# [***-How the IAEA Contributes to Bend the Curve of Biodiversity Loss***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:65HG-30N1-JD3Y-Y2N3-00000-00&context=1516831)

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**Body**

The topic of this year's International Day for Biological Diversity is 'building a shared future for all life'.

It celebrates all the efforts to bend the curve of ***biodiversity*** ***loss*** at a time when ***biodiversity*** is declining faster than ever in human history. The IAEA, in partnership with the Food and Agriculture Organization of the United Nations (FAO), contributes to soil, plant and animal ***biodiversity*** while supporting countries worldwide to reach their strategic objectives towards food security, sustainable agricultural development and ecosystem services with the use of nuclear and related techniques.

Of an estimated 8 million animal and plant species, around one million are threatened with extinction unless action is taken to reduce the intensity of drivers of ***biodiversity*** ***loss***, according to the most recent meeting of the UN Environment Programme discussing the post-2020 Global ***Biodiversity*** Framework.

Over the last decades, the IAEA, in cooperation with FAO, has developed and validated a wide range of isotopic and nuclear techniques to address ***biodiversity*** ***loss*** in agriculture, in the forests and in the marine environment. Through its technical cooperation programme and coordinated research projects (CRPs), the IAEA transfers these techniques to scientists, technicians and practitioners around the world.

Promoting sustainable agriculture

Soil is the thin layer of earth that hosts a quarter of our planet's ***biodiversity***. It is the most diverse habitat of micro- and macro-organisms, such as bacteria, fungi, nematodes, vertebrates, and invertebrates, which interact and contribute to the global cycles that make life possible.

'Unfortunately, we're degrading and destroying our soils faster than they develop or replenish, through climate change, intensive agriculture, deforestation and industrial activity,' said Lee Kheng Heng, Head of the Soil and Water Management and Crop Nutrition Section at the FAO/IAEA Joint Centre of Nuclear Techniques in Food and Agriculture.

As part of its activities to foster a more sustainable use of soil, the IAEA is organizing the International Symposium on Managing Land and Water for Climate-Smart Agriculture next July. The FAO/IAEA Joint Centre supports farmers around the world to develop climate-smart agriculture practices, reduce the use of fertilizer, combat desertification and prevent contamination of the soil and water.

Improving plant and animal genetic diversity

Since its creation 58 years ago, the FAO/IAEA Joint Centre has worked with thousands of scientists worldwide to develop new plant varieties of both major crops and underutilized and indigenous crops - increasing ***biodiversity*** in the process. In 2021 alone, it provided technical support for the development and release of 36 new plant varieties. They included higher-yielding sorghum and cowpea, banana resistant to major fungal disease, drought-tolerant peanut varieties and many more. They were developed using irradiation of seeds, creating new lines selected for their superior properties. As part of its efforts to promote mutation breeding, a technique that accelerates natural evolution in plants to adapt to the conditions of their environment, in different countries, the Centre has recently launched a five-year CRP on radiation-induced crop diversity and genetic associations.

'Our work in plant mutation breeding helps countries improve existing crop varieties by bringing in new genetic diversity to provide better and stable yields under existing and evolving environmental challenges, including climate change,' said Shoba Sivasankar, Head of the Plant Breeding and Genetics Section. 'In that sense, we are bringing in new 'genetic' diversity, which does not crowd out local ***biodiversity***, as it focuses on agricultural lands where a previously existing crop variety is improved upon.'

The IAEA and FAO also support countries in the field of animal reproduction and breeding by developing protocols and guidelines that help characterize the ***biodiversity*** of livestock and use it more sustainably. They provide services to animal genetics laboratories and livestock professionals, including training on the application of nuclear and nuclear-related genotypic techniques to identify environmentally adapted breeds with superior genetic makeup to tolerate climatic changes such as drought tolerance or to mitigate susceptibility to emerging or re-emerging animal diseases in order to improve the livelihood of farmers.

As part of that support, the IAEA has recently launched a five-year CRP on applying nuclear and related genomic technologies for enhancing the efficiency of national dairy cattle breeding programmes to improve productivity and adaptability of local genetic stock.

Mitigating the effects of invasive species on ecosystems

'The impacts of invasive species are second only to natural habitat destruction as a cause of global ***biodiversity*** ***loss***. They can interfere with ecosystem services or disrupt whole ecosystems and cause the decline of many of the native species that are now listed as endangered or threatened,' said Walther Enkerlin, Entomologist at the FAO/IAEA Joint Centre.

The IAEA and FAO help countries control invasive species, such as the drosophilid fruit fly, using a nuclear technique known as the sterile insect technique (SIT). Sterile insects when released in the field mate with wild insects of the same species, so no offspring is produced, resulting in the reduction of a pest population over time.

Studying and restoring ecosystems

The IAEA supports countries in the use of nuclear and isotopic techniques to better understand, strengthen and restore ecosystems that not only provide homes to animals and plants, the biological diversity they incorporate, but are also at the core of maintaining the balance that allow ***biodiversity*** to flourish. Ecosystems are interconnected systems of diverse components (air, water, soil) and organisms (animal, plants, microorganisms). Expanding urban areas, agricultural activities and industry can have an impact on biological diversity of ecosystems (mainly seen though the number of animal or plants composing them, e.g. the sum of visible organisms), but also on the ecosystem ***biodiversity*** (its capacity to maintain or create biological diversity through the connections between the ecosystem components and organisms and its resilience to changes). The IAEA conducts research and provides expertise on processes and stressors, such as pollution or climate change, which could result in ***biodiversity*** ***loss***.

For instance, in 2021, the IAEA launched a four-year long CRP that uses isotopes to better understand the fluxes of water in wetland-groundwater ecosystems. Wetlands and groundwater systems are connected as wetlands occur in areas where groundwater is discharged and serve as a transition point between groundwater and surface water. 'Understanding this connectivity is critical for the long-term protection of wetlands as well as sustainability of groundwater systems that depend on them,' said Lucia Ortega, Isotope Hydrologist at the IAEA

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