Finding an Ethical Career in Science, Design and Technology

Dr Stuart Parkinson

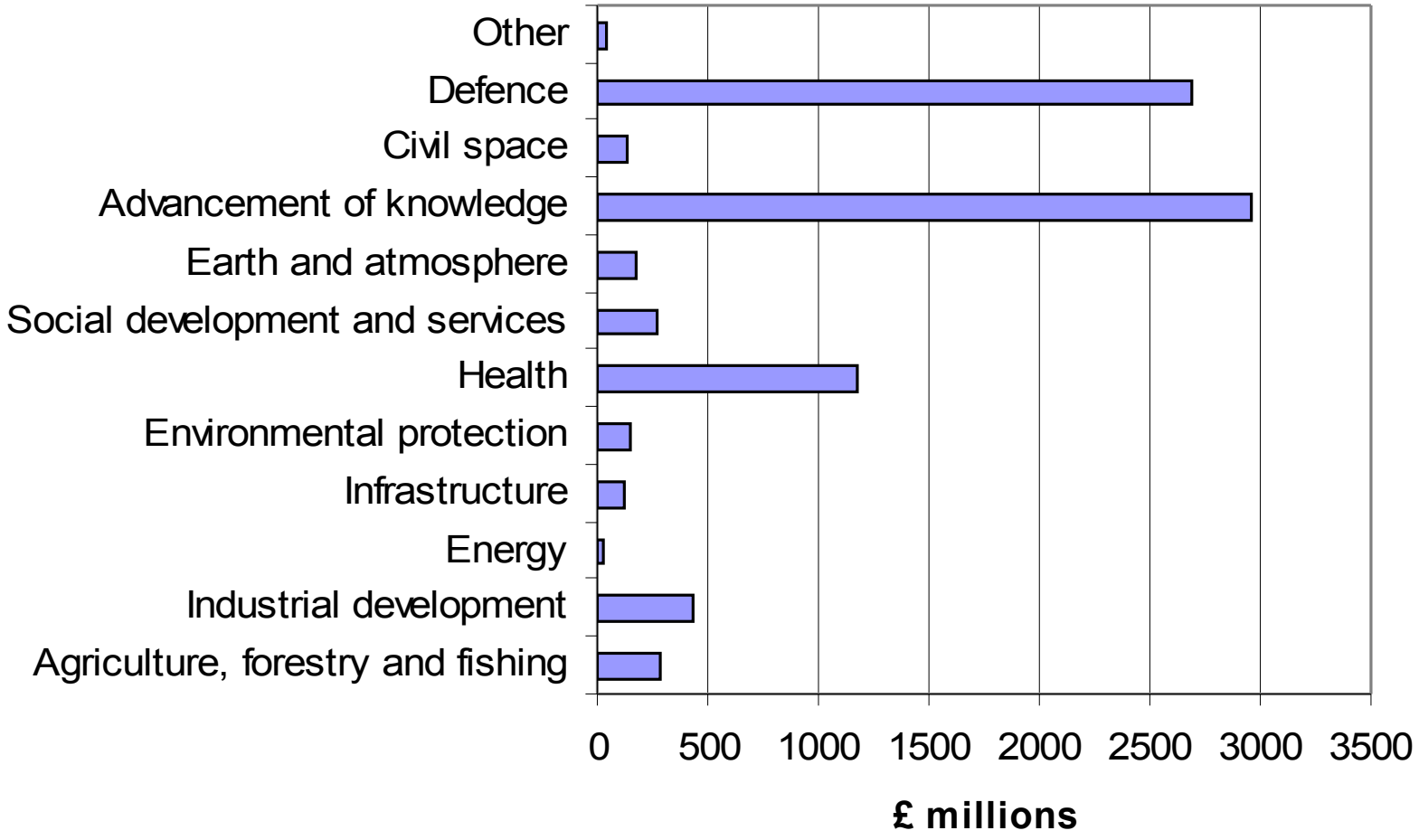
http://www.sgr.org.uk/

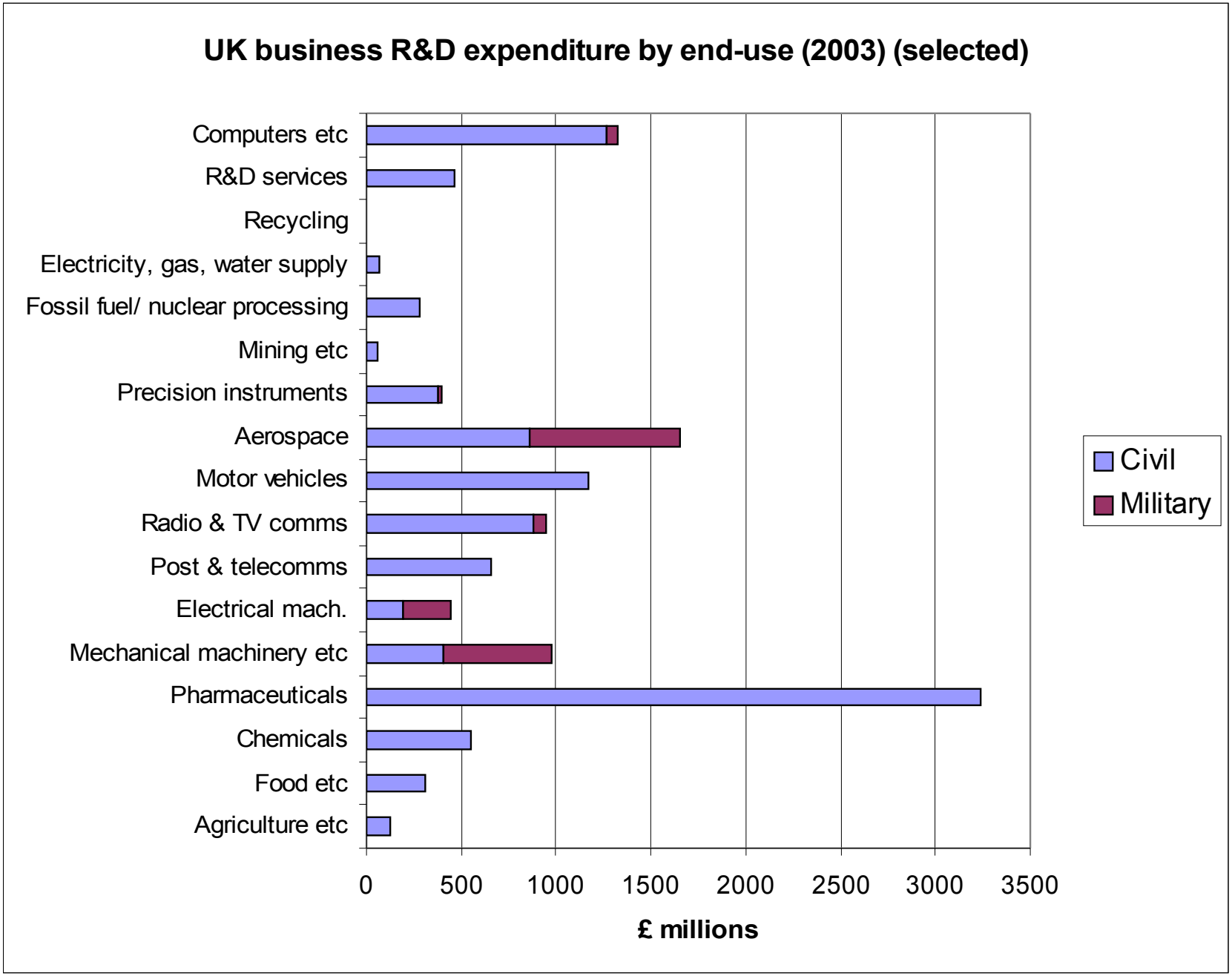
Why an ethical career in science, design and technology?

- Global environmental damage
  - Warnings that we have only 10y before dangerous, irreversible climate change becomes inevitable
  - Current extinction rate for wildlife could be 1000 times the nature level
- 300,000 people die each year in wars
- ~1 billion people live in absolute poverty

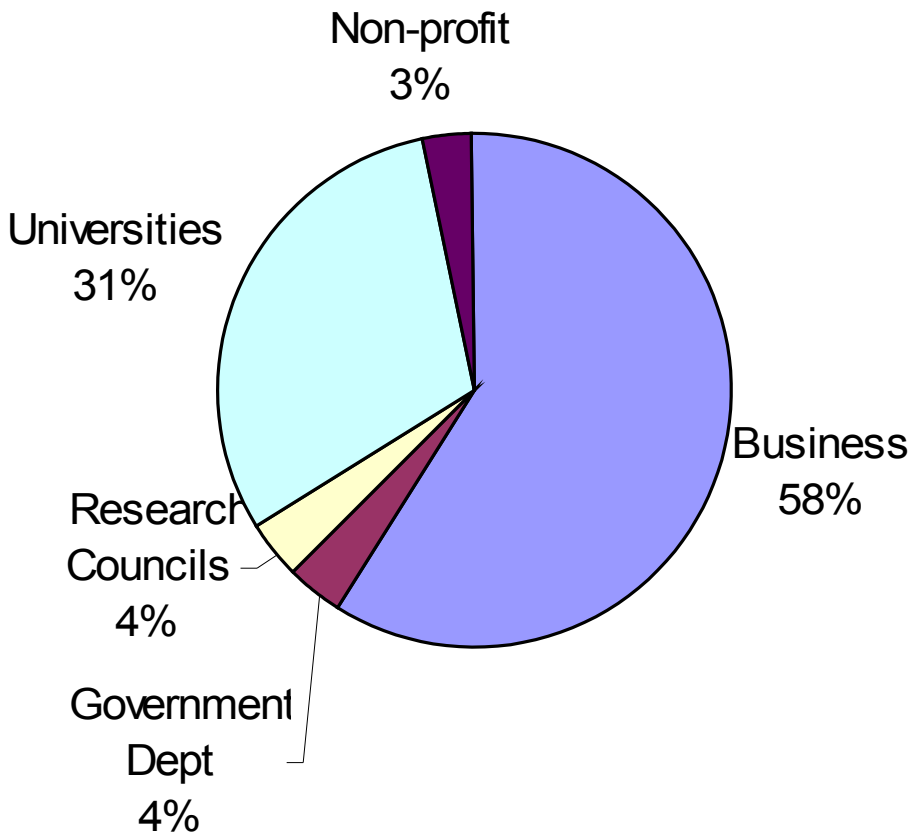
➔ *Science, design and technology can help tackle these problems or can make them worse*

UK Government R&D expediture by end-use (2003-4)




UK business R&D expenditure by end-use (2003) (selected)
Computers etc
R&D services
Recycling
Electricity, gas, water supply
Fossil fuel/ nuclear processing
Mining etc
Precision instruments
Aerospace
Motor vehicles
Radio & TV comms
Post & telecomms
Electrical mach.
Mechanical machinery etc
Pharmaceuticals
Chemicals
Food etc
Agriculture etc
0
500
1000
1500
2000
2500
3000
3500
£ millions
Civil
Military

UK personnel in R&D (2002)



Total: 285,000

Govt 10y science & innovation plan

- Timescale: 2004 - 2014
- Economic and military aims dominant
- Pushing closer collaboration between universities and business
- Some significant environmental, health programmes

Some positive signs…

- Environmental industries (including renewable energy) now employ 400,000 people
- Health charities are major R&D funders
- Sustainable design growing quickly (eg eco-buildings)
- Research Council programmes on sustainable energy, sustainable agriculture, health inequalities, understanding conflict
- Growing number of courses on environmental/ development/ security issues

Guiding principles

1. Apply precautionary principle
2. Guard against malicious use
3. Follow democratic principles
4. Consider distributional effects

➔ Look for contribution to peace, social justice, and environmental sustainability

Which Employer?

	Work Freedom	Influence on Policy	Influence on Technology	Ask ethical questions?	Pay
Academia	★★★	★?	★★	★★★	★
Government	★	★★★	★★	★	★★
Industry (big)	★	★★	★★★	★	★★★
Industry (small)	★	★	★★★	★★	★★
Non-profit (eg pressure group)	★★	★★	★	★★★	★

Tips on being successful…

- Educate yourself on the wider social/ environmental issues affecting your field
- Don’t be fooled by ‘greenwash’
- Incrementalist or revolutionary?
- Develop your ‘transferable skills’
- Get voluntary/ vacation experience beyond science
- Get support

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Brief personal history

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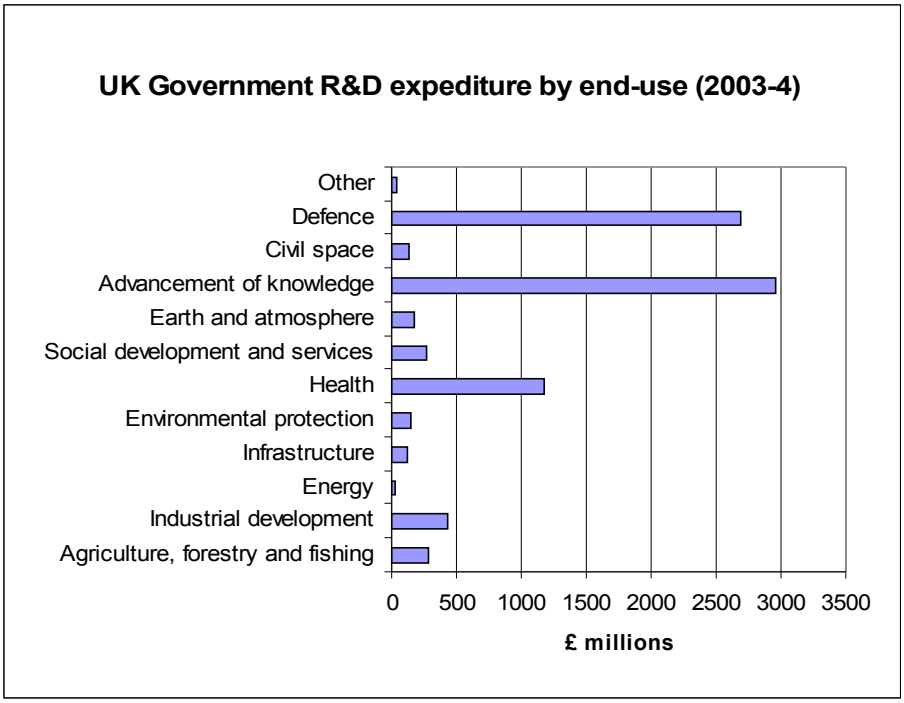
Notes

Climate change – atmospheric levels of CO2 likely to reach 400ppmv by 2015 – a variety of 'dangerous' impacts likely to become inevitable at this point (IPPR et al, 2005)

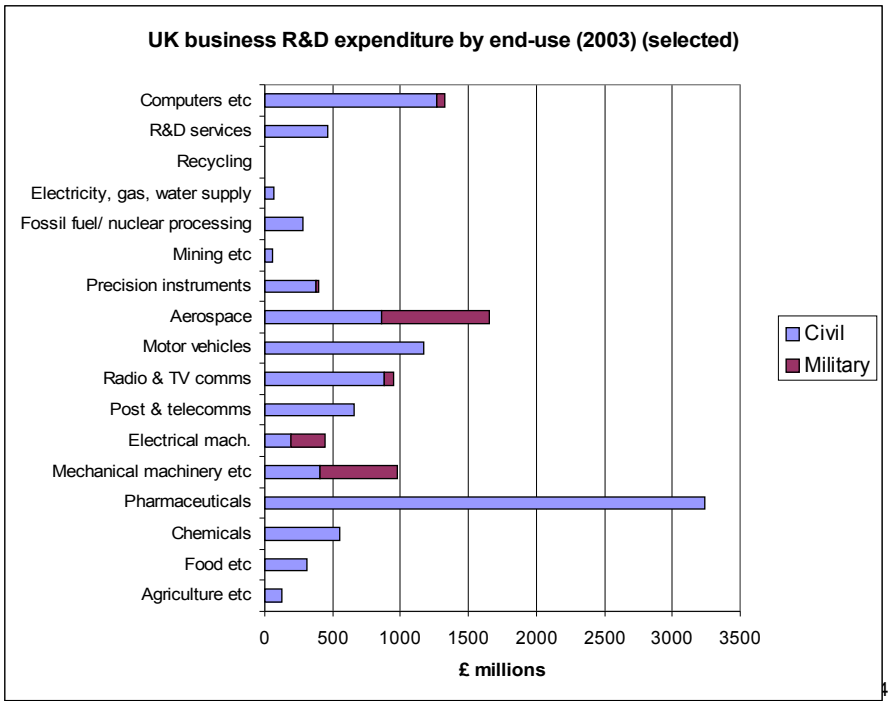
Biodiversity - Human activity has caused between 50 and 1000 times more extinctions in the last 100 years than would have happened due to natural processes (Millennium Ecosystem Assessment, 2005); Half the world's forests, half the world's wetlands have been destroyed by human activities; over-fishing has caused 90% of large ocean predators to be lost (p17 of Worldwatch Institute, 2004)

War – 300,000 people die each year in war (p29 of SGR, 2005)

Poverty – absolute poverty can be defined as: income of less than $1 a day (>1 billion); lack access to clean water (> 1 billion); malnourished (800 million) (p13 of SGR, 2005)



Source: Office of Science and Innovation website:
http://www.dti.gov.uk/science/science-funding/set-stats/



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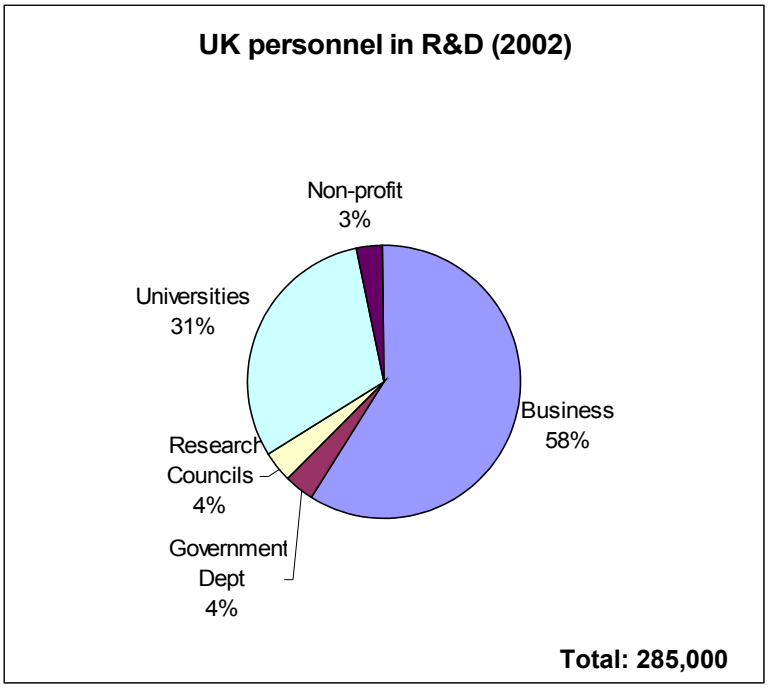

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Approx 50% of R&D staff in government are military

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From HM Treasury et al (2004) “Science and innovation investment framework 2004-2014”

Closer collaboration between universities and business is likely to further compromise scientific independence

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- Environmental technology industries (DTI, 2004):

2004 – 17,000 companies worth £25 billion and employing around 400,000 people – expanding at least 20%/y

Env industry includes: air pollution control, noise control, marine pollution, contaminated land, clean production, energy management, renewable energy, environmental consultancy, environmental monitoring and analysis, recovery and recycling, waste management, water and wastewater management

Env industry now employs more people than military industry (2003/04: 305,000 – DASA, 2005)

UK Gov R&D funding for renewable energy technologies is increasing (£250m 2001-2004)

Renewable energy industry employs around 8,000 but expected to rise to between 17,000 and 35,000 by 2020 (DTI, 2004)

- Health charities contributed £270 million to clinical medical research at UK universities in 2001/02 (Treasury et al, 2004)

- Environmental consultancy is growing fast (UK 2002: growing 10%/y despite deterioration in general economy)

- Research Council led initiatives (details from the RCs' websites):

Sustainable energy economy (NERC, EPSRC, ESRC) including UK Energy Research Centre (focus on new renewables, hydrogen, nuclear waste, geo-storage of carbon) (£28m over 3y up to 2006)

Rural economy & land-use (ESRC, BBSRC, NERC) - sustainable agriculture – (£20m over 5y - 2003-08)

QUEST Earth system programme (NERC) monitoring and prediction - focus on global carbon cycle (£23m over 6y – 2003-09)

Environmental Equity programme (ESRC)

New Security Challenges programme (ESRC) – £4m – eg understanding roots of conflict

- For university depts running courses, see http://www.sgr.org.uk/ethics.html

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Precautionary

If possibility/ likelihood of significant health/ environmental harm, must put in place safeguards – sometimes this means not developing the technology. Uncertainties are important and should be investigated. Hi-tech solutions (based on cutting-edge science) are inherently more uncertain.

Consequences: work for organisations with clear environmental/ health goals, or actively applying the precautionary principle through, eg, assessing new technologies for health/ environmental effects, or assessing whether intermediate technology or non-technological options offer a better solution

Malicious use

How easy is it for you work to be intentionally misused, eg weaponised? Particular concern is military work, eg is it encouraging a focus on military solutions to political problems? Are arms/ equipment being sold to countries with bad human rights records?

Consequences: look at military policies of governments which are funding the work; easiest to avoid working for military or taking military funding, or only working on, eg, disarmament projects

Democracy

Vested interests such as big corporations and military can direct scientific and technological work in their favour – which is not necessarily in the best interests of society. Public involvement in decisions on science and technology is generally very limited.

Consequences: work for organisations with clear social/ environmental goals and rather than narrow economic/ military ones, and/ or who actively engage with the public over scientific controversies

Distribution

New technologies can exacerbate social inequalities rather than help tackle them. Hi-tech solutions tend to be expensive, and hence intermediate technologies or non-technological options may be fairer.

Consequences: work for organisations with clear goals in terms of equitable development, and involve public dialogue over technologies

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You can make a difference!!