COMMUNITY ESSAY

Planning for landscape multifunctionality

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Author’s Personal Statement:

The term “multifunctional landscapes” has been greeted with suspicion in some quarters as unnecessary jargon for which there are simpler and better-known alternatives, such as multiple use. This community essay explores the meanings associated with landscape multifunctionality and concludes that it is, in fact, a useful term that reflects important new ideas. In particular, it can help to promote landscapes that cross urban-rural divides, are more sustainable, and are planned and implemented in an integrated way.

“Multifunctionality” has become a popular term in landscape design and planning. It has been particularly influential in Europe, where it resonates strongly with the protective and creative measures being promoted through the European Landscape Convention (Council of Europe, 2000). However, while this essay draws principally on European sources, and especially UK practice, it recognizes the term’s growing international currency (Bills & Gross, 2005; Cocklin et al. 2006; Robinson, 2006; Lovell & Johnston, 2009a).

A clutch of studies on the UK urban fringe over the last few years has centered on the promotion of multifunctional landscapes (Box 1) (CURE, 2002; Entec UK, 2003; Ove Arup & Partners, 2004; Bartlett School of Planning & LDA Design Exeter, 2004; Gallent et al. 2004; Countryside Agency & Groundwork Trust, 2005). More recently, “green infrastructure” (Benedict & McMahon, 2006) has become a favored vehicle to embed a strategically planned network “designed and managed as a multifunctional resource capable of delivering…ecological services and quality of life benefits…and needed to underpin sustainability” (Natural England, 2008). Similarly, the UK Landscape Institute states that:

Functions are multiplied and enhanced significantly when the natural environment is planned and managed as an integrated whole; a managed network of green spaces, habitats and places providing benefits which exceed the sum of the individual parts. It is this concept of connectivity and multifunctionality which makes the GI approach such an important part of landscape planning and management (Landscape Institute, 2009).

The term is also entering frontline planning documents. A recent study in Central Scotland argued that: “Multifunctional green networks should be used within the planning process to ensure that greenspace creation and management is spatially targeted to achieve optimum gains for social, environmental and economic development” (SNIFTER, 2008). National policy makers are taking this advice seriously, and such networks are likely to be implemented. At the regional level in England, the North West Green Infrastructure Think Tank (2008) states:

Functions can co-exist, leading to multifunctionality, and can therefore aid economic, environmental and social objectives through the spatial integration of land uses and activities…Multi-functionality is generally desirable, as it encourages efficient use of land, delivers wider public benefit and builds partnerships of user groups, leading to better stewardship.

More locally, a report on smart growth potential in East Devon (LDA Design, 2009) notes the “opportunity to address the goal of establishing multifunctional landscapes” in urban extensions and new settlements where they serve “to underpin sustainable functioning and ‘liveability.’”

However, some critics question whether “multifunctionality” is just another piece of fashionable jargon. This essay interrogates whether or not the term offers a distinct and innovative concept that can advance the sustainable management of urban and rural landscapes. For example, existing terms such as “urban open space” and “green belts” claim the same properties ascribed to green infrastructure, such as containment, recreation, biodiversity, health and ex-
exercise, visual amenity, land-value enhancement, water quality and quantity, heritage, education, and microclimate amelioration. An equally long-standing tradition of the “multiple use” of rural resources promotes combined outputs from land or water under conditions of competition (e.g., Bowes & Krutilla, 1989; Hytönen, 1995). Some of the justifications for multifunctionality refer to the need for land to support more than one activity in response to population growth and social demands. While this may be desirable, it appears very similar to multiple or integrated use. Thus, if landscape multifunctionality is to be a helpful concept, it must offer something that involves more than mere “layering” of different topics such as economics, ecology, culture, history, and aesthetics (Haines-Young & Potschin, 2004). It needs to provide an alternative to predominantly economic concepts such as multiple use and to address more than the efficient coproduction of two or more commodities within a particular land parcel.

The literatures associated with agriculture and landscape give rise to a specific source of confusion. Agricultural multifunctionality is a narrowly defined term with specific policy connotations with the European Union (EU) and the concept is often viewed suspiciously outside the EU as a covert form of protectionism (Schmitz & Moss, 2005). In this context, it refers to “jointness of production” between agriculture, forestry, and other land uses to diversify away from monofunctional food/fiber production (Bohnet et al. 2003; van Huylenbroeck & Durand, 2004; Hagedorn, 2004; Lankoski et al. 2004; Brunstad et al. 2005; Campos et al. 2007). While sharing some common ground with agricultural multifunctionality, landscape multifunctionality addresses a broader social-ecological system and entails an understanding of landscape as something that goes “beyond the view” (Countryside Agency, 2006) and where qualities of placeness and resilience derive from underlying functions rather than surface activities. Even the term “function” is itself a cause of ambiguity. For example, Soini (2001) refers to “qualities” of landscape—the ecological, aesthetic, historical, or symbolic characteristics—and the “value systems” associated with these qualities. Some authors distinguish between structures, functions, and values (c.f. Bergstrom, 1998; Terkenli, 2001). This three-fold division is helpfully summarized by Parris (2004) as:

- **Structures**—natural and human-made environmental features and land-use patterns
- **Functions**—provision of living space, ecosystem operation, soil filtering, water supply, agricultural production
- **Values**—historical, recreational, aesthetic, spiritual, existence, biodiversity, security, agricultural, cultural

The links between these elements are sequential, so that structures supply functions, which in turn may yield values. Brandt & Vejre (2004) have grouped functions into four types—regulation (e.g., climate regulation, nutrient recycling), carrier (e.g., habitation, cultivation), production (e.g., raw materials, genetic and ornamental resources) and information (e.g., aesthetic, educational). Values are often related to the economic, amenity, and security benefits that functions confer on society (Palang et al. 2004).

Apparently similar concepts such as “quality of life capital” and “ecosystem services” cause further confusion over the notion of “functions.” The idea of natural capital, long established in the sustainability literature, implies that we should be living only off the “interest” of ecosystem resources rather than depleting the capital stock (Ekins, 2003). Some researchers have thus related landscape sustainability to the continuous enhancement of natural capital (e.g., Haines-Young & Potschin, 2004) and social capital (e.g., Luz, 2000). The Millennium Ecosystem Assessment (MEA) advanced the highly influential concept of ecosystem services that are deemed to comprise:

- **Provisioning services** such as food, water, timber, and fiber

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**Box 1** Multiple functions and values of the urban fringe landscape (based on Ove Arup & Partners Ltd., 2004; Gallent et al. 2004; Countryside Agency & Groundwork Trust, 2005):

- “A bridge to the country”—the green infrastructure connecting rural to urban areas
- “A gateway to the town”—features that make a powerful impression of the region
- “A health center”—the health benefits of outdoor recreation
- “A classroom”—hands-on learning such as farm education centers
- “A recycling center”—i.e., landscaped quarries and landfills
- “A power plant”—to expand, harness and use renewable energies
- “A productive landscape”—i.e., agriculture, forestry
- “A place to live sustainably”—scope for compact, energy-efficient settlements close to work and leisure
- “An engine for regeneration”—increasing the value of often run-down landscapes
- “A nature reserve”—existing ecological assets and scope for creating new ones
- “A heritage resource”—hosting rich and diverse archaeological and historical legacy
- “A locational function”—occupying a position with potential to reduce travel, reduce food miles, and increase social inclusion

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Some of the scenarios proposed by the MEA (e.g.,
tem) even where this involves economic sacrifice.
The promotion of diverse and integrated natural sys-
tems, while a “function” relates more closely to the
dynamic and interactive behavior (functionality) of
systems themselves. However, this is not an absolute
distinction. For example, while services are explicitly
human-centered, this does not imply that they are
seen in a narrowly utilitarian way. The MEA argues
that long-term human survival and well-being require
the promotion of diverse and integrated natural sys-
tems, even where this involves economic sacrifice.
Some of the scenarios proposed by the MEA (e.g.,
adapted mosaic) are strikingly similar to multifunc-
tional landscapes (e.g., green infrastructure). Similarly,
“capital” analysis should reflect underlying
functions even if the procedure does not consider
them explicitly (Newson & Chalk, 2004). Thus, mul-
tifunctionality is fundamentally eocentric, having a
primary concern for the functioning of earth systems,
even though it yields cultural benefits. By contrast,
“service” and “capital” perspectives are primarily
anthropocentric, focusing on human well-being, even
though they rely on underlying functionality. Haines-
Young et al. (2006) have helpfully observed that:

• The landscape possesses “biophysical structure or
  process” (e.g., woodland habitat, net primary pro-
tuctivity)
• This underlying structure/process performs “func-
tions” (e.g., slow passage of water)
• These functions deliver “services” (e.g., flood pro-
tection)
• In turn, these “services” have “benefits” or “val-
tues” to people (e.g., harvestable products)

Thus, functions have a distinct and critical existence,
and planners need to assure their fundamental integ-
riety separately from any benefit they may deliver.

Even if we agree that “functionality” is a worth-
while and distinct concept, this situation still leaves
the meaning of “multi” open to question. It seems
that the attainment of “multiple” functions entails:

• Regulating services that affect climate, floods, dis-
ease, wastes, and water quality
• Cultural services that deliver recreational, aes-
thetic, and spiritual values
• Supporting services such as soil formation, photo-
synthesis, and nutrient cycling (MEA, 2005)

This terminology has been enthusiastically adopted
into official UK government discourses (DEFRA,
2007).

Although the various terms may appear con-
 founding, they can in actuality be fairly easily recon-
ciled. Both the “capital” and “service” concepts tend
to reflect a surface manifestation of underlying sys-
tems, while a “function” relates more closely to the
dynamic and interactive behavior (functionality) of
systems themselves. However, this is not an absolute
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riety separately from any benefit they may deliver.

Even if we agree that “functionality” is a worth-
while and distinct concept, this situation still leaves
the meaning of “multi” open to question. It seems
that the attainment of “multiple” functions entails:

• The pursuit of different goals on the same parcel of
  land either simultaneously or successively in time
• The integration of different land-use goals at the
  beginning of a project and constantly revisiting
these objectives to accomplish them simulta-
neously
• Spatial combination of separate land units with
different functions (see De Blust & van Olmen,
2000; CURE, 2002; Brandt & Vejre, 2004; Ove
Arup & Partners, 2004)

In a multifunctional perspective, land is capable
of serving more than one purpose and of fulfilling
several needs at the same time. Thus, on the same
area of land, key functions—ecological, economic,
sociocultural, and aesthetic—can be promoted simulta-
neously and to mutual benefit. Even so, it would
appear that the above principles would not always
distinguish between approaches where land-use ac-
tivities are merely collocated (multiple use) as op-
sposed to genuinely multifunctional.

The literature suggests four distinctive hallmarks
of multifunctionality. First, perhaps the most diag-
nostic theme is that of interactivity as opposed to
mere colocation. For example, Gallent et al. (2004)
describe multifunctionality in terms of simultaneous
spatial integration of functions, especially where
these activities lead to beneficial interaction among
local economies, the environment, and social ob-
jectives. Second, authors typically point to a syner-
gistic effect in which landscape is more than the sum
of its parts. Hence, where functional interactivity is
positive (and not dysfunctional such as pollution), a
more self-sustaining landscape tends to ensue. Much
of the visual charm, social vibrancy, and environ-
mental integrity of cultural landscapes derive from a
mosaic of land uses that complement each other, gen-
erally as a result of fortunate accident. Emerging
policy approaches often aim to recapture this kind of
serendipitous, dynamic, and self-reinforcing interac-
tion, promoting the reinforcement of “regenerative”
landscapes and the rehabilitation of “degenerative”
ones. Third, the more recent literature affirms land-
scape as an integrative system rather than as mere
scenery. In this perspective, landscape is defined in
terms of its functions, goods, and services (operating
in three dimensions) and its time-depth of cultural
associations (the fourth dimension).

Finally, multifunctionality shifts the emphasis
away from the predominantly rural and positions
landscape planning as a practice for the entire land-
use matrix. Antrop (2004) suggests a seamless urban-
to-rural sequence of landscape—urban center, urban
fringe, the rural countryside of the urban network,
and the “deep” rural, while Gallent et al. (2006) focus
on the undervalued potential of the urban fringe. Ar-
arguably, the disconnection between town and country that occurred mainly during the industrial revolution has significantly contributed to our unsustainable lifestyles. Landscape multifunctionality is closely associated with arguments for the “reconnection” of social-ecological systems, so that their integrity and connectivity can be reinstated. For example, following centuries of “taming the flood” and sanitizing biodiversity, society has little collective memory or wisdom about living with nature’s caprice, and public authorities are expected to control natural hazards so that urban life is not inconvenienced. Yet there is a growing realization that the limits to control have been reached and that sustainable development will require a relearned relationship between communities and their water/land, based on intelligent care (Iverson Nassauer, 1997). Physical reconnection will entail both horizontal and vertical reintegration of ecological, hydrological, and climatic processes. Thus, ground and surface waters will regain connectivity via sustainable drainage systems (Sharma & Maltby, 2008), encapsulated greenspace will be joined to open countryside through corridor creation (Bryant, 2006), and airsheds will combine with extensive vegetation to provide comfort during a period of climate change (Gill et al. 2007). Multifunctionality is thus most likely to flourish in “connected” landscapes, where physical systems can behave as functional units without excessive human disruption and landscapes possess a spatial and perceptual coherence that facilitates social embedding in the particularities of place.

Writers about multifunctionality also often assume two other conditions. First, they typically prefer landscapes that display heterogeneity (Mander et al. 2007) rather than homogeneity, expressed in terms of visual complexity, ecological opportunity, and physical diversity. Traditionally, landscape planners have focused their attention on the protection of high-quality designated areas and have assumed that the wider matrix is relatively impoverished and not worthy of serious attention. Conversely, multifunctional approaches emphasize opportunities to improve the matrix by increasing spatial heterogeneity through the addition of seminatural landscape elements designed to provide multiple ecosystem services (Lovell & Johnston, 2009b). Second, multifunctionality is often discussed in relation to “landscape scale” and to spatial units based on landscape-scale analyses (Macinnes, 2004; Swanwick, 2004; Hamilton & Selman, 2005; Selman, 2006). This perspective offers the prospect of integrated policy delivery based on landscape units, for example river restoration or promotion of focal species networks. Landscape units may also be related to a sense of place and this may help foster social learning and land care. The integrative potential of the landscape scale can thus assist multifunctional approaches to data collection, policy delivery, and partnership-based coalitions.

Multifunctionality in landscapes is characterized by a high degree of complexity, particularly associated with the properties of simultaneity and interactivity. Not surprisingly, landscape planners have widely resorted to systems models. Knickel & Renting (2000), for example, have explained multifunctional landscapes in terms of substitution and multiplier effects, as well as backward and forward linkages. To resilience theorists, cultural landscapes are social-ecological systems that have a characteristic capacity to regain equilibrium following disturbance (e.g., Walker et al. 2004; Walker & Myers, 2004; Matthews & Selman, 2006). Simpler “soft system” models can be invaluable in understanding the intensity and direction of feedback loops within cultural landscapes (Morris et al. 2006). Landscape “drivers” such as housing development and climate change can be represented as internal and external disturbances as they have forcing effects on system status (e.g., Schneeeberger et al. 2007).

While functions and their connecting systems are natural phenomena, we attach human values to ecosystem services, often considering some system responses beneficial and others detrimental. As Naveh (2001) and Haines-Young & Potschin (2004) note, functions are recognized and defined relative to social needs so that multifunctionality emerges from the interaction of ecological systems and human-value systems. Synergy in multifunctional landscapes may therefore lead to self-reinforcing situations that are either “virtuous circles” or “vicious circles,” that is, regenerative or degenerative feedback loops (Powell et al. 2002; Selman & Knight, 2006). In the virtuous situation, a landscape is likely to be a sustainable system (Selman, 2008). As is typical with complex dynamic systems, desirable properties are emergent; thus virtuous multifunctionality emerges from a set of conditions difficult for planners to define or orchestrate. We need to accept that hypercomplex environmental systems cannot simply be controlled for human convenience and that sustainable landscapes will involve a degree of risk and “letting go.” Thus, simplified monofunctional solutions (e.g., coastal defense works) may be locally appropriate, but increasingly our stewardship will need to accommodate riskier approaches (e.g., managed coastal retreat). Multifunctionality is thus an emergent property that is not easily measured or predicted, but that serendipitously produces sustainable landscape qualities of great value to people.

Several authors have pointed to how land-use planning has reinforced monofunctional land uses by
segregating functions into zones (van Mansfelt et al. 1998; Jongman, 2002; Brandt, 2003). In rural areas, monofunctionality has been associated with soil erosion, pollution, energy waste, biodiversity loss, and degradation of services. Not surprisingly, environmentalists and planners often assume that multifunctionality is good and monofunctionality is bad. This duality is simplistic, as economically monofunctional systems may still satisfy certain conditions of sustainable management (Wiggering et al. 2003). However, landscape planners increasingly adopt a general presumption in favor of multifunctionality.

The pursuit of multifunctional solutions will create governance problems—it is clearly much more straightforward to plan for monofunctional outcomes. There is a broad consensus that governance for multifunctionality involves:

- A partnership among public, private, and voluntary sector organizations, as well as individuals and communities (Stockdale & Barker, 2009)
- A transdisciplinary approach that blends the views, skills, and energies of both professional and lay stakeholders (e.g., Tress & Tress, 2001)
- A committed lead organization to enthuse the other partners, but one that is also ready to adopt an exit or succession strategy once a program has become self-sustaining.

A number of recent policy initiatives in the UK demonstrate these qualities to some degree. These efforts include the spatial targeting of public benefit forestry to secure economic and community regeneration (Morris & Urry, 2006; Forestry Commission, 2009); regional-scale habitat networks (Catchpole, 2007; Land Use Consultants, 2008; Whitehead, 2009); and programs of agricultural support measures to promote habitat recovery and catchment-sensitive farming (Natural England, 2008). Ling et al. (2007) have explored how a multifunctional approach to spatial planning—drawing upon historical, ecological, communitarian, economic, and aesthetic functions—could underpin more sustainable regeneration in post-industrial landscapes.

To summarize, I suggest that from a landscape-planning perspective: multifunctionality provides us with a way of understanding change and delivering joined-up policy at the landscape scale, where its core property of interactivity can be harnessed in ways that produce qualities valued by people. The key attributes of this perspective are that it:

- Requires not only colocation and coexistence of functions, but also their interactivity to create synergistic effects
- Operates at the landscape scale, including upward and downward linkages between neighborhood, district, and region
- Is a social construct, so that we can reasonably talk about positive (beneficial, virtuous) and negative (detrimental, vicious) interactions, with the former resulting in the accumulation of something valued by humans (e.g., capital, services, and benefits)
- Offers reconnected settings for social learning and collective action so that multifunctional landscapes contain high levels of social and economic entrepreneurship, as well as sustainable environmental systems
- Is a dynamic social-ecological system that is susceptible to catalysis by natural and cultural drivers, some of which are novel (e.g., sustainable energy production, river restoration, carbon-offset plantations) and may create unfamiliar, but potentially cherished new types of cultural landscape

While multifunctionality and green infrastructure have sometimes been seen as unwelcome new jargon, I argue that they do contain important new ideas for sustainable landscape planning (Box 2).

Multifunctionality is thus a fundamental property of sustainable landscape systems. The functional relationships of these systems are never static, and are constantly being deflected by cultural and natural

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**Box 2 Are “landscape multifunctionality” and “green infrastructure” genuinely new ideas?**

**Multifunctionality—distinctive features:**
- Integration of different land-use goals to promote simultaneous and interactive operation of functions
- Integration of rural, urban, and urban fringe
- Reconnection—social, economic, and environmental
- Synergistic—landscape that is more than the sum of its parts
- Elusive, emergent property
- Operation at a landscape scale—upward and downward linkages between neighborhood, district, and region
- Delivery entails integrated, partnership-based, participatory management and planning, social learning
- Risk-taking to enable serendipitous outcomes

**Green infrastructure—distinctive features:**
- Multifunctional
- Landscape scale
- Includes blue infrastructure (surface and groundwater systems) and airsheds
- Connected—structurally, functionally, socially
- Fundamental to planning and design—not an add-on
drivers, although they are often highly resilient and apparently stable. Landscape functions deliver ecosystem services and sometimes these services may have value to humans. The more that powerful groups of humans value a particular service, the more likely they are to drive a landscape toward multifunctionality. Relatively monofunctional landscapes will require high levels of human input to continue delivering their values and functions and it is likely that a completely monofunctional landscape will cease to be sustainable and will eventually require remediation. Hence, from the point of view of public policy, it will normally be desirable to seek a degree of multifunctionality in all cultural landscapes, and to achieve high levels throughout much of our green infrastructure.

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