$600k OPEC-fund grant to promote use of nuclear techniques for improved food security and sustainable agriculture

Improved farming practices, healthier animals and – ultimately – increased food security will be the outcomes of projects supported by a US$ 600 000 grant by the Organization of Petroleum Exporting Countries (OPEC) Fund for International Development (OFID) under a partnership with the IAEA signed last December.

The work will promote the use of nuclear techniques towards best agricultural practices, and will benefit many people, including poor farmers, in developing countries in Asia.

The projects tie in with Sustainable Development Goal 2 "Zero Hunger", emphasized OFID Director-General Suleiman J Al-Herbish at the signature of the agreement at OFID headquarters in Vienna.

"The two projects will improve food security, and ultimately social and economic growth – two essential elements of the United Nations Agenda 2030 for Sustainable Development, which OFID has committed to wholeheartedly," Al-Herbish said. "We are pleased to be working with the IAEA in support of agriculture in Asia."

Producing more rice

US$ 400 000 will be used to help farmers grow rice that can cope with the effects of climate change in Bangladesh, Cambodia, Lao PDR and Nepal. Countries in Asia, which produce 90% of the world's rice, have seen fluctuating yields in recent years due to rising temperatures that bring plant diseases and insect pests, extreme floods and droughts as well as a rise in sea levels leading to increased soil salinity and lower soil fertility in coastal areas. By using nuclear and isotopic techniques, scientists can help farmers improve water management practices and optimize the use of fertilizer for best yields at the lowest cost.

The increased productivity from these improved practices is expected to lead to higher volumes of high-quality, affordable rice, increasing the food security of the rural population in target countries. The improved technologies will also help reduce greenhouse gas emissions from rice production.

Fighting animal diseases

The other US$ 200 000 will go towards the application of nuclear-related techniques for the diagnosis of foot-and-mouth disease and other diseases impacting cattle in Cambodia, Lao PDR, Myanmar and Vietnam. Many animal diseases are highly contagious and can spread extremely quickly within a country and across borders, hindering trade and, in some cases, affecting public health. Early and rapid detection of the pathogen is key to halting the spread of these diseases. Nuclear-related techniques are used in the development of testing kits for the diagnosis of such diseases. While conventional methods can detect the viruses, they take a long time and cannot determine their behaviour or genetic character – which is required for a rapid response.

Under the grant, the IAEA, in cooperation with the Food and Agriculture Organization of the United Nations (FAO), will train veterinarians from the four countries in the diagnosis and control of the diseases. The project will ultimately benefit livestock farmers and increase cattle production.

Since 1989, OFID has extended 12 grants totalling US$ 2.4 million to the IAEA in support of health and agricultural projects in Africa, Asia and Latin America.

— By Miklos Gaspar

Strategic management of new and expanding nuclear power programmes discussed at annual meeting

Challenges that countries face when introducing or expanding a nuclear power programme were discussed at an IAEA meeting in Vienna earlier this year. Among them are developing a regulatory and legal framework, establishing an effective owner/operator organization, involving all stakeholders to build public confidence in nuclear power, and training a well-qualified workforce.

The annual Technical Meeting on Topical Issues in the Development of Nuclear Power Infrastructure, held from 31 January to 2 February 2018, attracted some 100 representatives from both embarking and operating countries and international organizations. Senior officials from national government organizations, regulatory bodies and owner/operator organizations presented updates on their activities, shared good practices and lessons learned as they embark on, or consider introducing or expanding nuclear power.

"In 2017, we saw considerable progress in the area of nuclear power programme development," said Milko Kovachev, Head of the IAEA Nuclear Infrastructure Development Section. "Two countries new to nuclear power, the United Arab Emirates (UAE) and Belarus, are about to complete their first nuclear power plants. The UAE will be the first newcomer country to start commissioning in years." He added that a key for success is that the relevant nuclear infrastructure is developed at the same pace as the nuclear power plant project.

Bangladesh began constructing its first unit in November 2017. Turkey is expected to start construction of its first plant soon, subject to regulatory approval. Egypt has signed contracts for its first nuclear power plant, while other newcomer countries are at different stages of making preparatory steps for their nuclear power programme.

There were also significant developments in operating countries expanding their programmes last year. "We expect that advanced, first-of-a-kind designs are scheduled to be commissioned in a number of countries this year, such as the AP1000 in China and the EPR1600 in China and France," Kovachev pointed out. Both designs are advanced pressurized water reactors.

Participants discussed a number of key areas that are also part of the IAEA Milestones Approach, a three-phase process for developing the necessary infrastructure for a safe, secure and sustainable nuclear power programme.

Involving different groups of stakeholders at various stages of programme development is a crucial aspect in successful programme implementation, participants heard. IAEA Member States are using a combination of common tools and approaches to meet stakeholder needs, including social media, and aim at creating positive and open relationships with local communities.

The IAEA offers a wide range of guidance materials and training activities for national experts and policymakers and is developing new services including a training course in stakeholder involvement.

Modelling human resource needs plays an important role in preparing plans for adequate staffing of national organizations at different stages of programme development, participants agreed. The IAEA offers a nuclear power human resource model and has already trained many national experts in its application.

The owner/operator organization for the nuclear power plant project needs to be planned from the very beginning and established during the project development phase (Phase 2 of the IAEA Milestones Approach), participants heard. They agreed that the owner/operator organization must be a 'knowledgeable customer' with sufficient capabilities to hire services from contractors and oversee them.

Building capabilities for regulatory oversight must start early on, during the project development phase, to be expanded during construction. A sufficient number of qualified staff is crucial for national regulators to perform their functions effectively. The IAEA offers support and guidance in this area. "Having a transparent, open and trusted regulatory body is one of the most important aspects of a nuclear power programme," stressed Stewart Magruder of the IAEA's Regulatory Activities Section.

Several countries are considering small modular reactor technology for their nuclear power programmes. These advanced reactors that produce electricity up to 300 MW(e) per module are better suited for smaller electricity grids and for remote or isolated locations. Also, they have shorter construction times and may require less initial investment. However, participants also recognized that licensing would include first-of-a-kind features, so the regulatory processes would be complex. Although there are about 50 small and medium-sized or modular reactor designs and concepts, three of which are in advanced stages of construction, they are lacking operating experience. The IAEA offers a forum for exchange of the most recent research and development results in this technology.

Representatives from many countries highlighted their cooperation with the IAEA and emphasized the importance of an Integrated Nuclear Infrastructure Review (INIR) missions. "The pathway for us to move forward has become much clearer after an INIR mission in 2017," said Nii Kwashi Allotey, Director of the Nuclear Power Institute in Ghana. "We are now working on the mission's recommendation and have a better understanding of where we need to commit more resources." To date, the IAEA has conducted 22 INIR missions in 16 countries.

— By Elisabeth Dyck