



POSITION PAPER ON THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

Over the past two decades, the number of endangered species and the rate of ecosystem degradation have increased dramatically across all regions. The [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services \(IPBES\)](#) noted that approximately 1 million plants and animal species are now at risk of extinction. Climate change is adding to and worsening the impact of biodiversity losses. Together climate change and biodiversity losses threaten the viability of crucial ecosystems in many regions of the world. The Post-2020 Global Biodiversity Framework must acknowledge the urgency to stop and reverse these biodiversity losses.

While there have been many successful initiatives, issues of cost, replicability, and scalability have limited the capacity of current methods to address environmental degradation alone. The Post-2020 Global Biodiversity Framework must include a focus on research and development of novel and complementary tools for transformative change to enable success in restoring and protecting ecosystems. Without sustained support for research and innovation, enabled through high-level policy frameworks, the international community will not be able to deliver the speed, scale and affordability needed to meet conservation challenges.



SCIENCE IS KEY TO SUCCESS

Science and research are the cornerstone to evidence-based decision making. They will underpin the ability to measure progress on the next biodiversity goals and support decision-making and prioritisation. But science and research need to be recognised not only for providing information, but also for delivering solutions. **The Post-2020 Biodiversity Framework must explicitly recognise the role that science and research plays in the development of novel tools and approaches as essential to achieving the post-2020 objectives.**

The Zero Draft recognises the generation and sharing of scientific knowledge, capacity-building initiatives and technical cooperation as critical mechanisms for the implementation of the new Framework. The Network welcomes the inclusion of these elements, as well as further commitments to research new solutions for biodiversity challenges, among targets and indicators. This is important because:

- Recognizing that science is not only a tool of observation to enhance our understanding of ecosystems or biodiversity - as stated in Aichi Target 19; but also a solution to global challenges. Throughout history, science has enabled tremendous progress to be made in countless areas, from controlling diseases to improving energy efficiency.
- Recognizing the importance of innovative and complementary solutions in the new Biodiversity Framework is a crucial opportunity to reaffirm the need to build a supportive environment to research, development and, ultimately, change.
- Including research and investment on novel tools and approaches explicitly in the Framework will help ensure financial, human and other resources are directed towards these activities in the future and that researchers are adequately supported.
- Emphasizing the need for innovative and complementary solutions is consistent with the emphasis on research in Sustainable Development Goal 9 (Industry, Innovation and Infrastructure) and with the recommendation from the last IPBES report.

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As noted in the IUCN Assessment of Synthetic Biology and Biodiversity Conservation, research in the field of synthetic biology is ongoing and the state of knowledge is growing rapidly, offering possible tools to complement existing methods to stop extinctions, improve climate change adaptation and reduce pollution:

- In the US, researchers developed a gene edited version of the endangered American chestnut for potential forest restoration. The new tree is modified using a single gene derived from wheat genome to tolerate a lethal fungus' substance. Nearly four billion American chestnut trees were growing in the eastern part of the U.S. a century ago and the nuts fed billions of wildlife, people and their livestock, indicates [The American Chestnut Foundation](#). Now these trees are categorised as Critically Endangered on the IUCN Red List.
- To reduce water pollution, synthetic biology is being used to clean wastewater by using a granular material capable of attracting micropollutants and chemicals. The [World Health Organization](#) estimates that by 2025, half of the world's population will be living in water-stressed areas.
- To reduce coral reef degradation due to climate change, scientists are researching the possibility of modifying coral genomes to increase their resistance to warming ocean temperatures and water acidification, and pollution. Corals are an essential source of nutrients for marine food chains, provide habitats for many marine organisms, protect coastlines from wave action, among many other important ecosystem functions. In 2016 and 2017, the Australia's Great Barrier Reef alone lost approximately 50% of its corals, according to the [IUCN report Genetic Frontiers for Conservation](#).
- Researchers are also investigating the use of gene drive approaches to control the population of invasive alien species, as a complement to current tools. Present research is focused on mice and rats, the primary cause of extinctions on islands. A total of 1352 mammal, bird, reptile and amphibian species worldwide, classified as threatened, are primarily endangered by invasive alien species impacts, highlights [IUCN](#).



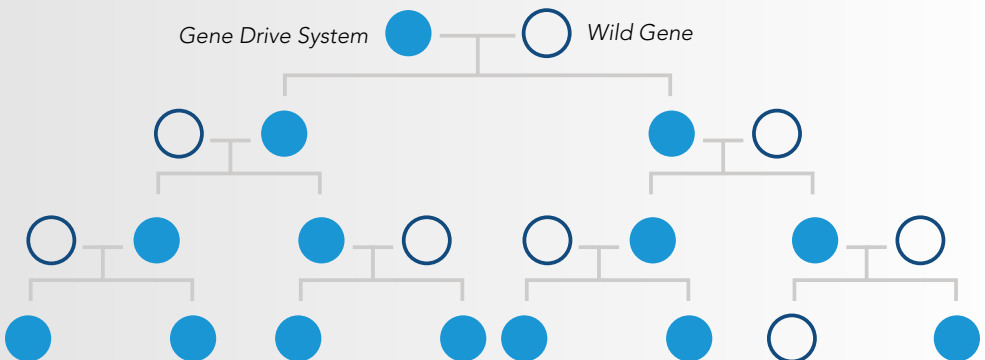
What is Gene Drive?

Gene drive is a naturally occurring phenomenon that is providing inspiration for new approaches to conservation and public health. Used in combination with other methods and tools already in place, gene drive approaches can offer the speed, sustainability, and effectiveness to reverse current biodiversity loss and to tackle public health threats, such as malaria.

Gene drive is a well-established field of research. First observed in the 1920s in mice and *Drosophila*, gene drive has been the subject of investigation for many years. Researchers have been studying whether it is possible and appropriate to harness gene drives to address some of the world's intractable problems. Public health and biodiversity and ecosystem conservation are two of the main areas where gene drive research has focused.

There has been significant progress in research in this field, but it will take many years before gene drive could be applied to eradicate diseases or protect species from extinction. Before that, it will be necessary to assess the potential positive and negative impacts of each gene drive-based technology fully, so that decisions on whether and how to use new tools derived from this approach are based on knowledge and evidence. The risks and benefits of each gene drive application vary according to the type of modification made, the species applied to, as well as the ecosystem and geography where the gene drive organism will be used. Therefore, risk assessments should be carried out on a case-by-case basis for each proposed application.

Figure 1: Gene Drive Inheritance





THE CARTAGENA PROTOCOL IS ESSENTIAL TO ENABLE RESEARCH AND KNOWLEDGE TRANSFER

New technologies, such as those derived from synthetic biology and gene drive approaches, have the potential to contribute to addressing global conservation and health problems. However, research on synthetic biology and genetic technologies must be done responsibly and safely and biosafety is an essential aspect of the proper conduct of research on living modified organisms (LMOs).

Effective implementation of the Cartagena Protocol in signatory countries should be a priority for the Post-2020 Biodiversity Framework. Effective biosafety frameworks are important not only to enable countries to control the movement of living modified organisms (LMOs) but also to provide the predictability and clarity needed to encourage research and knowledge transfer.

The Cartagena Protocol is the foremost international framework for managing LMOs. Parties to the Protocol now are over 170, a clear sign of its importance and relevance. Yet, implementation of the Protocol is uneven across Parties, undermining trust in its processes and its ability to ensure smooth and robust international management of LMOs. Partial or inadequate implementation also create uncertainty for researchers and limit the ability of researchers to benefit from international collaborations through knowledge and technology transfer.

Specific actions could help support the implementation of the Protocol, and should be included in its Implementation Plan:

- Evaluate the need of Member States for support in the development and implementation of legal, administrative and other measures to implement the Protocol and provide training opportunities
- Improve knowledge and access to detection, identification and monitoring methods.
- Increase timely information sharing on the Biosafety Clearing House.
- Facilitate access to adequate technical infrastructure and training for biosafety experts.
- Ensure that Parties have the necessary capability to take into consideration socio-economic aspects when making decisions on LMOs.

The implementation of the Cartagena Protocol should not be an end in itself. As knowledge and science advance, the Protocol should be revised to incorporate lessons learned and best practices and evolve to include wider and more ambitious coordination initiatives over time.

Urgency and commitment to change must guide the negotiations on the Post-2020 Global Biodiversity Framework. The increasing number of endangered species and the accelerating rate of ecosystem degradation require complementary new approaches and transformative tools to halt current trends. Parties must work to guarantee that the new Framework puts in place the necessary conditions to encourage responsible research, support evidence-based decision-making and development of new and complementary tools to conserve biodiversity, including LMOs.



For more information visit: www.genedrivenetwork.org

