

# Understanding the Use of GMO's in Agriculture

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[slideshare.net/kevinfolta](http://slideshare.net/kevinfolta)

- Consumers are concerned about farming, food, and how it is produced.
- How has our communication strategy changed?
  - 2000-2012 : “Well they just are clueless, so if I give them information they’ll figure it out.”
  - 2012- present : “I understand why they feel that way, let me share what I know and show them we have the same core values.”

- Why is there a problem with acceptance of agricultural technologies?
- How do we communicate the science effectively?
- What are our lost opportunities and costs of non-action?
- What can you do to participate (solve this problem)?

# **THE PROBLEM(s).**

**Misplaced Concern About Food and Farming**

**Profits from Misinformation**

**Speaking to the Wrong Audience**

**Asymmetric Public Debate**

**Lack of Trust**

**Misguided Activism**

**Experts and Trusted Voices Not Participating**

# Top Concerns About Life Issues



## Moms

- Rising Cost of Food (8.71)
- Keeping Healthy Food Affordable (8.65)
- Rising Healthcare Costs (8.51)
- Rising Energy Costs (8.35)
- Food Safety (8.29)
- U.S. Economy (8.28)



## Millennials

- Keeping Healthy Food Affordable (8.18)
- Rising Cost of Food (8.13)
- Rising Healthcare Costs (8.09)
- U.S. Economy (8.01)



## Early Adopter

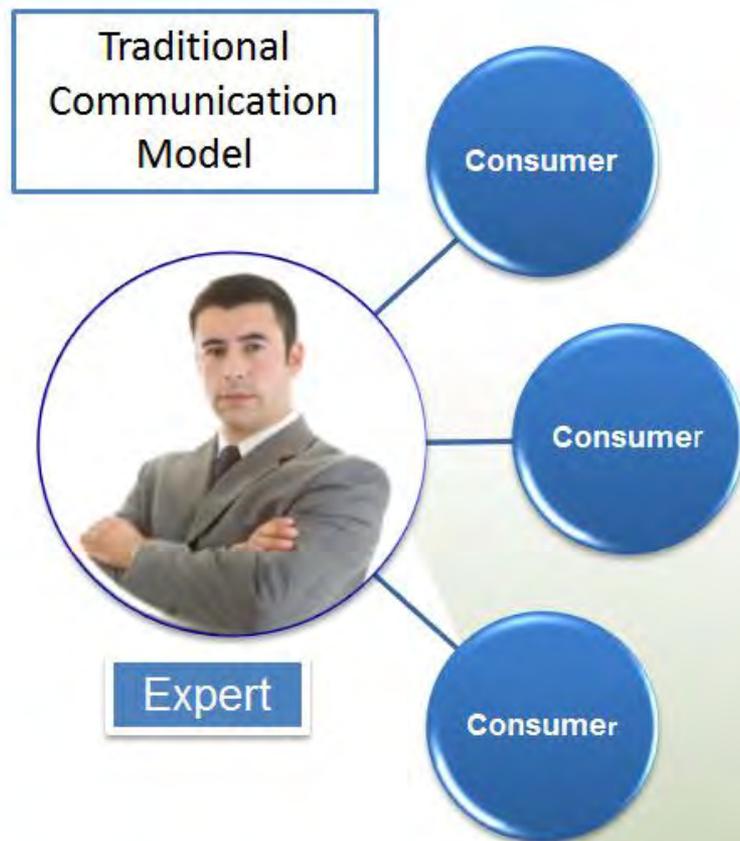
- Keeping Healthy Food Affordable (8.55)
- Rising Healthcare Costs (8.50)
- Rising Cost of Food (8.47)
- The U.S. Economy (8.44)
- Rising Energy Costs (8.29)



## Foodies

- Keeping Healthy Food Affordable (9.27)
- Food Safety (9.18)
- Rising Cost of Food (9.10)
- Rising Healthcare Costs (9.08)
- U.S. Economy (9.08)

# Online Communication is Tribal/Insular



# Why is there even a problem?

## The “Mom” Tribe

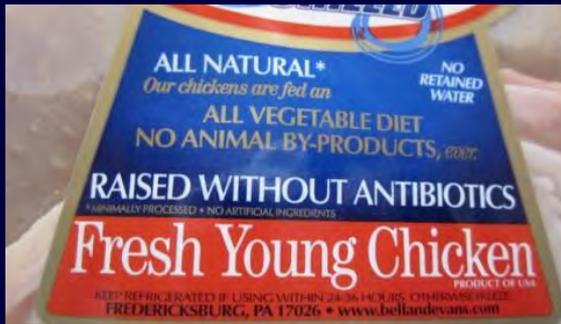
What information sources have you used to come to your conclusion that GMOs are dangerous?



Heidi: “I’m part of a moms group. When there is a big consensus, I think ‘there’s something here.’ You don’t need doctors or scientists confirming it when you have hundreds of moms.”

# What Does the General Public Think?

There's a backlash against production practices they don't understand.

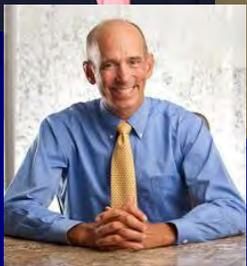


Earls' decision to source beef from the U.S. instead of Canada is being called a 'slap in the face' by some Alberta ranchers



# Why is there even a problem?

How can we help you? We're sorta farmers, producers and scientists.



We want to understand food, farming and technology!



We're actually farmers, producers and scientists, but we're too busy.



# **Farm producers have great potential to influence the conversation, but give up that power.**

Farmers and ranchers are 1.5% of the population, yet are ~0.001% of the presence in social media.

People are interested in food, farming, animal care

Consumers look to social media for answers

Ag professionals are consistently are rated as most credible sources of information

Agricultural producers are not participating in the discussion.

Who is your audience?

## WHO IS NOT YOUR AUDIENCE?

Many have no interest in understanding facts. They are not a good investment of your time.



## WHO IS YOUR AUDIENCE?

Most of the time these are people that don't know about science and are concerned about food. Share science with them.

How do we talk to that  
audience?

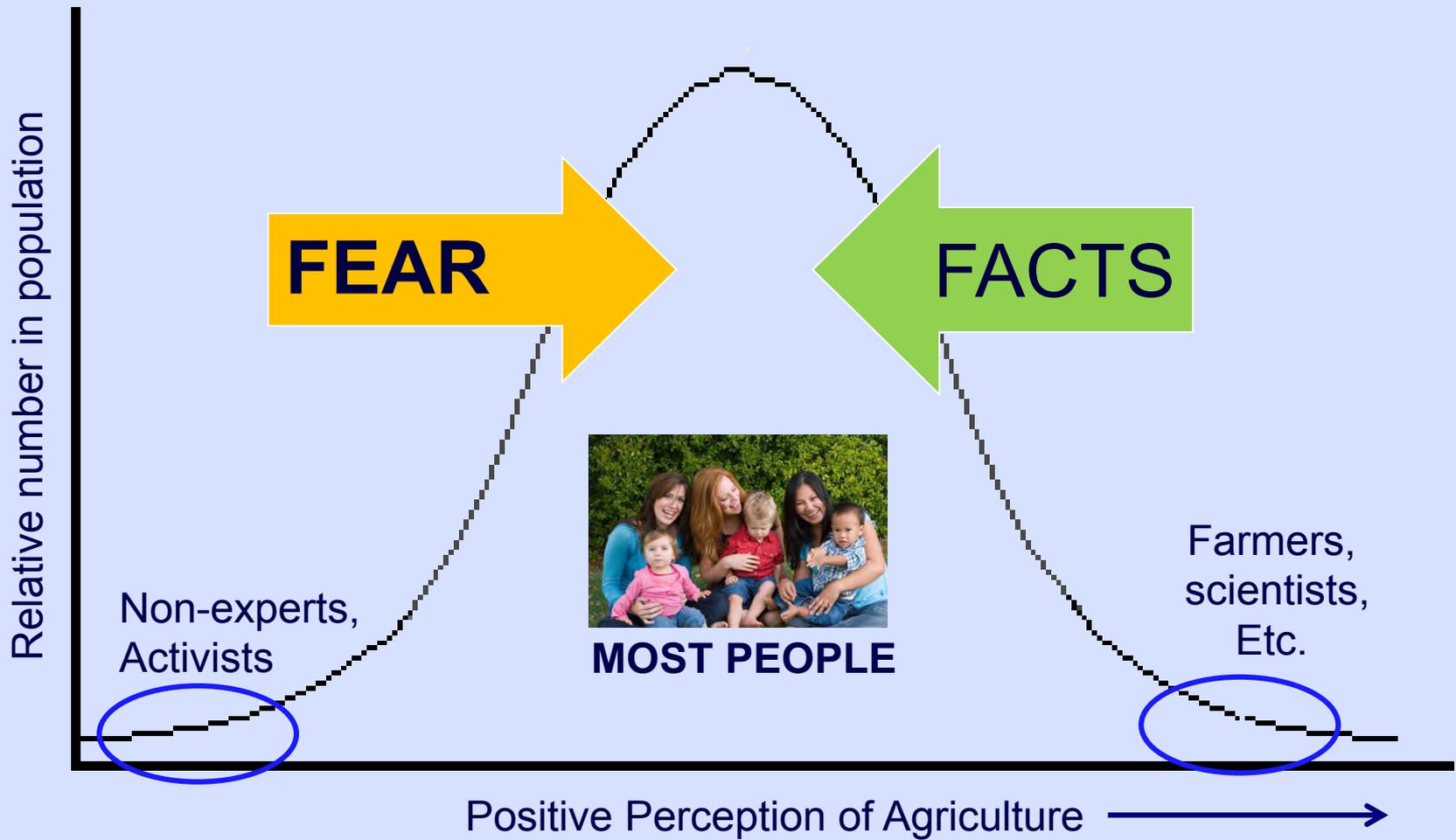
## THE DISCUSSION IS HAPPENING ONLINE

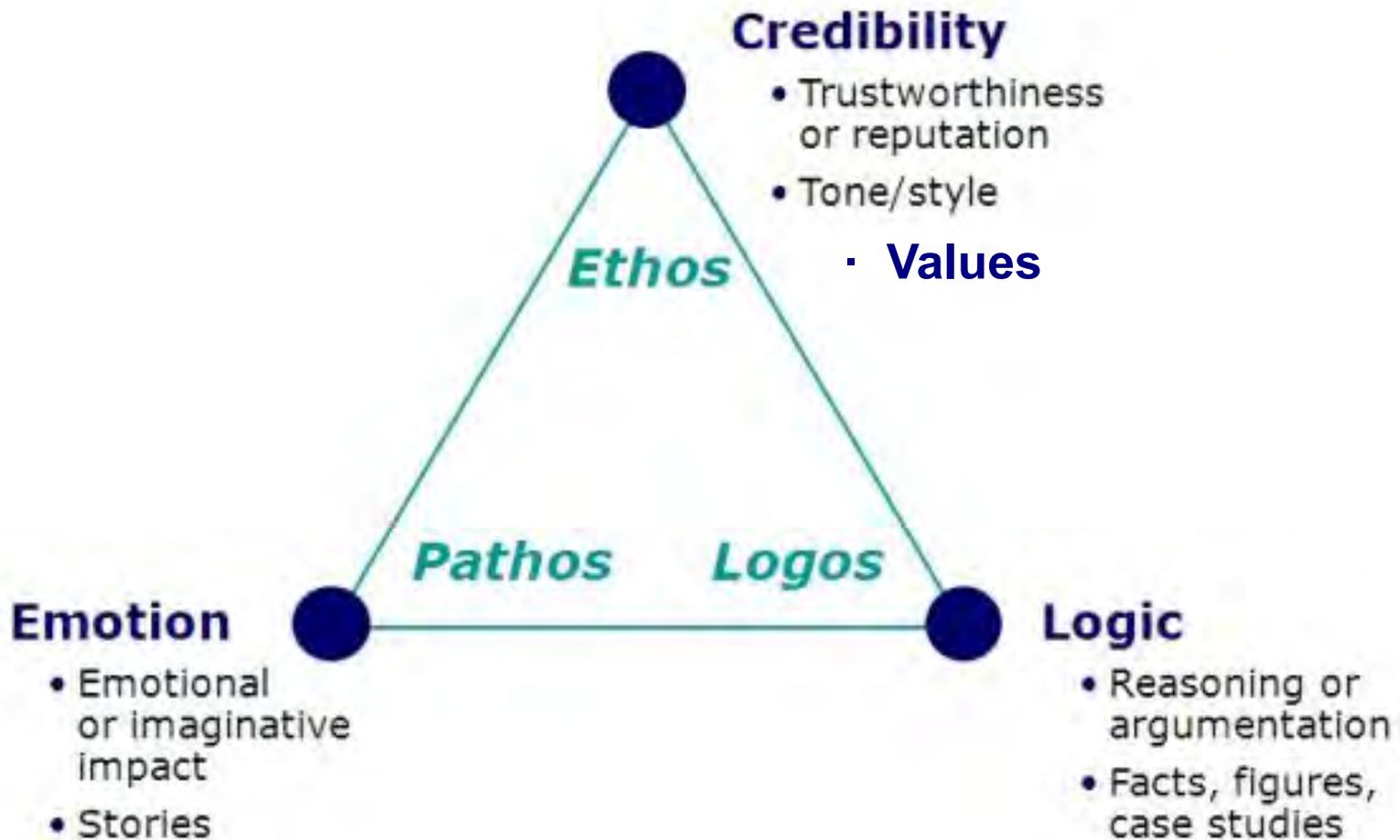
The internet is the home of bad information, but is where the conversation is taking place. Expert voices are not being heard.

Those with opinions contrary to the facts about food and farming are there, they are spreading bad information, profiting from it, and confusing a curious public.



Where do we find that  
audience?





Lead With Your Ethics.

## How Do Reach that Middle?

**Your audience is not moved by facts and statistics.**

You have to start by defining  
SHARED VALUES.

# State your priorities up front

What are things you care about in food and farming, that almost everyone can agree with?

# State your priorities upfront

Animal Care



Environment



Farmers



Food Safety



The Needy



Consumers



[Home](#) | [Our Values](#) » [Ethical Principles](#)

## ETHICAL PRINCIPLES

WE CARE INITIATIVE

ETHICAL PRINCIPLES

[Email](#) [Pinterest](#) [Evernote](#) [Google +](#) [Tweet](#) [Recommend](#) [Like](#)

The Pork Farmers in Oklahoma recognize our obligation to build and maintain the trust of customers and the public in our products and our practices. To promote confidence in what we do and how we do it, we affirm the following ethical principles.

### Food Safety

We affirm our obligation to provide safe food.

### Animal Safety

We affirm our obligation to protect and promote animal well-being.

### Environment

We affirm our obligation to safeguard natural resources in all of our practices.

### Public Health

We affirm our obligation to ensure our practices protect public health

### Employee Care

We affirm our obligation to provide a work environment that is safe and consistent with our other ethical principles.

### The communities in which we operate

We affirm our obligation to contribute to a better quality of life in our communities.

# Effective Logos- What Moves the Needle?

# EFFECTIVE LOGOS

**Dispel the  
Argument from  
Nature**



# What Animal Genetic Improvement Is

## 1957 vs. 2001 chickens

1957



2001



43

57

71

85 d.

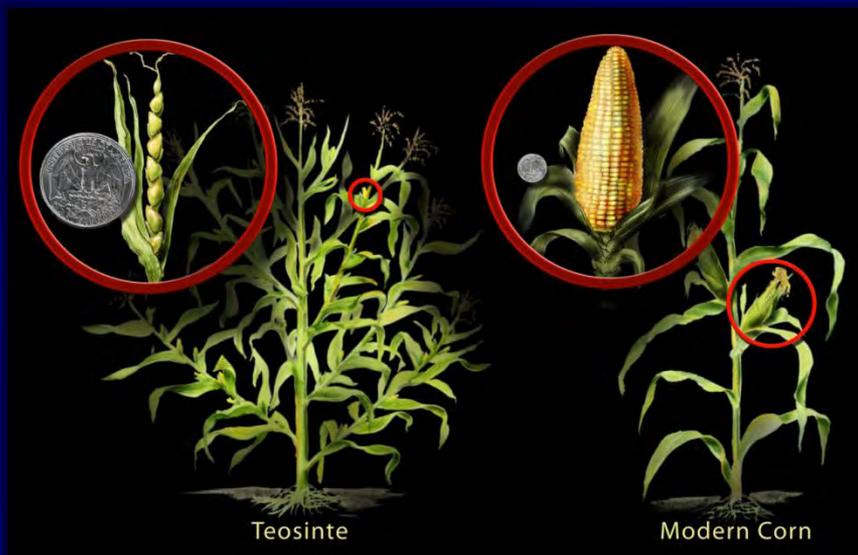
Havenstein, G., Ferket, P. and Qureshi, M. (2003). Growth, livability, and feed conversion of 1957 versus 2001 broilers when fed representative 1957 and 2001 broiler diets. *Poultry Science* 82, 1500-1508.

# What Animal Genetic Improvement Is

Round Oak Rag Apple Elevation (born 1965)  
>80,000 daughters, 2.3 million granddaughters,  
and 6.5 million great-granddaughters



# Domestication and Selection are Not Natural



# Many Modern Genetic Innovations are Accelerated by Genetic Engineering, and Satisfy Our Shared Values

Genes to Produce Vitamin A Precursor Added to Local Staples



Improved shelf life of fresh fruits



Added genes can stop plant viruses



Suppression of allergy-inducing proteins



Engineering resistance to weather extremes and climate change



Added genes fight plant diseases



# Animal Genetic Engineering

# GE chickens do not pass on Avian Influenza

## Suppression of Avian Influenza Transmission in Genetically Modified Chickens

Jon Lyall,<sup>1</sup> Richard M. Irvine,<sup>2</sup> Adrian Sherman,<sup>3</sup> Trevelyan J. McKinley,<sup>2</sup> Alejandro Núñez,<sup>2</sup> Auriol Purdie,<sup>3\*</sup> Linzy Outtrim,<sup>2</sup> Ian H. Brown,<sup>2</sup> Genevieve Rolleston-Smith,<sup>3</sup> Helen Sang,<sup>2</sup>† Laurence Tiley<sup>1</sup>††

Infection of chickens with avian influenza virus poses a global threat to both poultry production and human health that is not adequately controlled by vaccination or by biosecurity measures. A novel alternative strategy is to develop chickens that are genetically resistant to infection. We generated transgenic chickens expressing a short-hairpin RNA designed to function as a decoy that inhibits and blocks influenza virus polymerase and hence interferes with virus propagation. Susceptibility to primary challenge with highly pathogenic avian influenza virus and onward transmission dynamics were determined. Although the transgenic birds succumbed to the initial experimental challenge, onward transmission to both transgenic and nontransgenic birds was prevented.

The diversity of avian influenza viruses (AIVs) and their propensity for inter-species transmission make them a global threat to animal and public health communities. Cross-species transmission of influenza viruses mediate host species that amplify and diversify virus populations, notably domestic chickens, ducks, and pigs (*J*). Although control of AIV infection in its wild aquatic bird reservoir is impractical, control of AIV in domesticated hosts is



Downloaded from

X

Farmers

X

Consumers

X

Environment

X

Needy

X Animal well-being

Science 331:223-226. **2011** SCIENCE VOL 331 14 JANUARY 2011

223

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### Avian flu crisis grows for poultry producers throughout USA

 Aamer Madhani, USA TODAY 7:10 p.m. EDT April 21, 2015

Talking  
Biotech

Episode 007

**AquaBounty Salmon** – attains market weight in less time. Salmon may be farmed on inland pools, generating high protein food on fewer inputs.

npg © 1992 Nature Publishing Group <http://www.nature.com/naturebiotechnology>

## GROWTH ENHANCEMENT IN TRANSGENIC ATLANTIC SALMON BY THE USE OF AN "ALL FISH" CHIMERIC GROWTH HORMONE GENE CONSTRUCT

Shao Jun Du, Zhiyuan Gong, Garth L. Fletcher<sup>1</sup>, Margaret A. Shears<sup>1</sup>, Madonna J. King<sup>1</sup>, David R. Idler<sup>1</sup> and Choy L. Hew\*

Research Institute, The Hospital for Sick Children and Departments of Clinical Biochemistry and Biochemistry, University of Toronto, Toronto, Canada M5G 1L5. <sup>1</sup>Ocean Sciences Centre, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1C 5S7. \*Corresponding author.

We have developed an "all fish" growth hormone (GH) chimeric gene construct by using an antifreeze protein gene (AFP) promoter from ocean pout linked to a chinook salmon GH cDNA clone. After microinjection into fertilized, nonactivated Atlantic salmon eggs via the micropyle, transgenic Atlantic salmon were generated. The presence of the transgene was



- X Farmers
- X Consumers
- X Environment
- X Needy
- X Wild populations



# Enviropig™ (Low-phosphorus manure)

© 2001 Nature Publishing Group <http://biotech.nature.com> RESEARCH ARTICLE

**Nature Biotechnology 19, 741–745 . 2001**

## Pigs expressing salivary phytase produce low-phosphorus manure

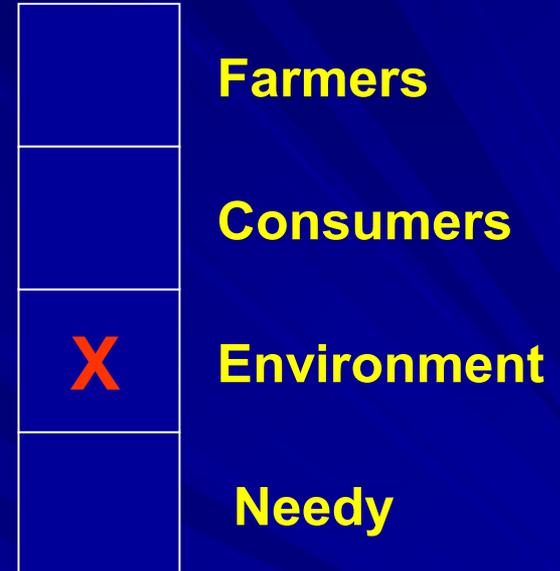
Serguei P. Golovan<sup>1,2</sup>, Roy G. Meidinger<sup>2</sup>, Ayodele Ajakaiye<sup>3</sup>, Michael Cottrill<sup>1</sup>, Miles Z. Wiederkehr<sup>4</sup>, David J. Barney<sup>4</sup>, Claire Plante<sup>5</sup>, John W. Pollard<sup>6</sup>, Ming Z. Fan<sup>2</sup>, M. Anthony Hayes<sup>6</sup>, Jesper Laursen<sup>7,8</sup>, J. Peter Hjorth<sup>7</sup>, Roger R. Hacker<sup>9</sup>, John P. Phillips<sup>2,\*</sup>, and Cecil W. Forsberg<sup>1,\*</sup>

To address the problem of manure-based environmental pollution in the pork industry, we have developed the phytase transgenic pig. The saliva of these pigs contains the enzyme phytase, which allows the pigs to digest the phosphorus in phytate, the most abundant source of phosphorus in the pig diet. Without this enzyme, phytate phosphorus passes undigested into manure to become the single most important manure pollutant of pork production. We show here that salivary phytase provides essentially complete digestion of dietary phytate phosphorus, relieves the requirement for inorganic phosphate supplements, and reduces fecal phosphorus output by up to 75%. These pigs offer a unique biological approach to the management of phosphorus nutrition and environmental pollution in the pork industry.



“reduces fecal phosphorus output by up to 75%”

[www.uoguelph.ca/enviropig](http://www.uoguelph.ca/enviropig)



<b>X</b>	<b>Farmers</b>
	<b>Consumers</b>
<b>X</b>	<b>Environment</b>
	<b>Needy</b>

# Gene Editing

Not adding a gene, changing the gene that is present so that it stops function or creates a known change.

Still strong opposition from activist NGOs

Some countries have taken stands on the issue

Stands to generate rapid improvement of crop plants, especially where traditional breeding is long (trees)



# Gene Editing



**HORNS!!!**  
**Bad beef**  
**Great milk**

Horn Gene



**NO HORNS!!!**  
**Good beef**  
**Bad milk**



Horn Gene

# Gene Editing



**HORNS!!!  
Bad beef  
Great milk**

Horn Gene



**NO HORNS!!!  
Good beef  
Bad milk**

STOP  
Horn Gene

Cross....

Mix of bad beef, bad milk production



# Gene Editing



**HORNS!!!**  
Bad beef  
Great milk

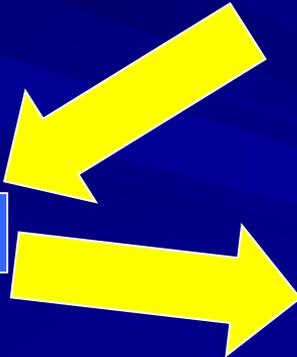


**NO HORNS!!!**  
Good beef  
Bad milk

Horn Gene

 Horn Gene

 Horn Gene



**NO HORNS!!!**  
Bad beef  
Good milk

# Could these piglets become Britain's first commercially viable GM animals?

Pigs 'edited' with a warthog gene to resist African swine fever could help spawn GM animal farms in the UK



These piglets were created by using a gene-editing technique to make them resistant to African swine fever. Photograph: Murdo MacLeod for The Guardian



**Changing domestic pigs' DNA to provide resistance to African Swine Fever**

# Antibiotics and Hormones

Lead with your values.  
Build the case with logic.

# Appropriate Pathos- The Power of Emotion.

# Personalize Your Message

Tell your story. Start with your concerns.

Talk about points that everyone can agree upon

Refer to your family, your personal goals.



Brian Scott [TheFarmersLife.com](http://TheFarmersLife.com)

# Your Experience and Operation in Social Media

# Grab your e-Real Estate Talking to public audiences – Get Involved!

## STEP 1



*Use this only for creating accounts and facilitating interactions*

**Obtain a dedicated Gmail account- use your real name.**

## STEP 2



*Use this space to keep a publicly-accessible blog, basically an online account of activities.*

**Get a blog space on [blogspot.com](http://blogspot.com) or [wordpress](http://wordpress.com).**

# Grab your e-Real Estate

## Talking to public audiences – Get Involved!

1. Sign up for facebook, twitter, instagram, pintrest, etc.
2. Share your experiences, even if you don't think they are important or impressive.
3. Tell the story.

### In other media:

1. Answer questions in comments sections of news articles.
2. Amplify messages in social media via Twitter, etc.

Spend >15 minutes a week. Remember your audience.

# Know when to disengage.

1. Difficult people are everywhere. Don't argue, state your credentials and values (ethos) and the facts you know that support them (logos) and the effects (pathos).
2. Use block/mute/etc.
3. Others are watching. Leave information, "Those that want to learn more should contact me directly at [yournamehere@Gmail.com](mailto:yournamehere@Gmail.com). Thank you."
4. Don't ever lose your cool. They take screen shots, and they will haunt you forever.

# Farmers taking action.

Brian Scott

www.thefarmerslife.com

@thefarmerslife

**The Farmer's Life**  
"When tillage begins, other arts follow. The farmers, therefore, are Webster"  
Home About Farm Week in Pictures FAQ

Farm Week in Pictures 01/31/2015  
January 31, 2015  
Farm Week in Pictures  
01/31/2015  
Whoa! A whole month of 2015 is already gone. Even though it's winter the farm is still pretty active. Last week saw a lot of grain hauling. We hauled a little more this week, but we also worked on a few other projects. Check [...]  
Share: Like 22 Tweet 8 Pin it

I AM WOMAN.  
**WATCH ME FARM.**  
Jennie Schmidt MS RD  
Devilan based Farmer. Lover of God & family. Asst. of Markeman & Musikan. Family Farm on Delmarva, VA.  
Tweets 4,876 Following 2,527 Followed 2,477 Favourites 455 Lists 8  
Readers respond in @FGNews: "Q. What will fruit farms look like in 50 yrs? A. Hello China? Can u send food? We..."

Jennie Schmidt  
@FarmGirlJen

Nurse Loves Farmer  
Kevin Home 20+  
Nurse Loves Farmer  
Personal Blog  
Like Follow Message  
Timeline About Photos Contact More

Sarah Schultz – Nurse Loves Farmer  
@NurseLovesFarmr

The Farmer's Daughter USA  
home blog team ag ask the farmer's daughter usa farming Fridays about me  
CONTRIBUTOR TO:  
Voice of AGRICULTURE  
gmo answers  
GENETIC LITERACY PROJECT  
MICHIGAN FARM BUREAU FITZALA  
BLOG GOT QUESTIONS? FARMING FRIDAYS!

Amanda  
@farmdaughterusa

**Boonstra Farms** Inc.

Meadows, MB

0910572015



Episode 024

Facebook profile for **Food and Farm Discussion Lab**. The profile picture shows a cornfield with a glass jar of corn in the foreground. The page name is **Food and Farm Discussion Lab**, a Public Group. The page is joined by Kevin Folta. Navigation options include News Feed, Ads Manager, Messages (20+), Events (3), Photos, Biotalknowldgey, and Kevin M. Folta (20+).

# #farm365

Website header for **Ask the Farmers**. The navigation menu includes: WELCOME | BLOG | MEET THE FARMERS | HAVE A QUESTION? ASK US | CONTACT US | WRITE FOR US | POLICY. The logo features a green silhouette of a farm with a tractor and the text *Ask the Farmers* in a cursive font.

Website header for **The FOOD DIALOGUES**, featuring logos for U.S. Farmers & Ranchers Alliance and USFRA. Navigation options include Headlines, FoodSource, Events, and Videos.

**FOODSOURCE**

Answers to questions about how food is grown and raised

- ANTIBIOTICS**  
How is the industry working to ensure the U.S. Food and Drug Administration's (FDA) Guidances 209 and 213 are effective?
- ANTIBIOTICS**  
What are the U.S. Food and Drug Administration's (FDA) Guidances 209 and 213 and how do they relate to animal agriculture production?
- ANTIBIOTICS**  
What is the PCAST Report and

**RESOURCES FOR FARMERS & RANCHERS**

## TOP STORIES



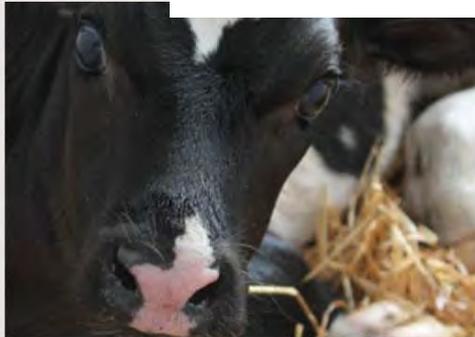
### Farm Size and Ownership >

July 16, 2015

**USFRA's Faces of Farming and Ranching and ABC's Bachelor Encourage all Farmers to "Open their Barn Doors"**



## FEATURES



### **COW APPRECIATION DAY CALF CARE FROM DAY ONE**

Face of Farming & Ranching and dairy farmer Carla Wardin shares her story about raising calves.

# AMPLIFICATION

# Transparency.

**“If you take the time to describe it, you won’t have to take the time to defend it.”** - *Charlie Arnot, Center for Food Integrity*

## #FarmToPork

Changing the conversation  
with “radical transparency”





**Cristen Food & Swine**  
@FoodSwineIowa



Birth, life, kill floor, #bacon: #farmtopork 12 various US bloggers experience entire #pork industry in 2 days.

[foodandswine.com/2014/09/26/far...](http://foodandswine.com/2014/09/26/far...)

4:06 PM - 26 Sep 2014



**#FarmtoPork Blogger Tour**

Birth to the Kill Floor: 12 dynamic bloggers experience 100% through the #farmtopork Blogger Tour in NC. \*I was a sponsored [foodandswine.com](http://foodandswine.com)



**Lisa Frame**  
@Daily\_Pinch



I'll be talking about food for the next 48 BH hours! It's all about #farmtopork and the process of farm to table.

8:39 PM - 16 Sep 2014

↩ ↻ ❤ 1



One of the greatest incentives for bloggers is to spend time with each other in person.



**Cristen Food & Swine**  
@FoodSwineIowa



My husband & our son in the barns. Taking time for lessons in stockmanship is top priority in our family. #farmtopork

11:07 PM - 16 Sep 2014

↩ ↻ 3 ❤ 5

# Others are Listening and Reading

DO	DON'T
Talk about specific cases of those you serve directly, your markets.	Use generic statements like “Feed the world”
Talk about the things you could do better, the things you'd like to see changed.	Just focus on the positive
Welcome discussion, visits, etc.	Walk away in disgust.
Provide references to good sources of information, and several of them.	“Because I said so.”
Recognize the positive aspects of ‘alternative’ ideas	Criticize another avenue of thinking without evidence.

## Conclusion:

Farm producers are the most trusted and competent sources of information, but are among the least likely to engage.

When engaging in conversation, lead with your ethics. Build the argument with evidence and bring in personal impacts and emotion.

Know how ag innovations satisfy shared values.

Get involved in the conversation. It is happening online with or without you, and we need your experience if we are going to control the narrative, and maintain freedom to operate.

# Thank you

kfolta@ufl.edu

 kfolta.blogspot.com

 @kevinfolta

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[www.talkingbiotech.com/support.html](http://www.talkingbiotech.com/support.html)



**Dr. Norman Borlaug**