Skills to provide evidence in support of policy

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The Scottish Government

Aims of this talk

To give a perspective on how there are increasing opportunities and needs for evidence to feed into policy &….

what new skills this might need from science graduates

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Structure

- Moving to an outcome based approach to government
- Challenges to embedding evidence in policy making
- Climate change & food policies as case studies
- Skills required to develop scientific evidence
- Communicating evidence

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Moving to outcomes

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SG Purpose

"To focus Government and public services on **creating a more successful country**, with opportunities for all of Scotland to flourish, ***through increasing sustainable economic growth***."

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What does a more successful country look like?

Wealthier and Fairer

Smarter

Greener

Healthier

Stronger and safer

Scotland Performs Website

The Scottish Government
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Thursday, February 12, 2009

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Search site | Search

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Text size: A A A A | Contacts | Site Map | Help

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- Scotland Performs
- Our Purpose
- Strategic Objectives
- National Outcomes
- National Indicators
- Performance at a Glance

Search

Search for:

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Scotland Performs

This website gives you the latest information on how Scotland is performing on a range of topics affecting all aspects of Scottish life.

The Scottish Government has a single Purpose - to create a more successful country where all of Scotland can flourish through increasing sustainable economic growth. The Government Economic Strategy sets out the approach to delivering our Purpose to ensure that all of the Government's resources and policies are focused on its achievement.

We want to live in a successful Scotland: a healthy, safe, well-educated country, with a vibrant economy and opportunities for all. We want Scotland to be fair, tolerant and green. Put simply, we want a Scotland to be proud of.

Over time, Scotland Performs will tell us just how Scotland is doing in our pursuit of these aims. It describes the outcomes we want to achieve and how well Scotland is progressing in key areas: health and wellbeing; justice and communities; the environment; the economy; and education and skills.

Our vision for success for Scotland is described and measured in four parts which support and reinforce each other:

- The Government's Purpose and its associated targets
- Five Strategic Objectives that describe where we will focus our actions
- 15 National Outcomes that describe what the Government wants to achieve

4 out of 15 National outcomes

- We realise our full economic potential with more and better employment opportunities
- We live longer, healthier lives
- We value and enjoy our built and natural environment and protect it and enhance it for future generations
- We reduce the local and global environmental impact of our consumption and production

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Strengthening the evidence-base

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*In recent years, a number of governments have made moves towards **evidence-based policy making** justified by the assertions that scientific understanding makes for **better informed and more effective** legislative and regulatory decisions.*

Lagacé et al (2008)

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The policy process

The traditional view has conceptualised the use of research in policymaking as a linear, unidirectional and mechanical process involving the transfer of information from science....

.....it is actually rather messy, with outcomes occurring as a result of complicated political, social and institutional processes which are best described as 'evolutionary',

(Juma and Clarke 1995)

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Effectiveness of evidence…..

…….suffered when communication was largely one way, whether this involved ***experts*** *assuming they knew what questions* ***decision makers*** *would see as salient or*

*….****decision makers*** *assuming that questions relevant to them were ones* ***experts*** *could credibly answer*’

Cash et al 2006

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Cultural differences

Policymakers often do not understand how scientific knowledge is generated nor the values or traditions of understanding defended by scientists and technical experts.

Scientists often lack an understanding of how policymakers use scientific evidence and have often failed to understand the complexities of reaching consensus in a political arena.

Lagacé et al (2008)

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What do policymakers really want (and need) from evidence?

Answers to questions

Who frames the questions and how?

Basic or strategic research: science community

Applied research or consultancy: policy community + stakeholder involvement

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Climate change as a case study

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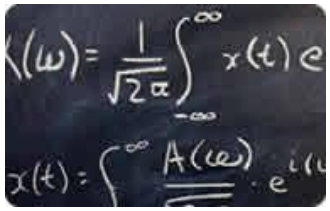
Climate Change – from basic science into policy

1824



Fourier refers to the ‘greenhouse’ function of the Earth’s atmosphere

1859

Tyndall identifies water vapour and CO_2 as heat-trapping gases

1938

Callendar suggests burning of fossil fuels responsible for warming of climate

1958

First direct measurement of atmospheric CO_2 (Keeling)

source: www.metoffice.gov.uk

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Climate Change – from basic science into policy

1975

First 3D simulation models of impacts of increased CO_2

1988

IPCC set up to provide evidence to policy-makers on climate change

1997

Kyoto Protocol sets binding targets for GHG emissions reductions

2008-9

Climate Change Bills in UK and Scottish Parliaments

source: www.metoffice.gov.uk

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Climate Change – from basic science into policy

2009

Current evidence needs to focus on quantifying the effects of measures in policy and practice to reduce emissions, the expected and unexpected consequences of these measures and ways to help communities to adapt to the impacts of climate change

2009 -

to be continued…

source: www.metoffice.gov.uk

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Climate Change science – key messages

- Almost two centuries of science directly underpin today's climate change agenda

- From a science 'push' for policies to deal with climate change, to a policy 'pull' for evidence to identify and prioritise measures

- From physical sciences (physics, engineering) to interdisciplinary evidence (systems research, socio-economics…)

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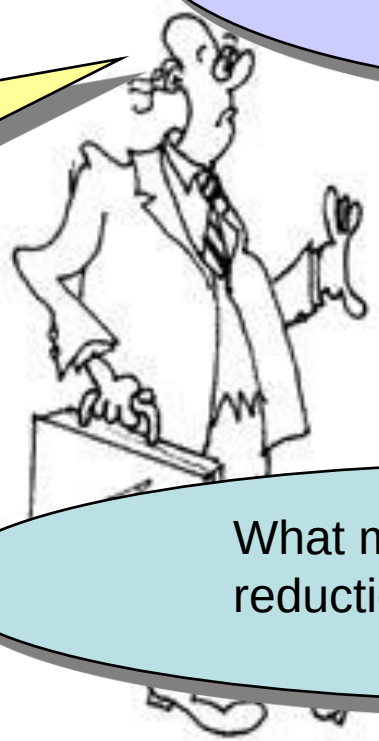
What kind of questions do policy-makers ask?

What's the 'right' level of grazing from an environmental point of view?

What can the agricultural sector contribute to delivering GHG emissions reduction targets?



What measures will deliver GHG reductions most cost-effectively?

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Policy teams looking for….

- High (sectoral) level integration of science
- The practicality (social research) and economics of different measures
- **Detail in relation to specific measures**

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Food policy and land use as a case study

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Historical perspective – food prices

Underlying trend is slow decline since 1870s

Only 3 major spikes in food prices in last 100 years:

- After World War II
- 1970s
- This decade

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'During the 50 year period from 1936 to 1986 the modern agricultural revolution occurred, in which, for the first time, science was properly harnessed to the improvement in agricultural productivity'

In 'From Dearth to Plenty: the modern revolution in food production' Blaxter & Robertson (1995)

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Challenge ahead

Agricultural production needs to:

- increase by 50% by 2030
- increase by 100% by 2050

Source: Ban Ki-Moon World Food Summit 2008

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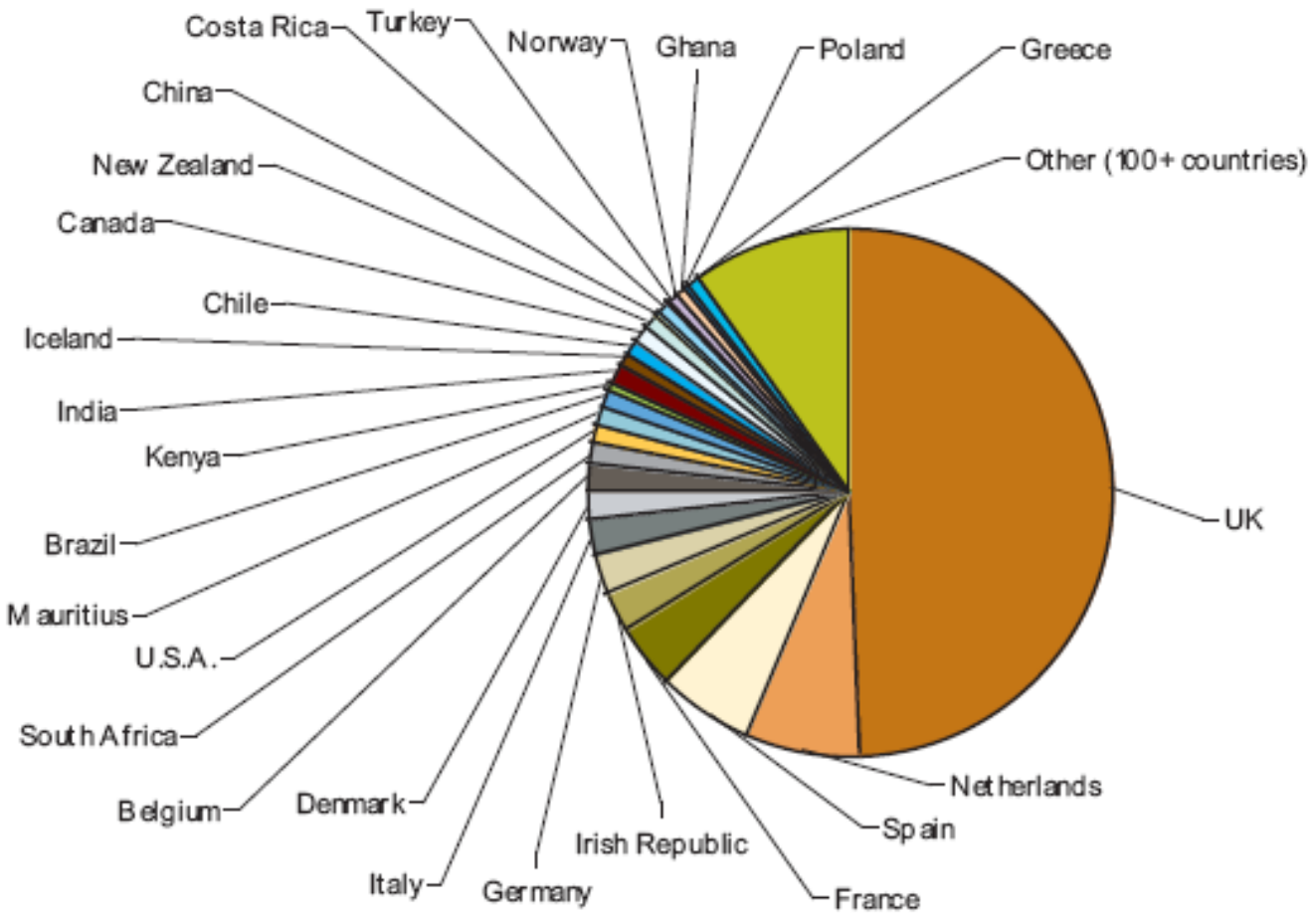
Origins of food consumed in the UK by unprocessed value, 2006



Based on the farm-gate value of unprocessed food

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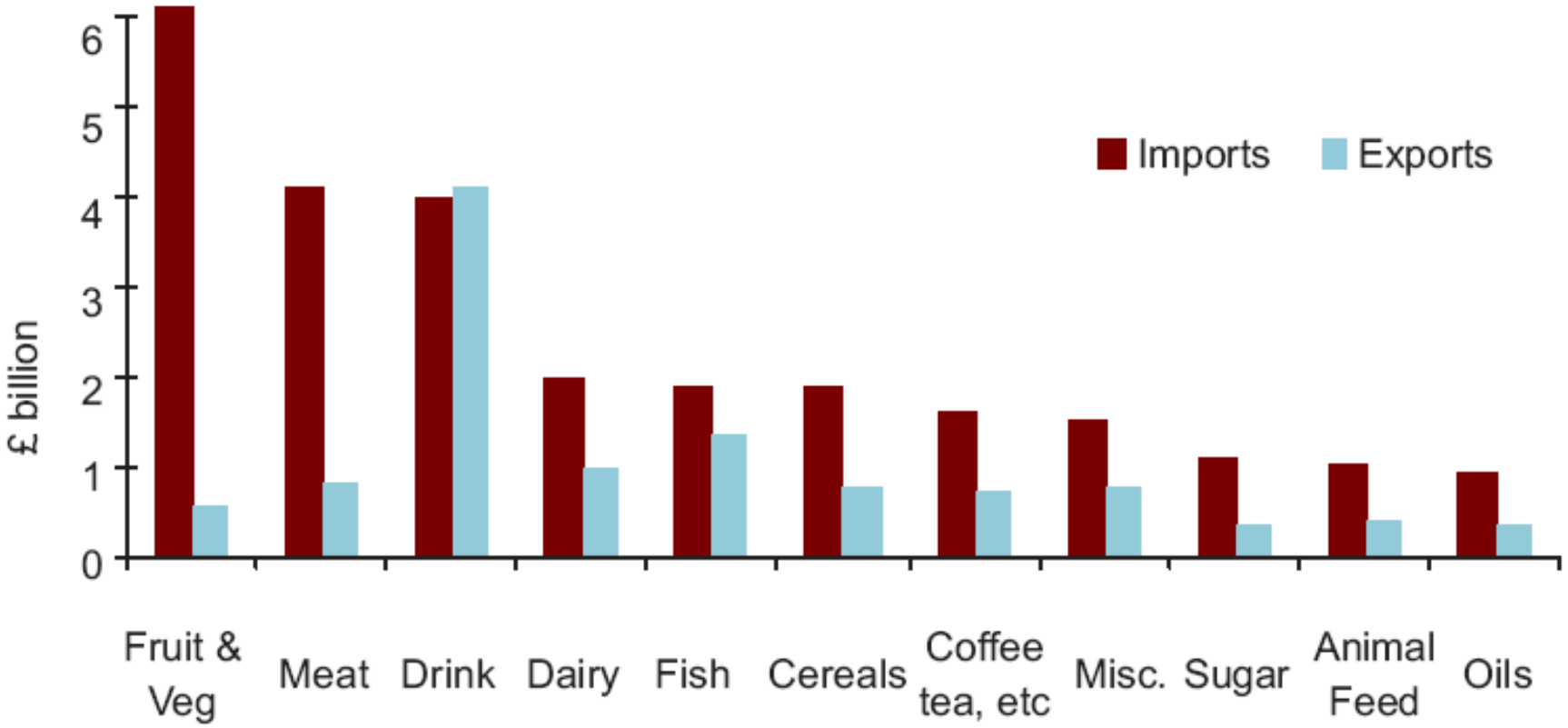
UK trade in different food groups 2007



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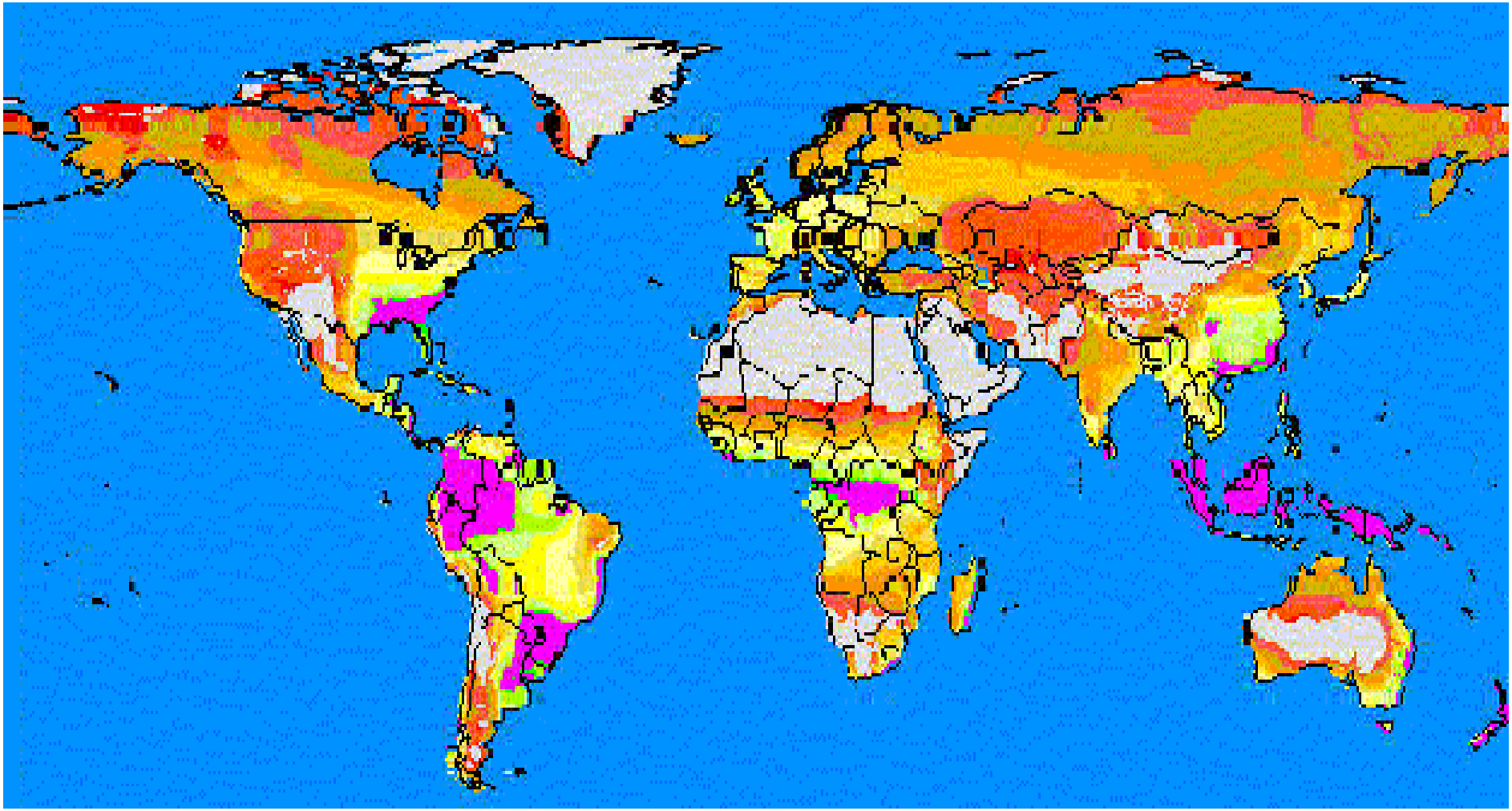
Agro-ecological zones of the world



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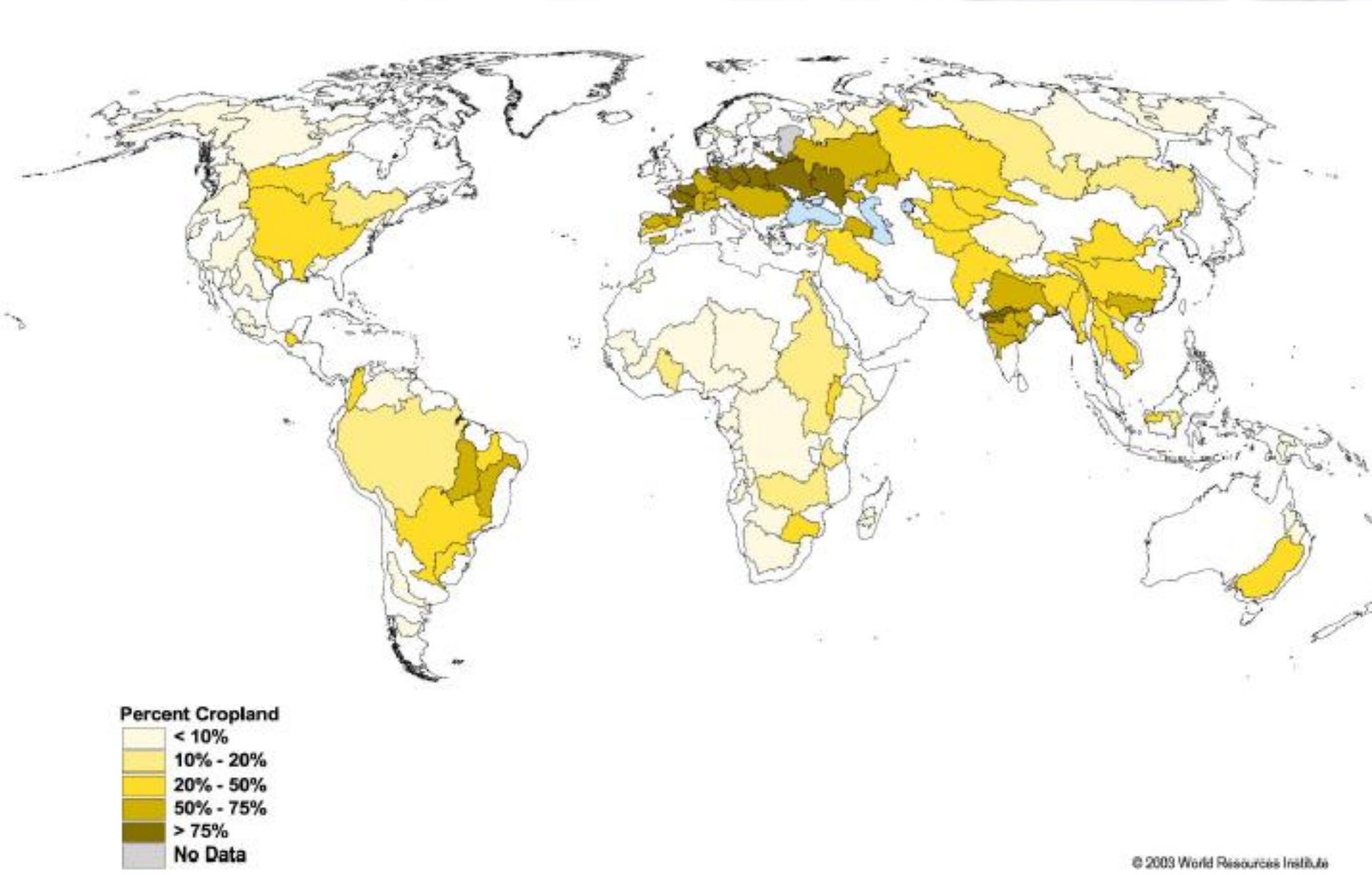
Distribution of croplands globally



Trade-offs

Use of land for food production

VS

Use of land to decrease carbon emissions

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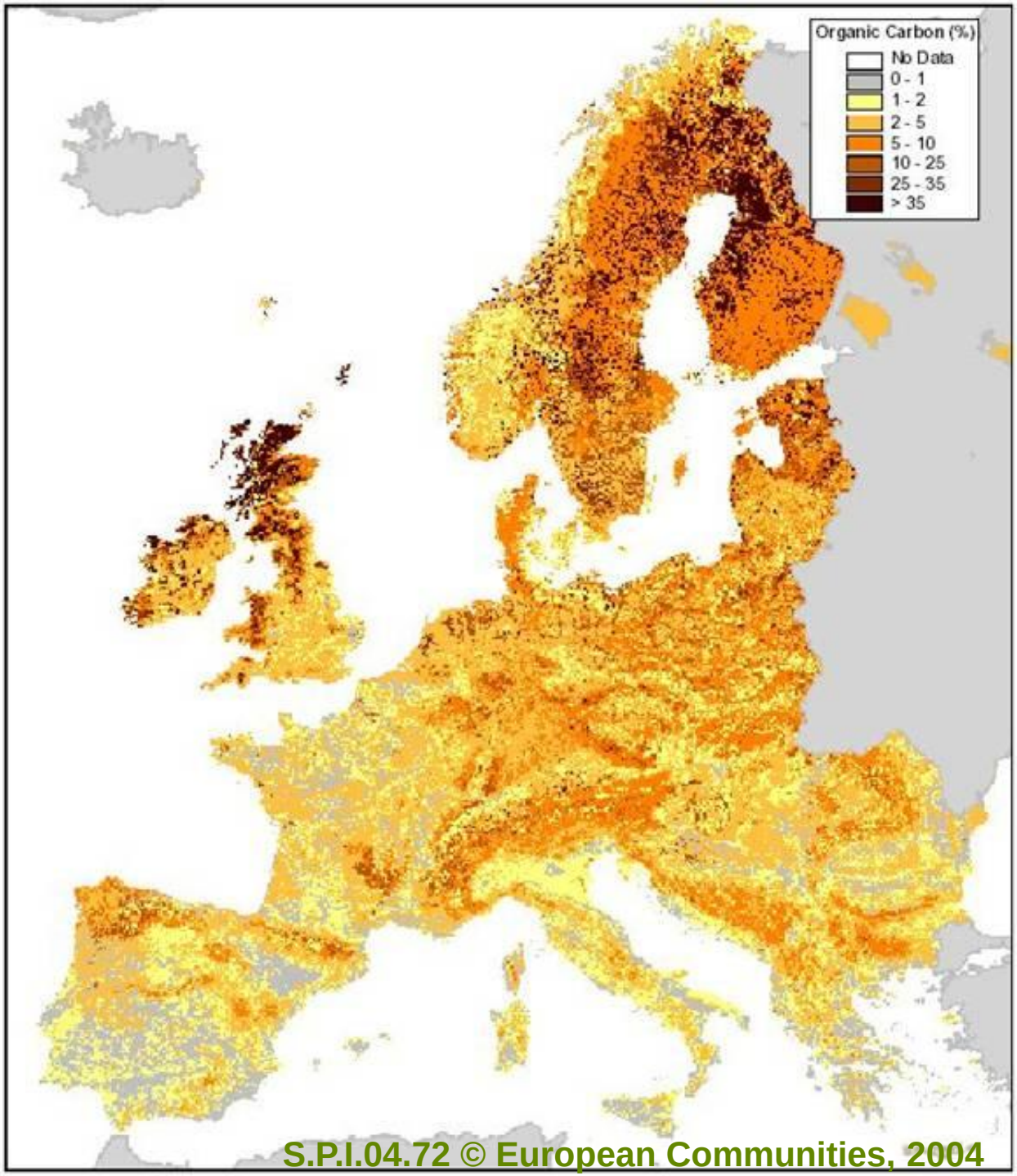
Soil – Scotland's soils are high in organic carbon



Models and maps to look at trade-offs

Mathematical models to illustrate potential consequences of different policies

Maps, pictures to communicate the spatial challenges

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Skills required to develop evidence

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Climate change

Mitigation – decrease emissions:

- Low carbon technologies e.g. electric cars
- Renewable energy
- Understanding behaviour

Adaptation – live with a changing climate:

- Breeding new crops
- Infrastructure to deal with floods
- Coping with infectious disease

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Coping with trade-offs

- Mathematics
- Economics
- Social sciences
- Geography

plus

- Soils, hydrology, forestry, plant science, animal science, epidemiology, engineering, meteorology, ……

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Working together

- Answering policy questions requires multidisciplinary teams of scientists economists
- Economists talk the language closest to that of policy colleagues
- Economists depend on the evidence of scientists

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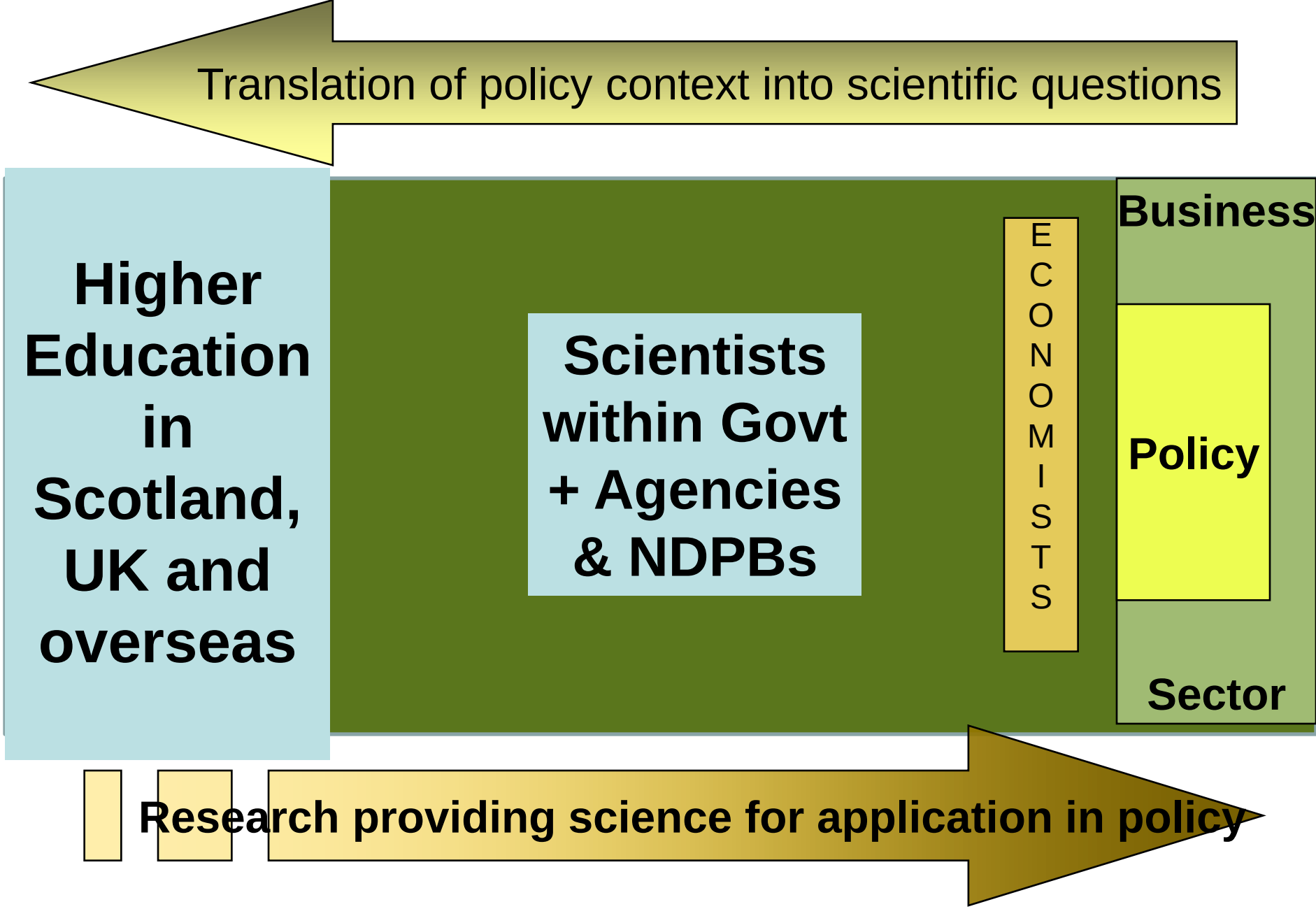
Translation of policy context into scientific questions
Higher Education in Scotland, UK and overseas
Scientists within Govt + Agencies & NDPBs
ECONOMISTS
Business
Policy
Sector
Research providing science for application in policy

Challenges of multidisciplinary approaches

- Language – same word can mean something totally different
- Transaction costs of learning other vocabularies
- Loss of depth within subject areas

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Benefits of multidisciplinary approaches

- Good understanding of the context in which results will be applied
- Exciting opportunities for generation of new knowledge
- Seeing the world from a different angle helps cope with change

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Shift happens

- We are currently preparing students for jobs that don't yet exist….
- Using technologies that haven't yet been invented….
- In order to solve problems we don't even know are problems yet

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Shift happens

- For students starting a 4 year technical or college degree this means that…..

- Half of what they learn in their first year of study will be outdated by their third year of study.

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The future is….

…..uncertain

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Communicating evidence = communicating uncertainty

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Science vs Art

Science is about fact…until it's no longer a fact.

Art is about arguing meanings, feelings, and contesting views.

Science is about forming probabilities.

Art is about endless possibilities

http://theuniversityblog.co.uk/2008/03/14/science-vs-art/

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Communicating probability

Scientists need to be able to communicate uncertainty without drowning out main messages

We face unprecedented rates of change at global level (economic, climate, resource demand) and scientists will need to understand and be able to explain, uncertainty

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Skills for the future

- Ability to cope with change
- Ability to communicate change
- Breadth as well as depth
- Awareness of context
- Creativity/innovation
- Willingness to listen

- Growing cadre of academics trained in > 1 discipline

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Question for discussion

If need for training in > 1 discipline do you:

- Train in 1 discipline to a high level before adding another?
- Train in a number of disciplines at degree level sequentially?
- Have multidisciplinary courses?