Building Trust to Counter the Public Threat to Gene Editing in Agriculture and Food

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Introduction

- Gene editing techniques heralded as “revolutionary”, “powerful”, “disruptive” with “endless possibilities” to deliver major social, economic and environmental benefits in agriculture and food

DNA double-helix model simulating gene editing

Introduction

- Potential to create variety of novel changes to crops and livestock **quickly, easily, cheaply**
  - Resistance to pesticides, herbicides, diseases, pests, drought, flooding
    - Citrus greening resistant oranges
    - Virus resistant pigs
    - Disease resistant cassava
  - Improve nutritional composition, yields, etc.
    - Gluten-reduced wheat
  - Improve animal welfare
    - Hornless cattle
  - Reduce food waste
    - Non-browning mushroom

Non-browning mushrooms

Introduction

- Perceived mistrust of public viewed as threat by proponents to public good of gene editing
- Controversy over GMOs and labeling cited as important precedent to be avoided
- If “done right”, gene editing technologies will be accepted by the public (Menayang 2017).

Introduction

- Our goal: to understand efforts by proponents to pre-empt imagined public threat to gene editing technologies in agriculture
  - How is the public and their concerns imagined?
  - What strategies adopted to address public concerns?
  - Will these strategies enhance public trust via enhanced trustworthiness of agriculture industry?

Publics, Trust and Science

- Public ‘deficit’ of trust in science often viewed as threat to public good of novel technologies (Welsh and Wynne 2013: Marris, 2015).
- Public deficit of scientific understanding reinvented as deficit of trust in science (Wynne, 2006)
- More information, transparency, explanation, will restore trust (Wynne, 2006)
- Public understanding and perceptions of technology and science shaped by judgement of trustworthiness of social systems, organizations, experts involved
- Organizational actors central to critical evaluation of trust since they frame social problems, define potential risks, shape technologies

Methods

- In-depth interviews: 2018-2019
  - Key actors
    - 49 participants from 39 organizations
  - Questions: risks, benefits, trust, governance, lessons from GMOs
- Participant observation (2019): Notes, recording
  - BIO World Conference,
  - CRISPRcon
  - Genome Writers' Guild conference

Organizations	
Biotech, Consumer, Food Safety, Environmental Advocacy Groups	*12
Agribusiness, Biotech, Seed Companies	6
Industry Trade Associations	5
Federal Agencies	5
Food Companies and Retailers	3
University Scientists/Associations	3
Patent Lawyer	1
Biotech Research Center	1
Total	39

* NGOs and Activist Organizations	
Environment	5
Consumer and Food Safety	3
Scientific	2
Community Development	1
Biotechnology and Food Security	1

Coding and Analysis

- Interviews transcribed and analyzed in NVivo
  - Two coders with periodic consistency checks
  - Examined themes for emergent topics
- Participant observations
  - Summaries of key themes and topics

Themes and Codes	
Governance	Scientific Scientism Government Regulations Private Governance
Risks and Benefits	Socio-Economic Environmental
Public Perceptions	Publics' Perceptions
Trust	Trust and Trustworthiness

Bio World Congress on Industrial Biotechnology

CRISPRcon 2019

Genome Writers Guild

RESULTS

Imagining the Public

- Public perceptions and fears threaten promise of gene editing
- Engage with the ‘invited’ public to “address the skepticism” and fear
  - **Shared benefits**
  - Transparency
  - Democratization of technology
  - Governance


SKEPTICAL
CONSUMERS
DON'T KNOW
DON'T KNOW
FEARS
WORRIED
EMOTION
DOMINATION
DON'T KNOW
CONCERNS
CONSUMERS
DON'T KNOW
EMOTIONAL
BIAS
WORRIED
DON'T UNDERSTAND
MISTRUST
OPPOSED
OPPOSED
MISTRUST
MISTRUST
FEARS
BIAS
DOMINATION
UNAWARE
MISINFORMATION
SCARY
SCARED
CONCERNS
PUBLICS
SCARED
DOMINATION
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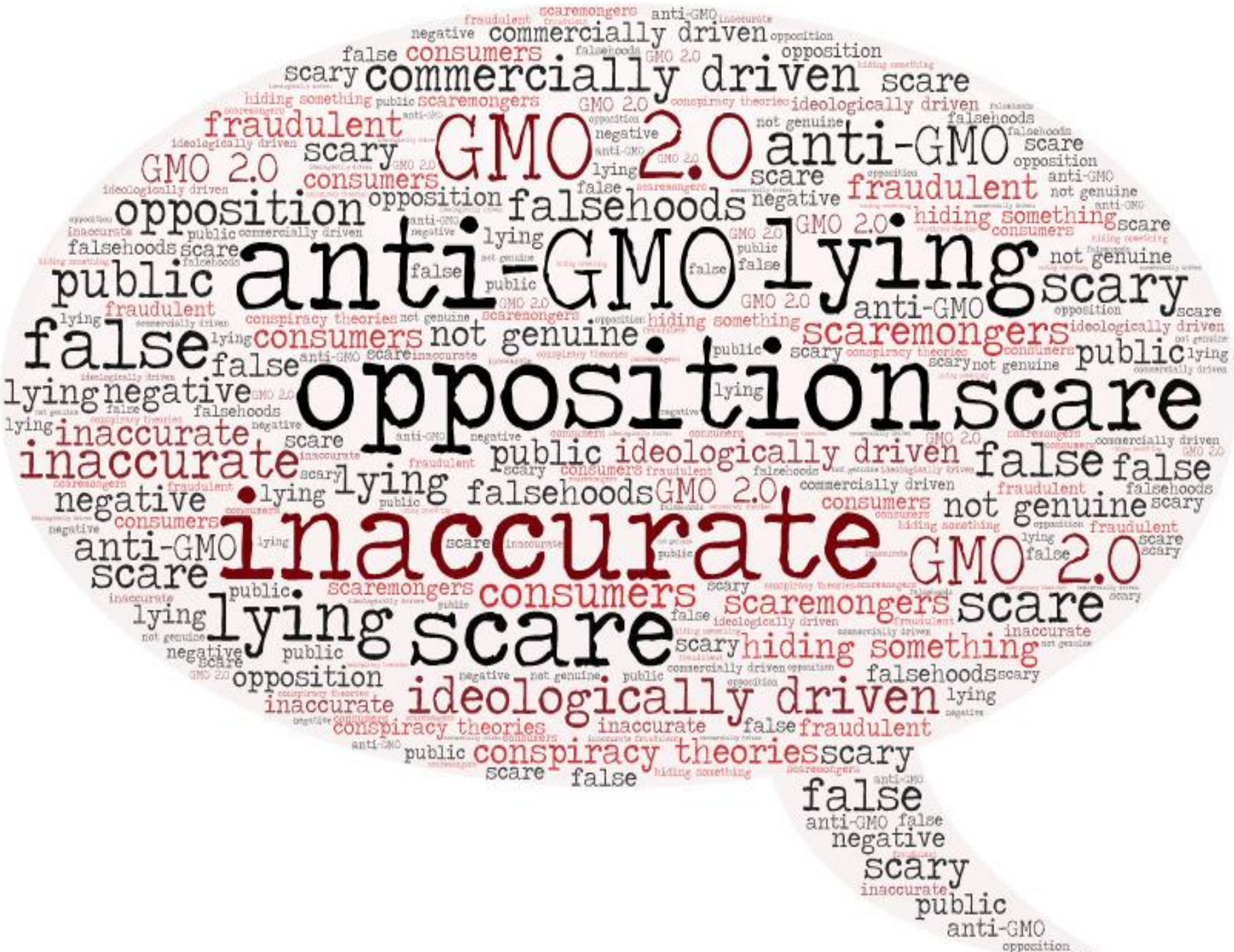
inaccurate
opposition
anti-GMO
GMO 2.0
scare
lying
false
scaremongers
ideologically driven
commercially driven
conspiracy theories
consumers
fraudulent
hiding something
falsehoods
not genuine
public
scary
negative

Building Social License

- How can industry learn from the GMO experience and engage in an effective dialogue with consumers to gain social license for gene editing technologies in food production? (Center for Food Integrity, 2016)
  - “there was never any conversation with consumers around what is this [GMOs] and what did it mean” (Bill Even, Pork Board, 2017)
  - Our job now is to “set the conditions that will allow us to deliver the benefits of the technology.” (Biotech Industry Leader, BIO, 2019)

“social license is what allows a company to access a marketplace and operate freely, it affords the holder the ability to operate with minimal-to-no constraints, whether they be regulatory or based on public acceptance”

(Roxi Beck, 2016, Center for Food Integrity)

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HELPING TODAY'S FOOD SYSTEM EARN CONSUMER TRUST

As consumers become more interested in how their food is grown, processed and brought to market, the food system must ensure it is doing the right things in a way that builds trust.

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COALITION FOR RESPONSIBLE GENE EDITING IN AGRICULTURE

Gene editing is one of the transformational innovations of the decade and has tremendous potential to benefit society and food production.

CRISPRcon

EVENTS

CONVERSATIONS ON SCIENCE, SOCIETY, AND

THE FUTURE OF GENE EDITING

OUR MISSION

BRING TOGETHER DIVERSE VOICES TO DISCUSS THE FUTURE OF GENE EDITING.

The scientific community has handed the world an incredible tool: the ability to make precise edits to the DNA in living cells. These technologies could allow us to transform our food, health and ecological systems. They also raise important questions about risks, benefits, ethics, equity and more.

CRISPRcon creates a unique forum in which a broad selection of diverse voices come together to discuss the future of CRISPR and related gene editing technologies across a variety of applications in agriculture, health, conservation and more.

CRISPRcon

EVENTS

CONVERSATIONS ON SCIENCE, SOCIETY, AND

THE FUTURE OF GENE EDITING

BAYER

Bio Biotechnology Innovation Organization

CEPLAS Cluster of Excellence on Plant Sciences

Cornell ALLIANCE FOR SCIENCE

CORTEVA agriscience

editas MEDICINE

Genus

Innovative Genomics Institute

KONINKLIJKE NEDERLANDSE AKADEMIE VAN WETENSCHAPPEN

KWS

Plantum

UNITED SOYBEAN BOARD

VIB science meets life

Engaging the “fearful” Public

- Industry leaders argue that deficit model failed with GMOs

“Feelings and beliefs are often a more important discussion point…especially with consumers who may lack a sophisticated science background” (Beck, CFI, 2016)

You “don’t start with discussions about the technology but about the **benefits**.” (Biotech industry leader, 2019)

“Shared Values” with Consumers

- Industry leaders argue that with GMOs focused too much on farmers and on-farm efficiencies and bottom line (CFI Oct 9, 2017)

“Focus on the greater good” “connecting with consumers on the **values we all share is the key to earning trust**.”

“Consumers simply want to know that **you care about the same things they do,** like the highest standards in animal care and producing safe, affordable, nutritious **food** in a way that protects and sustains our environment” (CFI Oct 9, 2017).

innovature
NOURISHING TOMORROW

A CONVERSATION ABOUT INNOVATION IN FOOD & AGRICULTURE

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OUR PLANET

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OUR FOOD

Smith Edge: It Takes a Special Person to be a Farmer

The registered dietitian weighs in on the future of food.

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1:52 min Read

"We have been focusing our communication strategy on thinking about how to have a better conversation about gene editing. Our focus is on **shared values**." (BIO Communications Lead, BIO, 2019)

Uninvited Publics

- Proponents seek to delegitimize uninvited publics behind closed doors
- Justifies not engaging in key concerns raised by critics
- Benefits overstated (pesticide reductions, feed the world), nutritious foods: similar to GMOs, which failed to materialize
- Risks minimized: unintended changes to DNA, off target effects
- Governance: Lack of regulatory and formal regulatory review; lack of labeling to ensure transparency and consumer choice
- Lack of traceability mechanism in the food system

Conclusions

- Proponents creating imaginary “invited” public and imaginary concerns
- Goal is to build trust to gain social license and minimal oversight
  - Predetermined shared benefits
  - Absolute certainty in benefits
  - Zero engagement in risks and uncertainty
- Will this build public trust?
- Delegitimize “uninvited” publics (activists) so don’t have to engage with those concerns
  - Regulatory oversight, labels, traceability, risks

Thank you!

Questions?

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Notes

- Engagement efforts emphasize great potential of GE
- GMOs: there was never any conversation with consumers around what is this and what did it mean” (Bill Even, Pork Board, CFI 2017)
- Building trust = reject deficit model of communication, public communication efforts that emphasize shared values, social benefits, naturalness

Avoid the Deficit Model

- Dilemma is that proponents want to counter activists, and make the case to the public and regulatory authorities that CRISPR isn't GMO (NPR, 2017)

- In our communications, we want to emphasize that gene editing is "rooted in nature" (BIO),
- Innovature

"It's editing. It's like going into a Word document and basically replacing one letter, maybe that instead of 'wind,' you want it to say 'wine' (Alison Van Eenennam, animal genetics professor, UC Davis, 2017)

THE BIRTH OF AGRICULTURE

9000 BCE — 300 BCE

THE EARLY SCIENTIFIC AGE

1760 — 1944

THE DNA AGE

1953 — 2012

TODAY

THE BIRTH OF AGRICULTURE

9000 BCE — 300 BCE

THE EARLY SCIENTIFIC AGE

1760 — 1944

THE DNA AGE

1953 — 2012

TODAY

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history.

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Avoid the Deficit Model

There is an emerging regulatory landscape where we see much better regulation globally. … We know that 14 out of 27 countries have stepped forward and signed on that they want gene editing treated as mutagenesis. …We think that we're going to see positive change in the next 3-5 years. (Biotech industry leader, 2019)