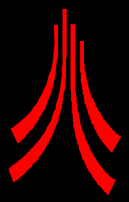
Sustainable Water Management

Pressures, Drivers and Options

Louise Heathwaite

Lancaster Environment Centre

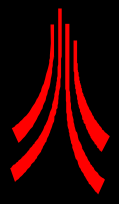


Centre for Sustainable Water Management

Professor Louise Heathwaite, Director

Integrated solutions to diffuse environmental problems

PRESSURES



Water Resource Issues in the UK

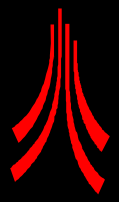
- Impact of climate change on freshwater systems
- Economic and social costs of meeting improved water quality standards
- Water conflict/ regulatory systems/ asset location and management
- Risk management

BIGGER DRIVERS

- Economic incentives e.g. subsidies *vs* ecosystem impacts
- Public goods: environmental concerns *vs* consumer aspirations
- Globalisation e.g. resources as capital assets; resource use efficiencies/ international performance comparisons

WATER ISSUES AND POTENTIAL RISKS

- **WFD: moving 2,073 designated water bodies in North of England to "good ecological status"**
- **Social aspects of improving water quality: agricultural policy effects on diffuse pollution & eutrophication of rivers and lakes**
- **Climate change effects on floods and droughts**
- **Economic implications of water use & savings**
- **Water and health**



Westmorland Gazette

12 August 2005

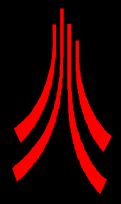
"LORDLY 'BID' FOR POWER AT LOWTHER"

"The most important thing in the world over the next 40 years isn't oil - it's fresh water and people will be paying vast amounts of money for it." declared Lord Bragg.

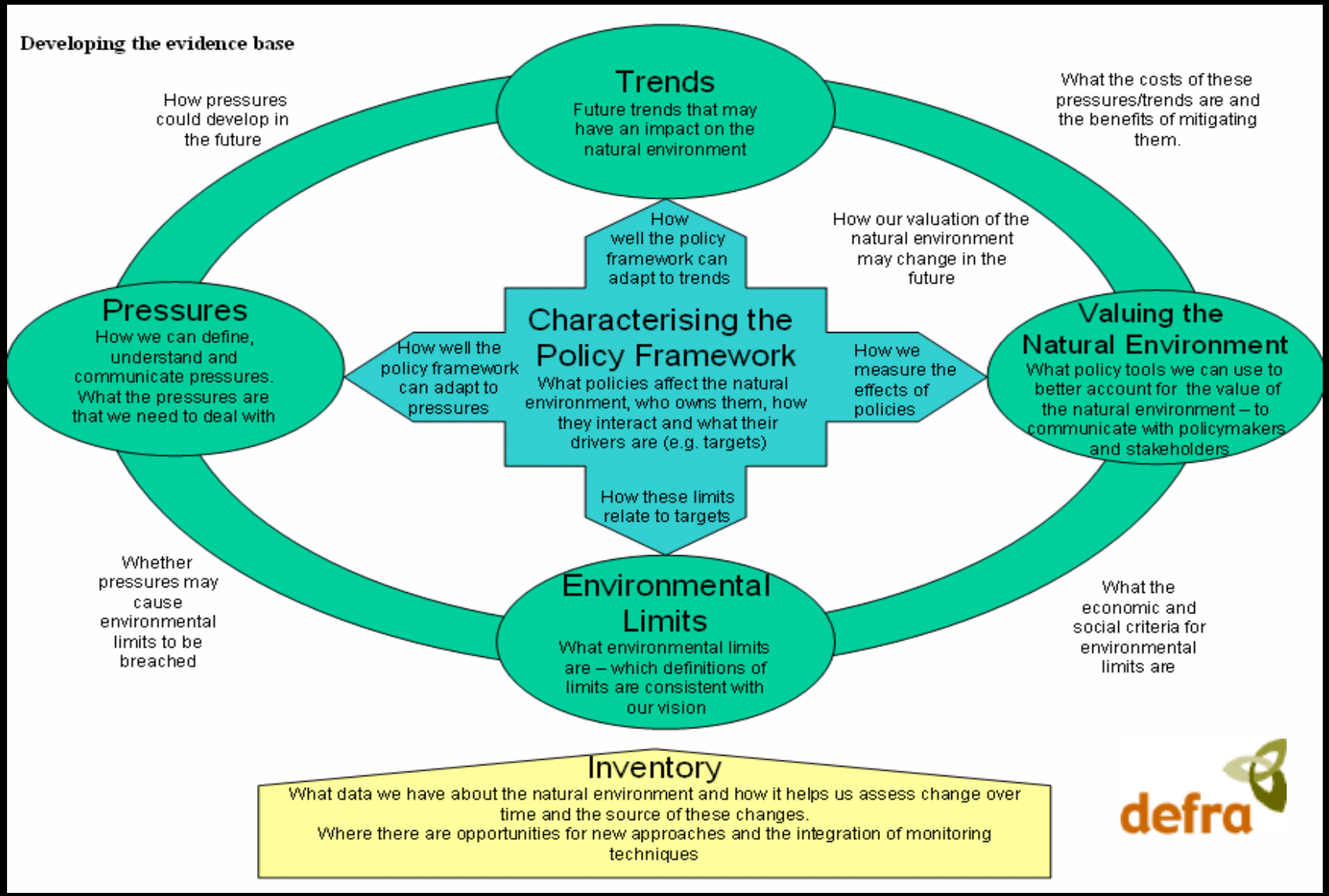
"We have all this weather we endure, we should say this water belongs to us and we should sell it."

"Ken Livingston has already said London is going to come north for its water, we have been warned!"

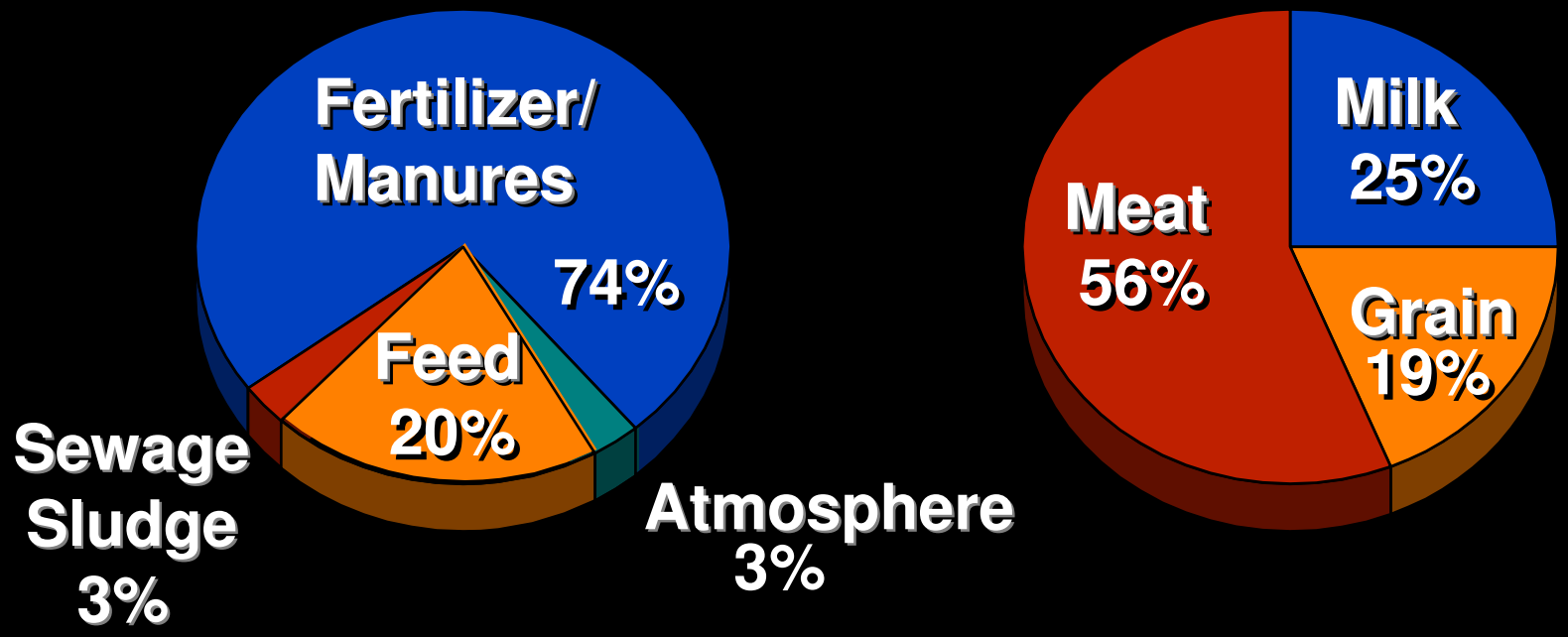
‘STRUCTURAL’ DRIVERS



Natural Environment Programme



Phosphorus Fluxes in UK Agriculture

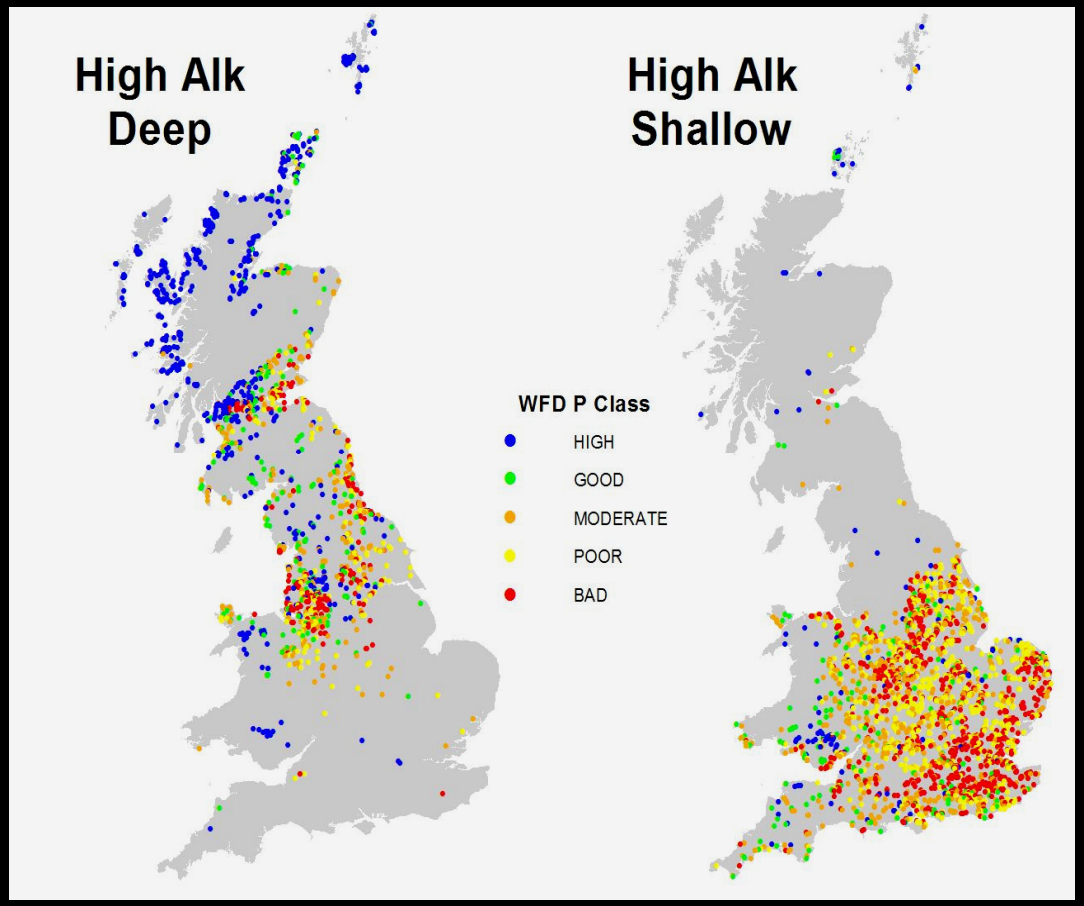


P surplus: 177 000 tonnes (c. 10 kg ha^{-1} a^{-1})

WFD UKTAG Jan 2006

River Typology (based on alkalinity, altitude)		Mean annual SRP (ųg l^{-1})	
		High	Good
1n	Lowland, acid	30	50
2n	Upland, acid	20	40
3n+4n	alkaline	50	120

Risk Assessment for High Alkalinity Lakes



High Alkalinity – Shallow

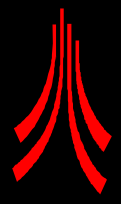
- England 91% at risk
- Wales 61% at risk
- Scotland 29% at risk

High Alkalinity – Deep

- England 72% at risk
- Wales 34% at risk
- Scotland 23% at risk

ENVIRONMENT AGENCY

WATER MANAGEMENT OPTIONS FOR THE FUTURE



OPTIONS

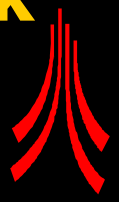
Three themes:

- Water Supply and Savings
- Water Treatment and Clean-up Technologies
- Water as a Hazard (floods, droughts, health)

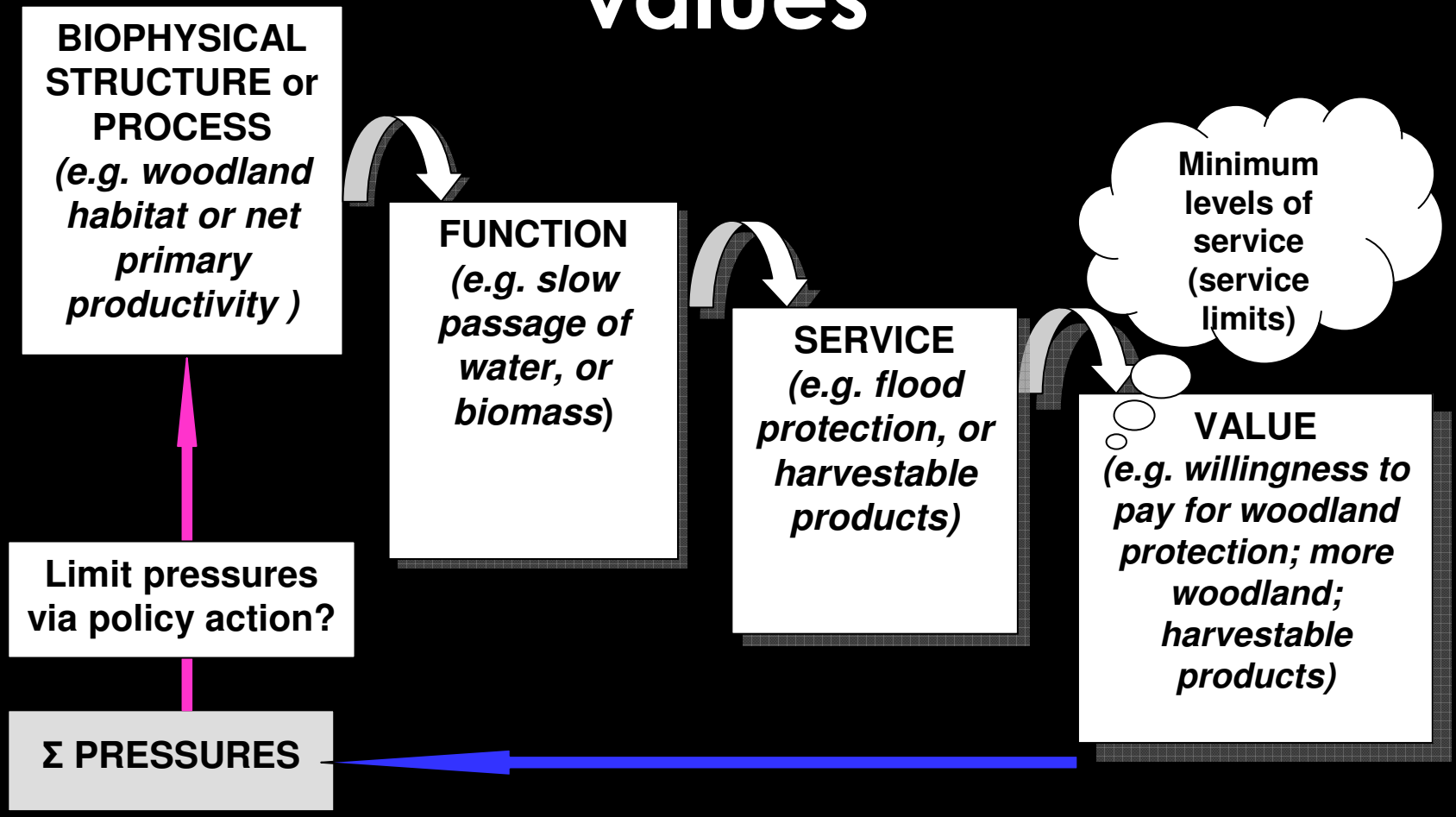
Two time scales:

- Decade (Water Framework Directive)
- Long Term (Climate Change)

Outcome: towards Risk-based Management within an Ecological Assessment Framework



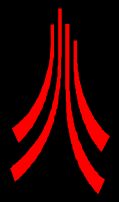
Systems, functions, services and values



Abstraction – Treatment - Wetland Sustainability - Saltwater Intrusion

ISSUES AND VALUES

- Water charges; water metering
- Conflicting goals e.g. SE housing
- Technology *vs* frugality
- Politics and votes; short-termism
- Legislation - groundwater contamination: diffuse pollution
- Risk-based decision making



CRYSTAL BALL…

- More diverse rural economies (CAP reform, agri-environment schemes)
- Reductions in UK N emissions
- More widespread application of UWWTD (not >10,000 pe)
- More widespread adoption of BMPs in agriculture
- Encouragement of sanitation without water in rural areas
- Sustainable (energy efficient) water treatment
- Water consumption patterns across sectors; water pricing
- Harness landscapes…Wetlands/DOC/NO3 attenuation in shallow groundwater systems?