interregional collaboration also took place, as Africa countries participated in regional activities.

Later the panellists stressed the role played by the TC programme in promoting, facilitating and supporting regional cooperative modalities such as the ones used to face the Zika outbreak, and in helping Member States use these modalities to address development issues with a regional dimension. In particular, they appraised the valuable support provided by the TC programme to ARCAL over the past 32 years and shared some of the achievements attained under this cooperative arrangement. Additional relevance and visibility as well as partnerships are expected to accrue to ARCAL as a result of the new regional strategic profile for Latin America and the Caribbean, which was formulated based on a deep analysis of the development context of the region and the priority needs and interests of Member States.

In closing, the panellists expressed the hope that while current and future challenges are significant, the commitment of Member States and the TC programme will help overcome these, and enhance the contribution of NS&T to the attainment of Member State SDG targets.

Highlights of Regional Cooperative Modalities in Africa

The speaker from the Department of Water Resource Planning and Regulation, Ministry of Water and Environment, Uganda, in his presentation 'Addressing Water Scarcity in Africa', described actions taken under TC projects to address regional challenges in water resource management through the regional cooperative framework. He stressed the complexity of the challenges associated with the rational management of groundwater resources in semi-arid regions and transboundary groundwater aquifers, and explained the focus of TC support was on the characterization of groundwater systems, management of transboundary aquifers and on building capacity for water resource management in all participating countries. Regional cooperative modalities applied included TCDC, South–North cooperation, mentorship and networking, which all proved effective in helping all counties to identify the phenomena governing groundwater resources in the selected areas.

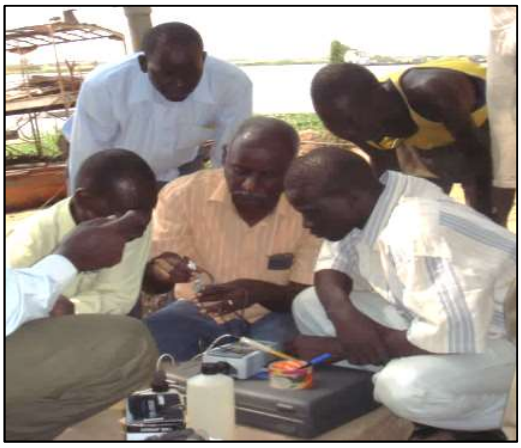

Fig. 25: The TC programme has built capacity in Africa in water resource management.

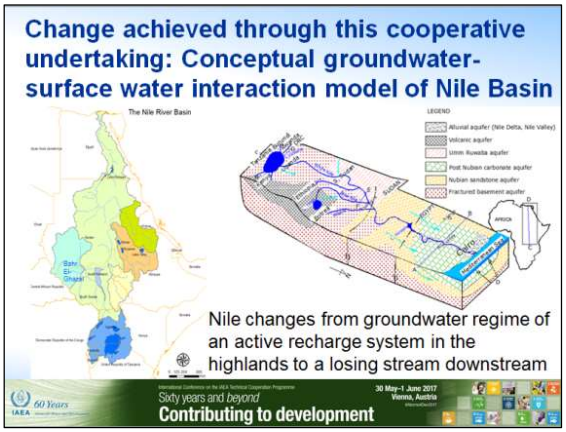

Fig. 24: The TC programme has supported Africa in addressing water scarcity through regional cooperation.

The support provided through the TC programme was instrumental in enhancing the capacities of Member States to embark on and efficiently manage cooperative activities, with advanced counties mentoring the less advanced ones by hosting training activities and fielding experts. Utilization of available isotope hydrology laboratories and expertise increased as a result of the application of the principle to use in the first place the infrastructure and capabilities of the region to address regional development issues. Thanks to the strong commitment and high degree of mutual assistance of the participating countries, the regional programme achieved significant results including the collection of scientific data on the conceptual groundwater and surface water interaction model of the Nile Basin. This will help the countries sharing this basin to agree on policies and design concrete measures to protect and strategically plan the future exploitation of these natural resources.

The panellists made reference to the three regional designated centres in isotope hydrology in Africa, which are recognized under the regional cooperative agreement AFRA as bodies of knowledge in the field of isotope hydrology, noting how they contribute to building capacities in the region and facilitating samples analysis, previously performed outside the region at high cost. They emphasized the IAEA regional cooperation modalities of TCDC, triangular cooperation, networking and mentorship.

As a way forward to further promote regional cooperation and mutual assistance in water resource management, the panellists suggested intensifying this profitable collaboration between African

countries. They also suggested the development of indictors to measure and calibrate progress at the regional and national levels. A number of key messages arose from the discussions, highlighting:

- The importance of nuclear techniques to characterize water resources and to establish sound and informed management strategy for the rational and sustainable management of water resources;
- Improved communication between Member States for the effective management of water resources using the regional cooperative modalities;
- Importance of Regional Designated Centres to carry out studies and provide training and advisory assistance as well as analytical services;

Highlights of Regional Cooperative Modalities in Europe

The speaker, from the Belarusian Research Institute for Soil Science and Agrochemistry (BRISSA), Belarus, presented 'Remediation of Radiation Contaminated Lands in Europe', which highlighted the extent of the damage of the Chernobyl accident that happened in 1986 on land, populations, ecosystem and economy. The extensive assistance provided under the TC programme, including networking and mentorship by international and region experts and meetings and assessments, using the regional cooperative framework and other national TC projects, was instrumental in the recovery of the areas affected by the contamination. Various partners were also involved in this regional programme, including United Nations Development Programme, the World Bank, UNEP and FAO. The regional efforts paved the way to appropriate actions designed to support the land recovery effort.

In looking forward, the speaker explained future outlooks on the remediation of Chernobyl-affected

Fig. 26: From the presentation: 'Remediation of Radiation Contaminated Lands: Experience of Europe'.

lands, noting the importance of leveraging their unique knowledge and experience in lands recovering from the consequences of the Chernobyl nuclear disaster. This knowledge and experience ought to be carefully preserved and shared widely with the international community.

The panel recognized that the effective and efficient regional cooperation between the three countries affected by the Chernobyl accident — with support from the IAEA — ensured confidence and the independence of the work that was done. This led to wide acceptance by the local authorities and population. Since uranium mining issues in Central Asia are also, to a certain degree, a crossboundary issue affecting several countries in Central Asia, the good experience from regional collaboration between the Russian Federation, the Republic of Belarus and Ukraine in the aftermath of the Chernobyl accident can serve as a role model for the remediation of uranium legacy sites in Central Asia.

Moreover, the Chernobyl site can be used for the training purposes of international experts and researchers working on remediation. Specific lessons learnt from Chernobyl relevant to the remediation of contaminated soil can be shared with other countries, such as Uzbekistan for example. It is also key to identify local champions who are willing to work on the remediation of uranium mining sites in Central Asia under the leadership and guidance of international experts, including using the knowledge of key stakeholders such as the Russian Federation. Finally, funding efforts to remediate uranium mining sites in Central Asia have to be increased.

Highlights of Regional Cooperative Modalities in Asia and the Pacific

The presentation by the speaker from the National Nuclear Energy Agency (BATAN), Indonesia, entitled 'Integrated Strategies to Address Urban Air Pollution in Asia and the Pacific', stressed the transboundary nature of air pollution, particularly, air particulate matter (APM), which calls for a regional approach due to its serious impact on human health. To address air pollution problems, the APM analysis and monitoring through the regional cooperative framework was addressed through several cooperative modalities, including TCDC, North–South cooperation, mentorship and networking. The IAEA's technical cooperation programme enabled Member States to apply advanced nuclear analytical techniques (NATs) as a unique characterization tool to assess APM pollution. It is expected that the acquired data will support the initiation of coherent actions in all Member States, and will help decision makers to develop workable strategies and take sound measures to improve air quality in the region.

Fig. 27: The IAEA's technical cooperation programme enabled Member States in Asia to apply advanced nuclear analytical techniques (NATs) as a unique characterization tool to assess air pollution.

The panel emphasized the importance of using regional cooperative modalities to help the region address development issues of regional dimension, galvanize the creativity of scientists in the region and mobilize resources in support of regional activities and initiatives. In contrast with the other regions, the Asia and the Pacific region has two regional cooperative agreements which also promote, facilitate and support regional cooperation in all its forms for the benefits of their respective States Parties. For example, RCA is a unique regional cooperative body of developed and developing countries, brought together by the ideals and principles of working together to collectively enhance the contribution of NS&T to the socioeconomic development of the peoples of the region as a whole. In west Asia, ARASIA — the youngest of the four agreements — also endeavours to address the regional needs of its Member States using the expertise and infrastructure available in its member countries. Both regional agreements use various regional cooperative modalities to strengthen cooperation capacities of Member States, including TCDC, North–South and triangular cooperation, as well as mentorship and networking.

The panel referred to Agenda 2030, stressing the strategic importance for both regional agreements to grasp the many opportunities that will be offered by the SDG targets, particularly as RCA and ARASIA

have already developed their medium term strategies and aligned their goals with the SDGs. Moreover, Agenda 2030 accords a special place to ST&I, and to partnership building and sustainability, which are also strongly supported by both regional agreements. Looking beyond the traditional resources of the TC programme, RCA and ARASIA are taking a lead in identifying novel ways to support their respective regional activities and initiatives, through for example the RCA Regional Office.

In conclusion, the panel strongly appreciated the support provided over decades by the TC programme under the regional frameworks and suggested that Member States, through their respective agreements, design and implement concrete measures in conformity with their medium term strategies to overcome the new challenges resulting from climate change, environment issues such as urban air pollution, the evolving needs of Member States, and the specific development context of new Member States, particularly small island developing States (SIDS).

Highlights of the Interregional Cooperative Modalities: The case of SESAME Project

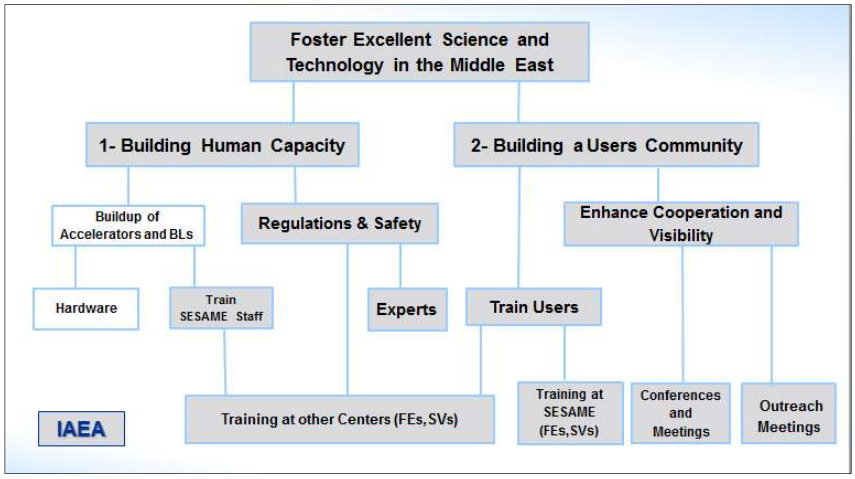

Fig. 28: SESAME project: an example of an interregional cooperative modality of the TC programme.

The presentation by the speaker from the Jordan Atomic Energy Commission (JAEC) provided a brief outline of the purpose, structure and stakeholders of the SESAME project. This project aims to strengthen scientific collaboration in the Middle East and the Mediterranean region in basic and applied research using synchrotron radiation and closely related topics. The support provided by the TC programme focused on human capacity building to enable senior scientists and administrators to work together to construct SESAME and to gradually build a user community and to enhance capacities for cooperation and mutual assistance using various cooperative modalities.

The panel recognized that research accelerators are complex facilities which require high competence and determination to carry out collaborative work with a sustained transfer of know-how and experience. This cooperative modality offered practical training opportunities which have better chances to lead to sustainable impact. It was recognized that the facilitation provided through the TC programme enabled SESAME staff to periodically visit the European Organization for Nuclear Research (CERN) and to work with the local scientists. With the commissioning of its storage ring, the SESAME project took off and it was officially inaugurated in May 2017.

Looking forward, the panel strongly supported expanding the cooperation between the TC programme and SESAME for mutual interest and benefits, including the establishment of an IAEA beamline at SESAME that will be dedicated to other IAEA Member States for training their scientists and engineers at SESAME. Moreover, the panel is of the opinion that SESAME can accommodate IAEA Coordinated Research Programmes (CRPs), and build partnerships with scientific organizations, other UN sister organizations and academia using other cooperative modalities such as mentorship and networking.

Session 4: Global Partnership for Sustainable Development

Objective

This session focused on the IAEA's approach to building lasting and mutually beneficial partnerships with Member States and development organizations. In particular, it highlighted how the IAEA's TC programme helped Member States to establish effective strategic partnerships with countries and development organizations and examined how collaborative modalities might evolve to meet the requirements and imperatives of the new development context of Agenda 2030

Structure

The emphasis in Session 4: Global Partnership for Sustainable Development was on two interrelated topics: firstly to showcase the partnership policy and modalities adopted by the TC programme over several decades to enhance its impact and enlarge its outreach; and secondly to identity innovative approaches and operational modalities that are more suited to the new development context of agenda 2030 and the SDGs therein.

Session 4 consisted of two sub-sessions. Sub-session 4.1 started with an outline of the approach and modalities used by the TC programme for building partnerships; followed by presentations to showcase concrete examples of partnerships and a panel discussion on '*Collective Efforts to Advance Partnership in the TC programme',* which brought together panellists from various horizons, including HE the Ambassador of the European Union and HE the Ambassador of France, and decision makers and scientists from East China Institute of Technology, China, the Ministry of Foreign Affairs, Japan, the State Atomic Energy Corporation 'Rosatom', Russian Federation, the Permanent Mission of the United States of America to the IAEA, and the OPEC Fund for International Development (OFID).

Sub-session 4.2 started with a key note presentation on 'The New Dimension of Global Partnerships', followed by presentations and a testimony to showcase concrete examples of public–private partnerships in different regions. A panel discussion on 'Innovative Partnerships for the Future', then brought together panellists from the Japan International Cooperation Agency (JICA), the African Renaissance and International Cooperation Fund (ARF), the Asian Development Bank (ADB), Caribbean Public Health Agency (CARPHA), the Islamic Development Bank (IDB) and the World Bank.

Main Highlights

Sub-session 4.1 started with an outline of the approach and modalities used by the TC programme for building partnerships. Partnership in the TC programme has evolved throughout the years to include collaborations with Member States, UN sister agencies, development agencies and banks, and, more recently, R&D institutions, foundations and the private sector. Partnership within the TC programme is understood as adding value to the TC work through broader strategic outreach, technical innovation and additional financial resources. TC successes in partnership benefit Member States through increased services, higher impact and more sustainable solutions to development problems. Partnerships are guided by a strategic approach to development and are facilitated by core values and practices inherent to the TC programme, including a medium term strategy and related operational guidelines.

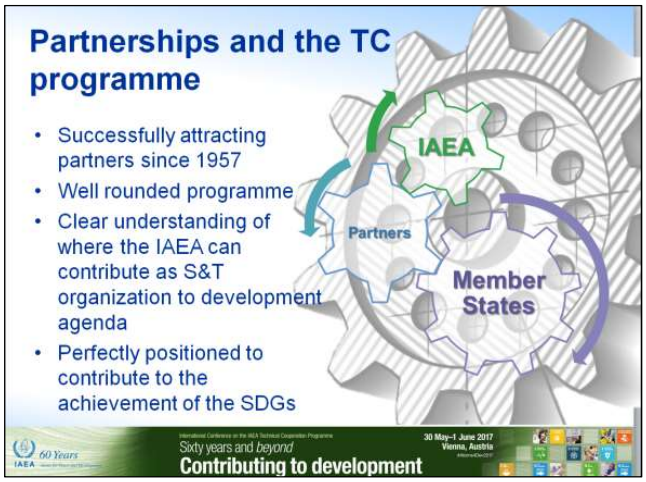

Fig. 29: From the presentation on Modalities of Partnership in the TC Programme.

The concrete examples of partnerships presented at the session were: Partnership to Fight Cancer; Eradication of Rinderpest from Africa; Addressing Food Value Chain in Indonesia. These examples highlighted the essential role played by the TC programme in facilitating, coordinating and streamlining partnership actions and activities in large scale projects supported by the TC programme and other partners and indicated that the TC-supported concept of partnership produced tangible results which have addressed — or contributed to addressing — development needs in Member States. For instance, the example of the IAEA Programme of Action for Cancer Therapy (PACT) showed how the IAEA's Department of Technical Cooperation works alongside other IAEA Divisions to bring in the expertise and contribution of additional relevant partners. The collaborative partners, including UN agencies, international civil society, non-traditional donors, the private sector, and NGOs, combine a broad range of individual strengths and resources to achieve maximum impact in Member States for a comprehensive cancer control strategy.

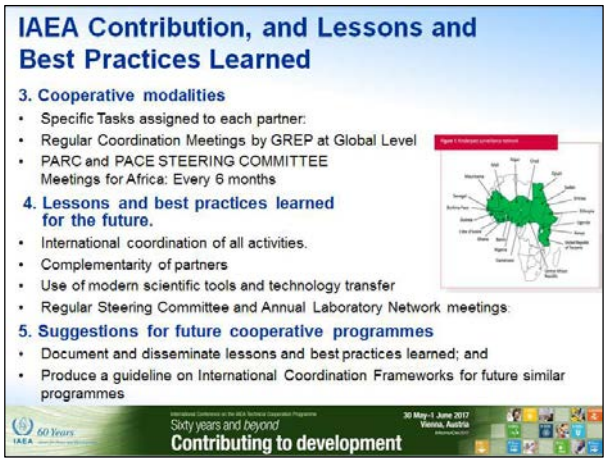

Fig. 30: Eradication of Rinderpest from Africa in partnership with the IAEA

Fig. 31: PACT Partnership Strategy

The success of eradicating rinderpest from Africa was only possible with the concerted efforts of all key technical partners involved in the eradication process namely: FAO, OIE, IAEA and the World Reference Laboratories for Rinderpest based in UK and France.

The United Nations Industrial Development Organization (UNIDO) provided an example of partnership which supports close collaboration between Indonesia and three UN agencies (FAO, IAEA, UNIDO) to enhance the Tempe Value Chain. This partnership addressed a wide range of development issues,

including the upscaling of soybean production, marketing and processing. The approach was comprehensive – it addressed raising farmers' income, increasing farmers' resilience, reducing energy consumption in the making of Tempe from soybean, and packaging and commercialization. The joint intervention also focused on building local capacities for handling soybean production and processing of derivatives through the systematic application of nuclear and biotechnological techniques and the development of water and nutrient management practices.

The newly acquired awareness about the importance of partnerships in development has gained further strength from realities on the ground, such as the consequences of climate change, emerging environment issues, and the spread of non-communicable diseases. These challenges are multisectoral and multistakeholder in nature, requiring holistic approaches and integrated action plans to address them sustainably.

The presentations were followed by a panel discussion, entitled 'Collective Efforts to Advance Partnership in the TC programme'. Panellists who represented the traditional partners of the TC programme expressed their enthusiasm and readiness to continue partnering with TC through the extrabudgetary scheme, the PUI and other established mechanisms. "PUI is an effective development tool not only for emergency responses but also capacity building to enhance the readiness for such unexpected threats," explained HE Mr Takeshi Nakane, special assistant to the Minister of Foreign Affairs, Japan. The panellists saw the opportunities offered under Agenda 2030 as a unique chance for the TC programme to position itself as a role player in helping Member States to achieve their SDG targets using NS&T. Suggestions were voiced to further enlarge the scope of TC partnership base by looking beyond the traditional partners to build innovative partnership modalities that can attract more resources for the TC programme and generate more visibility and outreach. Mr Andrew Schofer, Chargé d'affaires a.i., U.S. Mission to International Organizations in Vienna, said in his statement: "Looking to the future, I believe we must seek new synergies and think 'out of the box' about partnerships, including partnerships that leverage the expertise of other UN organizations; partnerships that bring in private sector expertise and investment; and those that marry the comparative advantages of both public and non-governmental institutions to advance shared development objectives." The key success factor in this endeavour remains the ability of the TC programme to effectively support Member States to achieve tangible impacts using NS&T, and to contribute efficiently to the attainment of the SDG targets.

Sub-session 4.2 started with a key note presentation on 'The New Dimension of Global Partnerships' which explored how global partnership for development was reflected in the United Nations Millennium Development Goals (MDGs), and how partnerships are covered in the successor 2030 Agenda for Sustainable Development – both in terms of substance and approach. The presentation argued that new partnerships will be shaped and conditioned by the changing world around us in a number of dimensions – economic, political, environmental, technological and demographic. The key elements of effective partnerships were suggested to include a stronger recognition of the different assets that governments, the private sector and civil society bring to the table.

Examples of successful public–private partnership experiences from Member States were presented: Electron Beam Technology in Support of the SDGs, and In the Area of Nuclear Technology: Malaysian Experience.

Fig. 32: Texas A&M gave examples of public–private partnerships in e-beam technology involving Mexico and Pakistan

The speaker from the National Center for Electron Beam Research (NCEBR) of the University of Texas A&M, a collaborating centre with the IAEA, presented two successful examples of public–private partnerships in e-beam technology involving Mexico and Pakistan. The lesson learned focussed on the importance of partnership building with the educational institute to sustain the technology transfer. For example, with the assistance of a regional TC project, Mexico forged partnership with a private company which built an electron beam facility for irradiating the Manila mango, which enabled Mexico to later export mango to the USA. This partnership has resulted in multimillion dollar investments and has created high paying jobs in Mexico.

The speakers from Nuclear Malaysia and Wonderful Ebeam Cable Sdn Bhd presented a public–private partnership project on radiation crosslinking of wire and cable. This demonstrated how nuclear technology attained through the TC programme plays a role in helping industry to be innovative and competitive. Collaboration was established to assist the company in the manufacturing of radiation crosslinked cable for the automotive industry, and with the further intention of developing flame retardant cable for building wiring. The impact of the project was manifested in foreign exchange savings, local job opportunities and the introduction of innovative technology.

Fig. 33: Mutual partnership in mutation breeding product utilization

A testimony by a private farmer from Indonesia then followed. The farmer described a journey of success: through sustainable partnership with BATAN and farmers, superior varieties of seeds were disseminated to larger farming communities, resulting in better yields and improved income generation.

The panellists then shared their views, experiences and best practices in building profitable partnerships to upscale the contribution of NS&T to the SDGs of Member States and to gain more relevance and visibility. The discussion focused on innovative aspects of partnerships for Agenda 2030, and several suggestions were made to pave the way to future collaboration with the TC programme. The discussion gave insights into workable mechanisms for achieving more development results, leading to increased recognition and visibility.

Some panellists suggested that the TC programme could look for partnerships to leverage the expertise of other UN organizations; bring in public and private sector expertise and investment; and benefit from others' best practices to avoid redundancy and waste of resources. To this end, some actions were proposed, including the mapping of potential partners who have a vested interest in partnering with the TC programme for mutual growth, the development and implementation of a sound strategy to allow TC to achieve its partnership vision, and the building of partner confidence and trust through transparency, accountability and dedication.

In looking forward, the speakers and panellists shared the opinion that partnership in the SDG era could provide innovative approaches and a new vision towards addressing the challenges of sustainable development by:

- Using technically and developmentally sound mechanisms to enable each partner to share its own specific competencies and capacities in order to achieve both common and complementary goals more effectively and sustainably;
- Facilitating access to more resources by drawing on the full range of technical, human, knowledge, physical and financial resources found within the core competencies of the partners;
- Promoting broader outreach and new networks which offers each partner better channels of engagement with the wider community and greater capacity to influence the policy agenda;
- Widely sharing understanding of the values and attributes of each partner, thereby building a more integrated and a more stable partnership base.

It was recognized that the social impact generated through partnerships ought to be assessed against the initial objectives. A mechanism of feedback and reporting is needed to draw lessons from strengths and weakness for continuous improvement. This would also enable all partners to track and report on their contributions to the SDGs.

In conclusion, as the TC programme contributes to a wide range of specific SDG targets without being the leader in the majority of socioeconomic fields, it is essential to build partnerships to contribute effectively to Agenda 2030. Since Agenda 2030 and its SDGs became the main common development framework for all development partners, it is essential for the TC programme to design, implement and communicate its results using the language of the SDGs. Moreover, another role of the TC programme is to help Member States develop and implement strategies for building partnerships with their public and private sectors, and for mobilizing resources and communicating with stakeholders and partners.

Session 5: Beyond the Horizon: Paving the Way to the Future

Objective

In looking to the future, Session 5 brought together high level speakers and panellists to examine appropriate approaches and concrete measures that would help countries to maximize their use of nuclear science and technology in pursuit of the achievement of key Sustainable Development Goal (SDG) targets.

Structure

Session 5, Beyond the Horizon: Paving the Way to the Future, consisted of two sub-sessions. Sub-session 5.1: 'Science, Technology and Innovation in Support of Development' examined the various facets of the role assigned to ST&I in Agenda 2030. The sub-session began with a keynote presentation on the role of ST&I in development; followed by a panel discussion on 'Strengthening Member States' Capabilities in Nuclear Science, Technology and Innovation to Meet their Development Needs'. This brought together panellists that included HE the Minister of Higher Education and Research of Senegal, the University of Vienna, Austria, New Caledonia, the Institute of Research for Development (IRD), France, the Permanent Mission of Nigeria to the IAEA, the Secretariat of the Pacific Community (SPC) and the Department of Nuclear Sciences and Applications, IAEA. Speakers and panellists shared their views, experiences and best practices on how ST&I can develop evidence-based solutions to address challenges facing humankind, in particular development challenges resulting from climate change and environmental vulnerabilities.

Sub-session 5.2 focused on innovative approaches and modalities for further enhancing the ability of the TC programme to promote the sharing of information, knowledge and experience for ST&I facilitation. The final panel, 'Looking into the Future: Contributing to the 2030 Agenda for Sustainable Development', brought together high level decision makers from various horizons, including HE the Minister of Science, Technology and the Environment, Cuba, and HE the Minister of Agriculture, Fisheries, Livestock and Forestry, Vanuatu, the United Nations Department of Economic and Social Affairs (UNDESA), the Department of Nuclear Safety and Security, IAEA, and the Department of Technical Cooperation, IAEA. The discussion examined how ST&I contributes to human capacity building and the production of knowledge that will drive development for greater impact, open up new avenues for addressing major challenges facing societies, and play a significant role in economic growth.

Main Highlights

The keynote presentation emphasized the role of scientific evidence and technological innovation in achieving the SDGs. The UN will play a leading role in facilitating the transfer and uptake of technologies to support the implementation of the SDGs. To that end, the Technology Facilitation Mechanism (TFM) will facilitate multistakeholder collaboration and partnerships through the sharing of information, experiences, best practices and policy advice.

From the deliberations of the panellists, a consensus emerged regarding the essential role of ST&I as a major enabler to drive sustainable development under Agenda 2030, for example in environment, health, climate change and water. In these sectors, scientific information and evidence are needed to examine and clarify complex phenomena and, subsequently, to design and implement development policies and programmes which have a better chance to meet the needs of end users in a sustainable manner.

Fig. 34: ST&I in the 2030 Agenda – a slide from the keynote presentation.

The role of the IAEA as a science-based organization has been recognized. Over six decades, the TC programme has been — and is still — discharging this role through various activities and initiatives designed to facilitate increased access to nuclear science and technology, support knowledge sharing, build and reinforce scientific networks, as well as build Member States' capacity to provide a basis for evidence-based decision making in a range of important areas, such as human health, food and agriculture, water resources management, sustainable energy planning and development, including the option of nuclear power for electricity generation, environmental management, and nuclear safety and security. In discharging this responsibility, the TC programme also supports local science-based organizations and communities of practice who use nuclear ST&I to address national development priorities.

The IAEA TC programme is well positioned to continue its work under Agenda 2030 by further building on its strengths, including human capacity building and mentoring of national institutions in Member States to maximize their contribution to national SDG targets. "The TC programme is one of the few international mechanisms that allow developing countries to gain access to technical knowledge," said HE the Minister of Science, Technology and the Environment of Cuba.

There was a common view that, as science evolves and innovations require some lead time to start producing benefits, the TC programme will be more and more solicited to help Member States, and groups of Member States who share common development challenges such as the SIDS, to develop and implement comprehensive national and regional frameworks of science and technology that comprise policies and development oriented R&D initiatives, as well as institutional incentives for harnessing the fruits of scientific discoveries and bringing them to end users. Examples were given of how the TC programme capitalized on its accumulated experience and knowledge in this field and promptly supported national institutions to apply nuclear ST&I to address concrete development issues. TC support to address the recent outbreaks of Ebola in Africa and Zika in Latin America and the Caribbean is part of these examples.

Reflecting on how Member States intend to make use of nuclear ST&I under Agenda 2030, the panellists reaffirmed the central role of nuclear ST&I and scientific knowledge in the advancement of the SDG targets. They advised, however, that nuclear ST&I must be responsive to the needs of the SDGs and conceived as means of achieving them, not as ends in themselves. The panel noted that not every problem has a high-technology solution, and not all technological changes are conducive to sustainable development. Going forward, they suggested that the TC programme critically assess the ability of Member States to rapidly mobilize their nuclear ST&I base to address sustainably the greatest challenges of our time, which are climate and environment variations and the associated emerging

diseases. It was recognized that a more suitable TFM may be needed to map and rapidly mobilize nuclear ST&I solutions for the 2030 Agenda and the SDGs, taking into consideration the paradigm shift that only social needs drive and transform science, technology and innovation.

The panellists were of the opinion that nuclear ST&I has limited transformative impact when not tailored to the needs of society. They suggested some thoughts to encourage Member States to create knowledge based, innovative societies that utilize scientific evidence to help to inform policy and inspire science based solutions. Enhancing awareness about the role of nuclear ST&I among decision makers, development managers, the youth and the civil society is equally important in creating a culture of innovation in society.

In looking forward, the panellists noted that nuclear ST&I capabilities are not evenly distributed across countries, with several Member States still lacking basic scientific and technological infrastructure, and suffering from tremendous development challenges. The cases of the LDCs, landlocked developing countries and SIDSs were cited. The effective implementation of the SDGs will require identifying and addressing major knowledge gaps across domains, disciplines and regions. The TC programme can — through its regional and interregional projects — play a key role in reducing the scientific and technological divides between countries and regions, and help the most vulnerable groups of countries to capitalize on TCDC and North–South cooperation to maximize the use of nuclear ST&I in support of their SDG targets. Moreover, partnering with academia, NGOs, foundations and the public–private sector in support of these groups of countries may also contribute towards mobilizing the full potential of ST&I for the SDGs.

Closing Session

The closing session was addressed by HRH Princess Sumaya bint El Hassan, President, Royal Scientific Society of Jordan. In her statement, entitled: 'Science for Peace: Borderless Innovation for Creative Change', she highlighted the role of the IAEA in furthering peace and prosperity worldwide through science, engagement and perseverance. She said, "The incredible contribution of this organisation (IAEA) and its dedicated staff to durable development in our world has been, and continues to be, enormous."

In particular, she praised the sustained contribution of the IAEA's TC programme, from its inception, to the well-being and welfare of the people of its Member States through education, human capacitation, infrastructure building and operation as well as technology transfer facilitation to achieve tangible results in key development areas such as human health, food and agriculture, water and environment, industrial applications and energy. She stated that, as in other Member States, the impact of the TC programme in Jordan had been highly significant, and noted that this helped the country to promote nationally and regionally borderless innovation for the benefit of all Jordanians. She added that the official opening of SESAME, the Synchrotron-light for Experimental Science and Applications in the Middle East, with the support of TC programme, represented another milestone on the path towards developing a model for Open Science in Jordan and the region. She hoped that the potential of SESAME would galvanize and streamline the creative energies of the scientific communities in the region and drive them on the path of innovation to make life better for all.

Before concluding, she stated that the Royal Scientific Society of Jordan is very proud of being a partner of the IAEA because it greatly values this collaboration as both organizations share a strong commitment to science for peace and prosperity.

The Conference was then closed by Mr Dazhu Yang, Deputy Director General, Head of the Department of Technical Cooperation, IAEA, who delivered the following closing remarks:

Closing Session Statement

Your Royal Highness, Excellencies, distinguished delegates, dear colleagues, ladies and gentlemen,

We have reached the closing session of our three day meeting – the first ever international conference on the IAEA's technical cooperation programme.

I thank our speakers and presenters for their insightful input, and I thank all the participants for their engagement and interest throughout these very action-packed days. Over the course of the Conference, we have heard compelling accounts of how countries, through the IAEA technical cooperation, have used nuclear science and technology to move forward on health, food and agriculture, water resource management, the environment protection. We have heard interesting experiences in addressing energy needs and in building safety infrastructure in developing industry.

Something that has particularly struck me has been the many, many references to the benefits of collaboration, of joint undertakings, of working in partnership to achieve common goals over several decades. This has been a truly strong message emerging from this Conference. Of course, it is particularly relevant taking into consideration Agenda 2030, with its emphasis on working together for the achievement of the Sustainable Development Goals.

The closeness among the participants during the Conference has been also very much noticed. It's to be expected – a specific feature of the technical cooperation programme has been bringing people together for six decades now, and many of us have known each other for long years. It is indeed a privilege for me to address this community on the last day of our first Conference.

Ladies and gentlemen, I will now present to you the concluding remarks arising from this Conference.

Concluding Remarks

- The first ever International Conference on the IAEA's Technical Cooperation Programme: Sixty Years and Beyond – Contributing to Development was held in Vienna, Austria from 30 May to 1 June 2017.
- More than 1200 participants, including Heads of States and Government and other high level officials, from 160 countries and 27 organizations and entities attended the Conference.
- Mr Yukiya Amano, Director General, IAEA, His Excellency Mr Tabaré Vázquez, President of the Eastern Republic of Uruguay, Her Excellency Ms Ameenah Gurib-Fakim, President of the Republic of Mauritius, Her Excellency Sheikh Hasina, Honourable Prime Minister of Government of the People's Republic of Bangladesh and His Excellency Mr Tebogo Joseph Seokolo, Chairman of the IAEA Board of Governors, delivered addresses to the Conference at its opening session.
- During the course of the Conference, it was widely demonstrated how the IAEA technical cooperation programme, as the major mechanism for the Agency to provide development services to its Member States, has transferred nuclear technology, supported human and institutional capacity building, shared knowledge and expertise, and facilitated regional and international cooperation.
- A significant contribution was made by the IAEA's technical cooperation programme in supporting Member States for safe utilization of nuclear science and technology for peaceful purposes in many different areas. Concrete examples of achievements and impact were presented which were made possible with the support and cooperation of the Agency through its technical cooperation programme over the past six decades.
- In the area of human health, IAEA support has enabled many Member States to establish their cancer diagnosis and treatment facilities and to set up nuclear medicine centres, with competent, well-trained staff and the necessary equipment. In order to support Member States to address cancer in a comprehensive manner, the IAEA, through the Programme of Action for Cancer Therapy, supports Member States to integrate radiotherapy into comprehensive cancer control. Nutrition studies using stable isotopes have provided important information and data for the development of relevant national policy and interventions.
- In the area of food and agriculture, many Member States have benefited from IAEA support to develop new crop varieties, using radiation-induced mutation breeding to improve the yield, quality and resilience of crops, and built capacity in animal health diagnosis and production, which thus contributed to food security. In the area of food safety, technical and human capacity for food monitoring has been created and enhanced. Member States have strengthened their capacities in insect pest control using the sterile insect technique, and in soil and water resource management.
- In the area of water and environment, isotopic investigations have focused on the evaluation and management of groundwater resources, contributing to the efficient management of water resources, improving drinking water quality, ensuring sustainable livelihoods and complementing efforts to enhance human health, food security and agriculture. The technical cooperation programme has focused on building capacities in environmental monitoring programmes, including the management of marine and air pollution.
- In the area of industrial applications, non-destructive testing has provided a powerful tool for quality control and non-destructive examination of large structures, devices and machinery. Nuclear techniques are now used to examine and protect cultural artefacts, clean waste water, sterilize medical supplies and preserve food commodities.

- In the area of energy, Member States have benefited from the assistance of the Agency in energy planning and nuclear power programme infrastructure development.
- With the support of the technical cooperation programme, many Member States have promulgated nuclear laws or decrees and relevant regulations, and have established competent radiation and nuclear regulatory authorities, which are important for Member States to ensure radiation safety.
- With technical cooperation programme assistance, tens of thousands of people have been trained; many have become high-level government officials, enterprise managers, senior experts and specialists in research institutes, university professors, and senior staff in regional and international organizations.
- The technical cooperation programme has facilitated increased access to nuclear science and technology, supported knowledge sharing, built and reinforced scientific networks and strengthened Member States' capacities to base their policies and decisions on scientific evidence in a broad range of important areas, particularly environment and climate change.
- The technical cooperation programme has also facilitated regional and interregional cooperation, through regional/cooperative agreements, triangular, South-South and South-North cooperation.
- The role of the national liaison officer has been noted for its important contribution to the success of the programme. The officer serves as the primary contact person between the IAEA and his or her country and act as representative of the countries. This role is crucial in ensuring that the Agency fully understands the needs and wishes of the country. The officer also makes sure that the government, and other important authorities such as nuclear regulators, doctors and scientists, are aware of the Agency support available to them.
- It has been recognised that the country programme framework has been an instrumental tool for strategic planning where priorities to be addressed through the technical cooperation programme are identified. This framework will play a major role in the years to come to link, as appropriate and where relevant, national priorities with the Sustainable Development Goals.
- The IAEA encourages countries to support the participation of women in Agency programmes. At present, around a third of participants in the technical cooperation programme are women, but the IAEA aims for a steady increase in the coming years. This helps to build a growing pool of qualified women for the future.
- Looking to the future, Sustainable Development Goal 17 recognizes the role of science, technology and innovation as essential enablers for development, and emphasizes the importance of partnerships as a critical means of implementation. Achieving the Sustainable Development Goals requires multi-actor collaboration, and cannot be addressed in isolation. It was noted that the technical cooperation programme has established mutually beneficial strategic, technical and financial partnerships with United Nations sister organizations, including the Food and Agriculture Organization of the United Nations (through the FAO/IAEA Joint Division of Nuclear Techniques in Food and Agriculture) and the World Health Organization, and has cooperated with other United Nations organizations such as the United Nations Environment Programme and the United Nations Industrial Development Organization, other regional and international organizations, development banks and other financial institutions. Such long-standing cooperation should be encouraged and reinforced so that, together with its partners, the Agency can build on common strengths and effectively utilise resources for an optimal delivery of their services to Member States. Fostering partnerships that promote integrated approaches to development will support a more effective technical cooperation programme, and will also ensure coordination and complementarity of activities. This will enable an efficient and cohesive response to current and upcoming development challenges in Member States. In addition, promoting triangular, South-North and

South-South cooperation will promote sustainability, and contribute to effective technical cooperation.

- The Conference noted that the technical cooperation programme can strengthen delivery of services to Member States by continuing its efforts to increase focus on need-driven projects that are aligned with national development strategies, particularly, where appropriate, to national Sustainable Development Goal targets.
- The Conference also emphasized that the IAEA should continue to support Member States in their efforts to work together with relevant partners, including with the private sectors, with the aim of bringing nuclear R&D results to the marketplace, upscaling successful technical cooperation projects and creating conditions for sustainability. The Conference observed that the nuclear institutions in Member States would benefit from closer association with development activities by aligning their work with national Sustainable Development Goal targets.
- The Conference underscored that the technical cooperation programme is cross-cutting and draws on the support of all the technical departments of the Agency. Application of a one-house approach and SMART management should be further strengthened to avoid duplication and maximize synergies.
- The Conference acknowledged that, over the last six decades, Member States have provided generous support for technical cooperation activities, including through their contributions to the Technical Cooperation Fund. The Fund has been the main resource for the programme and is expected to remain so in the future. It is very important that all Member States pay their share to the Fund in full and on time. The technical cooperation programme has also benefited from government cost-sharing and extra-budgetary contributions, including through the IAEA Peaceful Uses Initiative, as well as various in-kind contributions such as the hosting of training events and fellows or the provision of expertise, and these contributions will remain important for the programme in future. Partnerships with financial institutions should be strengthened and the IAEA should seek support from other non-traditional donors, and through strengthened public-private partnerships. Efforts and cooperation of everyone will need to be employed to render the resources for the programme sufficient, assured and predictable.
- These are the conclusions drawn from statements, presentations and discussions made over the course of this Conference. They underscore the importance of the IAEA technical cooperation programme for our Member States, and highlight the importance of strategic, well-considered partnerships in contributing to the achievement of global development objectives. In addition, they recognize the essential role of nuclear science and technology for development.

I would like to thank all the speakers and panellists who have made significant contribution to this Conference. I would like to thank the organizing committee of the conference, and to extend my appreciation to the IAEA Technical Departments and the Department of Management, particularly the Division of Conferences and Documentation and all the other Agency offices which have provided such dedicated support all along, ever since we started preparing for this Conference more than one year ago. I would also like to thank our moderators, rapporteurs, interpreters, the hardworking clerks and technicians, and all the staff of the VIC who have made this Conference possible. I thank you all very much indeed – we couldn't have done it without you.

Ladies and gentlemen, I thank you for your attention. My colleagues and I would like to express our gratitude for your engagement, support and contribution throughout this Conference.

Thank you very much. I declare this Conference closed.

Acknowledgements

Member States, partners and the private sector were able to take advantage of the opportunity to exhibit during the conference, and some kindly made a voluntary contribution to the IAEA in support of the conference. The contributions were utilized to cover costs directly related to the organization of the conference, for example video and lighting equipment and coffee breaks.

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APPENDIX I
Opening Session Statements

Statement by His Excellency Mr Tabaré Vázquez, President of Uruguay

Dear Friends,

Although I currently serve as President of the Oriental Republic of Uruguay (by citizens' mandate and for the second non-consecutive time), I am a medical oncologist and radiotherapist by vocation and profession. Then, you may imagine how much to be here with you today means to me.

I bring greetings from my country, a Member State of the International Atomic Energy Agency since 1963 and a member of its current Board of Governors. But besides this background, a country aware of the importance of the transfer of technologies carried out by this agency through its Technical Cooperation Program.

A program from which Uruguay has benefited in areas such as regulation of activities relating to radiations through the creation of new requirements and guidelines based on IAEA guidelines.

A program to which Uruguay has also contributed from numerous national and regional projects related to nuclear applications in different fields and instances of the development of the countries since that is, in essence, the fundamental purpose of the Program and the IAEA: to make energy and nuclear technology available for the progress and well-being of humanity.

I do not say that just as a ruler but as a scientist as well. Because science without conscience, as Francois Rabelais taught us, is the death of the soul.

Dear Friends,

The 60th General Assembly of the IAEA, held in September last year, showed an alarming contrast with respect to the Technical Cooperation Program of this Agency: the assessment of its relevance, development and results is positive and unanimous; as it was also unanimous the intention to expand and go into detail in such critical areas as health, agriculture, food security, the environment or energy.

But unanimity vanishes when it comes to allocating financial resources for it, giving rise to harsh controversy and intricate negotiations during which, usually in the eagerness to preserve forms, the content is diluted and the objectives are devalued.

One may say "That is no news. That is politics...". I know that. But if I approach it this way and in this sphere is because I believe that politics is also, substantially, to democratically govern agreements and differences to transform reality with responsibility and a sense of progress for all, without anyone falling behind.

Thus conceived, such a task is not easy, but it is not impossible either. Besides being fundamental. And as it also requires collective commitments and efforts, none of those present here can remain unaware of it.

Even further, we cannot even be neutral about it.

And the above for two reasons as elementary as irrefutable:

First reason: the basic and inexcusable condition of citizens of our respective countries. Citizenship, we should bear it in mind, is a system of rights and responsibilities.

Second reason: none of us came here in representation of oneself, or the commission for development of one's neighborhood, or the football club of which one is a supporter. Each of us, from our respective identity (which also implies functions, competencies and duties), is an integral part of the international nuclear energy community.

We are not gods or owners of anything; at most we have the mandate and perhaps the trust of our fellow men and women to make nuclear energy a factor of development and wellbeing. This, by the way, is not an easy task…

And since things not only must be desired, described or expected, but further they need to be done, we must seek to ensure the IAEA's Technical Cooperation Program sufficient, predictable and safe resources. Without that guarantee, everything else is reliant and uncertain.

In this connection, I reaffirm our representation statements expressed at the 60th IAEA General Conference: Uruguay shares and accompanies the process of strengthening nuclear safety and nuclear physics safety measures.

Nuclear safety as a fundamental factor in the contingency plans of the countries, which should require a higher proficiency to their operators and ensure the protection and safety of materials and facilities.

Nuclear physical security based on the implementation of relevant international legal instruments; information protection; the accounting and control of nuclear and radioactive[2] materials, and both the detection of traffic and response to such materials; and national contingency plans.

In this regard, we value the activities carried out by the IAEA in the framework of the Action Plan on Nuclear Safety as well as the Convention on the Physical Protection of Nuclear Material which has been in force for a year.

Likewise, given the budgetary restrictions of the Agency[3], Uruguay considers that in the area of Nuclear Physics Safety Fund, the activities of this component must be financed with the specific fund (Nuclear Physics Safety Fund), thus maintaining an adequate balance between the promotional and non-promotional activities of the IAEA.

Dear Friends,

Even at the risk of falling into a certain particularism, let me tell you that in terms of radiological protection and security, Uruguay has a system that includes, among other instances and provisions, a National Regulatory Authority in Radiation Protection (created by Law 17,930 dated December 5th, 2005) which authorizes, regulates and controls all activities and equipment involving the use of ionizing radiation; a Radiological Protection Law (Law 19,056 dated January 4th, 2013), a Response Plan to Emergencies and Radiological Accidents (in force since 2005) and a National Strategy for the Safety of Radioactive Wastes (Decree 484 dated October 17th, 2007). All of them according to international agreements and protocols in force as well as guidelines of this Agency.

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[2] For the purposes of Nuclear Physical Security, the IAEA distinguishes radioactive materials from those subject to or not subject to regulatory control.

[3] In 2010 the IAEA budget was lower than that of Real Madrid FC in 100 million Euros. Probably the gap is even greater nowadays.

This is a system in constant development and improvement, because this is what this matter requires.

For instance, Uruguay supports, together with the IAEA, the conduction of workshops in the area of radiological protection in medicine, on issues such as justification, optimization and limitation of doses and safety in intervention, mammography and computed tomography.

But as in the world of today both reality and future transcend the geographical limits of countries, it is right to emphasize the relevance of areas and instruments such as the Ibero American Forum of Radiological and Nuclear Regulatory Bodies or the Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean.

In this context, our country promotes projects related to nuclear medicine (in particular cancer treatment), the determination of chemical agents in agricultural food products for domestic consumption and export; and the improvement of the productive efficiency in the dairy sector.

Finally, we are neither omnipotent nor infallible, but we believe that the future can be better and assume the responsibility to participate so this trust may translate into a tangible and daily reality.

Mr. President,

Dear Friends,

It might be said that it is not the subject of this meeting, but it would be an irremediable omission and a serious mistake on our part not to refer on this occasion to the non-peaceful uses of nuclear energy. Even more so if we take into account the news headlines with which we have been living over the last few weeks.

It is true that what is fundamental in history is not the news but the trends (many of which are unnoticed or undervalued by the media), but trend also indicates that there are many powerfuls playing with fire.

A reckless game in which no one wins and, however powerful they may be, they may also be the biggest losers. Because that fire, if it explodes, will not respect borders, or riches, or destinies. I will destroy all and everything irremediably. And I do not mean it metaphorically.

Should we accept and resign ourselves to that possibility?

The answer is obvious.

However, reality shows that the facts are not consistent with the words. It is not the first time this happens in the history of humanity, but given the magnitude of the issue raised, may be the last.

In that context, is of particular significance the negotiation which, in compliance with a decision adopted by the UN General Assembly in October last year, more than 120 member countries (the largest and most representative forum in the world today) initiated last March to agree on a legally binding instrument on the prohibition of nuclear weapons, leading to the total elimination of said weapons.

Indeed, it is still suggestive (not to mention alarming) that while biological weapons were outlawed in 1972, chemical weapons in 1993, antipersonnel mines in 1997 and cluster bombs in 2008, nuclear weapons have not yet been banned.

On the contrary: organizations specialized in the subject matter estimate that today there are about 15,000 nuclear warheads that have the potential to destroy the planet several times. Of these, about 1,500 are on a state of alert and may become operational in an average time of 5 minutes...

It is true that for several decades humanity has coexisted with a nuclear arsenal that is occasionally displayed but has never been used... but it is also true that no one has the plans of the future and that five minutes would suffice to make the human race disappear.

It is also frustrating that the major powers and other countries with nuclear[4] arsenals do not participate in these negotiations.

But since even against all odds many still continue to believe that human beings are not overcome by difficulties or frustrations, but by resignation, we will persist in the attempt as those before us, and also in adverse conditions or under suspicion of being naive or heretics, persisted in fighting slavery, plague, hunger or discrimination, or in promoting freedom, democracy, justice, human rights and so many other illusions at the time that are a reality today. Because to reach the horizon one has to sail away...

In our case, we will do so with the modesty of being a small country in terms of territory and population.

But also with the authority emanating from our status as a Member country of the world's first nuclear-free zone established by the Treaty of Tlatelolco (1969) and State Party of the Treaty on the Non-Proliferation of Nuclear Weapons (1970).

While defending the inalienable right of nations to the peaceful use of nuclear energy, Uruguay reaffirms its indeclinable commitment to universal and complete disarmament within the multilateral framework.

Mr. President,

Ladies and Gentlemen Delegates,

Dear Friends,

In the 21st century there are no excuses or attenuating circumstances: we are what we do and hence will be what we do.

This is not a tongue twister or a rhetorical recourse: it is a challenge and a commitment to which, I repeat, we cannot remain strangers neither as scientists nor as citizens.

With such conviction and with confidence in what we are able to do and be for our benefit and the generations to come, I thank you for your attention and I greet you fraternally.

[4] USA, Russia, China, NATO except Holland, India, Pakistan, Israel, North Korea have opposed or do not participate in negotiations.

Statement by Her Excellency Ms Ameenah Gurib-Fakim, President of Mauritius

Excellencies,

Ladies and Gentlemen,

It is such a pleasure and a great honour to be here at the IAEA and to address this forum on the occasion of the 60th anniversary celebration of this institution.

I would like at the outset to extend my sincere and deep appreciation to the Director General of the IAEA, Mr Yukiya Amano for his kind invitation and to the warm hospitality extended to me and to my delegation since our arrival in this magnificent city of Vienna. I would also like to recognize Dr. Shaukat Abdul Razak, scientist, friend and his colleagues for their support.

Ladies and Gentlemen,

I am aware of the very important work that is being carried out by the IAEA in making peaceful nuclear science and technology available to improve human wellbeing and prosperity. As a scientist, I feel deeply honoured to be part of this meeting today as it marks a very important milestone for the IAEA. We are collectively charting the way forward for mobilizing science, technology and innovation through the use of nuclear technology for sustainable development.

The Republic of Mauritius has ratified several of IAEA conventions and our scientists and engineers have benefited directly, since 1974, from several technical programs in the fields of human health, agriculture, food security, energy, waste management and water resources. A total of over 500 Mauritian scientists and fellows have benefitted from capacity building with a peak in the field of food and agriculture.

Among our other priorities are nuclear medicine services for cancer treatment, the monitoring of coal ash disposal and landfill solid waste disposal on ground water as well as air quality using nuclear techniques and nuclear related techniques. We have also sustained the suppression of the Dengue fever, Zika as well as Chikungunya vectors (Aedes albopictus) in many areas around the country and we are consolidating capacity building on the risk factors for non-communicable diseases using stable isotope techniques.

STI including nuclear technologies are helping countries reduce poverty and hunger, improve energy supply, treat diseases and respond to climate change – and much more. The best-known peaceful application of nuclear technology remains nuclear power, which through strengthened safety, can be a valuable source of energy and help mitigate the impact of climate change.

Unfortunately, many developing countries including those on the continent still lack the scientific capacity to enjoy the fruits that these technologies bring. Yet, to alleviate poverty and reduce income inequalities, Africa needs to move to high-productive sectors for industrial upgrading and technological innovation.

In September 2015, as part of its agenda for the next 15 years, the UN has adopted a set of sustainable goals. They are the most sweeping, ambitious program ever undertaken by a global organization but the main challenge will be in transforming them into actions that will touch the lives of those who need them most – the poorest on the continent. It is perhaps the first time that world leaders recognized the importance of science and technology for development.

STI will continue to contribute to increased agricultural productivity, competitiveness and sustainability as well as food and nutritional security. STI will increase job creation in a context of skill deficits and

where 370 million young people are expected to enter the job market within the next 15 years. Recognizing the critical role that the IAEA has been playing, several LDC countries are joining the organization and 26 of 35 LDC's member states of the IAEA are from Africa.

Excellencies, Ladies and Gentlemen,

STI are important levers of economic growth and job creation for our youth. I am therefore committed to using my pulpit to advocate for greater investment and for mobilizing stronger support for R&D. I remain convinced that the social and economic transformation of the continent will only happen when Africans are healthy and are fully equipped with the right skills, knowledge and competencies that will enable them to formulate and implement African solutions to Africa's challenge.

It is a fact that higher education in SSA must have a larger focus on STEM as the latter must be placed at the front and centre of our development effort. And with good reason.

Agriculture is another area that should remain at the heart of the technological transformation of Africa as the continent is home to over half of the world's total arable land, some 500 million acres. In the absence of a flourishing agricultural sector, the majority of Africans will be excluded from the rising tide of prosperity. In this sector, Mauritius benefits from IAEA technical cooperation and has focused on the setting up of an African training hub against fruit flies, which cause major economic losses to farmers.

As a member state to AFRA (Africa Regional Cooperative Agreement for Research, Development and Training to Nuclear Science and Technology) since 1990, Mauritius has, under the AFRA, acquired significant expertise in the field of sterile insect techniques, nuclear medicine and mutation breeding for improved crops.

Annually, scientists from many African countries are trained in Mauritius. Insects are mass-reared in special facilities, irradiated and released in the field at weekly intervals, with the ultimate goal of significantly reducing their population and at the same time saving farmers millions of euros worth of damaged crops.

Advanced technology, including biotechnology increases yields, prevent damage from insects and pests and transform our agricultural products. Nuclear techniques can complement these efforts as they have already been used to produce new varieties of rice for example and that can thrive in difficult conditions. This infrastructure also supports the control of mosquitoes, vector of transmission of the Zika virus, Chikungunya and the Dengue fever. Soil erosion, environmental pollution tracking, water supplies management as well as irradiation of medical devices are all applications of nuclear techniques that we often take for granted.

Therefore boosting investments in Science, Technology and Innovation is no longer an option. It is only through science and its corollary, research and development, that we will be able to nurture the vast African human capital and create a pool of scientists well-equipped to take on the multi-faceted challenges that continue to beset our Continent.

I remain confident that in our partnership with the IAEA and through the peaceful applications of nuclear science and technology, we should be able to achieving 13 of the 17 goals and include poverty, hunger, human health, clean water, affordable and clean energy as well as climate change.

However, excellent science comes with a price tag. This is where the amount and scale of investment matter. International consortia, interdisciplinary partnership as well collaboration with the private sector will empower Africa to take advantage of her strengths and unfolding opportunities.

We remain hopeful that strategies for achieving sustainable development will increasingly be linked to the CPA and dovetail with the 2063 agenda of the African Union. Regional and local partnerships will help institutions pool their limited resources and achieve economies of scale, allowing them to join laboratories, set common standards for R & D and, more importantly, share knowledge and expertise.

We must be mindful however that our reflections must increasingly focus on the inter-linkages between technology and the economy as Innovation pushes ahead at warp speed. The emergence of countries like India, Brazil, China is going to further enhance South-South collaboration and partnership. This South-South learning and sharing initiative is, I am sure, going to be a rich source of knowledge and will help build the scientific capabilities in African institutions, which in turn depends on the quality of our higher education.

While collaboration will inevitably help improve the quality, relevance and depth of scientific education, there is no doubt that the finality of this effort will be judged on their contribution to the economic transformation through increasing linkage with the private sector.

Last but not least, the issue of equal access cannot be overlooked any more. This brings me to a topic that is close to my heart: Women. Women are dramatically under-represented in most Science and Technology-related courses and professions. By some estimates, the economic loss in developing countries from the education gap between girls and boys could be as high as $90 billion a year—almost as much as the infrastructure gap for the whole of Sub-Saharan Africa.

The bottom line is clear: invest in women. It has a great rate of return—economically and socially for the future. It is also the smart thing to do.

So in conclusion, I will cite the President of MIT who rightly said and I quote: "*To reverse the trend, and to compete in an intensely globalized world, we need to take a big leap forward, fueled by innovation — and we need an innovation system that can deliver new manufacturing technologies and processes to get us there."* (Unquote)

I remain confident that the IAEA will continue to help us on the African continent, mobilize cutting edge knowledge and forge partnership anchored in the common good for the benefit of all and more importantly help us become the voice of change.

I thank you for your attention.

Statement by Her Excellency Sheikh Hasina, Honorable Prime Minister of the Government of the People's Republic of Bangladesh

Bismillahir Rahmanir Rahim

Director General Mr. Yukiya Amano,

Her Excellency Mrs. Ameenah Gurib-Fakim ,President of Mauritius,

His Excellency Mr. Tabaré Vázquez ,President of Uruguay,

Chairman of the IAEA Board of Governors,

Distinguished Delegates,

Assalamu Alaikum and Good Morning to you all.

I extend my felicitations to all Member States and the IAEA on the 60th anniversary of the IAEA. I congratulate Mr. Yukiya Amano for his leadership and the Agency for its dedicated efforts in the promotion of peaceful uses of nuclear energy under its motto 'Atoms for Peace and Development', in the last 60 years. I also thank IAEA for its support to Bangladesh in its development over the last 45 years.

IAEA holds a special place in Bangladesh's development and energy security. It is one of the first few intergovernmental organizations that granted membership to Bangladesh in 1972, immediately after our war of liberation. I recall references to this organization from Late Dr. MA Wazed Miah, an eminent nuclear scientist who used to visit IAEA as leader of the Bangladesh Delegation in the IAEA General Conference.

It is his bold and forward-looking initiatives that gave the earliest expression to the dream of the Father of the Nation Bangabandhu Shiekh Mujibur Rahman to build peaceful nuclear energy in Bangladesh. Bangabandhu Sheikh Mujibur Rahman decided to establish an Atomic Energy Research Establishment with the aim to transform the war-ravaged country into a prosperous "Golden Bengal". In fact, a small Research Reactor has been running successfully in this centre for more than 30 years for research, radioisotope production, education and training purposes.

Bangladesh today is regarded as a model country for its socio-economic achievement, with an economic growth rate of 7.24% this year. Science, technology and innovation played a major role in our achievement. A group of Bangladeshi scientists deciphered the complete genetic code of jute with a great success. We have also devised "science diplomacy" to ensure partnership for sustainable economic development through knowledge generation and sharing.

We aim to make full use of science, technology and innovation to achieve a "Digital Bangladesh". Accordingly, in the National Science and Technology Policy and the 7th Five Year Plan (2016 to 2021), we have focused on finding solutions to the emerging problems in the sectors of agriculture, food, health, environment and climate change through application of science and technology. The digitization of some public services has helped us to bring the fruits of economic development to the door steps of the rural people.

Excellencies,

Bangladesh enjoys an excellent collaboration with IAEA. We have successfully completed 138 national projects under Technical Cooperation (TC) and participated in 111 regional projects under Regional

Cooperative Agreement (RCA). Recently Bangladesh successfully hosted the 39th Meeting of the National RCA representatives.

Under the framework of IAEA's Technical Cooperation programme, we have received support in many areas, such as, promoting nuclear education and research, food safety, food security, human healthcare improvement, use of isotopes techniques in water and environment system management, industrial applications like Non Destructive Testing (NDT), crop and livestock improvement, control of pests etc. Amongst these many activities, let me share two concrete examples of Bangladesh's achievement in the peaceful use of nuclear technology:

First, Bangladesh Institute of Nuclear Agriculture (BINA) has developed high yielding, high nutritive, short duration, salt and submergence tolerant, climate resilient mutant varieties of different crops, by using nuclear technology, radiation and other advanced techniques. We have already developed 92 improved varieties of 13 crops. BINA was awarded with the "Outstanding Achievement Award" in 2014 by FAO-IAEA for its contribution towards the achievement of food security. Bangladesh today is self-sufficient in staple food production and even able to export surplus food grains.

Second, the number of people who can affordably access diagnostic medical care in Bangladesh has increased 10 times over the last twenty years, as the country has expanded and strengthened its nuclear medicine services. 15 public and 6 private nuclear medicine Institutes in the country carry out more than 400,000 nuclear medicine procedures each year in the areas of oncology, cardiology, nephrology, Thyroid, invitro studies and cerebral studies. Uses of most recent nuclear technologies in the treatment of cancer are a real help to the people of Bangladesh. We have also built well-trained medical staff, advanced imaging tools and a cost-effective source of essential radiopharmaceuticals. As a result, life expectancy has increased and public health indicators have improved remarkably.

Excellencies,

I am happy to announce that Bangladesh has recently stepped into nuclear power generation programme. We regard nuclear energy as a safe, environment friendly and economically viable source of electricity generation to meet the ever increasing demand of electricity of 160 million people of the country and thus unlock our development potentials through enhanced productivity and sustained growth. The Russian supported Rooppur power plant will produce 2400 Mega Watts (MW) electricity by two reactors. Our aim is to generate at least 4000 MW of electricity from nuclear source by 2030.

Excellencies,

Capacity building and transfer of technologies are much needed by the developing countries to achieve Sustainable Development Goals (SDGs). I would call upon developing countries to forge greater cooperation to draw maximum benefits from the peaceful uses of nuclear technologies through IAEA expertise. I would also call upon the developed countries to help maintain IAEA resources assured and sufficient for the Technical Cooperation (TC) programmes. I call upon IAEA to strengthen its efforts to help member states particularly the LDCs and developing countries to implement the SDGs.

Excellencies,

In conclusion, I would like to say that, Bangladesh is solidly anchored at its principled position on nuclear disarmament and non-proliferation. Bangladesh remains committed to working with IAEA and other international partners in ensuring due diligence of the peaceful use of nuclear technology.

I thank you. Joy Bangla. Joy Bangabandhu.

Statement by His Excellency Mr Tebogo Joseph Seokolo, Chairperson of the IAEA Board of Governors

Your Excellencies, Heads of State and Government

Director General Yukiya Amano

Honourable Ministers and Heads of Delegations

Distinguished Delegates

Ladies and Gentlemen

Programme Director

Allow me to express, on behalf of all Member States, my sincere appreciation to Director General Amano and the Secretariat for overseeing preparations for the IAEA International Conference on Technical Cooperation (TC) Programme. The Agency continues to play a pivotal role in contributing to peace, security and development. This first International Technical Conference is both historic and timely, especially as we mark an important milestone in the history of the IAEA: the 60th anniversary of the establishment of the Agency.

The evolution of the Agency's work over the decades, covering different areas and facing multiple global challenges, has re-emphasized its role as one of the organizations at our disposal to advance the cause of humanity in general. By progressing from the motto of "Atoms for Peace" to embrace "Atoms for Peace and Development", the IAEA has reaffirmed its commitment to harness the peaceful uses of nuclear energy for development.

Your Excellencies

For the past six decades, the Technical Cooperation Programme of the IAEA has been recognised as an important delivery mechanism through which the Agency fulfils its statutory mandate to promote the peaceful uses of atomic energy. In recent years the Agency has become even more relevant in assisting Member States towards the attainment of the 2030 Agenda for Sustainable Development as adopted by the General Assembly in 2015.

This International TC Conference, will therefore provide Member States with an ideal opportunity to collectively reflect on how the IAEA Technical Cooperation Programme continues to assist countries through nuclear science and technology to address their socio-economic development challenges. The TC Programme provides an important support to countries in areas such as human health, food and agriculture, environment and water resources management and industrial applications in support of their national development priorities.

For example in the area of human health, the IAEA supported global efforts to fight the outbreak of the Ebola Viral Diseases in West Africa, in 2015, using a nuclear diagnostic technique for rapid identification of the virus. In addition, the Agency provided assistance in the form of equipment, laboratory supplies and technical advice, to supplement the limited capacities of these countries.

Your Excellencies

In order to build upon these achievements and for the Agency to continue to provide this vital support to Member States, funding for the Technical Cooperation Programme should be sufficient, assured, and predictable. Member States have a collective political responsibility for the financing of the TC

Programme. This includes Member States paying their assessed contributions to the Technical Cooperation Fund (TCF) in full and on time.

Member States continue to acknowledge the extra-budgetary support provided including through the Peaceful Uses Initiative (PUI) in financially supporting a wide variety of the IAEA activities especially unfunded TC projects.

Your Excellencies, distinguished delegates,

Most of the Agency's activities related to the TC Programme are supported and implemented through the Nuclear Applications Laboratories in Seibersdorf. However, these laboratories were built more than 50 years ago and have not received a comprehensive renovation to enable them to meet the evolving and growing demands of Member States. In this regard, the IAEA established the Renovation of the Nuclear Applications Laboratories project (ReNuAL) in order to modernize these laboratories. We commend the tireless efforts of the Director-General and his team as well as the Friends of ReNuAL which have resulted in securing the required financial resources to commence with the first phase of this project.

However, in order to commence with the second and final phase of this project more financial resources are required. I therefore appeal to esteemed Member States to favourably consider making financial contributions to this important endeavour.

Your Excellencies, distinguished delegates,

In conclusion, and as we start this historic conference, it is my sincere hope as Chair of the Board of Governors, that our deliberations in the next few days will solidify the partnership amongst Member States in the attempt to assist the IAEA in optimally achieving its mandate. Future generations should be assured that the Agency will be there to provide a helping hand as we seek to realise a better world. Technical Cooperation is a manifestation of how we can collaborate in a mutually beneficial relationship.

I thank you.

APPENDIX II
Session 1 Statements

Statement by H.E. Mr Igor Crnadak, Minister of Foreign Affairs of Bosnia and Herzegovina

Distinguished Mr. Chairman, Excellences, ladies and gentlemen,

I have the honor to present to you the Statement on Bosnia and Herzegovina's journey through the Technical Cooperation Programme.

First of all, allow me to express my gratitude to the IAEA for organizing such a conference as this will give us an opportunity to recognize the technical cooperation as a very important role of the IAEA, especially in the context of the UN sustainable development Goal, but also for world safety and security in general.

After the bitter war ended in 1995, Bosnia and Herzegovina was in the process of major reconstruction and in the need of support from international partners. Regarding the peaceful application of nuclear technologies, as well as nuclear safety and security, the situation in Bosnia and Herzegovina was extremely difficult .

At that time we had two legislative systems inherited from the pre-war time, but for the most part they were not harmonized with international standards and recommendations.

Application of nuclear science in medicine was at the X-ray generator level while we could only dream about more sophisticated equipment. We can say that other applications in science and industry were almost non-existent.

Human resources in this field were really poor; we are talking about only a handful of persons in the whole country who could take up the task of adopting and implementing nuclear technologies and developing one single radiation and nuclear safety system for the entire country.

This is when the country became an Agency Member in 1995 and initiated its first Technical Cooperation Programme (TC).

Dear friends,

Bosnia and Herzegovina is a non-nuclear country which doesn't have nuclear power plants or research reactors, however, the peaceful use of nuclear science and technology has been applied in various fields, with particular emphasis on medical science.

The IAEA TC contribution in the field of medicine has helped us to establish better radiotherapy and nuclear medicine facilities.

Through the support from the TC, a medical radiation physics center in the Departments of Medical Physics at the Clinical Centre of the University of Sarajevo (KCUS) and the Clinical Centre Banja Luka were successfully established. Additionally, trained staff from these clinical centers were able to help establish medical radiation physics centers in three more hospitals in the country. A larger professional body of medical physicists has established the foundations for continuous education and clinical training in medical physics and radiation protection. Internationally accepted standards of staff and equipment are now available for training in all major areas of medical radiation physics: radiotherapy, diagnostic radiology and nuclear medicine.

The Act on Radiation and Nuclear Safety in Bosnia and Herzegovina, which was published in 2007, was prepared with major IAEA support, and this Act additionally enabled establishment of a regulatory body in the country in 2008. The regulatory body has created a regulatory framework in accordance with the IAEA standards. Multiple regulations were prepared through the support of national TC projects as well as helped us to strengthen the regulatory body's capacity through staff training and also to equip the regulatory body's Inspectorate. In the area for environmental monitoring, we have managed to establish laboratories which can measure and develop a radioelement map of the country, and effectively use it in identifying areas of potential natural radiation hazard, and to improve knowledge of public exposure to ionization radiation.

The prevalence of transboundary animal diseases (TADs) in Bosnia and Herzegovina has increased due to a lack of consistency in the country's disease control strategies. Thanks to the support from the TC, a disease control strategy based on quantitative epidemiological methods was developed and implemented to enhance Bosnia and Herzegovina's disease surveillance and control system. Today, the new system has improved the capacity of the State Veterinary Service to detect, control or eradicate brucellosis and has established a model for other transboundary animal diseases. A network of advanced epidemiological units has been set up, and standard and harmonized laboratory techniques and diagnostic protocols are being implemented. Bosnia and Herzegovina is now better able to ensure the safety of its livestock and population.

Bosnia and Herzegovina welcomed an ImPACT review mission in June 2015, which recognized that the country has a good basis for implementing the effective national cancer control strategies. We incorporated these recommendations to our strategic documents, and we are committed to fulfilling recommendations made by the mission team. In this regard, I would like to emphasize the importance of the IAEA's continued support to Bosnia and Herzegovina through the TC which could contribute to the improvement of cancer diagnostics and therapy treatments in an effective and strategic way.

We have joined and ratified all important and relevant multilateral agreements and conventions. Today our institutions and their representatives are able to participate very actively in many different IAEA activities.

Since 1995, a total of 215 professionals in various fields of nuclear science and technology in the country have been given valuable opportunities to be trained and to broaden their knowledge by visiting institutions in other countries.

We are strongly committed to continue very actively our work with the TC IAEA, and I do hope we will achieve many important goals in the near future, such as:

- Finalize implementation of Integrational management, and quality system in our regulatory body
- To Establish the network of early radiological warning system all over the country
- To Establish a radon map for B&H, since we are black hole on Europe Radon map today, together with few other countries in the region
- Regarding Emergency and preparedness, we plan to start with organizing exercises, due to strengthen our preparedness for reaction on radiological emergency incidents.
- To Establish proper laboratories to have appropriate system for radiological control of food prior to our full EU membership.
- As far as regional cooperation is concerned we are intending to play very active role, and try to lead in "Safety Infrastructure" field, within different IAEA networks, especially EuCAS Network.

Distinguished Mr. Chairman, dear friends, ladies and gentlemen, allow me to conclude.

Bosnia and Herzegovina is a part of Balkans, a historically vivid microcosm that offers not only old cultures, striking mountain landscapes but also a strong sense for diversity, willingness and readiness to move forward and create a better future for the younger generations.

Accompanying the global trends, dynamics and goals featuring health and other areas, is a leitmotif and a necessity to urge the importance of the international cooperation and development agendas, strengthened national policies to achieve these targets through many programmes, mechanisms, financing strategies in the scope of the comprehensive overview of the socio-economic vision of the country.

By abiding to the international rules and conventions as well as through the support of the IAEA, we are ready to continue further creating a cultivated standard in promoting peaceful use of the nuclear science and technology, in offering our hand of cooperation and stand back to back with our neighbouring countries in overpassing potential political and economic barriers in the development of the region as a whole.

We hope that in the near future Bosnia and Herzegovina will become a provider of expertise within the IAEA TC projects and support other countries by sharing experience and knowledge gained through our long-standing cooperaton with the IAEA Technical Cooperation.

On behalf of Bosnia and Herzegovina, I would like to express our gratitude to the IAEA for its continued support for promoting the safe and secure peaceful use of nuclear energy for the benefit and development of the human kind and the world community. Without it, the nuclear science and technology in Bosnia and Herzegovina would not have been at the level where we are today.

Thank you for your attention.

Statement by H.E. Mr Yongde Liu, Secretary General, China Atomic Energy Authority (CAEA), China

Nuclear Powering Future

Achievements and Prospects of TC Programme in China

LIU Yongde

Secretary General of CAEA

Vienna · Austria
May 2017

TC Programme in China

2

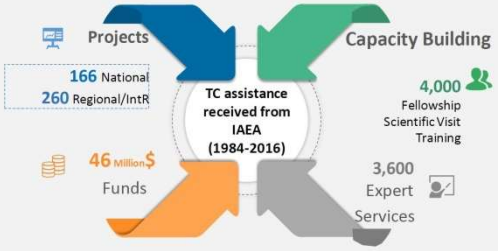
The IAEA can play a central role to coordinate and consolidate global resources for nuclear security, and use its professional expertise to serve all countries.

Seminar on 30th Anniversary of Cooperation between China and IAEA in 2014

- In 1984, China acceded to the IAEA.
- Over three decades of successful collaboration in various fields.
- China supports the mandate of the IAEA: Atoms for Peace and Development.

TC Assistance Received from the IAEA

3



Contributions from China to TC

4

China follows the principle of "Give and Take" in TC collaboration with IAEA.

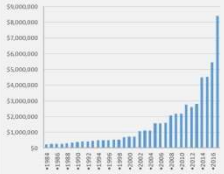
In 2017, China becomes the third largest donor to TC.

China contributed 150 million USD to the Regular Budget and 43 million USD to TC Fund.

China dispatched 2,000 more experts to provide service, and received over 3,000 foreign experts.

China donated 2 million Euro and 2.5 million USD equipment to the ReNUAL Project.

Annual Contributions from China to TC Fund



TC Programme in Nuclear Energy Development

5

- China has reinforced the infrastructure development, human resources training, technical and research capability.
- China has adopted almost all the safety standards of IAEA and improve her safety regulatory system.
- China has established sustainable and comprehensive partnership with IAEA and other countries.

The Nuclear Safety Regulations and Guidances in China

IAEA completed the Generic Nuclear Reactor Safety Reviews for Hua Long 1 Reactor (HPR1000) in2014

CPR4018 –Workshop on QA in Design, Manufacture & Construction of Qinshan III NPP held in 1997

TC Programme in Nuclear Energy Development

6

- China recieves fellows, scientific visitor, trainers from other countries, provides expert services.
- In 2011, China established the International Nuclear Power Construction Training Center(ICTC) with the IAEA, and has trained over 200 people from 38 countries.

IAEA DG Yukiya Amano visited the 10 MW HTGCR in Tsinghua University in 2011

The 2nd International Ministerial Conference on Nuclear Energy in 21st Century was successfully held in China in 2009 in cooperation with IAEA

IAEA DG Yukiya Amano and CAEA Vice Chairman Wang Yiren inaugurated the ICTC

TC Programme in Food and Agriculture

7

- China has established a robust nuclear agriculture system. China has developed 958 mutant varieties, while the world total is no more than 3,000.
- Ever since 2002, China became the lead country for nuclear agriculture projects under RCA.
- China shares its technologies and expertise, providing technical service and making available facilities for joint research.

Some Gynotype Maize Varitels screened out with TC support

Regional training courses on mutation breeding technologies held by CAAS

IAEA experts service on SIT

TC Programme in Human Health

8

In 2012, IAEA DG Yukiya Amano visited the Cancer Hospital of Chinese Academy of Medical Sciences

Regional training course on nuclear medicine technique used in treating thyroid diseases in 2015

Young doctors engaged in academic exchanges on medical physists radiation protection under RAS6083

- The application of nuclear and radiation technologies in medicine have been developing rapidly in China.
- 43,000 departments of diagnostic radiology in hospitals nationwide, with a total staff of 300,000 and over 10,000 X-ray diagnostic facilities and nearly 20,000 computed tomography (CT) scanners.

TC Programme in Industry and Environment

9

- Fruitful cooperation conducted in water resources managment, air pollutents monitoring, ocean environment monitoring, irradiated treatnment of waste water, etc.
- Ever since 1994, China has participated in projects in the air pollutents analysis using nuclear technology.
- With the TC assistance, China's first industrial-scale wastewater treatment plant has been established in Zhejiang and good results achieved.

The IAEA/RCA regional training course on ground water assessment using isotope techniques in 2016

The industrial-scale wastewater treatment plant in Zhejiang

TC Programme Management--Planning

10

- Drawing up a tailor-made TC plan(Country Programme Framework) on the basis of China's Five-year plans on socio-economic development and nuclear industry development.
- Ensuring the CPF is consistent with the UN 2030 Agenda for Sustainable Development and IAEA TC Strategy.
- Working closely with the IAEA to make it practical and workable.

CPF (2010-2015) and CPF (2016-2021) signed by CAEA and IAEA

Projects Selection Process

11

Peace and Development are the common aspirations of the world people. China is ready to work jointly with all member states by leveraging TC and contributing to the global peace and prosperity.

Statement by HE Ms Elba Rosa Pérez Montoya, Minister, Ministry of Science, Technology and Environment, Cuba

Distinguished Mr. Amano IAEA Director General,

Distinguished Members of the Presidency,

Distinguished delegates,

Cuba welcomes the holding of this important event, the International Conference on the IAEA Technical Cooperation Programme: Sixty Years and Beyond, and would like to take this opportunity to thank all the staff of the Department of Technical Cooperation for 60 years of hard, fruitful work.

Our country was one of the founding Member States of the International Atomic Energy Agency (IAEA), but it was not until 1977 that our first national technical cooperation project was implemented.

Since then, the programme of technical cooperation between Cuba and the IAEA has been an example of a successful partnership that has benefited our country's priority sectors such as human health, agriculture, industry and the environment through national, regional and interregional projects.

In the 40 years since 1977, Cuba has implemented 111 national projects and participated in 173 regional and 24 interregional projects, attaining an average annual implementation rate of over 90%. Thanks to this cooperation, Cuba has benefited from 740 fellowships, 390 scientific visits and the experience of more than 800 international experts.

In return for the support it has received from the IAEA, our country has made its own contributions, mainly in education and training to support the development of human resources in other Member States. In these 40 years, Cuba has carried out more than 1000 expert missions, trained more than 200 fellows from every region at its facilities, hosted multiple events and been the site of training courses for more than 700 participants.

Cuba actively participates in the Regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) and is currently ARCAL's focal point for human health in the region.

This cooperation greatly benefits the training of human resources in such important areas as the treatment of patients suffering from cancer and other non-communicable diseases, which are the cause of the decline in various health indicators in the region, including life expectancy at birth, childhood malnutrition and cerebrovascular diseases.

Thanks in part to the projects implemented so far, we are now able to produce almost all the radiopharmaceuticals and labelled compounds required by nuclear medicine units, have increased our capacity to conduct clinical and preclinical studies for the development of new pharmaceuticals and, in recent years, have begun exporting modest exports to other countries of the region.

In the area of human health, we now have laboratories with advanced equipment and highly qualified specialists capable of conducting body composition studies, and as a result we have been able to conduct valuable research into child malnutrition and influence national prevention strategies for young people. We also have nuclear cardiology and nephrology services that meet international standards.

The technical cooperation programme has also contributed to the implementation of national programmes dedicated to improving agricultural yields, using soils efficiently, developing new plant varieties and preserving foodstuffs.

Thanks to such projects, new varieties of rice, sugar cane and tomato have been established; laboratories have been accredited to monitor inorganic and radioactive contaminants in foods; radioimmunoassay techniques have been introduced to increase milk production and improve livestock breeding; and soil degradation assessments using nuclear and isotopic technology have been carried out that have helped to introduce better practices and make more efficient use of soil and water in agriculture.

With respect to water and the environment, Cuba has three laboratories that are part of the ALMERA network, and a centre recognized in the region for the study and monitoring of the marine environment and coastal ecosystems. A national network of analytical laboratories has been established to provide environmental conservation and protection services. In addition, the use of nuclear and isotopic technology has led to improvements in the management of the country's main drainage basins and the monitoring of air pollution and industrial waste. These achievements were possible in part thanks to Cuba's participation in various technical cooperation projects.

The Caribbean regional observatory for the study of ocean acidification was inaugurated on the occasion of the recent visit to Cuba by Deputy Director General Dazhu Yang, Head of the IAEA's Department of Technical Cooperation. The observatory will provide important information on climate change.

With the IAEA's assistance, our country has strengthened its capacities for conducting energy planning studies, and has set up irradiation facilities and developed technology for the irradiation of various products.

Among all the success stories in recent years, particular mention should be made of the improvement of the nuclear medicine service in Havana, the use of oysters as marine sentinels to protect against poisoned shellfish, the production of hydrogel membranes for the treatment of burn patients, the strengthening of nuclear cardiology, the improvement of radioactive waste management and the use of isotopic and nuclear techniques to identify risks and vulnerabilities in Cuba's coastal areas.

Nuclear security is an issue where international cooperation is becoming increasingly important, as it cannot be limited to a single area or region but rather requires the commitment and involvement of all.

Cuba has been pursuing a large number of activities in the implementation of its Integrated Nuclear Security Support Plan, approved in 2012, to strengthen nuclear security in relation to radioactive sources and associated facilities, nuclear material and border control to prevent and respond to illicit trafficking in and unauthorized movement of radioactive and nuclear material.

Cuba's current national legislation takes its scientific basis from the Agency's system of standards. Our legal and regulatory framework is constantly updated and has been bolstered by various technical cooperation activities over the years.

We cannot fail to mention Cuba's extensive collaboration with the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (FORO), from which we have benefited and to which we have also contributed our experience and experts. This cooperation has made it possible to carry out major projects that have had and continue to have a great impact in the Ibero-American region and beyond by helping to raise levels of nuclear and radiation safety and nuclear security. Thanks to our cooperation with the IAEA, we have available to us technical officers skilled in project development and the dissemination of outcomes through publications and regional activities organized for that purpose.

Distinguished delegates,

Cuba's technical cooperation programme has been strongly bilateral in nature, as recognized by IAEA Director General Mr. Yukiya Amano during his visits to Cuba to highlight the country's achievements in the peaceful use of nuclear energy and in its technical cooperation projects.

During his keynote speech in the Aula Magna of the University of Havana, Mr Amano underlined the fact that our cooperation was a "two-way street" and that Cuba not only benefited from the Agency's technical cooperation programme but also made substantial contributions to it by sharing its experiences and knowledge with other countries and participating in regional projects through its research centres and laboratories.

During all the years of technical cooperation between Cuba and the IAEA, the keys to success have been the effective alignment of the technical cooperation programme with national priorities and resources, active participation in regional and interregional programmes and the making available of our enhanced capacities in order to promote development in other countries, which, in turn, has increased our own experience and competence.

Despite strict prohibitions and restrictions associated with the economic, financial and trade embargo imposed on Cuba by the Government of the United States, which are ongoing and create serious difficulties, the IAEA's technical cooperation programme has been an effective mechanism for cooperation and the transfer of the technology, scientific information and knowledge required in order to continue to develop peaceful applications of nuclear technology in Cuba in pursuit of the Sustainable Development Goals (SDGs) and a better society for all.

Distinguished delegates,

I once again congratulate all the IAEA managers and staff who, along with Cuba's managers and experts, have made possible everything that has been achieved throughout all our years of successful cooperation.

Lastly, we ratify Cuba's strong commitment to continued cooperation with the IAEA with the shared objective of making the Agency's motto 'Atoms for Peace and Development' a sustainable reality for all peoples.

Thank you.

Statement by H.E. Dr. Mohamed Shaker El Markabi, Egypt Minister of Electricity and Renewable Energy

Ladies and Gentlemen

It is a real pleasure for me to be with you today in the opening of the "International Conference on the IAEA Technical Cooperation Programme, Sixty Years and beyond".

Egypt is proud to have been among the first group of states that sign and ratify the Agency Statute in 1957. Since then, Egypt became one of the largest recipients of IAEA's Technical Assistance. Let me take this opportunity to assure the Egyptian deep appreciation for the continuous support that the Agency has offered over six decades to build, strengthen and maintain capacities in the safe, peaceful and secured use of nuclear technology. The Agency's important work has, therefore, greatly contributed to social and economic development of Egypt and directly supported the achievement of the Sustainable Development Goals (SDGs).

The Egyptian early projects aimed at building up human capacities, creating institutions and enlarging the role of nuclear technology besides applying nuclear technology safely and effectively. In the mid-1990s the Egyptian TC program followed the IAEA policy and being directed to have a cost efficient and measurable impact on the high priority and social needs of the Egyptian society. Now, Egypt highly appreciates the quality-based planning process that lays the foundation for effective and successful TC projects.

Over decades, Egypt has implemented a lot of TC projects ranging from basic nuclear science to advanced nuclear technology. Egypt notes with gratitude the specific continuous and substantial contribution that the Agency has made to the various development sectors in my country.

Ladies and Gentlemen

Allow me now to elaborate on key areas of priority for Egypt where the Agency played a significant role and its assistance is still needed to support Egypt Vision 2030.

In Egypt's Vision 2030 and in the framework of Integrated and Sustainable Energy Strategy till 2035, diversifying the energy mix is a key priority. The establishment of several nuclear stations to produce electricity, reducing the country's dependence on petroleum, expanding the use of renewable energy, improving energy efficiency, and promoting consumption rationalization are main goals. IAEA assisted Egypt to enhance the national capacity for initiation of Nuclear Power Programme. Egypt, in collaboration with the Agency, has established an Integrated Work Plan under which all TC projects related to nuclear power programme management, site evaluation, safety, human resources development and public communications will be implemented.

Due to importance of food and agriculture as the major driver of Egypt's socioeconomic development, IAEA assistance will be directed to support Egypt to increase agricultural productivity and achieve a higher degree of food security using nuclear techniques.

In the health sector, IAEA assistance focuses on the use of radiation and isotopes for diagnosis and health care applications, besides upgrading the national facility for radio-pharmaceuticals production to meet the international quality standards.

We also appreciate the continuous support of the Agency in the fields of safety, security, safeguards, nuclear materials exploration, emergency response, waste management, irradiation processing, engineering and research reactors.

In this regard, I would like to highlight some of TC projects that were implemented in Egypt with continuous outputs.

In the field of irradiation processing, IAEA assisted Egypt to establish a High Dose Reference Dosimetry Laboratory which is one of seven reference laboratories worldwide to implement a quality management system for Radiation Processing Sector adapted by ISO 9001 as well as the development of QA&QC systems for the High Dose Dosimetry Laboratory and Microbiology Laboratories to assure a higher degree of Customer satisfaction.

In the field of food and agriculture, IAEA assisted Egypt, through mutation breeding techniques in combination with Biotechnology, in the development and field evaluation of improved food crops for higher agricultural food productivity, better nutrition and greater tolerance to stress, such as drought and salinity which led to the official release to farmers of improved mutant varieties of sesame, sunflower and wheat.

In the field of health, the IAEA support not only focuses on the use of radiation and isotopes to prevent, diagnose and treat diseases but it also assists Egypt with medical equipment maintenance and networking using the latest information and communication technologies.

In the field of standardization and calibration of all radiation measuring instruments, a secondary standard dosimetry laboratory for low level doses was established in 1985 by the IAEA assistance. Now, the laboratory is a member of the IAEA-WHO network.

Over the past years (1957-2017), considerable efforts were made by the Egyptian government to strengthen the institutional capacities through active participation in the Agency human resources development programme. A total of 1128 Egyptian nationals took part in training courses and 916 Egyptian nationals participated in meetings organized by IAEA. Further, the Agency granted 1100 fellowships and 350 scientific visits. During this period, Egypt's institutions benefited from 290 Agency experts assignments implemented under the TC projects.

Ladies and Gentlemen

In response to the Agency's generous contribution, Egypt makes its contribution to the TC fund in full and on time. Egypt also reiterates its commitments to support the Agency's activities by annually hosting several regional meetings, workshops and training courses.

Egypt also offers training opportunities and technical support to other African countries through AFRA Designated Centers and AFRA Agreement.

Finally, with all of the above, Egypt has had productive cooperation with the Agency and witnessed its fruitful contributions in supporting Member States to meet their development priorities through the peaceful applications of Nuclear Science and Technology.

Thanks for the Agency and thank you for your kind attention.

Statement by H.E. Prof. H. Mohammad Nasir, Ph.D., Ak., Minister of Research, Technology and Higher Education, Head of Delegation of the Republic of Indonesia at the 60th Technical Cooperation Programme Conference of the International Atomic Energy Agency

His Excellency Director General of IAEA – Mr Yukiya Amano

His Excellency Chairman of the Conference

Distinguished Member States Leaders, Ministers and Representatives

Distinguished Ladies and Gentlemen,

Assalamualaikum Warrahmatullahi Wabarakatuh

First of all, allow me to congratulate the IAEA, which this year marks its 60th anniversary of contributing to the efforts of all Member States in developing and utilizing nuclear science and technology for peaceful uses and development.

It is my honor and pleasure to address you today, on behalf of the Government of the Republic Indonesia, regarding our country's journey with the IAEA TC Programme, illustrating its achievements and positive impact on our national development programme.

At the outset, Indonesia recognizes that the IAEA TC Programme plays an indispensable role as the main vehicle for the Agency to deliver its main statutory mandate "to seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". Indonesia notes with interest that 13 out of 17 Sustainable Development Goals (SDGs) relate directly to the Agency's area of competence. The Agency should strengthen its valuable contribution to the fulfillment of these Goals, particularly through its TC Programme, and its direct impact for the benefit of all people.

As a matter of principle, Indonesia believes that the IAEA TC Programme must play a crucial role in ensuring the full, effective and non-discriminatory implementation of Article IV of the Nuclear Non-proliferation Treaty (NPT). Indonesia is of the strong conviction that peaceful uses of nuclear technology is an inalienable right of States Parties to the Treaty, and therefore the TC Programme should not be subject to any conditionalities.

Indonesia encourages all Member States to continue and enhance their support and contributions to the TC programme. The current funding mechanism for TC, which relies fully on voluntary contributions, could prove to be a significant burden on assurance and predictability in planning, programming and implementation. Member States need to make every effort to ensure that IAEA resources for technical cooperation activities are sufficient, assured and predictable.

Being a member of the IAEA, Indonesia has benefited from the TC Programme in promoting the contribution of atomic energy to peace, health and prosperity. Aside from enjoying cooperation with the Agency, beginning in 2012 Indonesia has provided voluntary contributions, including through the Peaceful Uses Initiative (PUI). The aim is to assist other countries, especially developing and least developed countries, under the framework of Technical Cooperation among Developing Countries and South-South Cooperation. At the same time, the contributions are used to support the advancement of nuclear sciences and applications through the modernization of the IAEA Laboratories in Seibersdorf.

In 2015, Indonesia also initiated the Regional Capacity Building Initiative (RCBI) to promote resource mobilization in Asia and the Pacific region, engaging Member States and potential donors. Indonesia believes in the importance of broadening stakeholders through partnerships with non-traditional donors

in resource mobilization to seek additional funds, and encourages efforts by all Member States to find such partners within their own countries.

Chairman, Excellencies, Ladies and Gentlemen

Let me reiterate a few achievements that have been accomplished by Indonesia.

Irradiation technology has resulted in the release of a number of mutant food crop superior varieties, which represent 10% of our national varieties with twice as much yield. The crops have generated revenues for farmers, as much as 2 billion USD for one variety, a boon for people's income. In 2016, farmers in 22 provinces have utilized the food crop varieties with a total cultivation area of 3 million hectares. In this conference, you will hear a testimony by a young seed breeder from Indonesia, whose vision is to transform his village and the region by growing the mutant varieties.

Indonesia is also moving forward with a new project on the business process for soybeans, building a bridge between the farming community and the food industry as well as creating partnerships with the other United Nations agencies FAO and UNIDO. The project is expected to promote acceleration of sovereignty in high quality and quantity of local soybeans, empowering farmers to have a better quality of life and empowering small and medium food enterprises in producing highly nutritious food products for the people.

Distinguished Chairman, Excellencies, Ladies and Gentlemen,

Health is a national priority with the goal of improving the quality of life of our people. Indonesia continues its efforts, among others, to produce radioisotopes and radiopharmaceutical products, and to develop health equipment. We have five radiopharmaceutical products that have received national licenses for commercialization. A national license for our own renograf equipment, used to analyze kidney function, is expected to be issued this year.

As an effort to combat the vectors of mosquito-borne diseases, the Government of Indonesia also utilizes Sterile Insect Technique (SIT) which has been implemented in several piloted areas in the country.

Distinguished Chairman, Excellencies, Ladies and Gentlemen,

On contributing to global efforts on climate change mitigation, for almost a decade, the IAEA TC Programme has been enabling our researchers to utilize neutron activation analysis to investigate air pollutants in 15 of the 34 provinces in Indonesia, providing data needed by the Ministry for Environment and Forestry to issue new standards for air quality.

Indonesia also put priority on the study of the impact of climate change on marine life, including coral reefs.

Ladies and Gentlemen,

In 2015 the IAEA Collaborating Centre for Non-Destructive Investigation was established at the National Nuclear Energy Agency of Indonesia (BATAN) to assist the Agency and cater to regional needs. Such trust and recognition from the Agency is highly appreciated and a source of further motivation for us.

Indonesia recognizes the potential of nuclear energy to provide a reliable source of power generation and to contribute to global efforts in climate change mitigation. Through the support of the IAEA TC Programme, studies have been conducted on the potential use of nuclear energy in the national energy

system. The country is developing its first Experimental Power Reactor to strengthen its mastery of nuclear power.

Ladies and Gentlemen,

With regard to the on-going project of the Compendium for Nuclear Science and Technology for secondary level schools, Indonesia is pleased to be one of the pilot countries to implement the project and plans to incorporate such learning into the national education scheme.

Indonesia would like to express its appreciation for the support in the development of regulatory capacity, nuclear and radiation safety infrastructures, and safety of nuclear applications in Indonesia. With the capacity that has been developed, Indonesia is ready to support other Member States in establishing the required safety infrastructure. In this regard, in 2016 our Nuclear Energy Regulatory Agency (BAPETEN) has supported the Agency's mentoring activity for the least developed countries in the Asia and Pacific region.

Excellencies, Ladies and Gentlemen,

As a final note, on behalf of the Indonesian Government, I wish to again express our appreciation for the strong commitment and support given by the IAEA, through the TC Programme, to nuclear technology research, development and applications for peaceful purposes in our country.

On a personal note, I am still amazed at how much nuclear science and technology has contributed to our modern lives. I am sure it is something that our society is not yet fully aware of. It is our responsibility to educate our young generation and society on the benefits of nuclear science and technology.

Thank you.

APPENDIX III

Statement by HRH Princess Sumaya bint El Hassan: Science for Peace: Borderless Innovation for Creative Change

Ladies and Gentlemen:

It is a great privilege for me to address you all at the closing of this wonderful conference to celebrate and assess 60 years of the IAEA Technical Cooperation Programme. The incredible contribution of this organisation and its dedicated staff to durable development in our world has been, and continues to be, enormous. Perhaps more importantly, your contribution to the furtherance of peace through science is immeasurable. You have shown that science and innovation positive progress must know no borders and that change may only be built on cooperative creativity.

The technical cooperation programme has been vital to the work of the IAEA since the very beginning. Over the course of six decades, you have shown time and again that technology transfer and capacity building are the greatest gifts that any economy in transition, or any population under stress, can receive. The IAEA's support for projects in areas as diverse as health, food and agriculture, water and the environment, industrial applications and energy, have proven consistently that the peaceful, innovative and cross-border utilisation of nuclear technology has so much to contribute to sustainable development and to the creative realisation of the Sustainable Development Goals.

The variety of applications for the skills and expertise of the IAEA is truly inspiring. The breath of disciplines that you impact on is indeed impressive. You are an inspiration to all of your affiliates who share your commitment to building a society of equal partners in progress, where individuals, regardless of their backgrounds or occupations, may feel allied in some way to the potential and promise of science and innovation.

For our part, we in Jordan hope that we may all cooperate to help our citizens, young and old, to feel a borderless connection with the platforms, tools and infrastructure that enable scientific enquiry to engage and to flourish.

In this regard, we were delighted to see the official opening of SESAME, the Synchrotron-light for Experimental Science and Applications in the Middle East, just two weeks ago. It was our privilege to welcome Mr Amano, the Director-General, and to recognise the invaluable support that the IAEA has given to the project and to Jordan over the years. As I said to Mr Amano on that occasion, we are delighted to have such a cutting-edge research facility on our doorstep so that we may strive to develop a model for Open Science that suits and supports our nation and our region.

For Science offers so much more than answers to our many challenges – it promises a bold and uniting journey towards finding innovative solutions to those shared challenges. We very much hope that we can make much of the research that will be conducted at SESAME, and elsewhere in Jordan, comprehensible and relevant to a wider audience. Science is, indeed, humanity's greatest endowment as we strive to manage our challenged resources and to care for, and heal, our threatened environment.

Ladies and Gentlemen: SESAME is a beacon of cooperative science in a region where political collaboration is so often absent or thwarted. But it also has the potential to help shine a light into all our communities, one that will illuminate the vast potential of creative innovation to solve problems, to make life better for all of us, and to teach us so much more about ourselves.

But we must also note the place of science in our cultural identities and our tribal memories. For science must be seen as a shared resource, and a common gift, for all our human family. For all of us, our cultural heritage is a creation of the innovative spirits of many ancestors.

On the evening of the opening of SESAME, I was delighted to host our international and Jordanian guests at the Jordan Museum, so that we could remember that those of us who call ourselves Jordanian today, are descended from so many tribes, races and civilisations, who have been at the centre of timeless conversations on innovation and the application of knowledge for so many thousands of years. We lie at the heart of a region where so many communities and cultures have had to innovate to survive. Today, it is incumbent on all of us to embrace nations where science has lost its place of honour, or where science is seen as alien and unfamiliar. The truth is, science belongs to all humankind and it must bring its creative benefits to all who need them.

In our fractious world, we seem to face new and especially daunting challenges that make science seem like a force for division rather than unity. Yet it should not be so. For so many thousands of generations, creative adaptation and cultural exchange have gone hand in hand in our human story.

SESAME follows in that tradition and the Jordan Museum, of which I have the honour to be Vice-Chairman, reminds us of what we must strive to do for our families and our communities. We occupy our space on this planet for such a short period. What we build and what we leave behind will create our legacy. Our lives and legacies must deserve space in our descendants' halls of history and so we must show them that we were worthy of our human gift of innovation.

Ladies and Gentlemen: I am delighted to celebrate with you this vital anniversary for the IAEA. I am proud to be a partner with you through my own organisation, the Royal Scientific Society. We greatly value our friendship with you and we share deeply your commitment to science for peace and prosperity. This year, we celebrate a wonderful year for Science in Jordan, and the region, as we are privileged to host World Science Forum 2017 at the Dead Sea in November. Indeed, our theme could not be more agreeable to the mission of the IAEA – We will convene under the banner of 'Science for Peace'.

I firmly believe that the practice and policy of Science have never been more vital to our regional and global conversations. In Jordan, we are making that conversation central to all our national debates. We look forward to welcoming many of you to World Science Forum 2017, and to learning from the great work that so many of you do for science and for peace. We wish you every success in the future and assure you that we are your partners on this path to balanced and durable progress.

APPENDIX IV

Conference programme

Tuesday, 30 May 2017	
9:30–11:00	**Opening session**
11:00–12:30	**Session 1: The evolving IAEA Technical Cooperation Programme (TCP)**
12:30–14:00	**Lunch**
14:00–17:30	**Session 2: The IAEA TC programme: Contributing to Member States' national development**
14:00–15:00	Session 2.1: Human health and nutrition
15:00–16:00	Session 2.2: Food security
16:00–16:30	Coffee break
16:30–17:30	Session 2.3: Clean water and environment
Wednesday, 31 May 2017	
09:30–12:30	**Session 2 (continued): The IAEA TC programme: Contributing to Member States' national development**
09:30–10:20	Session 2.4: Innovative solutions in industry
10:20–11:10	Session 2.5: Energy planning and nuclear power infrastructure
11:10–11:30	Coffee break
11:30–12:30	Session 2.6: Radiation and nuclear safety infrastructure
12:30–14:00	**Lunch**
14:00–17:30	**Session 3: Taking a regional approach: Cooperation to address common development issues**
14:05–14:45	Example from Latin America and the Caribbean
14:45–15:30	Example from Africa
15:30–15:50	Coffee break
15:50–16:30	Example from Europe

16:30–17:10	Example from Asia and the Pacific
17:10–17:30	Addressing global issues through interregional cooperation

Thursday, 1 June 2017

09:30–11:00	**Session 4: Global partnership for sustainable development**
11:00–11:20	**Coffee break**
11:20–12:30	**Session 4 (continued): Global partnership for sustainable development**
12:30–14:00	**Lunch**
14:00–15:00	**Session 5: Beyond the horizon: paving the way to the future**
15:00–15:20	**Coffee break**
15:20–16:30	**Session 5 (continued): Beyond the horizon: paving the way to the future**
16:30–17:00	**Closing session**

APPENDIX V

List of Speakers and Panellists

Opening session

Mr Yukiya Amano, Director General, IAEA

His Excellency Mr Tabaré Vázquez, President, Eastern Republic of Uruguay

Her Excellency Ms Ameenah Gurib-Fakim, President, Republic of Mauritius

Her Excellency Sheikh Hasina, Hon'ble Prime Minister, Government of the People's Republic of Bangladesh

His Excellency Tebogo Joseph Seokolo, Chairman of the IAEA Board of Governors

Session 1: The evolving IAEA Technical Cooperation Programme

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

HE Mr Igor Crnadak, Minister, Ministry of Foreign Affairs, Bosnia and Herzegovina

Mr Yongde Liu, Secretary General, China Atomic Energy Authority (CAEA), China

HE Ms Elba Rosa Pérez Montoya, Minister, Ministry of Science, Technology and Environment, Cuba

HE Mr Mohamed Hamed Shaker El-Markabi, Minister, Ministry of Electricity and Renewable Energy, Egypt

HE Mr Mohammad Nasir, Minister of Research, Technology and Higher Education, Indonesia

Session 2 The IAEA TC programme: Contributing to Member States' national development

Session 2.1: Human health and nutrition

Speakers:

Ms May Abdel Wahab, Director, Division of Human Health, Department of Nuclear Sciences and Applications, IAEA

Mr Eduard Gershkevitsh, Head, Medical Physics Service Radiotherapy Centre, North Estonia Medical Centre, Estonia

Mr Abdul Jalil Nordin, Dean, Faculty of Medicine and Health Sciences, Putra University Malaysia (UPM), Malaysia

Ms Susana M. Petrick, President, Peruvian Institute of Nuclear Energy, Peru

Ms Wade Salimata, Former Director, Nutrition Laboratory, Cheikh Anta Diop University (UCAD), Senegal

Panellists:

HE Mr Alassane Seidou, Minister, Ministry of Health, Benin

Mr Jun Hatazawa, President, Asia and Oceania Federation of Nuclear Medicine and Biology, Professor at Osaka University, Japan

Mr Noël Marie Zagre, Regional Nutrition Adviser, UNICEF Regional Office for West and Central Africa

Mr Pablo Jiménez, Regional Advisor on Radiological Health, World Health Organization (WHO)/Pan American Health Organization (PAHO)

Session 2.2: Food security

Speakers:

Mr Qu Liang, Director, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Department of Nuclear Sciences and Applications, IAEA

Mr Mirza Mofazzal Islam, Chief Scientific Officer and Head, Plant Breeding Division, Bangladesh Institute of Nuclear Agriculture, Bangladesh

Mr Pascal Houngnandan, Vice Rector, National University of Agriculture (UNA), Benin

Mr Oscar Antonio Zelaya Estradé, Executive Director, MOSCAMED Programme, Guatemala

Mr Yussuf Haji Khamis, Director, Department of Livestock Development, Ministry of Agriculture, Natural Resources, Livestock and Fisheries, Zanzibar, United Republic of Tanzania

Panellists:

Mr Thierry Lefrancois, Director, Joint Research Unit on Animal Health, International Cooperation Centre of Agricultural Research for Development (CIRAD), France

Mr Kauser Malik, Former Chairman, Pakistan Agricultural Research Council, Pakistan

Ms Rebecca Bech, Associate Deputy Administrator, United States Department of Agriculture, United States of America

Ms Ismahane Elouafi, Director General, International Center for Biosaline Agriculture (ICBA)Session 2.3: Clean water and environment

Speakers:

Mr David Osborn, Director, IAEA Environment Laboratories, Department of Nuclear Sciences and Applications, IAEA

Mr Héctor Mario Herrera Parra, Specialist in Environmental Sciences, Regional Autonomous Corporation of Sucre, Colombia

Mr Hamid Marah, Scientific Director, National Centre for Nuclear Energy, Sciences and Technology (CNESTEN), Morocco

Ms Elvira Z. Sombrito, Former Chemistry Section Head, Philippine Nuclear Research Institute, Philippines

Ms Elena Finaeva, Scientist, Institute of Water Problems, Hydropower Engineering and Ecology, Academy of Sciences of the Republic of Tajikistan, Tajikistan

Panellists:

Ms Muhayatun Santoso, Senior Researcher, Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency (BATAN), Indonesia

Mr John Ramsdell, Chief, Harmful Algal Bloom Research and Analytical Response Branch, National Oceanic and Atmospheric Administration (NOAA), United States of America

Mr Harald Egerer, Head, UNEP Vienna Office, Secretariat of the Carpathian Convention, United Nation Environment Programme (UNEP)

Mr Henrik Enevoldsen, Head, Science and Communication Centre on Harmful Algae, Intergovernmental Oceanographic Commission (IOC), United Nations Educational, Scientific and Cultural Organization (UNESCO)

Session 2.4: Innovative solutions in industry

Speakers:

Ms Meera Venkatesh, Director, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications, IAEA

Mr Jair Mengatti, Director, Radiopharmacy Center, Nuclear and Energy Research Institute (IPEN), Brazil

Mr David Ekoume, Director General, HYDRAC S.A., Cameroon

Mr Shijun He, Vice Director, Department of Environmental Application, Institute of Nuclear and New Energy Technology (INET), China

Mr Andrzej G. Chmielewski, Director General, Institute of Nuclear Chemistry and Technology (INCT), Poland

Panellists:

Mr Gilles Bignan, Head, User Facility Manager, The Jules Horovitz Research Reactor, French Alternative Energies and Atomic Energy Commission, France

Mr. Gautam Kumar Dey, Director, Materials Group, Bhabha Atomic Research Centre, India

Mr Tak Hyun Kim, Principal Researcher, Research Division for Industry and Environment, Advanced Radiation Technology Institute (ARTI), Korea Atomic Energy Research Institute (KAERI), Republic of Korea

Mr Robin Grimes, Chief Scientific Adviser, Foreign and Commonwealth Office, United Kingdom

Session 2.5: Energy planning and nuclear power infrastructure

Speakers:

Mr Irej Jalal, Head, Planning and Capacity Building Unit, Department of Nuclear Energy, IAEA

Mr Milko Kovachev, Head, Nuclear Infrastructure Development Section, Department of Nuclear Energy, IAEA

Mr Osvaldo Calzetta Larrieu, President, National Atomic Energy Commission (CNEA), Argentina

Mr Aleksei Raiman, Senior Counsellor, Permanent Mission of the Republic of Belarus to the IAEA, Belarus

Mr Phumzile Tshelane, Chief Executive Officer, South African Nuclear Energy Corporation (Necsa), South Africa

HE Mr Hamad Al-Kaabi, Resident Representative, Permanent Mission of the United Arab Emirates to the IAEA, United Arab Emirates

Panellists:

Mr Donato Marcos, Undersecretary, Department of Energy, Philippines

HE Mr Shi Zhongjun, Resident Representative, Permanent Mission of the People's Republic of China to the IAEA, China

Mr Khaled Toukan, Chairman, Jordan Atomic Energy Commission (JAEC), Jordan

Mr Andràs Molnar, Advisor to the Director General, Hungarian Atomic Energy Authority (HAEA), Hungary

Mr Joseph K. Njoroge, Principal Secretary, Ministry of Energy and Petroleum, Kenya

Session 2.6: Radiation and nuclear safety infrastructure

Speakers:

Mr Peter Johnston, Director, Division of Radiation, Transport and Waste Safety, Department of Nuclear Safety and Security, IAEA

HE Mr César Cardozo, Minister, Radiological and Nuclear Regulatory Authority (ARRN), Paraguay

Ms Indah Annisa, Head, International Cooperation, Nuclear Energy Regulatory Agency (BAPETEN), Indonesia

Mr Khammar Mrabit, Director General, Moroccan Nuclear and Radiation Safety and Security Agency (AMSSNuR), Morocco

Mr Shamsideen B. Elegba, Former Director General, Nigerian Nuclear Regulatory Authority, Nigeria

Mr Horia Grama, President, Nuclear and Radioactive Waste Agency (ANDR), Romania

Panellists:

Mr Emi Reynolds, Director General, Nuclear Regulatory Authority, Ghana

Ms Nanthavan Ya-anant, Head, Radioactive Waste Management Section, Thailand Institute of Nuclear Technology (TINT), Thailand

Mr Jack Ramsey, Senior Advisor, Office of International Programs, Nuclear Regulatory Commission (NRC), United States of America

Mr Vince Novak, Director, Nuclear Safety Department, European Bank for Reconstruction and Development (EBRD)

Mr Pablo Jiménez, Regional Advisor on Radiological Health, WHO/PAHO

Session 3: Taking a regional approach: Cooperation to address common development issues

Speaker: Mr Luis Carlos Longoria Gandara, Director, Division for Latin America and the Caribbean, Department of Technical Cooperation, IAEA

Example from Latin America and the Caribbean

Speaker: Ms Margareth Capurro Guimarães, Associate Professor, University of São Paulo, Brazil

Panellists:

HE Mr José Antonio Galdames, Minister, Ministry of Energy, Natural Resources, Environment and Mines, Honduras

HE Mr Marcel Fortuna Biato, Resident Representative, Permanent Mission of Brazil to the IAEA, Chair of the ARCAL Agreement, Brazil

Mr Patricio Aguilera Poblete, Executive Director, Chilean Nuclear Energy Commission (CCHEN), Chile

Ms Hillary Alexander, Permanent Secretary, Ministry of Science, Energy and Technology, Jamaica

Ms Lydia Paredes-Gutiérrez, Director General, National Institute for Nuclear Research (ININ), Mexico

Example from Africa

Speaker: Mr Callist Tindimugaya, Head, Department of Water Resource Planning and Regulation, Ministry of Water and Environment, Uganda

Panellists:

Mr Abdelouahab Smati, Director, Mobilization of Water Resources, Ministry of Water Resources and Environment, Algeria

Mr Atef Abdel-Hameed Abdel-Fattah El-Kadime, Chairman, Egyptian Atomic Energy Authority (EAEA), Chair of the AFRA Agreement, Egypt

Mr Shiloh Dedeh Osae, Deputy Director-General, Ghana Atomic Energy Commission, Ghana

Mr Cheikh Gaye, Retired Professor of Hydrogeology, Cheikh Anta Diop University (UCAD), Senegal

Mr Abdel Kader Dodo, Head, Water Department, Sahara and Sahel Observatory (OSS), Tunisia

Example from Europe

Speaker: Mr Iossif M. Bogdevitch, Expert, Belarusian Research Institute for Soil Science and Agrochemistry (BRISSA), Belarus

Panellists:

Mr Mikhail Balonov, Head, Protection Laboratory, Scientific Research Institute of Radiation Hygiene, Russian Federation

Mr Bakhtiyor Gulyamov, State Inspectorate “Sanoatgeokontexnazorat” under the Cabinet of Ministers (SGKTN), Uzbekistan

Mr Valerii Kashparov, Director, Ukrainian Institute of Agricultural Radiology (UIAR), Ukraine

Mr Vince Novak, Director, Nuclear Safety Department, European Bank for Reconstruction and Development (EBRD)

Example from Asia and the Pacific

Speaker: Ms Muhayatun Santoso, Senior Researcher, Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency (BATAN) Indonesia

Panellists:

Mr Mark Alexander, International Affairs Manager, Nuclear Security, Government and International Affairs, Australian Nuclear Science and Technology Organisation (ANSTO), Australia

Mr Jafar Sadique, Chief Engineer and Director, Engineering Division, Bangladesh Atomic Energy Commission (BAEC), Chair of the RCA Agreement, Bangladesh

Mr Bilal Nsouli, General Director, Lebanese Atomic Energy Commission (LAEC), Chair of the ARASIA Agreement, Lebanon

Mr Hai Joo Moon, Director, RCA Regional Office (RCARO), Republic of Korea

Ms Ismahane Elouafi , Director General, International Center for Biosaline Agriculture (ICBA), United Arab Emirates

Addressing global issues through interregional cooperation

Speaker: Mr Khaled Toukan, Chairman, Jordan Atomic Energy Commission (JAEC), Jordan

Panellists:

Mr Jean-Pierre Koutchouk, Senior Accelerator Scientist, Honorary Member of the European Organization for Nuclear Research (CERN)

Ms Clarissa Formosa Gauci, Secretary of the SESAME Council, United Nations Educational, Scientific and Cultural Organization (UNESCO)

Session 4: Global partnership for sustainable development

Speakers:

Ms Ana Raffo-Caiado, Director, Division of Programme Support and Coordination, Department of Technical Cooperation, IAEA

Ms Nelly Enwerem-Bromson, Director, Division of Programme of Action for Cancer Therapy, Department of Technical Cooperation, IAEA

Mr Karim Tounkara, Regional Representative for Africa, World Organisation for Animal Health (OIE)

Mr Philippe Scholtès, Managing Director, Programme Development and Technical Cooperation, United Nations Industrial Development Organization (UNIDO)

Panellists:

HE Mr Didier Lenoir, Ambassador, European Union

HE Mr Jean-Louis Falconi, Resident Representative, Permanent Mission of France to the IAEA, France

Mr Takeshi Nakane, Special Assistant to the Minister for Foreign Affairs, Ministry of Foreign Affairs, Japan

Mr Xiaodong Liu, Vice President, East China Institute of Technology, China

Mr Vladimir P. Kuchinov, Advisor to the Director General, State Atomic Energy Corporation "Rosatom", Russian Federation

Mr Andrew Schofer, Chargé d'affaires a.i., Permanent Mission of the United States of America to the IAEA, United States of America

Mr Walid Mehalaine, Head, Grants and Technical Assistance Unit, Public Sector Operations Department, OPEC Fund for International Development (OFID)

Keynote speaker:

Mr Paul Ladd, Director, United Nations Research Institute for Social Development (UNRISD)

Speakers:

Mr Suresh D. Pillai, Director, National Center for Electron Beam Research, Texas A&M University, United States of America

Mr Zulkafl i Ghazali, Director, Radiation Processing Technology Division, Malaysian Nuclear Agency, Malaysia Mr Chang Choy Chan, Chief Executive Officer, Wonderful Ebeam Cable, Malaysia

Mr Ilham Akbar, Founding Manager, Salewangang Rice Seed Breeding Company, Indonesia

Panellists:

Mr Kaname Kanai, Executive Technical Advisor, Human Development Department, Japan International Cooperation Agency (JICA), Japan

Ms Dineo Mathlako, Director, African Renaissance and International Cooperation Fund (ARF), South Africa

Ms Samjhana Shrestha, Senior Economist, Environment, Natural Resources, and Agriculture Division, Asian Development Bank (ADB)

Mr Carl James Hospedales, Executive Director, Caribbean Public Health Agency (CARPHA)

Mr Abdul-Hakim Elwaer, Director, Cooperation and Integration Department, Islamic Development Bank (IDB)

Mr S.M. Ziauddin Hyder, Senior Nutrition Specialist, World Bank

Session 5: Beyond the horizon: paving the way to the future

Keynote speaker:

Mr Paul Ladd, Director, United Nations Research Institute for Social Development (UNRISD)

Panellists:

HE Mr Mary Teuw Niane, Minister, Ministry of Higher Education and Research, Senegal

Mr Andreas Richter, Professor, Department of Microbiology and Ecosystem Science, University of Vienna, Austria

Mr Benoît Martimort-Asso, Head, International Affairs unit, Institute of Research for Development (IRD), France

Mr Charles Abechi Oko, First Secretary, Permanent Mission of Nigeria to the IAEA, Nigeria

Mr Cameron Diver, Deputy Director-General, Secretariat of the Pacific Community (SPC)

Mr Aldo Malavasi, Deputy Director, Head of the Department of Nuclear Sciences and Applications, IAEA

HE Ms Elba Rosa Pérez Montoya, Minister, Ministry of Science, Technology and the Environment, Cuba

HE Mr Seremaia Matai Nawalu, Minister, Ministry of Agriculture, Fisheries, Livestock and Forestry, Vanuatu

Mr Shantanu Mukherjee, Chief, Policy and Analysis Branch, Division for Sustainable Development, United Nations Department of Economic and Social Affairs (UNDESA)

Mr Juan Carlos Lentijo, Deputy Director General, Head of the Department of Nuclear Safety and Security, IAEA

Mr Dazhu Yang, Deputy Director General, Head of the Department of Technical Cooperation, IAEA

Closing session

Keynote speakers:

HRH Princess Sumaya bint El Hassan, President, Royal Scientific Society, Jordan

Mr Dazhu Yang, Deputy Director General, Head of the Department of Technical Cooperation, IAEA

Annex (Attached CD-ROM)

CONFERENCE MATERIALS

List of participants

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Slideshow of conference photographs

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