

# SDG Perspective

## SDG2 Zero Hunger and SDG3 Good Health and Well-being

### Powering sustainable food production

Like many other crucially important goals, sustainable food production can only be secured if dangerous and irreversible climate change is avoided. The first contribution of nuclear energy to this goal is therefore to help achieve the complete decarbonisation of the global power industry as quickly as possible.

The International Atomic Energy Agency has been working for decades with the UN Food and Agriculture Organisation to develop and extend the ways in which nuclear technology can be applied to improve crop and livestock production around the world, to raise food safety, and to conserve scarce water and soil resources.

According to the Food Irradiation Global Market Outlook, nearly 1 million tonnes of food is sterilised with radiation worldwide. Such services are provided by many vendors, from US-based Food Technology Service and Sterigenics International to Rusatom Healthcare – a subsidiary of Russian nuclear giant Rosatom – that offers both isotope supplies and turnkey solutions in the construction of irradiation centres.

Examples of how nuclear technology can be applied include radioimmunoassay methods to help diagnose diseases and monitor the effectiveness of disease control and eradication programmes. In addition, brief exposure to radiation can be used to accelerate genetic changes in plants to make crops such as rice, wheat and soya bean more resistant to disease or drought.

The nuclear derived sterile insect technology sterilises male insects and releases them over pest-infested areas to suppress and eventually eliminate pests and prevent the introduction of invasive species in ways that are environmentally safer than conventional pesticides.

Countries which have benefited from using nuclear technology to improve the sustainability of their food production include Cameroon, Chile, Mexico, Guatemala, and Vietnam.

### Ensuring food safety and quality

Food, water, and energy are the basic needs of society. Their continued availability is jeopardised by the long, unsustainable pressure our society has placed on supply chains and the environment. These problems present a complex challenge that must be swiftly addressed to ensure the long-term wellbeing of our planet.

Some meaningful technological advances made since the industrial revolution have drastically increased food production and distribution efficiency across the globe to match rapid population (and thus food demand) growth. Certain nuclear techniques introduced in the 1960s have been critical in helping to combat unsustainable pressure on food systems. In fact, some of the most innovative ways wherein nuclear technologies can help to improve the overall food system - from production to distribution - include:

- ☒ **Animal productivity and health**
  - Improvement of zoonotic disease prevention and eradication of pests
- ☒ **Food safety**
  - Sterilisation to improve the safety and shelf life of food by destroying microorganisms and insects or to delay sprouting and ripening, thereby increasing the longevity and overall safe provisioning of food
- ☒ **Climate change adaptation and mitigation**

- ☒ **Qualitative agricultural production insurance and efficiency**
  - Combating pests and diseases
  - Seasonal famine prevention
  - Increasing crop production
  - Improving soil and water managements



### Powering modern health infrastructure

In 1895, Wilhelm Roentgen accidentally discovered X-rays while working in his lab and was subsequently awarded the Nobel Peace Prize in Physics for this work in 1901. Since then, medical professionals in the fields of radiology and nuclear medicine have extensively relied upon nuclear technology to diagnose and treat patients.

The most common application of nuclear technology in the medical field is diagnostic imaging. Over the past century, medical professionals have used radiation techniques, like X-rays machines, to produce 2D and 3D images of parts of the body and subsequently diagnose what medical treatment a patient might need. Similarly, doctors also use medical radioisotopes to track how organs may be functioning and how to subsequently treat them. This is done by ingesting, inhaling, or injecting radioactive material into the body and using computer technology to produce high quality images.

Medical professionals also use radiation to treat cancer patients. Just as a radioisotope can be localized in a specific organ for diagnostic purposes, it can also use radiation to destroy or weaken malfunctioning cells. In this type of treatment, seeds, ribbons, or capsules that contain a radioactive source are placed in your body. External radiation beam therapy is also an option.

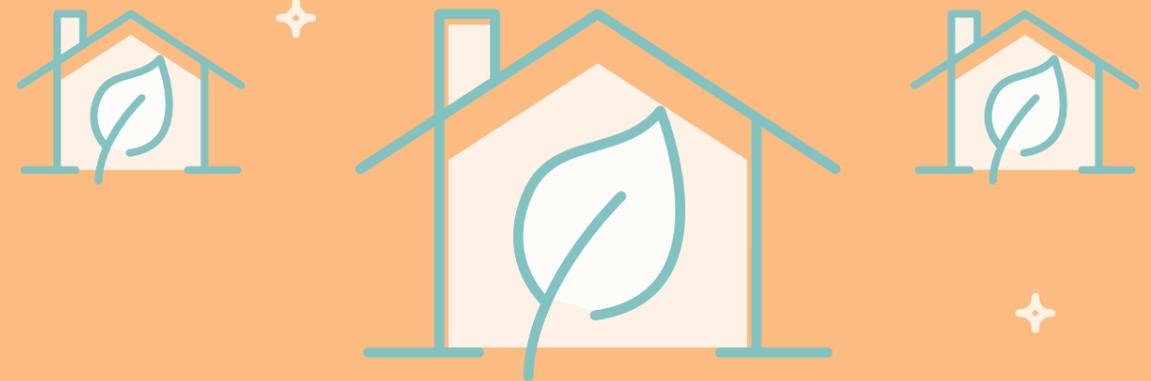
Today, more than one-third of all medical procedures involve radiation or radioactive material. Overall, experience proves nuclear technology is a quick, safe, and accurate way to diagnose medical conditions and future advances in nuclear medicine can substantially improve the healthcare industry.

### Improving the health of communities

Production of fossil fuels comes with an unacceptable environmental cost. Marine oil spills are all too often reported, and the mining of coal can have a disproportionate effect when compared to the energy produced. One ton of coal produces around 2,000 – 2500 KWh of electricity. Compare this with the 40 million KWh that is produced from one ton of natural uranium, and it is clear that nuclear power can provide a clean and sustainable energy source.

A sustainable environment must be the goal when balancing the need to protect our planet with the need to provide for healthy and prosperous communities.

Sustainable transport is identified as a major factor for improving social and economic wellbeing. A good transport system will provide a reliable route for the movement of people, such as to and from work, as well as an efficient way to ensure the delivery of all goods and services. Currently, this comes with an environmental cost. Over the next two decades it is envisaged that transportation will become the major driving force behind the growing energy demands of the world. Transport is already the largest end-user of energy in the developed world, and this will soon be joined by developing countries. This has serious health implications if fossil fuels are used. The use of fossil fuels produces huge quantities of CO2, NOX, SOX and particular pollution. This air pollution causes climate change, health issues, and damage to land and marine environments. These dangers can be avoided with the adoption of nuclear power.



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