



Strategic Evidence of Future Change

Summary report
10th November, 2015

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A collaborative project between the Defra Partnership and SAMI Consulting



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Background

- SAMI were commissioned by Defra “Partnership” to conduct Horizon Scanning
 - as recommended by Jon Day
- Collaborative scanning team entered 1057 “stories” into database
- Software tool used to store and analyse relationships
- Successfully completed three reports in first year of 3 year project

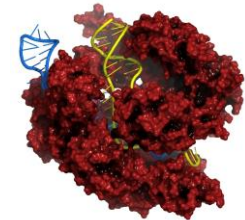


Key issues developing over the year

- Gene editing has accelerated the biotechnology revolution
- Radically new food ingredients are being developed
- The evolving “Smart countryside”
- Challenge and opportunity in rural areas
- Paris submissions suggest 2.7°C rise in global temperature
- Litigation as a strategy to stop climate change
- Rising environmental activism
- Resources for next industrial evolution
- Plus 4 other issues



Gene editing has accelerated the biotechnology revolution



- Gene transfer within species: akin to cross-breeding
- Between species – novel forms, especially for food
- Increased yields; disease resistance; shelf life; herbicide resistance
- Pharmaceutical production; bio sensors, control insects, conserve species; new pets; xeno-transplants; medicine etc
- Should gene edited organisms be treated as GMOs?
- Should they be encouraged?
- What are the implications for the human food chain?
- What are the impacts if released into the wild?
- What are the regulatory issues?



Radically new food ingredients are being developed



- Vegetable proteins to create food “better than beef” – not just for vegetarians
- Animal feed from aquatic plants and insects
- *In-vitro* lab-grown meat
- New genes in foodstuffs – hypo-allergenic peanuts
- Should mimic-meat be encouraged as policy?
- How to calculate environmental costs of such production?
- Implications for long-term food security?
- What about food chain effects of modified animal foodstuffs?



The evolving “Smart Countryside”



- Covers pervasive monitoring, big data, AI, expert systems, precision farming, drones, satellites, autonomous vehicles
- Eg Global Forest Watch
- Improved water use, food security, animal health
- Digital supply chain management
- Cyber-crime threats; accidents
- How best to support use to improve food security and drive economic growth in farming?
- How can GFW help regulation of forests and forest products?
- Where will expert systems help farming and food?
- What cyber-defence is needed?



Challenge and opportunity in rural areas



- Pressures on Green Belt with deregulation
- Urban greening
- Low carbon food production and resources for the circular economy
- Changing rural economy – relative decline of farming
- Soil degradation continues
- Should rural policy change to reflect decline of farming?
- Effects of climate change?
- Co-ordination of agri-environment policy with flood resilience and catchment management?



Paris submissions suggest 2.7°C rise in global temperature



- Climate Action Tracker analysis suggests stabilising at 2.7°C
- Company plans and cheap coal suggest 4°C rise possible
- Rapidly warming seas no longer absorb CO₂ causing +ve feedback
- At current GHG emission rates, will reach 2°C by 2036
- Plan for even more severe impacts
 - extreme weather events
 - biodiversity, habitats
 - food security
 - coastal flooding
- Happening sooner
 - impacting infrastructure planning horizons
- What more research or monitoring needed?



Litigation as a strategy to stop climate change



- Examples of Governments being sued in Netherlands and Belgium
- Peruvian community suing German company
- Reflects challenges to tobacco industry
- Threats to individual scientists – eg L'Aquila earthquake
- Are there plans to deal with an increase in litigation?
- Do Defra scientists need malpractice insurance?
- Will “open data” be threatened? Or need thorough checking?



Rising environmental activism



- Surveys show increasing concern for environment
- Social media “naming and shaming” – #droughtshaming
- Citizens monitoring – eg air pollution at schools
- Driving value shift in corporations
- Religions getting involved
- Can activism be channelled into civic partnership rather than litigation?
- How can citizen monitoring be used to support Defra goals?
- Public-private partnerships to reduce Climate Change impact?
- How best to involve religious groups?



Resources for the next industrial evolution



- Biomimicry more efficient than “heat, beat and treat”
- 3D-printing (even 4-D) changing materials requirements
- De-centralised production has waste implications
- “Circular economy” concept changes what is waste and what is resource
- What are the regulatory implications of re-cycled waste?
- Should we encourage bio-type or 3D-printed flood defences?
- What are the implications for national “resource security”?



Other important topics

- Air pollution issues increase
 - Deaths quantified; citizen science will raise political profile
- Green cities are burgeoning
 - Vertical gardening; reduced “heat island” effect
- Increased extinction risks
 - Oceans vulnerable; potential tipping points
- Biosphere control through species management
 - Coasts, rivers, forests



Discussion

- 5 minutes – Discuss in groups of three or four adjacent colleagues:
 - ***which one of the key issues potentially has the greatest future implications for Defra Partnership?***
 - ***and why?***
- 15 minutes – Feedback and discussion



Feedback

| Issue | 'Votes' |
|--|---------|
| Gene editing has accelerated the biotechnology revolution | |
| Radically new food ingredients are being developed | |
| The evolving "Smart countryside" | |
| Challenge and opportunity in rural areas | |
| Paris submissions suggest 2.7°C rise in global temperature | |
| Litigation as a strategy to stop climate change | |
| Rising environmental activism | |
| Resources for next industrial evolution | |
| Others - specify | |



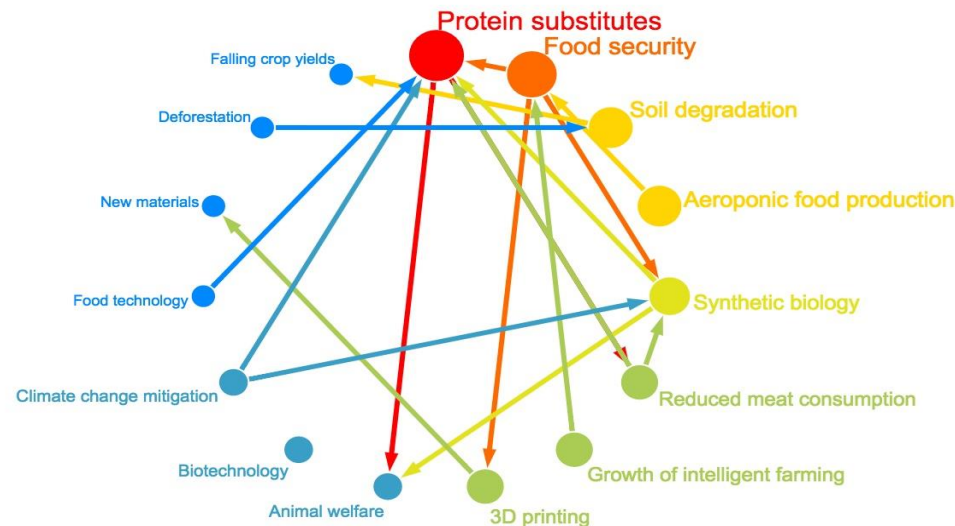
Contact

- Reports are at:
 - <http://samiconsulting.co.uk/5reports.php#Defra>
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Methodology (1)

- Scanners identify stories and enter into database
 - Adding metadata and causal links
- Software used to identify “clusters of change”





Methodology (2)

- “Emerging signals” identified using metadata and scanners’ insights
- A “core group” advised on most relevant topics to Defra Partnership.
- Reports and Executive Briefings written
- Final summary report brings together key issues over the year