

# **What will food systems look like in 2050?**

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# Outline

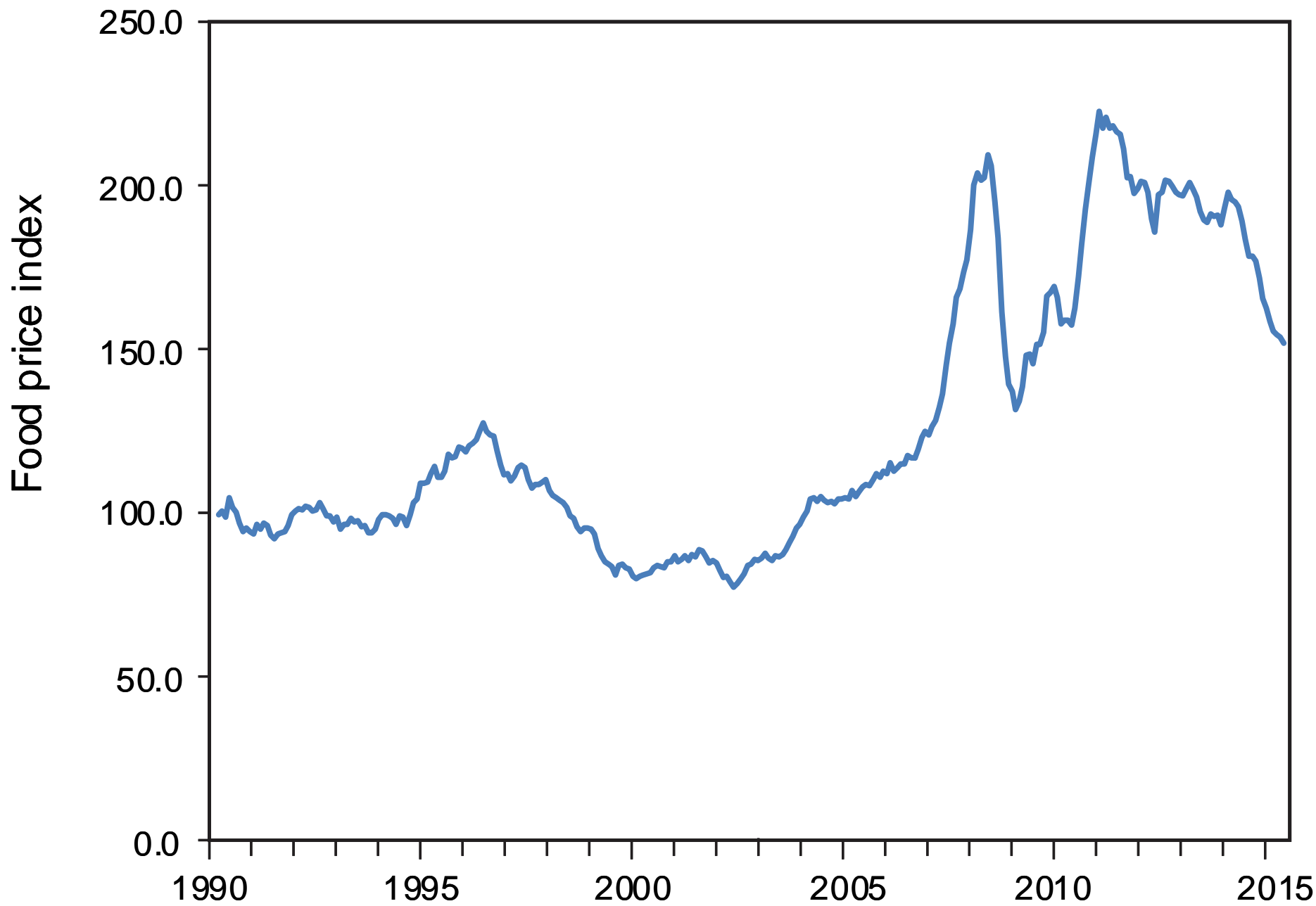
- Part I: How much do population growth, climate change and policy pressure farming?
- Part II: Where might these factors lead to?

# Trend 1: Rising Demand due to Population Growth

## World faces 'perfect storm' of problems by 2030, chief scientist to warn



...Food and water shortages as a result of climate change and growing populations are likely to trigger mass migration and unrest...









<http://crisisboom.com/2011/01/12/the-future-of-food-riots/>  
[http://media.npr.org/assets/img/2012/10/01/food\\_riot\\_wide-5ac93fb3df821987c05abd26a3b12660caf0d588-s6-c30.jpg](http://media.npr.org/assets/img/2012/10/01/food_riot_wide-5ac93fb3df821987c05abd26a3b12660caf0d588-s6-c30.jpg)  
[http://global3.memecdn.com/Have-you-ever-been-so-angry\\_o\\_70452.jpg](http://global3.memecdn.com/Have-you-ever-been-so-angry_o_70452.jpg)

Food supply  
(dietary calories / person / day)

Food price

2850

2600

1990

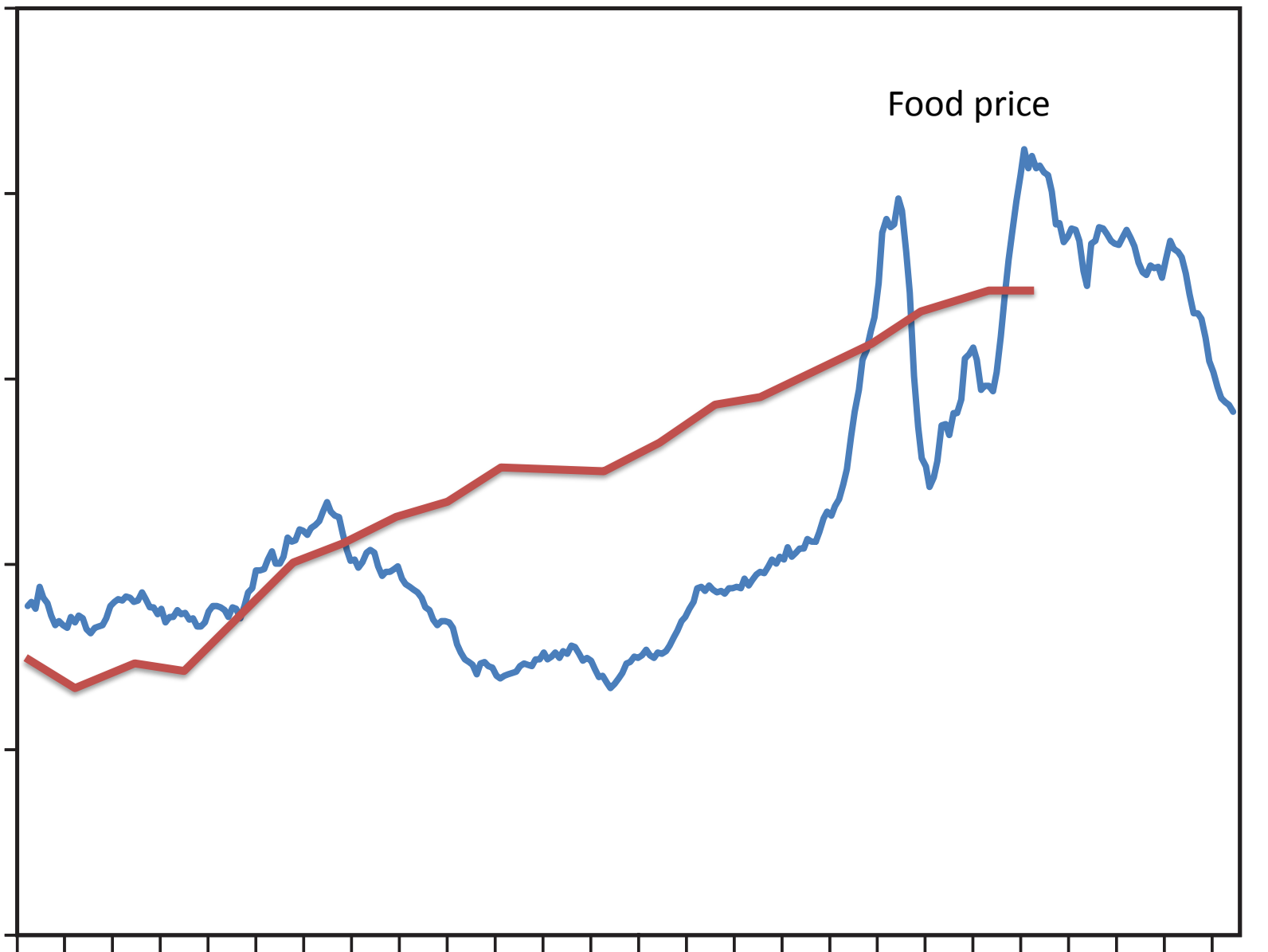
1995

2000

2005

2010

2015





# *Hungry Planet*

by Peter Menzel and Faith D'Aluisio







# In Metro Vancouver....



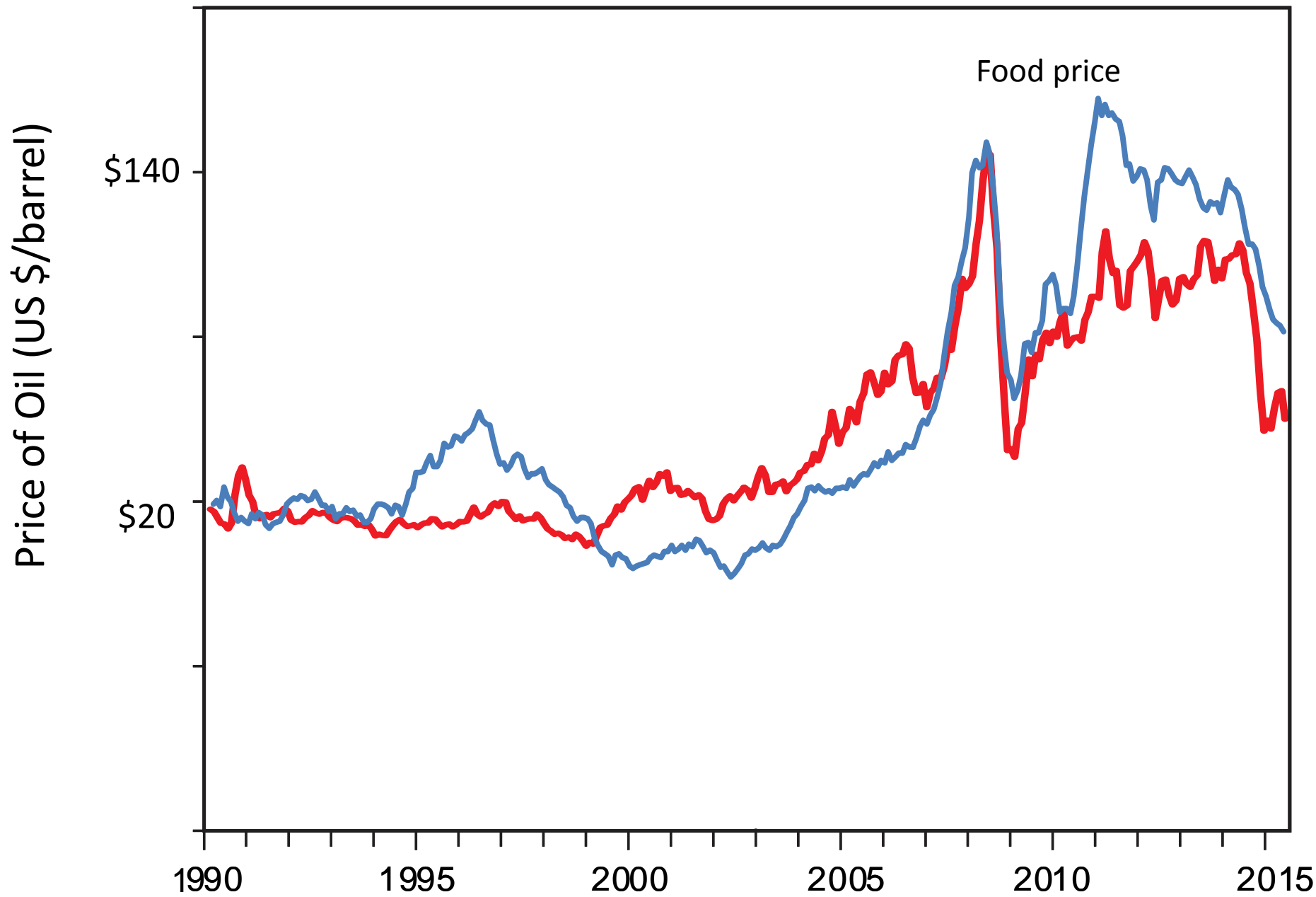
We throw away over 80,000  
potatoes a day



30,0000 eggs / day



70,000 cups of milk

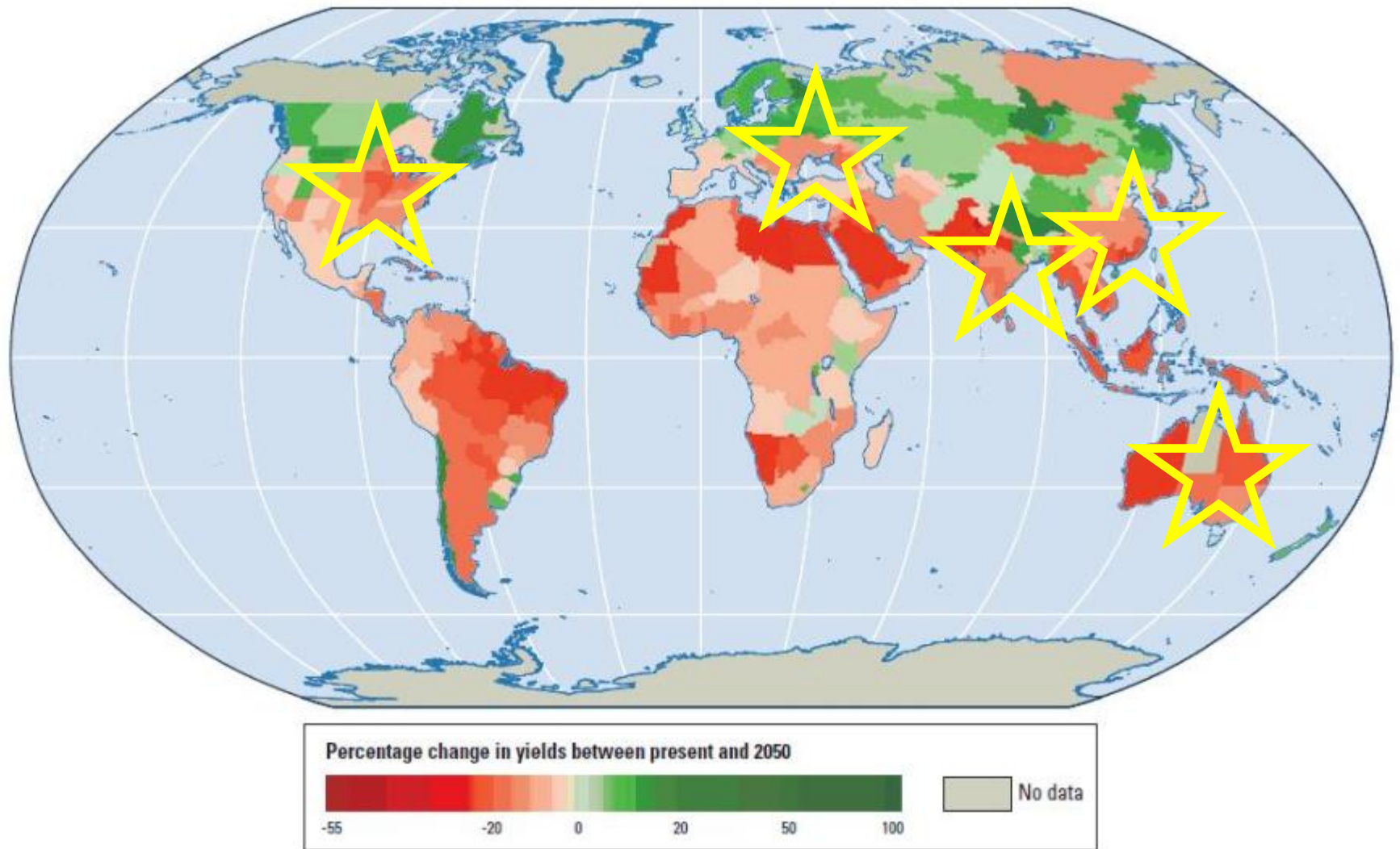


# Key message about population growth....

...population growth is likely to be a “weak” influence relative to energy prices over the short term.

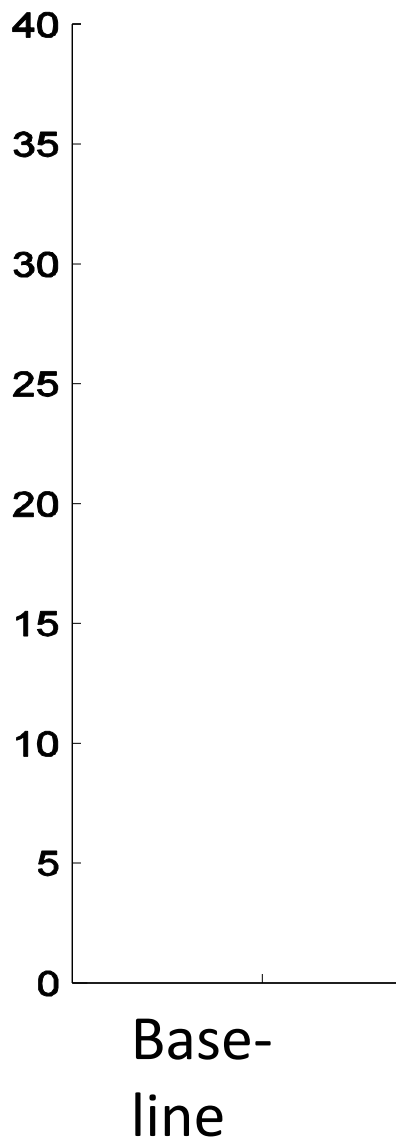
# Trend 2: Climate Change







Percentage of harvests failing  
over 21<sup>st</sup> century



Adaptation Strategy

# Key message about climate change....

...climate change has the potential to be hugely significant but we don't really have the tools to anticipate farmers' "adaptive capacity" that will be very important.

# Trend 3: Policies that capture “negative externalities”



...we should identify [economic activities'] negative environmental impacts, devise measures to avoid, ... those impacts, and include the costs of those in the price of the product.... It's the idea behind using carbon pricing to reduce greenhouse gas emissions,



We need to include [the environment] ... in the bottom line of the true costs of food production – the true financial costs and the true costs to the earth...



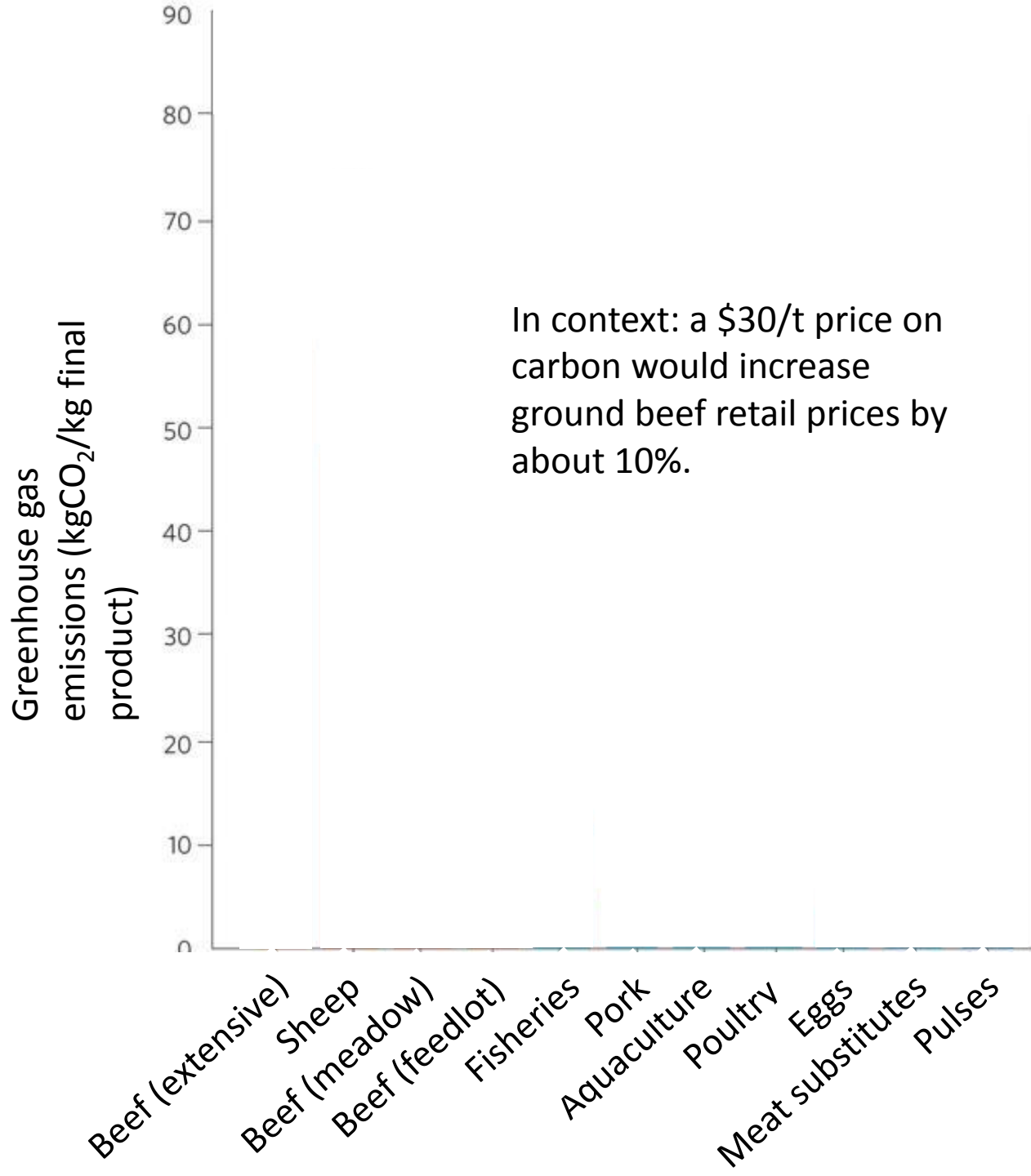
We ... need the right policies ...like an end to fossil fuel subsidies....a progressive carbon tax... All of these are based on a simple “polluter pays” principle and hold enormous promise.











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Health

# Antibiotic resistance: World on cusp of 'post-antibiotic era'

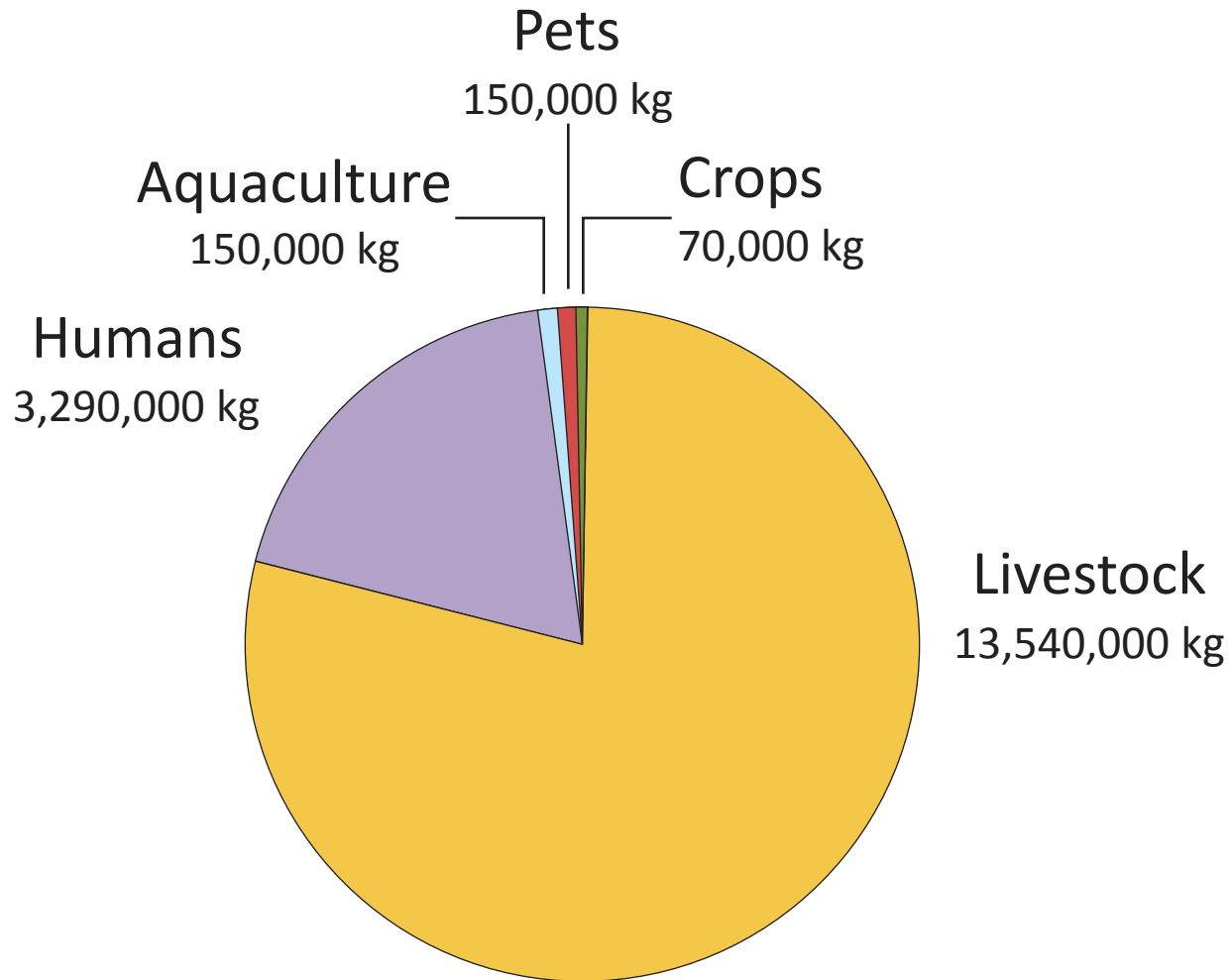
By James Gallagher  
Health editor, BBC News website

🕒 19 November 2015 | **Health**

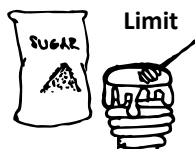
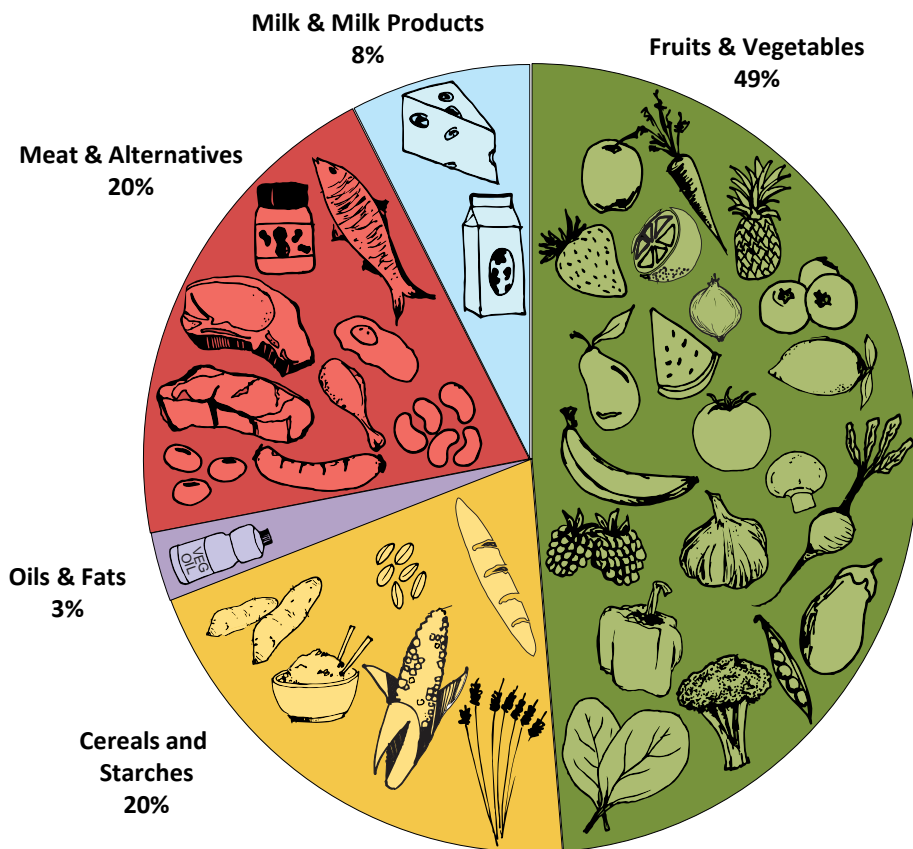
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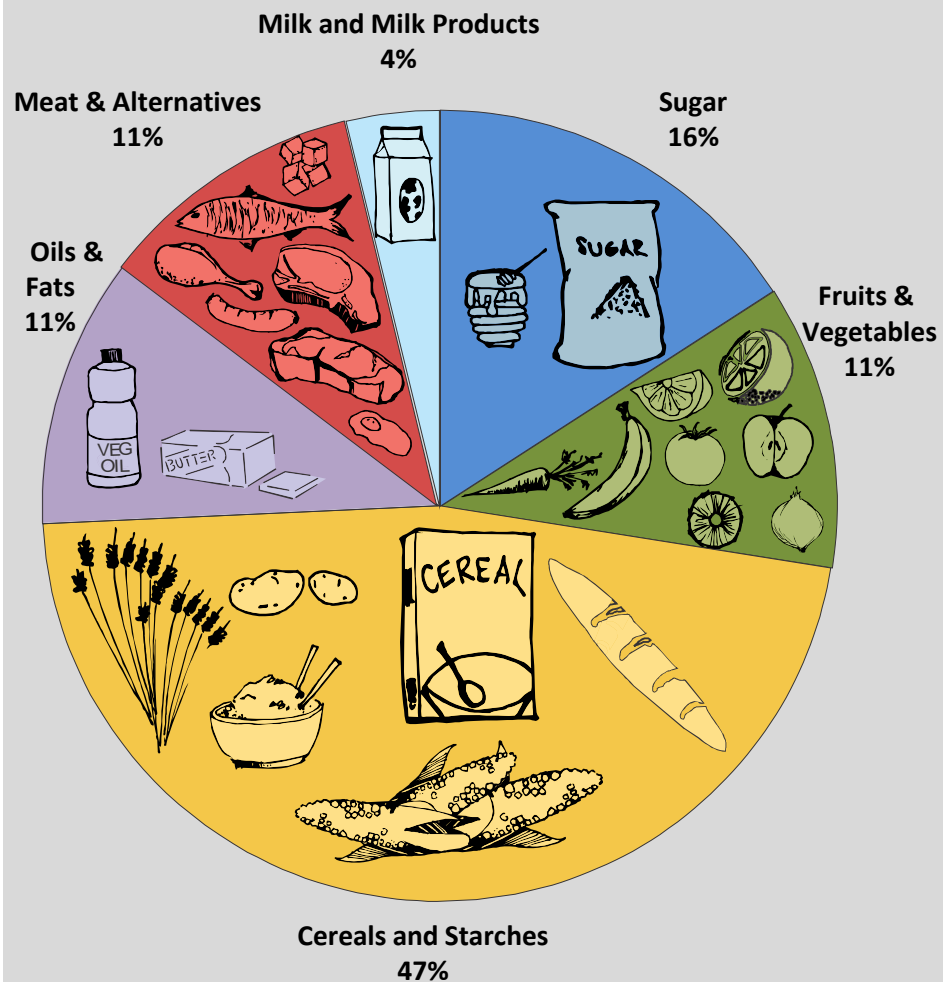
# Estimated Annual Antibiotic Use in the United States (Kg / year)



## What we should be eating (Harvard's Healthy Eating Plate Model)



## What we are actually producing (According to 2011 FAO)



# Summary of these trends...

- Population growth and rising demand is a weak driver of food and farming systems at least in the short term.
- Inputs (esp. energy prices) are a very strong driver and likely to favour lower-input systems over the long-term.
- Climate change may have a huge impact but current analyses struggle with quantifying the extent to which farmers are adaptable.
- Policy that focus on negative externalities such as greenhouse gas emissions, chronic diseases linked with diet, and antibiotics use in livestock are likely to change the playing field in unpredictable ways.

Part II: where might these drivers lead  
us?





Crickets require 12\* less feed and 13\* less water than cattle

Pigs produces 10 - 100 \* more GHGs per edible kg as mealworm.

<http://news.ubc.ca/2014/09/25/bug-bites/>



Quorn causes 5 times less GHGs than beef and 1.5 times less than chicken.

<http://www.cabi.org/cabdirect/FullTextPDF/2010/20103346525.pdf>; see also: <http://webarchive.nationalarchives.gov.uk/20140729081412/http://www.ktponline.org.uk/ktp-provides-carbon-footprint-certification-for-quorn-tm/>



# Larvets®

ORIGINAL WORM SNAX



# Larvets®

ORIGINAL WORM SNAX



CHEDDAR CHEESE 3.99



## Insects as animal feed commodity appears feasible

NUTRITION

3260

1



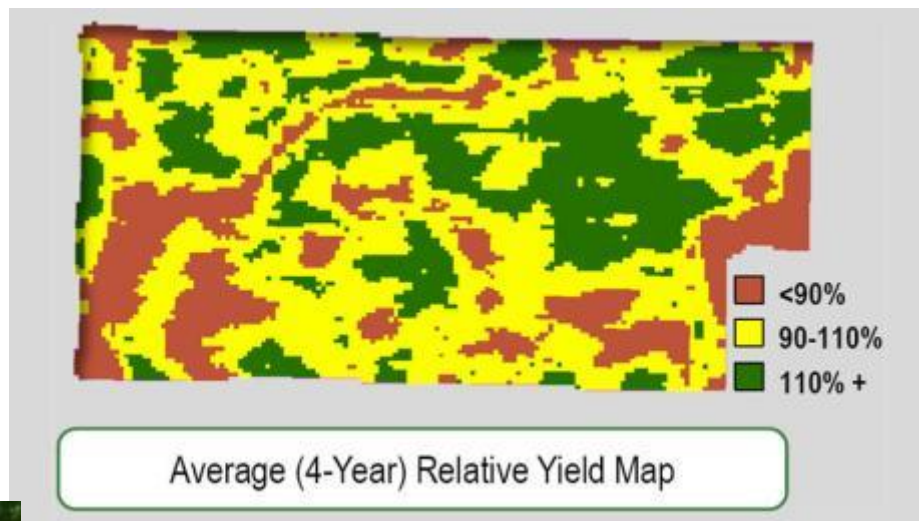


"The look [of the worms] put me off, but in the shape of a cookie I'll eat it..."





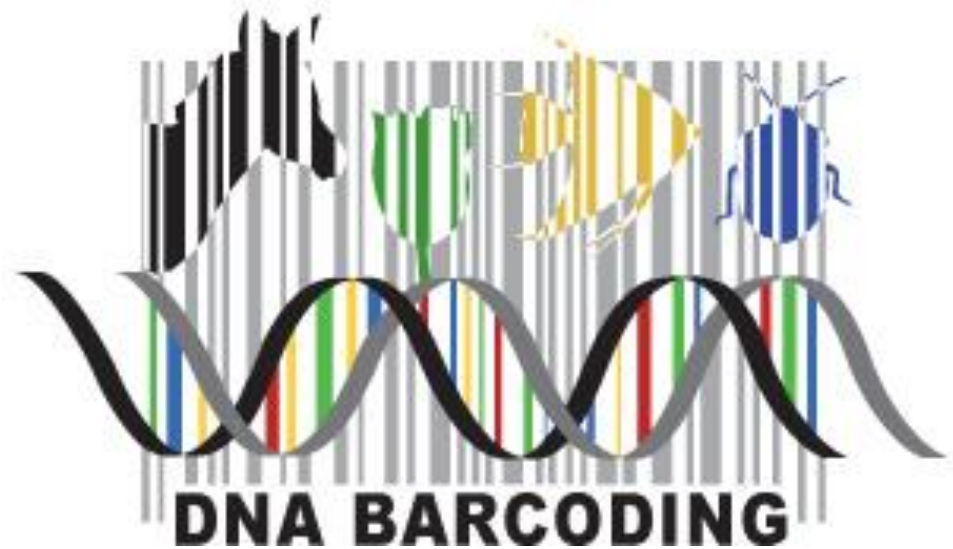
# Is the digital revolution coming to farming?







# The same digital revolution is coming at the genetic level



# A backlash?

The brave new world of automated farming described above, is an extension of the current 'efficient' Western scientific concept, and generally takes the form of large scale monocultures that have played havoc with soil fertility and the natural biodiversity of nature. The continuation of this type of blinkered high tech 'domination of nature' is not to be celebrated - in fact it is be feared.

Farming took a wrong turn at the time of the industrial revolution and has never recovered. The next revolution will be a return to an expansive plethora of smaller scale polymaths, demanding artisan skills and producing high quality foods for all. There will be an increase, rather than decrease, in employment on the land and a resultant overall improvement in human health.



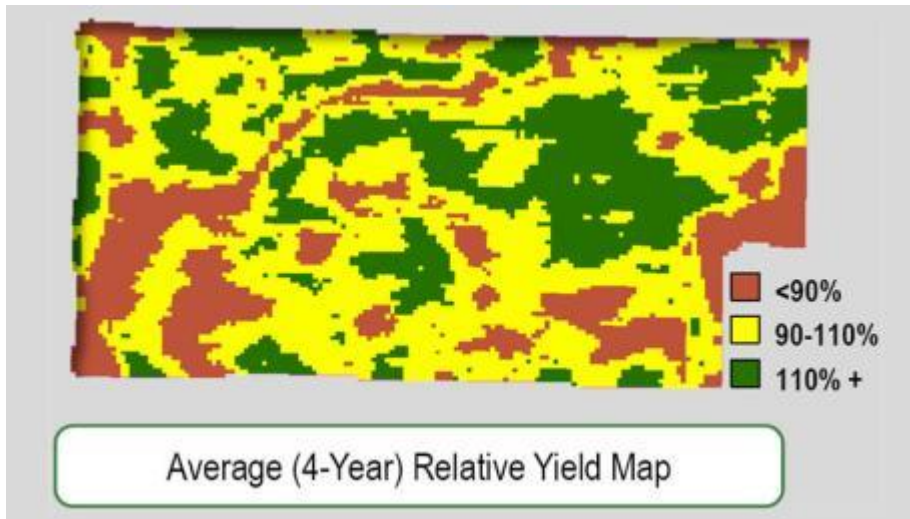






[http://athensfarmersmarket.org/~athfamkt/wp-content/uploads/2012/02/AthensFarmersMarket\\_b.jpg](http://athensfarmersmarket.org/~athfamkt/wp-content/uploads/2012/02/AthensFarmersMarket_b.jpg)





Today

The future



UNIVERSITY  
of GUELPH

CHANGING LIVES  
IMPROVING LIFE

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Feeding Nine Billion Video 3: What Policies Can Make Our Food System More Sustainable?

