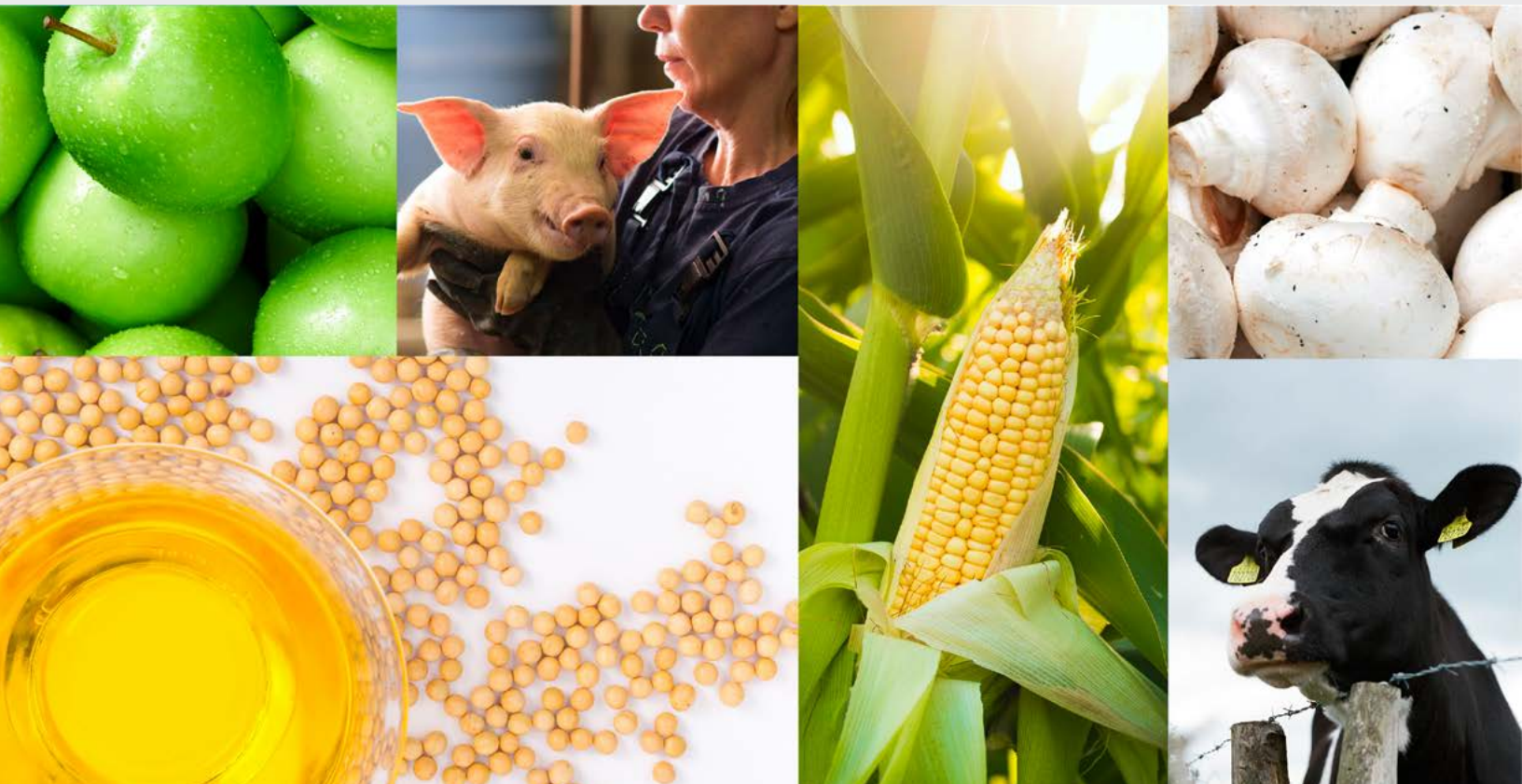


GENE EDITING ENGAGE IN THE CONVERSATION

JUNE 2021



GeneEditing.FoodIntegrity.org

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An Informed Dialogue on Gene Editing

Gene editing technology is one of today's most promising innovations, with tremendous potential to benefit society, farming and food production.

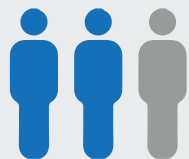
Advancements in gene editing are being developed to solve pressing challenges in farming and food production. That includes helping farmers keep pace with the growing demand for healthier, more abundant and affordable food, while using less water, land and other resources. Gene editing is also being used to develop foods that are safer and healthier. Specifically, gene editing is a tool that can:

- Reduce environmental footprint
- Improve nutrition and quality
- Help plants resist disease
- Reduce allergens
- Reduce food waste
- Reduce animal disease and suffering

In the midst of this promise, the success of gene editing hinges on public support. Market acceptance grants permission – or social license – to responsibly develop and use gene editing in farming and food production.

As more applications are developed and begin to enter the marketplace, it's imperative that those researching and using gene editing participate in an open, public dialogue about the shared benefits of gene editing and their commitment to responsible use.

Consumers Want to Know



2 out of 3 consumers

want to know about **how** food is produced and **who's** producing it.

Source: The Center for Food Integrity (CFI)



More than half of consumers

indicated they want to learn **more** about **CRISPR**.

Source: CFI Best Food Facts video series

Consumers are inherently curious about food production and generally have open-minded attitudes about gene editing. They want to learn more and deserve balanced, credible information from sources they can trust. It's an environment where effective, long-term engagement can provide information the public wants and needs to make informed decisions about gene editing.

The key is to engage in the most meaningful way.

Traditionally it has been assumed that sound science and appropriate government oversight will result in social acceptance of innovation. But what consumers want first and foremost, according to research from The Center for Food Integrity (CFI), is to know that food producers care about the same things they do, like producing safe, affordable, nutritious food in a responsible manner that preserves our environment.

Communication Resources

From the CFI Coalition for Responsible Gene Editing in Agriculture

Consider the following guidance and resources as you communicate about gene editing – whether that’s one-on-one or online conversations, presentations, media interviews, or educational and promotional materials.

These recommendations are the result of collaboration with associations, academic and health institutions, and others who have conducted research on consumer perceptions about biotechnology and gene editing. A foundation is the CFI Trust Model that demonstrates the importance of communicating shared values. The approach sets the stage for meaningful, long-term engagement with audiences who are open to learning more about gene editing.

In this guide, you’ll find:

- 4 [Consumer Perceptions About Gene Editing in Food & Agriculture](#)
- 6 [Effective Communication Approaches](#)
- 12 [The Power of Shared Values](#)
- 15 [Glossary of Genetic Terms](#)
- 21 [The Coalition for Responsible Gene Editing](#)

The CFI Coalition for Responsible Gene Editing in Agriculture is a diverse group working together to earn consumer confidence and trust in gene editing. The coalition has developed A Framework for Responsible Use to openly and transparently communicate with stakeholders about how gene editing technology is being used in a responsible manner as more products begin to enter the marketplace.

WHAT IS GENE EDITING?



A METHOD OF SELECTIVE BREEDING THAT MAKES **PRECISE, INTENTIONAL** AND **BENEFICIAL** CHANGES IN THE GENETIC MATERIAL OF PLANTS AND ANIMALS USED IN FOOD PRODUCTION, WHICH CAN **IMPROVE** HEALTH, NUTRITION AND ENVIRONMENTAL STEWARDSHIP.



OFTEN MIRRORS CHANGES THAT COULD **OCCUR IN NATURE** OR THROUGH **TRADITIONAL BREEDING**.



HELPS FARMERS KEEP PACE WITH THE GROWING DEMAND FOR MORE AND BETTER FOOD, WHILE **USING LESS** WATER, LAND, NUTRIENTS AND OTHER RESOURCES.



Consumer Perceptions about Gene Editing in Food & Agriculture

In reviewing various studies about consumer opinions on the role of science in food production, The Center for Food Integrity found these consistent themes.

Top 10 Takeaways

- There is a considerable knowledge gap among consumers – in science, genetics and modern plant and animal breeding.
- Most people have very little understanding about gene editing, so defining it in easy-to-understand terms is critical.
- Consumers show strongest support for benefits related to environmental stewardship, animal wellbeing, healthier food and disease resistance.
- People worry that gene editing could have unintended consequences; their concern about risks can outweigh support for benefits.
- Gen Z consumers are more aware of gene editing than older consumers. They also are more comfortable with the use of technology to solve food production challenges.
- Before describing gene editing, it's helpful to show the evolution of genetic improvement in plants and animals.
- Women and those most concerned about food ethics care more about gene-edited foods.
- The public wants information from credentialed experts, but they do not want an academic explanation.
- Analogies and visuals are important to explain science, and they should be understandable without being oversimplified.
- Consumers have additional questions about use of science in animals, compared to plants.

The knowledge gap

The public knowledge gap around science and genetics is validated by a significant number of publications.

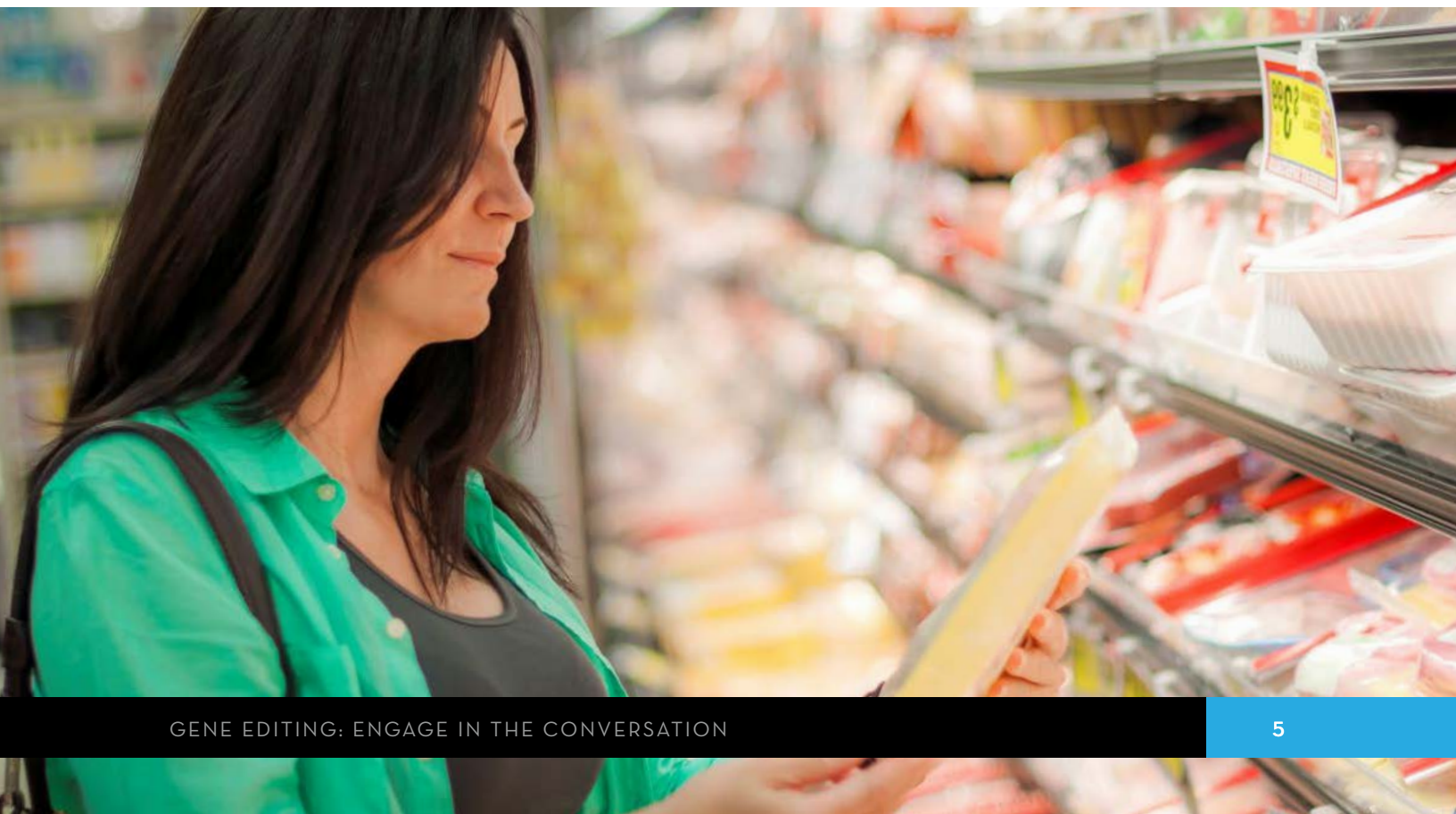
► CONSUMERS WANT TO LEARN MORE



► CONSUMERS HAVE LIMITED UNDERSTANDING ABOUT GENETICS IN FOOD



* Iowa State, 2021 **FMI Foundation, 2020



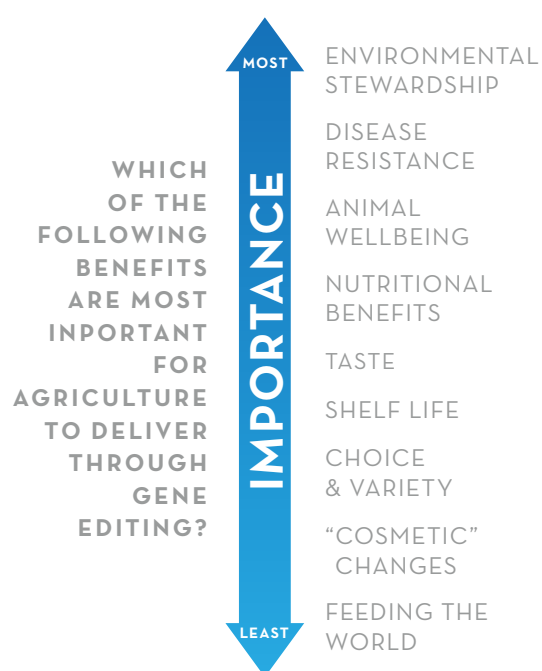
Engage Effectively

5 Effective Communication Approaches

1. Focus on public benefits and values.
2. Connect to gene editing solutions for human health.
3. Talk about evolution of genetic improvement, not revolution.
4. Leverage expert spokespeople who are credentialed and relatable, show integrity and share values.
5. Share analogies and visuals that explain science but are not oversimplified or condescending.

1 FOCUS ON PUBLIC BENEFITS AND VALUES

Consumers are curious about and generally supportive of science when it is used to benefit the environment, resist disease or make food more nutritious.



Consumers of various age demographics consistently rate positively the phrase, “producing more food with fewer resources – like using less water, land or other natural resources.”

Focus on yield improvements is not effective as a standalone benefit, but yield can resonate if connected to the compelling benefit of “producing enough with less.”

In a nationwide survey released in 2020, consumers who were given information about the benefits of gene editing technology were significantly more likely to purchase gene-edited foods. They were most interested in ways gene editing benefits the environment and consumers rather than farmers. When consumers are informed of the benefits of gene editing, the market potential for gene-edited products exceeds 15 percent (FMI Foundation, 2020).

CONVERSATION STARTERS

“Gene editing helps farmers keep pace with the growing demand for more and better food, while using less water, land, nutrients and other resources.”

2 CONNECT TO GENE EDITING SOLUTIONS FOR HUMAN HEALTH

Research shows advancements in human medicine are the strongest entry into conversations about gene editing in food.

Most people know someone impacted by cancer, leukemia, hemophilia or sickle cell disease where gene editing could be life-saving. Gene editing is a valuable tool to develop vaccines for viruses and respond to future outbreaks.

Enter conversations about gene editing through human health applications, and then share about disease resistance and other applications in plants and animals.

How do Americans feel about gene editing for human health?

In a survey of **1,600** people, **TWO-THIRDS** think gene editing for human therapeutic purposes is acceptable.

Scheufele et al. 2017

CONVERSATION STARTERS

“Gene editing shows great potential to cure or prevent disease in humans. Gene editing can also help plants and animals resist disease.”

Key Points

- Share benefits that matter most to **consumers** - not only food producers.
- Share benefits to the **environment, like protecting and conserving our natural resources** - not increased efficiency.
- Share benefits to **animals, like improving animal well-being and reducing disease** - not increased productivity.
- Share benefits to **plants, like tolerance to disease or weather conditions** - not increased yields.



3 TALK ABOUT EVOLUTION OF GENETIC IMPROVEMENT, NOT REVOLUTION

Farmers and scientists can be proud of advancements in genetics; however talking about how science can “revolutionize” food production does not resonate with consumers. In fact, “revolutionize” can invoke concerns about risk of newer technologies, perceived as less-tested.

The public is more supportive when gene editing is described within a continuum of plant and animal genetic improvement, which has a legacy of safe, responsible use spanning several generations. Consumers are more comfortable when gene editing is approached as an “evolution” or “next iteration” of improvement.

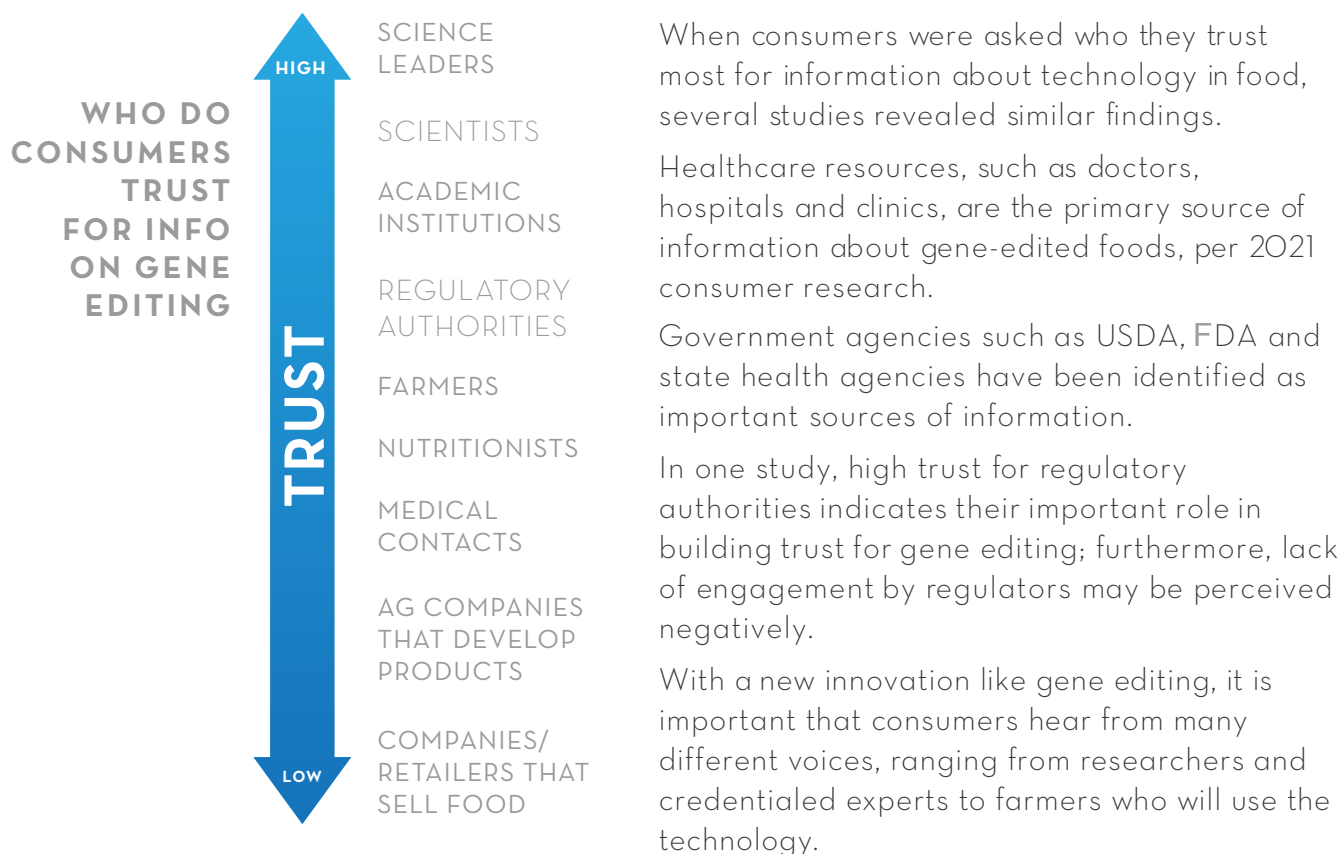
CONVERSATION STARTERS

“Throughout history, farmers have been breeding plants for the best characteristics, like disease resistance and drought tolerance. The lengthy process of observing, selecting and breeding could take years or even decades to complete. Today, plant scientists can use gene editing to make more precise, targeted changes to improve plants and provide solutions to a variety of challenges.”

“Farmers and animal scientists have used genetic diversity and natural selection for several decades by choosing animals with the most desirable characteristics as the parents of the next generation. Gene editing is the next iteration to improve animals’ native genes. Gene editing allows for precise and small but important changes, which often mirror changes that could occur in nature or through traditional genetic selection.”



4 LEVERAGE EXPERT SPOKESPEOPLE WHO ARE CREDENTIALLED AND RELATABLE, SHOW INTEGRITY AND SHARE VALUES



► HOW INFORMATION FROM TRUSTED SOURCES MOVED THE NEEDLE

Presenting information about gene editing from trustworthy sources in a relatable, credible and understandable way can make a significant difference. Consider how support increased after a group of consumers watched a three-part video series on CRISPR from [BestFoodFacts.org](https://www.bestfoodfacts.org/). This series is hosted by a blogger and digital influencer on a mission to learn more about the use of CRISPR who conducted interviews with human health and agriculture experts. Over half of the consumers surveyed found the videos **APPEALING, CREDIBLE** and **UNDERSTANDABLE** and they were interested in learning more. Acceptance of CRISPR grew significantly after watching the videos. For example, after viewing “*How can CRISPR Improve Food? Part 3*” consumer support for use of CRISPR grew from 49% before to 62% after.

CONVERSATION STARTERS

“Gene editing is being used to develop crops that reduce the environmental impact of farming by controlling weeds.”

CONVERSATION STARTERS

“GENE EDITING CAN HAVE A VERY POSITIVE ENVIRONMENTAL IMPACT.”

- Farmers have an obligation to meet the growing demand for healthy, wholesome food while also preserving our natural resources. Gene editing technology can help farmers achieve both.
- Gene editing can help make plants more resilient, which often means they will consume fewer natural resources.
- Gene editing holds great promise to ensure the survival of plants in changing weather patterns. Gene editing can make plants hardier to survive in droughts and floods, and to grow more successfully in regions of the world facing food shortages and malnutrition.

“GENE EDITING CAN HELP ENSURE THE AVAILABILITY, QUALITY AND NUTRITION OF FOODS.”

- Gene editing technology has been used to develop soybeans that produce oil with zero trans fat.
- Scientists say gene editing may provide the best solution for citrus greening disease, which is destroying Florida orange groves, by improving the trees’ genetic code so they are resistant to the pathogen that causes the disease.
- For those with gluten sensitivity, scientists have successfully used gene editing to modify wheat, producing strains that are significantly lower in gluten.
- Gene editing is being developed to prevent browning of potatoes and mushrooms, helping these fresh foods to last longer and reduce food waste.

5 SHARE ANALOGIES AND VISUALS THAT EXPLAIN SCIENCE BUT ARE NOT OVERSIMPLIFIED OR CONDESCENDING

For those less familiar with science or genetics, analogies, videos and graphics are very helpful to explain technology. Effective analogies are relatable, logical and safe, but not oversimplified. To date, common analogies for gene editing are “genetic scissors,” “word processor” and “find-and-replace function”; however, research shows some other analogies are more effective.

MORE EFFECTIVE ANALOGIES

Refer to the improvements of gene editing within the framework of a larger, yet tangible, context.

AN ENCYCLOPEDIA

“DNA is like a long encyclopedia of information – and increasingly, scientists can identify the exact page, the exact paragraph and even the exact word they want to study. With this knowledge, they can use gene editing tools to make corrections or improvements to specific areas of the genome.”

HOUSE BLUEPRINT

“Like the blueprints used to build a house, DNA provides the information for building every living thing. Builders can make small changes to the blueprint – like modifying a defect or adding a feature – to improve the house. These are small, targeted changes relative to the entire house. Likewise, scientists can make small, targeted changes in DNA.”

WORDS THAT WORK

These phrases are perceived more favorably, as shown through consumer research.

- Help farmers manage environmental challenges
- Grow enough food with less water and fewer resources
- Reduce pesticide use
- Protect plants
- Help plants/animals thrive
- Improve plants/animals
- Next iteration or next evolution (of plant improvement or animal genetics)
- Based on a natural process
- Includes no foreign DNA

What about “Feeding the World?”

Recent consumer insights show people have concern about food insecurity and healthy, affordable food for all.

When talking with people, especially younger generations, use phrases such as “Gene editing and technology helps me produce more healthy, affordable food with fewer natural resources.”

Other needs that resonate with the American public.

- Growing enough food with less
- A commitment to doing what’s right for people, animals and our earth
- People’s basic right to consistently have access to safe, nutritious, affordable food

The Power of Shared Values

Consumer Trust Research from The Center for Food Integrity

In conversations with consumers about food production,

VALUES ARE 3 TO 5 TIMES MORE IMPORTANT THAN FACTS.

*Yes, science and data are important,
but we must first establish shared values.*

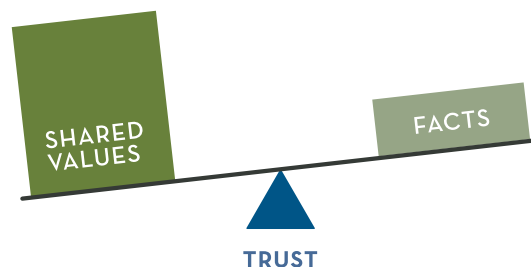
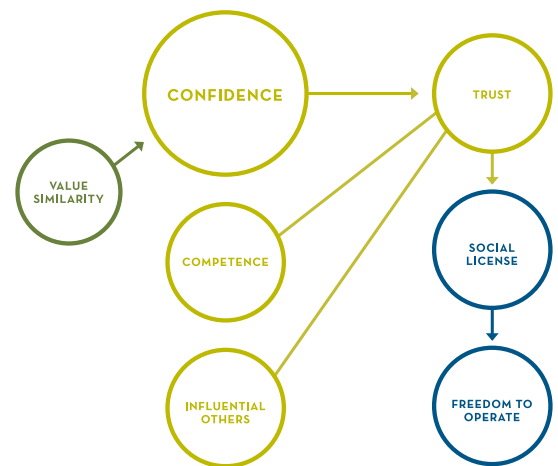
CFI's peer-reviewed and published trust model demonstrates that Confidence (value similarity), Competence (skills and expertise) and Influential Others (credentialed and/or credible individuals) are the primary factors in building trust, which leads to the public granting social license and the freedom to operate. Confidence, or value similarity, is the key driver.

CFI research shows that shared values are much more important to earning trust than communicating with science or demonstrating technical skills and expertise. Simply sharing science and facts actually galvanizes opposing viewpoints and makes it harder to find common ground.

TRUST MODEL

Our peer-reviewed research shows that Confidence, or shared values, is the key to building trust and earning and maintaining Social License, the privilege of operating with minimal formalized restrictions.

Trust research was published in December 2009
- *Journal of Rural Sociology*



WHAT DRIVES CONSUMER TRUST?

Shared values are 3-to-5 times more important to building trust than sharing facts/science or demonstrating technical skills/expertise.

Consumers simply want to know the food industry shares their values for safe, affordable, nutritious food and high standards of animal care and environmental stewardship.

Keys to Shared Values Communication

► EMBRACE SKEPTICISM

You can embrace skepticism without validating misinformation. Listen for the underlying value. What's the source of the concern? Environment, food safety, corporate influence? "I appreciate your interest in the environment. I know protecting the environment is critical to farmers. I'd like to share my perspective on that issue..."

► DON'T CHALLENGE BELIEFS

Challenging strongly held beliefs will cause people to become defensive and dismissive. "I can tell you feel very strongly about this issue. I respect your commitment and share your concern about... (food safety, our environment, etc.). We may not share the same beliefs about the issue, but I respect and appreciate your perspective..."

► LEAD WITH VALUES

Don't discuss science or data until you've listened and expressed shared values. "I can tell you're passionate about food safety. I am, too..."

► BE WILLING TO TALK ABOUT THE HARD ISSUES WITH AUTHENTIC TRANSPARENCY

Who you are is more important than what you know. Consumers want to know you genuinely care and that you are open to discussing the tough questions. "I can tell this is an issue that's important to you and it's important to me, too. I may not have all the answers, but I'll do my best to address your questions..."

LISTEN - ASK - SHARE

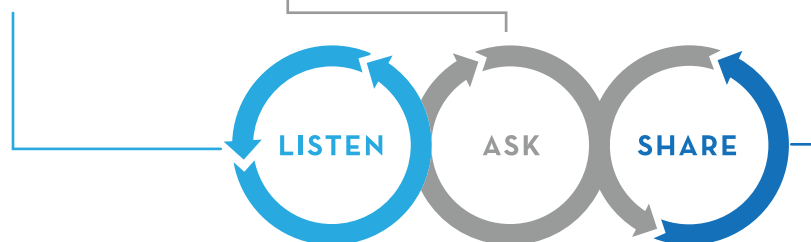
Actively listen, without judgment, for agreement and points of connection to understand how their concern is tied to their underlying values.

Ask questions to invite dialogue and clarify their perspective. Show that you heard them by acknowledging what they said.

"I understand why there are questions. What concerns you most?"

Share your values-based perspective first to build trust

"People all around the world and the U.S. deserve safe, healthy and affordable food. That's why I farm (or work with farmers) and keep up with research and technology that improves how we grow food."





CONVERSATION STARTERS

“I’m a farmer and I’m a parent, too. Producing healthy, affordable, safe food is important to me and I rely on science and innovation to do just that.”

“People in the U.S. and all around the world deserve safe, healthy and affordable food. That’s why I am involved in agriculture and continually work to improve how we raise crops and animals.”

“New technologies have enabled us to take better care of crops and reduce our environmental footprint. Gene editing holds tremendous promise on both fronts.”

“I’m excited about the tremendous potential of gene editing – in human health and in agriculture. Medical researchers are working on ways that gene editing can prevent and cure disease in humans. Plant and animal scientists are making progress, too, as to how gene editing can improve the health and disease resistance of animals and plants for food.”

Glossary of Genetic Terms

Earning trust in gene editing requires communicating in a way that makes science meaningful to a general public that is less familiar with genetic terms and scientific processes. When communicating with non-scientific audiences, consider describing the following terms with less jargon to help make the science more understandable. Using consumer-friendly images and analogies can also be very useful in making information relatable.

These terms can be introduced into a conversation about the continuum of genetic improvement in plants and animals, with gene editing as a next iteration in genetic improvement, or what farmers and scientists have been doing for years.

Another helpful resource is the glossary from [Innovative Genomics Institute](#)

Gene Editing

GENE EDITING (also known as **Genome Editing**)

1) Gene editing makes precise, intentional and beneficial changes in the genetic material of plants and animals used in food production, which can improve health, nutrition and environmental stewardship. This often mirrors changes that could occur in nature or through traditional breeding. Gene editing helps farmers keep pace with the growing demand for more and better food, while using less water, land, nutrients and other resources.

NOTE: The work of the Coalition for the Responsible Use of Gene Editing in Agriculture is focused on gene editing applications that produce variation in native alleles that could occur or be achieved through selective breeding between species that are sexually compatible.

SOURCE: [CFI Coalition for Responsible Gene Editing in Agriculture](#)

2) The process of making precise, targeted changes in the DNA of living cells and organisms.

SOURCE: [Council for Agricultural Science and Technology](#)

Gene Editing Techniques

CRISPR

CRISPR refers to a specific type of gene editing and stands for “Clustered Regularly Interspersed Short Palindromic Repeats.” Like other gene editing processes, CRISPR can precisely change the genetic code, or DNA, within a living thing.

ADAPTED FROM [Best Food Facts](#)

MEGANUCLEASES

Meganucleases can be described as molecular scissors that cut DNA at a very specific location. Meganucleases target large DNA sequences, thus the word “mega.” Such large sequences in DNA rarely occur. Meganucleases can be used as highly specific tools to modify or eliminate a particular gene, for example.

ADAPTED FROM [Meganucleases by Cellectis](#)

TALENs

Transcription Activator-like Effector Nucleases, or TALENs, refers to one technique used for gene editing. Its first reported success came in 2012 when researchers at Iowa State University used the technique to develop disease-resistant rice. The technique has also been used to create naturally hornless cattle and soybeans with higher quality oil.

SOURCE: [Genetic Literacy Project](#)

ZINC FINGER NUCLEASES (ZFNS)

ZFNs is the oldest of the gene editing technologies, developed in the 1990s. It has been primarily used in research for a variety of human diseases, including HIV/AIDS and hemophilia. It is used in plants to stimulate the cell's naturally occurring DNA repair processes.

SOURCE: [Genetic Literacy Project](#)

Other Genetic Terms

CISGENESIS

The introduction into an organism's genome of a gene from a member of the same species or a closely related species.

SOURCE: [Council for Agricultural Science and Technology](#)

CROSSBREEDING (ANIMALS)

In genetic improvement, mating two purebred animals that come from different breeds or varieties, with the intent of producing offspring that would acquire desired, or beneficial, traits of the parents. This is commonly practiced by animal breeders, especially when the desired traits would be beneficial to the offspring, such as when its health is enhanced.

SOURCE: [Biology Online Dictionary](#)

CROSSBREEDING (PLANTS)

Classical plant breeding crosses closely or distantly related plants to produce new crop varieties with desirable characteristics.

ADAPTED FROM [Science Daily](#)

DNA

DNA, which stands for deoxyribonucleic acid, is a unique genetic code that, like a recipe, holds the instructions for making all the proteins in organisms. DNA tells cells how to grow, function and reproduce.

ADAPTED FROM [Your Genome](#)

GENE

A segment of DNA that encodes the information used to make a protein. Each gene is a set of instructions, like a recipe, for making a particular molecular machine that helps a cell, organism or virus function.

ADAPTED FROM [Innovative Genomics](#)

GENOME

A genome is an organism's complete set of DNA, including all of its genes. Each genome contains all of the information needed to build and maintain that organism. In humans, a copy of the entire genome – more than 3 billion DNA base pairs – is contained in all cells that have a nucleus.

SOURCE: [Genetics Home Reference](#)

GMO

GMOs are crops developed through **genetic engineering**, which allows plant breeders to take a desirable **trait** found in nature and transfer it from one plant or organism to the plant they want to improve, as well as make a change to an existing trait in a plant they are developing. The 10 genetically modified crops available today include: alfalfa, apples, canola, corn (field and sweet), cotton, papaya, potatoes, soybeans, squash and sugar beets.

SOURCE: [GMOanswers.com](#)

HYBRID

A hybrid is an animal or plant that has been bred from two different breeds or varieties of animal or plant, similar to crossbreeding.

SOURCE: [Collins Dictionary](#)

HYBRID BREEDING

Two different varieties or breeds are crossed to produce an offspring with stable characteristics and hybrid vigor, where the offspring is much more productive than either parent.

SOURCE: [Crops.org](#)

MUTAGENESIS

Changing the genetic material of an organism in a stable manner, resulting in a mutation.

SOURCE: [Biotech Articles](#)

MUTATION

A change from one genetic letter (nucleotide) to another. Variation in DNA sequence gives rise to the incredible diversity of species in the world, and even occurs between different organisms of the same species. While some mutations have no consequence at all, certain mutations can directly cause disease. Mutations may be caused by DNA-damaging agents such as UV light or may arise from errors that occur when DNA is copied by cellular enzymes. They can also be made deliberately via gene editing and other methods.

SOURCE: [Innovative Genomics](#)

PLANT BREEDING

Since plants were first domesticated, gardeners, farmers and plant scientists have been observing, selecting and breeding for their most desirable traits. In the past, this involved looking at a plant's observable advantages – like growth, disease resistance and taste – then selecting and planting the seeds from those plants. Over time, this resulted in better, stronger plants, which breeders continued to improve over time.

SOURCE: [American Seed Trade Association](#)

TRANSGENIC

Transgenic refers to the movement or insertion of a gene into an organism that normally does not have a copy of that gene.

SOURCE: [GMOAnswers.com](#)



Resources

ARTICLES & BLOGS

- Best Food Facts - [CRISPR – Why is it used in Food?](#)
- Best Food Facts - [How Did Science Create an Apple that Doesn't Brown?](#)
- Best Food Facts - [New Potatoes Solve Historic Problem](#)
- FMI - [Findings Suggest Consumers Largely Unaware of the Benefits to Environment and Animal Welfare from Groundbreaking Technology](#)
- Gates Foundation - [Gene Editing for Good: How CRISPR Could Transform Global Development](#)
- Iowa State University - [Public Awareness and Understanding of Gene Edited Foods in the US](#)
- Ketchum - [A Rising Generation of Food Consumers Is More Open to New Food Technology, Says Ketchum Study](#)
- University of California Davis - [What is Gene Editing? By Dr. Alison Van Eenennaam](#)
- Live Science - [What is CRISPR? With Dr. Jennifer Doudna \(video included\)](#)

IMAGES

- Corteva Agriscience - [Here's How CRISPR-Cas Works](#)
- Danforth Center Gene Editing with CRISPR-Cas9 - [Gene Editing with CRISPR-Cas9 Infographic](#)
- Genetic Literacy Project - [Public embrace of CRISPR gene editing key to future of agriculture](#)
- Innovative Genomics Institute - ["The Future of Genome Editing" IGI Infographic](#)
- Massachusetts Institute of Technology - [CRISPR Cuts](#)
- National Pork Board - [Producer Shares Views on Gene Editing](#)

VIDEOS

- American Seed Trade Association (ASTA) - [Seed Innovation Video Library](#)
- American Seed Trade Association (ASTA) - [Saving the Orange](#)
- American Seed Trade Association (ASTA) - [Plant Breeding Innovation Animation](#)
- Bayer - [Marker Lab](#)
- Best Food Facts - [What is CRISPR Technology? Part 1](#)
- Best Food Facts - [How Can CRISPR Treat Disease? Part 2](#)
- Best Food Facts - [How Can CRISPR Improve Foods? Part 3](#)
- Bill Nye The Science Guy - [Genes Episode](#)
- Bozeman Science - [What is CRISPR?](#)
- CommonGround - [Plant Breeding Innovation 1](#)
- CommonGround - [Plant Breeding Innovation 2](#)
- Corteva Agriscience - [CRISPR-Cas for Healthy Seed Development](#)

VIDEOS

- Nature Methods – [CRISPR Gene Editing and Beyond](#)
Purdue University – [Interview with Dr. Williams M. Muir, Biotechnologist](#)
TED Talk with Jennifer Doudna – [How CRISPR Lets Us Edit Our DNA](#)
The Roslin Institute – [Three Videos on Advantages and Potential of Gene Editing](#)
University of California Berkeley – [What is CRISPR-Cas9 Gene Editing and How It Works with Jennifer Doudna](#)
University of California Berkeley – [The Ethics of Gene Editing with Jennifer Doudna](#)

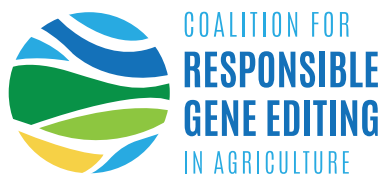
WEBSITES

- American Seed Trade Association (ASTA) [FAQs](#)
American Seed Trade Association (ASTA) [Plant Breeding Innovation Animation](#)
Best Food Facts [BestFoodFacts.org](#)
CommonGround [Plant Breeding](#)
CRISPRcon [CRISPRcon.org](#)
FDA [Feed Your Mind](#)
Genetic Literacy Project [Gene Editing/CRISPR](#)
Innovative Genomics Institute [Media Library](#)
Innovature [Nourishing Tomorrow](#)
National Human Genome Research Institute [Genome Editing](#)
NIH U.S. National Library of Medicine [Genome Editing](#)
Soybean Research and Information Network – [Soybeanresearchinfo.com](#)

CONVERSATION STARTERS

“Improving plants to eliminate allergens means fewer people will have to worry about an allergic reaction to food.”





Visionary ag leaders and The Center for Food Integrity formed a Coalition in 2016 with the vision to earn trust in gene editing for food and agriculture. Representatives from food companies, academic institutions, farmer organizations, civil society, gene editing product developers and related associations took part in developing a Framework For Responsible Use, introduced in 2021. The framework provides assurance that those using gene editing within the framework do so in the best interests of agriculture, the food system and society in general.

The framework is designed to provide adequate transparency and appropriate oversight to be accepted as credible by a broad range of stakeholders. It is also workable and affordable for the wide range of entities that use gene editing, including researchers and commercial enterprises of varying sizes.

FRAMEWORK PRINCIPLES

Transparency – Access to meaningful, accurate and clear information as a cornerstone of trust

Stakeholder Engagement – Engage a balanced and representative group of stakeholders

Safety and Quality – Commitment to the ethical, legal and safe use of biological materials

Continuous Improvement – Framework will be reviewed and revised as needed to integrate learning about new technologies

Verification – Independent verification demonstrates that participants are meeting the spirit, intent and specifications of the framework

Social Considerations – To help individuals and groups engaging with gene editing consider a variety of perspectives on different topics

Trade and Market Considerations – Ensure products are managed to facilitate the flow of goods in commerce in the country in which the company operates and in key markets

For more about the CFI Coalition for Responsible Use of Gene Editing visit geneediting.foodintegrity.org or contact The Center for Food Integrity at learnmore@foodintegrity.org • 816.880.5360



THE CENTER FOR
FOOD INTEGRITYSM

**THE COALITION FOR
RESPONSIBLE GENE EDITING
IN AGRICULTURE**

GeneEditing.FoodIntegrity.org

The Center for Food Integrity is a not-for-profit organization with the mission of helping today's food system earn consumer trust. Our members and project partners, who represent the diversity of the food system, are committed to providing accurate information and working together to address important issues in food and agriculture. The Center does not lobby or advocate for individual companies or brands.

Contact The Center for Food Integrity for more information
at learnmore@foodintegrity.org or **816.880.5360**



FoodIntegrity.org