A Multidimensional Sustainability Framework for Landscape Architecture

Are Diverse Outcomes Being Realized in Design Practice?

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Introduction

The ‘Anthropocene,’ according to Dutch landscape architect Dirk Sijmons, “is an apt and provocative term to describe the age and the world in which we now live” (Sijmons 2014: website). Proposed by Crutzen and Stoermer (2000), the Anthropocene theory asserts that we are now experiencing a geological epoch in which human activities, as opposed to natural processes, have become the dominant forces reshaping the Earth’s ecosystems and environment (Steffen et al. 2011; Purdy 2016). Mounting anthropogenic pressures include ongoing population growth (Ehrlich and Ehrlich 2009) and mass urbanization (UN 2015); unsustainable consumption of natural and finite resources (Deffeyes 2010; FAO 2011; Heinberg 2007; Heinberg and Lerch 2010; Kunstler 2006; Leggett 2014; Meadows et al. 2004; Nikiforuk 2012); climate change (Chen 2012; Dryzek et al. 2011; Leal Filho 2015); and problematic agriculture systems and food consumption patterns (Cribb 2010; Erisman et al. 2008; FAO 2016; Jarosz 2009; Poore and Nemecek 2018; Sage 2012; Roberts 2008; Weis 2010; Zeunert 2018a). The collective sustainability ramifications are resulting in ongoing net loss of planetary biocapacity (Barrett and Odum 2000; MEA 2001; Mostafavi and Doherty 2010: 216–217; Steffen et al. 2015), ecosystem degradation and biodiversity loss and a mass extinction crisis (UNICBD n.d.; Ceballos et al. 2017), leading to widely divergent and troubling potential future scenarios, such as ‘collapse’ (Holmgren 2009) and ‘survival of the richest’ (WEF 2017: 5). According to Bruns et al. (2017: 14),

Confronting the grand challenges society is facing from a landscape architecture perspective will contribute our special approaches to tackling problems. . . . The challenges of climate change, energy transition, urbanization, health, food security and others can successfully be addressed only if the driving processes and the spatial and human dimensions are considered together.
A Multidimensional Sustainability Framework

Despite the effectiveness of the small discipline of landscape architecture to meaningfully contribute to ‘wicked’ challenges being questioned (Fleming 2019; France 2003), and the hubris associated with the notion of managing the complexity of planetary systems (Lister in Zeunert 2017: 379; Lovelock 1994), such large-scale issues continue to provide impetus for the discipline to apply creative problem-solving skills to contribute potential design, planning and policy solutions. In this spirit, this chapter argues that it is essential to conceptualize landscape architecture sustainability within a multidimensional scope. ‘Multidimensional’ is herein defined as utilizing an intentionally diverse range of strategies, tactics and techniques to achieve a wide breadth of sustainability outcomes (such as qualitative and quantitative; measurable and immeasurable; ecological and environmental; social and cultural; official and activist; functional and aesthetic; conventional and unconventional; rational and poetic, and so forth). Are landscape architects already achieving a multidimensional approach to sustainability in their design outcomes? This chapter examines this question, focusing on design projects predominantly in the past two decades and in English-speaking, Western contexts.

It is also crucial to define ‘sustainability.’ Despite being an exhaustively utilized term for several decades, its ongoing use likely reflects humanity’s inability to achieve it. The most widely used definition of sustainability stems from the ‘Brundtland Report,’ being “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987: 8). As noted by Maggie Roe, however, ‘sustainable development’ is an oxymoron (Roe 2017: 4), and the Brundtland report had a thinly veiled economic agenda (van der Ryn and Cowan 1996). The saving face of the WCED definition is its notion of intergenerationality, albeit, from an anthropocentric purview. Ultimately, sustainability for humanity equates to the ability of planetary systems to perpetually furnish humanity with conditions enabling survival, and thus an ecocentric worldview is helpful in redressing the imbalance wrought by anthropocentric human activities upon planetary systems (Thompson 2007: 18).

Next, an overview of sustainability research focuses on the design and practice of landscape architecture in recent decades in order to assess the state of play. Sustainability is a perennially verdant topic in landscape architecture (Bruns et al. 2017; Cushing and Renata 2015; Green 2015; Weller 2014) and, for some, beyond saturation point (Oles and Lickwar 2015). Apathy to sustainability may stem from not only its heavy thematic weighting in recent decades, but its long legacy as a disciplinary anchor point; Frederick Law Olmsted and Ian McHarg are key sustainability emblems from the 19th and 20th centuries, respectively, and Anne Spirn assesses Olmsted’s (Spirn 1995) and McHarg’s (Spirn 2000) contributions to ‘designing nature.’ She raises tensions and contradictions still prevalent today between “preservation and management, nature and culture, tradition and invention, theory and practice” (Spirn 2000: 97). There are many notable contributors to the topic of landscape architecture and sustainability across the 20th century, certainly not limited to key works by McHarg (1969); Hough (1984); Spirn (1984); Thayer (1993); and Lyle (1994). There are innumerable works from other disciplines influential in shaping thinking and approaches to landscape architecture design practice (Zeunert 2018b: 59–102). Significantly, when reflecting on the past 50 years of the discipline in 2014, Richard Weller positions sustainability as landscape architecture’s “highest ambition,” with its allied concept of stewardship as its “raison d’être” (Weller 2014: 85).

Yet in more recent decades and coinciding with global urbanization, landscape architecture practice has increasingly separated from landscape planning and larger scales of operation – which were central in McHarg’s ‘sieve mapping’ approach (Weller 2009: 167) – to instead place increased emphasis on designing in urban contexts and addressing urban scales and issues (Weller 2014). As noted by Nina-Marie Lister (2007), in ecological terms, urban contexts are typically
isolated and fragmented, frequently lacking the operational ecologies of landscape-planning scales afforded by McHarg’s planning scales (Lister 2007). Similarly, Fleming (2019) critiques U.S. landscape architects for “spend[ing] most of their time designing small parks, office courtyards and residential projects for private clients” under the guise of impactful sustainable design. Accordingly, for increased sustainability effectiveness, it is important for landscape architecture to reintegrate thinking and practice at larger scales corresponding with ecological systems and their perpetuity.

John Benson and Maggie Roe’s edited book *Landscape and Sustainability* (2007) theoretically contributes to the topic of sustainability in landscape architecture; however, except for John Stuart-Murray’s chapter (2007: 222–236) this provides little specific content teasing out the interconnections between theory and practice. Milburn and Brown identified rifts between academic research foci and practice-based priorities in the USA in both 2003 and 2016 papers (Milburn and Brown 2003, 2016). As observed by Roe (2017: 77), it is therefore vital to link research and practice more substantively. Nancy Rottle and Ken Yocom’s book *Ecological Design* (2011) is geared to this aim within the remit of sustainable landscape architecture, although arguably fails to incorporate a multidimensional scope.

It is important to note that an array of landscape architecture design expertise exists in relation to specific sustainability concerns. The following ‘sustainability’ sub-topics include a wide range of books and other works not limited to: blue and green infrastructure (Austin 2014; Austin and Yu 2016; Benedict and McMahon 2006; Brears 2018; Czechowski et al. 2014; Perini and Sabbion 2017); ecology and ecological restoration (Reed and Lister 2014; Orff 2016); biophilic design (Beatley 2011; Kellert 2018); improving landscape performance (SITES n.d.; LPS n.d.; Calkins 2011); materials and construction (Calkins 2009; Margolis and Robinson 2007; Sorvig and Thompson 2018); landscape management (Cook and van der Zanden 2011); and other ancillary measures such as green walls and roofs (Dunnett and Kingsbury 2010; Hopkins and Goodwin 2011).

While focused investigation is important and entirely necessary in developing detailed, specialized understanding and optimizing performance outcomes of specific elements, it is crucial that focused concerns are understood as situated within wider overarching, systems-based conceptual sustainability frameworks. According to Rudolph Steiner, “what leads to a perceptive understanding of the thing is not the focus on one image, but the viewing of many images together” (Steiner 1897, 1985: 166). This systems-thinking approach provides a holistic way of understanding a system through examining its elements, linkages and interactions over time and within larger systems contexts (Zeunert 2017: 311). Non-isolationist approaches to sustainability are crucial to improving effectiveness and are posited by E.O. Wilson, who stated that “the world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely” (Wilson 1998: 294). Charles Massy quotes David Orr in his advocacy for ecological literacy to engender systems thinking and regenerative outcomes as, “that quality of mind that seeks out connections (not narrow specialization); that the ecologically literate person has the knowledge necessary to comprehend interrelatedness, and an attitude of care or stewardship” (Massy 2017: 65–66). Deming and Swaffield’s (2011: 4–7) interviews of ‘gatekeepers’ in landscape architecture research reinforce the importance of a broad and interdisciplinary view in arguing that researchers “need to retain their breadth of approach [and] improve the professional and social relevance of scholarship” (Deming and Swaffield 2011: 6). Landscape architects routinely claim to possess integrative abilities spanning diverse concerns, necessary to meaningfully address the large concerns in the Anthropocene. But is this ability demonstrated in design practice and built outcomes?
Methodology: A ‘Multidimensional Sustainability Framework’ (MSF)

In order to facilitate greater understanding and coverage of contemporary sustainability concerns, a number of areas must be considered together; or at least acknowledged as constituting a wide spectrum of intertwined factors. Ecological, environmental, social, political, governance, economic and infrastructural systems collectively contribute to the complex makeup of landscape architecture sustainability projects’ outcomes. Following over a decade of research, testing, application and iteration in practice and academia (Zeunert 2017: 169–196; Figure 19.1), in Landscape Architecture and Environmental Sustainability (Zeunert 2017), I suggest such a ‘multidimensional sustainability framework’ (henceforth ‘MSF’) (Figure 19.2). This is articulated through a structured survey and classification of landscape architecture sustainability practice outcomes. My book does not, however, provide an explanation of its framework, nor analysis and discussion of its findings. Consequently, this chapter aims to drill down into outcomes across two main areas: the extent to which the MSF reveals imbalances and gaps in landscape architecture sustainability practice and research.

Iteration of the Multidimensional Sustainability Framework (MSF)

Figure 19.1 Iteration and development of the Multidimensional Sustainability Framework (MSF) through applied environmental design research in landscape architecture sustainability practice and research.
sustainability practice, and whether individual landscape architecture projects (within the surveyed context) are demonstrably achieving multidimensional sustainability. In doing so, it hopes to offer tangible examples of how a synthesized (Wilson), ‘interrelated’ (Orr/Massy), ‘broad’ (Deming and Swaffield), systems-thinking (Steiner) approach to landscape architecture sustainability may hope to fulfill Sijmons’, Weller’s and Bruns’ visions of the profession contributing to the mounting environmental problems of the Anthropocene.

What might a ‘multidimensional sustainability framework’ look like? How might the many individual components of landscape architecture sustainability practice be teased apart in order to be identified and then fused together to form a holistic practice model? A possible answer was developed through a range of research methods including *reflective practice* (see Frayling 1993; Grotcott 2010) from practice-based sustainability project work, tools, systems and testing (see Zeunert 2018b: 169–196, 212–215); foundational research, document and literature review and analysis; canvassing professional institutes (IFLA, ASLA, LI, AILA); practices and local governments; semi-structured interviews (nine are published in Zeunert 2017); extensive project research (including targeted case studies, surveys of Sustainable SITES™ projects and metrics and LAF’s Performance Series Case Studies (Landscape Performance Series n.d.) and direct observation; analyzing professional award schemes; reviewing online resources and media; consulting professional networks; seeking feedback from public lectures and conference presentations; among other investigations. Figure 19.1 articulates the development, iterative nature and evolution of the MSF.

The resultant proposed practice-oriented MSF is comprised of eight sustainability ‘themes’ as follows (see Figure 19.2):

1. **Landscape and Ecology**: ecological and biodiversity/geared pursuits;
2. **Landscape as Cleanser**: remediation, mitigation and healing terrestrial and aquatic environments through intentionally designed ‘natural’ processes providing and enhancing ecosystems and their services;
3. **Environmental Infrastructure**: sustainability concerning transportation and energy infrastructure networks. Emphasis of performance over visual-centric outcomes. Mitigation as well as adaptation approaches to human-induced climate change;
4. **Landscape and Food**: recognition that substantial footprints relate to food and agricultural systems, and that landscape architecture can increasingly incorporate this area into its scope;
5. **Landscape Activism, Art and Beauties**: acknowledging that both activism as well as immersive and heightened experiences of beautifully designed installations and landscapes can engender and increase sustainability awareness, outcomes and their ongoing operation;
6. **Social Sustainability: Influence Beyond Site**: social sustainability concerns of both site-based as well as wider strategies and interventions to catalyze more sustainable behaviors and actions;
7. **Less Is More: A Lighter Touch**: highly attuned, ‘light-touch’ design, and sensitivity to natural and cultural place concerns; and
8. **Landscape and Performance**: performance-oriented approaches and ratings to increase quantitative benchmarking and empirical evidence.

These eight primary themes are then expanded into 31 sub-themes to further capture and articulate a breadth and depth of landscape architecture sustainability possibilities (Figure 19.2). Use of the term ‘framework’ as opposed to ‘theory’ is used in light of critical debate on the topic of theoretical substance in landscape architecture spurred by Robert Riley (Riley 1990: 48; Deming and Swaffield 2011: 32–33). The MSF as a conceptual model seeks to guide rather than prescribe, as well as address practice-focused contexts to provide a means for approaching and understanding landscape architecture sustainability endeavors.
Figure 19.2 A ‘Multidimensional Sustainability Framework’ for landscape architecture.
The eight sustainability themes and 31 sub-themes aim to synthesize what are often treated as separate sustainability foci into a structural framework. To examine how and to what degree these themes are currently represented within practice, a research process undertaken from 2014–2016 identified approximately 750 projects with potential (often self-claimed) sustainability outcomes (Figure 19.1). Through a critical process of investigation and case study research, this was subsequently reduced to just under 300 interrogated and ‘publication–appropriate’ works. For publication, 262 of these were thematically categorized, with 188 analyzed in greater detail as brief case studies cum project summaries (Zeunert 2017: 38–291).

Findings

How multidimensional are landscape architecture practices when filtered through the MSF? This section presents findings structured into two key areas: first, the ease of identifying built/realized projects as they relate to the eight themes and 31 sub-themes, and second, whether individual projects realize each of the eight MSF themes.

The ease or difficulty of identifying constructed works that demonstrate the MSF’s themes and sub-themes in 2014–2016 helps to reveal where sustainability was established and conversely, where underrepresented within design practice. Table 19.1 ranks each of the themes and the sub-themes based on whether they were prevalent, moderate, or rare in the 750 projects canvassed. Sub-themes are additionally quantified (as a percentage) according to their position (see ‘Sub-theme Summary’ in Table 19.1). Table 19.1 thus reveals gaps and imbalances to indicate where the profession has focused attention as well as successfully realized projects over the past two decades. This table provides an indicative ranking of each of the eight

Table 19.1 Ease of identifying projects for themes and sub-themes.

<table>
<thead>
<tr>
<th>Multidimensional Sustainability Framework Themes (8)</th>
<th>Prevalent</th>
<th>Moderate</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 2, Landscape as Cleanser</td>
<td>Theme 8, Landscape and Performance</td>
<td>Theme 3, Environmental Infrastructure</td>
<td></td>
</tr>
<tr>
<td>Theme 1, Landscape and Ecology</td>
<td>Theme 7, Less Is More: A Lighter Touch</td>
<td>Theme 4, Landscape and Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Theme 6, Social Sustainability: Influence Beyond Site</td>
<td>Theme 5, Landscape Activism, Art and Beauties</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Multidimensional Sustainability Framework Sub-themes (31)</th>
<th>Prevalent</th>
<th>Moderate</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Theme 2) Postindustrial Transformation and Adaptive Reuse</td>
<td>(Theme 8) Responsible Materials</td>
<td>(Theme 3) Energy Landscapes</td>
<td></td>
</tr>
<tr>
<td>(Theme 2) Remediation</td>
<td>(Theme 8) Embodied Energy and Material Lifecycle</td>
<td>(Theme 3) Resilience to Climate Change</td>
<td></td>
</tr>
<tr>
<td>(Theme 2) Environmental Water Cycle Management</td>
<td>(Theme 8) Performance and Rating¹</td>
<td>(Theme 3) Landscape’s Role</td>
<td></td>
</tr>
<tr>
<td>(Theme 1) Landscape Ecology &amp; Ecological Restoration</td>
<td>(Theme 8) Post-Completion Review²</td>
<td>(Theme 4) Food Systems</td>
<td></td>
</tr>
</tbody>
</table>
multidimensional sustainability themes and the 31 sub-themes based on ease of identifying realized project examples.

Based on the survey, certain themes were easy to identify and thus well represented in practice, namely Theme 2, *Landscape as Cleanser* and Theme 1, *Landscape and Ecology*. Three themes are moderately represented and/or available through a limited diversity of sources (Themes 8, 6 and 7). Others, however, are underrepresented, namely Theme 5, *Landscape Activism, Art and Beauties*; Theme 4, *Landscape and Food*; and Theme 3, *Environmental Infrastructure*. Independently ranking the 31 sub-themes provides a more nuanced indication of practice-based sustainability representation. Subsequently calculating the percentages of sub-themes (as prevalent, moderate or rare) independently correlates and substantiates the eight theme rankings, with, for example, 100 percent of Theme 2 and its sub-themes positioned as ‘prevalent,’ as opposed to 75 percent of

<table>
<thead>
<tr>
<th>Theme</th>
<th>Prevalent</th>
<th>Moderate</th>
<th>Rare</th>
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</thead>
<tbody>
<tr>
<td>Theme 2</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 1</td>
<td>66%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 3</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 6</td>
<td>20%</td>
<td></td>
<td></td>
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<tr>
<td>Theme 8</td>
<td>100%</td>
<td>75%</td>
<td></td>
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<tr>
<td>Theme 7</td>
<td>75%</td>
<td>50%</td>
<td></td>
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<tr>
<td>Theme 5</td>
<td>50%</td>
<td>37.5%</td>
<td></td>
</tr>
<tr>
<td>Theme 6</td>
<td>33%</td>
<td></td>
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</tr>
<tr>
<td>Theme 4</td>
<td>33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 7</td>
<td>25%</td>
<td></td>
<td></td>
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</tbody>
</table>

Table Footnotes
1 This sub-theme’s projects were predominantly discovered through Sustainable SITES™ (Zeunert 2017: 274–279). Very few other sources provided landscape architecture project ratings, so it is accordingly positioned as ‘moderate’ due to relative ease but lack of source diversity.
2 Primarily identified through the Landscape Performance Series (Zeunert 2017: 288). Few other sources provided post-completion analysis, so this sub-theme is classed as ‘moderate,’ again due to relative ease but lack of source diversity.
3 Meyer (2008: 2015) includes a range of completed works she considers exemplify Landscape Beauties and Sustainability (Meyer is also interviewed: see Zeunert 2017: 212–213). Again, due to a lack of diversity, this sub-theme is ranked ‘moderate.’
4 This sub-theme’s works were chiefly found through The Therapeutic Landscapes Network (Zeunert 2017: 240). Surprisingly, other sources were moderately challenging to identify.
Theme 3 classified as ‘rare.’ The sub-theme percentages also provide an indicative ranking of the themes based on their ease of identification and inclusion, being: 2, 1, 8, 6, 7, 5, 4 and, lastly, 3.

It is, important however, to note nuances in the sub-theme rankings, such as the total number of sub-themes affecting the overall percentages (Theme 6 has eight sub-themes while Theme 5 has only two), as well as some sub-themes (e.g., Environmental Water Cycle Management, Transport) lending themselves more to permanent constructed projects than others (Landscape Activism and Art, Design as a Service Sector, Restraint), thus indicating that identifying realized projects may inherently be more difficult. More detailed research and quantification would help to address shortcomings and limitations, and accordingly Table 19.1 intends to provide a high-level and initial indication of gaps and imbalances.

Next, the 188 works that were analyzed and written-up as cases (Zeunert 2017: 38–309) are now individually reviewed on the basis of demonstrating multiple MSF themes to indicate whether individual projects demonstrate narrow or multidimensional sustainability characteristics. Table 19.2 presents singular works that realized the most concurrent themes and thus the most notable ‘multidimensional sustainability’ breadth in their design and outcomes. The table includes 14 projects – 10 constructed and four unbuilt – that clearly demonstrate at least four sustainability themes. Table 19.2 displays notable landscape architecture sustainability projects demonstrating the widest multiple realization of MSF themes from the 188 project cases included in Zeunert, 2017 (page numbers are noted).

Astoundingly, from all the projects canvassed, only two encompass all eight themes, The Eden Project in Cornwall, UK (Zeunert 2017: 184, 186, 234, 236–237), and The Coal Loader Centre for Sustainability (Zeunert 2012, 2017: 235), in Sydney, Australia. Of the projects in Table 19.2, only Theme 6 (Social Sustainability: Influence Beyond Site) is realized across all 14 projects, showing its widespread interest and value (from the profession as well as project stakeholders and clients).

Table 19.2 Mapping of landscape architecture sustainability projects multidimensionality.

<table>
<thead>
<tr>
<th>BUILT PROJECTS</th>
<th>Multidimensional sustainability theme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>The Eden Project (see Zeunert 2017: 184, 186, 234, 236–237)</td>
<td></td>
</tr>
<tr>
<td>Coal Loader Centre for Sustainability (p235)</td>
<td></td>
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<tr>
<td>Center for Sustainable Landscapes (p279)</td>
<td></td>
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<tr>
<td>Underwood Family Laboratory (pp250–251, 254–255)</td>
<td></td>
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<tr>
<td>Ballast Point Park (pp96–97, 285)</td>
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</tr>
<tr>
<td>Union Street Urban Orchard (temporary) (p191)</td>
<td></td>
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<tr>
<td>Evergreen Brick Works (pp77, 304)</td>
<td></td>
</tr>
<tr>
<td>Emscher Landschaftspark (pp70–71)</td>
<td></td>
</tr>
<tr>
<td>Shenyang Architectural University Campus (pp176, 301)</td>
<td></td>
</tr>
<tr>
<td>Gary Comer Youth Center Rooftop Garden (pl89)</td>
<td></td>
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<tr>
<td>VISIONS/UNREALIZED</td>
<td></td>
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<tr>
<td>Detroit Future City (pp120–121,124–125)</td>
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<tr>
<td>Shadow Plans (p298)</td>
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<tr>
<td>DeDamming the Dutch Delta (pp132–133)</td>
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<tr>
<td>Urban Metabolism (p217)</td>
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</tbody>
</table>

Note: Light gray shading denotes achievement of a given MSF theme, while a white square indicates nonachievement. The dark gray is the primary MSF theme that each project was categorized into within Zeunert (2017).
When Table 19.2 is assessed based on the projects’ primary sustainability focus (dark gray squares), Theme 5 (Landscape Activism, Art and Beauties) and Theme 1 (Landscape and Ecology) are not represented. Yet Theme 1 is categorized as ‘prevalent’ in Table 19.1, suggesting that Landscape and Ecology focused projects are pursuing a narrow sustainability approach by excluding other themes. Theme 5, on the other hand, being ‘rare’ and thus difficult to identify is consequently less definitive in indicating a clear finding. A good balance of the other six primary themes is present. Overall, Table 19.2 suggests a pattern of prioritizing specific and sometimes narrow sustainability initiatives over far-reaching, multidimensional solutions, albeit, pending further and more detailed research.

Table 19.2 (and corresponding project summaries cited in Zeunert 2017) serves as an initial departure point for individual project’s multidimensionality and a basic reference marker for practice. Further in-depth case studies specifically focusing on multidimensional sustainability would elucidate (Francis 2001; Swaffield 2017). The Eden Project, for example, while demonstrating all eight themes, it is a private project charging a considerable entry fee, rather than being free for public access; thus, it has shortcomings outside of the capture of this research.

Future research could also importantly specify the measurement metrics regarding the extent of a Theme’s realization (through, for example, ranked scores /5 or /10, while noting that the MSF was not created with the intention of being used as a quantification tool). Is a project realizing all eight themes at low levels more sustainable than a project realizing four themes at high levels? To achieve multidimensional sustainability, a minimum of six themes should reasonably be present; moderate being four to five; and weak, one to three. Only nine projects in Table 19.2 realize six or more themes, and four of these are unbuilt works in which it is easier to propose an initiative than to actually realize it in built form. Ultimately, demonstrating both breadth and depth across multiple themes may constitute a multidimensional sustainability project outcome, based on more detailed research.

Notwithstanding that the great majority of the works analyzed demonstrate some aspect of sustainability outcomes, it is clear from the lack of projects realizing six or more Themes that a multidimensional approach to sustainability practice is yet to be holistically embedded in practice. Given this lack of multidimensional exemplars, at present, a collection of projects must be assembled in order to adequately demonstrate the notion of multidimensional sustainability in landscape architecture practice.

**Barriers and Opportunities for Multidimensional Sustainability in Landscape Architecture**

To what degree are multidimensional shortcomings due to designers or to external factors and practical constraints? It would be naïve to ignore the fact that wider factors such as practical constraints and inherited ideological assumptions affect the design and construction of sustainability processes; real-world barriers are ever-present and complex. The following points emerged from the research process reflecting central hindrances (and therefore potential opportunities) for landscape architecture to increase its multidimensional sustainability remit.

In the English-speaking cultural contexts surveyed, landscape architecture practice operates within neoliberal economic and governance systems. Neoliberalism fails to account for its reliance upon finite and diminishing natural resources and most certainly does not regulate its insatiable appetite for economic growth according to the capacity and state of the environment to provide for it (Allmendinger 2016; Hackworth 2007; Harvey 2005; Leitner et al. 2007; MEA 2001; Steffen et al. 2015). As such, a multidimensional sustainability agenda must adopt diverse tactics and strategies to both operate within this larger context as well as push back against it to offer new solutions. Within this limiting economic context, strategies include increasingly

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impacting the realm of sustainability mandates to influence policy and legislation more substantially. This would be aided by systems-thinking landscape architects seeking and securing a diverse range of leadership positions and influential public roles, as well as targeting client bases in such positions (such as Kongjian Yu approaching mayors as clients, see Zeunert 2017: 232). Ongoing and expanded advocacy will increase appreciation for sustainability skills and achievements (LPS n.d.; SITES n.d.; Yu in Zeunert 2017: 306–307; Zeunert 2017). Also, seeking a broader range of clients such as philanthropic and charitable organizations, granting bodies and research funds may help somewhat to circumvent neoliberal structures. Such an approach is also demonstrated by, for example, co-operative development in Baugruppen collectives (Ring 2013; Zeunert 2017: 211).

Increasing spatial scales of operation and the corresponding extent of sustainability influence may enhance tackling municipal, regional, national, even global-scale environmental problems beyond individual and small-scale urban land parcels (and rebridging the aforementioned rift between planning and design could assist). Examples of large-scale sustainability visions by landscape architects include Simon Kilbane’s (2017) national-scale green infrastructure network for Australia and Weller’s (2017) similar upscaled ‘World Park’ ecological restoration and conservation network focusing on biodiversity hotspots. While other intelligent, expansively scaled landscape architecture visions do exist, such as Weller’s (2009) and Weller and Bolletor’s (2013) population growth planning scenarios, they nevertheless operate within the perpetual growth gearing of neoliberal-agendas, therefore ultimately failing to alleviate anthropogenic strain on planetary natural systems.

When ‘push-comes-to-shove’ with design impetus and associated values and decision making, a preoccupation with visual form (Corner 1992), bourgeois aesthetics (Corner 2006: 27) and a concern with appearing modern and sophisticated (Yu 2010) continue to be very prevalent and perhaps even dominate landscape architecture (Zeunert 2017: 156–162; Fleming 2019). Notwithstanding that aesthetics and sustainability are not mutually exclusive, and sustainability can benefit from beautiful and highly crafted works (Cullity 2013; Meyer 2008; Zeunert 2017: 208–213), the visual must acquiesce to the sustainable if increasingly effective outcomes geared to planetary rebalancing are to be achieved (Yu 2010).

At the more pragmatic nexus of design thinking and practice, the following actions may assist progress in widening multidimensional sustainability’s catchment area. First, actively and consciously expanding beyond well-established sustainability themes and sub-themes (Table 19.1) (such as water management, postindustrial transformation and native plant species) and exploring underrepresented themes and sub-themes (such as renewable energy landscapes (Sijmons et al. 2014), landscape activism and food systems). Second, adjusting project timescales to longer time frames typically required for environmentally based processes, such as contaminated site remediation methods like phytoremediation and rhizofiltration (Kennet and Kirkwood 2015; Zeunert 2017: 91). Third and finally, problem-solving additional cost challenges from implementing sustainability practices, techniques and materials to help counter, for example, economies of scale and mass production favoring virgin and or imported rather than recycled, bespoke and/or local products (Zeunert 2017: 290).

As sustainability is normalized as a term and concept, it is essential to hold it accountable to standards, to measure its achievement in managing the planetary balance between human society and the capacity of ecosystems to provide services (provisioning, regulating, supporting and cultural; see MEA 2001). ‘Greenwashing’ continues to undermine the scale of this task, through intentionally or unconsciously applying a veneer of effectiveness to amplify given project outcomes. Within the discipline, increasing the use, number and capture of measurement tools (such as Sustainable SITES™ and the important post-construction Landscape Performance Series Case Studies) and their measurement methods will help to mitigate greenwash, particularly if aesthetic, place-attachment and emotive factors engendering sustainability are increasingly
incorporated (as articulated in MSF themes 5, 6 and 7; see Zeunert 2017: 196–273). This will also expand the landscape architecture’s quantified evidence base for increased use by government agencies, funding bodies, clients and stakeholders.

Concluding Thoughts

Considering landscape architecture’s already marginal role in the overall built environment (Bélanger 2017: 60–61; Fleming 2019; France 2003), the suggested multidimensional sustainability framework may seem to be merely ‘rearranging deckchairs on the Titanic’ as the Anthropocene’s crises unfold; ramifications from finite natural resource overexploitation, unchecked population growth, ever expanding urbanization and consumption patterns, all under the brooding malice of an increasingly volatile climatic system. Ultimately no single approach, framework, tool or method will result in a ‘silver bullet.’ Nevertheless, just as landscape architecture can be challenged to transcend its disciplinary limitations (Weller 2014: 85–108), so too can it continue to revise, reflect and review its sustainability strategies to become more resilient, more responsive and ultimately, more regenerative. Despite possible barriers to implementation and limitations in impactfulness, the ‘multidimensional sustainability framework’ articulated in this chapter seeks at the least, to present an original assemblage and unique sustainability view, while at most, hopes to assist the thinking and approaches of designers, specialists, students and clients in approaching landscape interrelationships through a systems-thinking ambit, encompassing the breadth, awareness and understanding so required for effectiveness in the field.

Despite landscape architecture routinely requiring students, practitioners and academics to be synthesizers of information with a broad knowledge base and the discernment and judgment to apply this ability to built, process-based outcomes, disciplinary sustainability practice in the past two decades demonstrates a tendency to focus on specific concerns, or the combination of two or three themes. Collectively surveying as well as individually situating sustainability projects and discourse within the MSF facilitates identification of concentration of sustainability foci, while subsequently revealing where gaps and less commonplace practices are occurring. Certain themes (Landscape as Cleanser, Landscape and Ecology) contain more realized work than lesser represented themes (Environmental Infrastructure, Landscape and Food, Landscape Activism).

Aside from a small number of notable examples, individual projects need to pursue a more diversified – a multidimensional approach – to sustainability design to increase the breadth of their endeavors. Based on the conducted survey of 750 projects, landscape architecture practice realizes diverse sustainability approaches collectively moreover than individually. This calls into question the ability of landscape architects to synthesize and realize a breadth of sustainability initiatives within individual built projects. The extent to which wider limitations affect this would benefit from further clarity and research. In addition to spurring the pursuit of a greater breadth (and depth) of initiatives within individual projects, results also suggest that intentional exploration of lesser populated sustainability themes and sub-themes would diversify realized outcomes. Primarily, these are concerns in landscape and food systems, landscape activism geared to sustainability and in environmental infrastructures – particularly, renewable energies. All this while perpetually adapting to a changing climate.

References


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