Chapter 1
The State of the Planet: From Anthropocene Dominant to Regenerative-Adaptive Futures

Abstract From the twentieth to the twenty first century humans have passed through a unique period; one in which the planning, design and construction of the built environment has been almost un-imaginably bad and unacceptable. The way we have designed and built our cities has resulted in a degeneration of the earth's natural systems, now eventuating in unprecedented impacts of a changing climate. The dominant approach to address this planetary issue is to apply sustainable development practices, focusing primarily on reducing damage to nature and aiming for a 'neutral' outcome using resources more efficiently. Ultimately, this practice is only resulting in a mitigation approach that is just slowing down the degradation of our living earth. Missing from the design, planning and adaptation practice discourse is a more deeply integrated approach to the design and planning of human settlements that considers the whole, which moves away from the current view that humans standing apart from nature, rather than participating, co-evolving and adapting with nature. Identifying key issues of concern to be dealt with – our human's affinity to water and unprecedented coastal development; the challenge of a changing climate with increased natural disasters; the degradation of ecosystems; and the half-hearted attempt by a global anthropogenic and utilitarianism society to achieve sustainability; this chapter introduces a *pattern language approach* to deal with these complexities. The narrative sets out the fundamentals for a more holistic, all encompassing, *integral method*, presenting a *regenerative-adaptive pattern language* for sustainable development, that re-establishes our wholeness with nature, and considers the vulnerabilities of a changing landscape. Setting in place the typical structure of *a pattern language*, the chapter concludes with the *fundamental pattern* The Whole, [1].

Keywords The whole · Regenerative-adaptive · Earth system · Patterns · Biophysical environment · Patten language · Integral · Informed by nature · Sustainability · Climate change

Upward links:
We begin with the part of this [new] pattern language that cannot be simply put into words, but is rather inherently understood by all sentient beings as the non-verbal language of natural attraction, the fundamental truth, the existence of the *web of life*. This is a universal form of oneness: all things are connected and all things are part of The Whole [1].

P. B. Roös, *Regenerative-Adaptive Design for Sustainable Development*, Sustainable Development Goals Series, https://doi.org/10.1007/978-3-030-53234-5_1

1.1 Introduction

> I think it would be a grave injustice to speak of the human species as in some sense evil, even though we are destroying the environment so efficiently at the present time. Basically that was not our intention, and it never was. It was very natural and it was necessary for the ancestral human being to throw everything they had against the wilderness in an attempt to conquer it and then utilise it. The nature of humankind is to expand its population, to gain security, to control, to alter. For millions of years that paid off without undue damage. But then what happened was, as we developed a modern industrial capacity, and then the techno-scientific capacity to eliminate entire habitats quickly and efficiently, we succeeded too well and at long last we broke nature. And now, almost too late, we are waking up to the fact that we have overdone it and that we are destroying the very foundation of the environment on which humanity was built (Edward Osborne Wilson, recorded in *The State of the Planet*; television program by David Attenborough, first transmitted November 2000).[1]

There is ample evidence that the human species is destroying the natural resources of earth, and that humanity's impact on the earth systems has become comparable to planetary-scale geological processes such as ice ages (Brito & Smith, 2012, p. 2). At the four-day convention *Planet Under Pressure: New Knowledge Towards Solutions,* held in March 2012 in London, over 3000 scientists and experts convened to evaluate the state of the planet and explored potential solutions to an impending global crisis. Consensus was reached by the attendees and recorded that humans have driven the planet into a new epoch, the Anthropocene,[2] in which many Earth-system processes and the living fabric of ecosystems are now dominated by humans (Brito & Smith, 2012, p. 10) (Fig. 1.1).

While many scientists debate this concept, recently a working group of scientists, put together by Zalasiewicz and tasked with confirming this epoch and its start date, came to conclusion that the Anthropocene is real, and a potential start date of this new epoch can be calculated around the early 1950s due to the industrial revolution (Davison, 2019).

As argued by Wilson, the very foundation of the environment on which humanity was built is in danger (Wilson, 2004). The human species has caused drivers of negative environmental changes which include the pollution of earth, oceans, waterways and atmosphere. These drivers are caused by industrial, agricultural, commercial and transportation activities of people and are now directly impacting the narrow band of climatic conditions that supports the on-going survival of the human species (MEA, 2005; Mgbemene, 2011; Parmesan, 2006; Pedersen Zari, 2012). The developing of environmental impact is rooted in the technological advancement of human habitation that resulted in developing populations, agricultural revolutions, urban and industrial revolutions, and the modern scene (Goudie & Viles, 2013). These impacts of human actions on the environment is as a result from the Anthropocene (Rockström et al., 2009; Steffen, Crutzen, & MCNeill, 2007). The *Anthropocene* is a name for describing the new epoch in Earth's history where human activities became a force so profound that it impacts the functioning of the Earth's system (Crutzen, 2002; Steffen, 2010). Human's impact on Nature came down to the fact that humans now have the greatest anthropo-mass of any living species on the planet and it is in the order of magnitude greater than the mass of all earthly mammals alive (Goudie, 2018, p. 27; Smil, 2011). This resulted in the biosphere transformed from a majority of terrestrial biosphere into intensively used 'anthromes' with predominantly anthropogenic processes with major negative impacts to nature (Ellis, 2011; Goudie, 2018).

Wilson further emphasise the fragile state of our planet in *Half-Earth: Our Planet's Fight For Life* (Wilson, 2016) by stating the 'world ends twice': the dawn of the Holocene replaced by the Anthropocene, the 'Epoch of Man', is finally leading this world into the peak of destruction called the Sixth Extinction. The human desire for enhanced and rapid technology will leave behind fossils of

[1] *The State of The Planet*, presented by David Attenborough is a three-part environmental documentary series, produced by Rupert Barrington for the BBC Natural History Unit, November 2000.

[2] The Anthropocene is an informal geologic chronological term that marks the evidence and extent of human activities that have had a significant global impact on the Earth's ecosystems. Eugene F. Stoermer first used the term in 1980 (Revki, 2011).

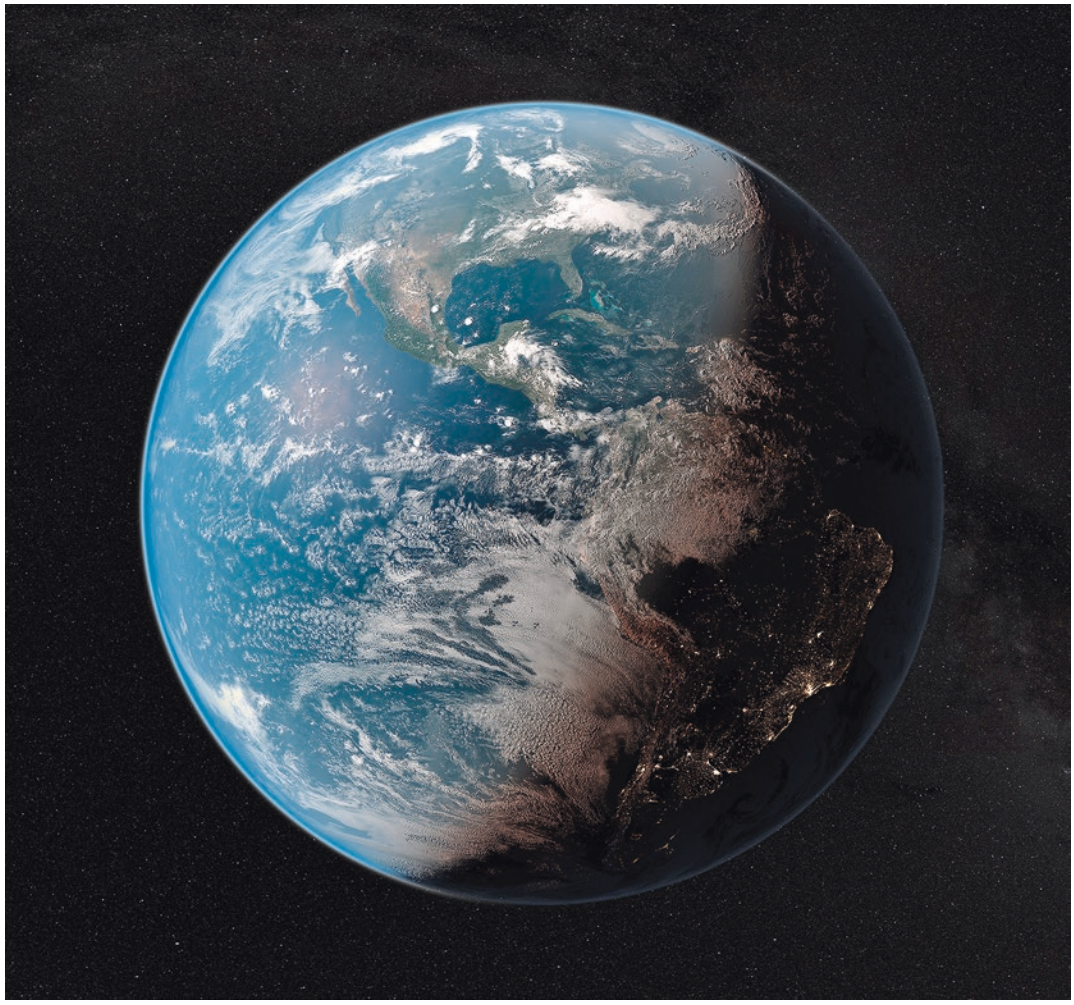

Fig. 1.1 Mother Earth. (Image by Samoilov 2018, CC BY 2.0)

fragments of machines, deadly weapons and layers of chemically altered soil for future geologists to discover. Wilson (2016) proposed a potential shocking discovery:

> The Anthropocene, far-distant geologists might say, unfortunately married swift technological progress with the worst of human nature. What a terrible time it was for people, and for the rest of life (Wilson, 2016, p. 9).

The problem is clear: we have to change our behaviours, we need to acknowledge the vulnerability of our human species, and reconnect to nature. I argue that a design and development process that is based on the stipulations of a nature-informed pattern language can help us address this planetary emergency. The journey of exploration in finding knowledge relating to sustainable design and development, one that includes a deep connection to nature and stewardship, resulted in me investigating design and planning theories that relates to the duality of man and nature. These theories have a common thread, the consideration of '*the whole*'. It is evident that living systems are part of a bigger interconnected whole, or part of an integral existence. As noted by DeKay (2011), relationships of entities in an integral theory that considers 'holons' are configured and assembled into languages, and these patterns in the language of nature occur mostly in the form of 'network patterns'. Not only is the network a whole system, but it also contains parts, which are themselves

networks and patterns; collectively, these make up the wholeness of the system (DeKay, 2011, p. 303; Koestler, 1967). The wholeness of spatial configurations is present in many natural occurring events, phenomena, our human interconnectedness with nature, and also in the aspects of complex systems behaviour (Alexander, 2003). In the context of the earth's environment and climate, this wholeness is evident in the Gaia theory[3] (Lovelock, 2009). We are part of this whole.

It is this connection to the ecological system that is evident in the teachings of Ian McHarg, where the solution for a sustainable future lies within the processes of design with nature. In his book titled *Design with Nature* (1992 [1969]), he provided a roadmap for applying ecological information to the way we interpret, plan and shape our surroundings (McHarg & Steiner, 2006). John T. Lyle and Sim Van der Ryn have put similar arguments forward that climate and the ecological system are influenced by design (Lyle, 1994; McHarg, 1992 [1969]). Every building project large or small, city making or settlement development contributes to climate moderation or extremity in some way or the other as part of a watershed, ecological system, floodplain or coastal environment.

Further in the context of *the whole* as defined by Alexander (Alexander, 1979; Alexander, 2001–2005), it is not only the physical sciences and factors we must consider, but also human dynamics—people's needs and concerns of a particular place, and how people of that specific place can produce reliable scientific knowledge. In *A Pattern Language* (Alexander et al., 1977) and in the book *The Timeless way of Building* (Alexander, 1979), Alexander argues that it is the local residents of a town that have the knowledge of how such a place evolved over generations. This knowledge can be used to establish the patterns of the urban fabric. Alan Irwin (1995), a British sociologist, defines this use of local knowledge as 'Citizen Science', where citizens themselves could produce reliable scientific knowledge (Irwin, 1995). In the case study used in this book, it is indeed the case, as local knowledge of the Great Ocean Road coast region in Australia is collected from local residents as well as from the Aboriginal peoples of the area, and synthesised to help to shape and form a pattern language. The knowledge of how these settlements changed over time is fundamental to the adaption planning for future changes. The local knowledge also informed the patterns and processes used to develop a *regenerative-adaptive pattern language*, further described in Chap. 11. It is also clear that the accumulation of knowledge of a specific place over time and the regenerative-adaptive patterns of a place embody the deep interconnections between people and their natural environments.

I argue thus that for human settlements to be resilient against changes of climate impacts, it is necessary to understand the patterns of natural systems and the human systems, how we connect within these patterns, and how we can use these patterns for adaptability. Further, using *regenerative-adaptive pattern language* principles that seek to develop approaches to support co-evolution of human and natural systems (which goes beyond the basic requirement of sustainable development), I propose in this book to apply these principles to the adaptation practice for climate change. A regenerative-adaptive methodology offers a holistic solution *informed by nature*, which is an integral player in all settlement planning and design processes, to better craft and strengthen our future communities (Roös & Jones, 2017). It is my argument that 'designing with nature', based on a regenerative-adaptive approach, is an innovative (and possibly the only) way to achieve true resilience for both human and natural environments in the future.

[3] Lovelock describes in *The Vanishing Face of Gaia* (2009) that the Earth, with all these levels of organising, is a self-regulating complex system involving the biosphere, the atmosphere, the hydrosphere and the pedosphere, tightly connected as an evolving system. His Gaia theory argues that the Earth system is a whole, an interconnected system that consists of a physical, biophysical and chemical environment optimal for contemporary life (Lovelock, 2009).

1.2 Affinity to Water: An Increased Risk

Our human species affinity to water in the landscape, more specifically the attraction to the sea and the resources it can offer, drew people to settle along the coastal areas of Australia more than 50,000 to 60,000 years ago (Nunn & Reid, 2016; Powell, Tournier, Jones, & Roös, 2019; Roberts, 1994). For centuries Aboriginal people have been confronted by climate, ecological and geological changes as well as annual seasonal variations. Weather patterns and climate change were gauged by the occurrence of natural events. Migrations of people along the Australian coast are captured in *Dreaming Stories*[4] of the *Sea Country*.[5] People lived in harmony with nature and practiced sustainable behaviours to adapt for survival. This was the scenario across the world, where Indigenous people settled along coastal areas to sustain generation upon generation living closely connected to their natural environments.

However, now in the twenty-first century people flock to coastal areas in ever-increasing numbers at a global scale, wanting a change in lifestyle from city life, seeking the pleasures, amenities and attributes that coastal settlements can offer. Contradictory to sustainable behaviours of the Indigenous people of the past, living with nature and understanding the patterns of the biophysical environment, today this predilection for the coast equates to an increased unsustainable development in the destination communities. The environmental changes associated with these land developments threaten the very qualities that make these places unique and attractive (Green, 2010).

Changes in the climate and rising sea levels make the coastal area more vulnerable and bring change to the coastal zone impacting beaches, marine environments, estuaries, wetlands and low-lying human settlements (DCC, 2009). Globally, the coastal areas are in peril. We know enough about how human actions are impacting the environment through the role we play. However, even with this knowledge, unsustainable behaviours of intense land development continue in the coastal areas. Graphic displays of the vulnerability of our species is right in front of us, demonstrated visually in events such as the 2005 Asian tsunami, the 2011 earthquake in Christchurch (Fig. 1.2), the large-scale disaster impacts of Hurricane Sandy in north-eastern United States (the largest Atlantic hurricane on record causing an estimated damage of around USD $ 50 billion), and in Australia the devastating 2010/11 Queensland floods, as well as the unprecedented floods in Queensland and Northern New South Wales in 2017 following the path of distraction by Cyclone Debbie.[6]

It seems that disasters due to a changing environment and climate are just getting worse and escalating, as it is especially noticeable in Indonesia and the Pacific. During 2018, Indonesia's National Disaster Mitigation Agency (BNPB) recorded approximately 2000 natural disasters that claimed nearly 4000 lives and displaced around 3 million people (Renaldi & Shelton, 2018). Undoubtedly, we are drawn to the coast, and human settlements continue to grow at a rapid rate in coastal areas. It is the coastal inhabited areas that are the most vulnerable to natural disasters, more so with the threats and risks as a result of a changing climate. For this reason, the case study area chosen for applying the *regenerative-adaptive pattern language* is the coastal town of Anglesea in a coastal area along the Great Ocean Road in Australia.

[4] *Dreamtime* or the *Dreaming* for Australian Indigenous people (sometimes referred to as the Dreamtime or Dreamtimes) is when the Ancestral Beings moved across the land and created life and significant geographic features. The Dreaming also means to have insight, and to see creation. *Dreaming Stories* pass on important knowledge and belief systems of the Aboriginal people from one generation to the next (Australian Government, 2008).

[5] *Sea Country*: Aboriginal people make no distinction between the sea and the land; the sea is part of *Country*. *Sea Country* is a term used to differentiate between land and sea. *Sea Country* includes the coastal land and the sea with everything connected to it. *Sea Country* includes the submerged lands that bear the footprints of the Aboriginal ancestors (Smyth, 2004).

[6] Cyclone Debbie made landfall along the Queensland coastline near Airlie Beach on Tuesday the 28 March 2017 (ABC News, 2017).

Fig. 1.2 Earthquake Christchurch 2011. (Photo by Koester 2019, CC BY 2.0)

1.3 The Challenge of Climate Change

The warming of the climate system with its related effects will continue. The modern industrial and techno-scientific capacity of the human species, developed to support and build mega cities to house the increased world population, is now estimated to reach a booming 9.8 billion people[7] on earth as early as the year 2050, and is continuously contributing to climate change. The built environment alone is contributing at least 30% of the total anthropogenic Global Greenhouse Gas (GHG) emissions, which come from the construction and the operations of buildings, and is consuming at least 40% of all energy (De la Rue Du Can & Price, 2008; Satterthwaite, 2008; UNEP, 2009). Estimates of how high the contribution to global GHG emissions from cities will increase vary from 30% to as high as 80% (Spiegelhalter & Arch, 2010). To put this in absolute terms, the IPCC (2014) estimated building-related GHG emissions have been around 8.6 million metric tons CO_2 equivalent in 2004, and under the high growth scenario (A2-ASF),[8] this figure could increase dramatically to 15.6 billion metric tons CO_2 equivalent in the year 2030 (Levine et al., 2007). Further, additional to GHG emissions, the building sector is also responsible for significant emissions of other harmful gases such as halocarbons, CFCs, HCFCs and hydrofluorocarbons (HFCs) through refrigeration and cooling applications and insulation materials (UNEP, 2009, p. 9).

[7] United Nations Population Division projects a world population growth with an estimated population between 8.3 and 9.8 billion by the year 2050 (UN, 2013; *World Population Prospects: The 2017 Revision*, UN, 2017)

[8] IPCC emission scenarios: The A2 scenario family includes slow improvements in the energy supply efficiency and a relatively slow convergence of end-use energy efficiency in the industrial, commercial, residential, and transportation sectors between regions. A combination of slow technological progress, more limited environmental concerns, and low land availability because of high population growth means that the energy needs of the A2 world are satisfied primarily by fossil (mostly coal) and nuclear energy. Source: IPCC Emission Scenarios, http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=98

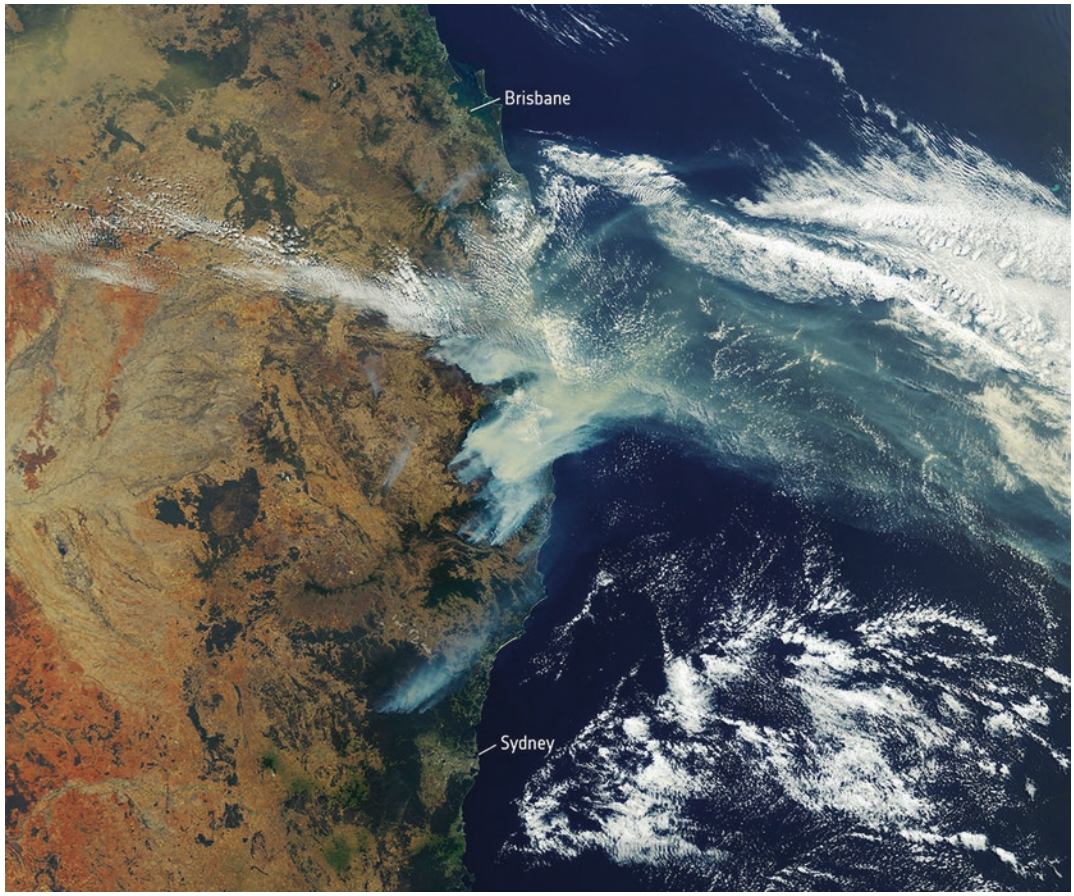

Fig. 1.3 Australian Bushfires 2019–2020. (Photo by European Space Agency 2019, CC BY-SA 2.5)

The human influence on the climate system is clear, and this is evident from the increase of global temperatures, greenhouse gas concentrations in the atmosphere, positive radiative forcing, ocean warming, loss of mass of the Greenland and Antarctic ice sheets, continued shrinking of glaciers almost worldwide, and sea levels continuing to rise (IPCC, 2013). Our human species is indeed facing a global challenge of unprecedented climate change proportions, recently evident in the 2019 Australian bushfires as never experienced before (Fig. 1.3). For the first time in the history the State of Victoria in Australia, the Premier Daniel Andrews declared a *State of Disaster* for 6 areas.[9] This demonstrates the increasing urgency for humans to address anthropogenic causes of climate change, as well as critically consider alternative methods of adaptation.

1.4 The Challenge of Ecosystems Degradation

Biodiversity and ecosystems and the services they support are fundamentally dependent on the climate; actually, on a stable climate with gradual variations and changes. Human impacts are one of the key factors for biodiversity loss, being the main stressor for the shift in habitats and alteration (Mooney

[9] *Victorian fires: state of disaster declared as evacuation ordered and 28 people missing*. The Age, Australian Associated Press, 3 January 2020. https://www.theguardian.com/australia-news/2020/jan/03/victoria-fires-state-of-disaster-declared-as-evacuation-ordered-and-second-man-found-dead. Accessed on 3 January 2020.

et al., 2009). Additionally, climate change interacts with the stresses on ecosystems in many ways, and is a main cause of concern particularly because climate change accelerates natural habitat destruction, overexploitation and the increase of invasive species (Staudinger, 2013; Brook, Sodhi, & Bradshaw, 2008).

In 1988, Wilson warned that global biodiversity, defined as the variation of all life on earth and the ecological complexes in which they occur, faced an unprecedented threat from habitat loss and other anthropogenic stressors (Leadley et al., 2010). Since then efforts were made to introduce conservation measures to classify and preserve global biodiversity before it was lost forever. Unfortunately, biodiversity change is of such a large and accelerating magnitude that despite worldwide conservation efforts, rates of species extinctions are currently up to 1000 times greater than natural background rates (Chapin et al., 2000; Diaz, Fargione, Chapin, & Tilman, 2006; Parmesan, 2006). Biodiversity is fundamental to ecosystem structure and function and underpins the broad spectrum of goods and services that humans derive from natural systems (Chapin et al., 1997; Naeem, 2009; Walther, 2010). As such it is in our own interest to consider alternative options for supporting a sustainable ecological-human integration system, where decisions are made in relation to the planning and design of the built environment that acknowledge that humans are part of nature, rather than above it.

1.5 Sustainability, Ecological Systems, and Climate Change

The word 'Sustainability' has become a 'buzz' word, applied to basically every aspect of our modern world—in economics, business, social structures, politics, and the environment. The attempt is to achieve the possibility of balance and permanence in the world. The concept of sustainability, as defined by the Brundtland Report, has been described by Van der Ryn as bias towards anthropogenic and utilitarianism that is based on a technical approach for the better management of the non-human world for its continued existence (Van der Ryn & Cowan, 1996, p. 5). Under various different definitions, sustainable development seeks to minimise pollution rather than achieve the regenerative outcomes of clean air, water and soil. It is clear that the focus of the sustainability discourse is on 'minimising'.

There is a global desire to achieve sustainable outcomes and provide a better world for society. Many governments and organisations worldwide have set in place policies, value statements and visions, trying to instil a sustainable future for their citizens. In 2015, all the United Nations Member States adopted the *17 Sustainable Development Goals* (SDGs), claiming that these are the world's best plan to build a better world for people and the planet by 2030 (UN, 2019) (Fig. 1.4).

However, we need to be aware of the mainstream status quo, where the standard approach for sustainability is merely superficial. Very disturbing assumptions are lurking behind the general vision of sustainability under a system of sustainable management (Van der Ryn & Cowan, 1996, p. 7). In his argument around the narrow-minded views on sustainability in this world, Van der Ryn and Cowan (1996) critiques this common approach of sustainable development and argues that it is in essence is a 'technological sustainability approach' with no substance. David Orr (1992) noted that the more urgent and best consideration is the 'ecological sustainability' approach. If ecological sustainability is applied to solutions for future outcomes, it is a very different vision of outcomes for society than the standard 'sustainability' approach:

> Ecological sustainability is the task of finding alternatives to the practices that got us into trouble in the first place; it is necessary to rethink agriculture, shelter, energy use, urban design, transportation, economics, community patterns, resource use, forestry, transportation, the importance of wilderness, and our cultural values (Orr, 1992, p. 24).

This approach by Orr provides the fundamentals for us to regenerate our environment, and as argued by Christopher Alexander, we need to consider the 'deep sustainability' that addresses the core of our culture, environment and our human connection to nature.

Fig. 1.4 Sustainable development goals. (By the United Nations, November 2019, public domain)

Deep sustainability[10] as defined by Alexander can be considered to be in contrast with the general understanding and current practice of sustainability (Alexander, 2004). In the general context of sustainability, along with the principles of the triple bottom line, the environment is seen as capital; in essence, in the decision-making process the key decision is how to maintain a stable pool of resources in the future for human benefits (O'Riordan, 2009). We can figuratively envision this standard discourse of sustainability as the branches and leaves of trees, the 'green' that we can see. In contrast, 'deep sustainability' is the roots of the tree that connect the whole ecological system together, described by Alexander as a whole integrated system of patterns illustrated in Fig. 1.5. This underground network of a complex ecosystem, connecting millions of species of fungi and bacteria as they swap nutrients between soil and the roots of the trees, forms a vast interconnected web (Popkin, 2019).

The standard and superficial context of sustainability (for that is what we can see) has now relocated into the wider context of the social response to climate change and global warming. Although sustainability was supposed to contribute to the classical green concerns by reinforcing environmental awareness, the climate change discourse operates on a different level, exposing the flaws of the traditional green approach of sustainability—or of sustainable development and design, for that matter. This raises the question of what we can do about the inevitable impacts of climate and environmental changes we are facing, and the relationship sustainable design and development has with this issue. Climate change is imposing a pragmatic turn on our approach to sustainability, and in regard to this narrative I investigate further the fundamentals that we need to pursue to be able to regenerate our environment, interconnect more with ecosystems, and adapt our human and natural environments for a resilient future. The discourse of this book is thus going far beyond the understanding and current practice of sustainability and sustainable development, seeking a *regenerative-adaptive pattern language* approach that considers *the whole*.

[10] Deep sustainability goes beyond the mere aspects of resource efficiency, energy reduction or sustainable growth; it requires the emotional, spiritual and cultural connections of people with their built and natural environment. Deep sustainability addresses the 'ends', rather than the means to an end (Alexander, 2004, p. 6).

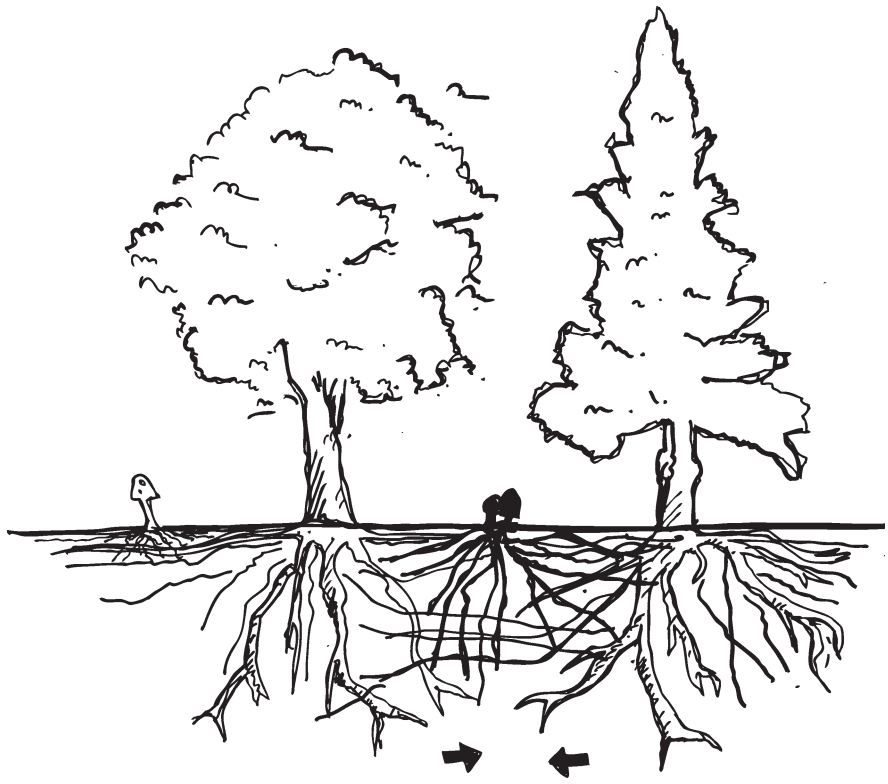

Fig. 1.5 The visual and non-visual interconnectedness of trees. (Drawing by Jesse Delmo, synthesised by Roös)

1.6 A Pattern Language Approach

This topic of the regeneration of built and natural environments and forging human-nature interconnectedness with ecological systems, fundamentally initiating a different approach to sustainability, is indeed not an easy task. In the first instance this dynamic and major shift requires a *new world view*, the development of ecological thinking and the acknowledgement that we as humans are part of nature and not above it. As noted by DeKay (2011), this change is a shift to *integral awareness*, where cultural and psychological references are based on ecological thinking that sees the world in systems terms (DeKay, 2011, p. 60). To be able to do this is to add the perspective of 'wholeness', in essence the understanding of an ecosystems model where living systems are organised in patterns, and these patterns form networks and ultimately create a language.

As we are dealing with humans and their designed built environments and connections to the natural world, the structure and the narrative of this book adopted a similar approach to *A Pattern Language* as defined by Christopher Alexander (Alexander, 1979; Alexander et al., 1977). Further, the development of *a regenerative-adaptive pattern language* followed suit and structured the patterns in a similar fashion, as described in detail in Chaps. 10 and 11.

A typical pattern language is a process of describing a set of patterns or good design practices of useful organisation within a field of expertise. In this context, the *regenerative-adaptive pattern language* provides a more holistic process and framework by describing a set of patterns and adaptation practices in a useful, organised way for sustainable development, regeneration, design and planning.

Undeniably, the fundamental properties of a pattern language originate with Alexander's (1979) argument, whereby he questions the creation of living structures and the need of a code, like the genetic one, for the acts of building:

> So, I began to wonder if there was a code, like the genetic code, for human acts of building? Is there a fluid code, which generates the 'quality without a name' in buildings, and make things live? Is there some process which takes place inside a person's mind, when he allows himself to generate a building or a place which is alive? And is there indeed a process which is so simple too, that all the people of society can use it, and so generate not only individual buildings, but whole neighbourhoods and towns? It turns out that there is. It takes the form of a language (Alexander, 1979, p. 166).

A typical pattern language can also be an endeavour to articulate the wisdom of what brings 'aliveness' within a particular field of undertaking, through a set of interrelated patterns. 'Aliveness' is a term used to encapsulate the statement of 'quality without a name', in essence representing a sense of spirit, grace or of wholeness, which while of varying form, is precise and empirically verifiable (Alexander, 1979).

The core of the pattern language system is the solving of problems that occur over and over in our environment. To deal with this complexity, it is necessary to use a simple, straightforward structure to represent the pattern. Alexander's pattern (Alexander et al., 1977; Mehaffy, 2010, p. 103) consists of:

1. A *pattern title*, written in Small Caps;
2. Main iconic and *representative image*, conveying the nature of the configuration and adding a qualitative dimension to the quantitative analysis;
3. *Upward links*, connecting the pattern to 'upper' patterns that may contain it and others;
4. *Problem statement* in bold, giving the configuration of the problem;
5. *Discussion*, assessing the associated issues to be discussed and addressed;
6. *Solution statement* in bold, describing the configuration of the solution;
7. *Diagram*, a sketch or cartoon of the solution with simple notes;
8. *Downward links*, connecting the pattern to 'lower' patterns that it may contain.

This system allows for nested hierarchical relationships, with overlaps, cross-linkages, and ambiguities. As the patterns combines into a system, into a 'language', these overlapping relationships creates a stronger, subtle and more complex kind of structure that is evident in the systems of nature.

Therefore, the structure of this book follows a similar structure to that of *A Pattern Language* (Alexander et al., 1977), and is set out as follows:

1. *Title* of the Chapter;
2. *Abstract*, which sets out the context;
3. Main *representative image*, which conveys the overall message from the chapter, or the fundamental patterns identified;
4. *Upward links*, which connect the fundamental pattern in the chapter to 'upper' fundamental patterns in previous chapters and key topics;
5. An *introduction*, giving the overview;
6. *Discussion*, the main body text of the chapter that provide details of the topic and detail context that supports the new fundamental pattern identified;
7. *Conclusion Statement*, providing a brief summary of the discussions and describes the configuration of a solution;
8. *Fundamental Pattern*, newly identified or developed as a result from the chapter discussion, with the pattern name written in Small Caps;
9. *Diagram*, a sketch or cartoon with simple notes about the new identified fundamental pattern;
10. *Downward links*, which connect the fundamental pattern in the chapter to 'lower' fundamental patterns in forthcoming chapters and key topics.

1.7 Levels of Scale in a Pattern Language

Similar to words with grammatical relationships to each other to form a spoken language, so does patterns relate to each other in a pattern language. In a pattern language the patterns are part of a directed acyclic graph, each mode of which represents a pattern. Core to the workings of a pattern language is the hierarchy of these patterns (Borchers, 2008; in Neis, Brown, Gurr, & Schmidt, 2012, p. 92), linked to each other in levels of scale. This is clearly demonstrated in *A Pattern Language* (1977), where the language has a hierarchal structure within a network. This network has a sequence, and going through the collection of patterns, the sequence always moves from:

> … the larger patterns to the smaller, always from the ones which create structures, to those ones which then embellish those structures, and then to those which embellish the embellishments… (Alexander et al., 1977, p. xviii).

In the *regenerative-adaptive pattern language*, levels of scale are represented by the higher level of *fundamental patterns* of the language, connected in the larger network with *regenerative-adaptive patterns*; these include:

- challenges of *design and adaptation*;
- *forces* that are continuously present;
- *centres* formed in the *dynamics of time*;
- *transformations* specific to place;
- *core patterns* embedded within communities;
- *regenerative attributes* that can regenerate environments; and
- the adaptive *evolutionary potential* as part of *the whole*.

The *fundamental patterns* identified in each chapter of this book are at the higher level of the hierarchy in the language; however, it must be noted that *fundamental patterns* can exist at all scales. In Chap. 11 the application of the *regenerative-adaptive pattern language* demonstrates the connections between *fundamental patterns* and the other entities in the larger network.

1.8 Use of the Regenerative-Adaptive Pattern Language

As described above, the *regenerative-adaptive pattern language* has a network structure. In essence, everything is connected together, linked in levels of scale. Each chapter in this book has a *fundamental pattern*, which is linked to other patterns and entities. Each pattern has a three-part rule, which expresses a relation between a certain context, a problem or issue, and a solution embedded in both the pattern and its entities (Alexander, 1979, p. 247). Since the language is in fact a *webstring*[11] *network*, there is no one sequence that perfectly captures it.

[11] In 1988, Michael J. Cohen (2008) developed an exercise in Ecopsychology in what he refers to as the *Webstring Natural Attraction Model*, where a *webstring network* in essence demonstrates the whole interconnected strings of attachment between all entities in Nature, including humans (Cohen, 2008, p. 12). When one string in this web of life is cut, it influences and has consequences for all other entities connected in this network. What is interesting about this *webstring network* is that there is no specific sequence of the connections, but they follow a line and form their own sequence upwards and downwards in the network.

However, when we use the network of the *regenerative-adaptive pattern language*, we always use it in a *sequence* moving from the higher patterns in the hierarchy towards the lower patterns and their connected entities in the language. The sequence in the network can flow both ways between the *upward* and the *downward links*, and interconnect between the other entities such as the *forces* that are continuously present, the *centres* formed in the *dynamics of time*, *transformations* specific to place, the *core patterns* embedded within communities, and so on. This sequence is further explained in Chap. 10, and applied and demonstrated in Chap. 11.

The reader will notice many simple sketches, diagrams and illustrations throughout this book, and in the use of the *regenerative-adaptive pattern language*. Their purpose is to visually represent the pattern or entity in a simple form while attempting to address the gaps in the traditional language of words and writing, which is inadequate to describe the complexities of the phenomena behind the pattern language. As Alexander (1964) puts it:

> The idea of a diagram [of a pattern] is very simple. It is an abstract pattern of physical relationships, which resolve a small system of interacting and conflicting forces, and is independent of all other forces, and of all other possible diagrams. The idea that is possible to create such abstract relationships one at a time, and to create designs, which are whole by fusing these relationships …. (Alexander, 1964, p. i)

1.9 Conclusion Statement

In this introductory chapter we begin with that part of the *regenerative-adaptive pattern language* that defines the consideration of The Whole [1], describing the critical issues we face as a global society, and how a new manner of thinking needs to be adopted if humanity wants to survive. This requirement is clearly reflected in the words of Einstein:

> A human being is part of the whole called by us the universe, a part limited in time and space. We experience ourselves, our thoughts and feelings, as something separate from the rest, a kind of optical illusion of consciousness … Our task must be to free ourselves from the prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty. We shall require a substantially new manner of thinking if humanity is to survive (Einstein, 1950, as quoted in *The New York Times*, 29 March 1972).

Therefore:

If we want to move beyond a damaging, anthropogenic-dominant, nature-destructive global society, we need to consider *the whole* and acknowledge that including the fundamentals of *wholeness* is a deeper, all-encompassing response to sustainable development.

1.10 Fundamental Pattern 1

The Whole [1]

The universe, the earth, the biosphere, the biotic and abiotic matter, sentient beings along with all their systems and parts, constitute a complex unity of networks, an organised coherent system of many parts fitting and working together as one, to create wholeness and making up *the whole*. All living systems are part of a larger interconnected whole, and are part of an integral existence (Fig. 1.6)**.**

Downward links:

The resilience of both humans and the natural environment in the future will depend on a new approach and thinking for sustainable development, where the consideration of The Whole [1] will be core to a new global Integral Sustainable Worldview [2] …

Fig. 1.6 Sketch of fundamental pattern – The Whole [1]. (Drawing by Jesse Delmo, synthesised by Roös)

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