

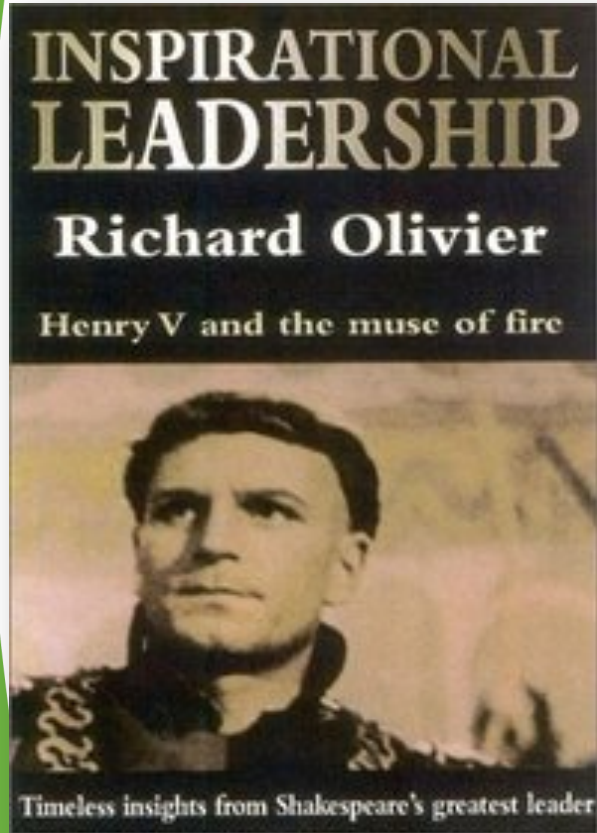
Achieving food security through an ecosystem services approach and why this matters to UK consumers...

Reflections of the Chief Scientific Adviser to the FSA  
**Professor Guy Poppy**  
**University of Southampton**



- Two jobs – two talks in one
- The Global Food System and why/how it has impact on UK consumers
- Ecosystem Services approach – the only way to achieve sustainable intensification
- Early thoughts/Approaches at the FSA

# The Call to Imagination



**O! for a muse of fire,  
that would ascend**

**The brightest heaven of  
invention!**

Prologue Henry V  
Shakespeare, W.

# The Vision

Food security alongside environmental stability in the context of global climate and population change

“The Harvester” – Pieter Brueghel (1565)



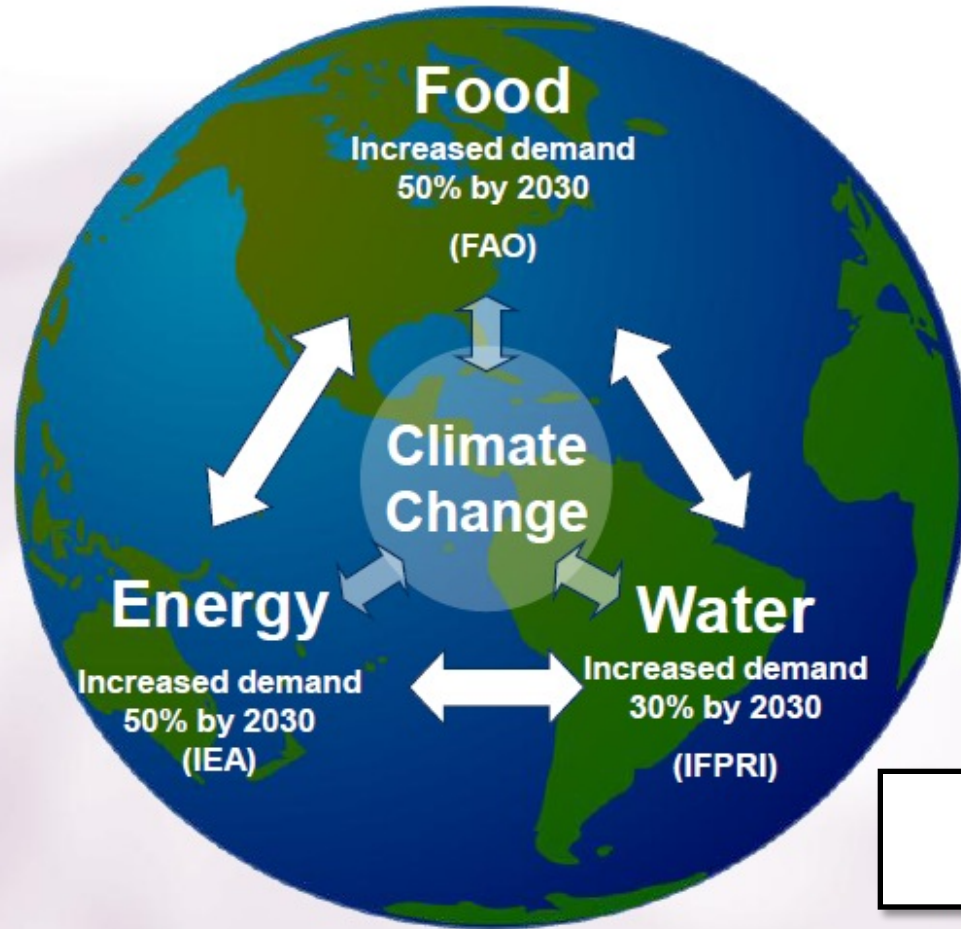
Agricultural fields Tibet



# John Martin – Sodom and Gomorrah



# The “Perfect Storm”

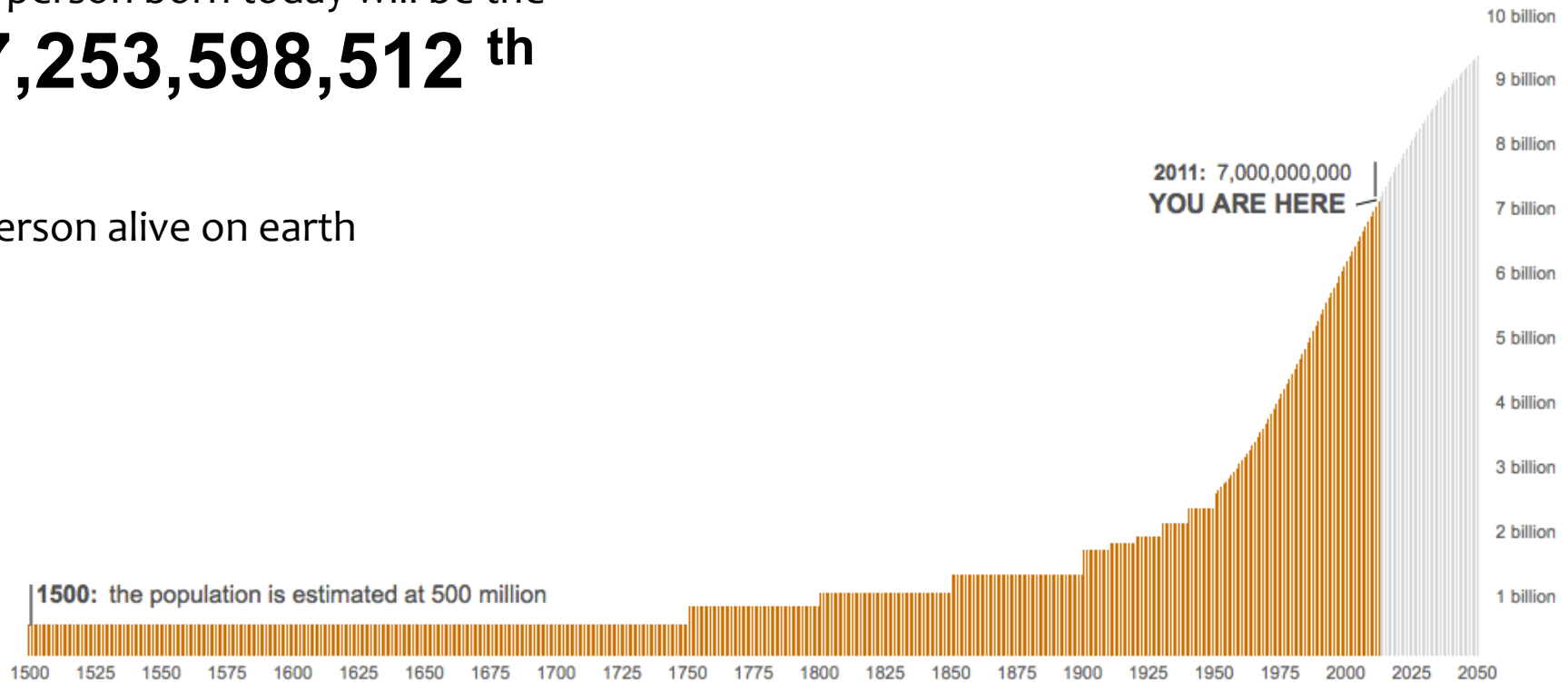


HM Government Chief Scientist Prof Sir John Beddington 2009

# World population, 11<sup>th</sup> Feb 2015

A person born today will be the  
**7,253,598,512<sup>th</sup>**

person alive on earth



# Arable land per person will decrease

Year

- World Population
- Arable land

1950

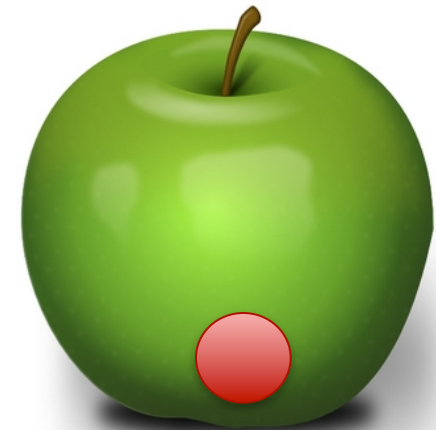
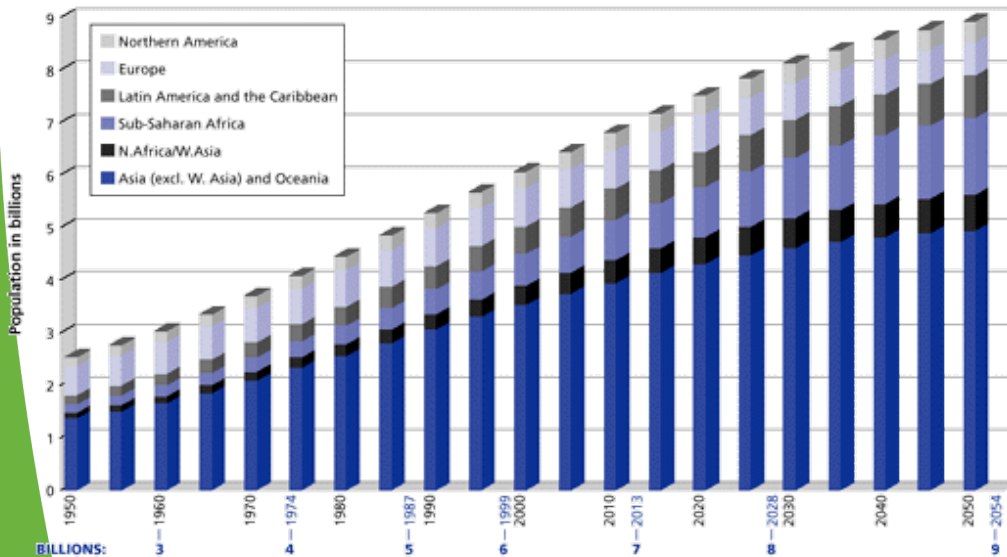
- 2,500,000,000
- 0.52 ha

2000

- 6,100,000,000
- 0.25 ha

2050

- 9,000,000,000
- 0.16 ha

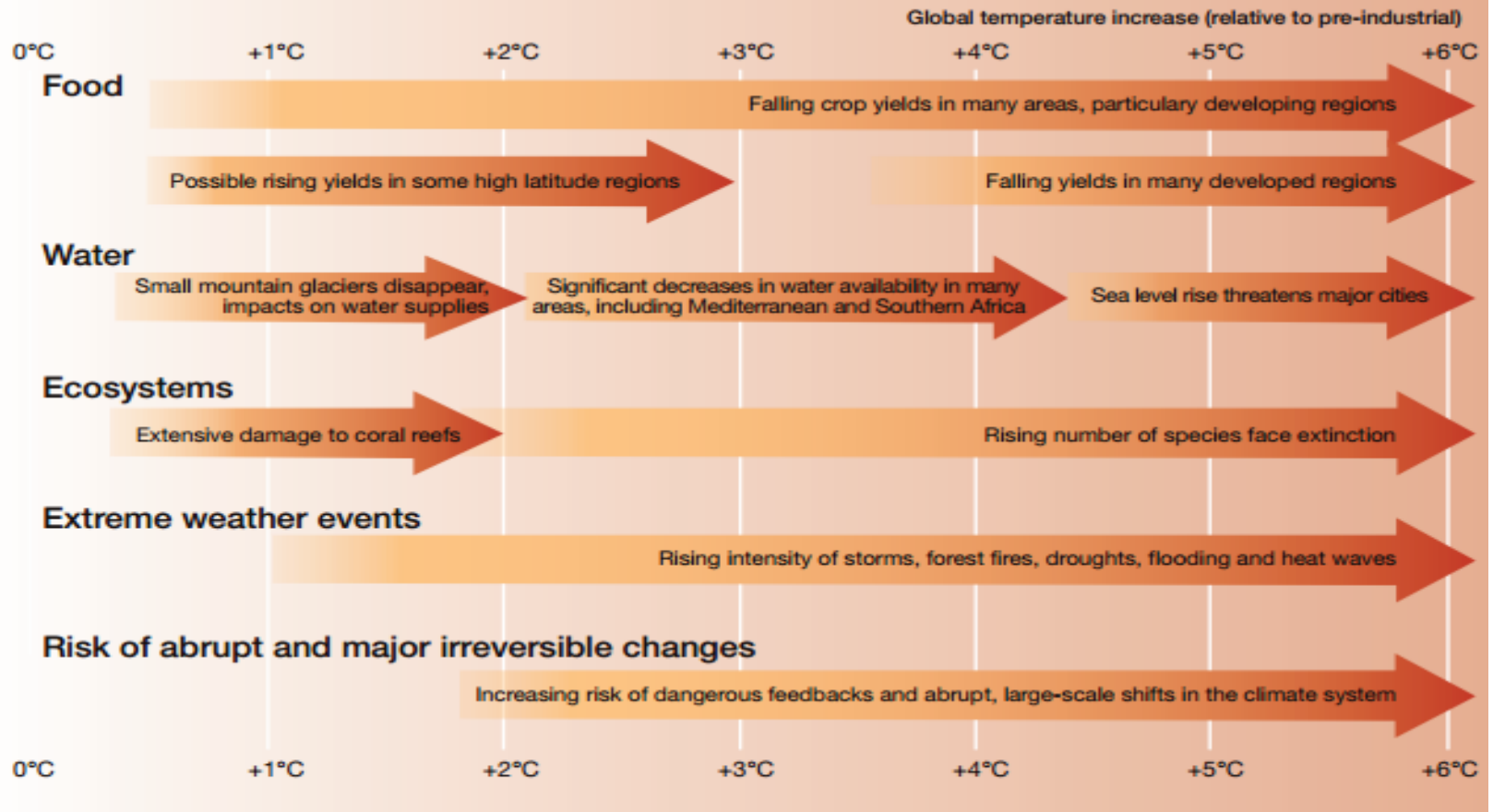


The arable land on the earth is ~3% or 1.5 billion ha



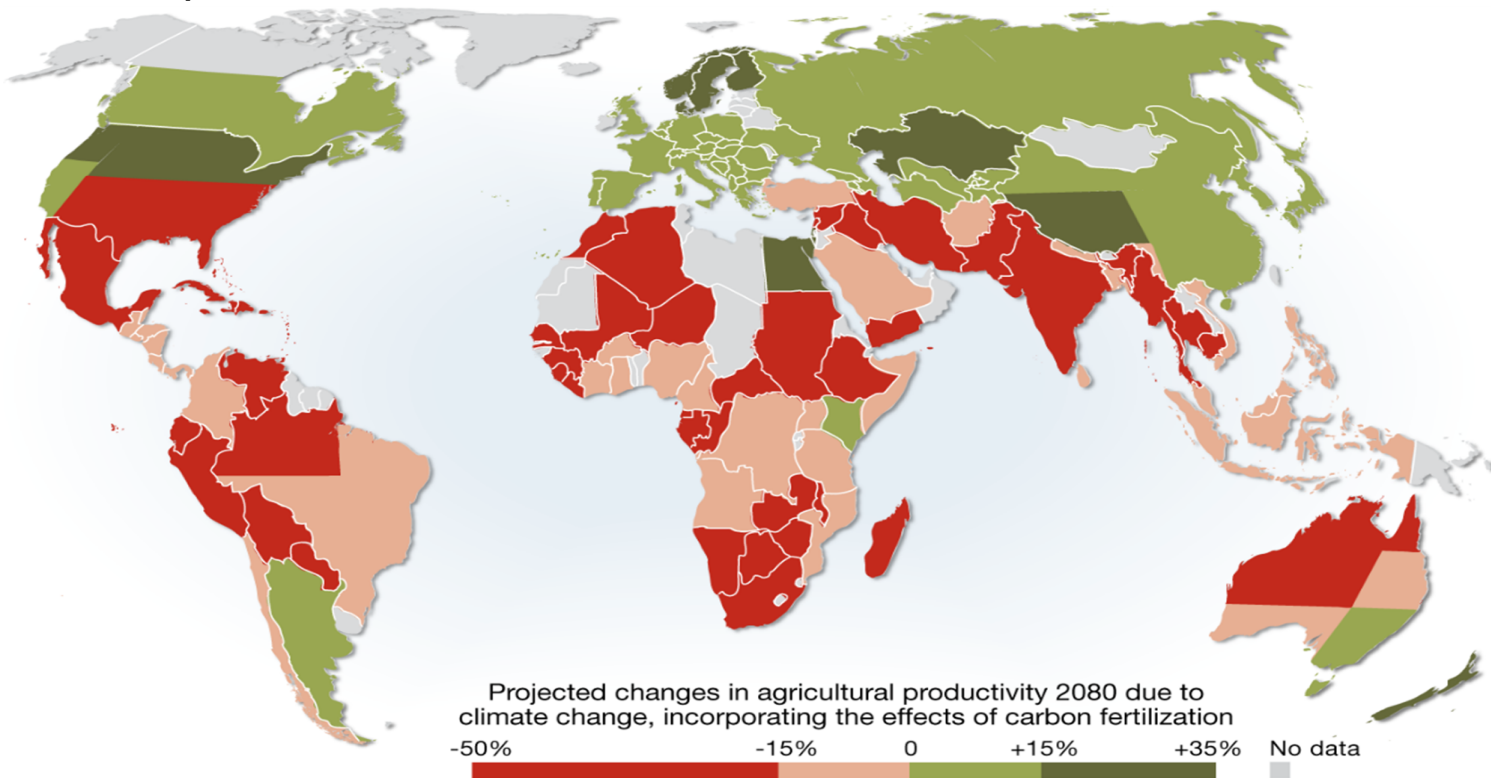
# Global climate change may impact food production across a range of pathways ...

## Projected impacts of climate change



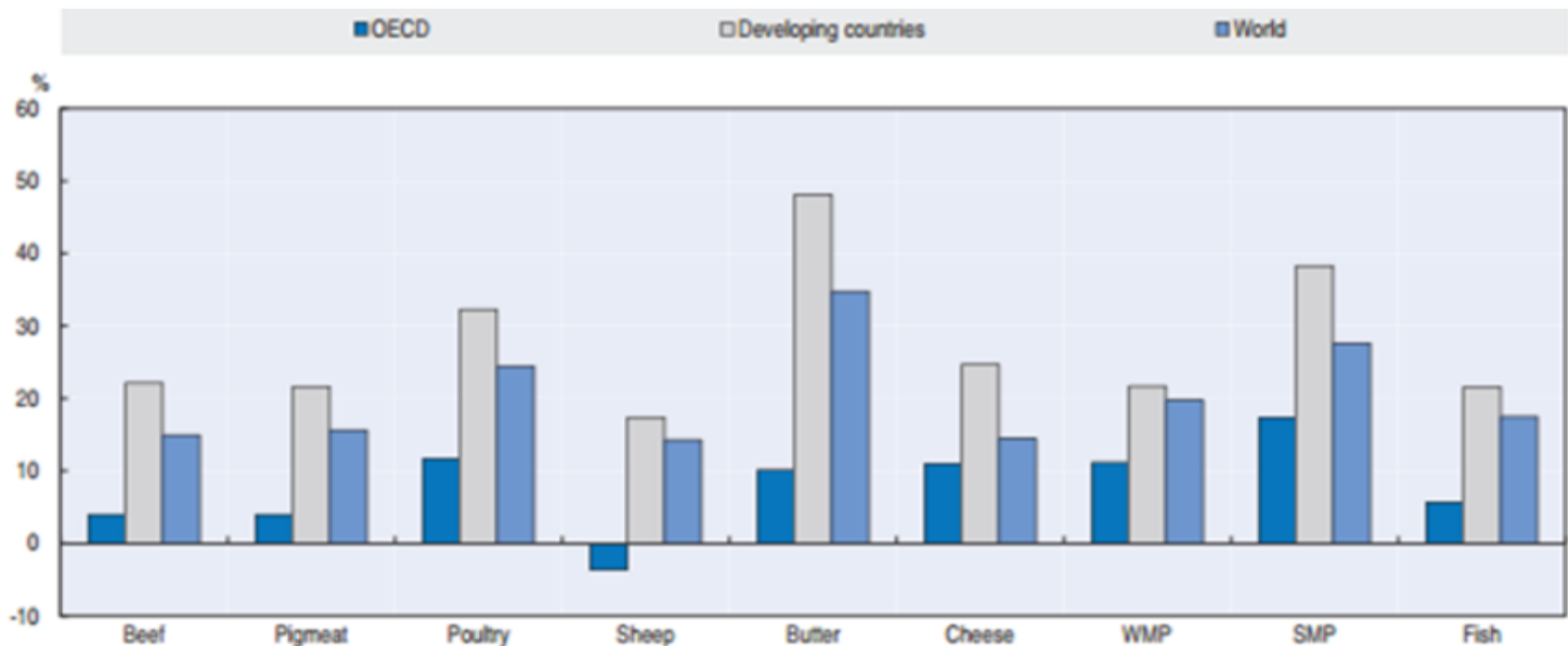
## ... putting pressure on agricultural productivity

- By changing overall growing conditions (rainfall distribution, temperature and carbon)
- By introducing more extreme weather such as floods, drought and storms
- By increasing extent, type and frequency of infestations, including invasive alien species



# Developing and emerging economies add further demand pressures on global food supply. Driven by ...

- growing populations and their increasing concentration in large urban centres and mega cities,
- rising per capita incomes, expanding middle classes, and with the growing affluence



Source: OECD and FAO Secretariats.

## Higher consumption of livestock and fish products

(Per cent change 2022 relative to 2010-12)



- 16% of world malnourished
- 1/3 of children in developing world stunted
- 30 million babies born impaired due to lack of natal nutrition
- 5 million children die annually from causes related to lack of nutrition

# UN FAO definition of Food Security

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life

Availability

Access

Utilization

Stability/Resilience

Availability

Access

Utilisation

Stability

So why does this matter to the  
UK consumer?

# UK Self-sufficiency has peaked

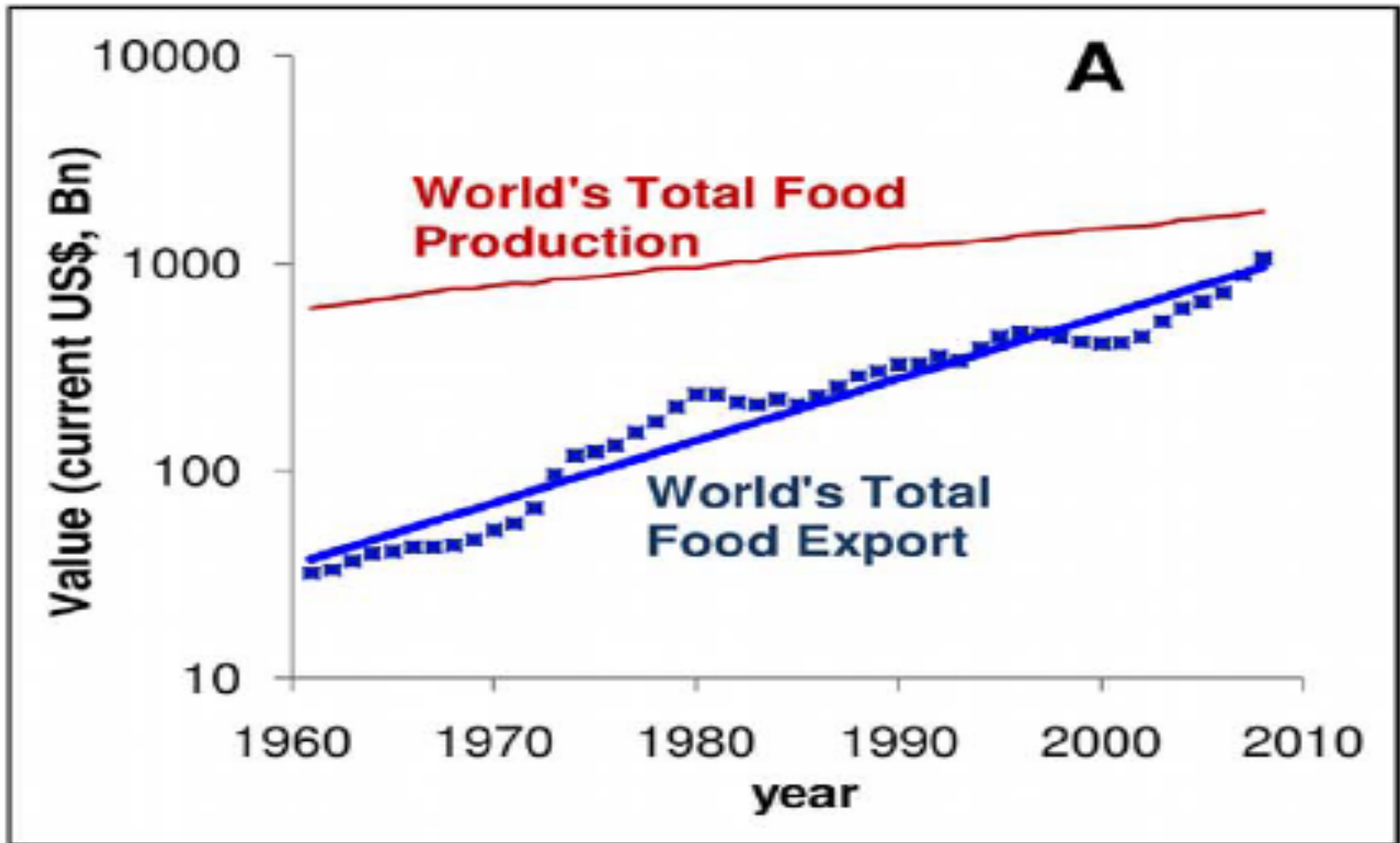
DEFRA; 25 Sep 2010

## Indicative British self-sufficiency ratios over different periods<sup>31</sup>

|              |   |
|--------------|---|
| pre – 1750   | around 100% (in temperate produce)      |
| 1750 – 1830s | around 90-100% except for poor harvests |
| 1870s        | around 60%                              |
| 1914         | around 40%                              |
| 1930s        | 30 - 40%                                |
| 1950s        | 40 - 50%                                |
| 1980s        | 60 – 70%                                |
| 2000s        | 60%                                     |

**“Britain least self-sufficient in food since 1968”**

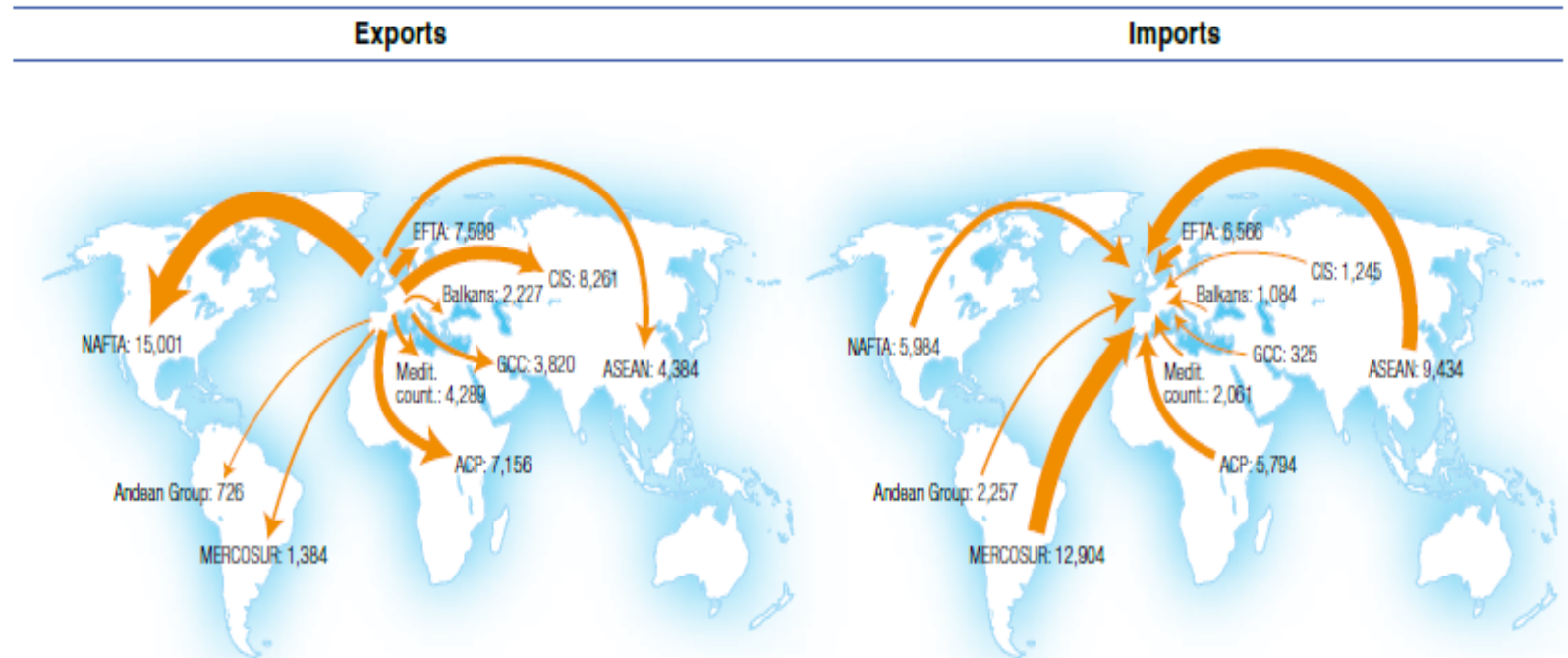
Daily Telegraph; 25 Sep 2010





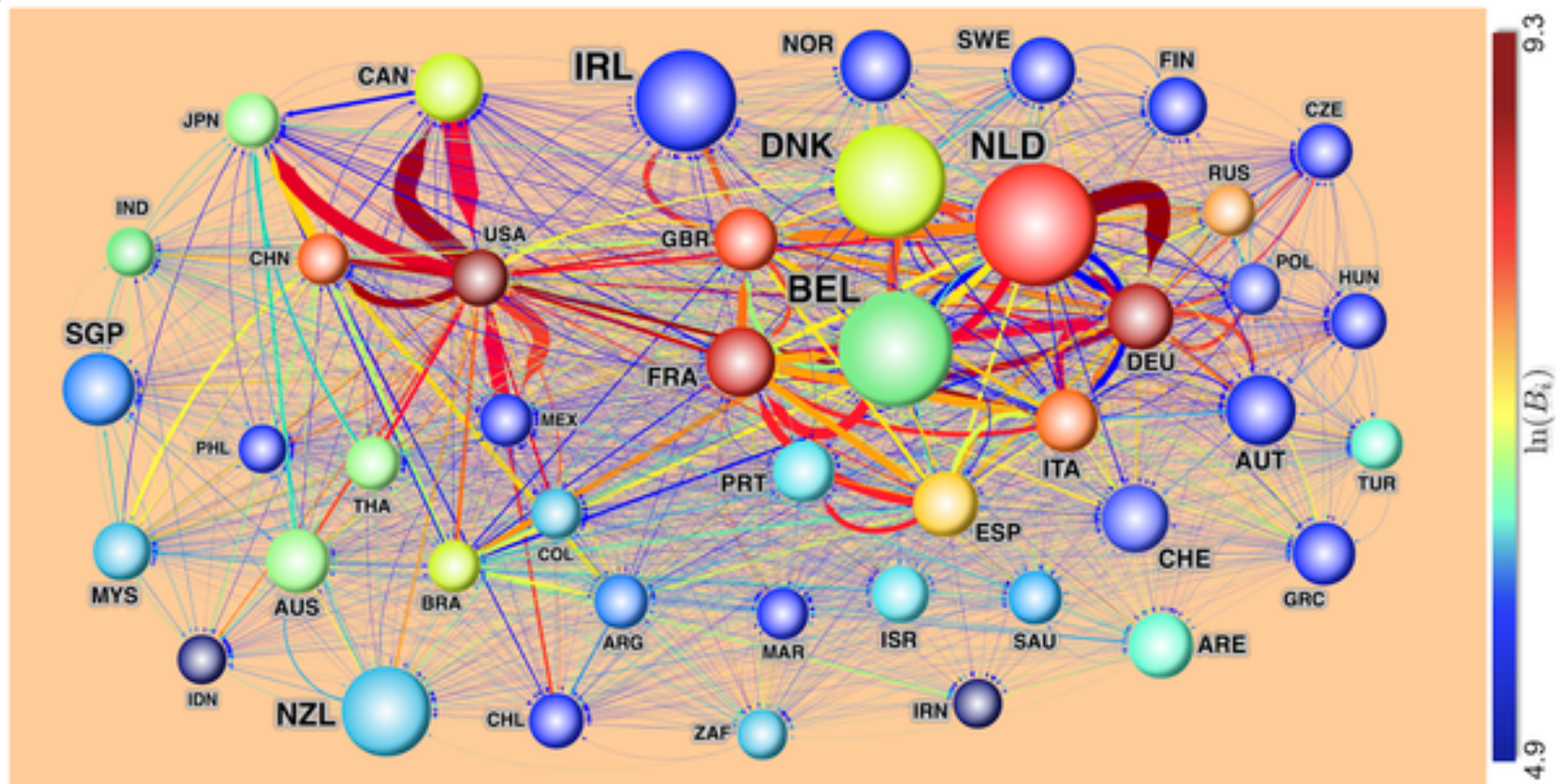
# The importance of extra-EC trade will increase

EU trade by region, 2011 (€ million)



Source: Eurostat (Comext)  
For trade region definitions, see page 25

Figure 4. The backbone of the IFTN based on the 2007 dataset.



Ercsey-Ravasz M, Toroczka Z, Lakner Z, Baranyi J (2012) Complexity of the International Agro-Food Trade Network and Its Impact on Food Safety. PLoS ONE 7(5): e37810. doi:10.1371/journal.pone.0037810  
<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0037810>

**Increasing productivity (one service)  
whilst conserving biodiversity (underpinning all services)  
– a difficult balancing act**





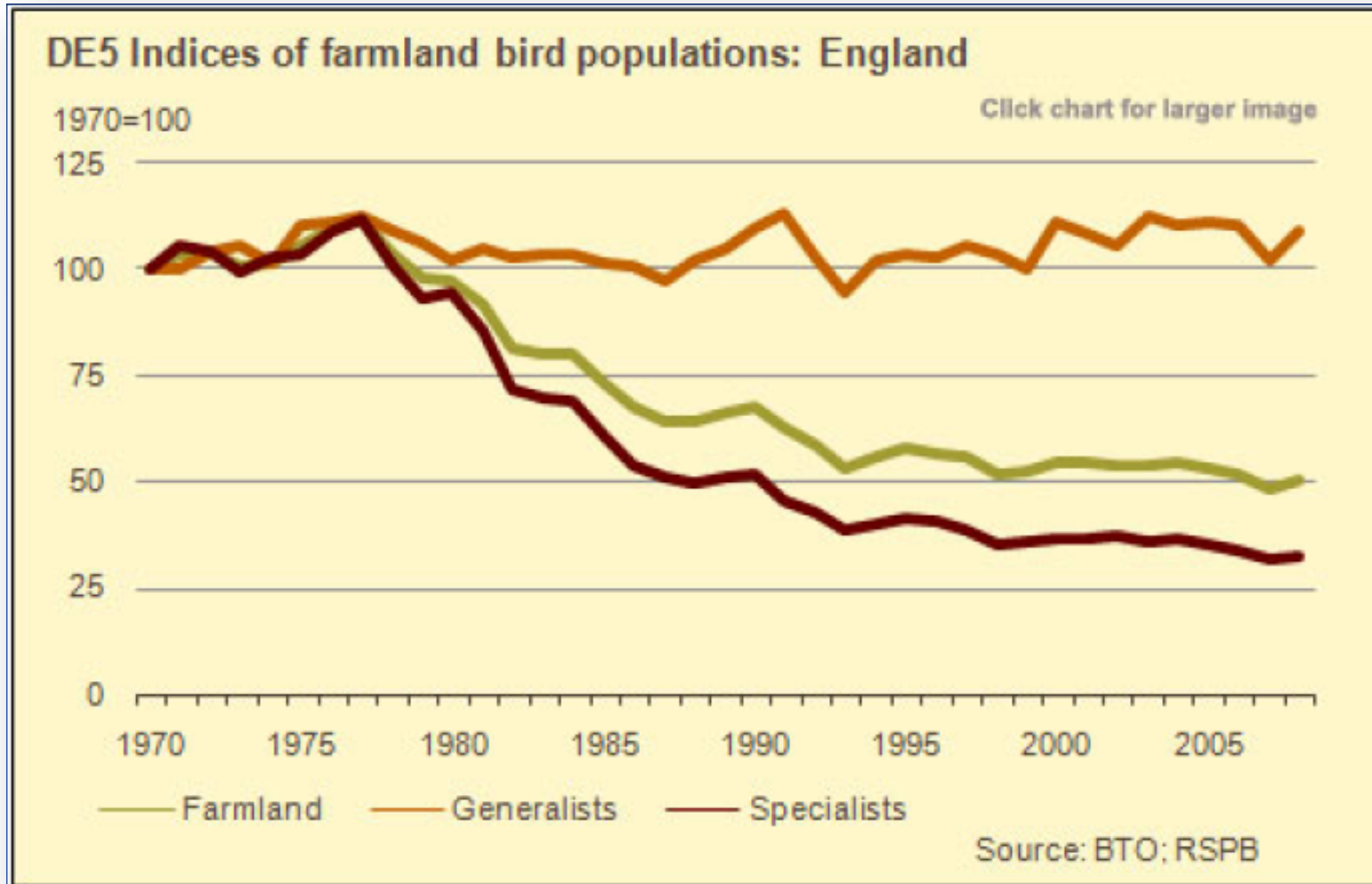
**Royal Society, 2009**



**Foresight, 2011**



# UK Farmland birds are in freefall ...



Sustainable agricultural intensification is defined as producing more output from the same area of land while reducing the negative environmental impacts and at the same time **increasing contributions to natural capital and the flow of environmental services.**



## Sustainable Crop Production Intensification (SCPI) in FAO

Sustainable intensification of crop production is Strategic Objective A of FAO. Through this Strategic Objective, FAO provides member countries with technologies, policies, knowledge, information and capacity building so they can increase their crop productivity and profitability throughout time. This is achieved through: production systems and crop management technologies that increase productivity without adverse effect on natural resources, enhancing climate change resilience and input-use efficiency, and creating enabling an environment so farmers can competitively participate in markets; eco-friendly reduction in field and post-harvest losses from abiotic and biotic stresses; and conservation and sustainable use of plant genetic resources for development of improved crop varieties and their deployment through pro-smallholder seed systems. AGP promotes crop production intensification using the ecosystem approach, including technical and policy considerations.

SCPI allows countries to achieve sustainable increases in agricultural productivity through an ecosystem approach, by providing technical and policy assistance in **four areas**:

- a) Increasing agricultural productivity through improved use of resources to achieve higher yields while promoting the sustainability of the farming systems and progressing from subsistence farming to market-oriented agriculture, supported by Conservation Agriculture (CA) and Integrated Plant Nutrient Management (IPNM).
- b) Enhancing sustainable crop protection through Integrated Pest Management (IPM), and through the implementation at national level of globally agreed instruments such as the International Plant Protection Convention and the Rotterdam Convention to minimize pest problems, misuse of pesticides, and environmental pollution.
- c) Managing biodiversity and ecosystem services, through identification and use of mechanisms for valuing agricultural biodiversity and ecosystem services, in addition to sound agronomic practices (crop, soil,

### Sustainable Intensification of Crop Production

► Strategic Objective A is one of the principal responses to anticipated growing demands for food and other agricultural products. It is rooted in the requirement for FAO's Members to increase crop productivity and quality, based on science-based sustainable practices, to improve resource use efficiency, and thereby also contributing to meet broader food security, rural development and livelihoods enhancement aims.

► Strategic Framework 2010-2019



@FAO/Giulio Napolitano



# How do we achieve food security and environmental stability?





UNEP Policy Series

ECOSYSTEM MANAGEMENT

ISSUE NO. 4, JUNE 2011

## Food and Ecological Security: Identifying synergy and trade-offs

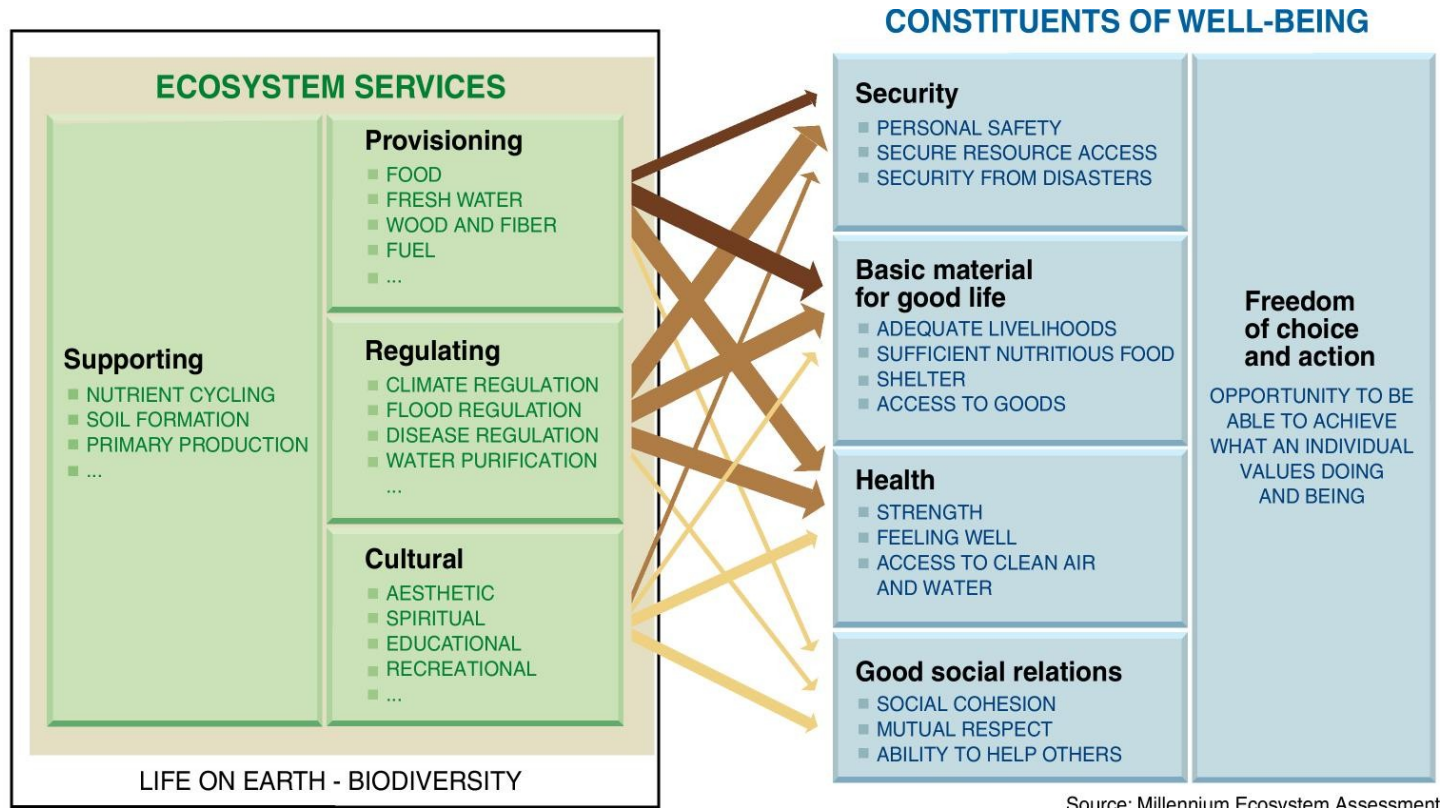


# THE ENVIRONMENTAL FOOD CRISIS

THE ENVIRONMENT'S ROLE IN  
AVERTING FUTURE FOOD CRISES  
A UNEP RAPID RESPONSE ASSESSMENT



# Focus: Consequences of Ecosystem Change for Human Well-being



Source: Millennium Ecosystem Assessment

**ARROW'S COLOR**

Potential for mediation by socioeconomic factors

- Low
- Medium
- High

**ARROW'S WIDTH**

Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

# UNEP June 2011 Food and Ecological Security: Identifying synergy and trade-offs

Figure 1: Ecosystem services to and from agriculture, and linkages between human well-being and benefits obtained from ecosystem services that are provided by agriculture.

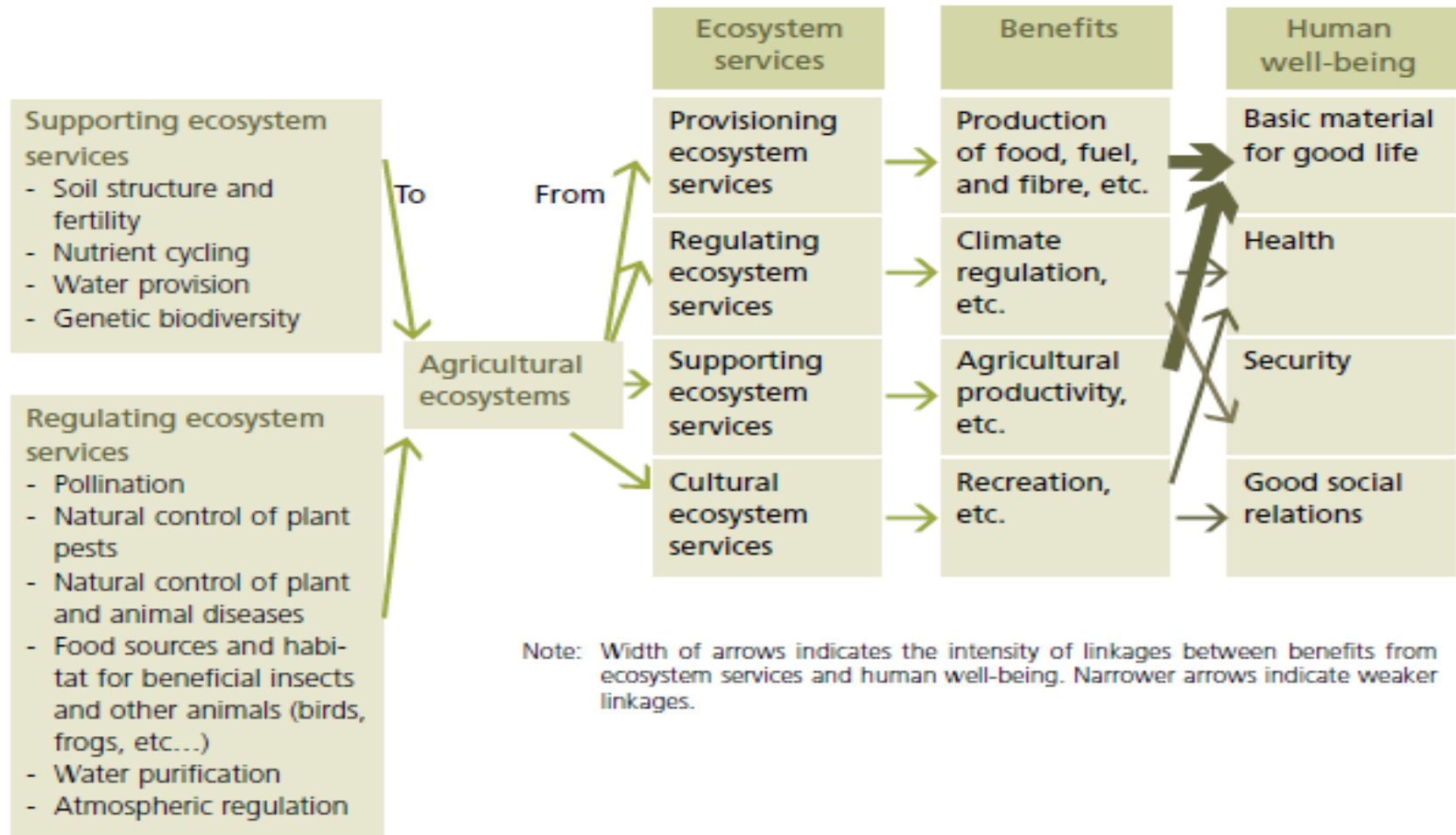
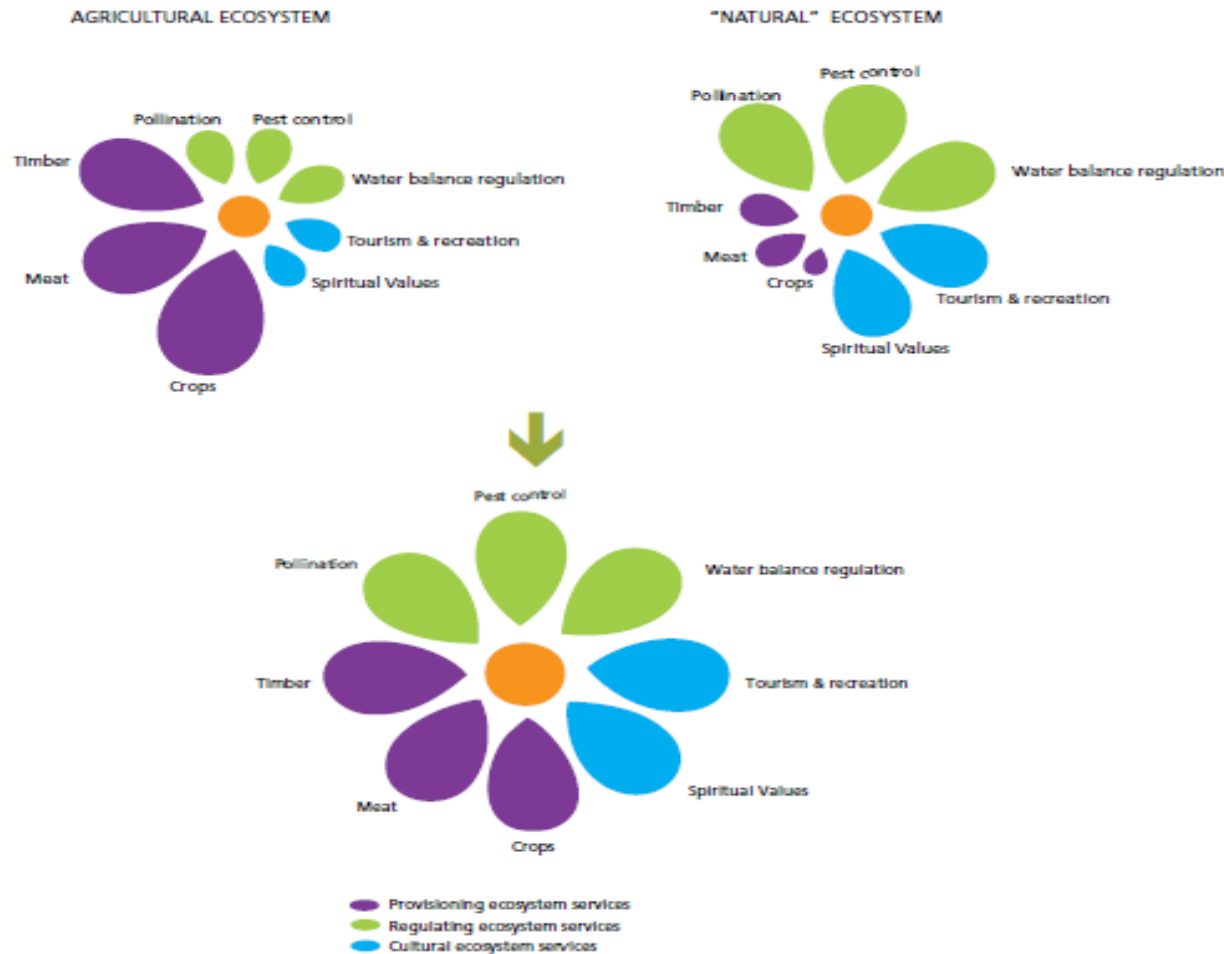


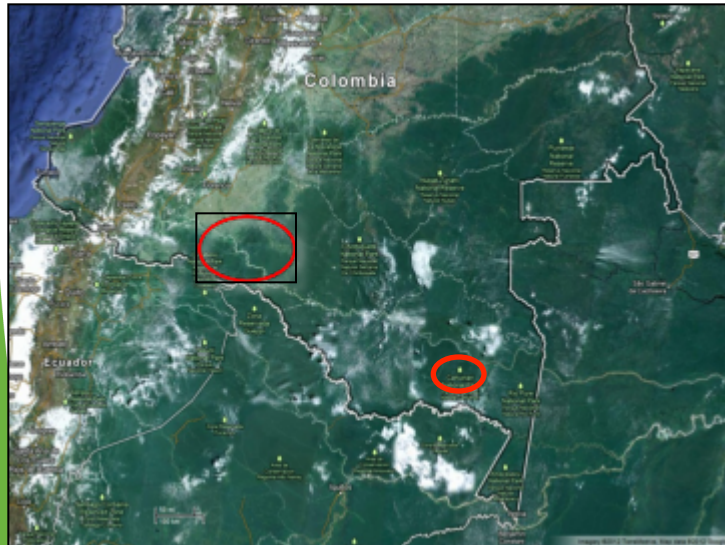
Figure 2: Agriculture generally increases provisioning ecosystem services at the expense of regulating and cultural ecosystem services that are often higher in less human-dominated ecosystems. Shifts can occur to develop agricultural systems that are designed to produce multiple ecosystem services and, where synergies exist among these services, trade-offs are reduced.<sup>7</sup>



<sup>7</sup> Adapted from Gordon and others, "Managing water in agriculture for food production and other ecosystem services", pp. 512–519.

# ASSETS

## ATTAINING SUSTAINABLE SERVICES FROM ECOSYSTEMS USING TRADE-OFF SCENARIOS



# Our main goal

To explicitly quantify the linkages between the natural ecosystem services that affect – and are affected by – food security and nutritional health for the rural poor at the forest-agricultural interface



Photo by Erwin Palacios (CI Colombia)

# Our study areas: Malawi, Peru and Colombia



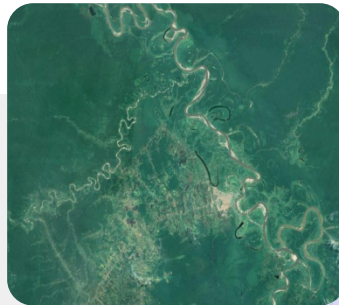


# The study areas on the forest transition curve

La Pedrera -  
Leticia



Pucallpa



High forest cover  
Low deforestation

High forest cover  
High deforestation

Zomba Plateau



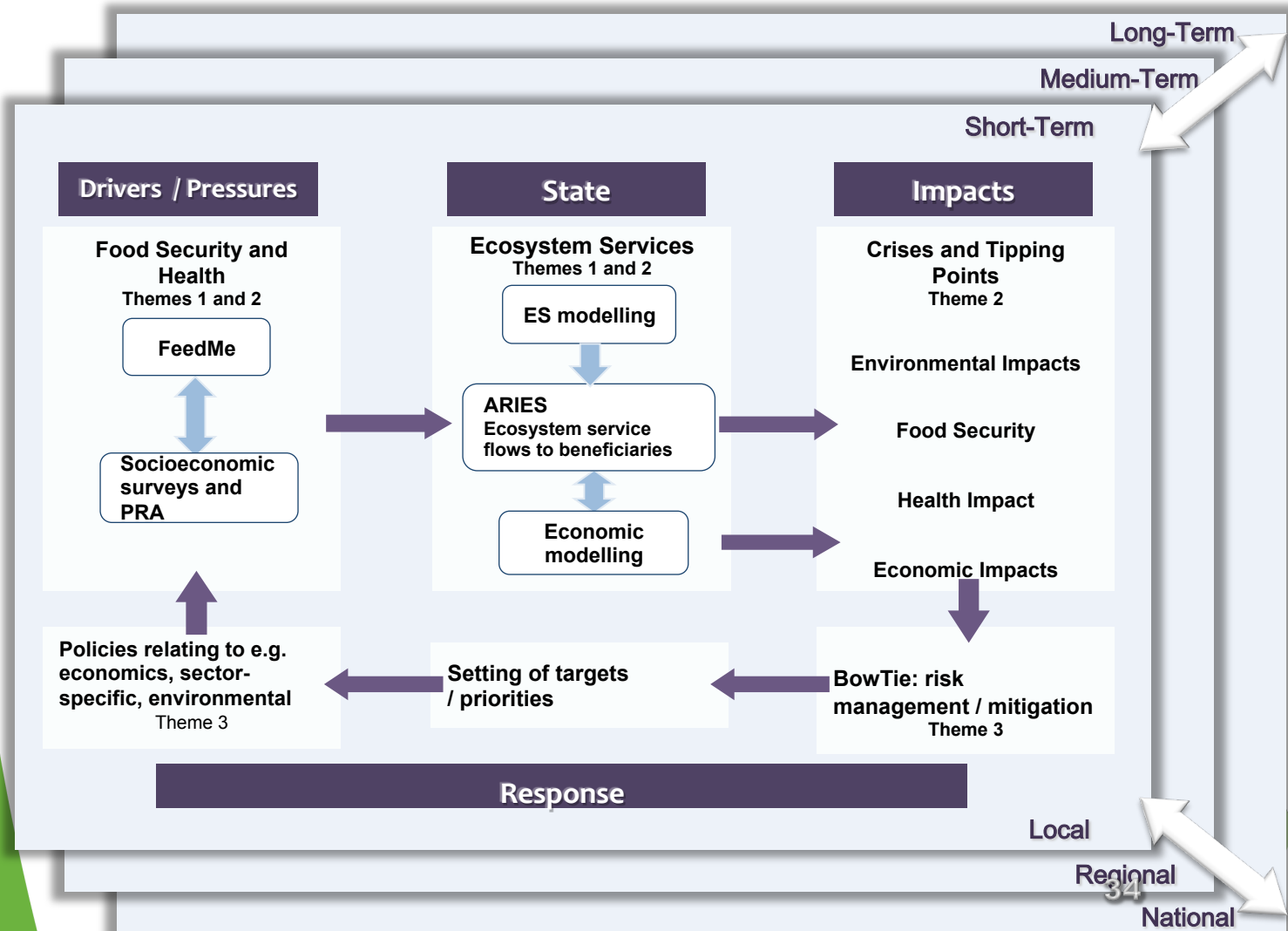
Low forest cover  
Low deforestation

Natural land use transition

Forest replenishment period

# Methodological Framework

The framework integrates the modelling tools and the DP-SIR approach to evaluate drivers, pressures and impact on ES over multiple spatial and temporal scales.



# ASSETS Research Themes

## Theme 1

Drivers, pressures and linkages between food security, nutritional health and ES



Photo by Malcolm Hudson (U. of Southampton)

# The Social Sciences Component

## A LONGITUDINAL MIXED-METHODS APPROACH



### Qualitative methods:

- Portrayals of livelihoods
- Perceptions of change in land-use, food security and NR stocks.
- Assessments of food security and insecurity.
- Natural resource governance.

### Quantitative information:

- Socio-demographics
- Living conditions
- Income
- Expenditure
- Anthropometric measures
- Consumption of NR.

### Quantitative information:

- Amount of daily food intake.
- Individual consumption within household
- Food sources.

### Quant. data for seasonal variation in:

- Income
  - Expenditure
  - Nutrition
  - Consumption of NR.
- Additional information:
- Social Capital
  - Cultural Services

### Quantitative information for seasonal variation in:

- Daily food intake.
- Individual consumption within household
- Food sources.

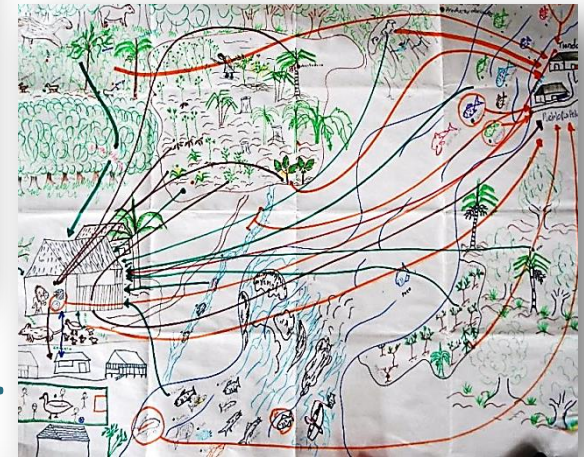
# The value of PRA



A collaborative learning process...



using visual techniques ...

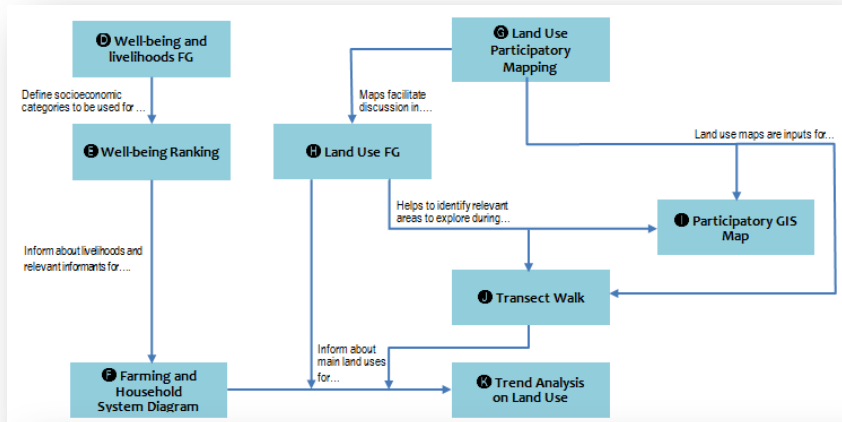


that lead to critical representations of complex issues...

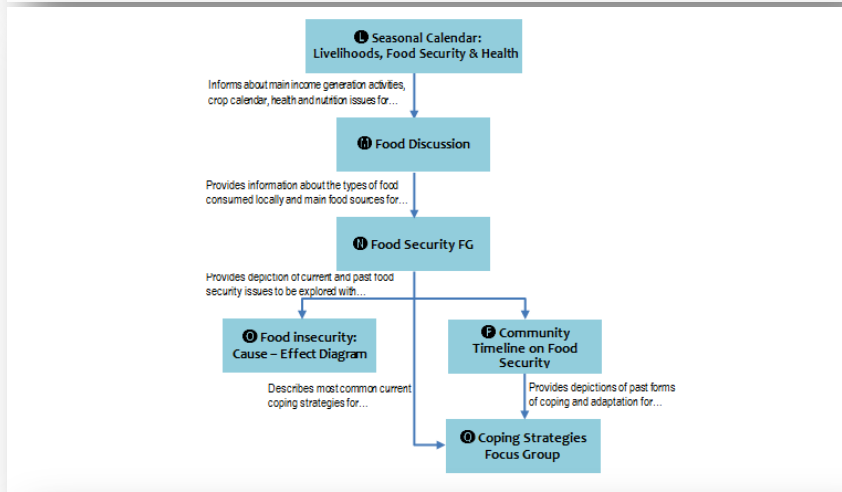


helping informants to better understand their situation and possibly facilitating collective action efforts.

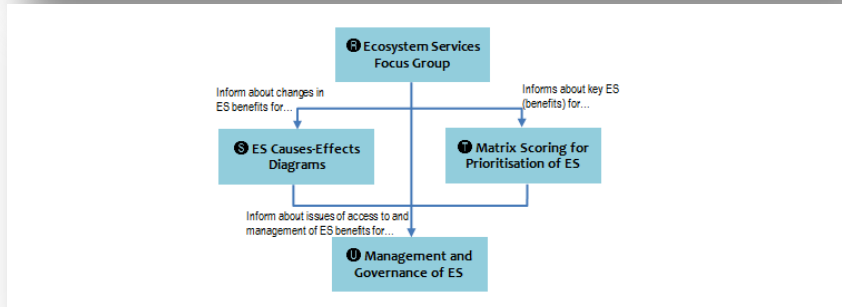
# Participatory Rural Appraisal



## Livelihoods and Land Use



## Food Security



## Ecosystem Services

# Standardising Procedure

## ASSETS

### Attaining Sustainable Services from Ecosystems through Trade-off Scenarios



#### Field Manual for Community Level Data Collection

Dr. Kate Schreckenber  
Dr. Carlos A. Torres-Vitolas  
Dr. Simon Wilcock  
Prof. Charlie Shackleton  
Dr. Celia A. Harvey  
with the support of the ASSETS team

November, 2012



UNIVERSITY OF  
Southampton

## EXERCISE D: WELL-BEING AND LIVELIHOOD DISCUSSION

### What for?

- To outline the concepts of 'well-being' used by residents
- To identify relevant economic indicators that distinguish different local socioeconomic groups and estimate the socioeconomic composition of the study area.
- To identify and describe local livelihood strategies (including farm and non-farm activities).
- To describe current land use for livelihood purposes.
- To describe current farming systems operating in case-study communities.
- To identify any (in)visible contributions of ES towards livelihoods and food security.
- To identify the presence of active social organisations and public institutions relevant to local livelihoods and food security efforts.
- To identify difficulties and limitations in generating sustainable livelihoods and food security.
- To identify any seasonal / monthly variations in livelihood strategies / economic practices
- To describe significant inter-annual changes in livelihood strategies and perceived causes.

### Who with?

Participants should represent a cross-section of the community. Different social, economic, and cultural groups should take part in this exercise:

- Well-off residents and the poorest ones (e.g., from large landowners to landless residents).
- Residents with different primary occupations (e.g., farmers, traders and fishers).
- Men and women.
- Members of different social—ethnic or religious based—groups.
- Residents living in different parts of the village.

**NOTE:** Make sure to work with 'viable' groups. They should neither be too small (at least 4 people) nor too large (e.g., 30 people). Be cautious with regards to including groups or individuals that are in conflict (e.g., antagonist ethnic or religious groups).

### What with?

- A spacious area/room.
- A flipchart, board or the ground.
- Writing/drawing material easy to amend.
- A camera to register the material produced.
- A digital recorder to record people's interventions.
- A notebook to take notes.

### How?

1. Explain the purpose of the exercise to participants. In general you want to learn about the following:
  - How do people make a living in the area?
  - How do people define who is rich and poor and how many of them live in the village?
  - What factors affect the manner in which people make a living and their capacity to secure enough food for their families (e.g., seasons, governmental subsidies, presence of NGOs, etc.)?
2. Discuss about participants' understanding "wealth" and "well-being". The following questions may be helpful to probe their views:
  - How do residents define "well-being" in terms of material possessions? (e.g., land or livestock)
  - What other aspects different than money or material possessions are associated with "well-being"? (e.g., education, memberships of certain organisations, friends with public officials, etc).
  - What are the key characteristics that define someone as "well-off" or "very poor"?
  - What does one group have that others do not?

# Forest Loss Detections 2004 - 2012 La Pedrera - Colombia



- ASSETS Communities
  - Towns
  - Municipality (GAUL)
  - - - Department (GAUL)
  - Roads (Open Street Maps)
- Terra-i Forest Loss Detection**
- 2012
  - 2004







## COLOMBIA AND MALAWI Local views on well-being and food security.



### LIVING BADLY IN A RICH LAND

- Most cover basic needs
- Most families have farmland
- Hunting, fishing are common
- Limited financial and physical capitals

### HOW TO PRESERVE?

- Land still available but more limited
- No changes in forest cover
- Decreasing variety of fish
- Diminishing variety of wildlife

### THREATS AND LOCAL CONTROLS

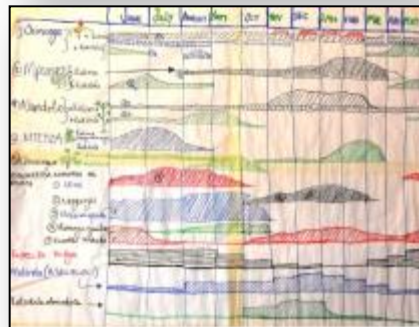
- Increasing population (settlers)
- Deforestation
- Over exploitation (commerce)

### THE “LAZY” USUALLY FACE HUNGER

- Fishing
- Hunting
- Collection of forest products
- Social support networks



|       | CHILWA IN<br>ZAMBIA | CHILWA IN<br>MALAWI | CHILWA IN<br>ZAMBIA | CHILWA IN<br>MALAWI | CHILWA IN<br>ZAMBIA | CHILWA IN<br>MALAWI |
|-------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |
| WATER | ...                 | ...                 | ...                 | ...                 | ...                 | ...                 |



### OVERWHELMING POVERTY

- Small (rain-fed) farmland
- Most have minor livestock
- Regular hungry seasons
- Casual labour (illegal or risk-prone)

### HOW TO RECOVER?

- Very little forest cover
- Decreasing water availability
- Limited land availability
- Diminishing soil fertility

### LITTLE CAPACITY TO CONTROL

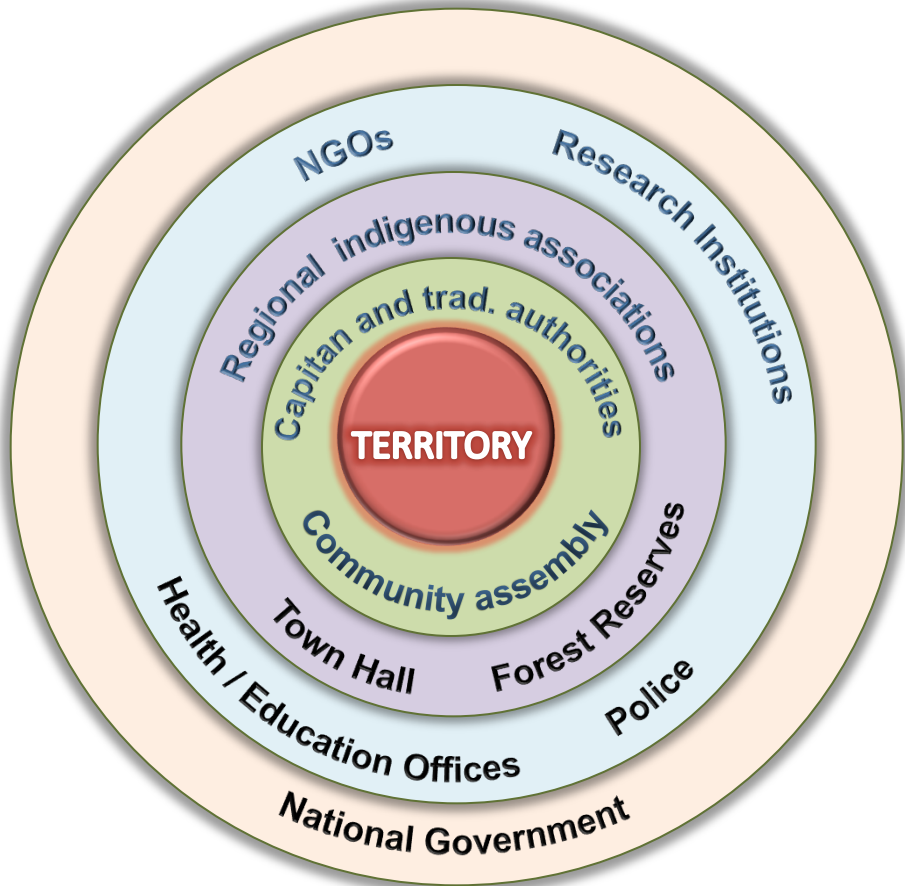
- Irregular rains
- Increasing population
- Deforestation (reserves)

### FROM MANAGING TO DESPAIR

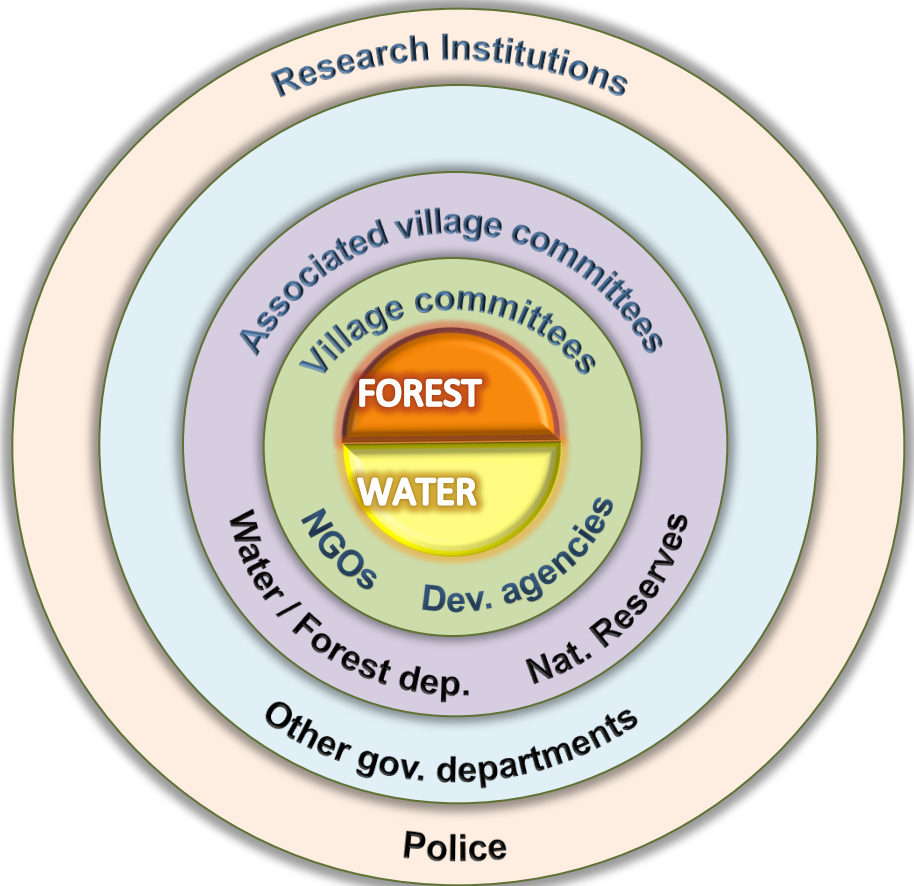
- Controlling frequency and size of meals
- Social support networks
- Collection of wild vegetables (limited)
- Selling assets
- Begging and prostitution

# Natural resource governance

## COLOMBIA



## MALAWI



- An integrated management of “territory” as compared to more specialised division of roles
- A community-centred management approach as compared to one more relying on aid.
- Regional indigenous organisations as compared to mainly village-level actors (committees).
- Both sites considered public agencies as secondary actors in the management of resources.
- Research institutions are not considered central to management activities.

# Measuring poverty and food security

- Two 6-month waves per study site.
- Samples in Malawi and Peru, census in Colombia.
- Standard demographic, expenditure and income estimates BUT...
  - Includes use of natural resources for basic wellbeing dimensions: health, housing, food, agricultural and business inputs, etc.
  - Subjective assessments of well-being
  - Anthropometric measures for children < 5.

Felicidad y Satisfaccion

Primero, **tomando todas las cosas en conjunto**, Ud diría que

Q.1 es muy feliz, feliz, algo feliz, ni feliz ni infeliz, algo infeliz, o muy infeliz?

Muy Feliz (1)    Algo feliz (2)    Ni feliz ni infeliz (3)    Algo infeliz (4)    Muy infeliz (5)

Ahora le voy a preguntar algunas preguntas sobre su NIVEL DE SATISFACCION en varios areas. En cada caso, le voy a dar 5 diferentes opciones. Por favor, para cada pregunta, dígame si Ud esta muy satisfecho, algo satisfecho, ni satisfecho ni insatisfecho, algo insatisfecho o muy insatisfecho. [DE SER NECESARIO, MUESTRE EL GRAFICO PARA ORIENTAR AL INFORMANTE](#)

| Muy satisfecho   | Algo satisfecho  | Ni satisfecho ni insatisfecho  | Algo insatisfecho  | Muy insatisfecho   |
|--|--|--|--|--|
|  |  |  |  |  |

Q.2 Que tan satisfecho esta Ud, con **su vida en familia**?

Muy Satisfecho (1)    Algo satisfecho (2)    Ni satisfecho ni insatisfecho (3)    Algo insatisfecho (4)    Muy insatisfecho (5)

[LEA LAS RESPUESTAS](#)

Q.3 Que tan satisfecho esta Ud, con **las amistades de su hogar**?

Muy Satisfecho (1)    Algo satisfecho (2)    Ni satisfecho ni insatisfecho (3)    Algo insatisfecho (4)    Muy insatisfecho (5)

[LEA LAS RESPUESTAS](#)

Errors: 0 Warnings: 0



# ASSETS Research Themes

## Theme 2

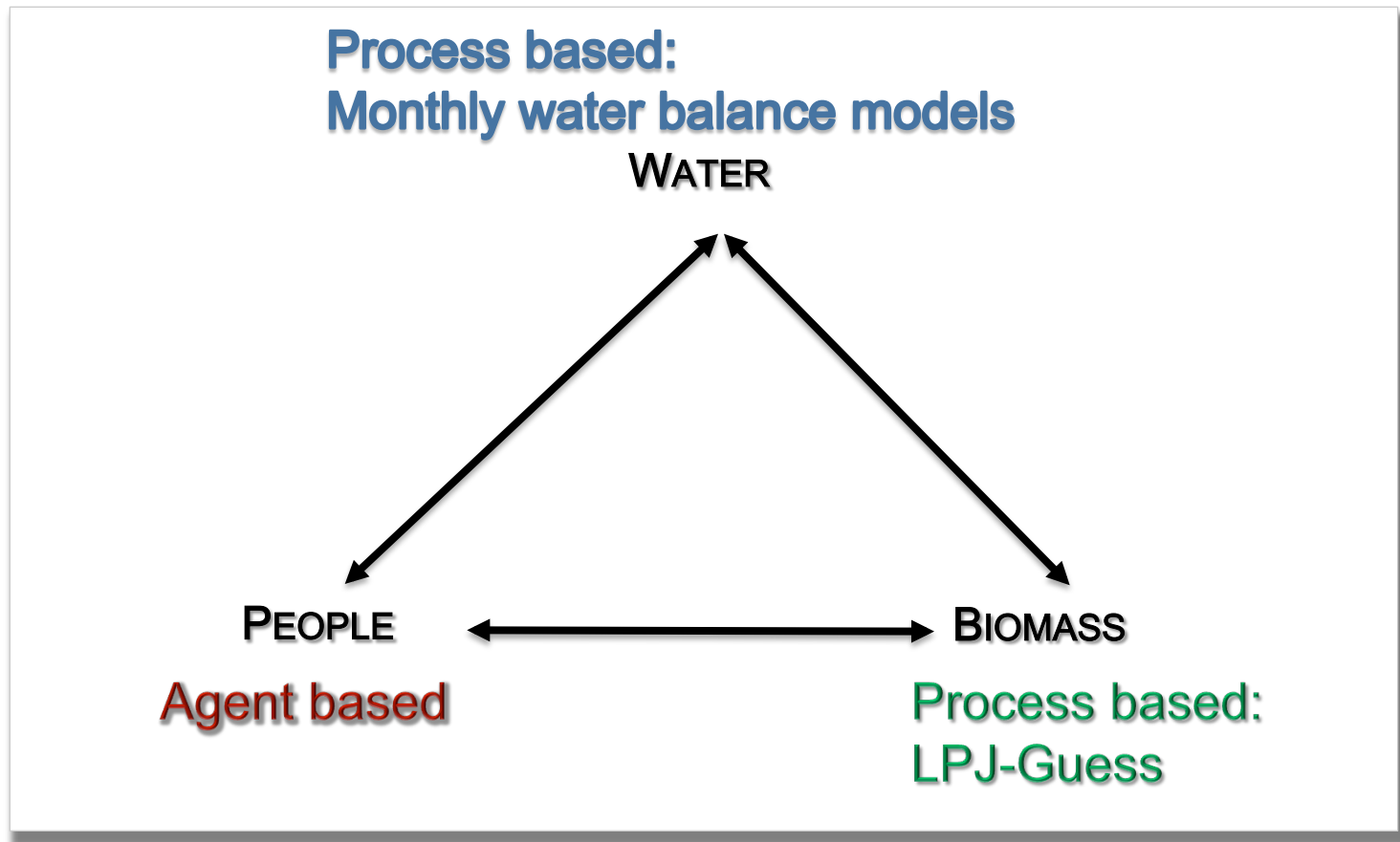
**Crises and tipping points: Past, present and future interactions between food insecurity and ES at the forest-agricultural interface.**



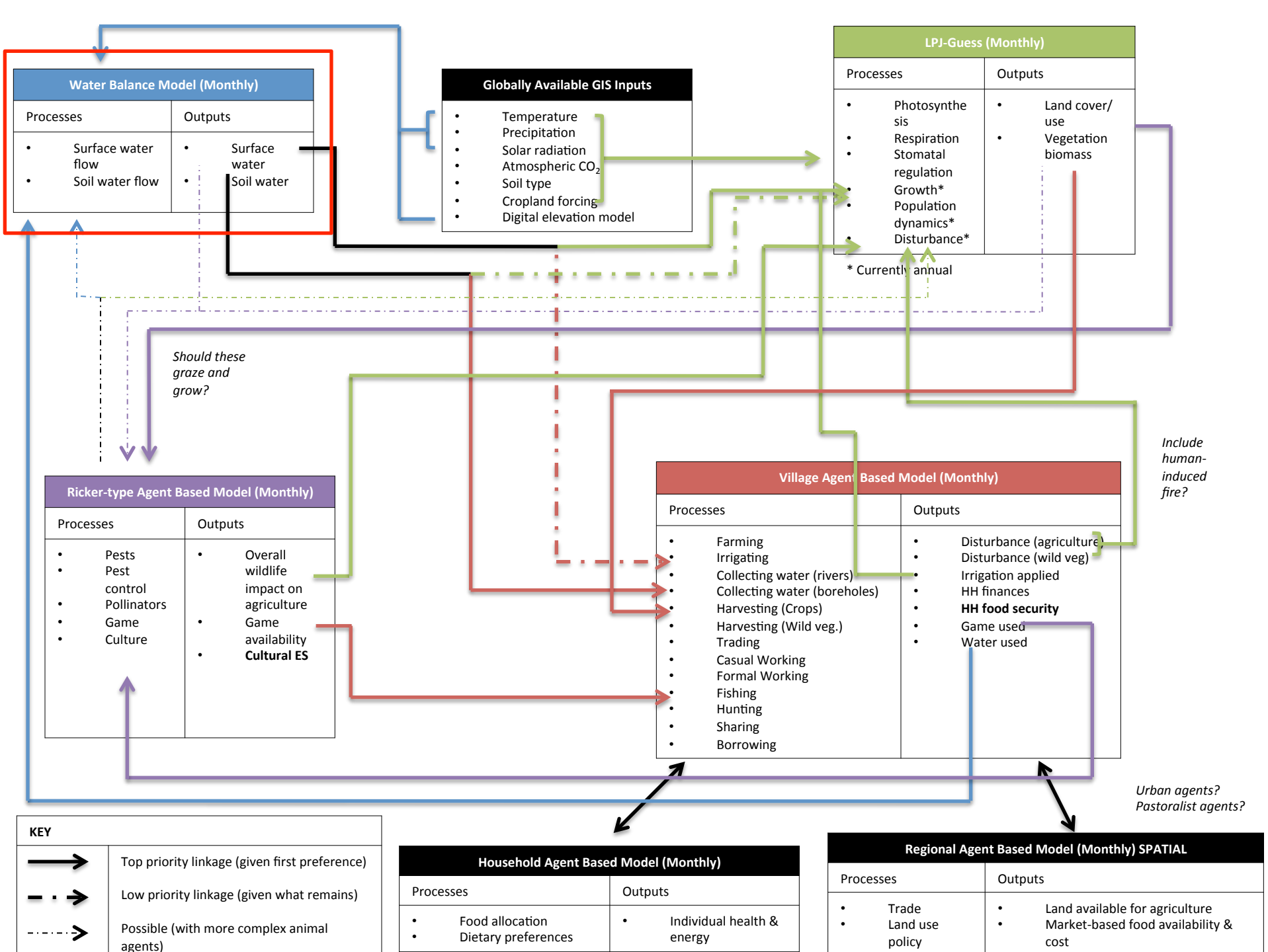
Photo by Simon Willcock (U. of Southampton)

# Modelling strategy

- 3 key interactions: Water, Biomass & People

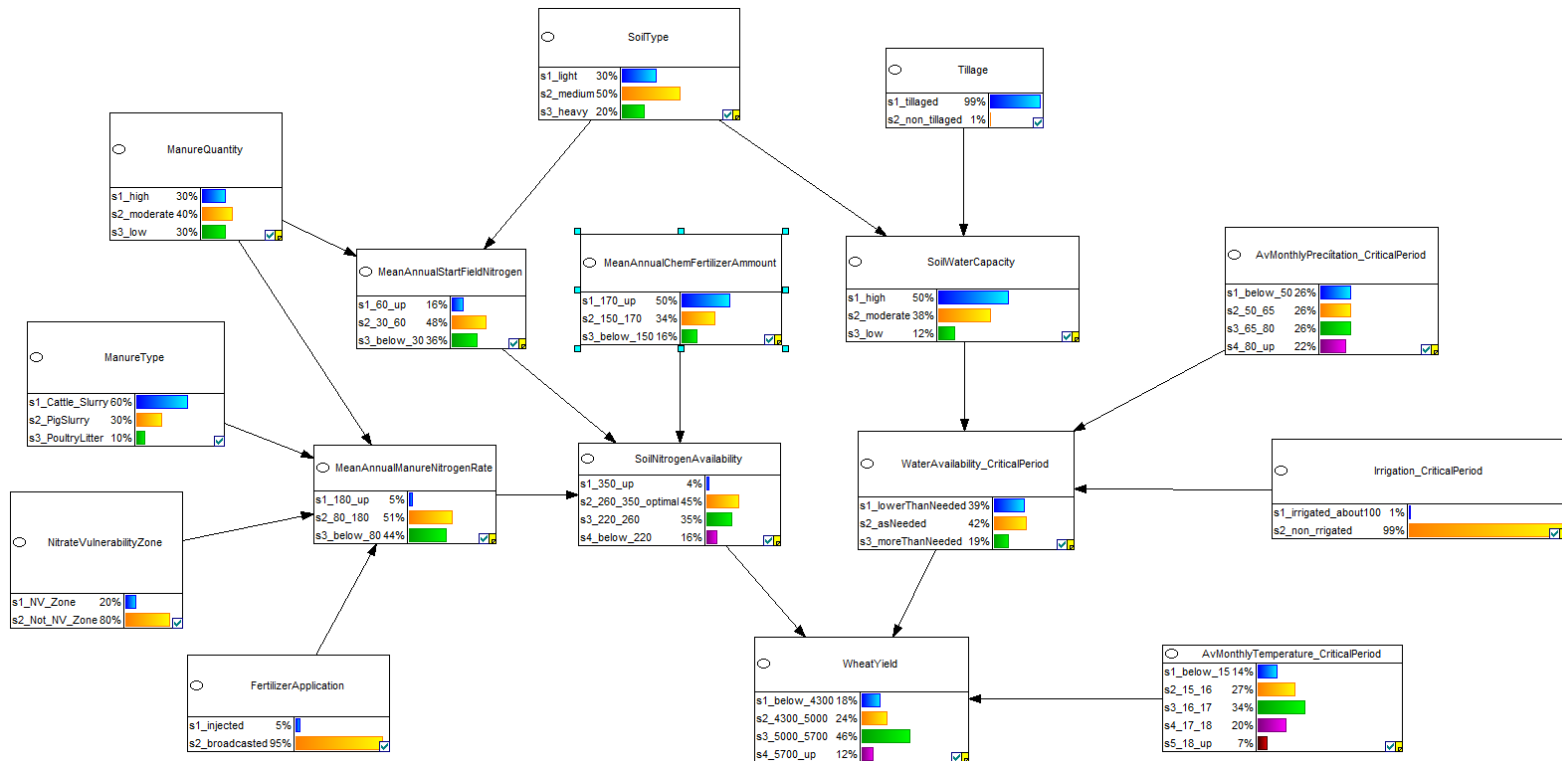


- Monthly time-steps; globally available inputs



# Agent-based Modelling

1. PRA used to build conceptual framework
2. National census used to build agent typologies
3. HH survey to be used build decision rules based on Bayesian networks

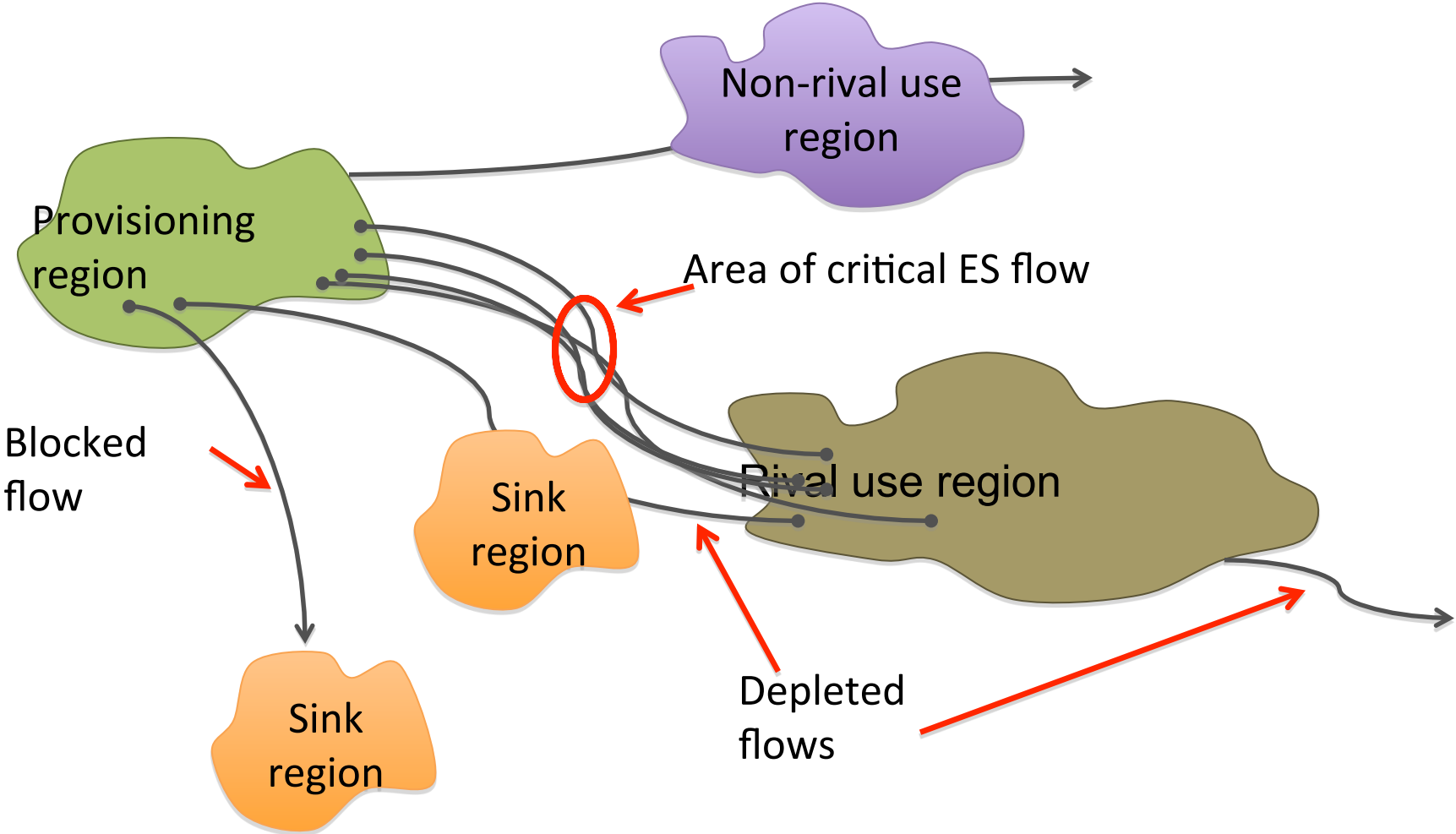


# ARIES: summary

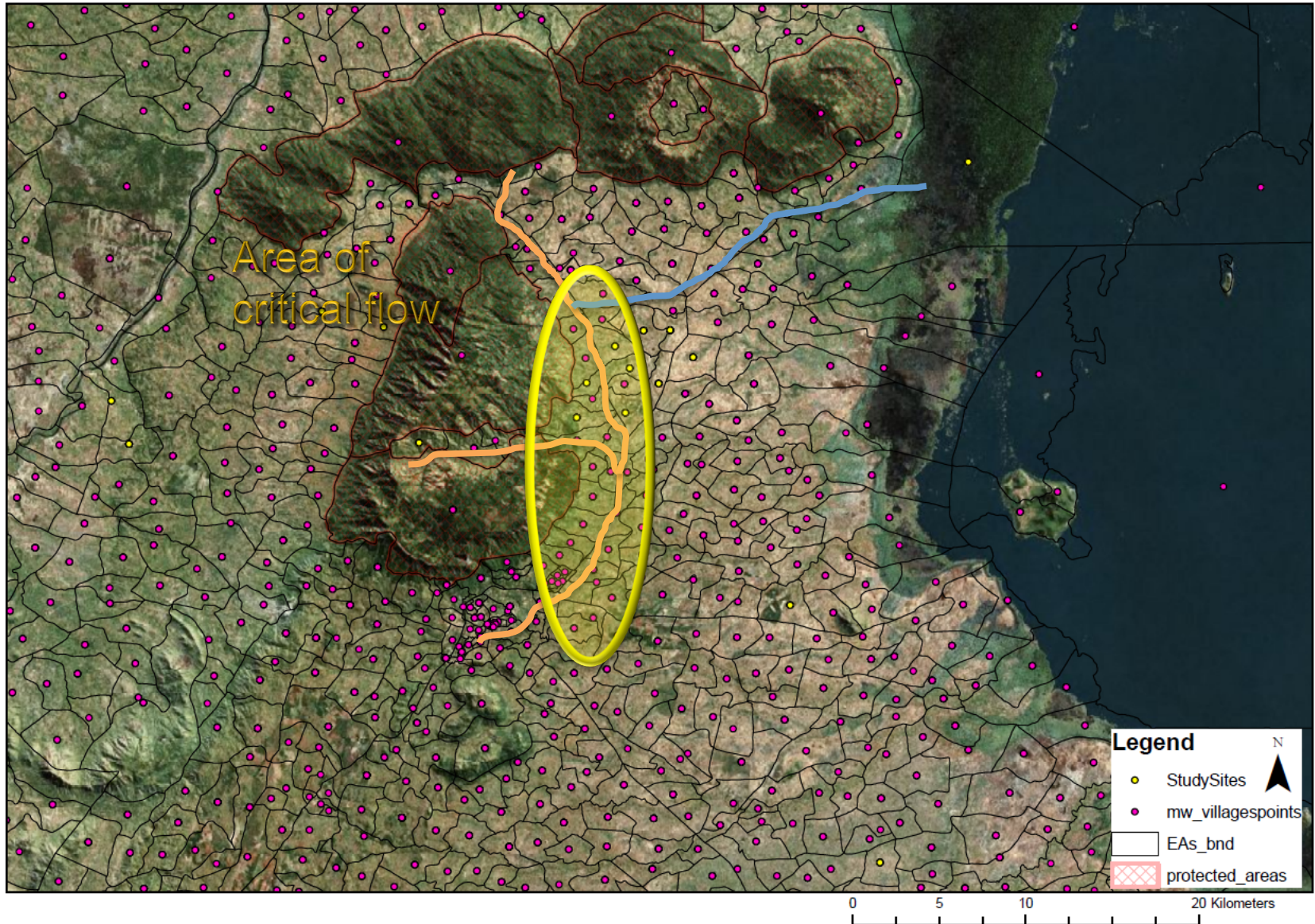
- ❑ A rapid spatial assessment tool for ecosystem services and their values; not a single model but an artificial intelligence assisted system that customizes models to user goals.
- ❑ Demonstrates a mapping process for ecosystem service provision, use, sink and flow while most ES assessments only look at provision.
- ❑ Probabilistic, Bayesian models inform decision-makers about the likelihood of possible scenarios; users can explore effects of policy changes and external events on estimates of uncertainty.



# Spatial context of ecosystem services



# Spatial Scale: Village level



# ASSETS Research Themes

## Theme 3

The science-policy interface: How can we manage ES to reduce food insecurity and increase nutritional health?

- Minimising risk of future environmental change
- Influencing policy to better manage

ES conflicts, trade-offs and synergies to sustain food security and health?



Photo by Simon Willcock (U. of Southampton)

# ASSETS: Science-Policy Interface

**Better resource  
management**

**Food security  
and nutritional  
health**

Map **different factors** affecting ES

Identify the **factors with highest negative impact on ES** (and which are more relevant for food security and nutritional health)

Identify **critical changes and tipping points** that can accelerate the degradation of key ecosystems (that can be addressed through timely policy interventions)

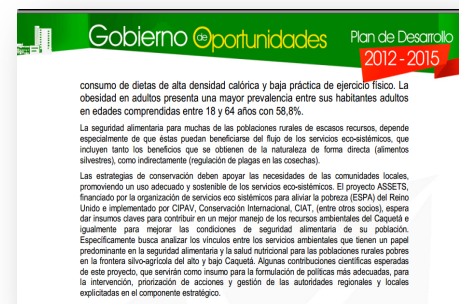
Report on **climate change** impacts on ES provision, food security and nutritional health

Report on current and future impact of **land use change** on sustainable provision of ES and food security

Provide **input for policies** that can counterbalance the most urgent needs of the population exerting pressure on ES

# Working towards influencing policy-making

- ❑ The project is working in collaboration with key governmental institutions, such as the Ministry of Forestry and the Ministry for Local Government and Rural Development in Malawi.
- ❑ The project has set up National Steering Committees in Colombia and Malawi with high-profile scientific researchers.
- ❑ Local partners have access to relevant policy-making instances and public-agenda setters:
  - Malawi TV documentary discussed the potential contribution of the ASSETS project to current environmental issues affecting Malawi.
  - Caqueta's Regional Government Development Plan (2012-2015) states that the project's *“scientific contributions are expected to serve as input for the formulation of better policies for intervention, prioritization of actions and management of regional and local authorities”*.



# THANK YOU



[www.espa-assets.org](http://www.espa-assets.org)

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## United Kingdom:

- University of Southampton (PI Poppy)
- University of Dundee (Dawson)

## United States of America:

- Conservation International (Co-PI Honzak)

## Spain:

- Basque Centre for Climate Change (Co-PI Villa)

## Colombia:

- International Centre for Tropical Agriculture – CIAT (Co-PI Jarvis)
  - Research centres, universities and NGOs

## Peru

Instituto de Investigación de la Amazonia Peruana – IIAP

## Malawi:

- Chancellor College (Co-PI Chiotha)
- LEAD Southern and Eastern Africa plus Ministry of Forestry, Forest Research Institute of Malawi
- WorldFish Centre - Malawi
- Rhodes University South Africa

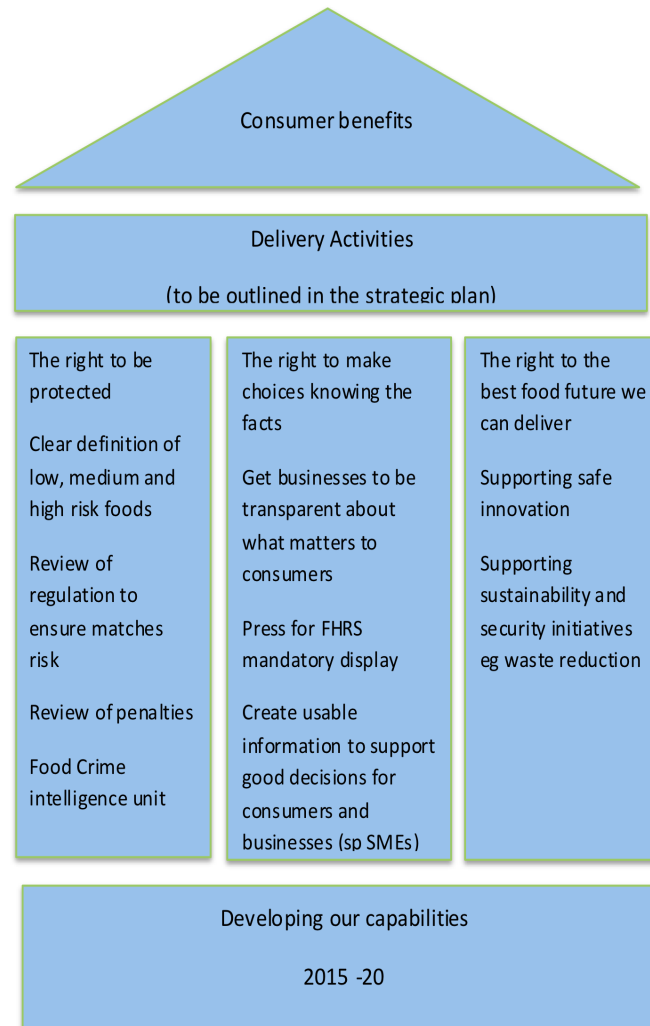
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# The Food Standards Act 1999

- “The main objective of the Agency in carrying out its functions is to protect public health from risks which may arise in connection with the consumption of food (including risks caused by the way in which it is produced or supplied) and otherwise to protect the interests of consumers in relation to food.”
  - (From Section 1 Food Standards Act 1999)

# Science needs to drive strategy and to ensure the overall strategy can be delivered

## Delivering the Strategy 2015 - 20





# Key facts – food safety risks, consumer concerns, FSA science

- Foodborne illness
  - estimated one million cases of microbiological foodborne disease in the UK every year
  - leads to around 20,00 hospitalisations and 500 deaths; cost of £1.5 billion to the UK economy
- Allergens and food intolerances
  - around 3,500 hospitalisations due to allergic response and around 5,000 due to coeliac disease
- In 2013, FSA investigated 1,562 food and environmental contamination incidents in the UK
- Top three food safety issues of concern for consumers: food hygiene when eating out (36%), food poisoning (28%) and the use of additives in food products (28%)
- FSA science spend – in 2013 we spent £26 million on commissioned science and evidence-gathering

FSA – our work is dealing with a complex globalised system to ensure we can offer food we can trust to the uk consumer

# Key facts on food system

## Number, type and distribution of food businesses – LAEMS data 2013

| Risk category        | Primary producers | Manufacturers and Packers | Importers/ Exporters | Distributors/ Transporters | Retailers      | Restaurants and Caterers | Total          |
|----------------------|-------------------|---------------------------|----------------------|----------------------------|----------------|--------------------------|----------------|
| A                    | 15                | 605                       | 3                    | 14                         | 396            | 2,569                    | 3,602          |
| B                    | 92                | 2,592                     | 12                   | 84                         | 2,771          | 27,358                   | 32,909         |
| C                    | 285               | 5,181                     | 131                  | 953                        | 29,805         | 190,922                  | 227,277        |
| D                    | 675               | 2,596                     | 162                  | 1,728                      | 27,170         | 68,245                   | 100,576        |
| E                    | 2,489             | 5,506                     | 507                  | 5,344                      | 66,498         | 113,654                  | 193,998        |
| Not Yet Rated (NYR)  | 1,183             | 1,418                     | 127                  | 756                        | 6,462          | 25,797                   | 35,743         |
| Outside *            | 1,157             | 387                       | 163                  | 685                        | 2,610          | 9,036                    | 14,038         |
| <b>Total</b>         | <b>5,896</b>      | <b>18,285</b>             | <b>1,105</b>         | <b>9,564</b>               | <b>135,712</b> | <b>437,581</b>           | <b>608,143</b> |
| Breakdown by country |                   |                           |                      |                            |                |                          |                |
| England              | 3,589             | 13,448                    | 995                  | 7,838                      | 111,687        | 359,533                  | 497,090        |
| Northern Ireland     | 59                | 994                       | 41                   | 415                        | 4,330          | 13,946                   | 19,785         |
| Scotland             | 1,873             | 2,777                     | 55                   | 876                        | 12,010         | 39,760                   | 57,351         |
| Wales                | 375               | 1,066                     | 14                   | 435                        | 7,685          | 24,342                   | 33,917         |

# Top priority: campylobacter

- Most common foodborne pathogen in the UK - 280,000 cases a year. Main source is fresh chicken.
- Costs UK economy about £900 million
- Although it does not normally grow in food, it spreads easily and has a low infective dose.
- FSA Board revised strategic approach September 2013
- New 12 month retail survey of fresh chicken started February 2014
- Joint funding and coordination of research
- In-line processing technologies - trialing of rapid surface chilling

# A complex system/problem requiring a systems approach



ACTING ON CAMPYLOBACTER TOGETHER

# Diversification and fragmentation seen across UK Society is increasingly reflected in shopping habits...

'Unprecedented change in grocery retailing' Kantar March 2014

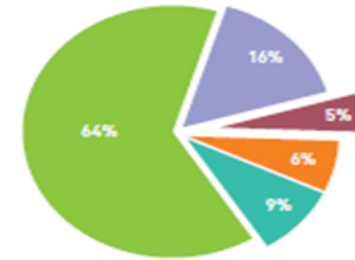


Waitrose at the top and Aldi and Lidl at the bottom end of the market continue to thrive.

Together they have taken market share equivalent to £4.4bn pa from Tesco, Asda and Morrisons (Kantar, March '14)

Internet shopping is growing

Fig.1: Where we are spending our money on groceries



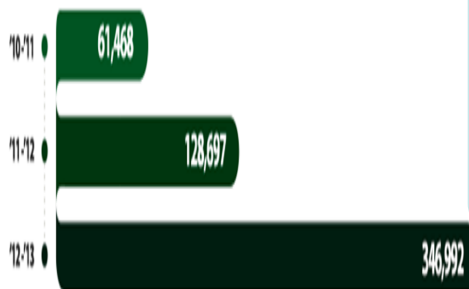
- Supermarkets -2%
- Grocery Convenience -3%
- e-commerce -19%
- Discounters -12%
- Other -4%

Yet only 22% of households actually shopped online for groceries over the past 12 months and even these still spent 75% of their money in an off-line environment.

Highest among high income households

(Kantar, 2013)

Food banks 'thrive'



"The sheer volume of people who are turning to foodbanks because they can't afford food is a wake-up call to the nation"

(Trussell Trust, 2013)

People pay more for food choices in line with their beliefs



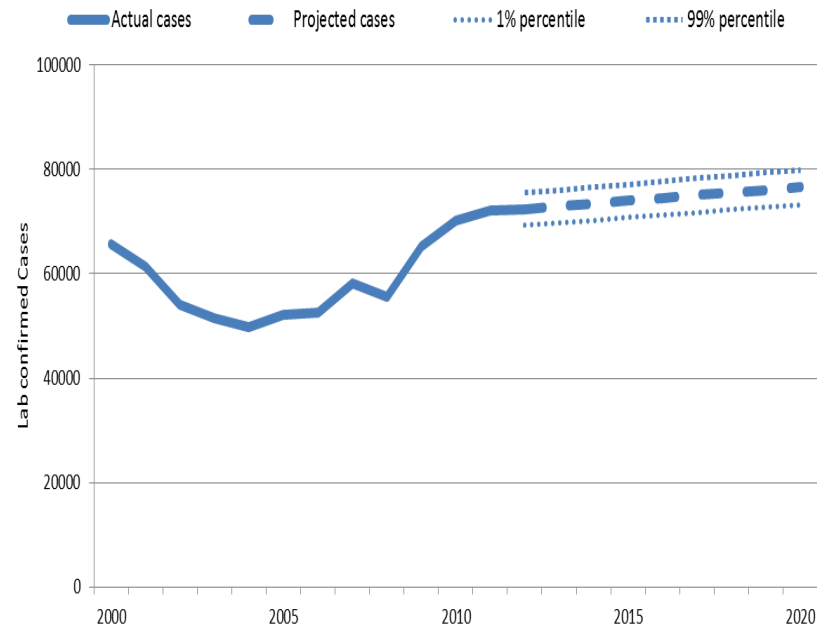
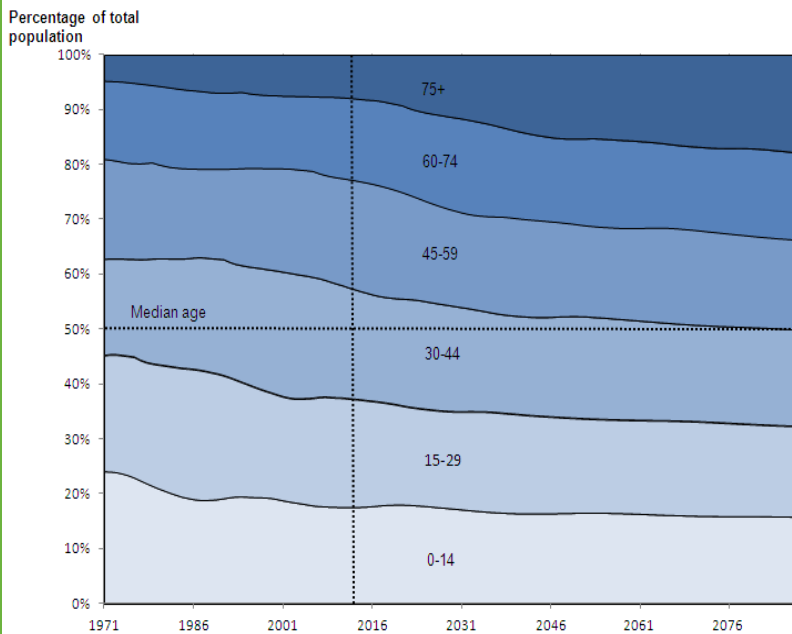
Organic Market growth 2013, Soil Association

"British customers are willing to pay up to 22% extra for a packet of frozen cod or haddock when the products are labelled "line-caught".

(Nofima, 2013)

# Ageing population contributes to public health risks. Over 65's are at increased risk due to ...

- Physiological vulnerabilities such as lower immunity caused by pre-existing health conditions
- Factors like mobility and ageing kitchen appliances working against them as more prevalent than in other household types
- Those aged 75 and over were found to be less likely to report food safety behaviors in line with some FSA recommendations



Increasing life expectancies and low rate of fertility in the UK are contributing to an ageing population

(ONS Population Projections 2013)

By 2020 population change and ageing could contribute to an estimated 5.8% increase in campylobacter (all else being equal) (FSA Analysis)

# Measuring impact – never easy but can be useful for identifying how to use/prioritise science

## Using Economics

Key work areas 2014/15:

- Developing FSA Specific Health Outcome Measures:
  - Quality Adjusted Life Years (QALYs)
  - Consumer Willingness to Pay (WTP)
  - Cost of Foodborne Illness (COI)
- Impact Assessments (IAs)



## A process for Science Strategy development

How issue is identified



Undertake research & evidence gathering



Influence policy/behaviour change



Evaluate/demonstrate impact

# FHRS/FHIS evaluation key findings

The schemes has had a positive impact on food hygiene standards

- 1.6-2.0 ppt increase in *broad compliance* 1 year after roll out



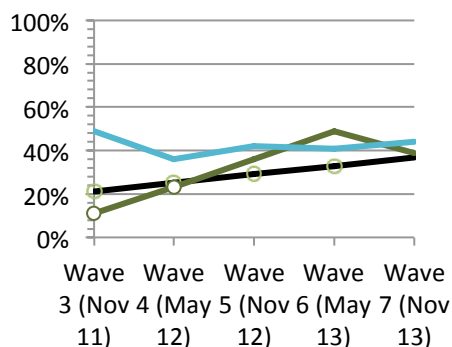
- 3.0 ppt increase in *full compliance* 2 years after roll out



- Around a half of businesses display a sticker / certificate
- More so for better performing businesses

- Lower than expected use of safeguards to challenge results
- Early evidence of the scheme driving business competition.

## Consumer awareness rising



Limited evidence on how consumers actually *use* the scheme in their food purchasing decisions.

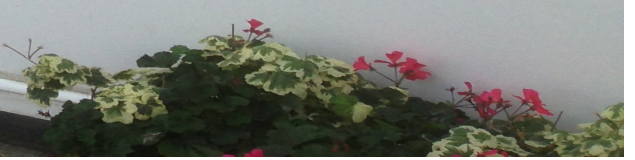
- Price, taste, atmosphere and occasion all play a important role too

Local authority support for the scheme is very high, however;

- Some perceived restrictions on operations as a result of limited resources
- Marketing differs across LA
- Potential inconsistencies in scoring reported *between* local authorities

# FOOD HYGIENE RATING

# SUNDAYES CHILLI



# Emerging Risks

- Optimal Surveillance
- Early Warning Signals
- Proxy indicators
- Weak links in a system

# Proportionate Risk Management and Risk Communication

- Certainty/Uncertainty
- Weight of Evidence
- Precaution and Innovation

# A POSSIBLE SCALE OF THE JUDGED QUALITY OF A RISK ANALYSIS

## Star rating

## Meaning

★★★★

4 star

We are fully confident of our understanding of the underlying process, so although we cannot predict what is going to happen, we can provide good numerical assessments.

★★★

3 star

We are reasonably confident in our analysis: we can expect numbers to change as we learn more, but not sufficient to justify major policy shifts.

★★

2 star

New evidence could have a substantial impact on our assessment, although no major new surprises are expected: we encourage a robust decision-making approach with some precaution and adaptivity.

★

1 star

We have very limited understanding of the process or possibilities, and so resilience to unexpected occurrences is called for.

# IPCC LIKELIHOOD SCALE

| <b>Term</b>                  | <b>Likelihood of the outcome (probability)</b> |
|------------------------------|--|
| Virtually certain .....      | 99–100%  |
| Extremely likely.....        | 95–100%  |
| Very likely .....            | 90–100%  |
| Likely.....                  | 66–100%  |
| More likely than not .....   | 50–100%  |
| About as likely as not ..... | 33–66%   |
| Unlikely.....                | 0–33%  |
| Very unlikely.....           | 0–10%  |
| Exceptionally unlikely.....  | 0–1%   |

# Consumer Behaviour/Concern

- Understand what Drives behaviour
- How best to nudge/change behaviour
- Should/Could we use to set priorities?



# Big Data

- Elucidate big signals
- How to get the data sets – retailers/ producers etc.
- Capitalize on other investment – £42 million Turing Institute at British Library

# Thank You

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