Feeding a Hungry World: Who will be the Winners and Losers in the Global Food Industry

Dr. David Hughes
Emeritus Professor of Food Marketing

ABIC 2013
Calgary TELUS Conference Centre
Calgary, Alberta, Canada
Wednesday, September 18th, 2013
Food and water shortages as a result of climate change and growing populations are likely to trigger mass migration and unrest. Photograph: AFP/Getty

A "perfect storm" of food shortages, scarce water and insufficient energy resources threaten to unleash public unrest, cross-border conflicts and mass migration as people flee from the worst-affected regions, the UK government’s chief scientist will warn tomorrow.

In a major speech to environmental groups and politicians, Professor John Beddington, who took up the position of chief scientific adviser last year, will say that the world is heading for major upheavals which are due to come to a head in 2030.  

(March, 2009)
Daddy’s back from Canada!

1950
FOOD SECURITY IN THE USA
1 in 7 Americans are on “Food Stamps”
At a Taxpayer Cost of $80 billion
<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2030</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>World</strong></td>
<td>6.9</td>
<td>8.2</td>
<td>9.0</td>
</tr>
<tr>
<td><strong>Africa</strong></td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Asia</strong></td>
<td>4.1</td>
<td>4.8</td>
<td>5.1</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>LAC</strong>*</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>North America</strong></td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Oceania</strong></td>
<td>0.04</td>
<td>0.04</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*Latin America & Caribbean
Source: UN (population scenario planning)
Per Capita Income and Population will Grow Faster in Developing Countries than in Developed Countries

<table>
<thead>
<tr>
<th></th>
<th>Per capita income</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012 level</td>
<td>2013-22 growth rate</td>
</tr>
<tr>
<td></td>
<td>2005 dollars</td>
<td>Percent</td>
</tr>
<tr>
<td>World</td>
<td>7,745</td>
<td>2.4</td>
</tr>
<tr>
<td>High-income countries</td>
<td>37,594</td>
<td>1.7</td>
</tr>
<tr>
<td>All developing countries</td>
<td>2,906</td>
<td>4.4</td>
</tr>
<tr>
<td>Latin America</td>
<td>5,959</td>
<td>3.1</td>
</tr>
<tr>
<td>Asia (excluding Japan)</td>
<td>2,572</td>
<td>5.8</td>
</tr>
<tr>
<td>Middle East</td>
<td>6,743</td>
<td>2.5</td>
</tr>
<tr>
<td>Africa</td>
<td>1,254</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Source: USDA, Economic Research Service, International Macroeconomic Data Set
Not the Richest, but the Most Populous: Add Income Growth & Changing World Order

* Then part of USSR

Quoted in: The Economist June 22nd, 2013. Original source: UN
Meat Consumption Generally Increases with Higher Income

## Regional Shifts in Global Egg Production 1970-2010: Percent of Global Production (%)

<table>
<thead>
<tr>
<th>Region</th>
<th>1970</th>
<th>1990</th>
<th>2010</th>
<th>+/- %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>3.0</td>
<td>4.4</td>
<td>4.3</td>
<td>+1.3</td>
</tr>
<tr>
<td>Asia</td>
<td>23.7</td>
<td>38.9</td>
<td>58.7</td>
<td>+35.0</td>
</tr>
<tr>
<td>Europe</td>
<td>42.4</td>
<td>33.2</td>
<td>16.5</td>
<td>-25.9</td>
</tr>
<tr>
<td>N America*</td>
<td>24.2</td>
<td>15.3</td>
<td>12.9</td>
<td>-11.3</td>
</tr>
<tr>
<td>CS America</td>
<td>5.4</td>
<td>7.5</td>
<td>7.2</td>
<td>+1.8</td>
</tr>
<tr>
<td>Oceania</td>
<td>1.2</td>
<td>0.7</td>
<td>0.4</td>
<td>-0.8</td>
</tr>
<tr>
<td>World</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

* Includes Mexico

Source: IEC, 2013
United States, North Carolina

The Revis family spends around $342 per week.

Source: What the World Eats
Peter Menzel and Faith D’Aluisio (2007)
The Japanese are Economising on Beef – Expenditure is Falling (it is in many recession-bound economies)

Source: ALIC

Source: MLA 2013
Big Shift in Aussie Exports to Japan from Chilled Grain Fed Beef to Frozen Grass Fed Beef

% of Australian exports to Japan

- Chilled grainfed
- Frozen grassfed

Frozen grassfed exports
Chilled grainfed exports

Source: DAFF

Source: MLA 2013
Emerging Countries Dominate World Food Consumption Growth & Import Growth, 2013 to 2022

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>87.9%</td>
<td>94.0%</td>
</tr>
<tr>
<td>Wheat</td>
<td>81.1%</td>
<td>92.8%</td>
</tr>
<tr>
<td>Rice</td>
<td>99.6%</td>
<td>97.9%</td>
</tr>
<tr>
<td>Corn</td>
<td>82.4%</td>
<td>93.7%</td>
</tr>
<tr>
<td>Sorghum</td>
<td>117.1%*</td>
<td>365.0%*</td>
</tr>
<tr>
<td>Barley</td>
<td>56.7%</td>
<td>91.7%</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>78.5%</td>
<td>90.0%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>91.9%</td>
<td>78.8%</td>
</tr>
<tr>
<td>Total protein meals</td>
<td>80.6%</td>
<td>81.6%</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>86.5%</td>
<td>78.8%</td>
</tr>
<tr>
<td>Total vegetable oils</td>
<td>78.2%</td>
<td>79.4%</td>
</tr>
<tr>
<td>Soybean oil</td>
<td>90.0%</td>
<td>58.1%</td>
</tr>
</tbody>
</table>

* reflects consumption decline in developed countries
Developing Countries Dominate World Meat Consumption Growth and Import Trade Growth 2013 to 2022

<table>
<thead>
<tr>
<th></th>
<th>Share of projected growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumption</td>
</tr>
<tr>
<td>Meats</td>
<td>81.2</td>
</tr>
<tr>
<td>Beef</td>
<td>80.0</td>
</tr>
<tr>
<td>Pork</td>
<td>86.8</td>
</tr>
<tr>
<td>Poultry</td>
<td>77.2</td>
</tr>
</tbody>
</table>

*Reflects consumption decline in developed countries


Imperial College London
Global Meat Consumption by Species

<table>
<thead>
<tr>
<th>Species</th>
<th>Percent Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pork</td>
<td>32</td>
</tr>
<tr>
<td>Poultry</td>
<td>26</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>23</td>
</tr>
<tr>
<td>Beef</td>
<td>16</td>
</tr>
<tr>
<td>Lamb</td>
<td>3</td>
</tr>
</tbody>
</table>

Global Meat Consumption: 315 million tonnes

Sources: GIRA, FAO, Hughes
Conventional Wisdom: Global Meat Demand to Sky Rocket. Well, It Depends!

- Developed country demand reducing (particularly for red meat) – ageing, health, environ. concerns, etc.
- China high meat consumption and ageing population. Over reliance on continued high GDP growth rates?
- What’s a premium cut in Asia and/or Africa?
- Volatile food grain markets focus attention of poorer households on securing staple purchases (e.g. rice)
- Slower growth India a fish and chicken market
- Tasty, affordable plant-based meat analogues out-compete “real” meat
FAO Global Food Price Index: 1990 to 2013*

* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)

Source: FAO  *(to August, 2013, September 5th, 2013)*
New

Chick-en-free Strips
Gluten-free | 20g cholesterol-free protein | Vegan

Lightly Seasoned

Plant-based protein made from soybeans & peas

Net WT: 12 oz (340g) | Keep refrigerated

Nutrition Facts

Serving Size 3oz (85g about 7 strips)
Servings Per Container: 4

Amount Per Serving

<table>
<thead>
<tr>
<th>Calorie Content</th>
<th>% Daily Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories 130</td>
<td>30%</td>
</tr>
<tr>
<td>Total Fat 3.5g</td>
<td>5%</td>
</tr>
<tr>
<td>Saturated Fat 0g</td>
<td>0%</td>
</tr>
<tr>
<td>Trans Fat 0g</td>
<td>0%</td>
</tr>
<tr>
<td>Cholesterol 0mg</td>
<td>0%</td>
</tr>
<tr>
<td>Sodium 400mg</td>
<td>17%</td>
</tr>
<tr>
<td>Total Carbohydrate 6g</td>
<td>2%</td>
</tr>
<tr>
<td>Dietary Fiber 2g</td>
<td>8%</td>
</tr>
<tr>
<td>Sugars 0g</td>
<td></td>
</tr>
<tr>
<td>Protein 20g</td>
<td></td>
</tr>
</tbody>
</table>

Vitamin A 0% | Vitamin C 2%
Calcium 6% | Iron 30%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Wholesome ingredients

Whole Foods Market

Hampton Creek

Bill Gates had a free sample. And now it's your turn.
Brands Emerging in Egg Replacement Product Sectors

A Winner in IFT 2013 Food Expo Innovation Awards

Optisol 3000 Egg Replacement
Flaxseed Meal and Whey
LIVESTOCK CONTRIBUTES TO 18% OF GREENHOUSE GAS EMISSIONS

FAO 2006

100 Brilliant Companies: The Company Leading the Future of Farming
May 24, 2013

Here’s a crazy idea: Combine 3-D printing and tissue engineering to “print” animal products and tackle some of the planet’s biggest problems. Animal farming, after all, accounts for about half of all human-caused greenhouse gases, taking place on one-third of the available, non-frozen land on Earth. All to feed people’s appetites for 300 million tons of meat a year.

TOXIC SOLID WASTES REPRESENT UP TO 70% OF THE WET WEIGHT OF LEATHER

Making Leather and Meat Better
Modern Meadow applies the latest advances in tissue engineering to develop novel biomaterials to address some of our most pressing global challenges. We develop cultured leather and meat products which require no animal slaughter and much lower inputs of land, water, energy and chemicals.
August, 2013:  
The Stem Cell Burger Is Revealed!  
Source: The Times, UK

Amazing, really. We were trying for a test-tube burger”
Life Science Companies
Ownership of Intellectual Property/Genetic Rights

market
power
polarised

growers/farmers
distributors, processors
manufacturers etc.
get squeezed!

Major Global Food Retailers and Food Service Firms
Ownership of Information on Shopping Behaviour
Top 12 Global FMCG Mega-Brands, 2013

But, Increasingly, Food Retail and Food Service Brands in Top 20

Sources: Interbrand, Millward Brown, 2013
## The Retail Market for Rice in the UK

<table>
<thead>
<tr>
<th></th>
<th>£ million</th>
<th>Market share %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Retail Market</strong></td>
<td>385</td>
<td>100</td>
</tr>
<tr>
<td>Of which:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncle Ben’s (Mars)*</td>
<td>145</td>
<td>38</td>
</tr>
<tr>
<td>Supermarket own label</td>
<td>118</td>
<td>31</td>
</tr>
<tr>
<td>Tilda*</td>
<td>61</td>
<td>16</td>
</tr>
<tr>
<td><strong>Branded rice spend on advertising</strong></td>
<td></td>
<td>% retail sales</td>
</tr>
<tr>
<td>Uncle Ben’s</td>
<td>5.6</td>
<td>4</td>
</tr>
<tr>
<td>Tilda</td>
<td>0.4</td>
<td>1</td>
</tr>
</tbody>
</table>

*85+% of retail sales sold on a “Deal” (price promotion) in 2013*

Source: Nielson UK and Kantar Worldpanel, UK, 2013
In the Dock: “Big Food” in the Global Food Industry

The Charge? Threatening the Health & Well-Being of:

- **The Planet** - issues relating to sustainability, climate change, resource conservation, biodiversity, etc.

- **Consumers** – food safety, obesity

- **Food System Participants** – abusing farm animals, threatening smaller-scale farmers
For the Prosecution
WHO boss says Big Food, Big Soda and Big Alcohol as bad as Big Tobacco

World Health Organization takes on the food industry

I've just been sent a copy of the opening address given by the Director-General of the World Health Organization, Dr Margaret Chan, to a Global Conference on Health Promotion in Helsinki on June 10.

Here is an excerpt from her extraordinary remarks:

Today, getting people to lead healthy lifestyles and adopt healthy behaviours faces opposition from forces that are not so friendly. Not at all.

Efforts to prevent noncommunicable [chronic] diseases go against the business interests of powerful economic operators.

In my view, this is one of the biggest challenges facing health promotion... it is not just Big Tobacco anymore. Public health must also contend with Big Food, Big Soda, and Big Alcohol.

Public health faces "daunting challenge" from "Big Food", Dr Chan believes

Self-Reported Obesity Among U.S. Adults

Mexico takes title of "most obese" from America
<table>
<thead>
<tr>
<th>Company</th>
<th>EBIT Margin (% sales)</th>
<th>ROCE (%)</th>
<th>Sales $ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philip Morris International</td>
<td>44</td>
<td>82</td>
<td>37</td>
</tr>
<tr>
<td>Altria Group</td>
<td>43</td>
<td>45</td>
<td>17</td>
</tr>
<tr>
<td>BAT</td>
<td>40</td>
<td>33</td>
<td>24</td>
</tr>
<tr>
<td>SAB Miller</td>
<td>37</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>AB InBev</td>
<td>34</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Diageo</td>
<td>33</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Reckitt Benckiser</td>
<td>25</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>24</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>Pernod Ricard</td>
<td>24</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Colgate-Palmolive</td>
<td>23</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td>Japan Tobacco</td>
<td>23</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Heineken</td>
<td>21</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>21</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>LVMH</td>
<td>19</td>
<td>16</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: OC&C (UK), 2013
“Something’s just not right—our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty.”
99% HORSE IN FINDUS LASAGNE

And traces of animal painkiller
QUEEN EATS HORSE
Dodgy meat served at Royal Ascot
Tesco Apologises for “Horsegate”
Pork chop shock

A pork chop labelled as ‘British’ that was bought by a BBC reporter in a Tesco Express has failed a provenance test. Isotope analysis by Bpex suggested there was a less than 1% probability that the meat was British. The meat was supplied to Tesco by Cranswick, which in turned traced it back to its supplier F A Gill. The Grocer’s Julia Glotz spoke to the BBC’s Farming Today programme this morning:

This matters because if you think back to the horsemeat scandal, at the very heart of that issue was consumer trust; consumers being confident that when they buy something, it contains exactly what it says on pack. So this is potentially yet another example where consumers are told you’re buying this, and later it turns out they’re actually buying something else. It’s fundamentally about trust.
CONCERNS REMAIN REGARDING THE USE OF GROWTH HORMONES IN THE CANADIAN BEEF INDUSTRY...
Pink Slime Bankruptcy: Ground Beef Processor Files For Chapter 11 After Heated Backlash

Centrifuged chicken paste ("pink slime")

Lean Finely Textured Beef (LFTB)

Jamie Oliver: Not Everyone’s Favourite Celebrity Chef in USA
Nutritional Weaklings in the Supermarket

Here is how heirloom varieties and wild species of produce have been found, in separate studies, to outshine their cultivated cousins.  

- Nutrient content of wild species and heirloom varieties
- Nutrient content of domesticated varieties

Blue corn 99.5
Purple 93.2
Red 85.2
Yellow 70.2
White 1.54

Corn
Customer Hierarchy at Coles Supermarket…

Kind to others

Back to Nature

Good for me, my family

Legal & safe

Source: Coles Supermarket, Australia
Trust in our food

1. Putting a floor under the problem – customers need confidence that we know what is in the food we sell and that labels are accurate

2. Rebuilding trust and quality – customers want us to simplify our supply chain, bringing it closer to home

3. Creating a tipping point to take trust and quality to levels beyond those before the issue – customers want us to demonstrate that we care about customers & the supply chain, not just profit

- Control and confidence
- Closer to home
- Demonstrate that we Care

TESCO
Every little helps
Trust in our food

- Communication
  - Media, in store, online
  - New food conversation - care, passion, provenance, transparency

- Labelling
  - Contains exactly what it says in the pack
  - Born, reared, killed, processed and packed

- Quality
  - DNA testing, traceability, increased audits, welfare
  - Increased testing with customers

- Sourcing and Supply Chain
  - British and Irish provenance, welfare
  - Development of sustainable farming groups
  - Tesco Agricultural team
  - Partnerships, direct relationships, shorter and safer supply chains

- Listening
  - Partners, suppliers, stakeholders
  - Viewpoint and groups
  - Producer network
Meat Safety and Supply Chain Integrity Very Big Deal in China

Mmmm, now where did they come from?
New Zealand milk stokes fears

Chinese firms recall products exposed to contamination

By ZHOU WENTING
in Shanghai
zhouwenting@chinadaily.com.cn

Chinese producers who bought contaminated batches of whey protein concentrate from New Zealand were recalling products on Sunday, dealing the latest blow to Chinese consumers' confidence in milk powder products.

Diary giant Fonterra said on Saturday that tests had discovered *Clostridium botulinum* in its whey protein, which clients buy as raw material to produce baby formula and sports drinks. *Clostridium botulinum* is one of the world's strongest toxins and can destroy the human nervous system if ingested. In infants under 1 year old, it can trigger neural damage.

Mu Liping (left) checks with a saleswoman at a supermarket in Beijing on Sunday whether her newly bought Dumex baby formula should be recalled. Dumex announced it was recalling 12 batches of products in China that may be contaminated. Mu found her purchase didn't belong to the recalled batches and left with the baby powder.

SOUND BITES

“I insisted on breastfeeding for 22 months after my baby was born, mainly because I was worried about the safety of dairy products. Now I prefer to have him eating soft food.”

WANG LIN, 30-year-old mother of a 2-year-old boy

“It's time to change brands for my baby. But it's really a hard choice because domestic and foreign products are both risky.”

YANG QUANSHI, resident in Hainan province

MONDAY, August 5, 2013
FOOD SAFETY

XL Foods recall was product of preventable errors, review finds

BILL CURRY

OTTAWA — The Globe and Mail
Published Wednesday, Jun. 05 2013, 4:10 PM EDT
BEEF IN OUR BURGERS.

Whole cuts of beef, seasoned with just a touch of salt and pepper after cooking. Nothing more. Nothing less.

THAT'S WHAT MAKES MCDONALD'S
Track My Macca's™

Turn your iPhone into an ingredient tracker and get the lowdown on some of your Macca's favourites.
Welcome to Open Farms

As part of our role as food supplier to the London 2012 Olympic Games, we’re throwing open the gates to some of the 17,500 British and Irish farms that provide us with top-quality ingredients.

Join us at an Open Farm

Just fill in the application form below and if you're successful*, we'll let you know about your nearest Open Farms event and all the details.

*A limited number of places are available at each event.
For Beef and Lamb: Lily White or All Black?
Michael Porter’s “Big Idea” for Business

What’s Good for American Business is Good for America (Coolidge?)

Turned on Its Head:

What’s Good for America – its citizens’ health, the environment, future generations, disadvantaged groups …., etc., is Good for American Business

“We are already finding that tackling sustainability challenges provides new opportunities for sustainable growth: it creates preference for our brands, builds business with our retail customers, drives our innovation, grows our markets and in many cases, generates cost savings.”

Paul Polman, CEO of Unilever
50 page manual w/ 10 sections:

- Chemicals & fuels
- Soils
- Water
- Biodiversity
- Energy
- Waste
- Social & human capital
- Animal welfare
- Value chain & local economy
- Training

Each with 3 levels of effort:

- Mandatory
- Must do
- Should do
**SOME “WINNERS”**
- High growth countries
- High integrity food
- Rich people
- Consumers/shoppers
- IP owners (patents on genes, blue chip brands)
- Colder, wetter, high-lying countries
- Plant-based products
- Food exporting countries
- “Good” biotech/GM communicators

**SOME “LOSERS”**
- Mature, ageing econs.
- Big, bad food
- Poor people
- Big box retailers
- Secondary brands, commodity players
- Hot, dry, low-lying countries
- Meat-based products
- Food insecure countries
- “Bad” biotech/GM communicators
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