

Landscape as an integrating framework for rural policy and planning¹

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Introduction

This review paper is written in the context of the *Rural Land Use and Economy* (RELU) initiative. It has the purpose of setting out the ways in which a landscape perspective may help in the framing of knowledge and delivery of policy relative to the rural economy and land use. It assumes that research and policy for landscape as a 'sectoral' interest are important *per se*; more particularly, though, it also assumes that many individual RELU projects and the programme overall can contribute to and benefit from the integrative potential of a 'systems' view of landscape. Given the RELU context, it should be noted that the emphasis in this paper is principally on European rural, cultural landscapes.

Even in its most limited sense of 'scenery', landscape is an important issue for RELU, in view of its 'consumption' values and threats to its quantity and quality. However, we assume that its greater relevance to RELU lies in its usefulness as a dynamic and holistic framework for integrating rural sub-systems through the medium of place or network (real or imaginary). Thus, broadly speaking, this paper addresses two main perspectives:

- Ϋ landscape as a <u>sector</u>, for which future research needs to relate to protection, management and planning strategies (*qua* European Landscape Convention);
- Y landscape as a multifunctional, dynamic <u>system</u> a hybrid entity that derives its character and integrity from an intimate attunement, interdependence and complementarity between the forms, functions and values of its constituent elements.

This distinction is similarly expressed as action **for** landscape and action **through** landscape (Selman, 2005). The paper concludes with a more speculative exploration of the potential for landscapes to be understood and stewarded as complex socioecological systems (SES) within which rural sustainable development can be pursued.

Action <u>for</u> landscapes has traditionally found expression as a sectoral, protectionist approach, often associated with 'ring-fencing' policies and often consumed passively but defensively by outsiders or recent incomers. Action <u>through</u> landscapes acknowledges the multifunctionality, multisemity and multivocality of place and space (Pinto-Correla and Vos, 2004; Terkenli, 2001) and finds in these a basis for integrated, sustainable science and governance. The most extreme expression of this is bioregionalism (Brunckhorst, 2000; Low Choy, 2002) though this is a highly disputed and not necessarily preferred end-point (Figure 1). This conceptual diversity has generated numerous definitional problems about the nature and purpose of landscape studies – a variability which some see as a weakness leading to problems of comprehension and communication, and others see as a strength reflecting a powerful potential for interdisciplinarity.

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Figure 1 Action <u>for</u> landscape and action <u>through</u> landscape: a spectrum of landscapecentred governance, stewardship and research

Whilst this review tends to focus around the middle of the spectrum in Figure 1, it does not presume a naïve acceptance of landscapes as instantly recognisable, discrete, bounded systems. It accepts that whilst some landscapes have a strong character and sense of local identity, and a relatively high degree of environmental self-containment, most do not. Equally, it recognises that global forces of change are often aspatial and nonlinear, and that 'place'-based approaches are open to challenge. Nevertheless, it proposes a view that: (a) the landscape concept affords unique opportunities for data capture, systems modelling, interdisciplinary research, development and delivery of integrated rural policy, sustainable development, healthy lifestyles and social learning; and (b) a 'place' (and network) based approach offers an effective option for integrated enquiry and planning, not least because even allegedly 'delocalised' citizens continue to show strong attachment to locales in various important ways. Further, it considers that the operationalisation and pursuit of a dynamic rural economy and land use can be informed by principles of landscape sustainability, such as:

- efficiency that still allows for new growth, conservation of resources, and the restoration of human health and environmental quality (Hill, 2000);
- a combination of visual identity, environmental integrity, vibrant socio-economy and legible time-depth (Selman, 2005);

• resilient behaviour by a complex socioecological system (Holling and Gunderson, 2002). This account starts with an overview of some key recurrent themes, before moving on to specific ideas about the integrative potential of landscape and its usefulness to the RELU programme.

Some Recurrent Themes

Before considering particular ways in which a landscape-centred approach can inform and be informed by RELU, it is helpful to take stock of some key ideas that recur in the contemporary landscape literature. This section, therefore, reviews the following issues:

- Ϋ́ drivers of landscape change
- Ϋ́ landscape multifunctionality
- Ÿ landscape scale, both in terms of 'units' and 'networks'
- Ÿ qualities of hybridity, particularly regarding the scientific and humanistic modes of enquiry that relate to complementary landscape properties, and

Υ the combination of stocks and flows of different types of capital that constitute the cultural landscape.

Self-evidently, the contemporary cultural landscape is subject to endemic change, even in areas that are classed as 'protected'. Many writers have drawn attention to the <u>drivers of landscape</u> change (Figure 2). Piorr (2003) for example, has alluded to three principal polarities within western Europe, namely:

- Expansion-withdrawal where the area of land devoted to agriculture increases or decreases according to economic exigencies;
- Intensification-extensification where land is associated with high-input or low-input practices; and
- Concentration-marginalisation notably associated with levels of enterprise specialisation, such as conversion to arable.

The processes are linked, so that intensification and concentration in some areas may drive marginalisation and withdrawal in others. Whilst traditional practices can be prolonged through subsidies in selected localities, this is not a practical universal solution in the long-term.



Figure 2. A model for reporting landscape change (Source: Based on Gobster and Rickenbach, 2004; Wascher, 2004);

One core dilemma for the rural cultural landscapes of Western Europe is that the agri- and silvicultural activities that once drove them are increasingly obsolescent. This loss of economic *raison d'être*, combined with new global economic and cultural drivers, leads to an erosion of valued landscapes and the traditional community structures and local knowledges that have sustained them. Thus, features that confer character and distinctiveness are widely being eroded and homogenised through processes of globalisation and detraditionalisation – for which the French term *banalisation* has aptly been used. Further, these trends are not due only to inexorable economic and technological innovations – they are also at least partly attributable to public policies. In particular, scientific and policy emphasis for most of the 20th century was widely associated with monoculture, monofunctionality and monodisciplinarity, as much in the conservation as in the production sectors. It has been suggested, mainly by continental European writers (e.g. Antrop, 2004; Jongman, 2002) that planning has compounded the process of polarisation, by encouraging a segregation of land uses and separate legislatures for built development and natural resources. Many benefits have arisen from this functional principle, but greater emphasis is now being placed on a multifunctional approach to the retention and reinvention of landscapes.

This leads into a second key theme, that of the essential <u>multifunctionality</u> of landscape. Indeed, a great deal of the attraction of using landscape as an integrative framework for research and policy development is its innately multifunctional and interdisciplinary nature, demanding a collaborative style of enquiry, management and governance. Terkenli (2001) notes that the landscape must be understood in terms of three interlocking facets – form (the visual), meaning (the cognitive) and function (biophysical processes and human uses). Piorr (2003) amplifies on this by suggesting the need to consider:

- structures or landscape form, such as natural physical, environmental land use and human-made features, often recognisable visually;
- *functions* associated with biophysical processes and human uses, such as environmental services and spaces for living, working and recreation; and
- values or meanings, including cognitive qualities such as the intangible and fluid values imputed by society to desirable landscape attributes, and real monetary values such as the costs of maintaining traditional agriculture.

Haines-Young and Potschin (2000) have interpreted multifunctionality in terms of the three attributes of 'simultaneity' (different material processes in nature and society taking place simultaneously), 'co-existence' (embracing different spheres such as ecology, economics, culture, history and aesthetics) and 'inter-activity' (i.e. simultaneity, combined with an understanding of the interactions between environmental and socio-economic systems).

Landscape multifunctionality stands in sharp contrast to the dominantly 'single objective' planning of the past (Antrop, 2000b; Pinto-Correla and Vos, 2004; Wascher, 2004). During the 20th century, landscape functions – for instance, of nature conservation, natural resource management and leisure (Vos and Klijn, 2000) – have tended to become segregated in most European landscapes, as a result of specialisation and intensification of production. Jongman, (2002) considers this functional separation of land to be an underlying contributor to many environmental problems, whilst Vos and Klijn (2000) note that multifunctionality at all levels – field, farm and landscape – was typical of traditional land use systems that combined arable, woodland and pastoral components in varying ways.

A third theme is that of <u>scale</u>, which is a defining feature of the landscape perspective (Figure 3). Landscape ecological studies in particular have emphasised 'scale' as their 'unique selling proposition'. In the first instance, scale is seen as a spatial property: perhaps the most intuitively compelling aspect of the landscape perspective is its capacity to treat extensive, recognisable and identifiable areas as multifunctional entities for holistic enquiry and integrated rural development. However, recently Selman (2005) has suggested that landscape scale may usefully be understood in terms of:

- Ϋ́ a spatial axis
- Ϋ́ a temporal axis, and
- Y a modification axis (drawing on Antrop's (2004) 'modification gradient' urban centre, urban fringe, rural-of-urban-network and deep rural – and also reflecting the East European landscape ecological concept of 'hemerobia', the degree to which land has been modified, fragmented and damaged).

This provides an effective framework for locating particular landscapes in terms of their unity, trajectory and condition. A similar framework has also recently been proposed by Burgi et al. (2004) who identify spatial, temporal and organisational scales, the last of these reflecting

possibilities for 'subsidiarity' of governance. Fairclough (2005) writing from a landscape archaeology perspective, identifies landscape scales of 'space', 'time' and 'perception', arguing that these raise policy and research issues of selectivity, detail/generalisation, subjectivity and interpretation, and applications and management.



The idea of a 'scaled' landscape tends to suggest nested spatial units, which can often be assimilated through a single 'gaze' (whether from a physical vantage point, or using a visual intermediary such as a map or satellite image). We must recognise, however, that the 'container' notion of a landscape unit promotes a physically constrained view, and that landscapes can also be dispersed entities (Caletrio-Gacera, 2005). Further, both of these phenomena can be either 'real' or 'imaginary'. Summarising Terkenli (2001), we may argue that landscape incorporates three types of flow, two of which relate mainly to the physical environment (energy and material flows), and a third which affects people's perceptions, usage and values (information flows). 'Real' container landscapes include physical domains such as national parks and Areas of Outstanding Natural Beauty (which can actually be farmed, visited, inhabited etc.), whilst 'imaginary' ones are mediated through conduits such as myth, literature and tourism promotion. Real dispersed landscapes include reticulated, network structures such as bocage systems, greenways and green infrastructures, whilst 'imaginary' dispersed landscapes are those networked and marketed universally to be reproduced in the imagination of multiple audiences.

Dispersed physical landscapes operate at various scales; at the most strategic level, they cross national boundaries and aim to connect key sites as a 'string of emeralds'. A notable example is the system of Special Areas of Conservation (SAC) designated under the 'Habitats' Directive which, although quite traditional in terms of its emphasis on site-based designation and regulation, has a more innovative ambition to create a transnational network of designated areas, *Natura 2000.* One problem with the 'Habitats Directive', however, is its continuing reliance on a 'ring fence' approach, which is now widely viewed as being 'necessary but not sufficient'. Consequently, other more spatial approaches are also being pursued, such as the Council of Europe's Pan-European Biological and Landscape Diversity Strategy (PEBLDS), which in broad terms aims to mainstream landscape into policy and planning, and to support the establishment of a Pan-European Ecological Network (EECONET).

At a more local level, the network comprising the dry and wet boundaries of agricultural landscapes is of pre-eminent importance. Perhaps the most significant cultural landscape of this type is the European *Bocage*, comprising a mixture of isolated trees, hedgerow trees, hedges, shelter belts, wooded zones and associated ditches (Soltner, 1985). Such areas are highly prone to changes arising both from human pressures such as land consolidation (*remembrement*) and road widening, and from natural change such as ageing of trees. Particularly in the USA, greenways represent an important type of dispersed, multifunctional linear landscape (e.g. (Fabos, 2004; Gobster and Westphal, 2004). Increasingly, they are expected to deliver multiple benefits rather than being restricted mainly to transportation and conservation. One of the problems associated with greenways is that they normally have to be retrofitted into existing land uses, but the presence of an institutionally 'thick' policy framework seems to assist successful implementation (Erickson, 2004). A similar *green infrastructure* is now being advocated as part of the Sustainable Communities programme (ODPM, 2002), with development proposals being linked to 'biodiversity opportunity areas' comprising habitat creation, woodland linkages, wildlife corridors and sub-urban wildscapes (English Nature, 2004).

These complex expressions of landscape affirm that, quintessentially, it is a scientific-humanistic <u>hybrid entity</u>. From the scientific perspective, key attributes may be identified as:

- Ϋ́ ecology connectivity, resilience, robustness, etc.
- Ÿ soil status and trends in terms of erosion, fertility and wetness
- Ϋ́ geology and geomorphology influence of solid and drift geology on landform and land use
- Y atmosphere and climate current conditions and trends towards increased drought, hazard etc
- Ϋ hydrology changing hydrological regimes within water catchments, including underground 'stygoscape' and trends in quality and quantity within river basins
- Ϋ́ marine science the physiography and ecology of the coast and intertidal zone, and its contribution to seascapes.

Elements in the cultural geography of landscape include:

- Υ identity with the 'associative' landscape, relating to memoricity, historicity and experience
- Ϋ́ 'power' in the landscape, as expressed through the symbols of political and economic imperialism and control
- Ϋ́ character and distinctiveness as the products of natural, human-made and associative qualities that make areas recognisably different and which contribute to 'placeness'
- Y aesthetics, tranquillity and enchantment, often as intangible, sensory qualities deriving from fluid ideas about beauty, peace and spirituality
- Y time-depth, deriving from inscriptions on the surface patina and hidden layers of the terrestrial palimpsest.

Some writers suggest that the two strands – physical change and human meaning – can be brought together through the medium of interpretive 'stories' about a landscape (e.g. Lapka and Cudlinova, 2003). Whilst a recognition of these various qualities can be used as a basis for classification, description and analysis, it is also often used to impute 'value' to particular landscape units. We may summarise these terms respectively as the layered and legible inscriptions in the landscape, the many 'voices' or shared histories and narratives associated with a particular landscape setting, and the many meanings and 'signals' that can be perceived in a landscape by sensitised viewers. Critical to the recognisability of landscapes, therefore, is their degree of *legibility*, or the potential for us to 'read' their embedded stories.

Landscape can also be understood as a collective expression of underlying <u>capital stocks and</u> <u>flows</u> (e.g. Pearce, 1993; Countryside Agency website²). Indeed, if the landscape is sustainable, then system feedback should be occurring in such a way that these capitals persist or accumulate. It is suggested here that a cultural landscape can be thought of as comprising:

- the natural capital its geomorphology, hydrology, soils and ecology, which provide irreplaceable service functions and are, effectively, life-support systems. Wise use of natural capital entails a knowledge of its functions (particularly in terms of sustainability/renewability) and form (land use/cover, physical structural units), and seeks the safeguard of distinctive scenery and indigenous wildlife, and the integrity and regenerative capacity of natural systems and service functions.
- the social capital which refers to the people living in and using the landscape, and the links and dependencies between them, as well as higher level capital such as the institutional structure. Typically, the social capital comprises the general public (both residents and visitors), particular stakeholder groups representing various production and consumption interests, the constellation of interests that constitute governance structures (including private and voluntary organisations that are drawn into partnerships), and the formal and informal network relations within and between these.
- the economic capital both locally-based production and wider trading and investment linkages. Within sustainable landscapes, it is likely that the local economy will display a high degree of embedding, that is, there will be endogenous economic vitality with many horizontal linkages, leading to retention of added value in goods and services that may well display 'distinctiveness' and 'traceability'; production and trading practices may also be described as 'just/fair'. Historically, agriculture has constituted the dominant economic capital of cultural landscapes, but this situation is changing markedly as rural and urban economies become more similar.
- the cultural capital the living legacy of shared histories and human-made artefacts. Sometimes this in only apparent through historical and archaeological traces, but normally it will be continued and reflected in wider practices, and in shared stories and associative properties.

In understanding the dynamics of landscapes it is important not to confuse 'social' and 'cultural' capitals – terms which are frequently used in a closely related and almost interchangeable way. Whilst one might dispute the choice of labels used in this paper, we use the former to refer to human resources and their associated relations and institutions, and the latter to reflect human-

² <u>http://www.countryside.gov.uk/LivingLandscapes/qualityoflife/index.asp</u>

made structures and inscriptions on the land which, along with natural capital, constitute the physical and associative system.

Sectoral and Systems Perspectives on Landscape

A number of trends indicate the importance of research into, and policy for, landscape as a topic in its own right. Whilst sectoral planning approaches have hitherto sometimes equated landscape with 'scenery' or 'prettiness', increasingly they are based on a deeper analysis of its multilayered and multifunctional properties (e.g. Scazzosi, 2005). The boundaries between governance 'for' and 'through' landscape are thus becoming blurred, though the latter tends to treat landscape as a more integrative, overarching and dynamic entity, encompassing elements such as biodiversity, settlement, land-based production rather than sitting alongside these as an additional policy layer.

Actions <u>for</u> landscape have recently been reflected in a comprehensive manner by the European Landscape Convention (ELC), which sets out a basis for landscape 'protection, management and planning' of the 'entire territory' of signatory countries. The Convention came into effect in 2004 following ratification by ten Council of Europe member states, and the number of signatories continues to increase. In the ELC's terms, *landscape protection* includes actions to conserve and maintain the significant or characteristic features of a landscape. *Landscape management* refers to actions, set within a sustainable development perspective, that ensure the regular upkeep of a landscape, so as to guide and harmonise changes arising from social, economic and environmental processes. *Landscape planning and landscape design/ architecture* involves strong forward-looking action to enhance, restore or create landscapes. Landscape planning is defined as the formal process of study, design and construction by which new landscapes are created to meet people's aspirations. It applies in particular to areas most affected by change (for example suburbs, peri-urban and industrial areas, coastal areas), and a key purpose is to radically reshape damaged landscapes.

Policies for landscape in the UK have matured over time, but still tend to suffer from inconsistency, an emphasis on 'landscaping', and a lack of clear central government guidance, in contrast to systematic approaches in certain other countries (Punter and Carmona, 1997). Protectionist planning, reinforced by active countryside management, is well established in national parks, and active management for AONBs has more recently been reinforced through the CROW Act. The most significant advances in landscape policy are currently occurring through characterisation approaches (Swanwick, 2002) which are starting to be linked into criterion based spatial planning policies, in addition to a range of other activities such as capacity studies and environmental impact assessment. In this way, a 'toolkit' for landscape planning is accruing (Bishop and Phillips, 2004). It is widely asserted that countryside character is declining, and changes have started to be monitored on the basis of 'joint character zones' (Haines-Young et al., 2004). A key principle of character-based landscape studies is that they refer to the whole countryside³, and thus policy increasingly extends to areas in need of reinforcement, restoration and re-creation, and not only those meriting conservation.

The limitations of a sectoral approach are that landscape tends to be viewed somewhat onedimensionally, as a 'wallpaper' commodity or a platform for monofunctional production/ consumption. However, this is starting to evolve into a more sophisticated perspective, with cultural landscapes seen as 'synoptic' spaces in which human and non-human elements are fused in a physical and social entity laden with individual and collective associations. In this regard, Phillips (2002) has referred to the cultural landscape as comprising:

- nature plus people
- the past plus the present, and

³ The 'entire territory' in European Landscape Convention parlance

 physical attributes (scenery, nature, historic heritage) plus associative (social and cultural) values.

In relation to safeguard of the finest countryside, Beresford and Phillips (2000) have identified a 'new paradigm' for protected areas, in which they are integrated into the wider territory and managed with multifunctional objectives (Table 1). This echoes the MacEwen and MacEwen (1987) view of such areas as 'greenprints' – sustainability exemplars – whose lessons could be transmitted to the wider rural economy and land use.

Table 1. A new paradigm for protected areas (after Beresford and Phillips, 2000)

As it was: protected areas were	As is it becoming: protected areas are		
Planned and managed against people	un with, for, and in some cases by local people		
Run by central government	Run by many partners		
Set aside for conservation	Run also with social and economic objectives		
Managed without regard to local community	Managed to help meet needs of local people		
Developed separately systems	Planned as part of national, regional and international		
Managed as 'islands' buffered and linked by green corridors)	Developed as 'networks' (strictly protected areas,		
Established mainly for scenic protection reasons	Often set up for scientific, economic and cultural		
Managed mainly for visitors and tourists	Managed with local people more in mind		
Managed reactively within short time scale	Managed adaptively with long-term perspective		
About protection	Also about restoration and rehabilitation		
Viewed primarily as a national asset	Viewed also as a community asset		
Viewed exclusively as a national concern	Viewed also as an international concern		

Similarly, in relation to ordinary and degraded landscapes, sectoral policies are becoming more integrated in nature. Antrop (2000a, 2000b, 2004) has taken a dynamic view of the nature and potentials of urbanic zones – in each of his four landscape domains, driving forces of accessibility, urbanization and globalisation act in different ways, and different opportunities present themselves for landscape redemption. Gallent et al (2004) emphasise multifunctionality and dynamism as principles for urban fringe policy, arguing that this zone possesses special characteristics, making it more than simply a transitional landscape. They argue that the uniqueness, diversity and particular dynamics of the urban fringe merit a distinctive approach to spatial planning and multi-agency, participatory management based on a principle of multifunctionality (Brandt and Vejre, 2003). More generally, the Groundwork Trust and Countryside Agency (2004) have instigated a policy debate about delivering an urban fringe renaissance in the context of new housing needs and rural diversification.

Perhaps the most radical policies 'for' landscape are those which entail creation of lost landscapes and their associated biodiversity. These include ambitious, dynamic approaches to 're-wilding', not only as a means of regaining what has been lost but also of responding to environmental (notably climate and sea level) change. Such approaches raise profoundly interdisciplinary challenges, and also illustrate complex systems principles (discussed later). They require anticipation of how 'nature' might respond to intervention: a degree of unpredictability must be accepted here, both because of inherent uncertainties associated with environmental responses to anthropogenic and natural processes, and also because we are increasingly aware of the ethical problems of controlling nature through an excessively positivistic style of conservation science. Consequently, we accept that there will be a 'future natural' which can to

some extent be predicted and directed, but which will differ from 'past natural' and 'present natural' states to which planners often aspire (Adams, 2003). An illustration of this opportunity is provided by the Royal Society for the Protection of Birds' proposed 'futurescapes' (RSPB, 2001), advocating the creation of large areas of heathland, downland, fresh water wetlands, heather moorland, woodlands and coastal wetlands.

A helpful way of understanding alternative strategies 'for' landscapes is the analytical grid proposed by Warnock and Brown, which identifies four fundamental options for governance, depending on the present condition of the landscape and the intensity of 'drivers' affecting it. A modified version of their framework is shown in Figure 4. A pre-eminent observation from this diagram is that cultural landscapes cannot be treated as something static or fossilised – they are essentially dynamic and this must be a basic principle of analysis or intervention, even where the over-riding policy objective is conservation. Cultural landscapes are thus as much about 'futuricity' as 'historicity'. Whilst the alternative strategic options in the Warnock/Brown model are not fixed end-points, we consider that they may represent distinctive positions associated with 'virtuosity' and systems 'attraction', and this possibility is amplified later.



Figure 4 Relating landscape strategy to landscape status and trends (Adapted from: Warnock and Brown, 1998; Wood and Handley, 2001)

Planning 'though' landscape involves a more fundamental appreciation of landscapes as <u>systems</u>. Many writers on environmental systems have argued that, undisturbed, these achieve dynamic equilibrium or homeostasis, at least when viewed over certain time frames. Such a circumstance is not equivalent to 'unchanging'; rather, it implies an intact state in which natural flows of energy reproduce persistent physical and biotic conditions through universal processes. Whilst this perspective remains useful in certain practical perspectives, a more 'chaotic' view of landscape evolution is now commonly accepted. Naveh (2000), for example, promotes a non-equilibrium view of biosphere landscapes, based on Prigogine's theories of dissipative structures (e.g. Prigogine and Stengers, 1984). Given that this 'dynamic-but-persistent' state reflects the

natural renewal and self-maintenance of essential 'life-support systems', it is also often considered to be an allegory for sustainable development.

The position of a landscape on the modification gradient can be indicative of its sustainability, or the degree of remediation involved in re-establishing sustainable conditions. As just noted, Naveh (2000) draws upon the 'self-organising' models associated with physico-chemical theories of dissipative structures, and biological models of catalytic networks of 'self creating' living systems. He argues that these models have far-reaching implications for natural and semi-natural landscapes (*biosphere* landscapes in Naveh's terminology), which can be viewed as adaptive self-organising systems, internally regulated by natural information and having the capacity to maintain their organisation and structural integrity. This process of continuous self-renewal is termed *autopoiesis*. Applying these principles to other, more modified, landscapes Naveh (2000) identifies:

Traditional agro-ecotopes which, although regulated and controlled by human cultural information, have still retained a great amount of their self-organising capacities and thus continue to behave as *regenerative systems* (Lyle, 1994)

Urban-industrial techno-ecotopes, comprising human-made, artificial systems, driven by fossil and nuclear energy and their technological conversion into low-grade energy. Lacking multifunctionality and self-organising and regenerative capacities, they produce high outputs of entropy, waste and pollution.

High-input agro-industrial ecotopes which, whilst still depending on photosynthetic energy, come close to 'throughput systems' and require high ecological and economic subsidies. Bioregionalists have sometimes alluded to the purpose of planning as being that of promoting landscape conditions which are inherently autopoietic or regenerative.

More generally, we propose that 'landscape' closely mirrors the complex notion of a socioecological system (SES)⁴. Murray et al. (1999) have noted that SESs have four key characteristics which account for their complexity, namely:

- Y they comprise many interrelated human and biophysical variables acting at different levels and rates, with interactions most often described by elusive and unpredictable nonlinear feedback loops;
- Ϋ́ they are dynamic and self-organising, their states changing in sudden and unexpected ways;
- V one's perspective, whether as scientist, lay stakeholder or bureaucrat, determines the 'part' of reality deemed worthy of attention, so that selection of relevant variables is strongly influenced by values and worldview (further undermining the possibilities of quantification);
- Y the social and institutional dimension, which is pivotal in ensuring long-lasting, selfsustaining change, is difficult to incorporate into models.

Since landscapes may be seen as SESs they are widely assumed to be susceptible to modelling. Later, we illustrate this by reference to systems models which illustrate 'virtuous' links between landscape and socioeconomy, and notions of sustainability related to ecosystem resilience.

Landscape Units as a Framework for Governance

A widely advocated approach to landscape-scale planning is to steward resources on the basis of biogeographic units: that is, segments of the earth's surface defined, not on the basis of traditional political and administrative boundaries, but according to intrinsic environmental properties. Very often, these units will also be associated with social traditions such as building

⁴ In the ecological systems literature, 'socio' and 'ecology' appear to be used as metaphors for (a) all that is 'human' in landscape (economy, community, etc.) and (b) the various components and circuitry that form the human 'life support system'. In a similar vein, Selman (2005) has referred to 'cultural legibility' and 'ecological integrity' as being touchstones of a sustainable landscape.

styles, farming practices and food products, and may well be recognisable through literary and touristic images. There are three main reasons for the popularity of biogeographic units in landscape-scale planning. First, natural systems, such as water catchments, often form logical units for many resource management decisions, and focusing on an integrative unit may help reduce fragmentation of environmental processes and of policy delivery. Second, neither wildlife species nor geo-hydrological systems recognise administrative boundaries, and their natural geographical range and extent must be respected in rural (and urban) governance, or even serve as its framework. Finally, people develop particular attachments to landscapes on the basis of both physical and cultural factors, and so may possibly identify with distinctive biogeographic spaces more than with, say, local government districts. Collectively, these factors mean that place-based approaches can be particularly effective means of framing research or delivering policy, especially where stakeholder participation is required.

Approaches based on these principles are often referred to as 'bioregional', and their underlying philosophies range from scientific arguments regarding energy and material fluxes, to psychological and religious grounds associated with attunement and responsibility towards nature (McGinnis, 1998; Thayer, 2003). McGinnis (1998) has linked bioregional thinking to the relationships displayed between indigenous cultures and their landscapes: in this perspective, industrialisation and its associated economic, social, institutional and administrative structures are represented as the cause of our psychological and political separation from local/regional landscapes. According to McGinnis (1998) bioregions are based on four key principles, namely:

- interdependence the recognition of a strong connection between natural and social systems;
- autopoiesis a system's self-organising capacity, deriving from the unity and relationship between its component parts;
- adaptability the bioregional boundaries should reflect the self-producing and selfwithdrawing characteristic of living systems; and
- *self-regulation* the system's capacity for self-organisation needs to be enhanced, and matched by the capacity of the social/governance system.

Brunckhorst (2000) has further suggested that a bioregional planning framework might comprise: participatory identification of a number of hierarchical management units and assembly of associated information needs based on multi-attribute biophysical regions and watersheds; an exploration of local people's perception of their place and their relationship with the biophysical attributes: and a participatory reconciliation of the implications of outcomes from these two steps. According to Low Choy (2002) a bioregion thus needs to be of such a scale that it facilitates maintenance of the integrity of a region's biological communities, habitats and ecosystems; supports important ecological processes; meets the habitat requirements of keystone and indicator species; and includes the human communities involved in management, use and understanding of biological resources. Whilst this implies quite a large area, it also needs to be small enough for insiders to consider it 'home'. However, although there may a compelling systems logic to the creation of bioregions, it is clear that, given the alleged prolonged separation between people and place in postindustrial societies, substantial effort must be invested in reconnecting people and their governance institutions with place. As Brunckhorst (2000) has cautioned, bioregional frameworks will only be useful if they have meaning to decision-makers and communities, and are recognised as valid by a range of sectoral interests.

Meadowcroft (2002) has critiqued a strictly bioregional approach to governance units, arguing that the notion of 'scale' is not simply a spatial one: environmental disturbances and policy interventions are social phenomena, so that scale dimensions relate not only to physical processes but also to social structures, practices and understandings. Evidently, two simultaneous processes affect scale within environmental governance: a scale-shift upwards in terms of the way in which we grasp and address complex environmental processes, and in the scale of social reforms envisaged; and a simultaneous downward scaling, reflecting an increasing diversity, specificity and complexity of initiatives at more local levels. Furthermore, the initiatives to address environmental challenges tend to be layered on top of pre-existing structures and processes, rather than serving as replacements for them. Hence, Meadowcroft argues that there

can be no simple re-drawing of bioregional units for environmental governance, but instead advocates two types of 'pluralism':

- a pluralism of institutions where different sorts of structures, with different scale preoccupations, are charged with responsibilities for environmental governance; and
- a pluralism of participating groups because groups experience environmental problems in different ways.

In practice, this closely mirrors the practices that have been emerging with biogeographic units such as River Basin Districts (Barth and Fawell, 2001; White and Howe, 2003), Natural Areas, Character Areas and so forth (Hamilton and Selman, 2005). The property of nesting, previously noted in relation to the general issue of landscape scale, is also important to landscape governance, as it ties in well with the principle of subsidiarity, where responsibility is delegated to the lowest appropriate level. Thus, 'nesting' of spatial units occurs in normal approaches to governance, and policy is developed and delivered at a range of levels, such as supra-nation, nation, sub-nation/ region/ state/ province/ territory, district or county, commune or 'parish', and neighbourhood (Burgi et al., 2004). Thus, landscape-scale action can often be matched to appropriate tiers of governance, even where a strictly bioregional approach is not adopted.

Landscape Units as a Setting for Deliberative Governance and Social Learning

Landscape domains are often places with which people can readily identify, in view of their associative values and lifespaces. Some researchers suggest therefore that they assist processes such as participatory management and social learning. In terms of landscape stewardship per se, a number of benefits may be attributed to varying degrees of stakeholder participation. These include acting in a co-operative and collaborative manner, incorporating a wide corpus of lay and professional knowledge, enhancing capacity for implementation, increasing trust between stakeholders, reducing the deadweight of enforcement, improving understanding and awareness, facilitating policy integration and increasing public commitment (Selman, 2004). Many stakeholders, particularly those who have previously been marginalised in decisions about their locality, may need considerable support in the form of community development if they are to make a positive contribution. Handley (2001) emphasises this point in the context of greening damaged urbanic landscapes, where there can be signal challenges in securing effective design inputs and subsequent management involvement from disadvantaged and sometimes alienated neighbourhoods. Involvement can occur at different levels (Osborne et al., 2002), namely, the strategic level where communities advise on the overall needs and desires of the area, an intermediate level when community project leaders liaise with representatives of strategic-level groups, and a third where residents and voluntary organisations participate directly in the design and implementation of specific projects. Pretty and Smith (2004) found that those forms of participation that were passive or reliant on consultants did not lead to a great amount of satisfaction for local communities. Conversely, more proactive modes of participation throughout the entire length of the project yielded much greater success.

One of the more difficult aspects of involving communities in cultural landscape management is that of helping them to imagine what future vistas might look like, and how their active participation in policy options might affect this appearance. Much effort has latterly been invested in visualising future landscapes (Bishop and Lange, 2005). For example, Dolman et al. (2001) investigated farmers' acceptance of alternative future options, and what these might mean for their management operations. Consideration has been given to the necessary level of 'realism' in landscape portrayals, and the importance of representing certain elements with particular accuracy (Bishop and Rohrmann, 2003). Tress and Tress (2003) used photorealistic visualisations based on aerial and ground photos as a basis of participatory landscape planning, and reported a number of differences in the reactions of experts and non-experts to different scenarios and levels of detail.

MacKinnon (2002) believes that rural areas have a strong tradition of co-operation, self-help and indigenous development. This type of development is where local actors are encouraged to take

responsibility for the design and execution of improvement strategies within their own communities (Murdoch, 2000) in support of priorities identified by local people themselves (MacKinnon, 2002). The idea of community participation is a popular one because it is perceived to make the best use of the cultural bonds between shared commitments, identity and belief. Australian federal policy, for example, considers that rural regions are well equipped to direct their own future plans within an expanding global economy because they are capable of identifying and capitalizing on their competitive advantages through niche marketing driven by traditions and cultural characteristics of individual places (Herbert-Cheshire and Higgins, 2004). By harnessing these traits, benefits may accrue from regulating relationships of competition and co-operation within the community itself (Day, 1998). Murdoch and Abram (1998) note also that communities are now being considered as partners to government, rather than merely the subjects of projects initiated in a top-down manner. Doubtless part of the popularity of partnerships is their tactical role in unlocking grant and regeneration funds (Jones and Little, 2000) but they may also have genuine support based on their apparent capacity to assist social justice (Ranniko, 1999), community spirit, problem-solving and democratic renewal (Williams, 2002), and as a self-help and capacity-building response to local economic necessity (Edwards, 1998).

Going beyond participatory management and planning *pe se*, landscapes more ambitiously offer scope as settings for Social Learning (SL). An important example is provided by the SLIM (Social Learning for the Integrated Management and sustainable use of water at catchment scale) Project⁵, which entailed researchers from several European countries investigating the value and methods of social learning. For example, the Benelux Middle area incorporates several transboundary river systems that affect the Netherlands and Belgium. In this area, water shortages and resultant government measures, such as banning some irrigation practices, proved unpopular with farmers on the river banks (Jiggens, 2004). A SL perspective was taken and different stakeholders such as the farmers, water boards, drinking water agencies and soil conservationists were encouraged to participate in a number of activities ranging from discussions to field demonstrations. This resulted in greater co-operation between the different groups and a more effective transfer of information and opinion.

A Virtuous Circle?

A particular purpose of this RELU Development Activity is to develop an outline conceptual model which might be operationalised as a basis for interdisciplinary research and policy intervention. Following the original proposal, we have framed this around the notion of a 'virtuous circle' (Powell, Selman and Wragg, 2002), in which natural and cultural capitals in a landscape reinforce, and are reinforced by, its social and economic capitals (Figure 5). Subsequent reflection has led us to consider elaborating this simple framework into a more complex model based on the idea of the resilient socioecological system (SES). Essentially, the core problem for cultural landscapes is that the forces that produced them are increasingly obsolescent, and thus a vicious circle of *banalisation* has often set in; we argue that a central purpose of landscape (and, indeed, rural) policy is to flip this into a virtuous circle in which natural and cultural capitals (the foundations of landscape function and character) are reinforced by, and in turn reinforce, economic and social capitals (the products of community vitality and entrepreneurship). The longer term intention of policy is to stimulate conditions in which this mutuality becomes self-sustaining and not reliant on continuous public subsidy.

⁵ <u>http://slim.open.ac.uk/page.cfm?pageid=resout</u>



Figure 5. A simple virtuous circle that incorporates different forms of capital.

The assumption of a virtuous link between socio-economic capital and natural-cultural capital requires a degree of environmental self-containment and a highly identifiable character within a landscape unit possessing strong qualities of 'placeness', land-care, service delivery and production. In highly globalised cultures and economies, we recognise that neither local linkage nor landscape self-containment is realistic as a dominant principle. However, we argue that there may be a minority relationship between people and place, which is in practice sufficient to achieve policy goals relating to countryside character, biodiversity, environmental management, community engagement and identity, and sustainable local economies. Perhaps – for argument's sake – if ten percent of local economic activity and social discourse could be re-embedded, this could generate sufficient care and investment to maintain essential landscape character and associated service functions. The locally embedded virtuous circle is worth pursuing for its economic, social and environmental spin-offs even if it sits within a more open system dominated by vertical and external linkages. The Countryside Agency's *Eat the View* programme⁶, for example, was based on such principles and has achieved some success.

In terms of the literature, the Virtuous Circle model (VC) has mostly been (a) used and cited in relation to development studies, and (b) applied in a generic, even macroeconomic way, rather than related to individual biogeographic units. This type of model shows relationships between different system components, which are all positive in the case of the VC and negative in the Vicious Circle context, and in both cases result from feedbacks and increasing and selfreinforcing momentum. Often, VC researchers do no more than demonstrate a beneficial multiplier effect, without showing spatially explicit links between economic sector and geographical place/landscape. For example, Aoyama (1999) sought a relationship between GNP and improved nutritional status within the Middle East and northern Africa. It was assumed that increased GNP resulted in increased nutrition but the evidence did not always support this view point - in some countries, the number of stunted children actually increased as GNP rose because the rise in wealth was unevenly distributed. Dinda (2004) explored whether economic growth can be actually used as a springboard for pollution and degradation abatement (rather than exacerbation), using the Environmental Kuznet Curve (EKC) model, which can be seen as a variant of the VC. Classically, the EKC is defined as an inverted U shape, where environmental degradation is plotted against income: initially when income is low there is high impatience for

⁶ http://www.countryside.gov.uk/LAR/Landscape/ETV/index.asp

commodity goods and wealth, at the cost of environmental health, but there is an inflexion at which more secure incomes lead people to become less impatient for industrial growth and more concerned about protecting natural capital (Chavas, 2004). However, this model has its critics and it may not be applicable to the virtuous circle argument because of its simplifications and the many assumptions on which it is based.

A further category of study depicting macro-scale links between economy and environment is that related to 'quality of life' (QoL). Throughout history the landscape has been a resource for economic and social expansion, as well as an emotive and experiential setting for life styles (Mahony, 2004). Attempts have been made to quantify what the landscape means in terms of QoL for its residents and there has been research into how these natural resources and systems can be categorised into different types and uses. Chee (2004), for example, lists ways in which humans find ecosystems emotionally valuable, notably the provision of aesthetic beauty, intellectual and spiritual inspiration, scientific discoveries, and serenity. In general, the literature is divided into the consideration of natural capital in monetary terms, the intangible properties of the landscape, and the role of landscape in community development and social cohesion. Additionally, several government led initiatives have assumed that enhancing local landscapes encourages and promotes social activities and increased community capital. Various studies also allude to the popularity of the countryside as a major contributor to the QoL of residents and investors (Chiesura and de Groot, 2003; Kaplan and Austin, 2004) or visitors (Curry and Ravenscroft, 2001). Reasons relate to preference, health, exercise and social opportunities, but positive relationships also emerge regarding associative values. For example, Antrop (2005) suggests that each traditional landscape expresses a unique sense of spirit of place (genius loci) that may contain special places and monuments of symbolic value, acting as landmarks allowing insiders to orientate themselves in both space and time. Work carried out in New Zealand by Swaffield and Foster (2000) found that in certain areas such as the upper Rakaia gorge, communities and sometimes even families had their own specific names for valued parts of the landscape, such as rock outcrops and river channels. Similarly, Oreszczyn and Lane (2000) found particular attachments to hedgerows in the English countryside, as these provided a direct link to the past and represented a quintessential identity.

By contrast, Buchecker et al (2003) found that, whilst most of their respondents in a rural case study area cared about their local landscape, they did not feel responsible for its development and delegated responsibility for upkeep to local authorities, probably due to alienation and individualisation associated with a move from agricultural economy to urbanisation. As a partial response, they proposed a more systematic involvement of residents in local landscape development through participatory measures. More generally (as noted earlier in this section) virtuosity cannot be taken for granted and a vicious spiral can occur. For instance, Martin and Taylor (2000) tested the stability of an immigration, farm employment, poverty and welfare relationship in California. Initially there was evidence that increased farm employment led to better incomes and quality of life for migrants, which in turn attracted more workers to the plantations. However, the system was not stable and the virtuous circle collapsed when labour supply exceeded requirements, and declining incomes resulted in lower tax revenues; reduced public funding of the social welfare system and service quality then began to affect all residents. In a study of a dairy economy in Blackton (near Brisbane, Australia) Herbert-Cheshire and Higgins (2004) described how community involvement failed following closure of a local butter factory (albeit they did identify signal success in Austin). The local farmers formed a group to lobby against unfair trends within the dairy produce market and did receive some assistance towards development and diversification; however, they felt that this was too little too late, and became so reactive, angry and confrontational that government agencies ceased to be supportive and community lobby groups eventually withered. MacKinnon (2002) also described the conflict between the needs and wants of local people and of new incomers who often live in the countryside but work in the city. New residents often seek to preserve tradition and the landscape rather than create new economic opportunities which appeal to those who have lived all their life in rural areas. Further, community meetings and workshops can be dominated by a few confident individuals who may be unrepresentative (Murdoch, 2000; Murdoch and Abram,

1998; Rogers et al., 2002). In a study of the emergent 'National Forest' in the English Midlands, Cloke et al. (1996) found that local people became uneasy that certain sectors of the community would benefit preferentially, such as farmers gaining preferential planning permission as a tradeoff for planting the amount of trees required. In a study in Braxholme (Victoria, Australia), Barlow and Cocklin (2003) found that afforestation and a change in natural landscape led to a change in social relations of production and community power balances: ownership of the trees appeared to the residents as belonging to outsiders and they felt separated from their own landscape. Elands et al. (2004) warn that investment in the landscape should be sympathetic to existing communities otherwise more harm to the community is achieved than good.

Whilst 'virtuous circle' studies have often been rather generalised, there are a few which seek to demonstrate virtuosity more clearly in relation to a particular area. For example, Evans (1992) described a VC model of development within a small Kenyan town. Connections were made between consumer demand, job creation, agricultural income and movements of labour. It was assumed that as wealth increased, demand for products rose, people become employed within the farming network and incomes expanded. The author noted that this type of cycle was positive but it did not operate in isolation, as exogenous agencies such as the coffee board of Kenya, were also important to rural development. Bodini et al. (2000) investigated the stability of the marginal aquatic systems in the Po Valley of Italy, in relation to key variables of economy, local tourism, protection effort and recreation. Many relationships were positive but there were some negative feedbacks, for instance between protectionist measures and local incomes (Figure 6). They were intrigued to find what tipped the balance of the system and how management strategies could be planned efficiently.



Figure 6. Taken from Bodini *et al.* (2000) where E is economy, T is tourism, P is protection of the environment and R is recreation. Arrows are positive relationships and circle tipped lines are negative feedbacks

The spatial specificity of virtuosity may also be related to an area's 'territorial repertoire' (Brunori and Rossi, 2000)⁷ and the ways in which this is connected to underlying 'capitals'. As previously noted, the landscape-unit economy is unlikely to be predominantly localised, but there may be important niche markets that create a sufficient link to help deliver sustainability objectives. A strong sense of community and appreciation of the regional landscape can lead to place specific economic enterprise. This is reflected in 'food patriotism' (Hinricks, 2003), defined as a reverential attitude to local produce derived particularly from traditional processing techniques and recipes. Many references have been made to traditions and products that have encouraged a growth in local economies. These often include terms such as embeddedness, synergy and valorisation, and embody strong connections between place, people and their produce. Clark and Smith-Canhem (1999) describe how well developed communities have networks that are based upon tradition, familiarity and trust. These types of links can be observed in Farmers' Markets where the producer often builds a rapport with the consumer when produce is sold face-to-face. These shortened food chains encourage interaction and help build relations of loyalty that lead to

⁷ i.e. distinctive place-related products and services

embeddedness of produce to a particular person and place (Winter, 2003). Having interviewed residents in Cheshire, Devon, Hampshire, Norfolk and Powys about their shopping habits, Winter (2003) found clear geographical differences, with people in Devon and Norfolk being twice as likely to buy local food. It was felt that this might reflect a stronger regional and local identity that aided the interaction between consumer and producer. Sage's (2003) study of country markets in Ireland also showed how the purchase of local produce could deepen the social embeddedness of exchange. Although the vendors and producers at these markets were viewed as very 'old fashioned', they were enjoying a resurgence of popularity as buyers considered local produce to be fresh, of good quality, and from people who they knew or with whom they could build up trust.

Small and isolated communities have always experienced embeddedness in their economies (Ilbery and Kneafsey, 2000) but now other areas and larger communities are exploring the advantages of traditional and place marketing by reinventing links to quality food production (Murdoch, 2000). Recently, there has been a large increase in Regional Specialty Food (RSF) products, which are labelled as authentic, healthy and traditional (llbery and Kneafsey, 2000). Ventura and Milone (2000) investigated local farm shops in Umbria, central Italy, which have proved popular because of culinary traditions, consumer preferences and trust in local producers. They identified some financial advantages to the farmer as a result of changes in food connectivity, including value added to beef products due to higher price stability in local retail than in national or global wholesale, and a continuous flow of cash as produce is sold on a day to day basis. Other local services, such as abattoirs and transport firms, also benefit, whilst Bessiere (1998) suggests that food may be used as an 'emblem' to create a wider springboard for local development. Even in areas that do not already have food associated with their image of place, RSFs are being encouraged because they are seen as a way of encouraging local enterprise. Instances include the valorisation of local food in lowa through the successful staging of traditional 'settler' type famhouse meals (Hinricks, 2003), a very diverse food festival in Skibbereen, Cork⁸ which draws heavily upon landscape imagery, the synergistic development of local produce branding and rural tourism through 'gastro-tourism' (Sage, 2003), and the promulgation of 'landscapes of wine' (especially in Italy) which trigger wider benefits of valueadded and institutional thickness at territorial level (Brunori and Rossi, 2000).

In France, the culture and agriculture ministries commissioned a complete inventory of the culinary heritage of the Provinces (Bessiere, 1998) resulting in 100 sites being classified as outstanding for their food (Sites Remarquable du Goût). This highly cultural culinary heritage is central to the rural tourism market and is widely supported and promoted by a large number of communities, to the extent that it is now displaying spontaneous and endogenous growth. A comparable experience was documented in Wales by Murdoch (2000), who found that many small producers, in the wake of the BSE crisis, diversified their activities, often using milk from organic herds to produce regionally distinctive cheeses. Trust relationships between the producer and the consumer were important for sale to local people, and speciality cheeses were sold to local restaurants and hoteliers to sell to appreciative tourists; eventually 'cheese trails' were established, like the wine routes of Italy, as a marketing device for the region. Some authors have drawn attention to the loss of native breeds of livestock, not least in terms of the benefits that these had regarding appearance in the landscape and contribution to conservation management. The SLIM programme reported on moves to reinstate a traditional breed of cow (Maraichine) that can graze on wetlands, whilst Yarwood and Evans (2003) suggest that Welsh Black Cattle are as distinctively important to the landscape of North and West Wales as its topography, architecture and natural history.

A particular instance of virtuosity between place and product, some would claim, is that of organic farming. The biological principles behind organic farming have been in circulation since the 1920s (Lampkin, 1990) but, latterly, social arguments have emphasised how it creates job opportunities,

⁸ <u>http://www.sibbereen.ie/taste-of-west-cork-2.htm</u>

promotes local markets, emancipates women farmers and creates openings for fairer global trading. The 'virtuosity' of organic farming is claimed to include:

- Y benefits to the individual who feel they are eating better quality food when it comes with an organic standard guarantee (on average, it is maintained that organic produce contains more vitamin C and essential nutrients than conventionally produced food, certain food additives are banned, and animals are kept in free range conditions with as natural a diet as possible);
- Y advantages of social cohesion and the preservation of traditions, culture and identity for the community as a whole – Clementsen and van Laar (2000) referred to a farm called Undredal (western Norway) which relied upon organic cheese production, and noted how this stimulated community pride, retention and sharing of traditional knowledge, community-based development of new production techniques, and formation of a cooperative with both economic and social benefits;
- ÿ general benefits of encouraging neighbours to work together to make resource use more efficient (Milestad and Hadatsch, 2003);
- Ÿ attraction of tourists who value areas with strong social cohesion and well stewarded natural capital.

However, Milestad and Hadatsch (2003) also noted farmers' concerns – in the event, largely unfounded – that a shift to organic farming might lead to higher levels of official inspection, and possible loss of subsidies. In the Mediterranean, organic farming is being heralded as a solution to restoring economic enterprise within rural areas (Hermansen, 2003; Stobbleaar et al., 2000). Here, Ronchi and Nardone (2003) discuss how organic farming often incorporates traditional practices and multifunctionality which are complementary to sustainable tourism, and may reduce economic marginality whilst increasing opportunities for traceability and valorisation. Rossi and Nota (2000) also describe how landscape character and aesthetic pleasure can be influenced by land use and organic farming. In a paired comparison of farm types, they found a more pleasing landscape diversity on the organic farm due to the rotation of fodder crops, cereals and vegetables, and inclusion of vineyards, orchards and woodlands. Using a set of evaluative criteria related to environment, ecology, economy, sociology, psychology and cultural geography, they claimed clear benefits from organic farming in terms of landscape, reduced erosion and water pollution, and increased biodiversity.

Inevitably, there are 'non-virtuous' aspects to organic production. For instance, Egoz et al. (2001) found opposing views to organic farms in New Zealand's' South Island in the region of Canterbury. Some people found organic farms to be untidy, weedy environments with little order and efficiency, whereas more conventional farms were seen to have straight and well cut hedges and short grasses that provided a sense of accomplishment and hard work, and were seen as 'cultural signatures' of the pioneer spirit, meriting maintenance and future development. Cobb et al. (1999) also noted some frictions between longer-established farmers and recent incomers, with the latter experiencing some difficulties of integration. Hermansen (2003) and Ronchi and Nardone (2003) further identify some technical difficulties, including reduced nutrition and consequent milk production amongst cows, difficulties of 'desocialised' battery hens in adjusting to new conditions, and higher disease rates among cattle. Hall and Mogyorody (2001) express longer-term concerns. Their study of Ontario organic farms investigated whether traditional practices were being modified and reshaped into a more conventional farming model, swayed by capitalist wages and commodity relations. Whilst the results provided only weak support for the idea that the ideological content of the organic movement was being eroded, there was a sense in which the growing economic attractiveness of organic farming might induce converts who were more interested in profit than natural capital.

Developing a Model

Drawing upon the foregoing discussion, it appears that overall, whilst there may be instances of reversion to 'vicious circles', there appears to be a body of evidence in support of virtuous circles operating within well stewarded landscapes through processes of 'cultural relocalisation' (Ilbery

and Kneafsey, 2000). Thus, embeddedness, synergy and valorisation appear to be keynotes in the mutually reinforcing and self-sustaining processes of landscape virtuosity.

Taking this as our starting point, we have sketched out how it might be formalised within a model. Discussions with systems modellers led to the conclusion that formalisation of the virtuous circle should, in the first instance at least, be based on a qualitative approach, concentrating on the nature and direction of feedback rather than quantification. A fully quantified approach is widely considered to be impractical and misleading, given the complexity of the system, whereas clarity over the general incidence of positive and negative connections is invaluable for research, planning and social learning. Broadly, the essence of a virtuous relationship within cultural landscapes can be illustrated by the use of a qualitative signed graph based on 'loops' creating feedback effects. If virtuous, these contribute to an accumulation and reinforcement of capitals. A positive loop creates a 'landscape premium', that is, producers and service providers find it profitable to do things that reinforce landscape sustainability, whilst the landscape in turn can provide richer rewards through increased character and resilience. Further development of the model would need to draw upon an evidence base that showed how capital accumulation was being achieved.

Thus, we hypothesised a draft 'multiple cause diagram' illustrating how the capitals might be connected virtuously. The four capitals (natural, social, cultural and economic) are portmanteau terms and so we divided these into variables that could potentially be observed or measured⁹. For example, economic capital can be split into variables such as employment and local welfare, which each have aspects that can be quantified and ultimately tested. Figure 7 conceptualises some of these more detailed variables with arrows showing the direction of the relationship between them. We realise that it is idealised to have entirely positive linkages reflecting virtuosity throughout and, indeed, this would reflect (a) an unstable situation insofar as the system overall must be moving from less to more sustainable conditions, and (b) a temporary state in that not all capitals can be enhanced indefinitely (e.g. there is an upper limit to soil fertility). In addition, certain relationships are more important than others at any given time but this is overlooked at this stage in order to maintain clarity and simplicity.

⁹ The contents of the Countryside Agency's *State of the Countryside Reports* and various other sources suggest that sufficient evidence may readily be available



Figure 7. A multiple cause diagram representing a hypothetical European cultural landscape.

The relationships within Figure 7 were further explored using evidence found in case study materials describing existing rural projects. For example, the Howardian Hills is an Area of Outstanding Natural Beauty (AONB) in North Yorkshire. It provides a highly relevant case study because it has attracted investment into protecting the natural capital of the area. Part of a £116,800 investment went to public awareness of products made in the area using a directory called 'Local Produce 2003' (Link **a** in Figure 8). This proved to be an effective promotional document which initiated a demand for local produce and the development of an enterprise called Moorfresh Delicatessen (Link **b**). This mobile shop then expanded and employed more staff (Link **c**) with the view to further expansion and possibly the creation of synergistic effects and the growth of complementary businesses.



Figure 8. Part of the conceptual diagram that describes the establishment of Moorfresh on the Howardian Hills.

The same project can be used to describe how natural capital is accumulated with a landscape. Some of the same funding went towards a training day to encourage use of local Yorkshire seeds and green hay (Link **a** in Figure 9). This was found useful by farmers who wanted to regain a working knowledge of indigenous seed banks and it prompted local residents to think about local resources and the diversity of their area (Link **b**). It was hoped that people would start to utilise local resources and enhance the biodiversity of the area, creating a more harmonious environment in which to live (Link **c**).



Figure 9. Part of the conceptual diagram that describes the establishment of indigenous seeds in the Howardian Hills.

Other relationships within Figure 7 can also be supported with material describing the Forest of Bowland, in Lancashire (Figure 10). The 'Undiscovered Bowland' project aims to provide investment into educating local residents about the AONB in which they live. It is designed to "enable local communities to celebrate, enhance and promote their local heritage." Many

stakeholders are involved, encouraging co-operation in order to market an area for increased recreation and tourism potential. This in turn should encourage the growth of hotels, shops and recreational businesses that will bring greater economic prosperity to the area. There are two positive feedback loops; as co-operation builds there is an increased sense of community and legibility of character; and as numbers of local businesses increase, so greater community co-operation is stimulated. A similar situation, which also fits Figure 10, is revealed in the reports describing the Lancashire woodlands project. The public has been encouraged to consider using local timber products to promote a valorised timber trade. The number of woodland owners, contractors and wood users have consequently increased and co-operate to produce a newsletter and workshops disseminating information about pests, planting techniques and products.





The Bowland festival has also raised awareness about the character of the area and the resources it has to offer. On the 12^{th} and 13^{th} of June 2003, £4000 was raised for the local economy through the organisation of walks, arts activities and stalls (Link A Figure 11). This highlighted the cultural capital of the area which encouraged demand for local produce and crafts leading to enhanced business opportunities that capitalised on Bowland's distinctiveness. Many local people were involved (Link **b**) in both organising this event and producing goods for sale.



Figure 11. Part of the conceptual diagram that is supported by the relationships identified from the Bowland festival.

Following this exploration of particular links within the overall virtuous circle, we sought to develop the multiple cause diagram (Figure 8) into a qualitative model. This has the advantage of allowing the system to be analysed as a consequence of change but does not require quantification of all of the flows and stores. The signed graphs used in these analyses contain negative and positive feedback loops, and the approach is sometimes called 'loop analysis'. Oritz and Wolff (2004) recognised the value of loop analysis in their review of techniques for holistic systems analysis, and they found that it enabled the estimation of alternative management effects (Table 2). The method connects variables together in a digraph using the 3 signs of negative (-), positive (+) or neutral (0) relating to the relationship between the different components (Puccia and Levins, 1985), and it incorporates self regulating feedbacks, internal mechanisms and external impacts.

Table 2. Types of questions that can be answered using 'loop analysis' include:

- What happens to the system/or part of the system, if there is an external change?
- How stable is the system?
- Why has the system suddenly changed and what variable could have been altered?
- What conditions lead to reversal of virtuous and vicious circles?
- What relationships need to be investigated and what isn't understood within the system?

As an initial illustration of how this qualitative concept might be applied to the landscape as a whole, we have extrapolated Figure 7 to reflect an organic farm (c.f. our earlier discussion of the presumed virtuosity of organic farming). Analysis of the model revealed particularly that:

- Y the labelling of each variable is crucial to the effectiveness of the model and requires adherence to a set of rules (*pers. comm.*, D. Morris). For example, phrases themselves should not refer to variations such as an 'increase' in business health or a 'decline' in the legibility of character. Keeping variable names neutral was important in understanding the connections.
- **Ÿ** problems were encountered when deciding whether relationships were positive, negative or if there was no change (Figure 12).

Regarding the previous point, although the idea of virtuosity includes positive connections, the opposite can be true under certain circumstances. The relationship between Business Health and Reciprocity can be positive as co-operation is likely during the evolution of businesses. However this relationship could change as businesses become bigger and more established, and conventional attitudes take over from altruistic ones. This suggests that the sustainability of a project depends upon the attitudes of the individual business and the networks to which they belong. Another example is the link between business health and legibility of character. Initially local business may help build a profile of the local area and strengthen any distinctive features the locality may have. This could change as the business /tourism sector becomes progressively commercialised, perhaps resulting in a commodified culture that antagonises locals. Other relationships exist where links could be either positive or negative depending on the circumstances. Therefore the model is appropriate for investigating the system given different sets of development scenarios and perhaps aids investigation into changes through time. At this stage of the research it would be premature to convert the whole of Figure 7 into a qualitative model and so, for illustrative purposes, we have reverted to the idea of just four capitals (Figure 13).



Figure 12 Sign graph of part of Figure 7. B is business health, R is reciprocity and cooperation and L is legibility of character. The minus signs show that there is negative relationship between the variables and that as one increases the other diminishes. The positive signs represent a positive relationship where as one variable grows so does the other.



Figure 13. A signed diagram of a cultural landscape. E is economic capital, S is social capital, C is cultural capital and N is natural capital. The arrows depict positive relationships and the lines with the circle tipped ends represent negative feedbacks and relationships. The labels describe the relationship and direction. For example, EC+ is the effect of cultural capital on economic capital and it is positive.

As mentioned above, relationships are positive apart from the link between economy and cultural capital where - for illustrative purposes - it is assumed that as economies grow conventional attitudes dominate and the character of local place becomes less important. All of the capitals have negative feedbacks incorporated apart from economic capital. These describe how each of the other forms of capital can regulate themselves. For example, NC cannot increase infinitely and there can be only so many traditions and social networks that can be remembered and established. However, it is assumed in this case that the economy can keep growing without any limits, although this may be improbable over a long time scale. Hypothetically, the model could be used to investigate what may happen to the system if the market for organic produce decreases because consumers feel prices are becoming too high. Puccia and Levins (1985) describe the methods used for loop analysis in detail, but here they are simplified down to four pieces of key information: a) the forced change, which is negative in this case; b) the relationship between the two variables being considered; c) the complementary feedbacks present; and d) the stability of the system as a whole, which is positive in this instance. Table 3 includes the results of an example scenario based on Figure 13 where economic capital has had a negative exogenous influence. There is a negative impact on natural and social capital, and economic resources decline, but there is a positive effect on cultural capital. Again, only the main outcomes are noted here, and there is scope for future addition of many more relationship links and self dampening mechanisms. In addition time step analysis can be incorporated and more complex analysis functions can be performed to either test an idea or to better understand the system.

Table 3. Change to the landscape system when there is a negative influence leading to a decline in economic capital.

Negative change to E	Change to N	Change to S	Change to C	Change to E
	Negative	negative	positive	

The Potential for Complex Systems Modelling

As noted previously, there are interesting similarities between the cultural landscape and the notion of a socioecological system (SES)¹⁰; further, the use of 'resilience' by SES modellers has parallels with ideas about landscape sustainability. As with VC models, SES models are likely to remain qualitative and conceptual, at least in the short term, when extended to the complexity of the landscape scale. Thus, Murray et al. (1999) have counselled against an over-quantified approach to SESs, noting both that quantification tends to demand lists of variables that are 'expensive to measure and difficult to integrate' and that, finite ecological limits notwithstanding, most aspects of sustainability are open to negotiation and require imprecision and judgement to be built into even the most mathematically explicit models.

Importantly, in the context of real-world landscape dynamics, an SES model does not rely on a single, optimal 'equilibrium' state, but rather permits a range of alternative relatively 'stable' positions, which could either be virtuous or vicious. Thus, when proposing virtuosity as a touchstone for sustainable cultural landscapes, it avoids the impression of wishing to fossilise particular vernacular set-pieces. On the one hand, some inherited cultural landscapes, such as the core areas of our National Parks, are almost invariably worth retaining with a high level of intactness; here, virtuosity is likely to reflect relatively traditional economic and social practices. On the other, viable but self-reinforcing linkages may need to be instilled afresh, such as emergent opportunities to supply wood fuel for school heating systems from recently established community forests.

Some key assumptions regarding SESs are that:

- **Ÿ** systems are self-organising (their dynamics are largely a function of positive and negative feedback loops, in which in emergence and surprise are normal)
- inherent uncertainty and limited predictability are to be expected although such systems organise around 'attractors', and stabilise within 'basins of attraction'
- Υ often there are several possible equivalent ecological/geomorphic states ('attractors') dependent upon history
- When ecosystem change does occur it is often very rapid and even catastrophic (at critical points of instability, open systems may dramatically reorganise), these instabilities and the resulting jumps or abrupt changes in the system being caused by self-amplified positive feedback loops
- ÿ geomorphic/ecological systems are nested hierarchies, as, indeed, are human systems, and
- ÿ some system properties are 'emergent', that is, they only come into view at a particular level, and would not be detected by examining only parts of the system.

The purpose of intervention – whether conservation, re-creation, reinforcement or restoration – may thus be to assist the landscape trajectory towards a virtuous 'attractor'. Murray et al (1999)

¹⁰ This topic is being investigated more extensively through another RELU Development Activity – 'Development of a rural economy and land use simulation modelling strategy' (Robin Matthews, Macaulay Institute)

propose that a diverse problem-solving approach for SESs comprising: historical reconstruction; analysis of stakeholders, policies, governance and issues; multiple system descriptions which are then linked, analysed and synthesised; debated solution-seeking; and implementation, monitoring and evaluation.

Further, and central to many studies of complex SESs, is the principle of 'resilience' – the capacity of a system for flexibility, or its ability to remain functionally stable in the face of stress and to recover following a disturbance. Since systems and their contexts are continually changing, resilience is also presumed to include a capacity for learning or restructuring new adaptations that often involve increased organizational complexity. Resilience theory suggests that: (a) change is ultimately inevitable and repeated, although repeated cycles may not follow the same pathway or result in analogous systems, and can be triggered by internal dynamics as well as (more conventionally) by external stimuli; and (b) that adaptive cycles appear to occur across (a handful of) spatiotemporal scales, ranging from small-and-fast to large-and-slow, and it is the interactions among adaptive cycles at these different characteristic scales that determine resilience dynamics. This dynamism, scale variability and changing context have significant consequences for the nature of flexible and scale-sensitive ecosystem management.

In terms of practical applications for sustainable landscapes, resilience theory raises some interesting possibilities. For example, it:

- draws attention to the role of social memory and system connectivity in allowing a system to retain its heterogeneity and durability, whilst providing an adaptive mechanism which is flexible enough to accommodate changing environmental and social contexts;
- 2. permits strong analogies with human ecosystems. In terms of similarities, natural and human systems display comparable lumpiness of unit sizes, entrepreneurial activity at the margins between spheres of economic or social activity, interaction between "small-and-fast" (small scale systems) and "large-and-slow" (top-of-nested-hierarchy systems), and overconnection in nested adaptive cycles precipitating potential shifts into new basins of attraction at large scales. However, there are also differences (particularly in relation to 'revolt' and 'remember' mechanisms), deriving from the mechanistic qualities of natural systems and the more nuanced cultural and individual qualities of human behaviour, the latter potentially having benefits in terms of analysis, speed of response and anticipation, or drawbacks of inertia, taboo and denial (Redman and Kinzig, 2003);
- 3. further, Redman and Kinzig (2003) note that the ways in which a society filters and conveys knowledge at a variety of levels of organization strongly influence the resilience of that society, and they hypothesise that the most effective information flows between two or more systems occur when information is exchanged at a similar level in the hierarchy, that is, horizontal exchange, perhaps because the sender and the recipient share more similar social positions, goals, and resources than when information travels up or down the hierarchy.

A fundamental difference between the adaptive cycle model as applied to human systems and to nonhuman ecosystems is that humans are participants in the process of change and may attempt to manipulate both their position on the phase curve and the outcomes of state flips. It has been suggested that this capacity for anticipatory action in steering adaptive cycles towards 'virtuous attractors' could hold promise for landscape-centred approaches to research and policy (Selman and Matthews, 2005).

Conclusion

This review of the significance of landscape as an integrative framework has, in the context of the RELU programme, emphasised rural cultural landscapes. In particular, it has represented them as being subject to endemic change and open to external forces, yet susceptible to relative stabilisation in 'sustainable' condition provided that at least a proportion of local economic and social entrepreneurship can be linked to landscape stewardship in a virtuous circle. Further, we have suggested that the landscape 'unit' can serve as an effective framework for research,

governance and social learning, albeit on the basis of spatial and administrative pluralism rather than prescriptive bioregionalism. Thus, whilst avoiding a naïve view of landscape as a selfcontained unit, we do propose that a certain level of social and economic re-embedding can deliver a range of benefits, from adaptive environmental management to reinforcement of community identity. For this to happen, interdisciplinary research must inform both 'sectoral' landscape policy and a wider understanding of landscapes as complex socio-ecological systems. In turn, a landscape perspective assists and indeed obliges an interdisciplinary approach and the sharing of epistemologies.

We have attempted to show how this general principle might be susceptible to more formal definition through 'soft systems' and 'complex socioecological systems' models. Modelling cultural landscapes confirms that they are inherently dynamic, and that they will probably tend towards deteriorating functionality and character if abandoned to external 'drivers of change'. The role for science and governance is thus assumed to be that of deflecting them towards self-sustaining desirable states. Our guiding principle in developing these ideas has been that of the virtuous circle, which is mainly reliant on endogenous energies to stimulate positive reinforcements between landscape 'capitals', but which also often requires government to 'construct'¹¹ virtuosity where appropriate.

Our investigation was based initially on loop analysis, but we speculated further on the scope to reflect the essentially dynamic-but-resilient nature of cultural landscapes. We see some potential here for exploring landscapes as complex 'socioecological systems' which tend towards stability as they approach certain 'attractor' states. One of the main benefits of this approach is that it accepts the inevitability of change even in highly conserved landscapes. Thus, it can accommodate the capacity of humans to influence change and so potentially can incorporate policy intervention as a means of shaping 'future nature' through conservation, restoration, recreation or reinforcement. Certainly, it is important that the dynamic potential of modelling is used to explore alternative policy options for cultural landscapes, and not simply to justify precious reinterpretations of traditional local production and stewardship systems. Resilience, we suggest is likely to derive from self-reinforcing relationships within the virtuous circle which can be instigated and assisted by targeted policy intervention, but not chronically dependent on public subsidy.

References

Adams, W., 2003. Future Nature: a vision for conservation (2nd ed.). Earthscan, London.

- Antrop, M., 2000a. Background concepts for integrated landscape analysis. Agriculture Ecosystems & Environment, 77(1-2): 17-28.
- Antrop, M., 2000b. Changing patterns in the urbanized countryside of Western Europe. Landscape Ecology, 15(3): 257-270.
- Antrop, M., 2004. Rural-urban conflicts and opportunities. In: J. R (Editor), The new dimensions of the European Landscape. Springer, Dordrecht.
- Antrop, M., 2005. Why landscapes of the past are important for the future. Landscape and Urban Planning, 70(1-2): 21-34.
- Aoyama, A., 1999. Towards a virtuous circle: A nutrition review of the Middle East and North Africa, Library of Congress.

¹¹ For example, see the work of de la Mothe and Mallory (2003) and Cooke and Leydesdorff (2006) relating to the capacity of public agencies to secure 'constructed advantage' for particular regions

- Barlow, K. and Cocklin, C., 2003. Reconstructing rurality and community: Plantation forestry in Victoria, Australia. Journal of Rural Studies, 19(4): 503-519.
- Barth, F. and Fawell, J., 2001. The Water Framework Directive and European Water POlicy. Ecotoxicology and Environmental Safety, 50: 103-105.
- Beresford, M. and Phillips, A., 2000. Protected landscapes a conservation model for the 21st Century. George Wright Forum, 17(1).
- Bessiere, J., 1998. Local development and heritage: traditional food and cuisine as tourist attractions in rural areas. Sociologia Ruralis, 38(1): 21-34.
- Bishop, I.D. and Rohrmann, B., 2003. Subjective responses to simulated and real environments: a comparison. Landscape and Urban Planning, 65(4): 261-277.
- Bishop, I and Lange, E (Eds) (2005) Visualisation in Landscape and Environmental Planning: technology and applications. Spon: London.
- Bishop, K. and Phillips, A., 2004. Countryside Planning: new approaches to management and conservation. Earthscan, London, 222-236 pp.
- Bodini, A., Ricci, A. and Viaroli, P., 2000. A multi-methodological approach for the sustainable management of perifluvial wetlands of the Po River, Itlay. Environmental Management, 26(1): 59-72.
- Brand, F., 2005. Ecological Resilience and its relevance within a theory of sustainable development, Ernst-Moritz-Arndt-Universitat, Greifswald.
- Brandt, J. and Vejre, H., 2003. Multifunctional landscapes motives, concepts and perspectives. In: J. Brandt and H. Vejre (Editors), Multifunctional Landscapes. Vol 1: Theory, history and values. WIT Press, Southampton.
- Brunckhorst, D., 2000. Bioregional Planning Resource Management Beyond the New Millennium. Harwood Academic Publications, Amsterdam.
- Brunori, G. and Rossi, A., 2000. Synergy and coherence through collective action: Some insights from wine routes in Tuscany. Sociologia Ruralis, 40(4): 409-423.
- Burgi, M., Hersperger, A.M. and Schneeberger, N., 2004. Driving forces of landscape change current and new directions. Landscape Ecology, 19(8): 857-868.
- Caletrio-Gacera, J., 2005. RELU presentation.
- Chavas, J.P., 2004. On impatience, economic growth and the environmental Kuznets curve: A dynamic analysis of resource management. Environmental and Resource Economics, 28: 123-152.
- Chee, Y.E., 2004. An ecological perspective on the valuation of ecosystem services. Biological Conservation, 120(4): 549-565.
- Chiesura, A. and de Groot, R., 2003. Critical natural capital: a socio-cultural perspective. Ecological Economics, 44(2-3): 219-231.
- Clark, D. and Smith-Canhem, J., 1999. Integration, embeddedness and local economic development The case of the clothing industry in Coventry. Local Economy, 14(3): 232-244.
- Clementsen, M. and van Laar, J., 2000. The contribution of organic agriculture to landscape quality in the Sogn og Fjordane region of western Norway. Agriculture, Ecosystems and Environment, 77(1-2): 125-141.
- Cloke, P., Milbourne, P. and Thomas, C., 1996. The English National Forest: Local reactions to plans for renogatiated nature-society relations in the countryside. Transactions of the Institute of British Geographers, 21(3): 552-571.

- Cobb, D. et al., 1999. Integrating the environmental and economic consequences of converting to organic agriculture: evidence from a case study. Land Use Policy, 16(4): 207-221.
- Cole, M.A., 2003. Development, trade and the environment: how robust is the environmental Kuznet curve? Environment and Development Economics, 8: 557-580.
- Collados, C. and Duane, T.P., 1999. Natural capital and quality of life: a model for evaluating the sustainability of alternative regional development paths. Ecological Economics, 30(3): 441-460.
- Cooke P. & Leydesdorff, L., 2006, forthcoming. Regional Development in the Knowledge-Based Economy: The Construction of Advantage, Journal of Technology Transfer forthcoming.
- Curry, N. and Ravenscroft, N., 2001. Countryside recreation provision in England: exploring a demand-led approach. Land Use Policy, 18(3): 281-291.
- Day, G., 1998. Working with the grain? Towards sustainable rural and community development. Journal of Rural Studies, 14(1): 89-105.
- Dinda, S., 2004. Environmental Kuznet curve hypothesis: A survey. Ecological Economics, 49(4): 431-455.
- Dolman, P., Lovett, A., O'Riordan, T. and Cobb, R., 2001. Designing whole landscapes. Landscape Research, 26: 305-335.
- Edwards, B., 1998. Charting the discourses of community Action perspectives from practice in rural Wales. Journal of Rural Studies, 14(1): 63-77.
- Egoz, S., Browring, J. and Perkins, H.C., 2001. Tastes in tension: form, function and meaning in New Zealand's farmed landscapes. Landscape and Urban PLanning, 57(3-4): 177-196.
- Ekins, P., Folke, C. and De Groot, R., 2003. Identifying critical natural capital. Ecological Economics, 44: 159--163.
- Elands, B.H.M., O'Leary, T.N.O., Boerwinkel, H.W.J. and Wiersum, K.F., 2004. Forests as a mirror of rural conditions; local views on the role of forests across Europe. Forest Policy and Economics, 6(5): 469-482.
- English Nature, 2004. Nature's Place(29): 4.
- Erickson, D (2004) The relationship of historic city form and contemporary greenway implementation: a comparison of Milwaukee, Wisconsin (USA) and Ottawa, Ontario (Canada), *Landscape and Urban Planning*, 68(2-3), 199-222.
- Evans, H.E., 1992. A virtuous circle model of rural urban development evidence from a Kenyan small town and its hinterland. Journal of Rural Studies, 28(4): 640-667.
- Fabos, J.G., 2004. Greenway planning in the United States: its origins and recent case studies. Landscape and Urban Planning, 68(2-3): 321-342.
- Fairclough, G., 2005. Large scale, long duration and broad perceptions: Scale issues in Historic Landscape Characterisation. In: G. Lock and B. Molyneaux (Editors), Confronting scale in Archaeology: issues of theory and practice. Kluwer Academic Publishers, Dordrecht.
- Gallent, N., Shoard, M., Anderson, J., Oades, R. and Tudor, C., 2004. England's Urban Fringes: multifunctionalality and planning. Local Environment, 9(3): 217-233.
- Gawande, K., Berrens, R.P. and Bohara, A.K., 2001. A consumption-based theory of the environmental Kuznet curve. Ecological Economics, 37(1): 101-112.
- Gobster, P.H. and Rickenbach, M.G., 2004. Private forestland parcelization and development in Wisconsin's Northwoods: perceptions of resource-oriented stakeholders. Landscape and Urban Planning, 69(2-3): 165-182.

- Gobster, P.H. and Westphal, L.M., 2004. The human dimensions of urban greenways: planning for recreation and related experiences. Landscape and Urban Planning, 68(2-3): 147-165.
- Groundwork Trust/ Countryside Agency (2004) Unlocking the Potential of the Urban Fringe.
- Haines-Young, R., Martin, J., Tantram, D. and Swanwick, C., 2004. Countryside Quality Countstracking change in English countryside.
- Haines-Young, R. and Potschin, M., 2000. Multifunctionality and value. In: J. Brandt, B. Tress and G. Tress (Editors), pp. 111-118.
- Hall, A. and Mogyorody, V., 2001. Organic farmers in Ontario: An examination of the conventionalisation argument. Sociologia Ruralis, 41(4): 399-423.
- Hamilton, K. and Selman, P., 2005. The 'Landscape-Scale' in PLanning: recent experience of biogeographic planning units in Britain. Landscape Research.
- Handley, J., 2001. Derelict and despoiled land problems and potential. In: C. Miller (Editor), Planning and environmental protection. Hart, Oxford, pp. 115-146.
- Herbert-Cheshire, L. and Higgins, V., 2004. From risky to responsible: expert knowledge and the governing of community led rural development. Journal of Rural Studies, 20(3): 289-302.
- Hermansen, J.E., 2003. Organic livestock production systems and appropriate development in relation to public expectations. Livestock Production Science, 80(1-2): 3-15.
- Hill, K., 2000. Visions of sustainability. In: J. Benson and M. Roe (Editors), Landscape and Sustainability. Spon, London, pp. 294-311.
- Hinricks, C.C., 2003. The practice and politics of food system localism. Journal of Rural Studies, 19(1): 33.
- Holling, C.S., 2001. Understanding the Complexity of Economic, Ecological and Social Systems. Ecosystems, 4: 390-405.
- Holling, C.S. and Gunderson, L.H., 2002. Resilience and adaptive cycles. In: L.H. Gunderson and C.S. Holling (Editors), Panarchy: understanding transformations in human and natural systems. Island Press, Washington DC, pp. 25-62.
- Ilbery, B. and Kneafsey, M., 2000. Producer constructions of quality in regional speciality food production: a case study from SW England. Journal of Rural Studies, 16(2): 217-230.
- Jones, O. and Little, J., 2000. Rural challenge(s): partnership and new rural governance. Journal of Rural Studies, 16(2): 171-183.
- Jongman, R., 2002. Landscape planning for biological diversity in Europe. Landscape Research, 27: 187-195.
- Kaplan, R. and Austin, M.E., 2004. Out in the country: sprawl and the quest for nature nearby. Landscape and Urban PLanning, 69(2-3): 235-243.

Lampkin, N., 1990. Organic farming. Farming Press, Somerset.

Lapka, M and Cudlinova, E (2003) Changing landscapes, changing landscape's story, *Landscape Research*, 28, 323-328.

- Levin, S., 1999. Fragile Dominion: complexity and the commons. Perseus Books, Reading, Massachusetts.
- Loiselle, S., Carpaneto, G.M., Hull, V., Waller, T. and Rossi, C., 2000. Feedback analysis in reserve management: studying local myths using qualitative models. Ecological Modelling, 129(1): 25-37.
- Low Choy, D., 2002. Cooperative Planning and Management for Regional Landscapes, Unpublished PhD Thesis. University of Queensland, Australia.

Lyle, J.T., 1994. Looking at Landscape, Seeing Process. Landscape Architecture, 84(1): 144-144.

- MacEwen, A. and MacEwen, M., 1987. Greenprints for the Countryside? The Story of Britain's National Parks. Allen and Unwin, London.
- MacKinnon, D., 2002. Rural governance and local involvement: assessing state-community relations in the Scottish Highlands. Journal of Rural Studies, 18(3): 307-324.
- Mahony, P., 2004. Building on a sense of place: the role of landscape character in creating sustainable communities. Sustain Magazine, 5(5): 28-29.
- Martin, P.L. and Taylor, J.E., 2000. Farm employment, immigration and poverty, University of California.
- McGinnis, M. (Editor), 1998. Bioregionalism. Routledge.
- Meadowcroft, J., 2002. Politics and scale: some implications for environmental governance. Landscape and Urban Planning, 61(2-4): 169-179.
- Milestad, R. and Hadatsch, S., 2003. Organic Farming and social-ecological resilience: the Alpine valleys of Solktaler, Austria. Conservation Ecology, 8(1): 3-18.
- De la Mothe, J. & G. Mallory. 2003. Industry-Government Relations in a Knowledge-Based Economy: the Role of Constructed Advantage, *PRIME Discussion Paper 02-03*, University of Ottawa: Program of Research in Innovation Management & Economy
- Murdoch, J., 2000. Networks a new paradigm of rural development? Journal of Rural Studies, 16(4): 407-419.
- Murdoch, J. and Abram, S., 1998. Defining the limits of community governance. Journal of Rural Studies, 14(1): 41-50.
- Murray, T., Kay, J., Waltner-Towes, D. and Raez-Luna, E., 1999. Adaptive methodology for ecosystem sustainability and health (AMSEH): an introduction., Conservation Medicine Conference, White Oak Conservation Centre, Florida.
- Naveh, Z., 2000. Introduction to the theoretical foundations of multifunctional landscapes and their application in transdisciplinary landscape ecology. In: J. Brandt, B. Tress and G. Tress (Editors), Multifunctional Landscapes: interdisciplinary approaches to landscape research and management, pp. 27-43.
- Office of the Deputy Prime Minister, 2002. Sustainable Communities: Delivering through Planning, ODPM, London.
- ODPM/ Defra 2004. Creating Sustainable Communities: Greening the Gateway, ODPM/ Defra, London.
- Oreszczyn, S. and Lane, A., 2000. The meaning of hedgerows in the English landscape: Different stakeholder perspectives and the implications for future hedge management. Journal of Environmental Management, 60(1): 101-118.
- Oritz, M. and Wolff, M., 2004. Qualitative modelling for the Caete mangrove estuary (North Brazil): a preliminary approach to an integrated eco-social analysis. Estuary Coast Shelf Science, 61(2): 243-250.
- Osborne, S.P., Williamson, A. and Beattie, R., 2002. Community involvement in rural regeneration. Partnerships in hte U.K. Key issues from a three nation study. Regional Studies, 36(9): 1083-1097.
- Pearce, D., 1993. Economic Values and the Natural World. Earthscan, London.
- Pfaff, A.S.P., Chaudhuri, S. and Nye, H.L.M., 2004. Household production and environmental Kuznet curves. Environmental and Resource Economics, 27: 187-200.

- Phillips, A., 2002. Management Guidelines for IUCN category V areas: Protected landscapes/seascapes. IUCN, Gland, Switzerland.
- Pinto-Correla, T. and Vos, W., 2004. Multifunctionality in Mediterranean landscapes past and future. In: R. Jongman (Editor), The New Dimensions of the European Landscape. Springer Dordrecht.
- Piorr, H.P., 2003. Environmental policy, agri-environmental indicators and landscape indicators. Agriculture Ecosystems & Environment, 98(1-3): 17-33.
- Powell, J, Selman, P and Wragg, A, 2002. Protected areas: reinforcing the virtuous circle, Planning Practice and Research, 17(3), 279-295.
- Pretty, J. and Smith, D., 2004. Social capital in biodiversity conservation and management. Conservation Biology, 18(3): 631-638.
- Prigogine, I. and Stengers, I., 1984. Order Out of Chaos: Man's dialogue with Nature. New Science Library, London.
- Puccia, C.J. and Levins, R., 1985. Qualitative modelling of complex systems: An introduction to loop analysis and time averaging. Harvard University Press, London.
- Punter, J. and Carmona, M., 1997. Cosmetics or critical constraints? The role of landscape in design policies in English development plans. Journal of Environmental Management, 40: 173-198.
- Ranniko, P., 1999. Combining social and ecological sustainability in the Nordic forest periphery. Sociologia Ruralis, 39(3): 394-.
- Redman, C.L. and Kinzig, A.P., 2003. Resilience of past landscapes: Resilience theory, society, and the Longue Duree. Conservation Ecology, 7(1): art. no.-14.
- Rogers, C., McIntosh, A. and Cooper, S., 2002. Effective community consultation can it be achieved?
- Ronchi, B. and Nardone, A., 2003. Contribution of organic farming to increase sustainability of Mediterranean small ruminants livestock systems. Livestock Production Science, 80(1-2): 17-31.
- Rossi, R. and Nota, D., 2000. Nature and landscape production potentials of organic types of agriculture: a check of evaluation criteria and parameters in 2 Tuscan farm-landscapes. Agriculture, Ecosystems and Environment, 77(1-2): 53-64.
- Royal Society for the Protection of Birds, 2001. Futurescapes: large-scale habitat restoration for wildlife and people, RSPB, Sandy.
- Sage, C., 2003. Social embeddedness and relations of regard: alternative 'good food' networks in south-west Ireland. Journal of Rural Studies, 19(1): 47-60.
- Scazzosi, 2005. Reading and Assessing the Landscape as Cultural and Historical Heritage. Landscape Reseach, 29(4), 335-356.
- Scheffer, M. and Carpenter, S.R., 2003. Catastrophic regime shifts in ecosystems: linking theory to observation. Trends in Ecology and Evolution, 18(12): 648-656.
- Selman, P., 2004. Community participation in the planning and management of cultural landscapes. Journal of Environmental Planning and Management, 47(3): 365-392.
- Selman, P., 2005. Planning at the Landscape Scale. Routledge, London.
- Selman, P. and Matthews, R., 2005. Landscapes as a focus for integrating human and environmental processes", Paper presented to RELU Workshop, People and the Environment: Scoping the Research Agenda, University of York, 18th May 2005.

- Soltner, D., 1985. L'arbre et la haie: pour la production agricole, pour l'equilibre ecologigue, et al cadre de vie rurale. Collection Science et Techniques Agricoles, Angers, 200 pp.
- Stern, D.I., 2004. The rise and fall of the environmental Kuznet curve. World Development, 32(8): 1419-1439.
- Stobbleaar, D.J., Kuiper, J., Van Mansvelt, J.D. and Kabourakis, E., 2000. Landscape quality on organic farms in the Messara Valley, Crete. Organic farms as components in hte landscape. Agriculture, Ecosystems and Environment, 77(1-2): 79-93.
- Swanwick, C., 2002. Landscape Character Assessment: Guidance for England and Scotland. Countryside Agency/Scottish National Hertiage.
- Terkenli, T.S., 2001. Towards a theory of the landscape: the Aegean landscape as a cultural image. Landscape and Urban Planning, 57(3-4): 197-208.
- Thayer, R., 2003. Life Place: Bioregional Thoughts and Practice. University of California Press.
- Torras, M. and Boyce, J.K., 1998. Income, inequality and pollution: a reassessment of the environmental Kuznet curve. Ecological Economics, 25(2): 147-160.
- Tress, B. and Tress, G., 2003. Scenario visualisation for participatory landscape planning a study from Denmark. Landscape and Urban Planning, 64(3): 161-178.
- Ventura, F. and Milone, P., 2000. Theory and practice of multi-product farms: Farm butcheries in Umbria. Sociologia Ruralis, 40(4): 452-465.
- Vos, W. and Klijn, J., 2000. Trends in European landscape development: prospects for a sustainable future. In: J. Klijn and W. Vos (Editors), From Landscape Ecology to Landscape Science. Kluwer Academic Publishers, Wageningen.
- Walker, B., Holling, C.S., Carpenter, S.R. and Kinzig, A.P., 2004. Resilience, adaptability and transformability in social-ecological systems. Ecology and Society, 9(2): 5.
- Warnock, S. & Brown, N. (1998) A vision for the countryside, Landscape Design, 269, 22-26.
- Wascher, D., 2004. Landscape Indicator Assessment: steps towards a European approach. In: R. Jongman (Editor), The New Dimensions of the European Landscape. Springer, Dordrecht.
- Werner., B.T., 1995. Eolian dunes: computer simulation and attractor interpretation. Geology, 23: 1107-1110.
- White, I. and Howe, J., 2003. Policy and Practice. Planning and the European Union Water Framework Directive. Journal of Environmental Planning and Management, 46(4): 621.
- Williams, C.C., 2002. Harnessing community self-help: some lessons from rural England. Local Economy, 17(2): 136-146.
- Winter, M., 2003. Embeddedness, the new food economy and defensive localism. Journal of Rural Studies, 19(1): 23-32.
- Yarwood, R. and Evans, N., 2003. Livestock, locality and landscape: EU regulations and the new geography of Welsh farm animals. Applied Geography, 23(2-3): 137-157.