



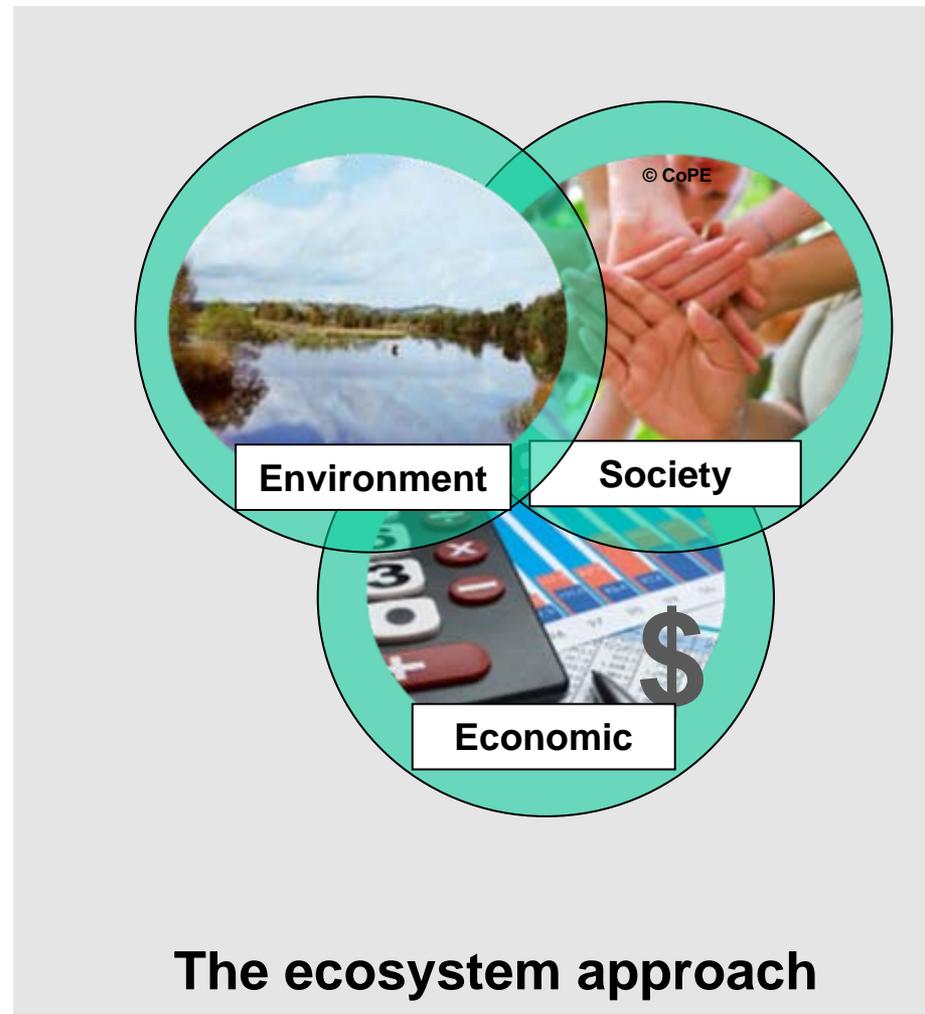
Modelling Ecosystem Services:

Opportunities emerging from Wales

Dr Katie Medcalf Cenv
Environment Director

- What is an ecosystems approach?
- Why do we need a new approach to environmental management?
- What is the current situation?
- How do we bring different data together and demonstrate solutions?
- How can we use this approach?





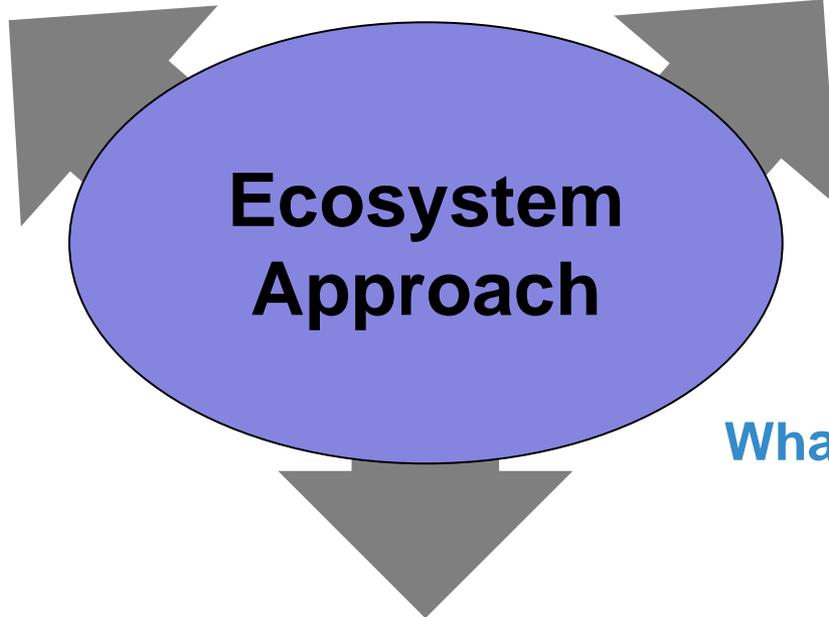
Diagrams adapted from: Lebel, 2003



Sustainable Land Use



Conservation of Biodiversity



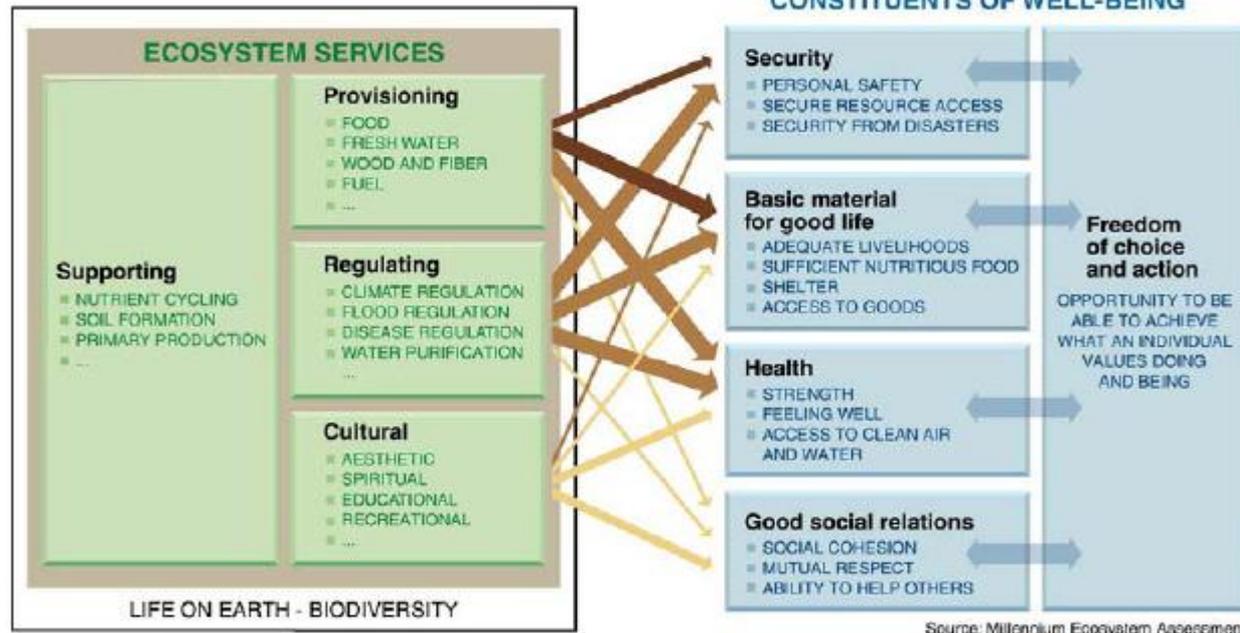
Ecosystem Approach

What are the key objectives of the ecosystems approach?



Fair and Equitable Sharing of land

Linkages between ecosystem services and human well-being



ARROW'S COLOR
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

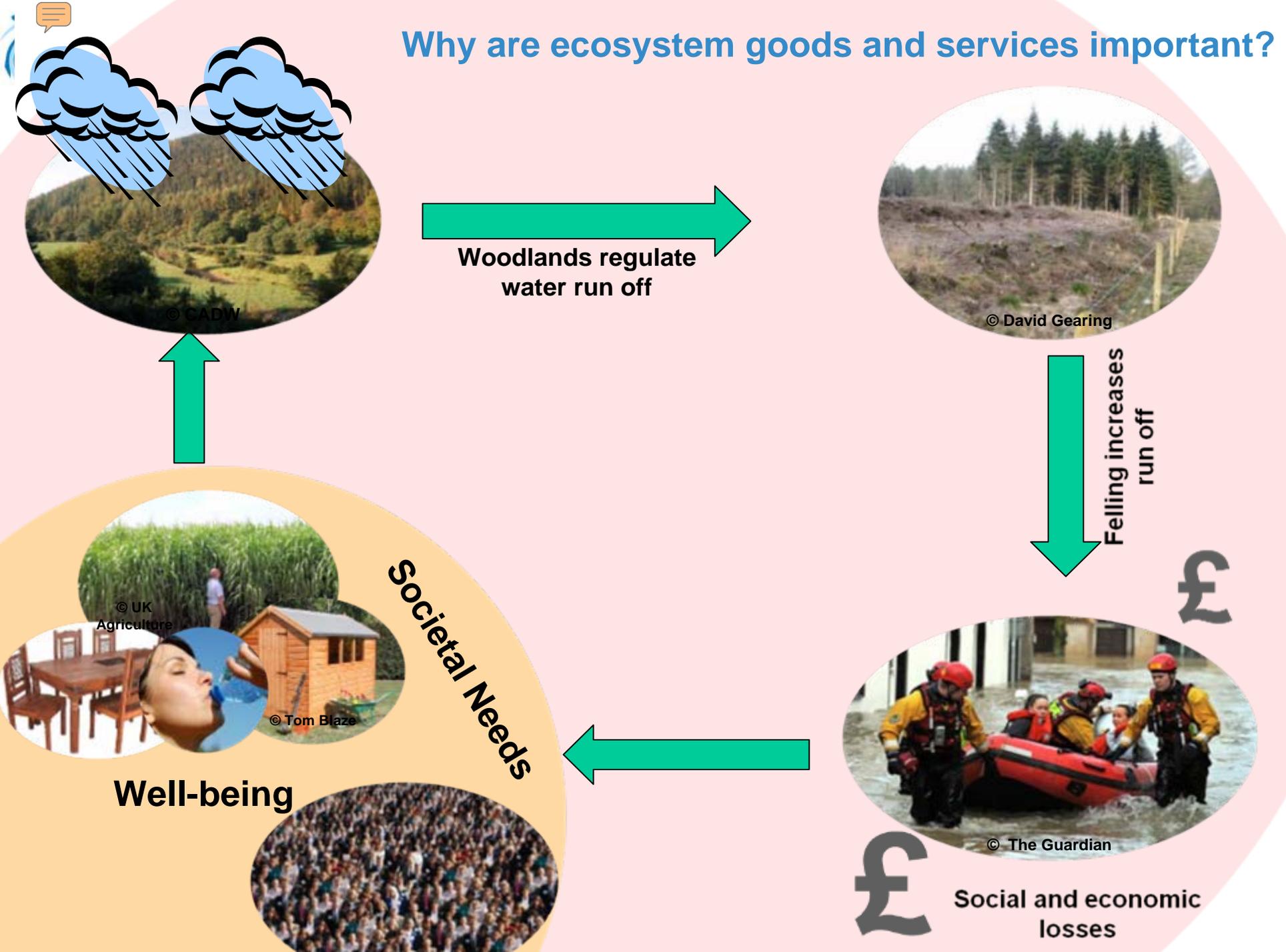
ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Figure SDM - A - The MA framework

Diagram:
Millennium
Ecosystem
Assessment,
2005.

Why are ecosystem goods and services important?



Woodlands regulate water run off



Felling increases run off



£

£

Social and economic losses

Societal Needs

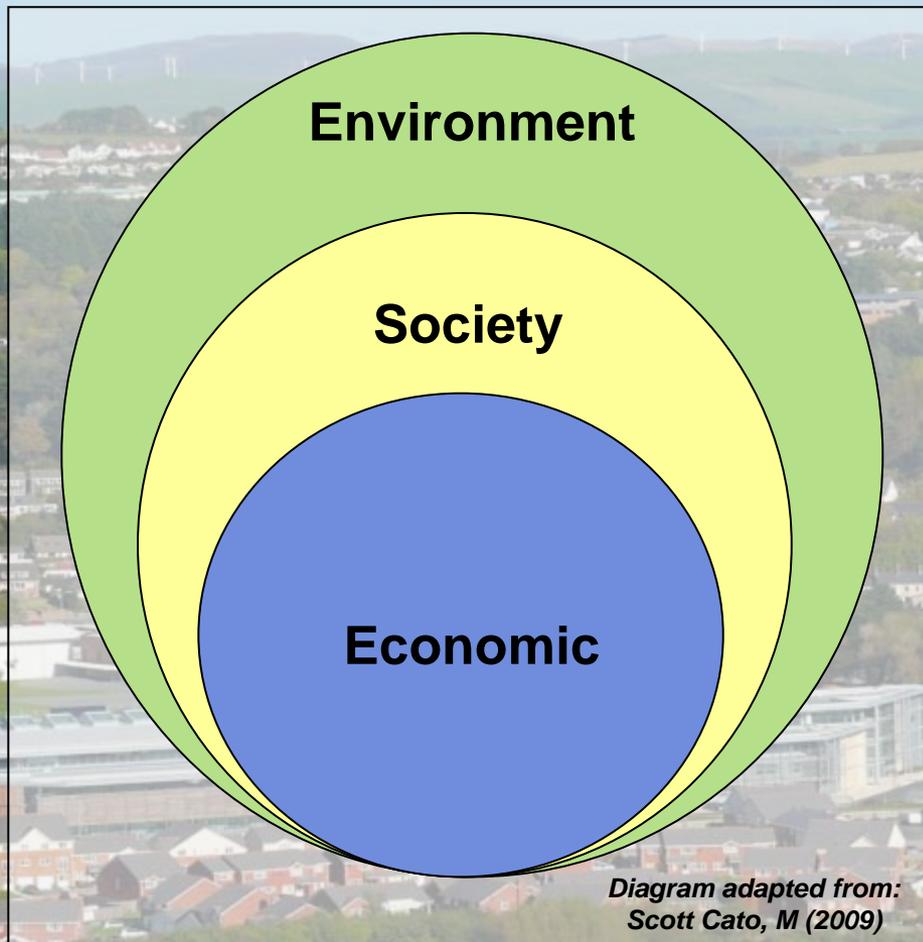
Well-being

© UK Agriculture

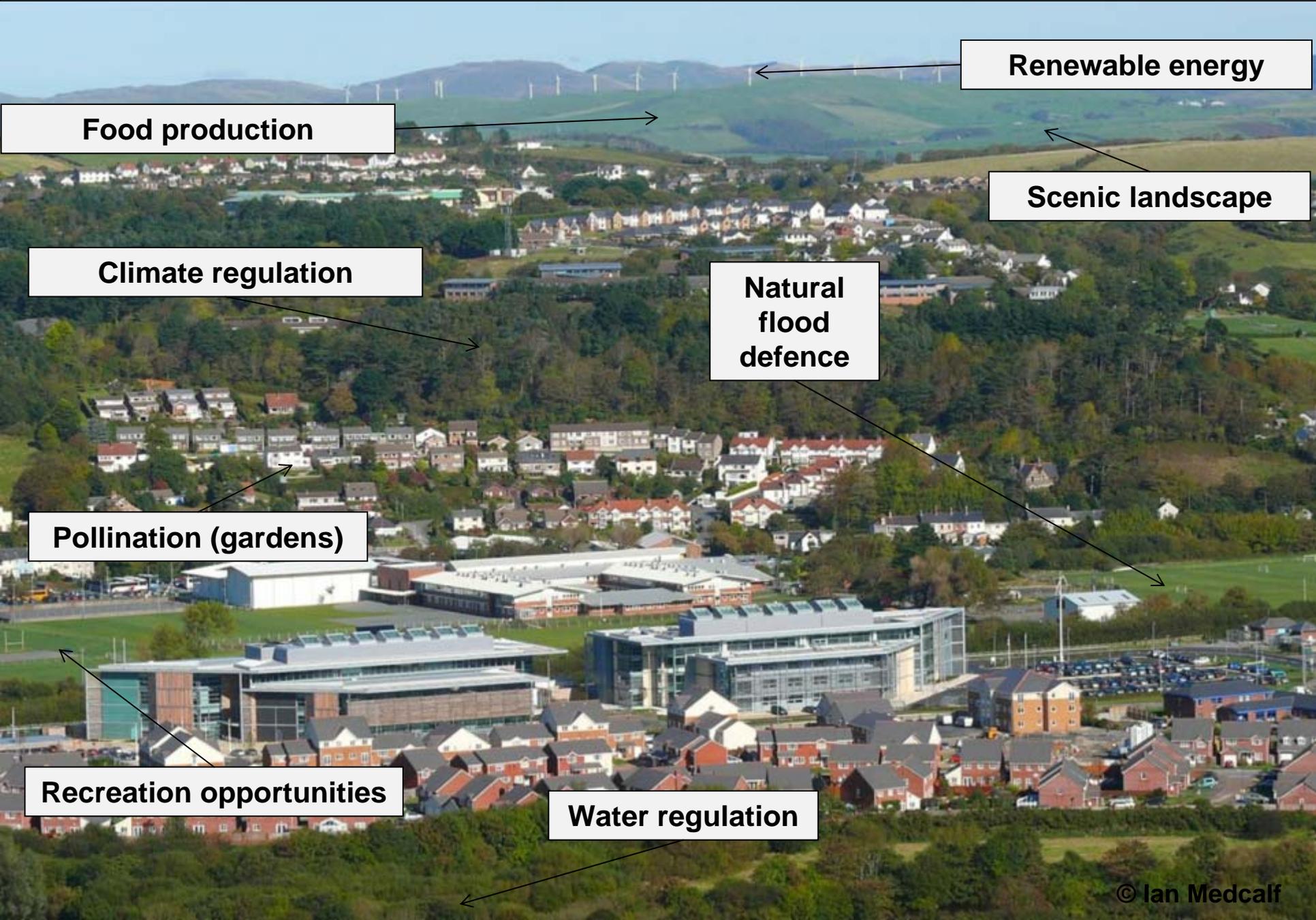
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Integrated land management defines an all encompassing holistic approach



Ecosystem services define the multiple provisions from the land



Renewable energy

Food production

Scenic landscape

Climate regulation

**Natural
flood
defence**

Pollination (gardens)

Recreation opportunities

Water regulation

Cross sector collaboration is an underpinning factor in delivering an integrated and sustainable approach to managing our environment.

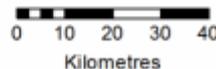
This collaboration is making headway through the:

- 1.Implementation of new approaches,**
- 2.Opportunities to combine and share knowledge between skill bases,**
- 3.High capacity computing available to analyse the huge complexities of data.**

- Scale of analysis and management action should be determined by the problem being addressed.
- Implementing the approach is dependent on scale - local, regional and national .
- Need to look within and across ecosystems to understand how scales(temporal/spatial) relate to service provision.

Key

- Wales
- Bridgend
- South East Wales Spatial Plan Area



Exploratory approach which looked at:

Readily available data

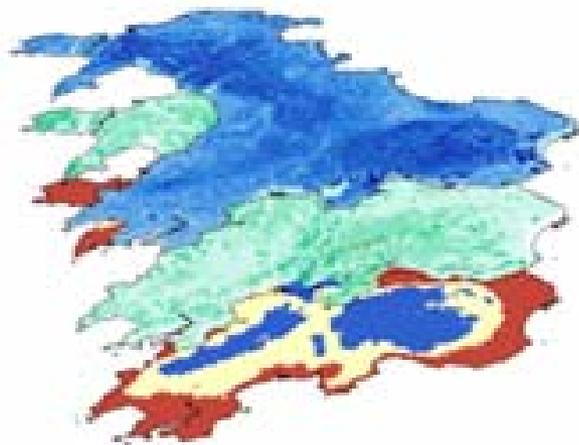


Formulating a method

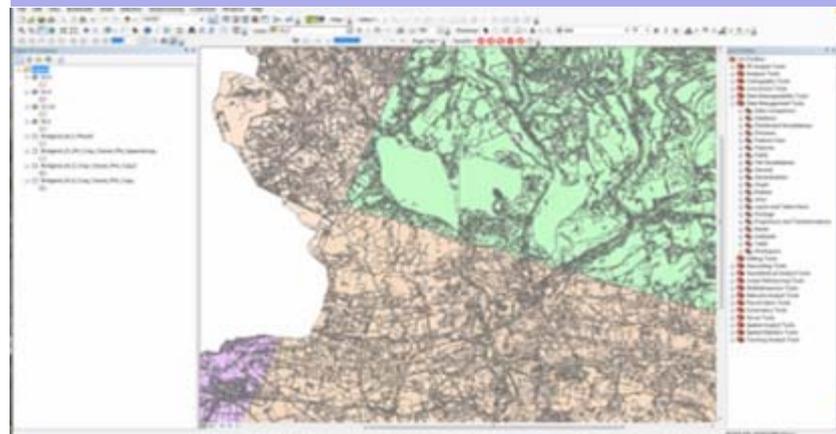
Table 3: Rationale, Datasets and Rule Base

Datasets and Rule base								
Data Layer	Category and code	Importance	Score	Processing	Mosaic Vegetation	Weighting	W/P	
1. Soil Group	Mineral Soils	Unimproved/Other Soils	22	L	1	100		
	Organic and Mineral Soils	Typical sand	361	L	1	100		
		Typical peat	421	L	1	100		
		Typical organic peat	421	L	1	100		
		Typical brown earths	40 5.41	L	1	100		
		Stagnic brown earths	5.42	L	1	100		
		Typical brown earths	5.43	L	1	100		
Typical brown sands	40 5.51	L	1	100				
Typical brown alkaline soils	40 5.81	L	1	100				
Typical organic brown earths	40 5.71	L	1	100				

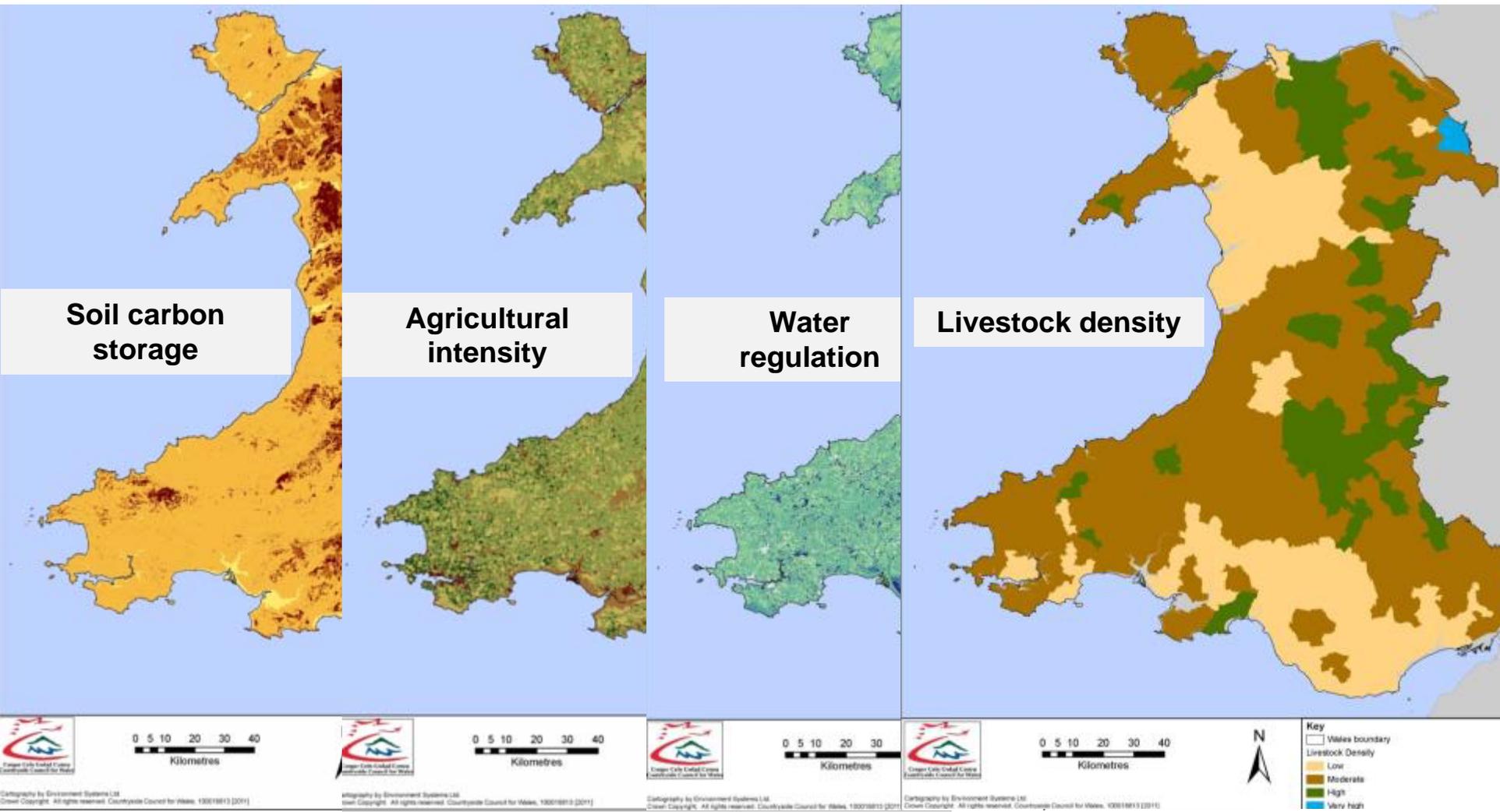
Practicalities of mapping



Analysing and interpreting data



- Overview maps aid the identification and visualisation of ecosystem services



“Ecosystems should be managed for their intrinsic value and for the tangible and intangible benefits people receive, but in a fair and equitable way (CBD, 2004)”



-Participatory Approach - actions need to be determined through negotiations and trade-offs amongst stakeholders and communities.



-As human society is diverse, everyone emphasises their own economic, cultural and societal interests and needs.



-Societal groups are placed in different environmental contexts. This determines the relationship they have with their surrounding natural world.





© Harrogate Council

Can this land keep providing all of societies needs?



© Ian Yarham



© John Lucas



© Google, 2010



© Andrew Carpenter

Feeling the pressure?



© MNV Consulting



© BBC



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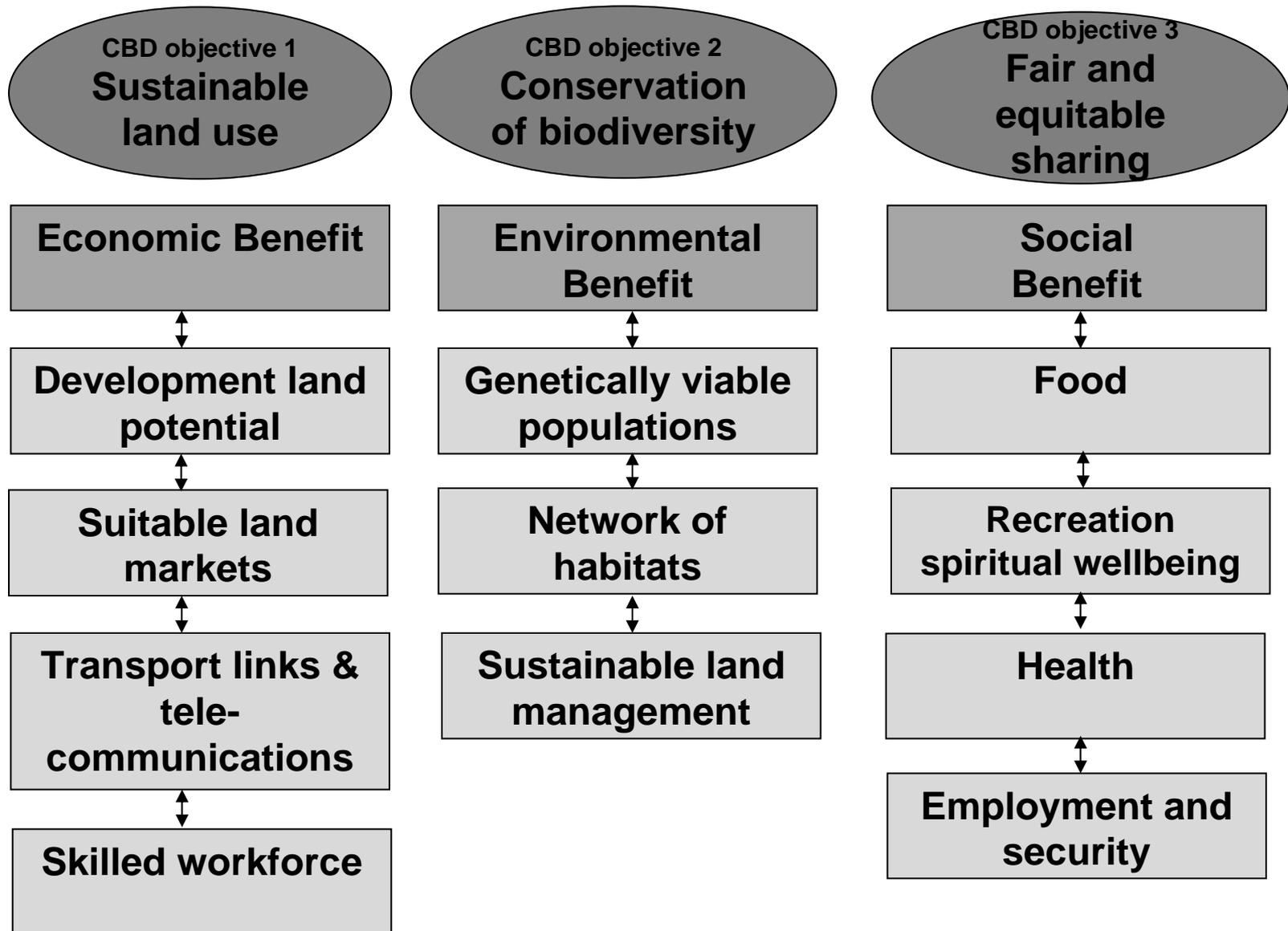


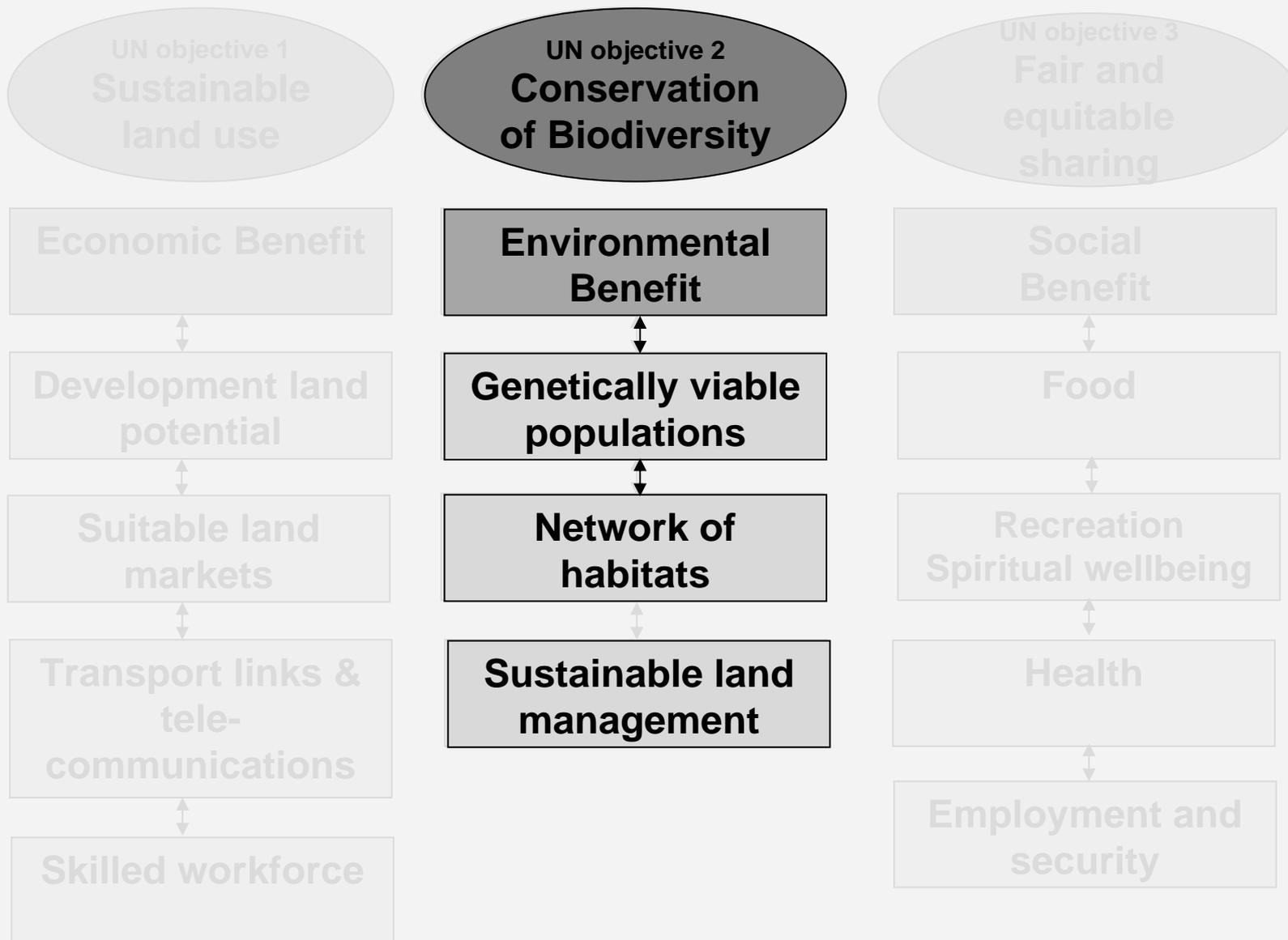
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“A key challenge of ecosystem management is identifying how to manage multiple ecosystem services across the landscape”
(Raudsepp-Hearne et al., 2009).



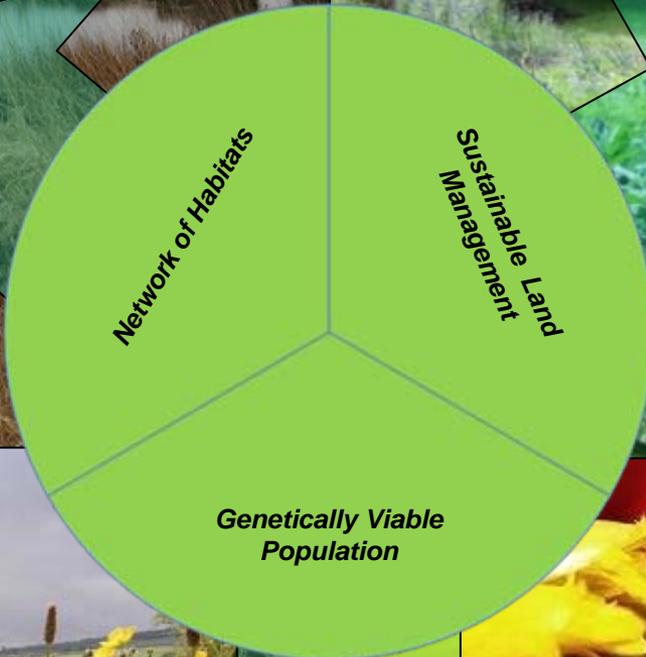




© Nigel Brown



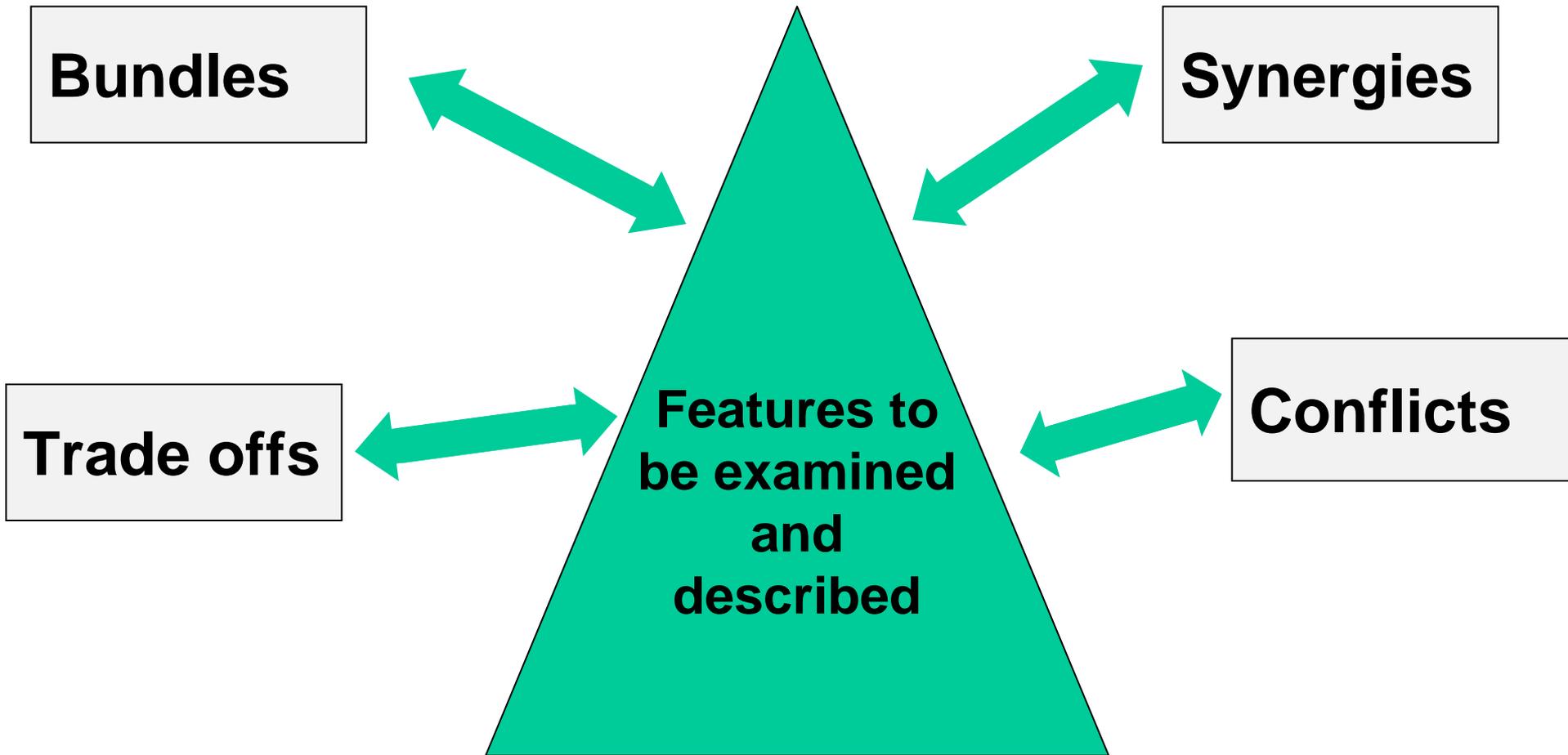
© Trish Steel



© wild seed



© AP

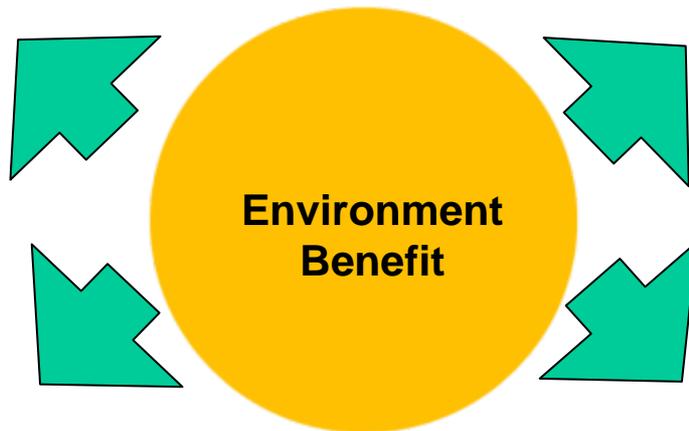


How do ecosystem services provide an environmental benefit to society?



Network of habitats depend:

- Highly on **biodiversity resources**
- Highly on **biodiversity opportunities**
- Positively related to **vegetation carbon** , **soil carbon** and **landscape aesthetics**
- Negatively related to **agriculture intensity** and **livestock density**



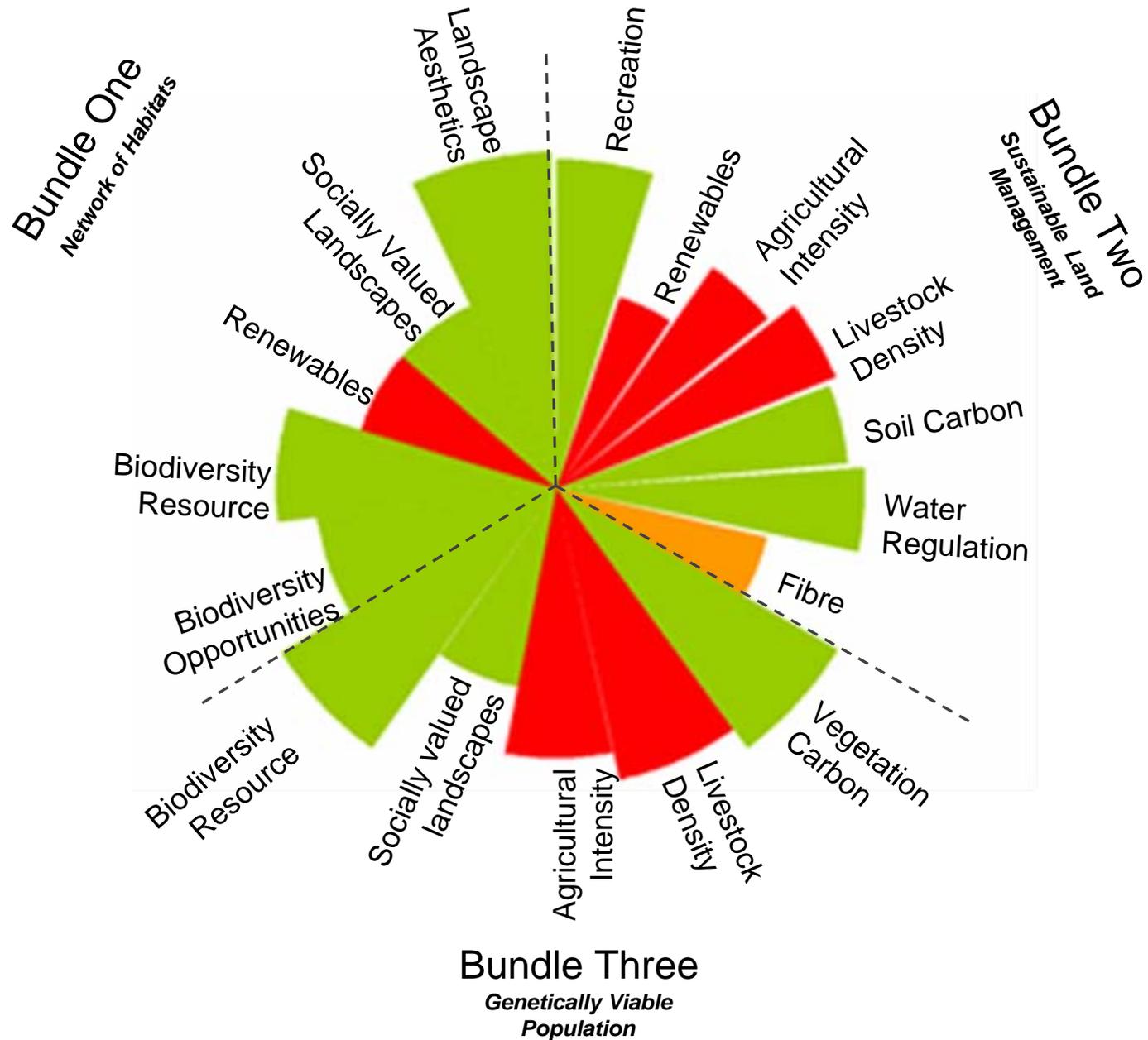
Genetically viable populations depend :

- Highly on **biodiversity resources**
- Positively related to **vegetation carbon** and **socially valued landscapes**
- Negatively related to **agriculture intensity** and **livestock density**



Sustainable land management depend:

- Highly on **water regulation**
- Positively related to **soil carbon** and **recreation**
- Negatively related to **agriculture intensity** and **livestock density**
- Moderately related to **fibre**





Recreation Facilities



Local food production



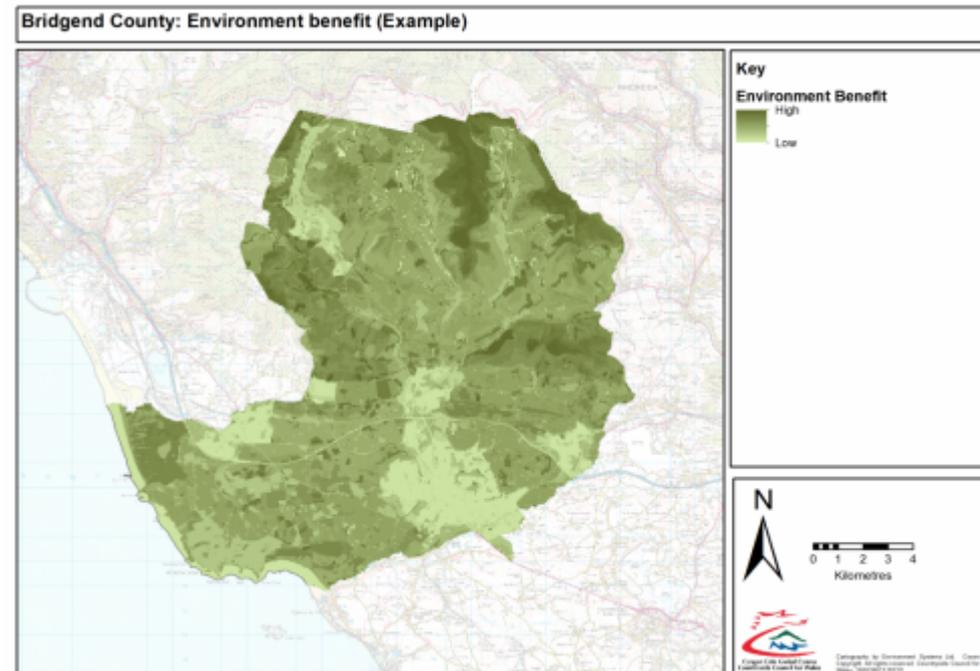
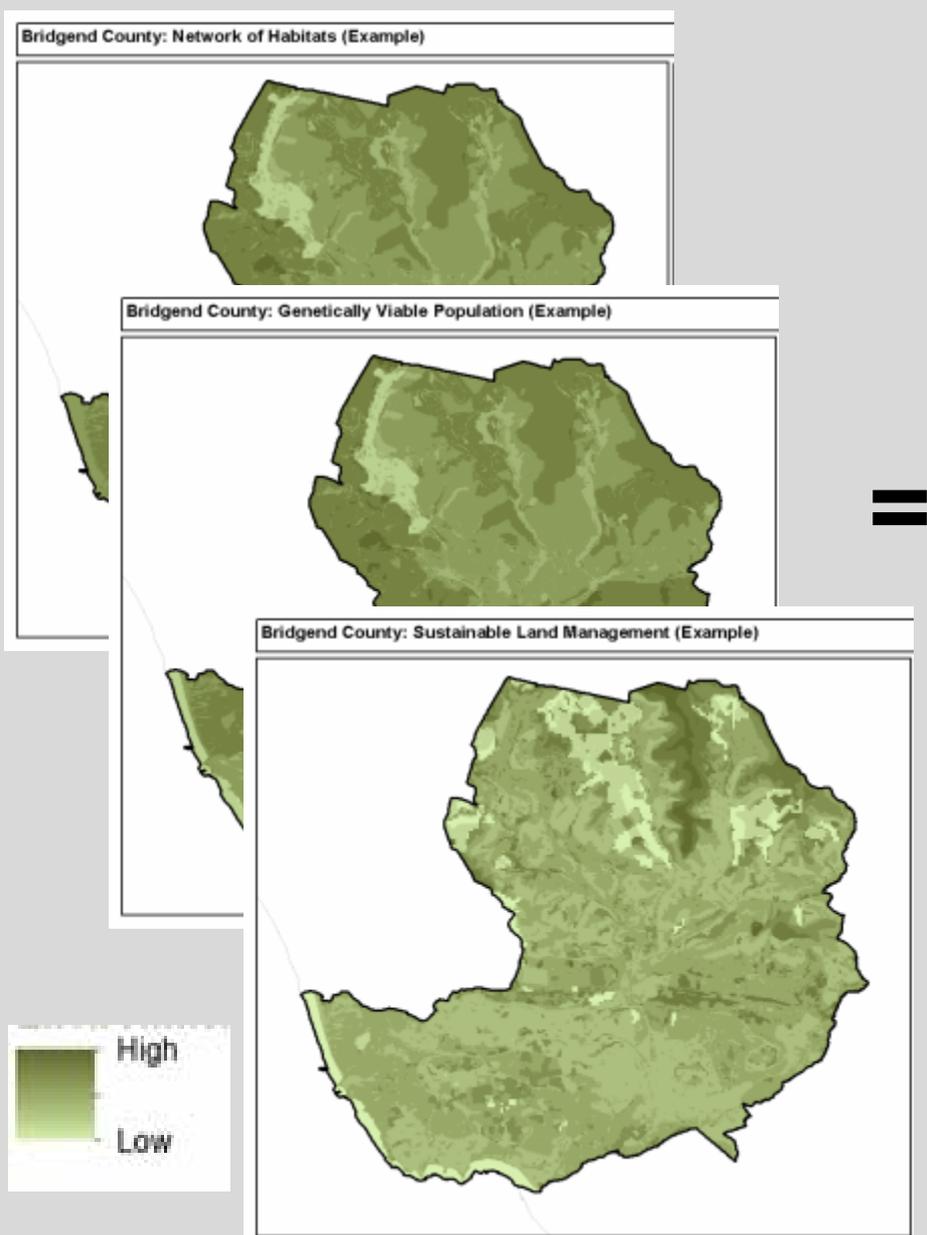
Local Pollinator resources



Biodiversity resource and water regulation



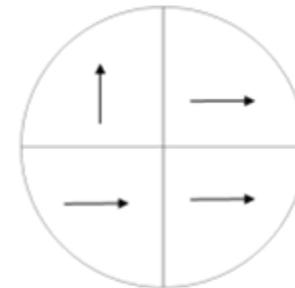
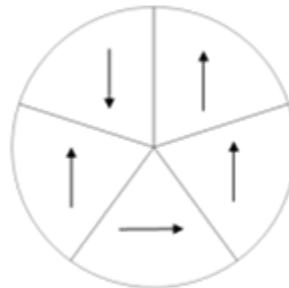
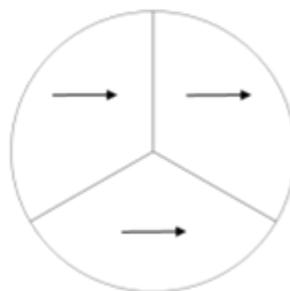
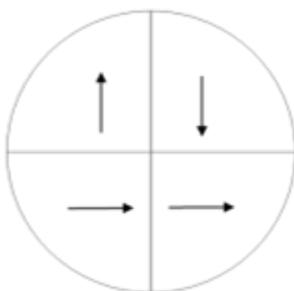
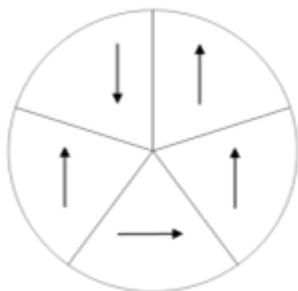
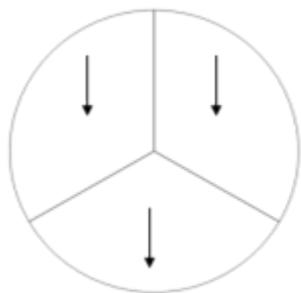
© US Forest Service
Carbon storage and water regulation



Where would be the best place to develop further industrial capacity?

1. Development to optimise economic benefit only

2. Development to optimise all benefits



Environmental Benefit

Economic Benefit

Well-being Benefit

Environmental Benefit

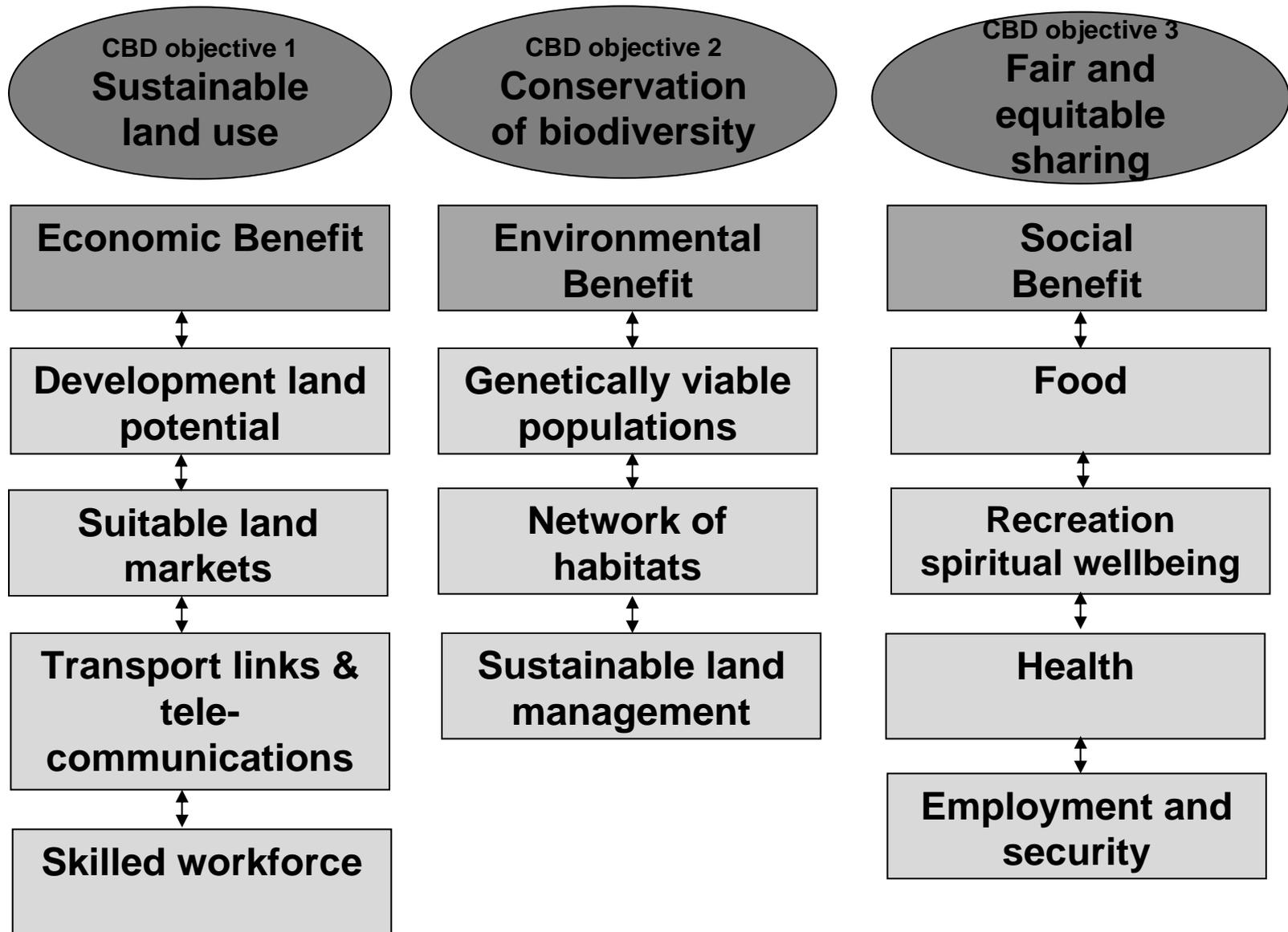
Economic Benefit

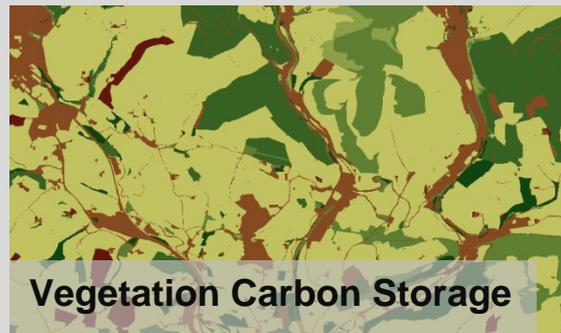
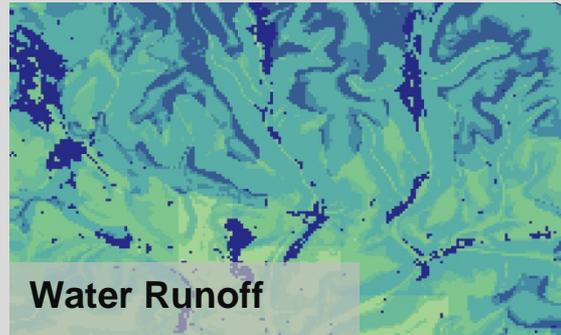
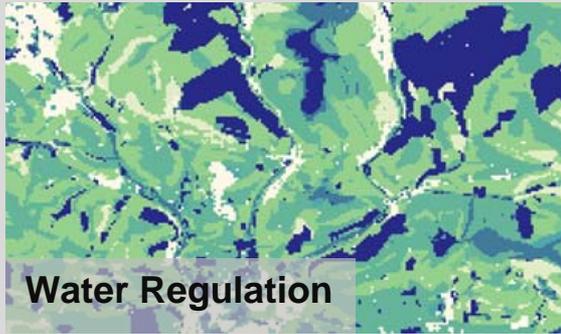
Well-being Benefit

**Economic
revitalisation**

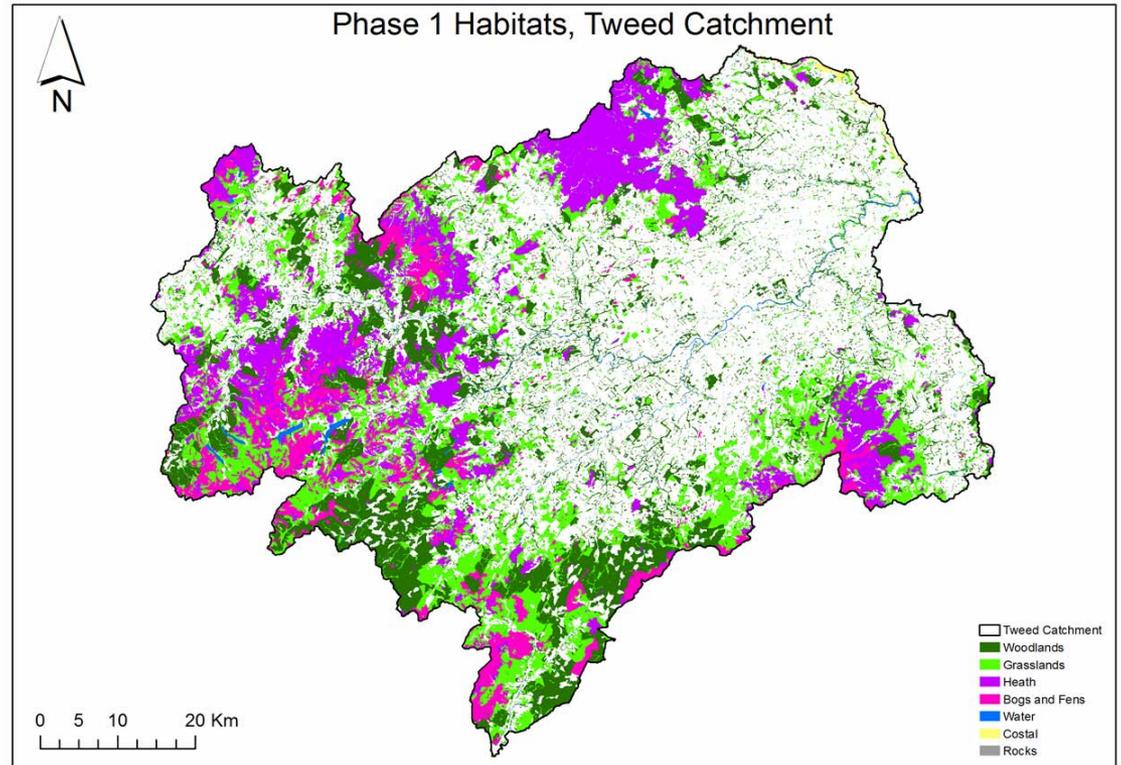
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**Smart
sustainable
economic growth**

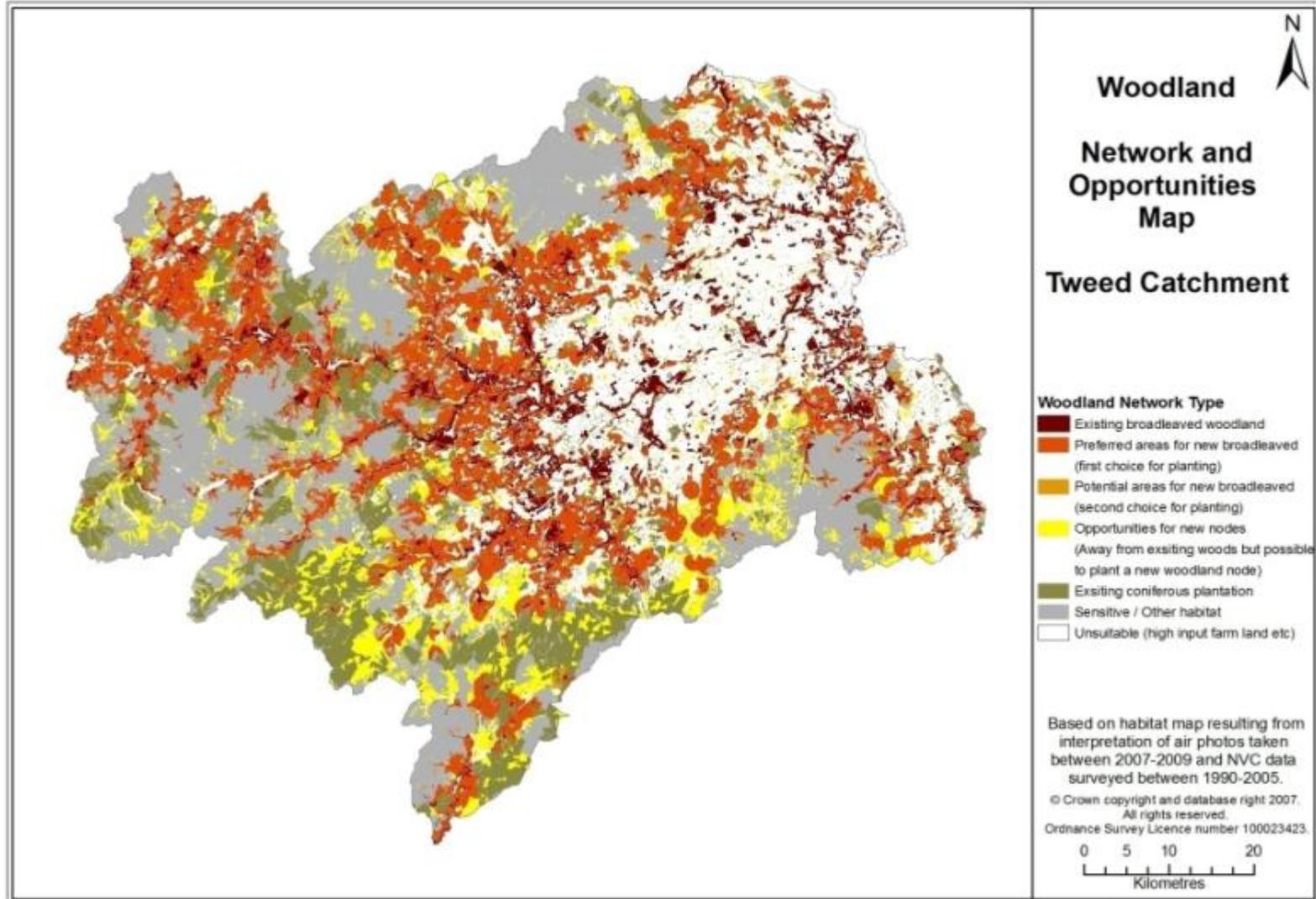


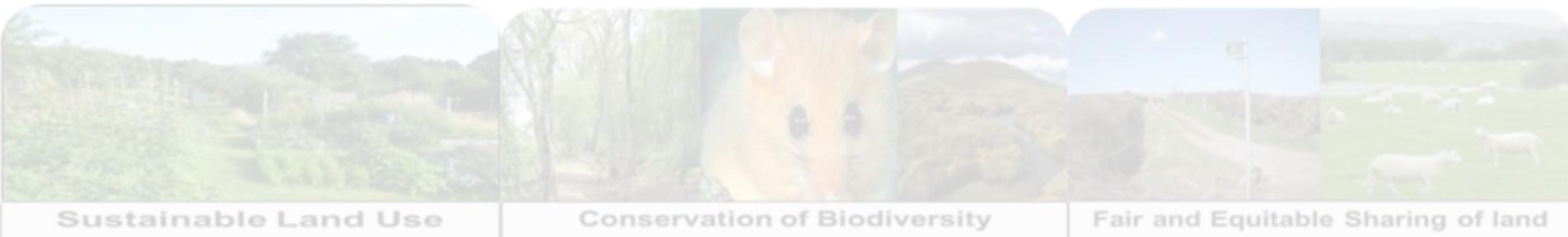


Identify Ecosystem Services



Use of Habitat Inventories and data modelling





Use existing knowledge to understand human-ecosystem interactions

Add new knowledge

Use the ecosystem approach to help us work together more effectively



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Thank you for listening



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