



# Biosafety

## and the environment



**An introduction to  
the Cartagena Protocol  
on Biosafety**



CBD



UNEP

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**An Introduction to the Cartagena Protocol on Biosafety**





THE BIOSAFETY PROTOCOL WILL ENABLE PEOPLE EVERYWHERE TO ENJOY THE BENEFITS OF BIOTECHNOLOGY WHILE AVOIDING UNNECESSARY RISKS.

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## The Convention on Biological Diversity and its Cartagena Protocol on Biosafety

Governments and civil society are collaborating through the Convention on Biological Diversity to reverse the tide of devastation that humanity has inflicted upon the natural world. The stakes are high: although some 40% of the world economy is derived directly from biological diversity, humanity is pushing ecosystems, species and gene pools to extinction faster than at any time since the dinosaurs died out 65 million years ago.

At present, natural habitats and ecosystems are being destroyed at the rate of over 100 million hectares every year. More than 31,000 plant and animal species are threatened with extinction; according to the Food and Agriculture Organization of the UN, at least one breed of livestock dies out every week. Band-aids are not enough: only a fundamental and far-reaching solution can ensure a biologically rich world for future generations.

Adopted in 1992 under the auspices of the United Nations Environment Programme, the Convention is the first global treaty to provide a comprehensive framework that addresses all aspects of biodiversity – ecosystems, species, and genetic diversity. It also introduces a new strategy for the biodiversity crisis known as the “ecosystem approach”, which aims to reconcile the need for environmental conservation with concern for economic development. By promoting “sustainable development”, the Convention seeks to ensure that the earth’s renewable resources are not consumed so intensively that they cannot replenish themselves.

Now boasting almost 190 member governments (known as “Parties”), the Convention has three goals: the conservation of biodiversity, the sustainable use of the components of biodiversity, and the fair and equitable sharing of the benefits arising from the use of genetic resources.

When crafting the Convention, governments recognized that modern biotechnology has the potential to contribute to achieving these three goals – as long as it is developed and used with adequate safety measures for the environment and human health. These governments put this conviction into action a few years later by establishing the Cartagena Protocol within the framework of the Convention.

# 1

## Introduction: the biotech revolution



Genetic manipulation is not new. For millennia, farmers have relied on selective breeding and cross-fertilization to modify plants and animals and encourage desirable traits that improve food production and satisfy other human needs. Artisans have exploited traditional fermentation techniques to transform grains into bread and beer and milk into cheese. Such intentional modification of the natural world has contributed enormously to human well-being.

Over the past 30 years, however, our ability to alter life-forms has been revolutionized by modern biotechnology. Scientists have learned how to extract and transfer strands of DNA and entire genes – which contain the biochemical instructions governing how an organism will develop – from one species to another. Using sophisticated techniques, they can precisely manipulate the intricate genetic structure of individual living cells. For example, they can insert genes from a coldwater fish into a tomato to create a frost-resistant plant, or use bacterial genes to make herbicide-tolerant corn. The results are known as living modified organisms (LMOs) or, more popularly, genetically modified organisms (GMOs).

Since the first genetically modified tomato became available in shops in the United States in 1994, dozens of food crops and animals have been modified for greater commercial

value, higher yield, improved nutrition, or resistance to pests and disease. Proponents argue that biotechnology will boost food security for the world's growing population by raising sustainable food production. It will benefit the environment by reducing the need for more farmland, irrigation and pesticides. It will also provide better medical treatments and vaccines, new industrial products and improved fibres and fuels.

For many people, however, this rapidly advancing science raises a tangle of ethical, environmental, social and health issues. Because modern biotechnology is still so new, they say, much is unknown about how its products may behave and evolve, and how they may interact with

other species. Could an ability to tolerate herbicides, for example, transfer from GM crops to related wild species? Might plants that have been genetically modified

***While modern biotechnology may have great potential, it must be developed and used with adequate safety measures, particularly for the environment.***

to repel pests also harm beneficial insects? Could the increased competitiveness of a GMO cause it to damage biologically-rich ecosystems?

Such concerns have kept GMOs in the headlines. One new scientific study concludes that modified organisms pose little risk – and then another raises difficult new questions. Modified soya is found in export shipments that had been declared GMO free, or pollen from modified



corn is detected in a nearby non-modified field. Editors fret about potential trade conflicts, and commentators recite emotional arguments about the pros and cons of modern biotechnology.

Fortunately, this debate has led to a broad consensus that, while modern biotechnology may have great potential, it must be developed and used with adequate safety measures, particularly for the environment. Countries with strong biotechnology industries do have national legislation and risk-assessment systems in place. However, many developing countries interested in modern biotechnology and its products are still in the process of drafting regulations. And because biotechnology is a global industry, and GMOs are traded across borders, international rules are needed as well.

In 1995, the Parties to the Convention on Biological Diversity responded to this challenge by launching negotiations on a legally binding agreement that would address potential risks posed by GMOs. These discussions culminated in January 2000 with the adoption of the Cartagena Protocol on Biosafety. Named after the Colombian city where the final round of talks was launched, the Protocol for the first time sets out a comprehensive regulatory system for ensuring the safe transfer, handling and use of GMOs subject to transboundary movement. In this way, the Protocol seeks to meet the needs of consumers, industry and the environment for many decades to come. This booklet explains how this system works.



USING SOPHISTICATED TECHNIQUES, SCIENTISTS CAN PRECISELY MANIPULATE THE INTRICATE GENETIC STRUCTURE OF INDIVIDUAL LIVING CELLS.

***To promote biosafety, the Protocol reflects a fundamental concept known as the precautionary approach.***

## 2 Biosafety and precaution

Before turning to how the Protocol operates in practice, we must first examine two key underlying concepts, namely: biosafety and precaution.

The concept of biosafety encompasses a range of measures, policies and procedures for minimizing potential risks that biotechnology may pose to the environment and human health. Establishing credible and effective safeguards for GMOs is critical for maximizing the benefits of biotechnology while minimizing its risks. Such safeguards must be put in place now, while biotechnology is still relatively young.

Biosafety is currently being promoted in a variety of ways by industry, governments and civil society. The particular contribution of the Cartagena Protocol to global biosafety is helping to ensure:

*“an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, including genetic diversity, in particular to those countries that are developing countries.”*

international agreements and organizations or products derived from GMOs, such as cooking oil from genetically modified corn or paper from GM trees.

To promote biosafety, the Protocol reflects another fundamental concept known as the precautionary approach. It reaffirms Principle 15 of the 1992 Rio Declaration on Environment and Development, which states that, “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.

Other international agreements also apply the precautionary approach to their particular concern. In the case of the Biosafety Protocol, this concept means that a government may decide on the basis of precaution not to permit a particular GMO to be imported across its borders. This is the case even if there is insufficient scientific evidence about the GMO’s potential adverse effects.

The Protocol applies precaution



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