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IAEA TO HELP SMALL ISLAND DEVELOPING STATES MEET DEVELOPMENT CHALLENGES

原子能總署幫助小島型發展中國家迎接發展挑戰

They're small, they're isolated and they share common challenges. They're often referred to as Small Island Developing States, or SIDS. Representatives from this group of countries gathered last week in Vienna to discuss ways in which the IAEA could help them tackle some of these pressing issues using nuclear technology.

SIDS have small but growing populations, who depend on the ocean for their livelihood. They're also particularly vulnerable to the effects of climate change, including natural disasters and rising sea levels.

Along with the rest of the international community, the 38 countries categorized as SIDS have agreed on a series of development priorities under the 2030 Development Agenda.

報告摘要(KEY INFORMATION)

1. 核技術可以幫助小島嶼發展中國家減輕和適應氣候變化的影響，幫助那些在有限的土地空間中努力的國家更有效管理其水資源，開發抗鹽漬土壤或加強土壤肥力的新作物。
2. 地中海果蠅是一種對農業有害的生物，去年造成 4000 萬美元的出口損失，歸功於原子能總署與聯合國糧農組織的技術合作下，短短 10 個月內遏制疫情爆發。
3. 11 月 21 日至 25 日，在維也納國際原子能總署，來自 45 個原子能總署成員國和兩個國際組織的 53 名代表舉行會議，探討從使用核能和放射事件中汲取的經驗教訓。
4. 原子能總署幫助並支持緬甸癌症中心的醫學物理學家和十幾名放射科醫生參加原子能組織的培訓，並對鄰國的機構進行科學訪問，希望在使用最先進的放射治療設備方面汲取更多經驗。
5. 原子能總署在巴哈馬舉辦了一個關於建立和驗證密封放射源國家清單的區域實務培訓班，來自七個不同國家的 12 名與會者參加了此會議。

But their limited resources and remote location make it hard for them to act alone.

"SIDS are aware that pooling their resources together to face common challenges is the best way to go," said Cameron Diver, Deputy Director General of the South Pacific Community. "For SIDS countries, regional and international technical organizations are an extension of their national capacity because they often don't have enough resources."

The meeting held at the IAEA was a good opportunity for SIDS representatives to learn about the technical capacities their countries can draw from and study the ways in which the IAEA and relevant regional organizations can help them use nuclear technology to further develop. "We can now move from regionalism in theory to regionalism in action, from the talk to the doing," Diver said.

"Meetings like this one help us realize that we're all facing similar problems and help us find the best technologies and ways to deal with them, together," said Maria de los Angeles Peña, Vice-minister of Energy and Mines of the Dominican Republic.

How can nuclear help?

Nuclear techniques could help SIDS mitigate and adapt to the effects of climate change. Nuclear-derived techniques, for example, can be applied to monitor ocean acidification and help identify the sources of pollution in the sea, essential information for populations that heavily rely on the sea for their livelihoods and nutrition.

Nuclear technology can help countries struggling with limited land space to better manage their water resources through smart agriculture, to develop new crops that are resistant to salty soil or to strengthen soil fertility. In addition, the Sterile Insect Technique (SIT), which is already helping the Dominican Republic contain the outbreak of the Mediterranean fruit fly, could help this and other SIDS countries combat vector-transmitted viruses such as Zika and Chikunguya.

"SIDS have a very different set of challenges to the rest of the world community," said Peter Kenilorea, Head of the SIDS sub-programme at the United Nations Office for Least Developed Countries, Landlocked Developing Countiess, and SIDS (UN-OHRLLS). "So the idea of the IAEA having a specific programme for SIDS right across the board — whether these are in the Pacific, the Caribbean, or the Indian ocean — is going to be useful and helpful."

DOMINICAN REPUBLIC USES NUCLEAR TECHNOLOGY TO WIN THE WAR AGAINST FRUIT FLIES

多米尼加共和國使用核技術贏得對果蠅的戰爭

Punta Cana, Dominican Republic — A group of men in sun hats gather around a cardboard trap for flies. They inspect it with their pencil-shaped UV lamp, nod and smile from time to time. These insect specialists have left their lab coats behind to help the Dominican Republic verify its success in controlling the Mediterranean fruit fly, a pest that cost the country US $40 million in lost exports last year. The men nod again, satisfied that the trap contains no wild flies.

The Mediterranean fruit fly was reported for the first time in March 2015 in Punta Cana, the eastern region of the island. As soon as the government announced the presence of this pest, the United States banned the import of 18 fruits and vegetables, severely affecting the country's main source of income after tourism: agricultural exports.

But thanks to a quick response and the support of the IAEA in collaboration with the Food and Agriculture Organization of the United Nations (FAO), the Dominican Republic's Ministry of Agriculture managed to contain the outbreak in just ten months. The result? In January this year, the U.S. lifted the agro-ban for most of the country.

"It was disastrous," said Pablo Rodríguez, financial manager of Ocoa Avocados, the country's number one exporter of green king avocado. "Almost all we do is export, so you can imagine our loss. We had our product ready by March, when the ban started. We lost all that and our next cycle of production, too. Just because of a few flies, we all had to pay." Ocoa Avocados' losses amounted to US $8 million.

Some could adapt more easily. Cory St Clair is a small producer in Cabeza de Toro. He had just planted chillies and red peppers when the ban was introduced, and he started looking for other markets. Now he sells mainly to Canada and Europe. "We were lucky," he said. "But bigger exporters were not."

Fear of the flies

While most of the flies were spotted in non-commercial almond trees along the coast, there was a fear that they might also invade commercial fruit and vegetable farms. Any appearance of the fly is seen as high risk and often causes countries free of the pest to restrict any imports of soft skin fruit and vegetables.

"We could have easily lost approximately US $220 million if the fly had reached the areas where the horticultural industry is concentrated," said Minister of Agriculture Ángel Estévez, "which means losing around 30 600 jobs directly and indirectly. We are a small country, and the livelihoods of thousands of

people working in the horticultural sector depend on exports."

In 2014 and 2015, fruits and vegetables represented approximately 30% of food exports, earning the country around $610 million per year, according to the Central Bank of the Dominican Republic. The agriculture sector is also the third largest source of employment.

When the government detected the outbreak, it did not have the adequate institutional capacity to respond, Minister Estévez said. "For us, it became a trauma. I would go to sleep thinking of the fly, I would dream of the fly, and in the morning, I would wake up with the fly in my mind."

Radiation to the rescue

When the Ministry of Agriculture asked for assistance in March 2015, the IAEA and the FAO helped launch an integrated pest eradication campaign. The authorities established an extensive network of traps along strategic spots to determine the spread of the pest, got rid of infested almonds, guavas and caya fruits, sprayed an insecticide mixed with a food attractant in hot spots, and imposed strict controls in the rest of the country, including at its ports and airports. But the key to contain the fly population was left for a nuclear-based birth control for insects called the sterile insect technique (SIT).

SIT involves mass-rearing male flies and sterilizing them with ionizing radiation. These sterile flies are then released from the ground and by air over pest-infested areas where they mate with wild populations, which subsequently do not produce offspring.

"It's amazing to me," said St Clair. "When I first heard about it, it sounded like science fiction." Thanks to the intensive weekly release of millions of sterile Mediterranean fruit flies, which led to the control of the outbreak, the U.S. lifted its ban in 23 of the 30 affected provinces within 10 months.

SIT is among the most environmentally friendly control tactics available, and is usually applied as part of an integrated campaign to control insect populations. The IAEA and the FAO jointly support about 40 SIT field projects delivered through the IAEA technical cooperation programme in different parts of Africa, Asia, Europe and Latin America and the Caribbean.

RATING THE SAFETY SIGNIFICANCE OF RADIATION EVENTS, INES NATIONAL OFFICERS MEET IN VIENNA

評估輻射事件的安全意義，INES 國家官員在維也納舉行會議

From 21 to 25 November at the IAEA Headquarters in Vienna, 53 representatives from 45 IAEA Members States and two International Organizations met to discuss the lessons learned from the use of the International Nuclear and Radiological Event Scale (INES).

Communicating with the public about radiation incidents and emergencies brings many challenges. For example, scientific terms and technical jargon are hard to understand for a lay audience. Additionally, the public perceives risk differently than experts. In 1990, in the aftermath of the Nuclear Power Plant accident in Chernobyl, INES was devised as a communication tool to help consistently communicate to the public on the safety significance of events associated with sources of radiation.

This week's Biennial Meeting of the INES National Officers, besides being a forum for exchange of experience, focused on the current scope of INES; the events that have been rated on the scale in the past two years; and on the revision of the rating guidance captured in the methodology.

Simon Coenen, the INES Advisory Committee Co-Chair from Belgium, said that the meeting "gave each INES National Officer the chance to share their own experiences and learn from each other about the use of INES in the evaluation of, and communication on, nuclear and radiological events."

Marty Larabie, the INES Advisory Committee Co-Chair from Canada, added, "In 2008 the application of INES was extended from its original focus on nuclear power plant events to include civil nuclear industry, nuclear installations and the transport, storage and use of radioactive material and radiation sources. In taking stock of how the scale has evolved, the meeting gave perspective for the work that will be done on the revision of the INES User's Manual, the rating guidance for INES, as well as on actions required to promote the implementation and harmonized use of INES".

How is the INES scale used?

INES is used to rate the safety significance of events using a scale ranging from 'anomaly' (rating 1) to 'major accident' (rating 7). Events are rated in terms of their impact in three different areas: impact on people and the environment; impact on radiological barriers

and control; and impact on 'defence in depth'. Levels 1–3 are defined as 'incidents' and Levels 4–7 as 'accidents'. Events with no safety significance are rated "Below Scale /Level 0".

Member States unilaterally decide if they want to use INES to rate events occurring in their respective countries and to use it in their communication process. Although the use of INES is voluntary, Member States in general agree to share information on an international level on events rated at Level 2 or above, and events attracting international media attention. Information about the events is then conveyed to all IAEA Member States through the secure Unified System for Information Exchange in Incidents and Emergencies (USIE) and to the public through a dedicated news channel (https://www-news.iaea.org/Default.aspx).
More information about the INES methodology can also be found on the NEWS webpage.

YANGON RADIOLOGISTS, MEDICAL PHYSICISTS JUGGLE TO PROVIDE CANCER PATIENTS WITH QUALITY CARE

仰光放射醫師、醫療物理學家努力為癌症患者提供優質醫護

Yangon, Myanmar – Mya Mya Kyi is in a hurry, trying to cut through a throng of patients waiting for their turn on the hallways of the Radiotherapy Department at Yangon General Hospital. As the department's Chief Medical Physicist, she is in charge of therapy planning for the close to 300 patients per day who receive cancer treatment on the hospital's four radiotherapy machines.

While the country's Ministry of Health has bought radiotherapy equipment for the Yangon hospital and three similar facilities around the country, training for medical physicists, including in quality assurance of the radiotherapy equipment, is not available locally. Mya Kyi and her colleagues rely on the IAEA for these services.

"Treatment plans, dosimetry calculations, daily audit of the machines and quality control – the day is never long enough for all of this," she says while making her way from a room with a Cobalt-60 machine to her work station where she prepares treatment plans.

Medical physicists work with sophisticated technology used in radiation medicine to diagnose and treat patients with diseases like cancer. They need to have knowledge of both the human body and physics principles, and how to apply these principles to support

diagnosing or treating patients. Read this article for more on medical physics.

Radiotherapy: from the margins to the mainstream

The demand for radiotherapy has increased three-fold over the last ten years, said Professor Khin Cho Win, Head of the Radiotherapy Department at Yangon General Hospital. Last year, the Department received 6,200 new patients, the majority of whom needed radiotherapy. This compares with just 2,000 cases in 2005. “We expect this trend to continue,” Cho Win said.

What will hopefully gradually change is the make up of the patients. Many people with cancer do not go to see their doctor until it is too late, and at that point are referred to radiotherapy only for palliative care. Half of the radiotherapy patients at Yangon General are in the last stages of cancer, when the only care available is pain relief during the final phase of the disease. By contrast, in developed countries only 14% of new cancer patients need palliative radiotherapy – the majority undergoes treatment with the intent to cure their cancer. An IAEA imPACT mission conducted in 2015 to assess Myanmar’s cancer control services recommended the establishment of dedicated palliative care services and an expansion of primary care facilities and home based care.

Opening up more radiotherapy centres and increasing access to these facilities is high on the country’s health agenda. There are just 18 radiotherapy machines for Myanmar’s population of 52 million. This is significantly below the level of one machine per one million people recommended by the World Health Organization.

Myanmar is not alone: according to the IAEA’s Directory of Radiotherapy Centres (DIRAC) database, most radiotherapy facilities in the world are located in high-income countries, and at least 36 nations do not have any such equipment to treat cancer.

IAEA assistance

The IAEA is doing its part to help and will continue to support staff at Myanmar’s cancer centres, said Ho-Seung Lee, who is in charge of the IAEA’s technical cooperation programme with Myanmar.

The five medical physicists and the dozen radiologists at Yangon General participate in IAEA-organized trainings, go on scientific visits to institutions in neighboring countries with more experience in using state-of-the-art radiotherapy equipment, and send dosimetry measurements to the IAEA’s laboratory near Vienna to check the calibration of their radiotherapy machines. This ensures that patients get the right dose: high enough to be effective, but not centigray more, so as not to deliver more radiation than absolutely necessary for their treatment. Lately, they have also begun using the IAEA’s online learning tools, offered via the Human Health Campus. “We only wish internet connectivity were better,” Mya Kyi says.

Radiation physics and dosimetry are the cornerstone of safe and effective radiotherapy

for treatment of cancer and are also essential to quality assurance of other radiation medicine disciplines, said May Abdel-Wahab, Director of Human Health at the IAEA. "IAEA support helps countries like Myanmar ensure that accurate doses are delivered and appropriate training is given to medical physicists, radiation oncologists and others involved in radiation medicine to achieve an optimal outcome for patients."

IAEA HOLDS TRAINING COURSE ON SETTING UP NATIONAL INVENTORIES OF SEALED RADIOACTIVE SOURCES IN THE CARIBBEAN

原子能總署在加勒比舉辦關於建立密封放射源國家清單的培訓班

A Regional Training Course on the practical aspects of setting up and validating national inventories of sealed radioactive sources has been carried out in the Bahamas from 5 to 9 September 2016.

In total, 12 participants from seven different countries attended, including students from newer IAEA Member States including Antigua and Barbuda, and Barbados, which acceded to the IAEA Charter in 2015, as well as the Bahamas, which joined the IAEA in 2014. Other participating Member States included Belize, Dominica, Jamaica, and Trinidad and Tobago.

The training course, delivered through the IAEA's technical cooperation programme, was designed to provide participants with the knowledge and practice necessary to set up and validate a national registry and inventory of sealed radioactive sources in their own country.

The course also addressed the implementation of a suitable record keeping system for sealed radioactive sources (SRS), including disused SRS inventories. Participants were able to evaluate the individual situation of their country, and to discuss the measures needed to implement a national strategy for developing inventories of radioactive material. Having completed the course, participants are now able to advise their national authorities on the appropriate path to take in establishing national SRS inventories.

The training course is the first to take place under the technical cooperation project RLA9081, 'Strengthening Cradle-to-Grave Control of Radioactive Sources', which aims to

protect people and the environment from potential adverse effects of ionizing radiation, while enabling and fostering the safe and secure use of radioactive sources to promote sustainable socioeconomic development. The project seeks to improve the control of radioactive sources in the Caribbean region through the establishment of a safe, adequate, and sustainable 'cradle-to-grave' management of radioactive sources.