



Special Guest Articles

Pakistan and the IAEA - A Mutually Beneficial Partnership

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Pakistan embarked on its quest to harness nuclear technology for peaceful uses around the same time the International Atomic Energy Agency (IAEA) was founded in 1957. The IAEA's mandate - to accelerate and enlarge the contribution of atomic energy for peace, health and prosperity throughout the world - held great promise for countries like Pakistan which had newly won their independence and were coming to grips with daunting developmental challenges. It was not surprising, therefore, that Pakistan was among the founding members of the Agency.

Starting out with exploratory baby steps on its nuclear journey in those early days, Pakistan today is a country with the entire range of nuclear fuel cycle, six operational nuclear power plants, and an extensive programme for the application of nuclear technology in agriculture, health, industry, water resource management and the environment. Its highly developed and multifaceted civilian nuclear programme, undergirded by an effective and elaborate institutional and regulatory infrastructure, is contributing to the country's socio-economic progress.

Pakistan's close cooperation with the IAEA has played a crucial role in the making of this success story.

IAEA's Technical Cooperation Programme and Pakistan's Achievements

The IAEA's technical cooperation (TC) programme serves as the main vehicle for the capacity building of interested countries in terms of infrastructure and human resource development. Pakistan has been one of the major beneficiaries of this mechanism with its national TC programme among the largest being implemented by the Agency. This has been possible due to the technically sound project proposals submitted by Pakistan, which align closely with the Agency's strategy, and their effective implementation through close collaboration between the Agency personnel and their Pakistani counterparts.

At present, three comprehensive and broad-ranging technical cooperation projects in the areas of food and agriculture, human health and nuclear power development are under implementation. Pakistan is also an active participant in several IAEA regional and Coordinated Research Projects. Thanks to this robust cooperation, Pakistan has been able to significantly extend the benefits of nuclear technology to its population and economy. Currently, the Pakistan Atomic Energy Commission (PAEC) is running 19 cancer hospitals which cater to 80 % of the cancer case-load in the country using the cutting-edge approaches like gamma CT, LINAC, Cyberknife and Theranostics.

In the agriculture sector, Pakistan's four agricultural research institutes have developed over 150 high-yield and extreme-weather resilient crop varieties through mutation breeding relying on nuclear techniques. These successes have been particularly remarkable with respect to cotton which is one of Pakistan's major cash crops and of vital importance to the country's textiles export sector. Using nuclear techniques, the first cotton variety was released in Pakistan in 1983 which led to the doubling of cotton production from 4.84 million bales to 9.63 million bales within ten years. Since then, a total of 39 cotton varieties have been developed. Most recently, the PAEC has developed a cotton variety that is naturally coloured. This breakthrough holds immense potential to

boost the country's textile industry which remains the major employer. Similarly, nuclear techniques are also being employed to enhance food security and food safety. This will also be useful in helping Pakistan's fruit and dairy exporters meet the international phytosanitary standards. Nuclear techniques are being used to shift towards Climate Smart Agriculture practices which minimize optimizing fertilizer use and maintaining soil health. Animal husbandry is also a major area of focus with the establishment of a specialized Animal Disease Diagnostic and Vaccine Development Laboratories at the Nuclear Institute for Agriculture and Biology in Faisalabad.

Yet another area of importance is the use of Isotope Hydrology in managing the country's water resources. Pakistan Institute of Nuclear Science and Technology (PINSTECH) has established a state-of-the-art Isotope Hydrology Laboratory in collaboration with the IAEA.

The contribution of nuclear techniques is equally significant in the industrial sector where the use of radiotracers and sealed source applications is on the rise. Pakistan's National Centre for Non-Destructive Testing (NCNDT), established in collaboration with the IAEA is providing immense benefits to different industries including oil and gas, power generation, petro-chemicals and manufacturing.

Pakistan prides itself on its decades' long experience of operating safe, secure and fully safeguarded nuclear power programme. Currently, we have 6 operational nuclear power plants with an aggregate capacity of 3,530 MW and work has begun on the construction of another nuclear power plant - Chashma Unit 5 – with 1200 MW capacity. Pakistan has benefitted greatly from the Agency's assistance in the safe and secure operation of its nuclear power plants which have played a critical role in diversifying the country's energy mix and reducing its dependence on imported fossil fuels. The Agency's Safety Standards and Security Guidance documents have served as a reference point for Pakistan to put in place a robust national regulatory framework for its nuclear power programme. It merits mention here that, unlike another country in the region, all of Pakistan's civilian nuclear facilities are under IAEA Safeguards.

Overall, nuclear technology is making a sterling contribution towards achievement of the UN Sustainable Development Goals (SDGs) in Pakistan.

Pakistan's Contribution to the Agency's Work

Pakistan has not merely been a passive recipient of the Agency's assistance. The relationship between Pakistan and the Agency has truly been mutually beneficial as Pakistan also enables and contributes to the Agency's work across different fields. Pakistani experts have served in different positions in the IAEA Secretariat over the years, including as safeguards inspectors. It also provides experts who serve on the Agency's many advisory and review missions to its Member States as well as different committees which develop safety standards. Following are some of the most recent examples of how the collaboration between Pakistan and the IAEA is a two-way street:

- Three of Pakistan's institutes presently have the status of **IAEA Collaborating Centres** which support the Agency's activities in promoting research, development and capacity building through the implementation of an agreed Work Plan. These include: (i) Pakistan Institute of Engineering and Applied Sciences (PIEAS); (ii) Pakistan's National Institute of Safety and Security (NISAS); (iii) and Nuclear Institute for Agriculture and Biology (NIAB).
- NIAB is also part of the worldwide network of laboratories under the Agency's **Zoonotic Disease Integrated Action (ZODIAC)** initiative. Established in June 2020, the ZODIAC initiative is aimed at the detection and prevention of zoonotic disease pandemics, such as the COVID-19, which originate in animals and can be transmitted to humans
- Pakistan's Nuclear Medicine, Oncology, and Radiotherapy Institute (NORI) has been designated as an 'Anchor Center' under the IAEA's '**Rays of Hope: Cancer Care for All**' initiative. This initiative seeks to support countries in the diagnosis and treatment of cancer using radiation medicine while relying on the available capacity and expertise in its Member States.
- **Pakistan's Centre of Excellence for Nuclear Security (PCENS)** at Chakri near Islamabad has emerged as a hub for nuclear security related training in the region. It has hosted several regional and international IAEA workshops and trainings. It will also work closely with the Agency's newly established Nuclear Training and Demonstration Centre at Seibersdorf in Austria.
- Pakistan has concluded two **Practical Arrangements with the IAEA** to exchange and disseminate information and sharing of experiences with other member states under the umbrella of IAEA in the areas of food and agriculture, nuclear medicine, radiation oncology, medical physics, radioisotope applications, industry and nuclear education.
- Pakistan is participating in **the Agency's Marie Sklodowska-Curie Fellowship Programme (MSCFP)** which is aimed at enhancing the participation of women in the nuclear field. As part of this project, female students are pursuing degree programmes at the Pakistan Institute of Engineering and Applied Sciences (PIEAS).

Pakistan's Role at the IAEA Policy Making Organs

IAEA's policy making organs – Board of Governors and the General Conference – determine its policy and oversee its work in order to ensure the effective implementation of its mandate. As such, they also exercise significant influence on the evolution of the normative framework governing the access to nuclear technology and applications, including in the areas of nuclear safeguards, nuclear safety and nuclear security.

Given its unique position, Pakistan has a significant interest in and has been an active participant in the work of the IAEA's policy making organs. It has a regular pattern of representation on the 35-member Board of Governors as a nominee from the Middle East and South Asia region which is a reflection of the important voice it carries as a developing country with a sizeable civilian nuclear programme.

Pakistan has consistently used its presence on the Board of Governors to further strengthen the Agency's role in the promotion of peaceful uses of nuclear technology on non-discriminatory basis and to ensure that the Agency's assistance effectively responds to the specific needs and national priorities of developing countries. Pakistan attaches great importance to preserving the IAEA's character as a technical body with a well-defined mandate and guarding against its 'politicization' which remains a significant risk in the prevailing challenging geopolitical context. These priorities also guide Pakistan's engagement on different resolution which are adopted by the General Conference at its annual regular session and are seen as the most authoritative policy pronouncements of the IAEA member states on the subjects of nuclear safety, security, safeguards and technical cooperation.

Championing the Cause of the Developing Countries

Pakistan has a proud tradition of championing the collective interests of the developing countries at the UN and other multilateral fora. The IAEA is no exception. Pakistan has always supported the call for striking a balance between the so-called 'promotional' and 'non-promotional' activities of the Agency and a corresponding allocation of resources. It has been a longstanding concern of the developing countries that the Agency's 'watchdog' role – nuclear verification and safeguards – tends to overshadow its 'promotional' role and responsibility in facilitating technology transfer and capacity building which would be more attuned to their needs and priorities. Accordingly, they also want to see more resources allocated to the Agency's Technical Cooperation Programme. Pakistan fully supports this approach. Enhancing the representation of developing countries in the IAEA staff is another important goal which Pakistan shares with other developing countries.

In the pursuit of these objectives, Pakistan has traditionally been a very active member of the Vienna Chapter of the Group of 77 & China, a cross-regional group of developing countries that strives to take common negotiating positions across the UN system to protect and promote the interests of the developing world. It is a reflection of Pakistan's commitment to the collective interests of the developing countries – as well as their confidence in Pakistan's leadership – that it is the current Chair of the Group's Vienna Chapter. Pakistan has also led the Group's Task Force on IAEA matters in the past years.

Way Forward

Pakistan's longstanding, successful and mutually beneficial cooperation with the IAEA was on full display during the recent visit of the Director General Rafael Mariano Grossi. The Director General visited several peaceful nuclear facilities across the country and held

meetings with the top leadership. This was the third visit of an IAEA Director General to Pakistan in the last decade.

In the coming years, Pakistan's energy needs are set to expand as it pursues economic growth and seeks to create job opportunities for a burgeoning youthful population. It is also among the most vulnerable countries to climate change as brought painfully home by the last year's devastating floods. Mitigating and adapting to climate change, enhancing industrial and agricultural productivity, ensuring food and water security, and providing quality healthcare to its populace are the inter-related challenges facing Pakistan. Peaceful applications of nuclear science and technology will have an important role to play in tackling all of them. Pakistan's relationship with the IAEA, therefore, will continue to gain in importance. Pakistan's technical and diplomatic engagement with the IAEA will be of critical importance to ensure that we continue to reap the benefits of this successful six decades old partnership.
