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How Nuclear Technology Can Help in Controlling the Spread of Infectious Diseases



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Real time reverse transcription–polymerase chain reaction (RT-PCR) is the most accurate and widely used method in many countries to detect the SARS-CoV-2 coronavirus, which causes COVID-19. But did you know that [real-time RT-PCR](#) is in fact a nuclear-derived virus detection technique? Originally, this nuclear technique utilised radioactive isotope markers to determine the presence of viruses in humans and animals, but ensuing improvement has led to the replacement of isotopic labelling with special markers, most frequently fluorescent dyes.

Many countries struggled to test more people for the COVID-19 while facing a shortage of detection kits. At the 64th General Conference of the International Atomic Energy Agency (IAEA) recently held in September, IAEA Director General Rafael Mariano Grossi reported to all member states how the IAEA stepped up and implemented its largest-ever operation helping countries respond to the COVID-19 pandemic. The Agency provided diagnostic kits, equipment and

training in nuclear-derived detection technique to 123 member states, including most of the Southeast Asian countries.

The IAEA, the Food and Agriculture Organization (FAO), and the World Health Organization (WHO) jointly provided technical guidance on COVID-19 detection using the real time RT-PCR, including webinars, to train laboratory and health care professionals from most of the IAEA member states. Highlighting the use of nuclear technology for virus detection, the IAEA launched the [Zoonotic Disease Integrated Action \(ZODIAC\) initiative](#), in collaboration with FAO and WHO, in June. This effort is aimed at improving detection and response capabilities of countries to prevent pandemics caused by bacteria, parasites, fungi or viruses that originate in animals and can be transmitted to humans. It uses an integrated re-search approach and nuclear-derived techniques.

For over 50 years, the use of nuclear techniques in medicine and nutrition has become one of the most extensive peaceful applications of nuclear technology. Nuclear-derived technique has been

used in the rapid detection and identification of viruses that are causing some of the world's most dangerous diseases in the recent past, such as Avian Flu, Ebola and Zika.

What can Southeast Asia do? The region's expertise in nuclear applications in public health is not lacking. Local expertise, as a result of decades of research and training, has grown steadily as demonstrated recently by the [Vietnamese authorities controlling the spread of African Swine Fever](#) using nuclear-assisted technique in 2019.

Higher education plays an essential role in nuclear capacity building that includes nuclear applications in disease surveillance and prevention. Despite the absence of nuclear power plants in Southeast Asia, several universities and knowledge centres in the region continue to offer institutionalised academic programmes and re-

search activities in nuclear sciences and engineering.

Indeed, the role of nuclear technology in public health, especially in producing testing kits in times of disease outbreaks and pandemics, reflects the importance of maintaining and even investing more in the region's nuclear education programmes.

ASEAN member states, especially those that have very limited testing coverage and capability, could tap into the robust assistance offered by the IAEA, such as the ZODIAC initiative, so as to benefit from nuclear technology applications in disease surveillance and prevention in the context of COVID-19 and other future pandemics.

The ASEAN-IAEA Practical Arrangements on the peaceful uses of nuclear technology, signed in 2019, would be a useful framework for knowledge and technology transfer to Southeast Asian na-

tions. Furthermore, ASEAN member states can maximise the burgeoning cooperation among their nuclear regulatory bodies through the [ASEAN Network of Regulatory Bodies on Atomic Energy](#). Another area of growing cooperation is by the regional training centres of excellence on nuclear security and safety. The applications of nuclear technology in disease surveillance ought to be regularly included in training programmes/courses, workshops and other modalities of knowledge sharing among these regional institutions. This is not only for the COVID-19, but also in dealing with other communicable diseases that may break out in the future.

Suggested Readings

- Laura Gil, "Hunting for viruses in Sierra Leone with the help of nuclear technology," *IAEA Bulletin*, Vol. 61-2 (June 2020).
- International Atomic Energy Agency, *IAEA Support to Member State Efforts in Addressing the COVID-19 Pandemic: Report by the Director General*, GOV/INF/2020/6, Vienna: IAEA, 2020.
- Nicole Jawert, "How is the COVID-19 virus detected using real time RT-PCR?," *IAEA Bulletin*, Vol. 61-2 (June 2020).
- Julius Cesar Trajano and Mely Caballero-Anthony, "The Future of Nuclear Security in the Asia-Pacific: Expanding the Role of Southeast Asia," *International Journal of Nuclear Security*, Vol. 6, No. 2 (2020).

CLIMATE CHANGE

NEWS & COMMENTARIES

Commentary: Flights to nowhere raise bigger questions about Singapore Airlines' future

Flights in general generate unnecessary carbon dioxide (CO₂) and greenhouse gas (GHG) emissions, and these flights to nowhere are only a plaster for the structural threats facing Singapore Airlines and the global aviation industry.

Eric Bea

Channel News Asia

20 September 2020

China will become carbon neutral by 2060, Xi Jinping says

Chinese President Xi Jinping called for a "green revolution" and said the country will scale up its targets under the Paris climate accord. China aims to reach peak carbon emissions by the end of the decade and achieve carbon neutrality in 40 years.

Helen Regan

CNN

23 September 2020

US-Qatar partnership aims to find buried water in Earth's deserts

Researchers are designing a satellite mission to probe the sand dunes and ice sheets of some of Earth's driest places. The project's primary goal would be to discover and monitor underground sources of fresh water called aquifers.

Jane J. Lee and Ian J. O'Neill

NASA

23 September 2020

The same old normal for climate action in post-pandemic Southeast Asia

A new normal for action on climate change is unlikely in post-pandemic Southeast Asia. Recovery plans in the region have thus far affirmed the priority of economic growth and are set to reinforce existing inconsistencies in greening the economy.

Margareth Sembiring

The National Bureau of Asian Research

26 September 2020

Tumble dryers harming marine species

Washing and drying clothes release thousands of microplastic particles into the environment. Tumble dryer lint can cause damage to the gills, liver and DNA of marine species.

Claire Hayhurst

Ecologist

5 October 2020

Campaign seeks 1bn people to save climate – one small step at a time

If a billion people around the world were to take a few small steps and make them into permanent lifestyle changes, global greenhouse gas emissions could be significantly reduced.

Fiona Harvey

The Guardian

10 October 2020

SELECTED PUBLICATIONS

Green recovery in post-COVID-19 Southeast Asia?

In Southeast Asia, an intentional shift towards a green recovery seems unlikely. This development thus highlights the continuing challenges in implementing green growth ideals as the main strategy in addressing climate change.

Margareth Sembiring

NTS Insight, Singapore: RSIS NTS Centre

2020

Is green growth possible?

Empirical evidence does not support green growth theory that asserts that continued economic expansion is compatible with our planet's ecology. Green growth is likely to be a misguided objective, and policymakers need to look toward alternative strategies.

Jason Hickel and Giorgos Kallis

New Political Economy, Vol. 25, No. 4

2020

EVENTS & ANNOUNCEMENTS

London Climate Action Week

London Climate Action Week creates space for London's world leading array of climate professionals to come together to find solutions to climate change.

London, United Kingdom

14-20 November 2020

Our Ocean 2020

Our Ocean 2020 convenes partners from across the globe to identify solutions to manage marine resources, increase the ocean's resilience to climate change and safeguard its health for generations to come.

Palau

7-8 December 2020

ENERGY SECURITY

NEWS AND COMMENTARIES

Re-energising Japan's plans for power and climate change

Japan must convey a clear signal to the market by reviewing its energy targets for 2030 and drawing up a long-term strategy to realise a decarbonised society by 2050.

Mika Ohbayashi

East Asia Forum

28 September 2020

Duterte orders consultations with Bataan residents amid calls to reopen nuclear plant

The Philippine president orders the energy department to closely consult with local residents if they are in favor of reopening the mothballed Bataan Nuclear Power Plant.

CNN Philippines

1 October 2020

Vietnam aims doubling use of renewables by 2030 to slash CO2

Solar, wind and other alternative energy sources will comprise 15% to 20% of Vietnam's electricity supply within a decade, up from roughly 10% now. The country's move away from coal reliance will help it implement the 2015 Paris climate change agreement.

Lien Hoang

Nikkei Asian Review

7 October 2020

Energy consumption and CO2 emission in South-east Asia

The development of green transportation and the adoption of green technology, especially in the energy sector, will propel the shift towards climate-resilient economic growth in Southeast Asia.

Alexander Ayertey Odonkor

CGTN

9 October 2020

Why coal should have no future in Southeast Asia's energy mix

While carbon capture technology has the potential to address emissions from industrial processes, its use at coal plants is unjustifiable when renewables are available at lower cost.

Pamela Simamora

South China Morning Post

9 October 2020

Indonesia's clean energy ambitions hit fresh obstacles

Ensuring renewable energy projects can proceed without displacing vulnerable communities entails greater attention to land governance. Acquiring land for renewable projects is a lengthy and tedious process that may pose a challenge to the country's clean energy goals.

Sean Kennedy

Channel News Asia

9 October 2020

SELECTED PUBLICATIONS

Sustainable recovery: World energy outlook special report

This sustainable recovery report recommends cost-effective measures that could be implemented during the specific timeframe of 2021 to 2023. It spans six key sectors – electricity, transport, industry, buildings, fuels and emerging low-carbon technologies.

International Energy Agency

Paris: IEA

2020

Global Renewables Outlook: Energy transformation 2050

This report accentuates climate-safe investment options until 2050, the policy framework needed for the transition, and the challenges faced by different regions to create a sustainable energy system.

International Renewable Energy Agency

Abu Dhabi: IRENA

2020

EVENTS & ANNOUNCEMENTS

Practices, Policies, and Plans in Civilian Nuclear Energy in ASEAN

Speakers discussed new developments in nuclear energy plans, including challenges, in Indonesia and the Philippines.

Recorded Webinar

8 October 2020

Powering Possibilities - Lessons Learned from Mini-grid Application in Conflict and Fragile Contexts

The webinar focused on the complex nature of humanitarian response and the challenges of integrating sustainable energy solutions into the humanitarian programme cycle

Recorded Webinar

15 September 2020

FOOD SECURITY

NEWS & COMMENTARIES

Food insecurity could soon be on everyone's plate. Here's what we need to do

The private sector, civil society, and governments should avoid complacency in discounting COVID-19's impact on food security, since it coincided with "good harvests" in some regions.

Sean de Cleene and Lisa Sweet

World Economic Forum

21 September 2020

China, food security and geopolitics

While China may consider engaging in "wolf-warrior" diplomacy to re-direct attention away from economic contraction and towards tense relations with the United States, it should also pay attention to addressing domestic food security threats from its recent floods that have affected its farmlands.

Scott B. MacDonald

The Diplomat

30 September 2020

Pandemic fast-tracks food security policies

Concerns over the risk of food insecurity amid COVID-19 have fueled national drives towards increasing domestic production. This has led to partnerships in food production, such as that between India and Saudi Arabia.

Marcos Carrieri

Brazil-Arab News Agency

30 September 2020

U.S. crop report signals worsening global food-insecurity crisis

The U.S. Department of Agriculture warned that global food prices could keep climbing, given anticipated smaller soybean stockpiles, growing competition over wheat, and a drier season.

Michael Hirtzer and Megan Durisin

Bloomberg

10 October 2020

Nobel Peace Prize: UN World Food Programme wins for efforts to combat hunger

The UN World Food Programme won the 2020 Nobel Peace Prize for its concrete efforts to fight hunger, improve conditions for peace in war-torn areas and thwart the use of hunger as a weapon of war and conflict.

BBC News

9 October 2020

Nobel Peace Prize 2020: Securing food and preventing hunger

The World Food Programme's receipt of the Nobel Peace Prize highlighted the importance of ensuring sufficient food availability. This concern is relevant to Southeast Asia too, despite the region being a major producer of food.

Dipinder S Randhawa

RSIS Commentaries

13 October 2020

SELECTED PUBLICATIONS

Food systems and building back better

In order to "build back better", this article argues for increasing the capacity of food systems over time at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances.

Ayako Ebata, Nick Nisbett and Stuart Gillespie

Position Paper, Brighton, UK: Institute of Development Studies.

2020

COVID-19 crisis and support for agrifood: Public sector responses through the financial sector

Through rapid desk research and a comparative review of measures adopted by 18 countries around the world, this brief discusses emerging patterns on how countries are currently responding to mitigate the effects of the COVID-19 crisis.

Food and Agriculture Organization of the United Nations

Rome: UN FAO

2020

EVENTS & ANNOUNCEMENTS

Food Security and the Global Economic Recovery with David Nabarro | The Great Food Challenge

This webinar discussed the critical role of international cooperation in incorporating food security into recovery plans, to enable a more inclusive and resilient recovery moving forward. Recorded Webinar

29 September 2020

Agriculture Trade and COVID-19: Trade Barriers, Food Security and WTO Reform

This webinar focused on COVID 19's impact on the food system; how resilient food supply chains have been; the role of an open and predictable trade system in supporting food security; and whether support programs will have distortionary impacts on agricultural markets.

Recorded Webinar

7 October 2020

HEALTH SECURITY

NEWS & COMMENTARIES

This overlooked variable is the key to the pandemic

COVID-19 is an overdispersed pathogen, meaning that it tends to spread in clusters, but this knowledge has not yet fully entered our way of thinking about the pandemic—or our preventive practices.

Zeynep Tufekci

The Atlantic

30 September 2020

Ending Covid-19 via herd immunity is 'a dangerous fallacy'

Uncontrolled transmission in younger people risks significant morbidity and mortality across the whole population. In addition to the human cost, this would impact the workforce as a whole and overwhelm the ability of healthcare systems to provide acute and routine care.

Sarah Boseley

The Guardian

14 October 2020

The tipping point: Climate crises and zoonotic disease

For years, science has warned policymakers of the consequences of rising greenhouse gas emissions and of the intimate link between the climate crisis and global health. This warning has been largely ignored.

Marcus Ranney

Atlantic Council

14 October 2020

Worried European nations revive curfews, lockdowns amid 'exponential growth' in virus

European nations are closing schools, cancelling surgeries and enlisting student medics as overwhelmed authorities face the nightmare scenario of a COVID-19 resurgence at the onset of winter. With new cases hitting about 100,000 daily, Europe has, by a wide margin, overtaken the United States, where more than 51,000 COVID-19 infections are reported on average every day.

Reuters

Channel News Asia

14 October 2020

Singapore ready for cold-chain transport of Covid-19 vaccines

The launch of high-tech containers further boosts Singapore's status as a reliable and quality air hub for pharmaceutical products and perishables.

Audrey Tan

The Straits Times

15 October 2020

Indian scientists develop new paper-strip test for Covid-19

A fast and easy paper-strip test for COVID-19, much like a pregnancy test, is set to hit the market, and it could be a game changer for India as it seeks to curb the coronavirus pandemic.

Nirmala Ganapathy

The Straits Times

15 October 2020

SELECTED PUBLICATIONS

COVID-19 and sustainable development goals

The COVID-19 crisis demonstrates the need to integrate the SDGs at the national level as well as in individual health-care decisions. The authors call for a focus on sustainable health decisions, meaning decisions that are made in the present do not compromise future needs, whether local or global.

Kristin Heggen, Tony J Sandset, and Eivind Engebretsen

Bulletin of the World Health Organization, Vol. 98, No. 10
2020

Impact of COVID-19 response on global surgical volumes: An ongoing observational study

This study aims to determine whether using a location-linked anesthesiology calculator mobile application (app) data can serve as a qualitative proxy for global surgical case volumes and therefore monitor the impact of the COVID-19 pandemic.

Vikas N O'Reilly-Shah et al.

Bulletin of the World Health Organisation, Vol. 98, No. 10
2020

EVENTS & ANNOUNCEMENTS

Perspectives of COVID-19 Pandemics: Epidemiology, Prevention and Control

This webinar assessed the epidemiological patterns and intervention strategies (risk communication, face masking, social distance, personal hygiene, stay home order, tracing and isolation, etc) of 4 countries in the Pacific Rim Region. It summarised the experiences and lessons learned and identified potential challenges, solutions, and opportunities for control of the COVID-19 pandemic.

Recorded Webinar

30 September 2020

Health Futures Webinar: Preparing for a Global COVID-19 Vaccine Deployment

How will the global public health community and national healthcare systems equitably deploy a vaccine to 7 billion people once it is available? This webinar discussed what is needed from the public and private sectors to support healthcare systems for vaccination on a large scale.

Recorded Webinar

5 October 2020

HUMANITARIAN ASSISTANCE AND DISASTER RELIEF

NEWS & COMMENTARIES

Who makes the final decision? AI-driven disaster management

As technology, including AI, becomes increasingly used in humanitarian work, at what point would an AI be trusted to make final decisions based on its algorithms? One key factor is the amount of trust people have in the algorithm.

Corinne Johannssen

Phys.Org

15 September 2020

From COVID-19 to climate change: What we're watching at the UNGA

Having gone virtual in deference to the COVID-19 pandemic, the 2020 UN General Assembly's annual gathering was dominated by the impacts of the current global outbreak. However, other significant issues from climate change and aid funding shortfalls still need to be discussed.

Paula Dupraz-Dobais

The New Humanitarian

22 September 2020

Nepal's 'bottom-up' approach to disaster risk governance

Since the major earthquakes that struck Nepal in 2015, the country has been rebuilding its disaster risk governance system. According to the new constitution, authority has been decentralised from the federal level to the local and provincial levels in an effort to create a system that is responsive to local needs.

United Nations Office for Disaster Risk Reduction - Regional Office for Asia and Pacific

8 October 2020

Countries of Asia-Pacific are reassessing their approaches to risk governance in light of COVID-19

The current COVID-19 pandemic has driven most stakeholders, particularly national disaster management agencies on the frontlines of disaster risk governance approaches, to reassess their current risk governance approaches. An effective risk governance plan requires multi-sectoral and multi-stakeholder approaches.

Omar Hussein Amach

United Nations Office for Disaster Risk Reduction - Regional Office for Asia and Pacific

13 October 2020

How tackling COVID-19 and reducing disaster risk go hand in hand

With the long-term impacts of COVID-19 slowly becoming more evident, it is also becoming clear that the international community now faces the double challenge of mitigating the spread and impact of the pandemic, while also addressing its compounding effects on climate-related and other disasters.

Angela Wells

IOM Blog

13 October 2020

Why should local disaster-risk-reduction-strategies wear gender lens for girls' safety?

COVID-19 has unmasked the inequality in prospects that different groups of affected people are experiencing and coping with the crisis, seen clearly in terms of gender. As such, any meaningful long-term response strategies will need to actively address discriminatory gender norms.

Renar Berandi & Nghia Trinh

Plan International

14 October 2020

SELECTED PUBLICATIONS

Neighbourhood first responder: India's humanitarian assistance and disaster relief

This paper assesses India's HADR efforts in the region, and how the changing nature of transnational emergencies is forcing India to re-assess and consolidate its role as a first responder in the South Asian region.

Saneet Chakradeo

New Delhi: Brookings Institution India Centre

2020

State of climate services 2020 report: Move from early warnings to early action

This report, produced by 16 international agencies and financing institutions, identifies where and how governments can invest in effective early warning systems that strengthen countries' resilience to multiple weather, climate and water-related hazards. It also provides successful examples.

World Meteorological Organisation

2020

EVENTS & ANNOUNCEMENTS

ACE Programme Webinar Series - Pandemics and Natural Disasters: Rethinking Humanitarian Logistics

This webinar explored how the pandemic has changed the delivery of humanitarian assistance in the region, and discussed ASEAN's role in improving logistics capacity to respond to diverse types of disasters during and after pandemics.

Recorded Webinar

21 September 2020

From Recommendations to Action: Building Resilient Supply Chains in the Humanitarian-Development Nexus | IAWG Webinar

This webinar provided recommendations for governments, donors, and implementing agencies from development and humanitarian settings to improve access to universal health care by focusing on supply chain strengthening at the points where humanitarian and development work converge.

Recorded Webinar

14 October 2020

MIGRATION

NEWS & COMMENTARIES

World becoming less tolerant of migrants - Gallup poll

According to a poll released by Gallup, the world is becoming increasingly less accepting of migrants, with index scores falling from 5.34 in 2016 to 5.21 in 2019.

Emma Batha

Reuters

23 September 2020

Indonesia's scrapping of placement fees for migrant workers welcomed – except by agencies, employers

Under new regulations being introduced by the Indonesian government, Indonesian migrant workers will no longer be required to pay their own placement and training fees. These fees will instead be borne by the government of Indonesia and the respective job providers.

Raquel Carvalho

South China Morning Post

27 September 2020

Britain plans to deny asylum to illegal migrants, newspaper says

The British government will routinely deny asylum to migrants who board boats to cross the English Channel or come to Britain through illegal routes.

Aakriti Bhalla

Reuters

4 October 2020

Migrant workers move into first Quick Build Dorms

Singapore's migrant workers living in dormitories have started moving into the new "Quick Build Dormitories (QBD)". These QBDs are part of a government pilot for dormitories with improved standards before deciding on specifications for new permanent ones as part of an overhaul after COVID-19 outbreak in the dormitories.

Lim Min Zhang & Yuen Sin

The Straits Times

12 October 2020

Education woes add to tensions outside Rohingya refugee camps

Schooling issues in communities hosting the Rohingya have grown more precarious as they grapple with rising poverty, teacher shortages and other side effects of the massive aid response. This education divide has been further exacerbated with the outbreak of COVID-19.

AZM Anas, The New Humanitarian

13 October 2020

Anti-migrant sentiment fanned on Facebook in Malaysia

Although Malaysia has long been friendly to the Rohingya despite not recognizing them as refugees, public sentiment has turned. As COVID-19 cases in Malaysia surged this year, hate speech and misinformation on Facebook accusing them of spreading the virus intensified.

Rozanna Latiff and A. Ananthalakshmi

Reuters

14 October 2020

SELECTED PUBLICATIONS

COVID-19 impact on stranded migrants

This report looks at the various COVID-19-related mobility restrictions that have been imposed and implications on the various populations, especially migrants. It provides a better understanding of the evolving needs of these stranded migrants and contributes towards programmes and advocacy.

International Organization for Migration

2020

The future of refugee resettlement & complementary pathways: Strengthening sustainable and strategic humanitarian solutions for refugees

This report aims to strengthen the effectiveness of refugee resettlement in three key areas: the identification of refugees for resettlement, the international processing of refugees by resettlement countries, and the promotion of alternative migration opportunities to refugees in need of resettlement.

Katherine Rehberg, Church World Service

2020

EVENTS & ANNOUNCEMENTS

Development Aid & Migration: Unexplored Dimensions and Latest Research Findings

This webinar brought together scholars in the field to discuss the link between aid and migration with a focus on the effect of foreign aid on illegal crossings and the role of aid projects as a driver of internal migration in developing countries.

Webinar

21 October 2020

Refugees as Active Agents in Peacebuilding Processes

This webinar will discuss the potential roles of refugees in the peacebuilding landscape of their countries of origin. It will address the questions: What factors or context conditioned the choices and role of refugees, and how can we harness the resources of refugees towards peacebuilding process?

Webinar

18 November 2020