Chapter 3
Student Guide 1—How to Develop a Nature-Centric Sustainability Manifesto

Abstract A foremost challenge in developing a biophilic design (BD) framework is uncovering a perception of sustainability that appreciates nature and fosters biophilia in the built environment. The sustainable built environment can be understood through the relationships among three dimensions: *the human*, *the built* and *nature*. Depending on the dimension in focus, the perception can drastically differ. This chapter provides a few directions for developing a nature-centric perception. Ecological thought and deep ecology are presented as the bases of the nature-centric perception. This perception has two functions in developing the BD framework: (i) it allows us to understand and interpret buildings and nature as two parts of the same metaphysical entity; (ii) it provides an opportunity for categorising the criteria found in current environmentally sustainable design and BD practices using a classification common to both approaches. One example of a common classification—based on defining nature as elements of earth, air, water, energy and habitat is elaborated, reflecting a verbal expression of the sustainability manifesto.

3.1 Introduction

This is a guide to support you in developing a sustainability manifesto. A sustainability manifesto is your own personal interpretation of sustainability, which will inform how you approach your design. This interpretation can be expressed through speech, a diagram, a video, an act or any other representation you deem appropriate and relevant.

This chapter presents a comprehensive framework that can guide you in building your manifesto through understanding the relationships between *the human*, *the built* and *nature*. We demonstrate, through one example, how we interpret sustainability; this can be taken as source of inspiration or even adapted for your manifesto. This example shows a sustainability manifesto that interprets building as an extension of the natural setting. We interpret both *the built* and *nature* as comprising the same elements of earth, air, water, energy and habitat. These elements provide a common categorisation for both an ESD and BD approaches.

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3.2 The Relationship Between Human, Built and Nature in the Perception of Sustainability

Sustainability is an ambiguous notion with diverse interpretations. In architecture, when we refer to a sustainable built environment, we usually mean a system that comprises three dimensions: *the human*, *the built* and *nature*. The evolution of a sustainability perception can be understood by the interrelationships among these dimensions (Fig. 3.1).

This triangular relationship between the dimensions can be understood through the built-centric, human-centric or nature-centric lens. Built-centric approach means that a primary objective of design is to bring benefits to the built environment, the human-centric approach attempts to bring benefits to humans, and the nature-centric approach brings benefits to nature. These dimensions are interrelated. The two-way relationships between *nature* and *the human* target the psychological wellbeing of building occupants; between *human* and *built*, physical comfort; and between *the built* and *nature*, minimising environmental impacts, which shifts attention from building occupants to the environment.

The resulting six relationships reflect various design approaches, which have different implications for sustainability. For ease of reference, we have termed these relationships as follows: *built-to-express*, *built-to-mitigate*, *human-built-comfort*, *human-nature-wellbeing*, *nature-for-wellbeing* and *nature-to-mitigate*.

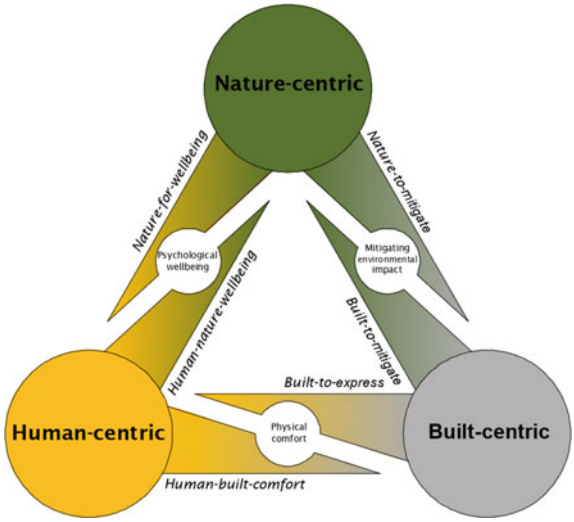

Fig. 3.1 Interrelationships among the human, the built and nature in sustainability perception

3.2.1 Built-Centric Design Approach

The relationships *built-to-express* and *built-to-mitigate* are part of the built-centric approach, in which design is focused on the built object. These are building-dominant views that maximise the benefits to the built program. When referring to the built-centric design approach in regard to *the human*, the *built-to-express* relation usually indicates a design approach with very little, if any, consideration for environmental impacts. For instance, classical architecture focuses on perfecting the shapes and forms of the building expression while providing a comfortable space for human activities. The same trend can be partially observed in modern buildings, which are intended to be functional and comfortable spaces for the occupants.

By contrast, a built-centric approach directed towards *nature* focuses on mitigating design impacts on the environment. This is the *built-to-mitigate* relation, which can be identified as the starting point of modern sustainability practice. In this approach, buildings are designed to mitigate environmental impacts, but they often overlook the implications on human psychological wellbeing. This dominates current ESD practice, in which sophisticated technology merely achieves mitigation targets. Research has shown that a building may achieve its sustainability and energy targets but fall behind in supporting healthy human–nature connectedness (Kellert, 2008). This is a different building expression, displayed in many technically advanced buildings and reflecting a new expression in modern buildings.

It must be noted that there exist exceptions in sustainable practices that can reflect other types of relationships. This is the case of architectures that draw upon vernacular practices, which demonstrate both built-centric and nature-centric sustainable practices.

3.2.2 Human-Centric Approach

In the human-centric approach, *human-built-comfort*—that is, the relationship between *human* and *the built*—reflects unique human-centred design within ESD practice and, in some instances, within conventional design. This approach established itself in opposition to the building-as-machine movement by supporting and appreciating human behaviour and thereby generating architecture that maximises comfort. The difference between this and *built-to-express* is that, even though both focus on comfort, the *human-built-comfort* approach is not dominated by building expression. Rather, forms are generated to support user comfort.

Another aspect of this design movement has focused on human behaviour—both individually and collectively—and has been advocated by scholars such as Alexander (1977) and Bill Hillier and Hanson (1989). However, buildings responding to human behaviour are also focused on psychological comfort, going beyond mere physical comfort. This highlights the fact that, when considering different design approaches,

there are some relations with overlapping boundaries, and it is always up to you to reinterpret them to suit your view.

Within ESD practice, some GBRTs such as the WELL Building Standard are focused on physiological comfort, providing strong examples of a *human-built-comfort* approach.

The current BD practice is a human-centric towards *nature* that can be deduced as being a *human-nature-wellbeing* approach. This approach is based on the numerous benefits that nature can bring to humans (Wijesooriya & Brambilla, 2021); designs following this approach attempt to harness these potential benefits and make them an integral part of the conceptual phase of the design process. The BD approach developed by Xue et al. (2019), for example, claims to improve human performance in terms of enhancing productivity, cognition and creativity by incorporating nature into buildings.

This approach can be observed in the growing design trend of using natural elements in isolation—often within sophisticated interiors—as distinctive BD features. The Changi international airport in Singapore (Fig. 3.2) is the perfect case: featuring a giant indoor waterfall, it has been depicted in many forums as a successful BD. In this example, nature is used and re-created for the sole benefit of human psychological wellbeing, paying less attention to sustainability—that is, the environmental impact of such design elements. Therefore, this design brings benefits to humans and is focused on psychological wellbeing; consequently, it is a perfect example of the *human-nature-wellbeing* approach.

3.2.3 Nature-Centric Design Approach

The *nature-for-wellbeing* and *nature-to-mitigate* relationships belong to the nature-centric approach.

Nature-to-mitigate approaches—that is, nature-centric approaches towards *the built*—focus on the mitigation of environmental impact. Buildings designed through this lens bring benefits to nature while achieving building performance targets. Recent GBRTs, such as the Living Building Challenge (International Living Future Institute [ILFI], 2016), promote this holistic approach to architecture. Even in earlier ESD practice, you may come across building designs that have these characteristics. For example, Kandalama Hotel in Sri Lanka—by Geoffrey Bawa, a pioneer in modern regionalism architecture—is designed with a nature-centric approach (Fig. 3.3). It is the first LEED-rated hotel and also has a focus on mitigating environmental impact.

Paramit Factory, Malaysia designed by Design Unit Sdn. Bhd. is another example that demonstrates *Nature-to-mitigate* relationship within nature-centric approach. This building is a BD example practiced in an industrial architectural project showcasing the potential for varied building types. The building lies within an industrial zone with a recreated forest earning the name ‘factory in the forest’ (Fig. 3.4). In this project the factory building design has included sustainability

Fig. 3.2 Changi airport. *Source* Authors

Fig. 3.3 Kandalama Hotel, Sri Lanka, by Geoffrey Bawa. *Source* Authors

Fig. 3.4 Paramit factory, Malaysia designed by Design Unit Sdn. Bhd. *Photo credit* Lin Ho photography

initiatives with passive strategies and sophisticated climate controls allowing it to mitigate environmental impacts.

Nature-for-wellbeing—a nature-centric approach towards the *human* dimension—is identifiable with designs that bring benefits to nature while optimising human psychological wellbeing. This is the case with vernacular architecture—which is designed to minimise the effects on the natural environment—or with modern buildings that focus on minimising the destruction of nature, integrating existing landscape into the design.

An example from Mexico that demonstrate *Nature-for-wellbeing* in the nature-centric approach is IK LAB Gallery designed by Jorge Eduardo Neira Sterkel. The design uses organic forms and shapes blending with surrounding natural environment with greater potential to enhance HNC. Figure 3.5 a similar project from Malaysia that includes a meditation centre designed by Inchscape Sdn Bhd. Unlike the previous example of Kandalama Hotel, that focuses on mitigation of environmental impact through verified sustainability performance this design emphasises on connection to nature at every possible opportunity.

The selection of the dominant approach is a personal choice. A sustainability manifesto can integrate more than one approach, or, conversely, it can be focused solely on one aspect. There is no right or wrong choice; however, if your intention is to develop a BD framework compatible with ESD criteria, you should explore the nature-centric approach.

Fig. 3.5 Meditation centre, Malaysia by Inchscape Sdn Bhd. *Photo credit* Lin Ho photography

3.2.4 Identifying the Built-Centric, Human-Centric and Nature-Centric Design Approaches

Table 3.1 summarises the six relationships so that you can easily refer to them and understand the differences.

You may have also come across numerous approaches that are practised in sustainable design, such as climate-responsive design (Hyde, 2000), passive design (Belmonte et al., 2021), bioclimatic design (Watson, 2020), low-carbon design (Pan & Pan, 2021), and water-sensitive design (Fogarty et al., 2021), to name a few. All of these approaches can be categorised within the six abovementioned relationships by investigating the concepts and targets at the core of each approach. By analysing different approaches, you can learn how to recognise the relationships between *the human*, *the built* and *nature*, which characterise current ESD practices. The following section presents a decision-making tree (Fig. 3.6) that can be used to identify these relationships.

To use the decision tree, follow these steps:

- Step 1—Identify the focal point of the design. Refer to the explanation above and ascertain the primary objective of the design. How is the design approach perceived?
- Step 2—Think about the potential outcome of the design and the target criteria that are used to judge whether it is successful.

Table 3.1 Six human–nature–built relationships for a sustainability manifesto

Relation	Approach	Focus	Description
Built-to-express	Built-centric	Comfort	Conventional highly expressive building designs
Built-to Mitigate	Built-centric	Environmental impact	The current environmentally sustainable designs, which focus on mitigating environmental impact using sophisticated technology
Human-built- comfort	Human-centric	Comfort	Building designs maximising the human comfort for physical and behavioural found within both conventional and environmentally sustainable design practice
Human-nature-wellbeing	Human-centric	Psychological wellbeing	The current biophilic design practice, which focuses on improving psychological wellbeing by using natural elements within the building
Nature for-wellbeing	Nature-centric	Psychological wellbeing	Development within biophilic design that aims to bring benefits to nature while enhancing psychological wellbeing through human–nature connectedness
Nature-to-mitigate	Nature-centric	Environmental impact	Designs that are sustainable and biophilic, where natural processes can be used to achieve building performance

- Step 3—Now, look into the area that will most benefit from the design. This step is crucial to reaffirm the originally identified perception in step 1.

Now, let us delve into an example and analyse the climate-responsive design approach (Fig. 3.7).

Climate responsive design is an approach where 'building from and structure moderates the climate for human good and wellbeing' (Hyde, 2000, p. 3), thus attempt to expose the senses of the user to the climatic variations. The first impression may lead you to think that this approach is nature-centric, since it seems to be

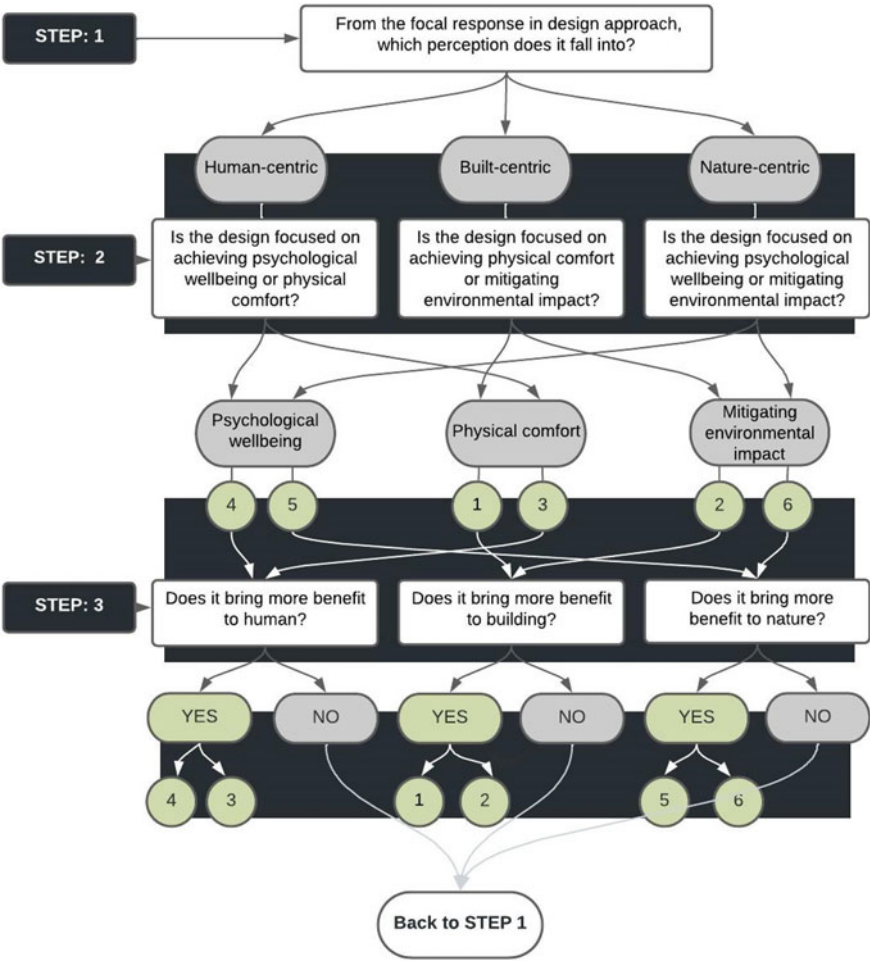

Fig. 3.6 Decision tree for identifying the dimensional interrelations in sustainable designs. *Note* Numbers refer to (1) *built-to-express*, (2) *built-to-mitigate*, (3) *human-built-comfort*, (4) *human-nature-wellbeing*, (5) *nature-for-wellbeing* and (6) *nature-to-mitigate*

dealing with climate. If this is the case, we will then ask the question of whether it is more focused towards mitigating environmental impacts or towards psychological wellbeing. Generally, climate-responsive design is focused on designing for a particular climate; hence, our interpretation shifts towards one of a focus on mitigating environmental impacts. It is important to remember that this is a personal interpretation and may differ from one person to another. One might even argue that climate-responsive design is, in fact, more focused on comfort. Selecting 'nature-centric', and 'mitigation of environmental impacts' as the focus, we are directed towards Relationship 6 (*nature-to-mitigate*). At this point, we have to double-check the relationship.

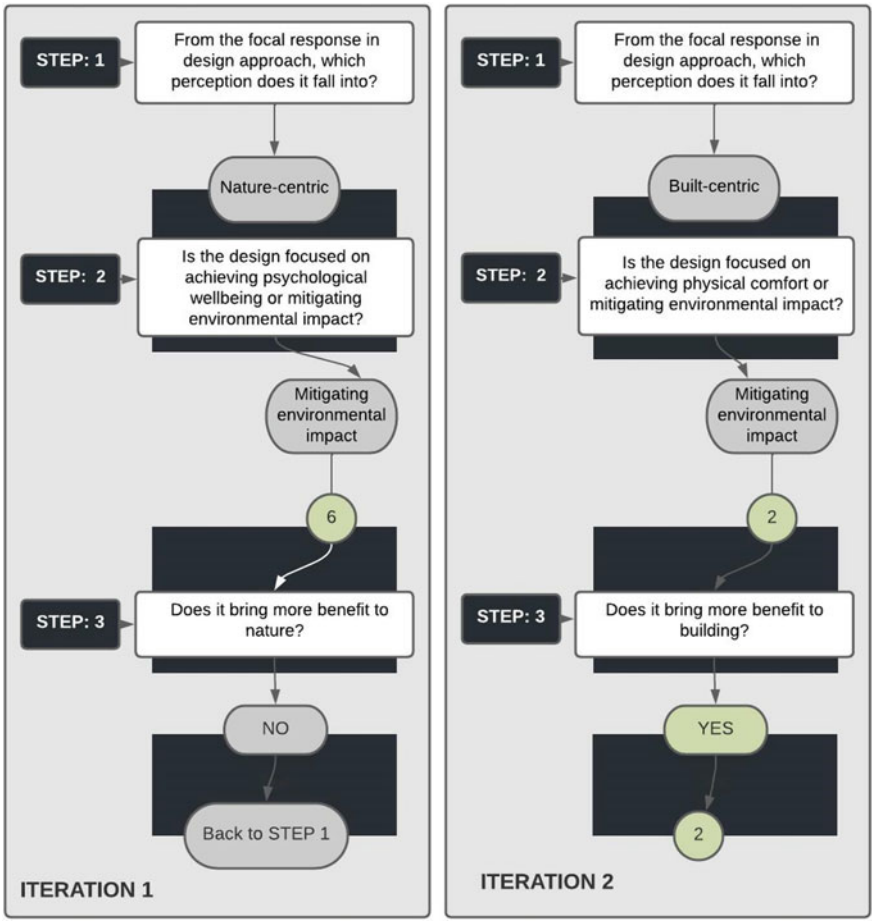

Fig. 3.7 Use of the decision tree to identify the dimensional interrelations for climate-responsive design. *Note* Numbers refer to (2) *built-to-mitigate* and (6) *nature-to-mitigate*

To do so, we might need to look at some examples (i.e., relevant case studies of developments following the design approach) and refer to the current debates on design. This step confirms that climate-responsive design seems to be more focused on using climatic conditions to achieve human physical comfort, reflecting a focus typical of Relationship 2 (*built-to-mitigate*). This is a typical ESD approach, which have lesser emphasis on psychological wellbeing.

Your conclusion may differ. Indeed, this analysis depends on your interpretation. We highly encourage you to try this decision tree as a group activity, wherein different interpretations can be elucidated, compared, and critically examined.

By completing this exercise, you will be able to understand what relationship is placed at the core of any sustainable approach, while building foundation and

confidence for making informed choices. You will also notice that this exercise will progressively clarify what is important to you as a sustainable designer.

3.3 Biophilic Design: How to Develop Your Nature-Centric View

Approaching design with a nature-centric perception and developing a sustainability manifesto is a crucial step for constructing a BD framework compatible with an ESD approach. Applying a nature-centric approach is fundamental for identifying a common classification for both ESD and BD.

However, once you have clarified your own approach to sustainable design, you might find that it is not nature-centric. If this is the case, you may need spend some time exploring and understanding the biophilic view. Contemporary ecological thought argues that *human* and *the built* can be considered parts of the same metaphysical entity; hence, *the built* can be considered an extension of the natural setting.

In the following sections, we will provide you with some ideas, principles and evidence that support the nature-centric view. In particular, we will explain in detail how ESD and BD are two faces of the same coin: the first is focused on sustainability as mitigation of environmental impacts; the second, on its human emotional affinity. Further, we will present advanced notions of ecological thought (Morton, 2010) and deep ecology (Devall & Sessions, 1985), which are grounded on the idea that everything is interconnected through nature.

3.3.1 Understanding Nature Within a Global Environmental Movement

The effects of human actions on the environment are no longer negligible. Visible, catastrophic consequences have aroused a desire to protect nature in all its forms, resulting in a global environmental movement (Mol, 2000). The roots of the modern environmental movements date back to the Middle Ages (Istiadji et al., 2018). There are some key milestones in organised environmentalism: McCormick (1991) has argued that the Age of Discovery, Romanticism and Darwinism heavily influenced the rise of protectionists, wilderness preservationists and resource conservationists. The rise of the movement is apparent from the mid-nineteenth century, but revolutionary actions are visible only after 1945, with drastic momentum after the 1960s (McCormick, 1991).

Examining some of the key contributions that shaped the directions of the global environmental movement, it is apparent that the human relationship with nature is the pivotal point. The Age of Discovery is represented by advances in natural

history that played a crucial role in exposing how human activities exploit nature. The foundations for modern botany and zoology were laid during this time, when being a naturalist and exploring natural sciences was quite popular during Victorian era. Studies into natural sciences awakened interest in studying, documenting and collecting specimens of nature. This new knowledge led people to explore and study nature from different viewpoints.

One viewpoint was Romanticism. *The Natural History of Selborne*, by Gilbert White (1788), was one of the texts advocating for people to restore the peaceful connection with nature as a way to appreciate its beauty. This text influenced many others to study natural history from a romantic viewpoint, focusing on beauty and emotional solace rather than scientific merit. While appreciating the beauty of nature, poets and painters bewailed the changes made to nature through agriculture. For example, Wordsworth (1882) claimed that agriculture violated the rights of nature, while Gilpin (1794) noted the shocking encroachments on the elegance of the natural landscape. In either case, nature was clearly the focus of concern.

The other viewpoint was to explore nature on scientific grounds. First naturalists emerged out of these scientific explorations of natural world. Their role was as scientific explorers, and their interests were in expanding the collection of animal and plant specimens through exotic expedition. The height of the exploration era was the rise of Darwinism, which drastically shaped environmentalism. At this time, Western thinking was premised on the belief that humans were superior to other species, and work by Darwin—with the subsequent publication of the *On the Origin of Species* (1852)—shattered this common belief. Darwin provided evidence for naturalists to realise that humans are evolved, much like any other species in nature, and it was by their own choice that humans have distance themselves from nature. This not only challenged the Western school of thought but also contributed immensely to the latter expansion of the environmental movement, which revealed that human dominance was leading to the unethical destruction of nature (Erdos, 2019).

Both Romanticism and Darwinism shaped the fundamental understanding of nature, and responses were broadly identified as either conservationist or protectionist. The conservationist approach aimed to conserve wilderness and natural landscapes. The establishment of nature reserves and parks was part of this response. The protectionist approach aimed to mitigate human impact and protect both animals and landscape. Both approaches had a common goal of raising environmental consciousness and constructing a healthy relationship with nature.

The environmental movement kept growing across the globe while expanding its focus. *A Sand Country Almanac* (1949), by Aldo Leopard, directed focus on ethical consciousness to protect nature. Conservation ethics is based on human intrinsic moral obligation to protect nature. This viewpoint also contained ideas around environmental justice that encompassed debate around equal participation in environmental policy, equal access to nature and justice for non-human environmental entities (Palmer et al., 2014). Thus, conservation ethics became embedded in the environmental movement (Rolston, 2012).

Drastic changes to legislation were seen after the 1960s. Seminal texts by Rachel Carson contributed immensely to strong policy frameworks for environmental protection. *The Sea Around Us* (1950), *The Edge of the Sea* (1955) and *Silent Spring* (1952) all presented vivid narratives of how people disturb the ecological equilibrium in nature in the name of development. These stories, with scientific evidence, reminded people of the origin of the environmental movement, the beauty of the natural environment and the tragedy of its loss.

The need for sustainable development was a broader response that attempts to encompass the many facets of the rising global environmental movement. This was evident from the United Nations Sustainable Development Goals, introduced in 2015, in which all social, environmental and economic aspects were incorporated into a very broad framework.

The response from the built environment focused on mitigating environmental impacts by introducing the new approach of ESD. ESD, from its inception, had more focus on policy and technological interventions than on the human–nature relationship. However, current ESD practice has a greater emphasis on nature and nurturing for healthy human–nature relationships (Africa et al., 2019).

It is clear that, throughout the rise and expansion of the global environmental movement, nature has held a focal position. Even though ESD originally focused on merely mitigating environmental impacts, there is currently a transition towards an approach that has enhanced human–nature connectedness. Thus, a nature-centric approach is crucial for shifting ESD to respond to the need for enhanced human–nature connectedness in the design outcome.

3.3.2 The Interconnected Mesh: Interplay of the Human, Nature and the Built

While literature on global environmental concerns presented in Sect. 3.3 above has emphasised the central position of nature in the global environmental movement, another crucial school of thought has evolved around the idea that all living entities are interconnected. This idea broadens the definition of what constitutes nature. This phenomenon was widely discussed in deep ecology and ecological thought (Morton, 2010), and highlights the criticality of achieving long-lasting sustainability.

The notion of the interconnectivity of all living things had its foundation in Eastern thinking. Erdos (2019) argued that Eastern philosophy has a high emphasis on enduring a close relationship with nature. Henning (2002) drew similarities between Buddhist philosophy and deep ecology. Buddhist philosophy was built upon this notion of interconnectivity to convince people to be more passionate towards nature. As Hennings (2002) pointed out:

> Buddhism views people as a part of nature. If the environment is destroyed or degraded, people cannot survive or have a quality life. By abusing the environment, people abuse themselves and their descendants as well as future generations of all life. (p. 9)

By contrast, early Western thinking placed humans above other living beings, which, in return, may have led to the exploitation of natural resources (Erdos, 2019). The idea of interconnectivity first appeared in Western thinking only after the rise of Darwinism. Darwin planted the seeds of the idea that all living beings are interconnected, and that human evolution was equal to any other species, which shattered the idea of human dominance over other species.

The idea of deep ecology was brought into the global environmental movement through the work of Norwegian philosopher and mountaineer Professor Arne Næss. He argued that there were two types of environmentalism (Naess, 1973), which were not compatible: the long-range deep ecology movement and the shallow ecology movement. He distinguished these two types by the level of inquiry. Deep ecology argues deeply into the purposes and values of environmental issues, breaking them down to their fundamentals, such as exploring the deeply rooted relationship between human and nature. Shallow ecology merely questioned at the surface level such as taking actions against pollution and resource depletion. Even though the term 'deep ecology' was coined in early 1970s, Rachel Carson's work with *Silent Spring* (1952) is recognised as the turning point that 'ushered in what appropriately can be called the Age of Ecology' (Sessions, 1987, p. 105).

Sessions (1987) conducted a comprehensive review of the deep ecology movement, pointing out its ideological nature and argued that:

> many environmental historians, ecophilosophers, and anthropologists now agree that primal societies throughout the world practiced a spiritual 'ecological' way of life in which everything was to be respected in its own right. This 'ecocentric' religious approach accounts for their cultural success for thousands of years and can provide modern humans with historical models for the human/nature relationship. (p. 107)

By assigning spiritual connotations to ecological views, Sessions (1987) also distinguished between the Eastern and Western religious philosophies and pointed out how Eastern religions were premised on the interconnectivity of all entities.

Snyder (2004) further expands this view by emphasising the need for nature to be considered from an ethical point of view, arguing that:

> a huge number of contemporary people we can no longer think that the fate of humanity and that of the natural world are independent of each other. A society that treats its natural surroundings in a harsh and exploitative way will do much 'other' people. Nature and human ethics are not unconnected expansion of ecological consciousness translates into a deeper un interconnectedness in both nature and history, and a far more grasp of cause-and-effect. (p. 21)

Snyder (2004) also stressed differences in the Western and Eastern philosophical debates in acknowledging the mutual connectivity of humans and nature. Snyder (2004) argued that, to establish this connection, we need to understand that 'I am part of your surroundings just as you are part of mine' where 'this sort of mutuality is acknowledged in Buddhist philosophy, and highly developed in ecological thought' (p. 23).

Deep ecology seemed to have its roots in Buddhist philosophy and that the idea of interconnectivity was been further explored with varying interpretations. Morton

(2010) used the term 'mesh' to represent the interconnectedness of all living and non-living things. In the mesh, he placed the built as an extension of the environment, arguing that:

> all the life forms are the mesh, and so are all dead ones, as are their habitats, which are also made up of living and non-living beings. We know even more now about how life forms have shaped Earth. We drive around using crushed dinosaur parts. Iron is mostly a by-product of bacterial metabolism. So is oxygen. Mountains can be made of shells and fossilised bacteria. (p. 29)

He specifically used the term 'ecological thought' to describe this way of thinking about an interconnected metaphysical world wherein we can consider the built as a part of nature itself.

The arguments around deep ecology and ecological thought support the idea that nature is a connecting factor in the world in which we live. Thus, shifting our sustainability perceptions towards a nature-centric approach will assist us to consider the built as an entity within nature and both are made from same elements. This means that the built is not a separate entity but rather an extension of nature. If nature is built with elements, then so is the human, and so is the building. Therefore, any definition we use for nature or natural things can be equally applied to the built or to humans.

3.4 Biophilic Thought: A Nature-Centric Sustainability Manifesto

We have argued that shifting the perception of sustainability towards a nature-centric view is also to accept that things are interrelated, that nature is the pivotal point, and that we can, therefore, define both nature and the built using common aspects.

With this biophilic thought, we developed our own sustainability manifesto. Drawing on the literature presented above, we used the elemental view of nature: that nature is a composition of *earth*, *air*, *water* and *fire*. This philosophical, elemental view of nature is common in both Eastern (Hardy, 1853; Kalupahana, 1976; Upham, 1829) and Western (Adler, 1952; Glacken, 1970) traditional cultures. *Earth*, *air*, *water* and *fire* are commonly used as grounding elements of the environment—or nature—bearing both physical and cultural meanings.

Buddhist philosophy provides an early revelation that matter is made of four elements: *prutav-dhatu* (earth), *vayu-dahthu* (air), *apa-dhatu* (water) and *theja-dhatu* (fire) (Karunadasa, 2020). In Hinduism, these elements are commonly termed *pancha boota* with an additional fifth element of space (Singh, 1992). The Chinese concept of *fengshui* similarly views *earth*, *air*, *water* and *fire* as elements of existence. In the practice of *fengshui*, functions of household are orientated to designated directions of the four elements (Parkes, 2003). The objective of this is to harmonise the elements and thereby attract universal energy for wealth and prosperity.

Mortimer Adler (1952) identified the elemental view as one of the hundred great ideas of Western thought. Traditionally, ancient Greek geography used the natural

elements as guides to understand and interpret the environment and space (Glacken, 1970). They identified the elements of fire in the sun, air in the sky, earth in mountainous landscape and water in the sea. This view is reflected in Greek mythology, poetry and literature (Hesiod, 1973) as well as in Greek philosophy (Macauley, 2010).

However, with industrialisation and technological advances, this perception also took a shift. Hegel, in the *Philosophy of Nature* (1970), explained how science, with the advances of chemistry, deduced all materials into elementary chemical compounds, and the four elements were neglected. Hegel (1970) stated that 'the concept of the four elements, which has been commonplace since the time of Empedocles, had been rejected as puerile fantasy' (p. 34) and that 'no educated person is now permitted, under any circumstances, to mention (it)' (p. 34). It is highly likely that this vision influenced the ESD approach as well, which is focused on technological solutions to mitigate environmental impacts, rather than building expression for depicting cultural meanings, values or enhancing human–nature relationships.

By contrast, the elemental view underlines the importance of sensory experience as a means to bring humans closer to nature. Macauley (2010) explored the use of the four elements under elemental philosophy and argued that further inquiry into the four elements not only enriches philosophical debate but also actively contributes to environmental activism. Macauley (2010) believed that understanding nature through these elements serves two purposes: First, it supports a sensory experience, wherein physical entities touch the senses—for example, the earth beneath our feet, feeling a breeze on our face or touching a body of water. Establishing these sensory links makes it easier to understand nature and enhance human–nature connectedness based on a set of achievable and tangible targets. Second, this 're-rooting' of nature as elements gives an understanding of the use of natural elements and processes within buildings for everyday use as a 'domestication of elements' rather than a 'domination of nature'. For instance, water is domesticated through fountains, ponds and reservoirs, while fire, in the form of hearth, brings warmth to an interior space, lighting and electricity (Macauley, 2010). This conscious domestication helps us to appreciate the consumption of elements extracted from nature, rather than positioning them as scientific or chemical compounds.

Foster (2002), among many others who have advocated for the use of the four elements to perceive nature in overcoming the environmental crisis (Callicott et al., 2014; Light, 1995; Sallis, 2012), has argued that an elemental view could lead to a stronger environmental virtue ethics.

With this definition, we could create criteria in BD and ESD using the four elements of *earth*, *air*, *water* and *fire.* To use these elements for both nature and the built, we also needed to amend the terms in ways familiar to sustainable design. We used *earth*, *air* and *water* as they were, but changed *fire* to *energy*. This change facilitated a more sensible interpretation of current ESD criteria given under *energy*. We added another element, *habitat*, which reflects the inclusion of flora and fauna into the built environment, currently promoted in both BD and ESD. Thus, biophilic thought defines **"buildings as extensions of a natural setting and as made of *earth*, *air*, *water*, *energy* and *habitat*".** We further elaborated our biophilic thought by assigning definitions to each element:

- *Earth* is the materiality of the building that brings it into existence with colours and textures.
- *Air* is the space that is trapped within the building to allow for ventilation and air quality performance and which contributes to the sense of space and light.
- *Energy* is the power of the building that brings warmth, comfort and light into the building; the visual attributes of daylight; and the perceived heat in the building.
- *Water* is the fluidity within the building, serving aesthetic and utilitarian purposes.
- *Habitat* is the living forms in and around the building that interact with humans, including flora and fauna that connects the inside with the outside.

These definitions allow ESD criteria and BD criteria to be mapped onto the five elemental categories. These categories can not only be used to create comprehensive design principles that encompass both ESD and BD criteria, but they are also the expression of our sustainability manifesto. For us, sustainable design is the bridge between the built and nature; it represents the fundamental connection between performance, emotions and wellbeing. The built without nature is a mere construction; the built is an extension of nature, and both are composed of *earth*, *air*, *water*, *energy* and *habitat*. Architecture is the interconnected mesh that allows us to design truly sustainable buildings, allowing for a nourishing coexistence of the built, nature and the human.

Now you have seen how we built our manifesto by drawing upon the literature on ecology and sustainability; however, this manifesto is our interpretation of the concepts, principles and ideas. You can try to build your own manifesto by responding to these questions:

- What is the fundamental role of architecture for you? Why do we design?
- What is sustainability? How can you define it in fewer than 100 words?

In responding to these questions, try to think about what you have read and the different connecting relations illustrated in Fig. 3.1. It is important that you try to contextualise the manifesto within the framework. If you do this, it will be possible to develop a design framework based on your manifesto.

The written definition of biophilic thought above is an example of a sustainability manifesto given in verbal expression. You can also use a diagram to communicate your sustainability manifesto, as shown in Fig. 3.8.

3.5 Concluding Remarks

In this chapter, we have seen the fundamental interrelations between *the built*, *nature* and *the human.* We identified a method for analysing current ESD frameworks and identifying their fundamental relations. The literature on the human-centric approach development can guide us towards the creation of a sustainability manifesto grounded in the elemental view, wherein humans, buildings and nature are part of the same entity and interconnected in a unique mesh. Starting from this exercise, it is possible

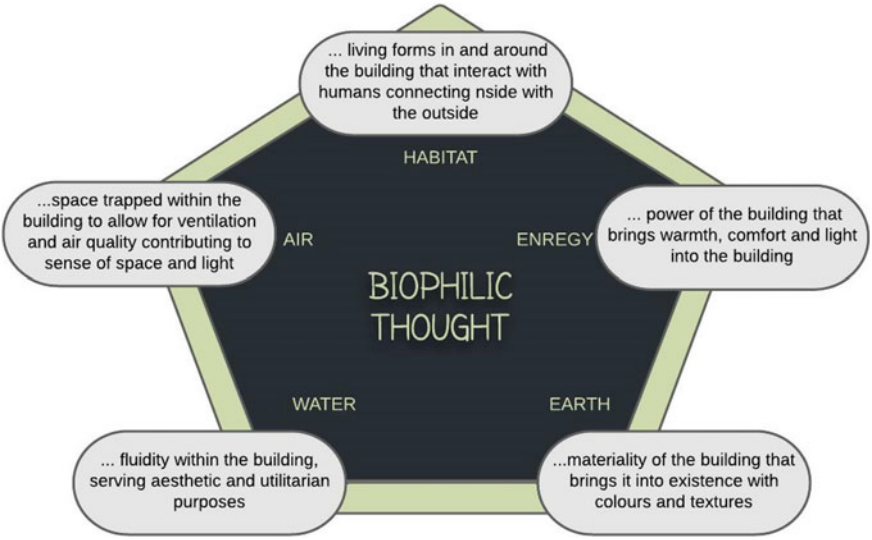

Fig. 3.8 Diagrammatic presentation of biophilic thought

to develop a personal manifesto, responding to these pressing questions: What is sustainability? What is the role of architecture?

Within sustainable studio, this represents a first step towards an informed approach to design. In the next chapters, we will provide evidence for the next steps that must be undertaken to integrate BD into ESD studios: Student Guide 2 (how to develop a BD framework) and Student Guide 3 (how to report and model your BD thinking), which contains an exemplar showing how to apply the framework to develop a design proposition.

References

Adler, M. J. (1952). *The great ideas* (Vol. 1, p. 306). Encyclopaedia Britannica.
Africa, J., Heerwagen, J., Loftness, V., & Ryan Balagtas, C. (2019). Biophilic design and climate change: Performance parameters for health. *Frontiers in Built Environment, 5*, 28.
Aldo, L. (1949). *A sand county almanac*. Ballantine Books.
Alexander, C. (1977). *A pattern language: Towns, buildings, construction*. Oxford University Press.
Belmonte, M. V., Díaz-López, C., Gavilanes, J., & Millán, E. (2021). Introducing passive strategies in the initial stage of the design to reduce the energy demand in single-family dwellings. *Building and Environment, 197*, 107832.
Callicott, J. B., & McRae, J. (Eds.). (2014). *Environmental philosophy in Asian traditions of thought*. SUNY Press.
Carson, R. (1950). *The sea around us*. Oxford University Press.
Carson, R. (1952). *Silent spring*. Houghton Mifflin Harcourt.
Darwin, C. (1852). *The origin of species*. PF Collier & son.
Devall, B., & Sessions, G. (1985). *Deep ecology* (pp. 200–205). Pojman.

Erdős, L. (2019). *Green heroes: From Buddha to Leonardo DiCaprio.* Springer Nature.
Fogarty, J., van Bueren, M., & Iftekhar, M. S. (2021). Making waves: Creating water sensitive cities in Australia. *Water Research,* 117456.
Foster, J. B. (2002). Ecology against capitalism. NYU Press
Gilpin, W. (1794). *Three essays: On picturesque beauty; on picturesque travel; and on sketching landscape: To which is added a poem, on landscape painting* (Vol. 8). R. Blamire.
Glacken, C. J. (1974). Man and nature in recent Western thought. In *This little planet* (pp. 163–201).
Glacken, C. J. (1970). Man and nature in recent western thought. In M. Hamilton (Ed.), *This little planet* (pp. 163–201). Scribners.
Hardy, R. S. (1853). *A manual of Budhism, in its modern development*. Partridge and Oakey.
Hegel, G. W. F. (1970). *Hegel's philosophy of nature: Edited by MJ Petry*. Allen & Unwin
Henning, D. H. (2002). *A manual for Buddhism and deep ecology*. World Buddhist University.
Hesiod, T. (1973). *Hesiod and theognistrans.* Dorothea Wender.: Penguin Books
Hillier, B., & Hanson, J. (1989). *The social logic of space.* Cambridge University Press.
Hyde, R. (2000). *Climate responsive design: A study of buildings in moderate and hot humid climates.* Taylor & Francis.
ILFI International Living Future Institute. (2016). *Living building challenge V3.1. Vol. 3.1.* https://www2.living-future.org/LBC4.0?RD_Scheduler=LBC4.
Istiadji, A. D., Hardiman, G., & Satwiko, P. (2018, December). What is the sustainable method enough for our built environment?. In *IOP Conference Series: Earth and Environmental Science* (Vol. 213, No. 1, p. 012016). IOP Publishing. https://doi.org/10.1088/1755-1315/213/1/012016.
Kalupahana, D. J. (1976). *Buddhist philosophy: A historical analysis.* University of Hawaii Press.
Karunadasa, Y. (2020). *The Buddhist analysis of matter*. Simon and Schuster.
Kellert, S. R. (2008). Dimensions, elements, and attributes of biophilic design. In *Biophilic design: the theory, science, and practice of bringing buildings to life* (pp. 3–19).
Light, A. (1995). Materialists, ontologists, and environmental pragmatists. *Social Theory and Practice, 21*(2), 315–333.
Macauley, D. (2010). *Elemental philosophy: Earth, air, fire, and water as environmental ideas.* Suny Press.
McCormick, J. (1991). *Reclaiming paradise: the global environmental movement* (Vol. 660). Indiana University Press.
Mol, A. P. (2000). The environmental movement in an era of ecological modernisation. *Geoforum, 31*(1), 45–56.
Morton, T. (2010). *The ecological thought*. Harvard University Press.
Naess, A. (1973). The shallow and the deep, long-range ecology movement: A summary. *Inquiry, 16*(1–4), 95–100.
Palmer, C., McShane, K., & Sandler, R. (2014). Environmental ethics. *Annual Review of Environment and Resources, 39*, 419–442.
Pan, W., & Pan, M. (2021). Drivers, barriers and strategies for zero carbon buildings in high-rise high-density cities. *Energy and Buildings, 242*, 110970.
Parkes, G. (2003). Winds, waters, and earth energies: Fengshui and sense of place. In *Nature across cultures* (pp. 185–209). Springer.
Rachel, C. (1955). *The edge of the sea.*
Rolston, H. (2012). *Environmental ethics.* Temple University Press.
Sallis, J. (2012). The elemental turn. *The Southern Journal of Philosophy, 50*(2), 345–350.
Sessions, G. (1987). The deep ecology movement: A review. *Environmental Review: ER, 11*(2), 105–125.
Singh, R. P. (1992). Nature and cosmic integrity a search in Hindu geographical thought. *GeoJournal, 26*(2), 139–147.
Snyder, G. (2004). Ecology, literature and the new world disorder. *Irish Pages, 2*(2), 19–31.

Upham, E. (1829). *The history and doctrine of Budhism: Popularly illustrated: with notices of the Kappooism, Or Demon Worship, and of the Bali, or planetary incantations, of Ceylon*. R. Ackermann.

Watson, D. (2020). Bioclimatic design. In V. Loftness (Ed.), *Sustainable built environments* (pp. 19–41). https://doi.org/10.1007/978-1-0716-0684-1_225.

White, G. (1788). The natural history of Selborne, reprinted 1981.

Wijesooriya, N., & Brambilla, A. (2021). Bridging biophilic design and environmentally sustainable design: A critical review. *Journal of Cleaner Production*, 124591.

Wordsworth, W. (1882). *The poetical works of William Wordsworth* (Vol. 2). Paterson.

Xue, F., Lau, S. S., Gou, Z., Song, Y., & Jiang, B. (2019). Incorporating biophilia into green building rating tools for promoting health and wellbeing. *Environmental Impact Assessment Review, 76*, 98–112.