

Nuclear science & technology: towards the 2030 Agenda for sustainable development in Malaysia

By Mohd Abdul Wahab Yusof

Nuclear activities in Malaysia began in 1897, when X-rays were first introduced to a hospital in Taiping, Perak. From this humble beginning, nuclear technology in Malaysia evolved and flourished with the establishment of PUSPATI (later Nuklear Malaysia) in 1973. The field became more active and dynamic when the Reaktor TRIGA PUSPATI, our first research reactor, was commissioned in 1982.

The peaceful uses of nuclear technology have had a positive impact on the nation's socioeconomic development by improving quality of life, enhancing social wellbeing and contributing to the gross domestic product (GDP). Building on a previous study, we are currently working on quantifying the value-added contribution that nuclear technology makes to the country's overall GDP and economic growth.

Malaysia aims to transform and modernize the food and agriculture industry into a high-income and sustainable sector. These efforts will include ensuring food security, improving productivity and overcoming the impact of climate change on the sustainability of agricultural practices. We are exploring the use of precision agriculture in managing and responding to various factors, such as weather patterns, soil condition and temperature. Developed using nuclear techniques, a new rice variety called NMR152 has been found to mitigate the effects of climate change by its ability to withstand periods of drought and flooding. The Gamma Greenhouse, which is the only facility for chronic mutagenesis activities in South-East Asia, can further support developments in climate-smart agriculture.

Industrial testing using nuclear technology has also contributed to the competitiveness of Malaysia's manufacturing sector by establishing an export niche in South-East Asia, offering non-destructive testing to manufacturers in neighbouring countries. Similarly, the field of radiation processing has produced numerous new materials and

composites with desirable characteristics for the manufacture of, among others, medical devices, cables and biodegradable plastics. Currently, Nuklear Malaysia is collaborating with PROTON, a car manufacturer, to produce and test a radiation-induced cable insulation material, which can withstand high temperatures to enhance car safety. The designation of Nuklear Malaysia as an IAEA Collaborating Centre in the area of non-destructive testing and radiation processing is a recognition of Malaysia's achievements in these fields, as well as of the close and valuable cooperation between Malaysia and the IAEA in various activities in the region, including research, development and training.

Malaysia remains committed to achieving universal access to quality healthcare by strengthening efforts towards improving healthcare services, particularly in areas where radiation is used in medicine, such as radiology, radiotherapy and nuclear medicine. We will continue to promote and improve the use of radiation in medicine for social wellbeing. Nuclear techniques are critical for the early detection, diagnosis, treatment and care of cancer. The field of radiation medicine in Malaysia has expanded greatly since the 19th century, culminating in the establishment of the first cyclotron and positron emission tomography/computed tomography (PET/CT) facility in 2006, which marked the first step in the creation of the National Cancer Institute. Currently, more than 20 hospitals in Malaysia use nuclear technology in diagnosis or treatment.

For Malaysia to be continuously relevant among other countries in nuclear technology, we need to follow technology trends such as Industry 4.0, the Internet of Things, and national and international agendas, such as the 2030 Agenda and the Sustainable Development Goals. Sustainable development has been at the heart of Malaysia's developmental approach since the 1970s, with an emphasis on eradicating poverty, improving the wellbeing of the



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people, providing universal access to education and caring for the environment. The 2030 Agenda, in the Malaysian context, is a mirror of our New Economic Model and the 11th Malaysia Plan.

So, what do we have to look forward to? In the future, fusion between nuclear and other technologies will be more widespread. I am convinced that nuclear technology will continue to expand, particularly through its convergence with emerging technologies, such as nanotechnology, biotechnology and information and communication technology. This is important for us, especially when faced with challenges such as technology acquisition, which may become more prominent in time and which may ensure further development and economic competitiveness, so that Malaysia can

become a fully industrialized and high-income nation.

As part of our preparation to face future challenges, localization and development of home grown technology needs to be enhanced, so that products and services of the future are adaptive to current demands. Undoubtedly, nuclear science and technology have contributed to the nation's socioeconomic development by generating employment, creating opportunities for new businesses, enhancing human capital development and improving the quality of healthcare services. Its use has exposed Malaysia to advanced technology, leading to better products and service quality, and enhanced diagnosis and therapeutic capabilities in medicine, and it provides the agriculture sector with the means to produce new and better cultivars.



Malaysian scientists use nuclear techniques to breed new plants with desirable traits such as humidity tolerance and higher yields.

(Photo: M. Gaspar/IAEA)