

‘Almost all crops today have been changed from their original form’: National Academies of Sciences says GMOs just most recent form of food genetic modification

People have been changing plants for thousands of years. Humans started farming [more than 10,000 years](#). Agriculture began in Mesopotamia, in the region we now call the Middle East. At first, people took the seeds of wild plants and put them in places where they would grow well and be easier to harvest. Soon, people noticed that some plants performed better than others, and they kept the seeds of the best ones to plant the next year. As people did this year after year, farmed crops slowly became different from their wild relatives. This process is often called *domestication*.

The choices early farmers made about which seeds to plant were driven by many of the same factors that influence choices made about seeds today. Many wild plants naturally produce toxins that act as a defense against pests, and people made seed choices so that many crops today are tasty, nutritious, and easy to digest. Farmers want plants that are [easier to harvest and produce more](#) fruit, vegetables, grains, fiber, or oil. They also look for plants that can withstand disease, pests, flooding, drought and other problems.

Over thousands of years, people grew many types of crops, brought them to new areas of the world, and continued to change the plants to suit their needs.

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Methods for changing plants expanded as science and technology advanced

In the 1800s, Gregor Mendel and others made discoveries about [how parents pass traits](#) to their offspring. This new understanding helped people produce [new varieties of plants](#) with useful qualities using *selective breeding*. In this method, two plants with desirable traits are deliberately mated so the next generation of plants will have these characteristics. As experiments in plant breeding continued, people learned how to breed plants together to create hybrids with certain traits. For example, hybrid types of [corn, wheat, and rice](#) were bred that produce more grain per plant and that can be grown in narrow rows in a field. Farmers are then able to harvest more grain using the same amount of land.

In the 1930s, people found that [applying radiation or chemicals](#) to a seed caused plants to have traits different from their parents. This is because radiation and certain chemicals can cause changes in the genes of plants, which determine what characteristics the plant will have. The seeds with the most useful traits caused by these genetic changes were then grown and used to breed new varieties of crops. Today, hundreds of varieties of more than 100 crops that we grow and eat were developed using these means, including many types of [rice, wheat, and barley](#).

With the discovery of the structure of DNA in 1953 and other advances in understanding how genes work,

scientists began to explore other ways to improve plants. By the 1980s, scientists were able to identify specific bits of DNA called genetic markers that are associated with particular traits. By knowing what genetic markers to look for, [marker assisted breeding](#) speeds up the breeding process by allowing scientists to know whether a plant will have the desired trait even before it is grown.

For most of history, improving plants depended on choosing two parent plants of similar types or varieties that are able to breed with each other. In the 1980s, scientists also invented ways to create new traits by combining the genes of different kinds of plants, as well as DNA from other organisms, including bacteria and viruses. These new plants carry “recombinant” DNA and are sometimes referred to as *Genetically engineered*, *transgenic*, *genetically modified organisms (GMOs)*, or *bioengineered*. More than a [dozen food crops](#) with traits introduced through [recombinant DNA](#) are grown in the world today.

In the 2010s, [gene editing](#) was developed, allowing scientists to directly change a plant’s genes without having to use the DNA from another plant or other organism. A few such crops are grown today, including gene-edited soybeans that produce soybean oil with a healthier balance of fats.

Almost all crops today have been changed from their original form

Since people have been farming for such a long time, nearly all crops grown today have been genetically improved, whether through domestication, selective breeding, hybridization, radiation or chemicals, or changes made directly to plant genes by humans.

Scientists and growers continue to improve methods for making crops with certain traits. For example, people are working to create crops that can better withstand droughts, which are becoming more common as the climate changes.

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