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MONGOLIA KEEPS ANIMAL DISEASES AT BAY WITH THE HELP OF NUCLEAR TECHNOLOGIES

蒙古在核技術的幫助下防止動物疾病

A portrait of life in Mongolia is not complete without livestock. For city dwellers and nomads alike, more than 70 million animals are an essential source of food, income and cultural symbols for this country of barely three million inhabitants. Yet livestock owners like Batbaatar Chuluun are calm about highly contagious animal diseases. That's thanks to Mongolia's comprehensive animal disease control system built in part with support from the IAEA, in

報告摘要(KEY INFORMATION)

1. 歸功於原子能總署與聯合國糧食及農業組織的支持下所發展出的動物疾病控制系統，蒙古利用核技術成功防止動物疾病。
2. 哈薩克是每年超過 2 萬噸天然鈾的生產國，近年來該國支持並接受原子能總署開發的安全指導並新增其新安全措施。
3. 來自亞洲和太平洋九個國家的癌症護理專家本月加入了總署的專業團隊，以開發緩解疼痛治療來提升癌症患者的生活品質。
4. 緬甸使用核技術研究的結論，確定了卡勞流域土壤侵蝕的確切來源，使當地林業官員能夠在最易受侵蝕的地區實現其保護工作。
5. 原子能總署 12 月舉行為期兩天的全面研討會，目標在於支持成員國對核電廠嚴重事故管理計劃達成共識。
6. 2016 年 11 月 4 日，NEA 指導委員會在 NEA 成員國內舉行有關於核能技術與教育的政策辯論會。
7. 2016 年 11 月 8 日至 10 日，國家能源局在日本福島舉辦了「事故後食品安全科學」國際研討會，討論事故後食品安全的最新進展與事故後的相關挑戰。

cooperation with the Food and Agriculture Organization of the United Nations (FAO).

"I don't worry about my animals or the diseases. If my animals get sick, the local vet will come and help me and will know what to do. I know the government is ready and can help," said Chuluun, a nomadic farmer from just outside the capital city Ulan Bator, who owns a few hundred cattle, goats and sheep. He relies on the meat and milk of these animals for his income and for feeding his family.

For decades, scientists and veterinarians in Mongolia have been trained and equipped by the IAEA and the FAO. Through this support, veterinarians have learned how to correctly take samples and manage potentially infected livestock, and scientists have acquired the skills and tools to use nuclear and nuclear-derived techniques to quickly and accurately analyse these samples (see The Science box).

Animal diseases, such as foot-and-mouth disease (FMD), peste des petits ruminants (PPR) and brucellosis, can easily spread to livestock through direct contact with wild animals, as well as through the air or contact with foodstuffs and objects contaminated by an infected animal. Their effects can range from lameness to death. These diseases are at times linked to infected meat and animal products, which causes many countries to impose trade restrictions to minimize the risk of potentially importing a disease.

"When an animal disease strikes, we're well-trained and ready to respond fast," said Batsukh Zayat, Lead Veterinary Scientist at Mongolia's Institute of Veterinary Medicine. "We know how to work together at all levels to quickly enact emergency response plans, effectively analyse samples and distribute vaccines to minimize the spread of a disease."

Animals on the move

Fast and accurate diagnosis is critical in Mongolia where nearly all of the livestock roam free and graze off the land, explained Bandi Tsolomon, Head of the Veterinary Division and Chief Epidemiologist at the Implementing Agency of the Government of Mongolia for Veterinary and Animal Breeding.

Risk of contamination is further exacerbated by the nomadic lifestyle of around half of the Mongolian population who care for the majority of the country's livestock. Nomadic people move on average four to five times per year to ensure their animals have sufficient land for grazing.

Put to the test

Mongolia's animal disease control system was put to the test during a major FMD outbreak in September 2010. The country was struck by a severe case of this infectious disease that affects cloven-hoofed animals — those with hooves split into two toes — such as cattle, sheep, goats and antelopes.

"At the time of the outbreak, we had to cull more than 25 000 animals, while many more fell sick," explained Zayat. Through the decades of close collaboration with the IAEA and the FAO, Mongolian scientists and veterinarians had the

training and equipment they needed to quickly respond to the epidemic.

Once farmers and local veterinarians spotted the sick animals, they quickly quarantined them and took samples. These samples were first analysed at provincial labs and then sent for further analysis to the veterinary scientists at Mongolia's State Central Veterinary Laboratory (SCVL). They used nuclear and nuclear-derived techniques to detect and evaluate the virus strains and to determine which vaccines to use.

IMPROVING SECURITY OF KAZAKHSTAN'S NATURAL URANIUM

改善哈薩克天然鈾的安全

Kazakhstan, producer of more than 20 000 tonnes of natural uranium per year, has welcomed security guidance recently developed by the IAEA.

"It is difficult to overstate the importance and timeliness of the guidance," said Eldar Nikhanov, physical protection officer at a uranium mine in Kazakhstan under the State-run company Kazatomprom. "Since we adopted new security measures consistent with the guidance, there have been no incidents of unauthorized removal of natural uranium."

Strengthening international security

In 2010, Kazakhstan established a comprehensive system for the control and physical protection of natural uranium. Its experience in implementing this system contributed to the development of a series of new IAEA security guidance documents compiled in a publication entitled Nuclear Security in the Uranium Extraction Industry, issued in February 2016.

"As a world leader in uranium ore concentrate production, Kazakhstan is aware of its responsibility to contribute to natural uranium security measures within the international community," Nikhanov said.

Meeting security challenges

At each of Kazakhstan's 23 uranium mining sites, the implementation of the security measures has helped strengthen physical protection and information security by improving site access control, burglar alarms and video surveillance.

"We are aware of the black market for natural uranium and the need for strong, practical security measures," Nikhanov said. "From industry experience, these measures will greatly reduce risks of theft."

Training is another focus. "Properly training workers is the main challenge in ensuring mines stay secure," he said. Kazatomprom's experience in quality control shows that mining workers need clear and simple guidelines to follow. According to Nikhanov, those provided by the IAEA this year have been an invaluable resource.

"Security regimes need to be embedded into the uranium extraction process from the start," said Assel Khamzayeva, nuclear security officer at the IAEA. "There is a real need for these kinds of specific measures to be adopted, and it is more difficult and costly to add them later."

STRENGTHENING PALLIATIVE CARE FOR CANCER PATIENTS IN ASIA AND THE PACIFIC

加強亞洲和太平洋癌症患者的緩和治療

Cancer care specialists from nine countries in Asia and the Pacific joined experts in Vienna this month to develop ways to improve the quality of life for cancer patients through pain relief – or palliative care.

"Even in countries where resources are very limited, we can still try to minimize the pain and suffering felt by cancer patients," said Nazmun Naher Shanta, radiation oncologist at Bangladesh's National Institute of Cancer Research. "We realize the need for us as health specialists to work with policy makers and community leaders to implement quality services that help suffering patients."

The need to expand quality palliative care services in Asia and the Pacific is enormous, Shanta said. According to the World Health Organization's Global atlas of palliative care at the end of life, two of the nine countries represented at the workshop do not have

related services in place, six provide only partial care and only one country has recently started integrating palliative care services in its national health system.

The workshop enabled participants to better understand the role of radiotherapy and other forms of treatment in palliative care and to develop short-term action plans to improve access to these services.

According to the International Agency for Research on Cancer, Asia has the world's highest number of cancer patients. More than half of all cancer deaths worldwide occur in this region and almost 7 million new cases were diagnosed in 2012, the last year for which continent-wide data is available, and the rate is rising. Many of these patients will require palliative care at some point, but very few will actually receive it.

It is estimated that by the time it's diagnosed, the majority of cancers in the developing world are incurable. Radiotherapy is one of the most effective ways of alleviating pain associated with cancer as it relieves symptoms caused by tumours like bone pain, bleeding and organ obstruction.

The action plans developed by the participants looked to strengthen advocacy efforts, build capacities and formulate ways to better plan and coordinate services. They also assessed how patients could receive improved access to quality radiotherapy treatment and essential medications for pain relief.

"Radiotherapy for palliation purposes is an integral part of a strong and effective national cancer control programme," said Beatrix Lahoupe, from the IAEA's Programme of Action for Cancer Therapy (PACT). "Pain relief through medicine and radiotherapy should go hand-in-hand."

Health care specialists from Bangladesh, Cambodia, Indonesia, Lao, Malaysia, Papua New Guinea, Sri Lanka and Vietnam attended the workshop in order to accelerate the implementation of recommendations specific to palliative care which arose from IAEA imPACT review missions.

Participants from several countries highlighted common challenges in providing palliative care, including a severe shortage of trained health workers, misconceptions about actual needs for palliative care services and the lack of integration of palliative care programmes into national cancer control plans and health systems.

During the workshop, participants and experts identified country-specific priorities and high-impact actions that could improve access to palliative care for cancer patients within a two-year timeframe. The proposed actions focused on: improving understanding of palliative care among domestic policy- and decision-makers, enhancing the training of health professionals in palliative care and integrating palliative care efforts into the activities of existing health systems.

The event was organized by the IAEA in collaboration with the International Narcotics

Control Board, the United Nations Office on Drugs and Crime, the International Association for Hospice and Palliative Care, the World Health Organization, the Union for International Cancer Control and other international, regional and national organizations.

"Our region is not often on the radar of many world bodies when it comes to palliative care," said Cynthia Goh, associate professor at the National Cancer Centre in Singapore and Chair of the Asia Pacific Hospice Palliative Care Network, "which is why workshops like these are essential."

NUCLEAR TECHNIQUES HELP SCIENTISTS SAVE MYANMAR'S UNESCO BIOSPHERE RESERVE

核技術幫助科學家保存緬甸聯合國教科文組織生物多樣性保護區

Nyaungshwe, Myanmar – Ongoing deforestation around Inle Lake is leading to significant soil erosion in one of its major tributaries, causing soil accumulation in the lake and threatening the fragile ecosystem of this UNESCO Biosphere Reserve. This conclusion of a study using nuclear techniques, which have also identified the exact sources of the soil erosion in the Kalaw watershed, will enable local forestry officials to target their conservation efforts in the areas most susceptible to erosion.

Conservation and the use of the new data to educate local people about the consequences of illegal logging and the increased use of the lake as a floating vegetable garden will help save Inle, said U Sein Tun, park warden at the Forest Department in Nyaungshwe, the biggest town on the lake. The research, which was completed last month, was carried out by Myanmar's Forest Research Institute and supported by the IAEA and the Food and Agriculture Organization of the United Nations (FAO).

It has used two nuclear techniques to characterize soil erosion.

Fallout radionuclides such as caesium-137 (Cs137), lead-210 (Pb210) and beryllium-7 (Be7) are used to assess soil erosion and sedimentation processes. These radionuclides are strongly fixed to soil particles and are not taken up by plants. During erosion and

deposition processes they move with the soil particles and can be used to trace soil redistribution over large areas and extended periods of time.The results in the Kalaw watershed have shown that each hectare of land that lost its forest cover 15 years ago has lost 26 tons of soil every year since, said Cho Cho Win, the research officer who headed the study. For land that was deforested and cultivated 40 years ago, the soil loss has been a whooping 40 tons per hectare per year. “By contrast, on comparable areas where the forest cover was left intact, there has been no erosion whatsoever,” she said.

The results have shown significant soil losses at the upper slopes and soil accumulation at lower locations, closer to the lake. This indicates that significant sediment discharges into the lake continue to occur, Cho Win said.

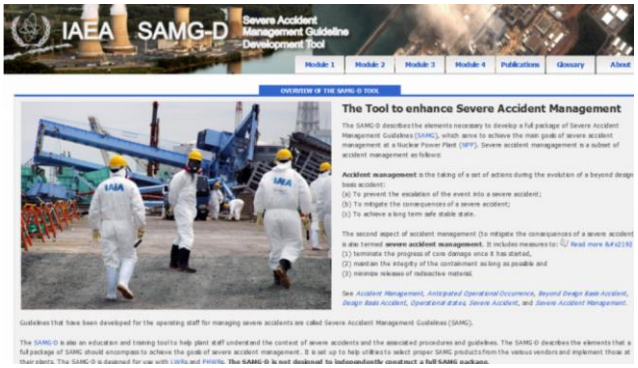
Another method, the compound specific stable isotope (CSSI) technique, was used to identify the origins of erosion by analyzing the makeup of sediments along the river, right until its confluence in the lake. CSSI is based on the measurement of carbon-13 isotopes of specific organic compounds in soil. The makeup of carbon-13 is unique for each compound, so a carbon-13 analysis reveals the origin of the soil. By linking carbon-13 fingerprints of land use to the sediment in deposition zones, this technique is useful in determining the sources of eroded soil and in identifying areas prone to soil degradation.

Reversing the environmental degradation of Inle Lake brought about by soil erosion is a key objective of not only for the local forestry office but also for the regional government of Shan state as well, Sein Tun said. Chief Minister Linn Htut has resolved to head the commission that is tasked with improving the condition of the lake.

“The research by Dr Cho Win is an important contributor to our efforts,” Sein Tun said.

IAEA WORKSHOP ENHANCES UNDERSTANDING OF THE ROLE OF SEVERE ACCIDENT MANAGEMENT PROGRAMMES

原子能總署講習班加強對重大事故管理方案的作用與了解



Highlighting the collective commitment to improve nuclear security at the national, regional and global levels, being vigilant about the threats to nuclear security, having concrete measures to protect against malicious acts involving nuclear or radioactive material, being cognizant of the need to support the central role of the IAEA: these were key

Supporting Member States to have a common understanding of a reliable severe accident management programme for nuclear power plants (NPP) was the aim of a comprehensive two-day workshop held this month at the IAEA.

The Agency's Severe Accident Management Guidelines Development (SAMG-D) Toolkit was first presented at a workshop in 2015. The recent event was organized to address the many requests from Member States for sharing knowledge and experience in using the relevant IAEA Safety Guide NS-G-2.15 and the SAMG-D Toolkit.

"This workshop has highlighted very important topics, especially for newcomer countries to nuclear power," said Levent Özdemir, from the Çekmece Nuclear Research and Training Center of the Turkish Atomic Energy Authority.

"The meeting has attracted a large number of operators, emergency response organizations and regulators involved with SAMGs," said Ibrahim Khamis, IAEA Scientific Secretary of the workshop. "It was the result of close collaboration between the Department of Nuclear Safety and Security, which developed the specific safety standard, and the Department of Nuclear Energy, which developed the practical toolkit."

Indeed, the workshop held on 15-16 December gathered 52 technical professionals from 25 countries and the World Association of Nuclear Operators (WANO), the Institute of Nuclear Power Operations (INPO) and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA).

Developed under the IAEA Action Plan on Nuclear Safety, the IAEA SAMG-D toolkit has so far received very positive feedback. "It is an excellent educational material," said a workshop participant, Dane Williams, INPO Team Leader for Emergency Response Development.

The workshop also covered main areas that support SAMG development. These included severe accident phenomena and challenges associated with maintaining fission product barriers, mitigation strategies, the development of generic SAMGs, the tasks and responsibilities in implementing and executing SAMGs in NPPs, interfaces with the emergency response organizations, extensive damage mitigation guidelines, and flexible and diverse response.

Meeting participants called on the IAEA to develop the SAMG-D toolkit in order to include multi-unit plants (i.e. NPPs with more than one reactor) and spent fuel pools, as well as case studies on how high level decisions by managers and regulators are implemented at various NPP sites.

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NUCLEAR SKILLS AND EDUCATION IN NEA MEMBER COUNTRIES

NEA 成員國的核技能和教育

Nuclear skills and education in NEA member countries

On 4 November 2016, the NEA Steering Committee held a policy debate on nuclear skills and education in NEA member countries, an increasingly important challenge concerning not only countries that rely on nuclear power, but also newcomer countries and those countries that have decided to phase out its use. Speakers included Dr F. Rayment of the UK National Nuclear Laboratory (NNL), Prof. P. Wilson of the University of Wisconsin‑Madison, Mr A. Kordas of the Polish Ministry of Energy, Mr J. Schmid of the Swiss Federal Nuclear Safety Inspectorate (ENSI) and Dr S. Oh of the Korea Electric Power Corporation (KEPCO) International Nuclear Graduate School. Participants in the debate noted that there has been a long-standing trend in many countries where the increasing age of experts in the nuclear field and the closure of experimental facilities are eroding the nuclear skills base and the infrastructure needed to renew these capabilities. They acknowledged that a partnership approach that includes government, industry, academia and training providers can contribute significantly to addressing the skills challenge by ensuring better co-ordination, attractiveness of education programmes and the funding of such programmes. The potential benefits of a co-ordinated international response to help maintain nuclear skills and education was also highlighted

ENSURING FOOD SAFETY IN A POST-ACCIDENT SITUATION

在事故發生狀況下確保食品安全

On 8-10 November 2016, the NEA held an international workshop on "Post-accident Food Safety Science" in Fukushima, Japan. Hosted by the Cabinet Office of the Government of Japan, the workshop brought together 137 participants, including experts and scientists from ten countries and local residents, to discuss the state of the art in post-accident food safety science; the local, national and international management of post-accident food safety; and approaches for addressing associated challenges. The workshop started with two sessions describing the current state of food and agriculture in Japan and the extensive work done in the aftermath of the Fukushima Daiichi nuclear power plant accident by farmers, distributors, prefectures and the central government to ensure that marketed products meet rigorous national standards. The final two sessions addressed the international standards, decontamination and measurement science, as well as the post-Chernobyl food management experience of Belarus, Norway and the United Kingdom. The workshop, which also featured a technical site visit to several food monitoring facilities, concluded that food management efforts of Japan were excellent and represented a good technical example for other countries. Workshop recordings and presentations are available at oe.cd/1xh