



# Strategic Evidence of Future Change

Summary report  
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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

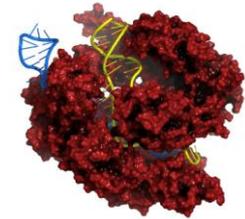


# Key issues developing over the year

- 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 re 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 CO<sub>2</sub> 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?



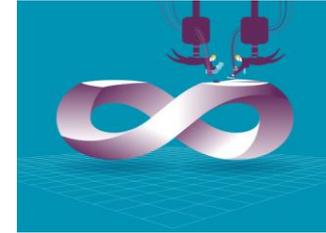
## Rising environmental activism



- 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	



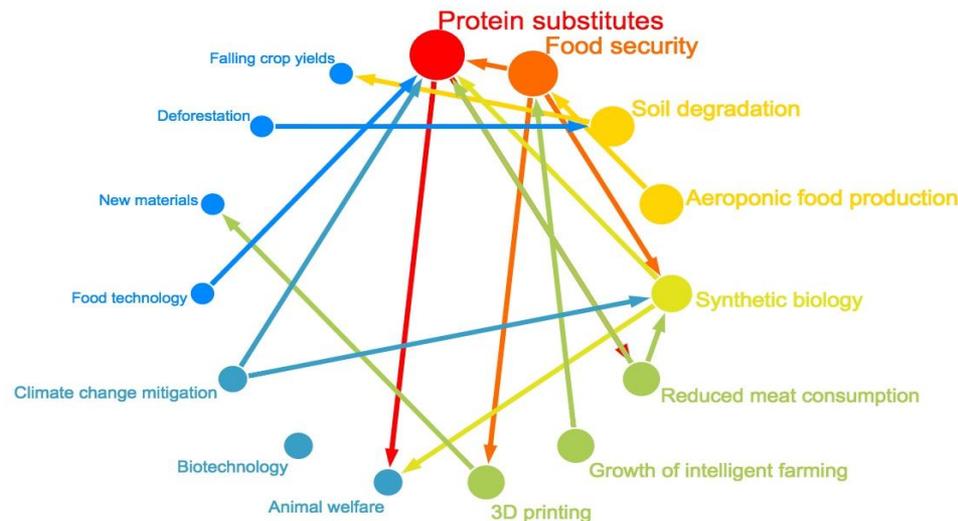
# Contact

- 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