**Achieving sustainable development goals with nuclear technology**

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In 2015, 195 nations agreed under the UN to set out 17 sustainable development goals to be achieved by 2030. If achieved, it would have a lasting impact on the reduction of poverty and making health and education more accessible in the less developed countries. All the countries agreed to adopt these goals that would improve the lives of their citizens through Agenda 2030. These countries have to work devotedly to achieve the goals as there is no plan B.

Global challenges have become more complex after the Covid-19 outbreak. Working for SDGs was being done by many countries before the pandemic, but after it, the targets are disturbed and seem difficult to achieve by 2030. In 2015, the Pakistan Planning Commission incorporated these SDGs in its national economic planning. The action plans will play a fundamental role by translating these SDGs into workable actions. In Pakistan, incorporating the use of nuclear technology (N-tech) has played a significant role in achieving SDGs. It is good to remind ourselves that N-energy has also been used for the betterment of Pakistanis, and not only for making weapons.

[Gov't will resolve power outage issue in coming 2 days: Hammad Azhar](https://nation.com.pk/10-Jun-2021/gov-t-will-resolve-power-outage-issue-in-coming-2-days-hammad-azhar)

It was recognised that SDGs can be more easily achieved by involving science and scientific communities and adopting innovative techs such as N-tech. N-tech is guided by IAEA internationally and PAEC nationally, which ensures that it is safe for use.

Pakistan is one of the largest recipients of IAEA’s technical and financial help. It has achieved considerable expertise in the application of N-tech for peaceful purposes and is also using N-tech in achieving 9 of 17 SDGs, which are: Eradication of Hunger and Malnutrition, Provision of Good Health and Well-Being, Access to Clean Water and Sanitation Facilities, Provision of Affordable and Clean Energy, Increase Industry Innovation and Infrastructure, Mitigation of Climate Change, Sustain Life Below Water, Sustain Life on Land, and Strengthening Partnerships for achieving Sustainable Goals.

In 2050, the world population may grow to 9.7 billion, thus increasing our need for more food by 60 percent. Currently, about 842 million people remain hungry every day and about 1 billion are food insecure. There is a need to increase food production by 60 percent to meet global needs. FAO underscores that there is little additional land available to grow more food crops. It requires that we must produce new varieties of high-yielding, disease-resistant, drought and salt-tolerant crops.

[Rain, thunderstorm to hit different parts of country from Friday](https://nation.com.pk/09-Jun-2021/rain-thunderstorm-to-hit-different-parts-of-country-from-friday)

Three institutes working under PAEC are using N-techniques for high-yielding varieties. Until now they have developed about 115 new varieties of cash crops by radiation mutation, which cover about 35-40 percent of cultivable area, contributing 10 percent to crop productivity. But we need to meet the ever-rising future requirements. The radiation sterilisation technique such as male sterilisation is also used for insect pest management to protect crops such as sugarcane in Sindh. Pakistan is also developing mutant varieties rich in iron and zinc micronutrients. A commercial irradiation facility in Lahore is helping to increase the shelf life of perishable food items by removing harmful bacteria and insects. Pakistan is also using stable isotopes to monitor body composition, food intake and absorption of various nutrients to understand the problems of malnutrition.

People should be healthy so that they can work and support themselves and their families as well as contribute to the national economy. A healthy nation would be essential to achieve SDGs. Nuclear techniques are most important in cancer treatment and management of some other fatal diseases using nuclear medicine, radiation oncology, radiation treatment and radiation diagnosis modalities. The International Agency for Research in Cancer estimates that about 150 million people are suffering from cancer globally. Pakistan has about 30 cancer treatment facilities, whereas 10 out of these have either diagnostic or treatment facilities. These facilities are catering to 1,450,000 patients/year; PAEC and Shaukat Khanum Hospital are playing a key role in cancer treatment. In 2015, I suggested to the Planning Commission to establish a cancer control programme to achieve tertiary healthcare targets. The programme needs to be implemented in two phases and both phases should be implemented simultaneously. A very large number of cancer patients cannot be treated as they reach the hospital when the disease is already in an advanced stage. An early diagnosis would help the treatment and recovery of more patients. Allocation of funds for early diagnosis is very important. More importantly, cancer treatment facilities need to be doubled. We need diagnosis facilities after every 50 miles and treatment facilities after every 100 miles. Nuclear techniques are also in use in the precise diagnosis of cardiovascular disease, tuberculosis and many other infectious diseases. These are helping to detect and control outbreaks of animal diseases.

[Corona vaccination made mandatory for public, private sector staff](https://nation.com.pk/09-Jun-2021/covid-19-vaccination-for-public-private-sector-staff)

Water is essential for life. Pakistan is already placed among the water-stressed countries. The efficient use of water is important and groundwater management and conversation are needed. To achieve this goal Pakistan is utilising nuclear isotopic techniques for collecting information such as age, amount and quality of groundwater which is very useful in integrated management of water resources and water ecosystem. Nuclear tech is also being used to make water bacteria-free.

Producing sufficient energy at an affordable cost without emitting greenhouse gases is a very important SDG. The energy production choices will have huge consequences for health, economy and climate change. The world’s energy mix at present shows 65 percent fossil fuel, 16 percent hydropower, 13 percent nuclear power and 6-7 percent renewable energy. Besides hydel, renewable and nuclear are the clean sources of energy. The most important thing is that nuclear energy is an uninterrupted clean source of energy. Recognising the importance of nuclear energy, the first commercial nuclear power plant was connected to the grid in 1956 at Calder Hall, England. At present, 31 countries are operating about 449 N-plants for electricity generation, whereas about 67 are under construction in 16 countries. Pakistan recognised the importance of N-power and built its first commercial power plant in 1971, K-1 of 137MW at Karachi. Pakistan is producing about 6 percent of its energy mix by 5 N-plants, which is going to increase up to 12 percent this year after K-2 in May and K-3 in October 2021 start operation at Karachi. Nuclear power is the answer to Pakistan’s future development, safety and security. PAEC has already given a 40-year plan to the government of achieving a target of 8800 MW by 2030, and 40,000 MW by 2048. The target of affordable and clean energy can only be achieved through nuclear energy, by installing more N-power projects on a BOT basis.

[Ethiopia says no famine risk in restive Tigray region](https://nation.com.pk/09-Jun-2021/ethiopia-says-no-famine-risk-in-restive-tigray-region)

An excellent infrastructure and cutting-edge technologies are required to sustain and increase industrial growth. N-tech is contributing to achieving the indicators of this SDG by using Non-destructive X-ray techniques for quality testing of the products, such as welds, building and bridges and irradiation of wires, cable pipes and tyres to improve quality and durability. Irradiation is also used to remove bacteria from medical products, sterilising surgical instruments, and increasing the shelf life of food products such as onions, potatoes, spices and mangoes. Pakistan has done a lot of research and the first irradiator was established in 1987 at Lahore. At present two irradiators are working; one for single-use products and other for food products, whereas another electron beam sterilisation plant is coming up at Lahore. We should install two electron beam irradiators at Gwadar and one each at Gilgit and Karachi.

Temperature plays an important role in food production. Leading nuclear think tanks and research groups on “nuclear for climate” programmes in different countries agree that nuclear energy is the key in the fight against climate change. It is one of the reasons for considering an increase of N-power share in the energy mix. Pakistan has chalked out a programme to increase its nuclear energy production and help mitigate climate change.

[Sudan fully scraps fuel subsidies](https://nation.com.pk/09-Jun-2021/sudan-fully-scraps-fuel-subsidies)

Protecting sea life is a significant SDG as marine life is one of the biggest and cheapest sources of nutritious food. Marine life can be studied by using isotopic techniques.

Land erosion is the biggest problem being faced the world over. About 1.5m acres is under erosion affecting several countries’ economies. Many countries are contributing to help control this menace by using nuclear and isotopic techniques. N-techniques help to determine soil erosion rates. Based on these calculations remedial measures can be undertaken to restore soil, the ecosystem and biodiversity. IAEA is supporting many countries. Pakistan’s two research institutes are using these techniques in controlling the saline land which makes about 30 percent of the cropping area.

Pakistan’s challenge is to achieve SDGs for the prosperity of the country. Nuclear techniques have played an important role in making progress on many fronts for achieving these goals. Pakistan is lucky to have scientific know-how and trained manpower in the field. This should be further enhanced by IAEA’s support. Pakistan is already the highest recipient of financial and technical know-how from IAEA in Asia. There is a need to develop the political will to coherently move with the UN and IAEA for utilising nuclear techniques to achieve sustainable development goals in the country by 2030.