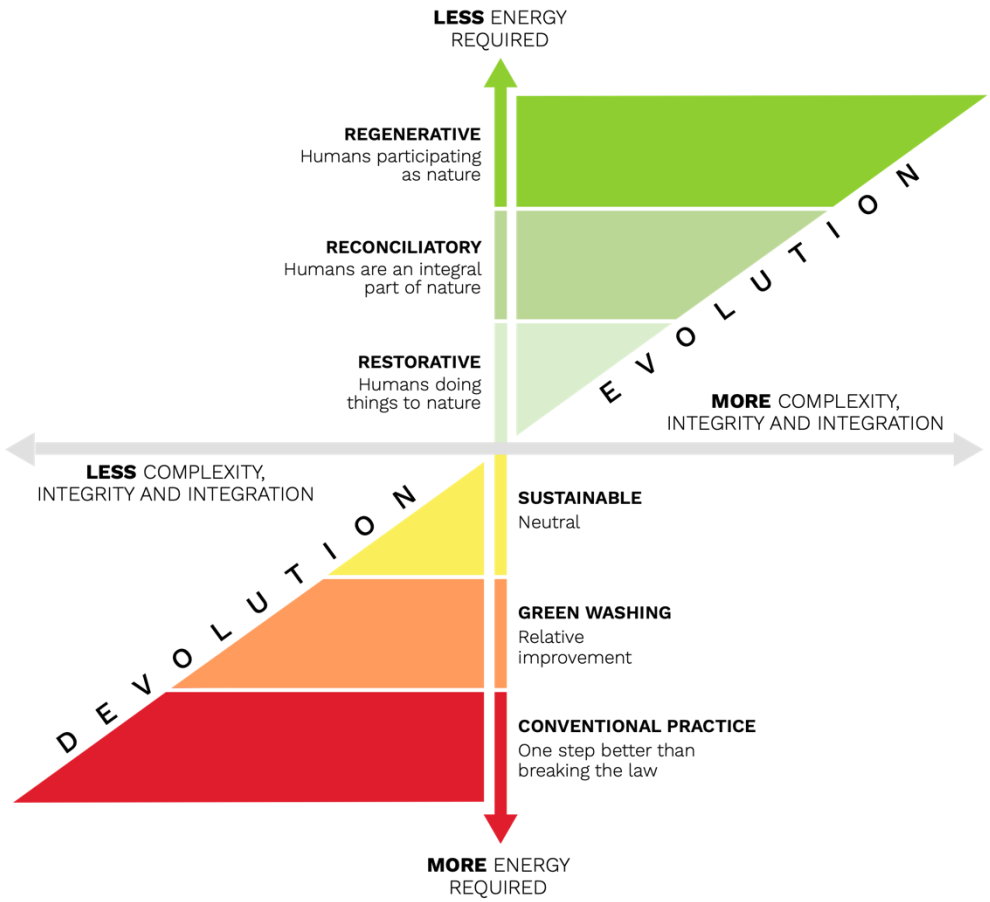
Health
Food Chain Safety
Environment

REGENERATIVE DEVELOPMENT AND DESIGN

Its origins, essence, practice and potential as a meta-discipline
to elevate governance, innovation and planetary health



A research study by Leen Gorissen, Karla Bonaldi, Piet Haerens and Lénia Rato

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"We have set our common home on fire and to move forward we must first put out the flames. But this is only a first step. In and of itself it will not mark the arrival of a new world. It will not change the mindsets that have used Earth's abundance to strip away her biocultural diversity. It will not restore the basis of life's creativity. And it will not seed the new role for humans that a new world requires. Happily, these changes have been quietly unfolding for some time, not in the media spotlight, but in millions of households, neighborhoods, communities and grassroots projects around the world where people are redesigning how they work and live."

Mang & Haggard, 2016

Cover illustration by djungle.be based on the original diagram of Regenesis (2012).
It illustrates the difference between *evolution* which leads to more order, integration and ableness and *devolution* which leads to more disorder, disintegration and less ableness.

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Disclaimer

This concise study is best viewed as a snapshot of a complex and evolving field of practice, which means that the angle through which we have looked at and explored the research question has determined what we have found. In other words, this study represents one perspective, but it is not the only possible perspective. It is best seen as a work in progress that has been building on the work of a whole lineage of people. It will need further attention and support to keep evolving towards higher levels of understanding and accuracy in the future. It is not intended to be detailed or comprehensive but is best viewed as a first introduction, a brief exploration of the rich background, history, and living complexity of regenerative development. We hope that it inspires new questions and study to uncover many more dimensions and aspects that can contribute to a fuller picture. This is a working paper, and hence it represents research in progress. This paper represents the views of the authors and is the product of professional research. It is not meant to represent the position or opinions of the Belgian Federal Public Service for Health, Food Chain Safety and Environment.

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Author Information

Most of the investigation, writing, and review has been done by Leen Gorissen, the analysis of EU legislation has been done by Karla Bonaldi, Piet Haerens and Lénia Rato.

Executive summary

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair."
Charles Dickens, 1859

Every generation sees itself reflected in Dickens' famous words written more than a century and a half ago. They certainly ring true for our present moment, highlighting the central question that has been raised in this report: What does it take to move forward to the best of times? What does it take to actively create the wisdom, willpower, and capability to become co-creators of a brighter future, rather than being victims of the mistakes of our past? The aim of this study has been to explore, define, and unpack the concept of regenerative development, the next step of sustainability, which includes and transcends the idea of sustainability because it aims for thrivability; the potential of qualitative growth that supports full prosperity of the human and more-than-human world in full co-creative partnership between people and planet.

In this report, we show that regenerative development (RD) has been practiced and evolved through the discipline of regenerative development and design (RDD) with roots going back 50 years and more, and that its uniqueness lies in the fact that it is not about sustaining *what is* or restoring *what was*. Rather, it is about creating thriving living systems—social-ecological systems such as places, organizations, communities, and ecosystems—that have the capacity to evolve toward increasing states of health, vitality and abundance over time. RDD calls for a new role for humans: to become agents of new vitality and evolutionary capability and to live in conscious alignment with living systems principles of wholeness, nestedness, relationship, and reciprocity, harmonizing human development with the way life works. These are the principles that Indigenous wisdom keepers have taught since time immemorial.

The understanding that this is possible, and an essential and desirable next step for humanity, is based on recent scientific insights from biology, quantum physics, systems theory, complexity science, developmental change theory, psychology, and neuroscience, among others. The shift in perspective that RDD represents comes from a new integration among knowledge systems that brings together modern Western science, ancient Indigenous science, and Eastern spiritual traditions and philosophies. While much of the focus of Western thought has been on the *science of entropy,* or increased disorder, Indigenous cultures have specialized in the *science of negentropy*, reverse entropy or increased order—the inherent capability of living systems to grow into new levels of spohistication, complexity and thrivability. That is because, although subject to the law of entropy, living systems are also governed by the countervailing processes of evolution. Living systems don't just run down; they also grow up and become more able and sophisticated over time. This evolutionary drive has been key to life's 3.8 billion years of success on planet Earth.

The concepts that inform regenerative thinking thus have long-established philosophical underpinnings, including from Indigenous, Eastern, and Western thought, and are still embodied in the practices of certain Indigenous cultures around the world. However, regenerative approaches for social-ecological systems are mostly unknown and unfamiliar in Western societies as they require fundamentally altered ways of thinking, acting, and relating among people and nature. In a world where planetary boundaries have been pushed out of their safe operating space and processes of degeneration are scaling exponentially, it will be critical to accelerate learning to transition to regenerative systems at a scale, pace, and depth to match the current crises.

Regenerative development builds on the understanding that a fragmented approach that deals with multiple intertwined crises separately will inevitably fall short, that our current theory of change is ineffective, and that the modern Western worldview and way of living is depleting humans and the planet. It builds on the understanding that our current meta-crisis requires a meta-response, and this is what the meta-discipline of regenerative development and design aims to bring. It is anchored in living systems understanding, which forms the basis for a distinctive thinking technology that can be used to develop, maintain, and promote value adding processes designed to benefit both people and their environments. It is negentropic (entropy-reversing) in its aims; that is, it seeks to enable systems to become increasingly ordered, resilient and sophisticated—one of the hallmarks of living systems. It focusses on (re)learning how to think like natural systems so that we can act accordingly.

RDD offers a comprehensive way forward. It integrates modern and ancient science and practice with essential but often neglected components of sustainability—ecological, social, cultural, spiritual, and geophysical dimensions. At the same time, it addresses the root causes of unsustainability: our ways of thinking and views about how the world works. To the best of our knowledge, RDD offers the most in-depth and detailed body of knowledge and practice currently available to advance the purposes of regeneration in a holistic way. To fully comprehend the depth behind the concept and practice of RDD, it is important to understand that the approach is not merely a combination of the concepts *regenerative*, *development*, and *design* but a fully integrative and inseparable union of all three: *regenerative development and design* is a meta-discipline that builds on clearly defined definitions of what regenerative, development and design means. In other words, there is a coherence and integrity behind the approach which implies that one cannot pick random elements and mix and match. It only works in integrality. It refers to a lineage of theory and practice that aims to more appropriately bring entropic technologies into alignment with negentropic processes. This is what makes it distinct from and also additive to other sustainability approaches.

Understanding RDD in practice, rather than only in theory, builds on three essential key ideas: regeneration as enabler of evolution, working in place, and developmental processes. Regeneration, as a mindset, focuses on developing the capacity and capability for living systems evolution. Given the nested nature of all living systems, this implies that to be regenerative, one must develop the ability to take direction from a higher-level system and develop ways to add value to that higher level. To achieve this, Western societies need to internalize and embody the understanding that any living system—an organism, business, ecosystem, bioregion—can maintain its health only while there is a balanced economy of interests between parts and whole. For example, no part of a healthy human body gains its

health at the expense of other parts. As long as the body is healthy, the body's ecology and economy are one, there is no conflict. There are no rich and poor organs. The wealth and vitality of your body, as in any living system, is in the whole, not the parts. In a healthy body every part adds value to the bigger system it is part of, and all the elements operate in harmonious relationship with each other to flourish as a whole. And this applies to any healthy living system —a body, a place, an organization, an ecosystem, a bioregion, a society... Humanity can only thrive on a flourishing planet. Vital for any regeneration process is thus *living systems thinking*, a discipline for seeing wholes, interdependencies, interrelations, and higher order potential.

Working from place is a fundamental starting point in RDD because working at the scale of local communities, cities, and bioregions is where our individual and collective behavior can make the difference that is needed in terms of regenerative development. Place is the right scale for most people to think and care about as it offers a common ground for people across diverse ideological spectra. Place is what people share in common and recognition of that commonality is what invites them to be a community. Regenerative development also builds on the premise that place-sourced and people-sourced potential go hand in hand as illustrated by multiple examples shared in this report. This means that the outer development of urban and rural places must always be matched by an inner development of those that inhabit them. The transition to regenerative sustainability requires us *to become indigenous to our places again*.

Policy-making can be an important lever to create the appropriate enabling conditions for regenerative development. RDD can help local governments to understand, acknowledge and treasure the living systems they depend on. It can help all kinds of governance to harmonize human and living systems development in ways that ensure longevity and security over the long term. This is especially important when it comes to biodiversity as few people understand that species richness is pivotal for the survival of the living systems that underpin the life support system of our planet. Biodiversity is not only vital in terms of the food webs on which we depend, biodiversity is also crucial when it comes to essential planetary processes like oxygen production, carbon draw down, climate regulation, nutrient cycling and soil formation. Dwindling species richness can therefore destabilize the planetary processes on which life depends. Our analyses of existing EU legislation and expressed ambitions shows that these provide a sound foundation to evolve future legislation and ambitions towards regenerative development, a developmental approach that fosters thriving living socio-ecological systems that are beneficial for all life on Earth.

To conclude, a benefit of working regeneratively and developmentally, of evolving place- and people-sourced potential, is the enrichment that it can bring to the sustainability field and the world at large: the regeneration of spirit and land, the growth of understanding and capability; the will to become a co-creator rather than a victim of change; the inspiration to step into the essence of who we are and who we need to become and the willpower to turn break-down into break-through. The all-encompassing nature of an RDD approach evolves our consciousness and competency to serve as instruments for a better future for every living being on Earth. It enables our *becoming* and our *homecoming* as a contributing species within a family of species that share our unique planet. RDD is not an endpoint and not a solution. It is a process-in-progress that both supports and depends on our continuous evolution toward

becoming a better keystone species, the enablers of increased vitality, viability, and wealth-generating capability in ways that serve the ongoing evolution of life. Because real change will only begin when we realize that we are the Earth regenerating herself.

I. METHODOLOGY OF THE RESEARCH STUDY

"In science as in politics we need contrarian thinking more than ever: if we were all to think inside of the box*, we would soon run out of innovations. In principle, our democratic societies are based on pluralism. But when crisis rears its ugly head, which it has done in recent decades, our societal tolerance of different perspectives becomes lowered: we tend to close our ranks to exclude diagonal thinking—in ways that in their end results move us closer to the totalitarian states that we remain keen to distinguish ourselves from."*
Sven Wunder, Douglas Sheil & Robert Nasi, 2024

The present study aims to give a concise overview of the origins, essence, uniqueness, practice, and potential of regenerative development and design. Since its origins have been conceived in the field and not in academia and have been developed through oral traditions rather than publications, we were not able to conduct a scientific study in the way that is conventional today. Instead, we followed a *mixed knowledge* and *blended resources* approach. Mixed knowledge refers to an approach that includes different knowledge sources: modern Western science, ancient Indigenous science, philosophical learning and living traditions, and field and practice-based knowledge. The aim is not to give a complete and detailed overview but rather to highlight the wide-ranging roots, dimensions and perspectives that inspired the concept and practice of regenerative development and design. Especially important to our research were those resources that provided a meta-perspective or helicopter view, going beyond the conventional cultural and scientific paradigms of today. A blended resource approach means that we have explored sources of information that go beyond academic papers and books, including non-academic online sources, papers, oral traditions, videos, podcasts, and educational course materials.

The required quick turnaround of the study shaped our approach: a first screening of published resources identified the key elements to explore and talks and interviews with people in the field helped us to reconstruct the origins and essence of the theory and practice while also providing us better insight into the RDD oral tradition and how RDD is applied in the field. We interviewed Dominique Hes, policy advisor and co-author of Designing for Hope: Pathways to Regenerative Sustainability, Pamela Mang, Education Program Director of the Regenesis Institute for Regenerative Practice and co-author of the first comprehensive book about RDD titled Regenerative Development and Design. A Framework for evolving Sustainability, Max Shkud, a leadership development and organizational change consultant who supports organizations in establishing a culture and practice inspired by regenerative frameworks and living systems principles, Johnnie Freeland, a regenerative practitioner, Indigenous systems navigator and Whakapapa Centered Designer, and Lara Lee, an experienced independent board member, chief executive and former senior operating executive in global public companies who experienced first-hand the results which can be obtained by working regeneratively in a corporate business environment. At the end, we included a glossary to explain words that may be unfamiliar.

II. UNDERSTANDING REGENERATIVE DEVELOPMENT AND DESIGN

Why do we need a regenerative development and design approach?

"Over time, sustainability paradigms have evolved from meeting human needs throughout time to improving human wellbeing and the viability of ecological systems. Regenerative sustainability, the next wave of sustainability, includes and transcends these goals, aiming for thriving living systems in which whole-system health and wellbeing increase continually."
Gibbons, 2020

The environmental and sustainability movements have urged people to hunker down and reduce their impacts. Their well-publicized imperatives, most of them very good ideas, have deeply influenced policy in countries around the world: reduce or eliminate waste and pollution; recycle or upcycle products that have outlived their usefulness; densify cities to reduce their ecological footprints; encourage mass transit and pedestrian use, and improve gas mileage in cars. Altogether, they are a creative response to the call to *reduce* human impacts.

Meanwhile, regenerative development asks the opposite question: How do we *increase* human impacts, but in ways that are consciously beneficial? In other words, how can humans serve as sources of healing and regeneration for every living system they affect?

Understanding regenerative development in practice, rather than only in theory, requires the introduction of three key ideas: *regeneration as enabler of evolution, working in place,* and *developmental processes (Mang & Haggard, 2016)*.

What is Regenerative Development and Design (RDD)?

"The concept of regenerative systems has long-established philosophical underpinnings, including from Indigenous, Eastern, and Western thought, and is still embodied in practice in certain (especially Indigenous) cultures and communities around the world, such as the good living approaches of Māori and Quechua peoples. However, regenerative approaches for social-ecological systems are still relatively unfamiliar (or forgotten) in Western societies, and embodying regenerative principles is challenging for newcomers because it requires fundamentally altered ways of thinking, acting, and relating between people and planet. A critical task facing humanity is thus to accelerate learning about transitioning to regenerative systems at a scale, pace, and depth that match those of global crises."
Buckton et al., 2023

Synopsis

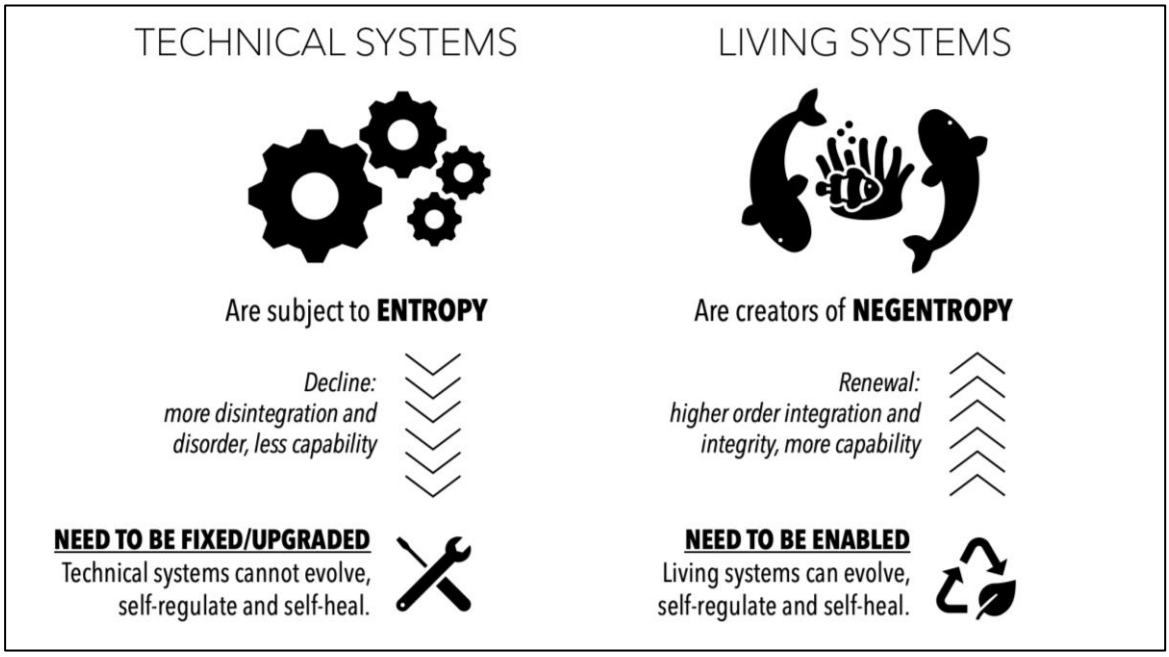
In her article 'Regenerative—The New Sustainable?' Leah Gibbons (2020) points out that regenerative sustainability transcends the goals of sustainability, because it aims for thrivability—full prosperity of the human and more-than-human world in full co-creative partnership between people and planet. From living systems science, we know that *sustaining what is*, is not how living systems operate. Living systems, of which humans are part and which are at the center of our social and economic development, continuously upgrade their health- and wealth-generating capability over time, evolving to increasingly higher orders of complexity, integrity, and integration as well as higher levels of vitality, viability, and biodiversity. A key difference between our initial understanding of sustainability and the emerging understanding of regenerative sustainability, is that the latter is based on a more holistic worldview that sees humans and economies as an intrinsic part of nature, and on a theory of change that is distinctly different from those applied today. Another key difference is that regenerative approaches start from potential instead of problems because problem solving dictates a future based on past and present problems rather than entire ranges of possibilities.

Gibbons writes that regenerative sustainability has been practiced and evolved through the discipline of regenerative development and design (RDD) for over 50 years and that its uniqueness lies in the fact that it aligns human consciousness and actions with living systems principles. She highlights that when this alignment occurs, sustainable development goals are elevated to become regenerative development goals, upgrading their focus and impact from *sustaining* to *thriving*. Aiming for regenerative sustainability is inherently inspiring and motivational because it offers holistic approaches based on how thriving living systems function and simultaneously addresses the root causes of unsustainability. Advancing regenerative sustainability will require fundamental shifts in how we view the world and our role in it.

The discipline of RDD refers to the most in-depth and detailed body of knowledge and practice currently available to advance the purposes of regeneration. It has been formulated by the founders of the Regenesis Institute for Regenerative Practice and builds upon the work of a whole lineage of scientists and practitioners that came before them (TRP course materials, 2014) (see page 20). In their book Regenerative Development and Design. A Framework for Evolving Sustainability, Mang & Haggard (2016) summarize RDD as "a system of developmental technologies and strategies that works to enhance the ability of living beings to co-evolve, so that the planet continues to express its potential for diversity, complexity, and creativity through harmonizing human activities with the continuing evolution of life on our planet, even as we continue to develop our potential as humans." RDD provides the framework, and builds the local capability, required to ensure regenerative design processes achieve maximum systemic leverage and support through time (Mang & Reed, 2012). In this, "regenerative development is about seizing the potential, born of crisis, for transforming our role as designers, planners, builders, and citizens. In particular, it is about learning how, in an increasingly unpredictable world, we can enable the places where we live and work to thrive, not just sustain a precarious balance." (TRP course materials, 2014).

Gibbons (2020) defines RDD as "an on-going change process in which capacities in living systems develop such that ever greater vitality, abundance, and prosperity for all life manifests. All living systems are regenerative at their core, moving through cycles that manifest new and higher levels of life and complexity. Humans have interfered with these cycles, causing them to slow and/or speed up at certain points, resulting in degenerative rather than regenerative processes on time scales that we can observe and that affect us greatly. To see that this is true, we have only to look at processes such as climate change, biodiversity loss, social inequity and unrest, and similar disruptions, as well as how they are interacting and amplifying across scales of space and time. We have tried to bypass living systems principles, and this is leading to the destruction of most of the life on Earth, Earth's life support and life regulating systems, and will lead to our own demise if we continue on this path."

To fully comprehend the depth behind the concept and practice of RDD, it is important to understand that the approach is not merely a combination of the concepts *regenerative*, *development*, and *design* but a fully integrative and inseparable union of all three: *regenerative development and design* is a meta-discipline that integrates important aspects of ancient Indigenous science and Eastern philosophical and spiritual wisdom traditions with the latest insights from modern Western science, especially from the fields of biology, physics, quantum physics, developmental psychology, cybernetics, complexity and systems science, and cognitive sciences. It works at the intersection of understanding, intention, and becoming, rather than on knowing, assessing, and cataloguing.



FIG—1: *THE IMPORTANCE OF LIVING SYSTEMS SCIENCE. Enabling negentropy—the inherent capability of living systems to grow into new levels of order, integrity, capability and thrivability: every living system, if it is to thrive and endure, must continually increase its vitality, viability, and competence for enabling further evolution.*

RDD is anchored in living systems understanding, which forms the basis for a distinctive thinking technology that can be used to develop, maintain, and promote value adding processes designed to benefit both people and their environments. It is negentropic (entropy-reversing) in its aims; that is, it seeks to enable systems to become increasingly ordered—one of the hallmarks of living systems (Mang & Haggard, 2016). Negentropy is an inherent capability of living systems to grow into new levels of order, complexity and thrivability. It is the opposite of entropy, which leads to increased chaos and disorder (Fig. 1).

While RDD works on systems transformation in the outer world, it also works on inner transformations for everyone involved. It invites people to shift their thinking from purely functional considerations (what can something do) to take into account *essence* and *roles* (how things can realize their intrinsic natures or indispensable qualities and therefore what they can enable). This increases the capacity of humans and the things that they work on to thrive as contributing participants in the on-going co-evolution of life. As an inner discipline, RDD helps its practitioners learn to live as conscious, proactive co-creators rather than as victims condemned to reacting to the overwhelming complexities of an ever-changing world. In his article 'Regenerative Development: Going Beyond Sustainability', Medard Gabel (2015) highlights that we must transform the art and science of *problem solving* into *building capacity*. Instead of focusing on 'problems' as something that needs to be 'solved', we need to see them as a symptom of something larger— the need to enlarge the capacity of a system. Another way of looking at this, according to Gabel, is to say that we need to focus on creating wealth, not just reducing poverty. When we focus on building capacity, it becomes apparent that wealth is in the whole, not the parts.

Resilience Earth consultants working with regenerative frameworks with the public administration from La Garrotxa, Catalonia, Spain. Picture ©Resilience Earth SCCL, Girona, Spain.

The overall aim of RDD is living systems actualization: fostering living systems (such as landscapes, places, organizations, or communities) that have the capacity to evolve toward increasing states of health and vitality over time. It focusses on (re)learning how to think like natural systems so that we can act accordingly. Place is the fundamental starting point for this relearning because it is the right scale for most people to think and care about. Place offers a communal ground for people across diverse ideological spectra because it is what they share in common—it is what draws them to be a community. The transition to sustainability and harmony requires humans to become indigenous to place again. For this reason, RDD is not a one-time event or project, and it is not a magical formula. Rather, it is a lifelong practice of learning to belong to place, bringing enhanced accuracy, mastery, and accountability for harmonizing how we live in our respective places in ways that serve the ongoing evolution of life.

Holistic in its approach, RDD has been conceived to address all current crises (or meta-crisis) and the roots of unsustainability simultaneously. RDD is thus a meta-discipline that aims to shift our role as humans from a species that destabilizes and degrades to a species that revitalizes the living systems that we inhabit. To achieve this, we must align human consciousness and actions with the principles and characteristics that govern living systems so that all life may thrive as one coherent whole. Plaut (2018) summarizes RDD as building the capacity and capability in places, people, communities, and other natural systems to renew, evolve, and thrive. She observes that "The practice of leading regenerative development, or becoming a regenerative practitioner, calls for a diverse and expansive set of capabilities around five core practice areas:

> *Systems actualizing*: to help realize the unique, value adding potential of a place, organization, landscape, or any other living system.
> *Framework thinking*: adept use of frameworks helps to bring ordered thinking, systemic understanding, recognition of innate potential, and ability to act effectively within complex systems.
> *Self-actualizing*: the ongoing ability to develop capacity and capability within yourself, which is essential for participating in regenerative development work.
> *Developmental facilitating*: a dynamic and adaptive process for helping groups evolve their sense of purpose and their ability to realize potential together.
> *Living systems understanding*: the ability to see how living systems work and where and how to engage with them in a conducive way, based on life's principles."

To sum up, there are many definitions of regeneration, regenerative, and development in circulation now that the concept is becoming popular. However, the composite term *regenerative development and design* refers to a lineage of theory and practice, a community of scientists and practitioners, and a holistic, integrative body of work. This makes it distinct from other approaches. As a theory and practice, RDD addresses dimensions that are often overlooked, including the architectures of thought, assumptions, and belief systems, and the underlying worldviews that inform them (i.e. Du Plessis, 2012; Du Plessis & Brandon, 2015; Mang & Haggard, 2016; Plaut, 2018; Gibbons, 2018; Cole 2020, Buckton et al., 2023; Sanford, 2020, 2022, 2023). A fundamental requirement of regenerative work is therefore the ability to constantly observe and regenerate our own thinking and understanding, if we are to cultivate regenerative relationships that foster the health of living systems as a whole.

Important terminology and definitions

Since our brain has a tendency to fit new information into old ways of thinking in a way that reinforces old beliefs (Sanford & Haggard, 2020), it may be helpful to share a few key definitions and concepts. Language and the way language is used shapes how we think and where we focus our attention, and for this reason language is a specific focus of RDD as a discipline. The following is a list of terms and definitions commonly used in the field of regenerative development and design. A more extended list can be found in the glossary section of the appendix.

Regenerate, as a process, includes three key ideas: "a radical change for the better; creation of a new spirit; and returning energy to the source" (Mang, 2001). It is defined as "an evolutionary process by which a living system, through the enfolding connection with its life source, rebirths into existence a higher order patterning for functioning, relating, and adding value in harmony with the whole" (Mang, 2009).

Regeneration is a biological and spiritual phenomenon of renewal that leads to a higher order of vitality, viability, and evolutionary capability. Regeneration allows a system to become more and do more. In developmental terms, regeneration is understood as a process that gives new life or energy to something, for instance something that has been depleted of its physical vitality or meaning. Successful regeneration within a system leads it to evolve and continually develop new potential (TRP course materials, 2014). The dictionary definition of regeneration addresses both the action and the source of this new potential: 1) to create anew and 2) to be born of a new spirit (Reed et al., 2018). Regeneration is also defined as the creation of a new improved state or condition that improves the value-generating capacity of the entity or system as a whole by increasing the potential of the resources—biological, human, material—that are the basis for an entity or system's functioning, thereby infusing new life energy and vitality (Mang & Reed, 2012). Regeneration is the instrument for evolution by which life on the planet has sustained itself for billions of years (Capra, 2020).

Regenerative is defined as tending to or characterized by regeneration, which comes from *generare* in Latin, meaning to give birth or generate. In the early days of biology, the term regenerative was used to indicate a functional self-renewal or, more often, a morphogenic replacement of lost or damaged parts or structures in organisms or ecosystems (Morseletto, 2020). More recent systemic understanding in the field of ecology defines regeneration as a process of renewal that leads to a higher order of vitality, viability, and evolutionary capability (e.g. TRP course material, 2014; Gibbons, 2020; Gorissen, 2020). Higher order here refers to a higher level in terms of the system's wealth and health generating ability. In other words, regeneration allows a system to become more and do more. *Becoming more* means that regeneration enables the achievement of higher levels of complexity and sophistication. *Doing more* means that regeneration enables new potential through the accomplishment of new capability and the enactment of new roles. In simple terms, regenerative is defined as enabling social and ecological systems to maintain a healthy state and to evolve (Brown et al, 2018).

Regenerative development (RD) refers to a system of developmental technologies and strategies that works to enhance the ability of living beings to co-evolve, so that the planet continues to express its potential for diversity, complexity, and creativity through harmonizing human activities with the continuing evolution of life on our planet, even as we continue to develop our potential as humans. Regenerative development provides the framework and builds the local capability, required to ensure regenerative design processes achieve maximum systemic leverage and support through time (Mang & Reed, 2012).

Development is understood as the ongoing and conscious process of *de-veiling* or *unfolding* to reveal and manifest the true natures and essences of things. It requires seeing the potential that exists within an entity or activity, given its essence, and then building on what is currently there in a way that increases value and value-generating capability. (TRP course materials, 2014).

Regenerative design is a design process that engages and focuses on the evolution of the whole of the system of which we are part. Logically, our place—community, watershed, and bioregion—is the sphere in which we can most readily participate in this way (Reed, 2007).

Regenerative development and design (RDD) combines a regenerative development and a regenerative design approach. It aims to contribute positively to the evolution of the whole system of which we are part by working developmentally so that humans and the living systems of which they are part can co-evolve towards increasing levels of health, resilience and wealth-generating capacity.

Regenerative sustainability is sometimes used as a synonym for regenerative development. It has been called the next wave of sustainability (Wahl, 2016; Lovins et al., 2018), and it represents a necessary worldview and paradigm shift for sustainability (Meadows, 1999; Du Plessis, 2012; González-Márquez & Toledo, 2020). It includes and transcends sustainability as it is understood today by placing it in a holistic and living systems worldview:

"A holistic worldview, rather than being fixed, fosters the ability to integrate and transcend paradigms, which is the deepest leverage point in systems and, thus, absolutely necessary for sustainability. Regenerative sustainability sees humans and the rest of life as one autopoietic system in which developmental change processes manifest the unique essence and potential of each place or community. Regenerative sustainability's aspirational aim is to manifest thriving and flourishing living systems (i.e., complex adaptive systems) in a fully integrated individual-to-global system. It calls for humans to live in conscious alignment with living systems principles of wholeness, change, and relationship, as nature does. The belief that this is possible and a logical, necessary, and desirable aim is based on recent scientific understandings in ecology, quantum physics, systems theory, developmental change theory, psychology, neuroscience, design, planning, and sustainability, as well as more ancient ways of knowing and being in the world (i.e., Indigenous knowledge and practices, Eastern spiritual traditions, and philosophies)" (Gibbons, 2020).

Place refers to the unique, multi-layered network of ecosystems within a geographic region that results from the complex interactions through time of the natural ecology (climate, mineral and other deposits, soil, vegetation, water, wildlife, etc.) and culture (distinctive customs,

expressions of values, economic activities, forms of association, ideas for education, traditions, etc.) (Mang & Reed, 2012). It can, for instance, refer to different subsystems, a community, watershed or bioregion. According to the discipline of regenerative development, regenerative solutions are specific to a given place and require an understanding of how the interdependencies between the social and ecological systems in a place can support and enhance life (Benne & Mang, 2015).

Potential is defined as the inherent ability or capacity for growth, development, or coming-into-being that has not yet been manifested. It is the difference between what something is versus what it could be. Potential is realized in the form of increasing ableness at higher levels of complexity. When something's potential is manifested, it is able to generate higher order value. Higher order is a term that comes from complexity science and does not mean hierarchically superior. Instead, it implies a greater level of effectiveness in working with or integrating things at increasing levels of complexity.

Evolution, as a process pertaining to development, is moving things from lower to higher orders of expression. Being of higher order implies a greater level of effectiveness in integration, resilience and dealing with complexity (adapted from TRP course material, 2014). It is defined as movement to new levels of order, differentiation, and organization—the opposite of entropy—in which "cooperation (deriving from the mutuality of interest among organisms and ecosystems) rather than competition" is the primary driver (Mang & Reed, 2012). This is very different from the industrial era definition of evolution as a struggle over scarce resources wherein individuals and species compete to survive. Evolutionary biologist Elisabet Sahtouris for instance, thinks of evolution as part of a 'maturation cycle' where immature or juvenile stage species learn to co-operate and co-evolve with their environments and with other species in ways that lead to a more sophisticated, complex and mature phase of functional membership in the wider community of life (Sahtouris, 2020).

Life includes all living entities, from bacteria to humans to ecosystems to Earth itself. This concept is more encompassing than that of *nature*, which is understood to be separate and distinct from the world of humans, their activities, and artifacts.

Living systems refer to all life forms that are open (permitting the flow of energy and material across their boundaries), and are differentiated by their autopoietic capacity, i.e., they are able to use the exchange of energies and materials with their environment to self-organize, self-maintain and evolve. Every living system, if it is to thrive and endure, must continually increase its vitality, viability, and capacity for enabling further evolution (TRP course materials, 2014).

Living systems thinking, (sometimes referred to as evolutionary systems thinking) is core to the work of regenerative development, as it builds on the aspects of aliveness and evolutionary capability of living entities. It thus differs from the (cybernetic) systems thinking approach that came out of engineering and influences most organizational and change efforts today. Living systems thinking looks at the pattern of the whole and thinks about shifting this underlying pattern to develop the system to another level. Instead of working at the level of existence it works to weave together potential (realization or evolution of potential) and existence (manifestation of potential) in a virtuous cycle (TRP course materials, 2014).

Vitality indicates the presence of aliveness and energy, qualities that are necessary to any living organism. It implies the ability to act from internal stimulus and energies and not only in response to external stimulus. It speaks to a life force or drive that comes from within (TRP course materials, 2014) and is related to the concept of intrinsic motivation in developmental psychology. Vitality has been defined as the capacity to live, grow, or develop, the characteristic, principle, or force that distinguishes living things from nonliving things and a healthy capacity for vigorous activity (Mang & Reed, 2012).

Viability refers to the ability to gain the nourishment required to stay alive over time. Increasing viability implies greater capacity and increased strength and intelligence to engage in effective, mutually value-generating transactions with a proximate environment, thereby gaining greater realization from communication and transactions in a world in which things have a systemic and thereby interrelated nature (TRP course materials, 2014).

Restorative comes from the word restoration or (*re)staurare* in Latin, which means to repair or give back or build up again. In recent literature the definition is proposed as "the return to a previous or original state" (Morseletto, 2020). However, Shanon (2015) points out that:

"It is important to note that the concept of restoring an ecosystem is a bit of a misnomer. This is because ecosystems are not static —you can't return an ecosystem to its original condition like you can with a painting or a vintage radio. An ecosystem, like any living thing, can never stand still and can only be in process—either a process of evolution, or a process of de-evolution."

Understanding is the capacity to grasp and see phenomena from the inside out, in terms of processes rather than content, and in terms of being rather than function. It occurs when we see something as a whole and how multiple qualities or energies come together to form this whole. "To understand is to see the way things belong together and to see why they are together as they are" according to Bennett (1992) in Elementary Systematics. A Tool for Understanding Wholes.

Meta-discipline refers to an approach that integrates different disciplines, which are inherently fragmentary, into a coherent whole that is more than the sum of its parts.

Origins of Regenerative development and design

Understanding the lineage of ideas —understanding where our understanding is coming from

"When creating change, mindsets and paradigms matter. Too often, perhaps, we focus on what to do differently (e.g. turn off lights, get regular exercise, or restore riparian areas). At times we work on changing what we or others think about (e.g. saving energy, health, or ecological restoration). Rarely do we actively work on how we think (e.g. examining paradigms, recognizing and choosing frameworks to structure our thinking, identifying the values and beliefs that drive our actions). Realizing the potential for local and global regeneration requires that we upgrade how we think, not just what we think about or what we do."
Plaut, 2018

An understanding of the lineage on which RDD builds is useful in clarifying the distinctions from, and the relationships to, other approaches being developed and applied in response to the challenges of the moment. That is why in this part, we explore where our understanding is coming from.

How can we know that *change* will effectively lead to different outcomes and that it is not just a variation of the *same old stuff*? RDD proposes that it is vital to break the patterns that lock-in status-quo thinking and path-dependency. This requires building an awareness of the deeper patterns of thinking that have been driving our creation of the world today. Einstein's famous maxim, that "one cannot solve the problems of today with the same thinking that created them", is well known, but not necessarily well understood. It means that the only way to effectively resolve problems is to engage them from a higher level of consciousness. This means that we have to actively explore and challenge the sources of our thinking: our view of the world, our beliefs and assumptions. Otherwise, we end up with more of the same, repeating the past rather than creating a different future. Einstein's' quote points to the fact that a new future can only be created from a new architecture of thought.

David Bohm, who has been described as one of the most significant theoretical physicists of the 20th century, further unpacks Einstein's thinking. He states that the ability to perceive or think differently is more important than the knowledge gained (New Scientist, February 1993). In his book Changing Consciousness: Exploring the Hidden Source of the Social, Political, and Environmental Crises Facing Our World (1991) Bohm writes: "If I am right in saying that thought is the ultimate origin or source, it follows that if we don't do anything about thought, we won't get anywhere." He goes on to say that although we may momentarily relieve current symptoms, the fact that we haven't addressed underlying causes means the symptoms will return in some new form.

This insight has been foundational for the practice of RDD as it reminds us that if we are not conscious of how we are thinking, of the sources of our thoughts and beliefs, we are trapped in the past, servants to old, outdated paradigms (TRP course materials, 2014). Or, in the words

of Donella Meadows (1999): "The most powerful change occurs when one transcends the paradigm one operates in." This points to the underlying theory of change that underpins the discipline of RDD: “The most effective way to create change is not by encouraging more and more actions but by building the thinking capabilities that enable discernment about which actions to take” (Sanford & Haggard, 2020).

Early roots of RDD in modern science

A detailed account of the early roots of RDD in modern science is described in Mang & Reed (2012). The following text contains highlights of some of the most notable developments described by these authors.

One of the first expressions of ecological thinking being applied to human settlements can be found in the Ebenezer Howard’s influential book Garden Cities of To-morrow, first published in 1898. Howard aspired to reconnect humans to nature and his book featured the use of natural rather than engineered processes to ensure the health of urban systems. Howard’s description of a utopian city in which people live harmoniously with the rest of nature stimulated the founding of the garden city movement, which led to the establishment of garden cities in Great Britain and around the world, including garden districts in Belgium (e.g. Genk and Maasmechelen).

In the following decades, concern for the effects of environmental degradation catalyzed more holistic ways of thinking. In a landmark paper in the 1930s, Arthur Tansley introduced a new concept, the ecosystem, which provided a unified framework within which to study both plant and animal communities together, their interactions with the material world, as well as their interrelations with human communities. He proposed the application of systems science as a way to bring more scientific rigor to the study of nature’s complexity and the effect of human activities on that complexity. According to Mang & Reed (2012), Tansley and other organismic biologists of the period were the first to formulate a systems view of life. Seeking a more accurate understanding of how life ordered and organized itself within a particular landscape or geographic location, he posited that neither a living organism nor its physical environment could be thought of as separate entities, they form one physical system. Two of the most significant implications of Tansley’s depiction of how life structures itself were “the deconstruction of the human/nature dichotomy that had shaped Western design thinking and the establishment of the premise that all species are ecologically integrated with each other, as well as with the abiotic constituents of their biotope or habitat.”

In 1953, the first textbook on ecology, Eugene Odum’s The Fundamentals of Ecology, was published. This work anchored within the scientific world the core concept of the ecosystem as the fundamental ordering structure of nature. Its study of wetlands pioneered the now widespread approach of using wetlands as water quality improvement ecosystems. Odum’s work made important contributions to the beginnings of the field of ecological engineering (Mitsch & Jørgensen, 1989) and exerted a strong influence on Bill Mollison, an ecologist who co-founded the practice of permaculture.

In 1968, biologist and systems theoretician Ludwig von Bertalanffy laid the foundations for systems theory and systems thinking through his book General System Theory: Foundations, Development, Applications. This work opened the door to a new science of complexity as it introduced the concept of open systems. Von Bertalanffy highlighted the differences between physical and biological systems and introduced the concept of evolutionary thinking—thinking focused on change, growth, and development (Von Bertalanffy, 1968). The recognition that complex systems cannot be understood through simple analysis led to the emergence of systems thinking as a major scientific field, representing a profound change from the analytic, reductionist mode that had governed Western scientific thought since the scientific revolution. Reductionism is understood as the view that all of nature works according to mechanistic laws, and everything in the material world can be explained in terms of the arrangement and movements of its parts. General systems theory also laid the basis for the development of living systems science.

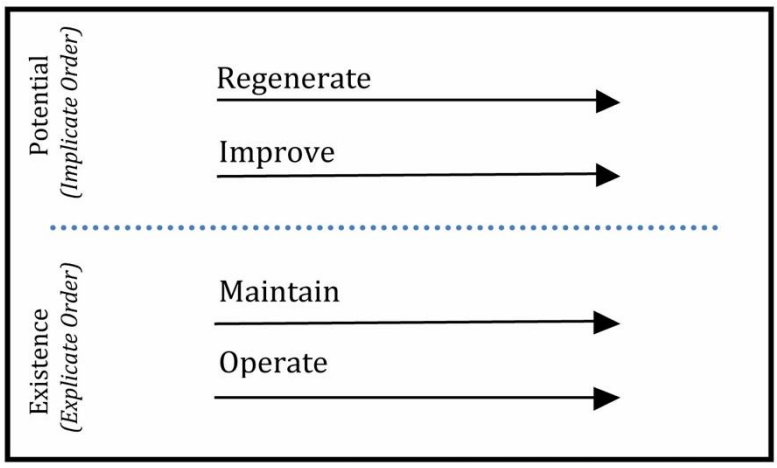
Of great importance to the development of the discipline of RDD was the work of systems theorist Charles Krone from the 1960s up through the early 2000s. Krone applied living systems theory to create a developmental technology for consciously improving systems thinking capacity in organizations (Krone, 1974). As Mang & Reed (2012) highlight: "His work greatly extended general systems theory and ***systematics***, a discipline developed by mathematician John Bennett that uses systemic frameworks to understand complex wholes within which people are participants rather than observers. The systemic frameworks and developmental processes Krone generated were applied and evolved within businesses. Their purpose was to create an understanding of businesses, communities, and nature as living systems, and to build the consciousness required to create reciprocally beneficial relationships through better integration of industrial, community and natural processes. Krone's work served as a core foundation for the emerging Regenesis Collaborative Development Group as they developed and evolved RDD processes and technologies[1].

Of particular importance in understanding the relationship between regeneration and other ways of working on growing and sustaining healthy systems was Krone's framework that depicts the ***four levels of work*** that are essential to any living system's continuing capacity for evolution (Fig. 2). According to Mang & Haggard (2016), its underlying premise is that all four: "…are necessary in order for an entity to sustain itself in a world that is nested, dynamic, complex, interdependent, and evolving. The framework defines these different levels of work within a hierarchy in which work at the lower levels focuses on existence (what is already manifested), increasing performance and efficiency. Work at the higher levels is concerned with potential (what could be but is not yet manifested), introducing potential for new life and creativity and advancing the whole."

Key to the four levels of work framework is the premise that to guarantee and enable evolution, the understanding, aims, and goals developed at the regenerative level need to guide the work at the other levels. By contrast, most contemporary practices develop strategies from the level of existence, that which already exists, usually in response to an existing problem or opportunity. The framework was thus utilized as an instrument for enabling "practitioners to design for the integrated evolution of all work" and as "a lens for seeing how and where

[1] Krone's work was mainly shared through oral tradition and has not been published, though an initiative has been launched to publish his work.

different sustainability strategies fit and how they can be leveraged when aligned around a regenerative goal."



FIG—2: *LEVELS OF WORK FRAMEWORK © 1984 by Charles Krone Associates is licensed under CC BY-SA 4.0. To view a copy of this license, visit http://creativecommons.org/licenses/by-sa/4.0/*

In 1969, landscape architect Ian McHarg published his book Design with Nature, which pioneered a technology for ecological land-use planning that was underpinned by the understanding of natural systems. The book became a foundational textbook for the ecological view of urban landscape design and its basic concepts lay the foundation for today's Geographic Information Systems (GIS)—a critical tool for ecological development.

Meanwhile, in Australia, ecologist Bill Mollison and one of his students David Holmgren came up with an ecologically inspired design system for food production systems and urban habitats that they named *permaculture* from a contraction of permanent agriculture or permanent culture. Permaculture drew inspiration from the functioning of natural living systems and the way Aboriginal Peoples interacted with their environments. In their overview, Mang & Reed (2012) point out that:

"While earlier iterations of ecological design promoted integration of human and natural systems for more sustainable development, permaculture was the first ecological design system to introduce the concept of a regenerative effect as a new standard of ecological performance […] Permaculture was based upon the generation of a surplus or overabundance of energy and resources that could be reinvested to evolve natural and human living systems as an integrated whole. In support of that goal, Mollison's Permaculture: A Designer's Manual, published in 1988, introduced a hierarchy of investments (regenerative, generative, and degenerative) as a framework for assessing the value of potential actions for building regenerative capacity in a system."

At the same time, Robert Rodale, the son of U.S. organic agriculture pioneer J. I. Rodale, advanced the use of the word regenerative in relation to land use by stating "where what we are really doing with the American Land is not only producing our food but regenerating, improving, reforming to a higher level the American landscape and the American Spirit"

(Rodale Institute, 2015). Rodale used the term regenerative to describe the continuing organic renewal of complex living systems that he saw as the basis for healthy soil and, in turn, for healthy food and healthy people. He later applied the same principle of ongoing self-renewal to regenerative economic development and his thinking has been foundational for the conceptualization and application of regenerative (land-based) methodologies to systems that support life (Rodale Institute, 2015).

Rodale's work also heavily influenced the thinking of John Tillman Lyle, whose book Design of Human Ecosystems was published in 1984. In it he argued that "designers must understand ecological order operating at a variety of scales and link this understanding to human values if we are to create durable, responsible, beneficial designs." The book introduced several key concepts that laid the basis for subsequent work on regenerative design. Lyle postulated that: "Shaping ecosystems, just like shaping buildings", requires (1) a set of organizing principles drawn from "strong concepts of an underlying order that holds the diverse pieces and all their hidden relations together;" (2) "these underlying concepts of order are drawn from ecology", and principles for ecosystem design "need to comprehend and envision the ecosystem the designer is seeking to shape as a dynamic (living) whole"; and (3) ecological concepts are "more or less analogous to the laws of mechanics in architecture in that they provide us with organizing principles for shaping ecosystems much as architects shape buildings".

In the same general time period, the Club of Rome published The Limits to Growth (Meadows et al., 1972), the first study to question the viability of unlimited growth of the human ecological footprint. This was followed by the establishment of the Brundtland Commission in 1983, which defined the term sustainable development as "development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs." (Our Common Future, The Brundtland Report, 1987). This helps to explain why ecological design thinking proliferated in the 1990s, seeking to expand beyond a narrow focus on reducing waste and human footprint, to discover a new role for human activities. A number of foundational books were published during this time, laying out both the practical and theoretical bases of design for ecological sustainability, including Ecological Literacy: Education and the Transition to a Post-modern World by David Orr (1992), From Eco-Cities to Living Machines: Principles of Ecological Design by Nancy Jack Todd & John Todd (1993), The Web of Life: A New Scientific Understanding of Living Systems by Fritjoff Capra (1996), Ecological Design by Sim van der Ryn and Stuart Cowan (1996), and The Ecology of Place: Planning for Environment, Economy, and Community by Timothy Beatley and Kristy Manning (1997). The term ecological literacy (also referred to as ecoliteracy) was coined to describe the capability to understand the natural systems that make life on earth possible, including understanding the principles of organization of ecological communities (i.e. ecosystems) and using those principles for creating sustainable human communities.

Emergence of the coherent discipline of RDD

"The emergence of regenerative development and design corresponds to a larger transition—from an age dominated by a mechanistic worldview to one organized around an ecological worldview. This larger shift has also contributed to an evolution in how we think about sustainability. RDD introduces new ways of thinking about how to assess and respond to the world's living complexity as a source of innovation and evolution. It does not seek to provide simple instructions or answers—the important questions are still emerging from the evolutionary ferment occurring within the sustainability disciplines. Rather, it is intended to help practitioners develop the capability to support their own evolution, to find their place and continue to grow themselves to be able to successfully navigate, stay relevant, and make a difference in this rapidly changing environment."

Mang & Haggard, 2016

The 1990s were also the time when regenerative design and regenerative development initially emerged as two distinct disciplines. As Mang & Reed (2012) describe:

"In 1994, John Tillman Lyle established the Center for Regenerative Design at California State Polytechnic University, Pomona to test, demonstrate, and further evolve the theory and practice of regenerative design. His book Regenerative Design for Sustainable Development (1996) is the first comprehensive articulation of and handbook for regenerative design. Lyle always saw the heart of his work, and the work of regenerative design, as the conscious design of whole ecosystems (seeds of which were in his earlier book Design for Human Ecosystems: Landscape, Land Use, and Natural Resources) (1984), but the bulk of attention has been given to his models and techniques for designing self-renewing resource and energy flows. The importance of developing a different nature of thinking as the basis for regenerative design, which was addressed in introductory chapters of the book, was left without further development as a result of his premature death, and the narrow definition of the term regenerative as simply *self-renewing* came to shape the focus of regenerative design for many architects and landscape architects for decades thereafter."

To overcome this narrow understanding of regeneration as self-renewal, a collective of pioneering social innovation practitioners came together and began developing the theoretical and technological foundation for regenerative development, which they defined as "enabling human communities to co-evolve with the natural living systems they inhabit, while continuously regenerating environments and cultures." Regenesis, a Santa Fe, New Mexico based collective of design, land-use planning, business, and development professionals was founded in 1995 to experiment with putting these theories into practice. They provided, according to Cole (2020) "considerable conceptual and practice understanding of RDD." The work drew from the diverse backgrounds of Regenesis' members, which included landscape ecology, geohydrology, permaculture, architecture, business, urban planning, and also general systems theory, living systems theory and developmental psychology. It integrated three different but complementary approaches to change:

Living systems thinking: a framework-based approach that had been developed by Charles Krone, building on the *general systems theory* of biologist Ludwig von Bertalanffy and *systematics*, a discipline developed by mathematician John Bennett. Both bodies of work have been foundational for the development of complexity and living systems science (see page 22). Krone applied and evolved these theories to help people and organizations to consciously improve their capability to understand how living systems work and how humans can become enablers of the inherent potential that a living system is attempting to manifest.

Permaculture: an ecological design system approach, developed by Mollison and Holmgren in the 1970s and inspired by Indigenous landscape practice. It strives to discern and mirror patterns in natural systems and weave them together with human living and food production systems into dynamic wholes to improve sustainability and self-sufficiency. Permaculture builds the capability to align human activity with the way that natural systems work so that less external effort and input is needed. Instead, natural processes can be harnessed to create abundance.

Developmental change processes: approaches with roots in developmental psychology that aim to engage communities and stakeholders to work together to evolve the potential of a place rather than struggling with the limits of a problem-oriented approach. Developmental change focuses on shifting people's perspective from being victims to becoming responsible co-creators of increasing local vitality and abundance.

And so, the new discipline of RDD took root in 1995. In their detailed account, Mang and Reed (2012) write that:

The founders of the discipline "…saw environmental problems as symptoms of a fractured relationship between people and the living web of nature and argued that the core issue was cultural and psychological, rather than technological. Like Lyle, they believed that addressing this issue required a fundamental transformation in how humans saw their relationship and role with regard to the planet—moving from the current view of standing apart from and using (or protecting) nature to seeing a *co-evolutionary whole*, where humans exist in symbiotic relationship with the living lands they inhabit. For regenerative design to take hold and be successfully applied, the Regenesis team reasoned, a radical shift in thinking and understanding would be required among design professionals, stakeholders, and all the human inhabitants of a place. They proposed the term *regenerative development and design*[2] for the more comprehensive work of creating the conditions and building the capacities required for achieving this shift, with the aim of making development a source of harmonious integration with nature."

[2] A more detailed rendering of the history of Regenerative Development is described in the paper 'Regenerative Development and Design' by Mang and Reed (2012), Encyclopedia of Sustainability Science & Technology.

Continuing expansion of RDD

"The integrity and wisdom of living systems is at the heart of the evolutionary process, which, in turn, is the heart of regenerative practice. At its core, regenerative practice is about coming into attunement with the life world through understanding and being able to work within the larger context in which we exist. In this way, Living Systems Understanding informs and nourishes regenerative practice. A significant aspect of Living Systems Understanding is a heightened understanding of how life is constantly patterned and engaged in nested systems. Living systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots."
Plaut, 2018

While awareness and appreciation of sustainability grew through the early 2000s, regenerative development and design continued to be largely an edge phenomenon for much of the decade. The decade after saw a rise in interest, including from the World Futures Council, which introduced the concept of regenerative cities; the Capital Institute and John Fullerton, who introduced regenerative approaches to economy and business; and the Commonwealth of Nations, which hosted a series of summits to explore regenerative development as a strategy for reversing climate change.

The American Sustainable Business Network was founded during this time and explicitly incorporates a regenerative approach into its charter, observing that environmental and social stewardship is not enough. To have equitable and just access to the resources we all depend on, our solutions must prioritize regeneration for all people and the planet. The ASBN represents 250,000 businesses today (ASBN, 2024). By contrast, the European Business Network for Corporate Sustainability and Responsibility, which supports about 10,000 businesses, does not focus on regeneration but sticks mostly to the agenda of sustainable growth.

Carol Sanford, a student and colleague of Charles Krone, furthered his approach in business settings. Inspired by how living systems work, she supported businesses to radically change the ways in which they organize themselves. While operating under her own organization, the Carol Sanford Institute, she closely collaborated with and supported Regenesis in its efforts from the outset (Mang, personal communication). Her first book, The Responsible Business: Reimagining Sustainability and Success (2011), won multiple awards and is required reading at Harvard Business School. In 2013, Regenesis launched *The Regenerative Practitioner* (TRP), a blended (distance) learning series for practitioners interested in integrating RDD into their practice. While most course participants were initially professionals working within the built environment, the geographic diversity was soon matched by a growing diversity of professions, a reflection of the widening interest in RDD.

Building on the momentum generated by the Millennium Development Goals (MDGs), all member states of the United Nations agreed to adopt the action plan on sustainable development called 'Transforming the World: the 2030 Agenda for Sustainable Development' in 2015. To make the action plan more tangible, the 2030 Agenda defined 17 Sustainable

Development Goals (SDGs) with 169 targets. The SDGs were informed by decades of scientific research and were created through an extensive participatory process, organized by the UN. Ten million people from different parts of the world expressed their views in the consultation process to help shape the 2030 Agenda (Ghorbani, 2020). Despite excellent intentions, most of the thinking was still anchored in the Cartesian mechanistic scientific paradigm of the mid-17th century that focuses on parts instead of wholes. This suggests that there is still room for further exploration at the UN level about how to bring sustainable development goals into alignment with a systems view of life.

As described by physicist and systems theorist Fritjof Capra and Professor of Biochemistry Pier Luigi Luisi in their book The Systems View of Life: A Unifying Vision (2014), recent insights from the life sciences are changing our view of how the world works[3] and these new insights can lead to significant breakthroughs regarding the challenges facing society today. Recent work by astrophysicist Adam Frank, theoretical physicist Marcelo Gleiser, and philosopher Evan Thompson (2024) confirms the central importance of evolving the scientific paradigm and urges us to "create a new scientific culture that views ourselves both as an expression of nature and as a source of nature's self-understanding". They propose that the new scientific culture will be vital for us to flourish in the new millennium and point out that:

"Although we have created the most powerful and successful form of objective knowledge of all time, we lack a comparable understanding of ourselves as knowers. We have the best maps we've ever made, but we've forgotten to take account of the map makers. Unless we change how we navigate, we're bound to head deeper into peril and confusion."

Awareness that conventional practice, *that sustaining what is*, is not going to be enough has been growing among a wide variety of actors, which explains the sudden peak in interest in regenerative approaches. This is exemplified by the increase in initiatives related to regenerative agriculture, developmental business and leadership, nature-based solutions, nature positive approaches, and impact investing. However, much of the current activity is focused on the *applications* (e.g. restoring and regenerating land), while very little attention is given to *changing the deeper levels of thinking, knowing and being in the world* that is required for regenerative practice to be effective. As a result, the narrow definition of regeneration as "self-renewing" continues to dominate much of the current thinking and strategy. Most efforts confine themselves to the level of technology (technofixes), while belief systems (epistemologies, cosmologies, and ontologies) remain unchanged. The discipline of RDD aims to address this void.

[3] More specifically, this work explains in detail how new understanding is changing the paradigms in science and society that determine what we think is feasible, appropriate and necessary.

Main aspects of a regenerative development and design approach

"Regeneration, as a mindset, is focused on developing the capacity and capability for systems evolution. It is not about maintaining what is, or restoring something to what it was. Rather, it is about creating living systems (e.g. places, companies, and communities) that have the capacity to evolve toward increasing states of health and vitality over time."
adapted from Plaut, 2018

In their book Regenerative Development and Design: A Framework for Evolving Sustainability, Mang & Haggard (2016) give a comprehensive overview of the premises and principles that define a regenerative developmental approach. The following summary is excerpted from the book and shared with permission.

Characteristics of Regenerative Projects/Processes/Practitioners

Premise: Every living system has inherent within it the possibility to move to new levels of order, differentiation, and organization.

Principle: Design for evolution.

A regenerative project shifts the focus of sustainable design from slowing down entropy to building the capability of living communities to evolve toward greater value. Every human creation, whether it's a cottage garden powered by the sun, or a company powered by employees, must function within a living planet made up of interconnected living systems. Although subject to the law of entropy, living systems are also governed by the countervailing processes of evolution. Living systems don't just run down; they also grow up.

This evolutionary drive has been key to life's 3.8 billion years of success on our planet. Failure to take this evolutionary drive into account when we design puts us in conflict with the nature of living systems and our own nature as humans. This is what Gregory Bateson alludes to in his famous quote: "The major problems of the world are the result of the difference between the way nature works and the way people think." Each and every organism on Earth is a *participant* in evolution. As participants, they shape not only their own destinies but the destinies of their ecosystems. Humans have the potential to make unique contributions to the ongoing evolution of living systems by consciously participating in them. Unfortunately, for the most part we are fighting evolution rather than aligning with it.

Designing for evolution requires us to recognize:

- change as a source of creativity—in contrast to approaching projects with the mindset that change is something we are working to prevent;

- diversity is about exchanging value—diversity of elements, such as organisms in an ecosystem or buildings on a site, adds nothing if there is no beneficial exchange of resources, energy, or material among them. A forest doesn't become healthy because it contains a long list of plant and animal species; it becomes healthy when those species actively nourish and shelter one another in an unbroken web of beneficial relationships;
- Adding value is a nested phenomenon—inadequate understanding of how (a project's) effects, positive and negative, will move outward into larger and larger systems (or inward into smaller and smaller systems) creates unintended consequences and fails to deliver the value of which our projects are inherently capable.

Premise: Co-evolution among humans and natural systems can only be undertaken in the places humans inhabit, using approaches that are precisely fitted to these places.

Principle: Partner with place.

The foundation for regenerative development is an understanding of place. What makes each place unique? What gives it vitality? Viability? What is the source of its potential and, therefore, of its capacity to evolve?

Place is one of those rare concepts in the English language that embraces both the human and natural worlds. It comprises all of the multitudinous interactions among nature and culture, interactions that can be found in urban and rural settings alike. Every place is a living whole with its own distinctive spirit. The proliferation of places, each different from any other, represents a key strategy for the planet as a living system, a diversified portfolio of investments. The innovation and experimentation that this diversity enables is necessary for the evolution of natural and cultural systems alike.

An image of a resilient town, illustration by doquigi.
Image ©Resilience Earth SCCL, Girona, Spain.

Place thus represents a powerful strategic leverage point for transforming the ways we live on Earth. Place is more than material reality; for many people it is also the holder of deep emotional attachment that offers a context that is meaningful, one that they can comprehend and care about. It offers the motivation needed to reintroduce regenerative practices into our endeavors. It is the *right scale of whole* for people to work on, providing an arena within which they can successfully take on the challenges that we are facing together as a species.

Premise: The sustainability of a living system is tied directly to its beneficial integration into a larger system.

Principle: Call forth a collective vocation.

Sustainability is a byproduct of growing the value that living systems create. It becomes possible when a person, forest, or river is in a reciprocally developmental relationship with the proximate whole it inhabits. The smaller system contributes to the larger system's development and, in turn, receives nourishment for its own. This relationship is described as *adding value*. One of the implications of this idea is that to be regenerative, one must develop the ability to *take direction* from a higher-level system. For humans, the desire to contribute to something larger is inherent and may be a trait that has allowed us to co-evolve with our planet and with one another. It doesn't just make life more meaningful; it is also the only path to a sustainable way of living.

In regenerative development, taking direction does not mean taking orders or following instructions. Rather, it is a pulling or a calling forth, in other words, a *vocation.* Vocation is the trail to which a person is especially drawn because they know that it is theirs to blaze. Every member of a living system is known, in part, by the contribution to which it is called… Like an individual's vocation, a vocation of place can be seen as an expression of essence in the form of new life that will allow both the place and the wider world in which it is nested to evolve.

Premise: Projects should be vehicles for catalyzing the cooperative enterprises required to enable evolution.

Principle: Actualize stakeholder systems toward co-evolving mutualism.

One characteristic of regenerative development is that its influence on place continues to unfold long after a project is completed. To achieve the full potential of this ongoing regenerative effect, it must call into existence a *system* of mutually beneficial stakeholder relationships to extend the project's contribution through widening spheres of influence and time.

To enable evolution, humans need to relearn how to be as necessary to the expression of ecological potential as bees are to the flowers they pollinate. This necessary relationship can be described as *co-evolving mutualism*, a progressive and mutually beneficial harmonization of human and natural systems. Co-evolving mutualism is a process that cannot be predicted but

can be continually planned and managed toward. As instruments for co-evolving mutualism, regenerative projects bring together stakeholders—people and groups with a stake in growing the potential of their places.

Premise: Potential comes from evolving the value-generating capacity of a system to make unique contributions to the evolution of larger systems.

Principle: Work from potential, not problems.

Most sustainability work today continues to respond to problems. Many new opportunities arise from attempts to solve a problem (e.g. much of the market for energy- or water-saving technologies has grown out of the desire to reduce spending on scarce and costly resources). But there is a hidden downside to this approach, because it dictates a future based on past and present problems rather than entire ranges of possibilities. A problem-solving orientation causes us to look backward while the world evolves forward.

Systems theorist and professor of organizational change Russell Ackoff described most planning as riding "…into the future facing the past. It's like trying to drive a train from its caboose." This approach is also inherently reductionist. It brings a single broken fragment to the foreground and fails to account for the context or system within which the problem is a symptom and severely limits the energies available for creating what we really value. When problems command our attention, we easily forget what we actually want to bring about. We lose connection with the overall purpose and meaning of our efforts, and that makes it difficult to maintain commitment. By starting from potential, we focus our attention on what we value and seek ways to evolve systems to new orders of value generation.

Premise: The continuing health of living systems depends on each member living out its distinctive role.

Principle: Find your distinctive, value-adding role.

Regenerative goals are open-ended and alive. They don't just get checked off the list when a project is completed. Regenerative goals orient a design process toward the capabilities and qualities required by a project's envisioned *value-adding* role. Value-adding is ongoing and "defines life giving processes and behavior for the system and all of its members." (Krone, 1974).

Setting this nature of goal requires a perspective and approach that is inherently systemic. This is where the idea of *role* comes in. A role is different than a function. An entity's function has to do with what it *does*. Its role, on the other hand, is what it needs to *be* in order to bring more life into a system. Starting with the predesign phase, regenerative practitioners seek to discover and illuminate the value-adding roles of all the nested systems that will be engaged in the project, including their team, the stakeholders, the project, the community, the place, and the larger wholes served by the place.

Bringing the River Dart into the room for the South Devon Catchments Partnership by Jane Brady, Bioregional Learning Centre (BLC). The photo shows a meeting of the South Devon Catchments Partnership on July 5th 2018, led by BLC, to discuss a whole-catchment planning approach. Picture ©BLC, South Devon, UK.

Premise: S*mall conscious and conscientious interventions in the right place can create beneficial, system-wide effects.*

Principle: Leverage systemic regeneration by making nodal interventions.

As our understanding and appreciation of the living world grows, it is overturning the ways we are used to thinking about change and doing good. The efficacy of regenerative work comes from making small but powerful interventions whose beneficial influence ripples across systems and up and down scales. This is in contrast to replication across scales.

Replicability made sense in a mechanical age, when progress and better living were thought to depend upon making machines work better, and machines included everything from the assembly line to the human body to cities to forests and farms. To do this well, we trained ourselves to focus on basic building blocks or parts. Even in ecological restoration and green building, for example, we looked at the key components of successful projects, analyzed how they were arranged, and then replicated them elsewhere.

But when projects are replicated outside of the contexts in which they arise, they tend to be resource intensive in their creation and resource consumptive in their operation. Built on imported models, they fail to reflect the cultural, economic, and ecological systems of place. Most important, by imposing pre-determined solutions, they fail to tap the creative potential of local people to design, build, and manage them.

Premise: A project can only create systemic benefit within a field of caring, co-creativity, and co-responsibility.

Principle: Design the design process to be developmental.

Regenerative development is not about finding a magic formula that will solve the world's problems. Rather, it enables communities to evolve beyond current conditions by growing capabilities that they don't already possess. Put another way, regenerative development is *developmental*. It builds the capability of the systems it affects (such as organizations, communities, and watersheds) to serve as catalysts for continuing co-evolution.

The successful completion of a regenerative project is a beginning, not an end. It launches an ongoing process that requires local players to be both able and willing to continue collaborating into the future.

Regenerative development cultivates evolutionary capacity in projects and living communities. This creates outcomes that are harmonious with the livingness of the world, but it also means that regenerative development can't be reduced to a recipe or formula. It must be reinvented for each new project and for each new situation.

Premise: The actualization of a self requires the simultaneous development of the systems of which it is a part.

Principle: Become a systems actualizer.

In order to anchor *self-actualizing* work in a way that serves the world outside us, we must incorporate an additional layer, the psychology of what might be called *systems actualization*. This occurs in a living world that requires of us that we learn how to awaken caring, honor complexity, and be a work in progress.

Awaken Caring: Many change efforts are mobilized in response to an impending crisis but die away once the problem is solved. Systems actualization, by contrast, is fueled by seeing new potential and feeling called to bring it into being, to care enough to make it real.

Honor Complexity: Much of the Western scientific and intellectual tradition has been built around the idea of atomization: the idea that if one understands the parts, one understands the whole (see also Cartesian reductionism in the glossary). This atomizing bias makes Western cultures poorly equipped to comprehend living systems. Working with complex wholes is simply not part of the way we've been educated. "The distinction that I want to make between Western science and the approach to science which my tradition, and perhaps other Native traditions, have found useful… is that first you look at the Forest… and then you look at the Path… you first acquire an intuitive, whole understanding, and then you focus on a Specificity and examine it, and then you always put it back into the Whole*".* Paula Underwood Spencer (1990), a Native American and keeper of the Oneida tradition.

Be a Work in Progress: Thoughts and emotions are strongly influenced by cultural conditioning and the energy fields within which they arise. Unless we engage consciously with our own thinking processes, we run on tracks that have been laid down for us by our individual and collective past.

RDD in academic literature and recent developments in the field

"Sustainable development and design have the potential to shift their aim from improving human well-being within environmental limits to catalyzing thriving social-ecological communities (i.e., living systems) across scales. Regenerative development, a methodology that harnesses the potential of living systems, offers a way forward. Regenerative development integrates science and practice with essential but often neglected components of sustainability—ecological, social, cultural, spiritual, and geophysical—as well as their temporal and spatial dynamics. It also addresses the root causes of (un)sustainability—thinking and worldviews."

Gibbons, 2020

RDD in academic literature

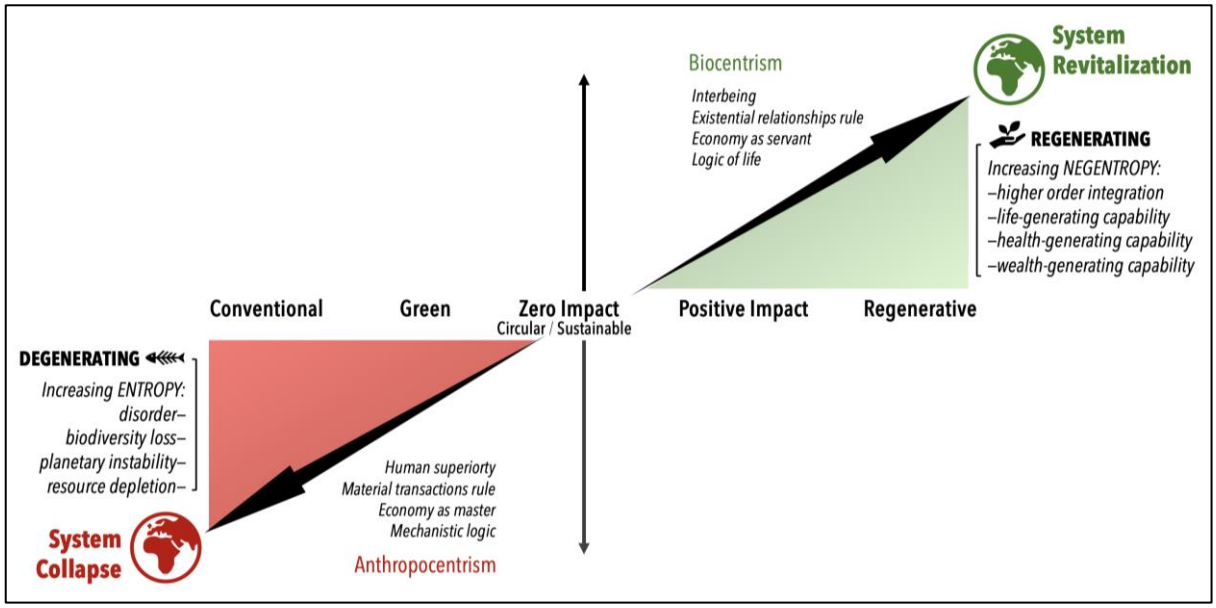
While the RDD approach has been conceived and tested in the field and thus outside of academia, academic interest in the concept and practice is growing. The first scientific field that explored the concept of regenerative development and design was the field related to architecture and the built environment. Bill Reed's paper 'Shifting from Sustainability to Regeneration' was published in the journal of Building Research & Information in 2007, and in 2011 the Springer Encylopedia of Sustainability published "Regenerative Development and Design" (Mang & Reed, updated in 2012). In 2012, a special edition of the BRI Journal on regenerative design and development carried several academic papers including 'Designing from Place: A Regenerative Framework and Methodology' (Mang & Reed, 2012), 'Towards a Regenerative Paradigm for the Built Environment' (Du Plessis, 2012), and 'Transitioning from Green to Regenerative Design' (Cole, 2012), among others.

Du Plessis (2012) describes a regenerative paradigm as one that focuses on strengthening "the health, adaptive capacity, and evolutionary potential of the fully integrated global social-ecological system so that it can continue regenerating itself, thereby creating the conditions for a thriving and abundant future—not only for the human species, but for all life". Gibbons (2020) sums up the essence of RDD as "a place-based development and design methodology that grows the capabilities necessary for living systems to increase in complexity, diversity, capacity to support all life, and the potential to change to provide future options (i.e., health and wellbeing; Fig. 3)". Scholars have identified RDD as tapping into the human potential to reconnect aspirations and activities with living systems principles in coevolutionary, salutogenic (health-generating) relationships. RDD is one of the few disciplines working on sustainability that emphasizes the need to make *inner* changes (how we think, process the world, and make decisions) to accomplish desired changes in the world, while offering a technology for how to make these changes.

In their 2012 paper, Mang & Reed give an overview of regenerative design and development and what it could mean if applied to architecture and the built environment. They highlight three key aspects of regenerative practice that are essential: understand place and the relationship to place, design for harmony with place, and design for co-evolution. They posit that regenerative projects should be grounded in the richest possible understanding of the

evolutionary dynamics of a place in order to identify the potential for realizing greater health and viability as a result of human presence in that place (Mang, 2006). "Regenerative potential is defined as the ability to leverage human interventions to achieve greater systemic health through time—for the places they occupy and depend on." The authors also highlight **why our current approach to fixing problems may eliminate what we *do not* want but does not do much for what we *do* want to achieve.** They observe:

"Many projects fail to achieve a regenerative effect because the potential they target is too limited—focused on an element or a problem without seeing its systemic connections. Others fail because they seek to realize a potential defined by human ideals but fail to align with the essence of a place and the larger patterns of life that make that place work." (Fig.3).



FIG—3: *Technical Systems (left) versus Living Systems approach (right). A focus on technological fix approaches ultimately will lead to increasing entropy and system collapse. Only by developing the capability to revive and regenerate living systems, negentropy and system revitalization can be achieved.*
Image adapted from Mang & Reed (2012).

In their 2018 paper, Gibbons et al. illustrate two cases in which a regenerative development approach has been applied and the results that this brought forward. They conclude:

"Regenerative development is not a natural practice for most people in the western world. We are steeped in a mechanistic worldview, and our default beliefs, thinking mechanisms, and actions emerge from there. Regenerative development ultimately grows from individuals who consciously commit to changing their own worldviews and ways of being in the world. This is no small task; it takes constant commitment and effort. Learning how to be a regenerative development practitioner or regenerative inhabitant of a living system is not easy. It is not as simple as implementing a formula or technology or following a prescribed list of activities. It is as much an art as it is a science. It will take continual effort to create the commitment and caring necessary to continue on a regenerative pathway. It will take a new kind of practitioner who possesses new skills, mindsets, and aspirations and constantly nurtures these. Initially, it

may be difficult to find fully willing practitioners and to provide them with the training and support they need. Yet, it might just be the approach to regenerate humanity and all life beyond."

Plaut (2018) concludes that we have the potential to not only address the pressing social and ecological imperatives of our time through the paradigm and practice of regeneration, but also that it may bring us closer to realizing our role as a contributive, life-enhancing species on this planet.

Emeritus Professor and past-Director of the School of Architecture and Landscape Architecture at the University of British Columbia, Raymond J. Cole sums up the approach in his 2020 paper:

"While many of their core tenets—systems thinking, community engagement, respect for place—have long individual histories in architectural discourse and practice, regenerative approaches tie them together in a cogent manner. Hes and Du Plessis (2015) and Mang and Haggard (2016) emphasized how such approaches logically emerge from an ecological worldview and represent a co-evolutionary, partnered relationship between sociocultural and ecological systems rather than a managerial one and, in doing so, build, rather than diminish, social and natural capital. *Co-evolutionary* speaks to a continually adapting relationship over time, making it necessary to reconcile how the timeframes and rates of change of people and their socio-cultural systems match those of ecological systems across various scales, how commitment and engagement is nurtured and sustained, and how to deal with uncertainties in outcomes. The interrelationship between people, socio-cultural, and ecological systems and, in turn, their consequences for the built environment are constantly evolving. While natural systems adapt to survive, human systems are *endowed with volition and intentionality*, and each system and relationship between them will be affected differently by a changing climate. Above all, regenerative approaches prioritize the understanding and engagement of the unique qualities and potential of both places and the people who live in them. Indeed, operating within the context of the place, it is argued, ensures the relevance and resilience of projects, and their ability to adapt."

He goes on to highlight the relevance of regenerative development, especially in dealing with climate disruption:

"The emphasis on place and, by implication local communities, is of considerable significance in adapting to climate change. While the climate crisis is driven by the aggregate of greenhouse gas emissions globally, the consequences will be experienced on a local scale as will the community capabilities to adapt to changes. Acknowledging these tendencies, regenerative development strives to build our individual and collective capabilities to work with complexity, change, and uncertainty."

Recent developments in the field

"In an era where the term regenerative is increasingly becoming part of the corporate lexicon, its essence, deeply rooted in ancient wisdom, is experiencing a renaissance in the modern world. This concept isn't just about sustainability or environmental stewardship; it's a holistic approach that encompasses becoming more human, more vibrantly alive, and more in sync with the natural rhythms of life itself."

Giles Hutchins, 2024

While RDD still occupies a relatively small niche in the larger world of sustainability efforts, interest in regenerative approaches is growing. A good overview of current regenerative approaches is described in Buckton et al. (2023). However, most of the current attention and efforts are focused on *outer changes* or results of regenerative efforts, with little regard to the *inner changes* they require. The importance of developing a different nature of thinking as the basis for transformative work, to echo Einstein's famous quote, is largely left aside. The term regenerative continues to be treated as interchangeable with self-renewing, which tends to cause people to overlook the critical, co-evolutionary process between what is being regenerated (outer) and the development of the regenerator (inner). Thus, the focus of much of the regeneration movement is on "What should I do?" (see for example Paul Hawken's latest book Regeneration: Ending the Climate Crisis in One Generation, published in 2021) rather than on "How should we be thinking about this?" This latter question provides the first step in RDD (Mang & Haggard, 2016). While action is needed, our *quick fix* mentality generally skips the crucial aspect of building the thinking capabilities that are needed to make better decisions on which actions to take (Sanford & Haggard, 2020). This narrow focus on regenerative as something we do, rather than who and how we are, represents a significant blind spot.

Recent developments in the field of RDD practice demonstrate that interest has been expanding. Between 2010 – 2019, interest was mainly coming from the US, Mexico, Australia and New Zealand, with for example a government commissioned research report that recommended the adoption of RDD as a national policy in New Zealand (Jenkin & Zari, 2009). The City of Auckland has built RDD into its public planning and development processes. Meanwhile, the ReGen Places Network, founded in 2022, is growing a network of place-based alliances across Australia, New Zealand and beyond that are focused on building the social infrastructure and capacity for places to initiate community-led projects and enterprises for the regeneration of cities, towns, and bioregions.

Regenesis launched The Regenerative Practitioner professional development series (TRP) in 2013 with the premise that the greatest possible impact of RDD would be realized by putting it into the hands of practitioners who are embedded within and called to serve as committed change agents for their own communities, organizations, and industries. Since that time, the TRP series has grown an overall global graduate community of well over 1,300 practitioners in 40+ countries.

Recent years have seen an increasing interest from Europe. Daniel Christian Wahl, author of Designing Regenerative Cultures (2016), hosted the first TRP in Europe in Mallorca in 2018.

Since then, 11 EU-based TRP series have been hosted by Nuno Da Silva and local colleagues in Lisbon, Portugal, with 230 TRP alumni, spread across 21 European countries. Local initiatives initiated by EU-based TRP alumni that aim to advance capabilities related to regenerative development are gaining traction, including but not limited to, the Bioregional Learning Centre in South Devon, UK, the Resilience Earth nonprofit cooperative committed to community resilience and regenerative design in northern Spain, LUCIDA in Portugal, JET Regeneration in Ireland, JET Hub in Germany, the regenerative education initiative in the Netherlands, Girls Make the City initiative in Brussels, the Power of Place learning journey by the Really Regenerative Centre, the Regenerative Business and Leadership retreat by Centre4NI and Weerwerk, and upcoming local TRP series in France and Spain.

In addition, a French translation of the book Regenerative Development and Design: A Framework for Evolving Sustainability is scheduled to be released later this year. TRP graduates in Spain launched RegenERA Local in Santander in November 2023, an Impact Hub initiative that is working to introduce RDD nationally, connecting Impact Hubs in Madrid, Barcelona, and Malaga (as well as Lisbon). Their aim is to promote bioregional regeneration, connecting urban and rural communities in a shared commitment to grow their viability, vitality, and the necessary capacity to face their ongoing ecological transitions. Also in 2023, the Royal Society of the Arts in the UK introduced the Regenerative Futures Programme, exploring entry points for regenerative change with TRP graduates Daniel Wahl and Josie Walden.

Meanwhile other publications and initiatives have also been fueling interest in the concept of regeneration. In Europe, Laura Storm and Giles Hutchins' book Regenerative Leadership (2019) sparked interest in the leadership dimension of change, while Daniel Christian Wahl's book on Designing Regenerative Cultures (2016) explored the cultural dimensions of the transition and his ReGeneration Rising Podcast with Josie Warden commissioned by RSA Oceania explores the many dimensions of regeneration through conversations with people in the field. Interest in regeneration from AXA Climate has led to the establishment of the Butterfly School, an online program to learn about regenerative business. Butterfly has been co-created by AXA Climate, LUMIÅ, La Jolie Prod, and Regenerescence to catalyze a concrete transition towards regenerative business. In the US, the team behind Project Drawdown has come together to create a new vision for a regenerative future and established a new organization called RegenIntel, short for regenerative intelligence, which aims to empower the next solutions-based economy[4].

[4] If and how RegenIntel works on development, is unclear at the moment of writing.

III. RDD IN PRACTICE

"The outer development of urban and rural places must always be matched by an inner development of those that inhabit them."
Mang & Haggard, 2016

How does RDD compare to other approaches

As we have explained, an RDD approach is different from other sustainable development strategies in that it is meant to align with and enable sustainability-oriented approaches to be more systemically effective and to reach beyond the constraints imposed by a narrow problem orientation to be able to create more beneficial and conducive spill-over effects on multiple scales. Daniel Christian Wahl (2017) calls this scale-linking:

"The sustainability revolution will be simultaneously local, regional, and global; it will require changes in worldview, value systems and lifestyles; and has to be based on widespread participation, both in the form of bottom–up community engagement and top–down policy changes and international collaboration. With regard to our everyday life, most of us will primarily experience and take part in this sustainability transition at the scale of our local communities, cities, and bioregions. These are the scales where our individual and collective behavior can and does make a difference, thereby driving regional transitions towards sustainability, which will ultimately result in the emergence of a sustainable human civilization."

A framework that helps in understanding the systemic power of an RDD approach is the Levels of Paradigm framework (Sanford & Haggard, 2020; Fig. 4). The framework is a powerful tool for exploring the paradigms that influence current thinking and discourse and how our consciousness can evolve. It is important to note here that this framework is specifically about *thinking*, rather than *doing*. Based on the premise that transforming the paradigm from which one is thinking is pivotal to resolve the crises that we are facing, the framework demonstrates that transcending the paradigm in which one is operating is the result of a disciplined effort to move up levels. As each level of paradigm represents an evolution of understanding beyond the paradigms that preceded it, Sanford & Haggard point out that work at the top level yields the greatest power and leverage for creating effective responses to the sustainability challenges we are facing.

At the bottom level, thinking and acting in the world is sourced from a ***value return*** paradigm that centers around *unrestrained self-interest*. In economic discourse this leads to models which aim to produce as much and as cheaply as possible and such models externalize the associated damage and costs that arise from this way of working.

As unrestrained self-interest is inherently unsustainable in the long run, e.g. pushing our planetary boundaries out of their safe zone, increased scientific evidence and elevated consciousness gave rise to the ***arrest disorder*** paradigm, which aims to *halt the ongoing*

degradation by coming up with ways to restrict unrestrained self-interest. This is the level where most current policy programs are operating, establishing rules, regulations, and legislation to avoid worst-case outcomes from the value return paradigm. Many familiar strategies aim to reduce negative impact, as approaches like green, carbon neutral, and sustainable/renewable technologies and initiatives illustrate. This is also the paradigm that sources activism.

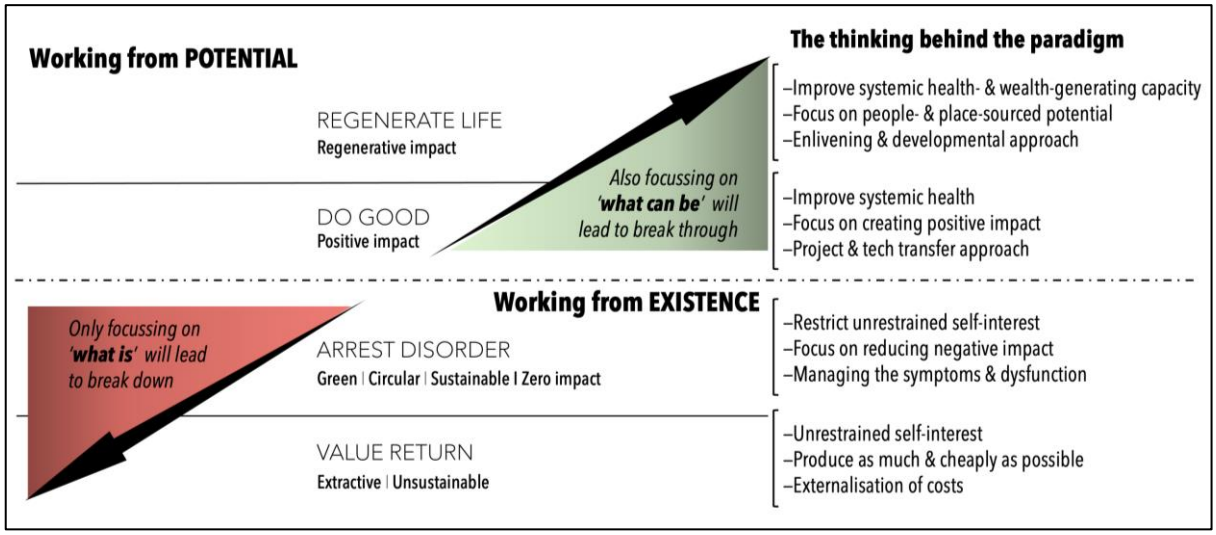
The downside when operating from this paradigm is that it almost always evokes resistance, can be very energy intensive, and is often spirit-draining and burnout-creating. Thinking tends to be locked-in at the level of existence, which diverts attention toward management of symptoms and dysfunctions and away from transformation. Many philosophical and spiritual traditions, as well as the latest neuroscience, point out that when we focus on what already exists, we eventually end up with more of the same. A focus on improving 'what is' mostly ends up repeating the past and will eventually result in more degeneration. Only when we focus on potential, or *what can be*, can a different outcome and future be created.

The ***do good*** paradigm moves away from a focus on doing less bad and toward a focus on *creating positive impact*. At this level, increased awareness and consciousness allow people to see the interrelatedness and interdependency that characterizes the web of life. While work is aimed at increasing systemic health, work is often conceived from a project and technology transfer mindset. One of the risks of operating from this paradigm is that initiatives easily collapse into generalization—one-size-fits-all approaches that are blind to the specific essence and potential of a given place.

Do good initiatives tend to be heavily influenced by the worldview of the do-gooder. Whatever they think is good, that's what they pursue. Philanthropy often falls into this category as the philanthropist funds those things that they believe in or are attached to, regardless of whether they are suited or appropriate to the specificity and uniqueness of place (e.g. technology transfer).

At the ***regenerate life*** paradigm, understanding and consciousness shifts beyond such strategies as tech transfer and positive impact projects toward an ongoing enlivening and developmental approach that is deeply people- and place-sourced, spirit-lifting, and capability-building. It focuses on enabling place-based potential that comes from the innate characteristics and qualities of place. It seeks right relationship, and if done well, it *improves the health- and wealth-generating capacity of the wider system*. The system achieves higher levels of integration and integrity; it becomes more and can do more.

The Levels of Paradigm framework helps to locate current efforts with regard to the thinking that informs them, but it also gives insight into what is needed to elevate this thinking to a next level. One of the most important insights the framework offers is that a *problem-solution* focus keeps us locked-in at the level of existence. Put differently, a problem-solving approach prevents us from working from potential. It focuses on avoiding what we do not want but does little for creating what we do want. RDD's technology and methods have been specifically designed to overcome this lock-in by working explicitly and simultaneously on the inner and outer dimensions of change. RDD works not only on building systemic understanding, it also works on building *will* by unlocking the unique essence and potential of individuals.



FIG—4: *LEVELS OF PARADIGM FRAMEWORK. Adapted from Sanford & Haggard (2020) whose framework is a powerful tool to explore the levels of paradigms that influence current thinking and discourse. In this adjusted version, we highlight in which paradigm some of the current economic discourses can be situated. Transcending the paradigm in which one operates requires advanced skills, e.g. to deal with ingrained cognitive biases, to overcome cultural conditioning, to work with paradoxes and from potential, to avoid path-dependency, to become a systems enabler, and to develop new capability, new roles, and new collaborations.*

A focus on identifying and developing value-adding processes and roles that can increase the vitality and viability of a living system brings meaning and purpose to people, which is spirit-lifting. This dimension is often missing in more conventional ways of working, wherein functional work dominates and bigger picture value is overshadowed by checklists, deliverables, and bureaucratic burdens. These can be spirit-killing if taken too far, as evidenced by steep increases in burn-out and mental health issues. As a meta-discipline, RDD differs from other approaches that use the term regenerative, as outlined on page 11, (e.g. regenerative agriculture, business, tourism, business, finance, etc.) by working on systemic wholes rather than fragmented subject areas, and by addressing itself not only to what we do, but also to who we are, how we think, and how we relate.

In what follows, we provide a brief overview of a variety of approaches to sustainability innovation and give a first indication of how RDD might elevate their effectiveness.

Sustainable Development

The term **sustainable development (SD)** was first institutionalized through the Rio Process initiated at Earth Summit in Rio de Janeiro in 1992. It is understood as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. While the concept of SD helped to build awareness and stimulate innovation, for instance in renewable energy technology, it has not instigated a fundamental transition in the way societies operate. A lingering lack of clarity about what sustainable development means

has handicapped progress. As Mang & Haggard (2016) point out: "what is missing is an adequate understanding of what sustainability is actually supposed to achieve". They go on to observe that we try to discover the way to sustainability through a process of elimination: pick a strategy, pursue it until its usefulness has been exhausted, and then switch to another. Worse yet, we argue about which strategy to choose in the first place, or the strategy we finally select gets watered down so much to fit current vested interests, that the risk of arriving too late increases every day. In short, the current approach to SD is often interpreted as an approach to minimize the negative (environmental) impacts of an ever-growing economy. It comes from an arrest disorder paradigm. As such, it has not succeeded in the creation of a new worldview or a radical change in mainstream development practices.

"The problem I see with the term sustainability" notes Fritjof Capra (2020), "is not in the term itself, but rather in the fact that from the very beginning it has been combined with the term development." He explains that:

"Most people don't talk about sustainability, but rather about sustainable development, which is problematic because development has two very different meanings—one in biology, and one in economics. In biology, development is a basic property of all life; all living organisms develop. It implies a kind of complex unfolding of organisms or ecosystems or societies, moving toward fulfilling their potential in a very broad, multifaceted way. Economists have narrowed this down to a single linear economic dimension measured usually in terms of per capita GDP. They have compressed the richness of human existence into this one limited quantity. If development is used in that economic sense, and especially in association with unlimited growth, it is manifestly unsustainable on a finite planet. Then sustainable development is an oxymoron, and development of that kind will never be sustainable."

He concludes that if we combine *regenerative* with *development* without upgrading our understanding of development, we will repeat the mistake of the past. He concludes: "it has exactly the same problem—as long as we use development in this narrow economic sense, it will not be sustainable, nor will it be regenerative." Within RDD this issue is addressed because development is understood in its holistic, living systems sense of adding value in nested holarchies. As Gibbons (2020) points out, adding a RDD approach to SD helps to shift the aim from *improving human well-being within planetary limits* to catalyzing *thriving socio-ecological living systems across scales*.

Circular Economy

The circular economy (CE) approach has been proposed as an alternative to the traditional, linear economic model, which is based on a take-make-consume-discard pattern. A circular economy, as defined by the Ellen McArthur Foundation, is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy aims to tackle climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources. The circular economy is based on three principles, driven by design: eliminate waste and pollution, circulate products and materials at their highest value, and regenerate nature. The strongpoint of CE is that it recognizes the

intelligence of living systems and sets out to emulate this natural pattern: life by default is circular, there is no waste. The CE discourse thus shifts the thinking from linear to circular pathways and establishes a focus on designing out waste and designing for disassembly and reuse. As such, the technical thinking behind a CE comes mostly from an *arrest disorder* paradigm: how can we maintain our economy into the future and avoid depletion of resources. The focus on regenerating nature on the other hand, opens the door to elevate the thinking and shift from a problem focus to a focus on developing potential.

However, a significant restraint to CE realizing its full potential in eliminating waste and regenerating nature lies in the fact that there is neither a strategic emphasis, nor a developmental infrastructure for developing the *nature of the thinking* required to embody nature's circularity. Our tendency towards quick-fix solutions and our vested interests in what already exists generate a kind of tunnel vision. For example, for all our emphasis on recycling plastics or embedding them in new products as a way to reduce pollution, scientific evidence shows that these efforts have not curbed plastic waste generation. On the contrary, plastic pollution has increased (OECD Global Plastics Outlook report, 2022). Moreover, the production and use of plastics creates a toxic byproduct—microplastics—that disrupts the health of all living systems, from fish to humans to ecosystems. In other words, circularity alone is not enough. There are other patterns in nature that ensure that byproducts and side effects are life-friendly and life-enhancing. For instance, life works with life friendly chemistry, which is bio-compatible and bio-degradable (Gorissen, 2020). To accomplish this, life uses a relatively small subset of elements from the periodic table. Enlarging our understanding of living processes and bringing our own industrial processes into alignment and integration with them could expand the power of CE efforts.

This example illustrates that for most practitioners, CE is not seen as an integrated part of living systems. As the co-founder of the Butterfly School, Veronique Letellier (2024) notes, achieving "a model that replenishes and regenerates […] demands a profound understanding of all life's interconnectedness (and) recognizing that education is key to this paradigm shift." As a meta-discipline, RDD could contribute to enhancing the effectiveness of CE by developing the capacity to work on complexity without fragmenting what we're working on into parts and pieces, a critical capability if we're going to design for and engage with the dynamism of a living world. In addition, RDD helps to uncover the hidden potential that exists in scale-linking. For example, thinking of value adding activities as nested could weave together CE initiatives at local, regional and global scales. Finally, RDD thinking is dynamic rather than static, specific rather than generic, and more spiral than circle in its orientation. By seeking to develop the potential of specific places, it looks beyond eliminating waste to discover unforeseen possibilities for generativity, grounded in the unique qualities of local systems.

Living systems thinking may help us gain new insight into some of the assumptions that underpin the logic of CE. For instance, is decoupling economic activity from resource use really what is needed? Or does the crux lie in the way we have formulated the relationship between both? As Indigenous cultures have always known, economies are intrinsically bound to and nested in living systems. Rather than separating human activity from the rest of nature, would it not be better to explore an alternative: coupling economic prosperity and living systems prosperity, for instance by widening the focus to include quality, not just quantity. What does good living mean to people and what role can CE play to move into that direction? What is the role of healthy air, water, soil, and food and how could CE ensure these? A broader perspective like this has the potential to empower the CE to not only maintain our economic activity long

into the future but to do so in a way that enables the health- and wealth-generation capacity of living systems.

Nature-based Solutions

The United Nations Environment Assembly (UNEA-5) formally adopted in operational paragraph 1 of its resolution 5 an elaborate definition of **nature-based solutions** (NbS) which are described as: "Actions to protect, conserve, restore, sustainably use, and manage natural or modified terrestrial, freshwater, coastal, and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits." The resolution recognizes the important role NbS can play to address a wide variety of social, economic, and environmental challenges in a sustainable way, through nature, while simultaneously providing co-benefits for human well-being, biodiversity and the ecosystem services it provides. To help policy makers and other stakeholders, and to avoid misuse of the label and greenwashing approaches, IUCN has developed a global standard for NbS to increase the scale and impact of the approach.

According to the analysis of Mendes and colleagues (2020) the strongpoints of NbS are that it:

"…allows finding solutions to tackle multiple challenges, within different dimensions. These challenges can be related to environmental dimensions such as climate resilience or water management, but also to economic and social dimensions ranging from green economy to planning and governance issues. In the context of planning exercises, the concept of NbS has also been associated with concepts such as co-design and co-management, where the role of stakeholders becomes central."

Another strongpoint of NbS is that its implementation across all landscapes is considered key in achieving the objectives of major EU policy priorities, in particular the EU Green Deal, EU Biodiversity Strategy for 2030 and the EU Adaptation Strategy to foster biodiversity and make Europe more climate resilient.

While NbS offers a great opportunity to (re)build ecological literacy and ecological resiliency simultaneously, it faces restraints that can hamper the realization of its aims. For example, a narrow focus on *solutions* tends to create a bias toward what has been *proven*, often in places other than where a solution will be applied. This aligns with the tech transfer approach that is a characteristic of the *do good* paradigm. The risk of this *best practices* approach is that what works in the context of one unique ecosystem and culture may not be replicable or even appropriate in another. A recent paper from New Zealand notes that there is "great potential for nature-based urban adaptation agendas to be more effective if linked closely to Indigenous ecological knowledge and understandings of wellbeing" and further, that:

"Without such contextualization, NbS runs the risk of undermining local or Indigenous notions of human and ecological wellbeing, worldviews, and social justice agendas. Climate adaptation and NbS should not become a tool of neo-colonization of spaces or ideas, even if unintentional." (Mihaere et al., 2024).

The authors point out that most examples of NbS to date do "not consider in depth how cultural diversity and the differences between the preferences or needs of various groups of people can be more effectively explored and integrated into design practice." They conclude that "NbS design could be an important contributor to a more holistic notion of ecological urban sustainability or regeneration that takes into account cultural relationships to land." (Mihaere et al., 2024). Another restraint comes from the common cultural tendency in modern societies to see humans as separate from nature. The term NbS can inadvertently reinforce this outdated belief. A narrow perception of NbS as an ecological engineering solution that has been artificially transplanted into a community does not ensure longevity.

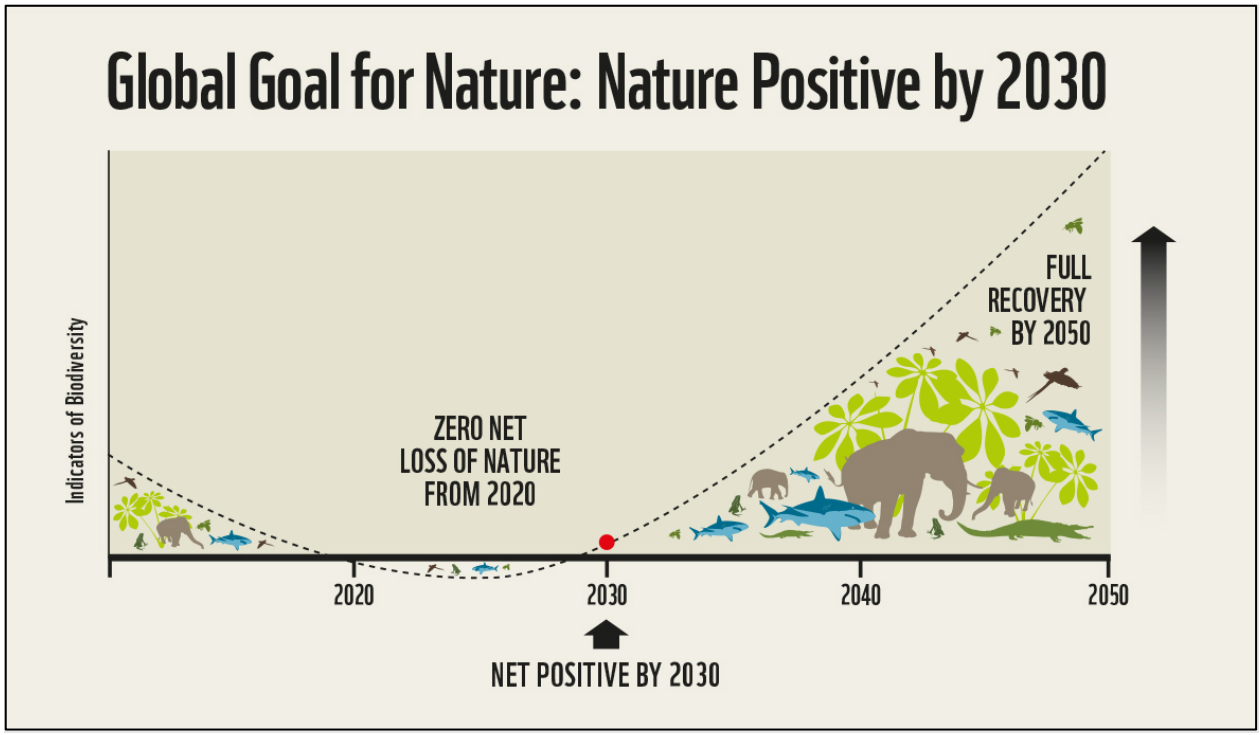
When the process to design and implement NbS is inspired by a regenerative developmental approach, these restraints can be overcome. When the thinking behind NbS is sourced from a regenerate life mindset, the focus shifts from *humans doing things to nature* to *humans participating as nature.* This shifts the relationship from separation to inclusion and interbeing (all things exist in a state of interconnected being, a state of being interwoven and mutually dependent). Adopting a living systems approach will help to illuminate the locally relevant living systems principles behind NbS initiatives. Incorporating a developmental approach that helps local people understand themselves as members of the living systems they inhabit can increase the likelihood of long-term success as it helps them to identify and cultivate the new capabilities of custodianship that need to be developed. This underscores the importance of a co-evolutionary approach that integrates physical interventions in a landscape with the development of new mental models and capabilities that are needed to ensure their success.

Nature-positive

Nature-positive (NP) goes beyond the paradigm of *arrest disorder* to create positive impact, impact that enhances living systems. The central adage is "protect what is left and improve the rest" (Nature Positive Initiative, 2022). NP lays out a global societal goal to halt and reverse biodiversity loss by 2030 with a full recovery of a healthy biosphere by 2050. In simple terms, this means ensuring more natural areas in the world in 2030 than in the baseline year of 2020 and a continued recovery after that. The concept of NP gained traction as a beacon for nature action in the lead-up to the UN biodiversity conference COP15 in 2022. It became a global goal for nature recovery with the subsequent adoption of the Kunming-Montreal Global Biodiversity Framework. To track progress, three key categories of metrics have been proposed by which to measure nature-positive contributions and outcomes: the retention and restoration of *species*, *ecosystems*, and *natural processes* at all scales (global, national, and landscape level). In addition, NP also aims to ensure the sustainable use of nature as well as support investments for a green global economy. In the EU, this goal is integrated into the European Green Deal and the EU's biodiversity strategy for 2030. These initiatives build on the recognition that NP is by default also People Positive, since a healthy environment can only be achieved through social inclusion and equity, while providing social benefits for all people.

According to Locke and colleagues (2021), a clear NP global goal for nature that can be combined with human development and climate goals, "would give humanity a guiding *North Star/Southern Cross* for development pathways across the world to bring about an equitable, nature-positive, and carbon-neutral future." NP refers to actions, policies, or initiatives aimed

at promoting the health and well-being of ecosystems and biodiversity. It emphasizes not just sustainability, but active restoration and regeneration of ecosystems to improve their condition beyond their current state (Fig. 5). NP includes NbS and practices such as reforestation, habitat restoration, sustainable agriculture, conservation efforts, and the adoption of renewable energy sources. Because the goal is to ensure that human activities have a positive impact on the environment (rather than simply minimizing negative impacts), NP can be situated in either the *do good* or *regenerate life* paradigm, depending on the quality of thinking that informs a given initiative.



FIG—5: *Nature positive by 2030 (Locke et al., 2021).*

One way in which RDD could enhance the effectiveness of NP measures and initiatives is to build an understanding and reverence for nature in those places where NP activities take place. NP approaches will only be effective if they are underpinned by a thorough understanding of how living systems work and how humans can become benevolent participants in those living systems. RDD can also help to build new local capabilities and develop new roles that can ensure the longevity of NP projects. Continued development and stewardship by and for the local community may help to not only cascade NP measures well beyond public service initiatives but also to ensure that changes in policy priorities in the future do not reverse the progress that has been made. As in the example of NbS, an RDD approach helps to uncover how cultural diversity and the differences between the preferences or needs of various groups of people can be effectively explored and integrated into design practice. It can also reveal the unique essence and potential of a place, so that each NP initiative can become locally attuned to its specific context. Otherwise, NP could easily run the risk of falling into one-size-fits-all strategies or technology transfer approaches that are not aligned with local conditions and therefore cannot harness the potential of place. Asking questions like “What is this place and what does it want to become?”, “What are the variables that we need to take into account

here?", "What are the patterns of relationships that need to be established or re-established to enable positive reciprocity of roles?", and "What specific positives can this NP project offer and/or catalyze?" might help to mitigate these risks.

Rewilding

The concept of **rewilding** has been proposed as a proactive tool for achieving ecosystem restoration quickly and at scale (Hart et al., 2023). It differs from more traditional conservation or restoration approaches as it aims to restore self-regulation in natural systems. Rewilding has been defined as "the process of rebuilding a natural ecosystem after significant human disturbance by restoring natural processes and the complete or near-complete food web, resulting in a self-sustaining and resilient ecosystem with biota similar to what would have existed in the absence of disturbance" (Carver et al., 2021). The concept and approach of rewilding thus accepts the fact that living systems need to be whole to fully function and achieve their potential. It is an important step towards the regeneration of the lifesheds that we are part of. It is a very recent approach, which is inspired by insights from living systems science, such as the concept of trophic cascades. A trophic cascade is an ecological phenomenon that relates to the powerful indirect interactions that can occur in natural systems when keystone species are removed or re-introduced. This often results in fundamental changes in the food web, physical structure, and nutrient cycling within the system.

In their book Rewilding: The Radical New Science of Ecological Recovery (2020), Jepson and Blythe write that the concept of rewilding is inspired by the realization that "we have internalized ecological impoverishment in our science" and that this impoverishment is a consequence of the shifting baseline syndrome, which is described on page 52. What Jepson and Blythe mean is that what we regard as healthy nature today in science and in society, is in fact an already degraded type of nature. The rewilding examples illustrated in the book showcase the largescale ripple effects that reintroduction of certain species have in terms of the restoration of ecological functions.

Bringing a regenerative developmental perspective to rewilding approaches could potentially improve the likelihood of success by addressing dimensions that are currently underdeveloped. For instance, rewilding is still oriented to the idea of humans *doing things to nature* (the *do good* paradigm)—e.g. inserting megafauna or apex predators back into landscapes where they have gone extinct—rather than envisioning *humans participating as nature* (the *regenerate life* paradigm). Reintroduction of predators can evoke resistance in local communities that perceive the predators as a threat. A regenerative approach can help by building the ecological literacy that is needed in the wider community, awakening a renewed reverence for wildlife, and uncovering new roles of human stewardship that support the work of these keystone species. Rewilding as an enabler of landscape regeneration will also require the development of new principles of co-habitation. Approaching rewilding initiatives from the *regenerate life* paradigm, rather than the *do good* paradigm, could improve and even accelerate their effectiveness.

RDD and the role of biodiversity

"Any organization, whether it's a for-profit business, whether it's public or private, whether it's a not-for-profit, we're all embedded in the larger social, economic, and planetary systems. Everything that we do has ripple effects out into the larger system. It is truly whether we take responsibility for those effects and whether we approach them intentionally or not."
Lara Lee, 2024

Biodiversity reflects the variety and variability of life on Earth and is both part of and an expression of life's evolutionary sophistication. In biological terms biodiversity refers to the vast variation of life at the genetic, species, and ecosystem levels. Indigenous science describes biodiversity as a web of life in which humans are but one thread. Indigenous peoples have long comprehended the vital importance of species richness to maintain the health- and wealth-generating capacity of living systems and have evolved cultures and governance systems that respect, maintain, and support this richness in the environments they inhabit as illustrated on page 90. By contrast, biodiversity has been peripheral in Western society for much of the industrial era. Since the 17th century, nature has been experienced in the West as something separate from humans, as a resource, while biodiversity has been seen primarily as a (exotic) curiosity or artifact. It is only in the last few decades, that the central importance of biodiversity to the wider web of life has gained attention in the scientific community, with the political world lagging even further behind. Even now, amidst the 6th mass extinction event on Earth (Barnosky et al., 2011; Strona & Bradshaw, 2022), the majority of people in Western society are unaware of what is happening and how this will impact (the quality of) future life.

The human body offers a useful metaphor for understanding the critical importance of biodiversity to living systems. The human body is a living system composed of several orders of smaller living systems: cells, organs, muscles, respiratory and other systems. Imagine a human body made up solely of one type of cell, say the muscle cell. What would be our chances of survival if we were all muscle but no brain? To be able to do what we do, we need a whole variety of cells: heart cells, lung cells, muscle cells, nerve cells, brain cells, bone cells, skin cells and so on. In fact, we need more than human cells. To function, a human body needs a microbiome: a biodiverse community of microorganisms, such as bacteria, fungi, and viruses that naturally live on our bodies and inside our digestive system.

Now imagine what would happen to a human body if our microbiome would degenerate? We would not be able to digest all our food anymore, which would lead to intolerances and allergies. It could also lead to nutritional deficiency which could cascade the process of degeneration further: the brain and reproductive cells, for instance, would deteriorate, which would weaken the health of hormones and nerve cells, which in turn would weaken the health of most other cells as the natural process of cell regeneration was disrupted. The organs, such as brain, lungs, or heart would cease their functions as a vicious cycle of degeneration set in.

Sahtouris (2000) notes that: “A living system can maintain its health only while there is a balance of interests between parts and whole.” She goes on by saying that “as long as the body is healthy, there is no conflict between its ecology and economy. No part of a healthy body gains its health at the expense of other parts; there are no such things as rich and poor organs.” In a healthy body, as in any healthy living system, every part adds value to the bigger system it is part of: a cell adds value to a tissue, which adds value to an organ, which adds value to a (respiratory, nerve, digestive, etc.) system. Diversity in living systems is about exchanging value.

In a comparable way, the importance of biodiversity lies in the value-adding relationships that a multiplicity of organisms participates in as a way to generate health and function in a systemic whole. For this reason, the crisis of biodiversity collapse is in a real way more existential than that of climate disruption because the climate may eventually evolve back to a life-friendly state, but species that are lost are lost forever. Biologist and entrepreneur Paul Stamets (2014) succinctly summarizes the importance of biodiversity for life on Earth as “biodiversity is biosecurity”. Unfortunately, few people realize that species richness is pivotal for the survival of the living systems on which we depend. A report on biodiversity and security for the French Institute of International and Strategic Affairs, illustrates that society relies upon biodiversity for, inter alia, food security, water security, economic security, and health (Hurrey, 2022). In a report on Biosphere Security from the Stockholm Hub on Environment, Climate and Security, scientists show that biodiversity is crucial for biosphere integrity and that the loss of biodiversity can interact with and even exacerbate conflict (Rist et al., 2023).

And while we are still uncovering the intricate and complex role of biodiversity in the web of life, more and more scientific insights are showing that biodiversity is not only vital in terms of the food webs on which we depend, but also crucial when it comes to the planetary processes that keep Earth livable (Gorissen, 2020 & 2022). When biodiversity collapses, vital processes like oxygen production, climate regulation, carbon sequestration, nutrient cycling, soil formation and pollination may also collapse, leaving our planet less friendly to life. Dwindling species richness thus not only endangers food security, but it also undermines those processes that maintain the stability needed to support life. When the environment no longer supports basic needs, people start migrating, and this generally increases tension and conflict as the Biosphere Security report from Rist et al. (2023) illustrates.

A study published in the scientific journal Nature, for instance, estimates that without radical transformation, abrupt food web collapse in the tropical oceans will begin before 2030 and spread to the tropical forests and higher latitudes by 2050 (Trisos et al. 2020). The impact of such collapse will be all-encompassing, potentially triggering extinction cascades all over our planet given that ocean and terrestrial ecosystems are interconnected in complex ways. While many think such a scenario is inconceivable—primarily because we fail to understand the features of living systems, like interconnectedness and interdependency and because of a host of subconscious cognitive biases that taint our perspective—there is no shortage of scientific evidence suggesting that Earth’s life-supporting systems are collapsing (Steffen et al. 2015, Bologna & Aquino 2020, Heleno et al. 2020, Persson et al. 2022, Ripple et al. 2022, Penn & Deutsch 2022, IPCC 2023 report and many others).

In their scientific paper, Heleno and colleagues (2020) write: “Altogether, evidence shows that apart from the challenge of tackling climate change and hampering the extinction of threatened species, we need urgent action to tackle large-scale biological change and specifically to protect food webs, as we are under the risk of pushing entire ecosystems outside their safe zones. […] The strong body of knowledge accumulated in recent decades has shown that endangered species lists are only the most visible side of a more insidious kind of threat cast over the natural food webs that support life on Earth. As scientists, we warn that in the face of what is likely to happen and the uncertainty in predicting when and how, the safest policy is to preserve every ‘cog and wheel’.” In other words, recent science shows that human activity has altered the natural processes and systems of our planet to such a degree, that we need to broaden our focus from protecting threatened species to safeguarding food webs and vital planetary processes.

Biosphere integrity is already far outside the safe operating space, according to the planetary boundary assessment of Richardson et al. (2023), indicating that slowing down biodiversity loss is not enough. To prevent extinction cascades, we must reverse biodiversity loss. This can only work if we heal and revitalize the wide diversity of living systems of which biodiversity is an expression. In other words, there are two dimensions to work on here: (1) curbing those processes that push ecosystems outside their safe operating space and (2) regenerating Earth’s living systems. In the example of oceans, this means that we must radically and rapidly curb practices that undermine ocean health, such as overexploitation, acidification caused by climate change, and the continuous influx of toxic substances (e.g. microplastics, forever chemicals, agricultural and pharmaceutical toxins). We must learn to not only protect but regenerate coastal and marine ecosystems. There is no time to waste because extensive modeling shows that our current course puts ocean life on track for a mass extinction rivaling the worst in Earth’s history according to a recent study in Science (Penn & Deutsch 2022).

Here again, an evolution in our thinking is critical. When it comes to biodiversity, two trends require particular attention. The first is known as the shifting baseline syndrome, which “describes a gradual change in our accepted norms and expectations for the environment across generations. Our tolerance for environmental degradation increases and our expectations for the natural world are lowered.” (Soga & Gaston, 2018). Soga and Gaston write that in the absence of past information or experience with historical conditions, members of each new generation accept as normal the situation in which they were raised. Shifting baseline is thus an intergenerational psychological and sociological phenomenon that represents one of the most important obstacles to addressing a wide range of today's global environmental issues. Shifting baselines are also referred to as chronic, slow, hard-to-notice changes in time, from the disappearance of insects or megafauna in our environments to the fading of what we experience as natural. For example, what we call forests and nature today, are shadows of what once existed; many of Europe’s forests are plantations and most of Europe’s nature is not wilderness but cultural landscape.

The second significant trend is how much the mechanistic, reductionistic world view still dominates what we see and how we interact with the world. This way of thinking has shaped most nature conservation efforts undertaken since the 1970s. While founded with the best intentions and real concern about the rapid deterioration of the environment, the thinking that sources the conservation movement still mostly comes from a machine view of reality. This

view is reflected in the conceptualization of *nature* as something out there, and *conservation* as the preservation of something in a predefined state, much as we conserve a piece of art in a museum. While the recognition of biodiversity's importance in food webs is growing, much of the conservation agenda is still influenced by the Cartesian worldview, with a focus on the protection of certain species and the preservation of remnant, isolated islands of natural areas.

While necessary, more is needed to ensure long term sustainability and resilience. To go back to our human body example, preserving certain parts of the body won't do much for the survival of the body as a whole. Nor will the preservation of certain species ensure the survival of an ecosystem. Bodies and ecosystems, as with any living system, need to live and evolve as wholes. We are not saying that protecting species from extinction is not meaningful. We are merely highlighting that if this is done in isolation from the preservation of the living systems in which these species are nested, that it will not be effective in the long term. Healthy species can only exist in co-evolution with healthy environments. This kind of holistic understanding needs to be developed at all levels of society, so that our approaches to safeguard future life can be tailored to living systems actualization instead of preservation of parts. Yet, the understanding of the interconnections and interdependencies among species, their environments, and planetary processes, is woefully underdeveloped, at least in Western science.

In other words, the deeper patterns of life, the systemic nature of living systems, and the processes of co-evolution are still not well understood. While great effort is expended on activism and policy to arrest disorder and to keep certain species from going extinct, far less effort is invested in developing the nature of thinking that is required to shift the patterns of human activity that are causing so much extinction in the first place. This is one of the reasons why biodiversity and the natural world continue to decline. The lack of systemic thinking and the lack of understanding that everything is nature is the basis for many of the current environmental problems that drive biodiversity loss, including the nitrogen crisis on land and the (micro)plastics crisis in the oceans.

Policymaking can be an important lever to create the enabling conditions for the regeneration of the living systems of which biodiversity is an expression. It can help local governments to understand, acknowledge and treasure the living systems they depend on. It can help local governments in harmonizing human and living systems development in ways that ensure longevity and security over the long term if it is done in a co-evolutionary way. That is because success will depend on the simultaneous development of our inner and outer nature: regenerating our living systems will only be effective if we regenerate our relationship with these living systems and if we develop the required capabilities of custodianship to safeguard and support their evolution into the future. Changing our practice without changing the thinking behind it, sets us up for failure as it reinforces path dependency.

RDD shifts the conversation about biodiversity away from quantitative and toward qualitative considerations. Rather than emphasizing the number of species present in a particular space, RDD emphasizes the quality of life-supporting relationships and exchange among species that allow them to function as participants within a thriving whole. There is no point in preserving species if they are not able to contribute successfully to the vitality, viability and evolutionary capability of the living system they are part of. Take a zoo for example, where the biodiversity

in a defined area may be high, but living systems coherence is low. The functioning of any system depends on all of its elements operating in right relationship with all other elements while adding value to the larger whole they are nested in. Isolating biodiversity from the functioning of living systems therefore makes no sense. The species in a zoo are isolated from their natural surroundings so they are transfixed in time, and the coevolutionary process that they would otherwise be contributors to is blocked. To summarize, preventing biodiversity loss will not work without recognition that everything is nature, and everything is linked. It will only succeed if we can develop a strategy and approach to revitalize and regenerate the living system in each place that we inhabit. When living systems flourish, so does biodiversity.

One particularly important implication of this is that economies can only flourish over the long term within well-functioning living systems. They simply cannot be seen apart, which brings us back to the importance of changing outdated worldviews and belief systems. So long as we keep operating from the belief that humans are better than and separate from nature, that nature does not need us, that an economy is the master rather than the servant of living systems, we will keep repeating past mistakes and fail to resolve the crises that we are in (Haggard & Ungard, 2020; Sanford & Haggard, 2020; Sanford, 2022).

From the perspective of living systems and a living planet, what is the role of human beings? Regenesis, in its manifesto, has this suggestion:

“What if nature needs humans—not simply to protect it from ourselves but to play a creative, hands-on role? What if the belief that we must always choose lesser evils is wrong? This belief tells us that to feed our population we must degrade our soil; that to heat our homes we must destroy our atmosphere; that to support our urban centers we must deplete our aquifers. RDD asks us to reject these premises and envision instead a world of human activity in which compromising the health of one system for the convenience of another has become a powerful and pervasive taboo.”

What if we could learn to manage, maintain, and regenerate our living systems, just as a healthy body manages, maintains, and regenerates itself? What if we would operate from a worldview that humans are a non-expendable keystone species, as the Indigenous wisdom keepers have been saying all along? Carol Sanford (2022) argues that the belief that humans need nature to survive, but nature does not need humans, is based on a false premise:

“This is a premise based on a mechanical, not a living systems, view of life—a clever sounding but false proposition that denies the core role humans play in fostering the vitality and viability of living systems, both as individual wholes themselves and as a collective whole. If we don’t stop spreading this erroneous message and promoting ignorance of our place as keystone species within the global whole ecosystem, we guarantee the de-evolution of life on Earth.”

Examples of RDD in practice

My experience of RDD is that it never ends like you think it will end, but it is always better, more alive, more appropriate, and more aligned."
Dominique Hes, 2024

Below we describe a few examples where an RDD approach was brought into practice. Since the discipline of RDD originated in the US, most of the longest-standing examples are found there. More recent examples exist outside of the US, but the quick turnaround for the study did not allow enough time to identify and explore these. The St. Mary's River Watershed regeneration process and the Puhinui river regeneration process are policy driven projects.

St. Mary's River Watershed, Maryland, US —a watershed regeneration process

⇒ How can an economically, ecologically and culturally important living system like a river and watershed reconnect and reconcile a divided community around a deeper understanding of what they share and what is at stake?

Rapid urbanization in St. Mary's County, Maryland was depleting the health of both the marine and land ecosystems. The local County Commissioners recognized this degradation as a serious concern and set out a two-million-dollar project to analyze the environmental carrying capacity of the peninsula. As soon as it was started, the project was put on hold when long-running divisions among environmentalists, developers, property owners, and city and county officials threatened to derail it.

The challenge was to bridge these divisions by making clear to each group what was at stake. Through a regenerative development approach, all stakeholders were invited into an *integral assessment* and *story of place* process where they learned about the ecological and economical contributions of the watershed to the local way of life. In this process the stakeholders came to understand that the river and its watershed, which runs through the geographical heart of the county, is critical to the health and functioning of local culture, economy, and ecology, having been a source of cultural identity from the start of urbanization.

The story of place methodology helped to coalesce the different groups around a deeper understanding of what they shared and what was at stake for the St. Mary's Watershed. It provided the basis for the formation of the St. Mary's River Watershed Legacy Coalition (now the St. Mary's River Watershed Association), dedicated to bringing the divided community together by reconnecting them to the ecological, cultural, and economic value of the river and its watershed. At the time, the formation of such an association was novel and groundbreaking as it gave rise to a partnership among groups with conflicting interests.

The regenerative development approach thus helped to reconcile divergent opinions and stakes by identifying common ground. The association was co-created by the stakeholders and was conceived as a change-infrastructure that could grow organically while maintaining alignment around a core mission and philosophy. The association still operates today as a

vibrant entity that offers a broad range of opportunities for St. Mary's County residents to stay integrally involved with the stewardship of their place.

The St. Mary's River Watershed Association has been operating since 2002 and has a Board of Directors made up of 15 individuals from the community. It ensures that the wildlife of the St. Mary's River basin, which includes endangered Atlantic Salmon and Wood turtles, will endure and flourish. Its vision is **Health for the St. Mary's River, the Atlantic salmon, and our community.** It fulfills its mission through community engagement and educational events in and around the county.

More info can be found here: https://www.stmarysriverassociation.com and here: https://storymaps.arcgis.com/stories/98e722ec97f54257bd20979909b55add

Puhinui river, Auckland, New Zealand —a holistic river regeneration program

⇒ How can an economically, ecologically, and culturally important living system like a river realize its full potential and create intergenerational benefits for people, place, and nature?

Te Whakaoranga o te Puhinui is a holistic regeneration program in the heart of south Auckland, focused on the ancestral stream of Te Puhinui, which spans from the peak of Tootara park through the residential area of Te Wirihana, into the commercial area of Manukau and out to the Manukau Harbour. The intent of this regeneration project is to focus on **intergenerational outcomes for people, place, and nature** (tangata, whenua, and taiao). The purpose of Te Whakaoranga o te Puhinui strategy, according to the initiators, is to realize the regeneration of Te Puhinui **in a way that is inclusive, place-sourced, culturally led and community-fed so that Te Puhinui and its people can thrive once more**. It aims to align and build on existing relationships and projects within the catchment and the Manukau Harbour by providing frameworks and methods that will help shift Te Puhinui from its current state towards **realizing its potential**. The Puhinui stream regeneration program in South Auckland is recognized as a successful example of this meaningful way of working because **it involves communities in climate adaptation efforts** and this is just as crucial as finding the right engineering solutions for natural events, like flooding or storms. The strategy outlines a roadmap for action and seeks to draw on existing knowledge about the catchment and the geological, ecological, and cultural threads that underpin the whakapapa relationships to **deliver improved social, cultural, environmental, and economic outcomes**. The roadmap has been specifically designed to increase the influence, decision-making and active involvement of local stakeholders and has catalyzed an unprecedented collaborative effort among distinct tribal communities in the area.

More info can be found here: https://www.ekepanuku.co.nz/projects/te-whakaoranga-o-te-puhinui/ and here: https://www.ekepanuku.co.nz/media/ckvnsc0l/puhinui-regeneration-strategy_rev1_lt.pdf

La Conchita, Xochimilco, Mexico—regenerating neighborhoods via rain-harvesting

⇒ How can a new water culture help a local community secure their own water supply, building local skills and self-reliance in an area with high water precariousness?

La Conchita, an old, traditional neighborhood in the district of Xochimilco, Mexico had been damaged by the 2017 earthquake. Before development, La Conchita used to be chinampas (gardens built on floating platforms), one of the most productive agricultural systems in the ancient world. Now the lake has been filled and the chinampas replaced by houses. Yet for thousands of years, Xochimilco was a settlement built around and on top of water. To improve self-reliance and resilience of the neighborhood, an RDD approach was developed by the local organization Isla Urbana. When exploring the essence and story of place in a participatory setting with local inhabitants, this reverence for water was re-awakened. Since water and the symbols of water are central to the lives of the people of La Conchita, working with water to regenerate the area really resonated with the local people. One of the highlights of the La Conchita example is how a participatory process gave rise to ingenious rain-harvesting practices in neighborhoods where there is a high level of water precariousness, as a practical strategy to secure their water supply, build local skills and self-reliance, and regenerate a culture of respect for the sacredness of water.

As part of the regeneration project, local children were invited to create large murals around the topic of water and rain. Picture from the Isla Urbana website.

A more elaborate description can be read in Sanford (2020), The Regenerative Life. Transform any organization, our society and your destiny. Nicholas Brealey Publishing.

Brattleboro Food Co-op, Vermont, US —a community level regeneration process

⇒ How can a food co-op regenerate its local community and agricultural sector in ways that lead to a just and resilient local economy?

The Brattleboro Food Co-op is a good example of how an RDD approach transformed an organization's understanding of what it means to be a food co-op and how to play an expanded role in its wider community.

The Brattleboro Coop was formed in 1975 as a small cooperative buying club–one of the first of its kind. Today, the co-op is a natural foods market of more than 1000m^2 that is enjoyed by the greater Brattleboro community in Vermont. The co-op is community-owned and has the dual goal of community accessibility and community education with regard to local food.

Regenesis was brought in when the co-op was expanding and wanted to build a new, LEED accredited building. A strong presence within town, the co-op wanted the building to reflect its values and to be a model of energy efficiency and appropriate building.

Through early conversations with the co-op's board and local stakeholders, it became clear that the potential energy savings of a LEED building paled in comparison to those of shortening the transportation distance of the food sold in the store, which traveled an average of 2.400 km to get to Brattleboro. By promoting local agriculture through its market, the co-op could save orders of magnitude more energy than the facility would ever consume, in the process connecting its own health and viability to the health and viability of the larger community. Once the co-op realized that regenerating the local food shed was key to their aim of being a regenerative market, they invested significant energy in galvanizing, extending, and educating local farmer cooperatives across the region.

A regenerative development approach demonstrated the value of bringing the food cycle back home to create a truly local and long-term sustainable approach to nutrition and local economy. The Board and managers of the co-op continued to extend the thinking Regenesis helped them develop. One of the results of this is that they developed a 100-year business plan. On their website they describe the important principles that underpin their model, which include "An organization that contributes to a just and resilient local economy" and "An enterprise that engages in sustainable and regenerative environmental practices". Through this work, the co-op became an early model for the role a grocery store can play in helping to develop local agriculture and a local food movement.

Over a decade later, the co-op occupies an entire city block in Brattleboro, acts as an anchor business for the downtown, serves as a regional food system hub, promotes community accessibility to healthy local food, and supports local farmers. The four-story building includes a large natural foods market on the ground floor, and the co-op offices, a commissary kitchen, a cooking classroom, and 24 residential apartments on three floors above.

There are solar panels on the roof, and the heating system for the entire structure is based on recycling the heat produced in the store by refrigeration. But more than green and co-operative, the building fully supports and helps to continuously regenerate this 6000-member co-op's commitment to community-building and a vital local food system.

More info can be found here: https://brattleborofoodcoop.coop

A more elaborate description can be read in Mang & Haggard (2016), Regenerative Development and Design: A Framework for Evolving Sustainability, Wiley.

Las Salinas Project, Viña del Mar, Chile —a landscape level regeneration process

⇒ How can the re-awakening of the spirit of the land inspire a new and bold, community supported, design for a brownfield site that strengthens the social, economic, and ecological fabric of the landscape.

The following example illustrates the integration that an RDD approach can achieve at the landscape level. It demonstrates how RDD translates ecology, living systems design, and sustainability principles into practical applications for developmental change processes. The description that follows is based on information provided by Gibbons et al. (2018).

Las Salinas is a brownfield site of more than 160,000m^2 located in Viña del Mar, Chile, which is owned by the Chilean energy company, COPEC SA, and has been used as a petroleum fuel distribution site for decades.

"In 2015, COPEC SA created a detailed redevelopment plan that maximized the development allowed there and presented it to the city as a 'gift'. This plan faced fierce backlash from the community, who feared it would exacerbate problems that had overwhelmed the community in recent decades, namely, increased traffic congestion, decreased quality of life, and decreased agricultural yields. The company decided to shift from a transactional approach to a reciprocal one."

To achieve this, they brought in practitioners to facilitate a collaborative and participatory process guided by the discipline of RDD. Gibbons et al. continue:

"The design team conducted a detailed integral assessment considering geological, ecological, and human components of the living system as well as their interactions through time and space. They also conducted deep listening sessions with the community, who they considered part of the design team. They connected to a feel of nostalgia for the Viña del Mar of the past, which exemplified its moniker, *Garden City*. *Viña del Mar*, which translates to Vineyard of the Sea, was a place associated with gentility, abundance, diversity, social and ecological connectivity, beauty, and vitality; these community elements had degenerated over a number of decades."

As Las Salinas is situated between what once was a biodiverse hillside and the sea, the deep understanding that came forth by diving deep into the story of place uncovered an important theme: its potential importance as a source of connectivity in the landscape. The regenerative development concept that emerged from this exploration "was to co-create Las Salinas as a connecting place and hub for the regeneration of the social and ecological components of Viña del Mar and the region beyond." Focus was on the value adding potential of the smaller landscape elements to the wider whole in which they would be embedded. In this, the development of ecological connectivity became a prominent feature. Streets have been designed to function as ecological corridors, green roofs and courtyards as ecological patches, or stepping stones for wildlife, and linear parks as diffused connectivity elements throughout the site to connect Las Salinas to its larger regional and ecological context.

At the same time, the design aims to improve social integration. While seascape views are preserved, new and easy access between hillside and coast reconnects the community with its seafront and public spaces. "A fully accessible and interconnected public realm network promotes greater social integration. In all, more that 400 km^2 have been allocated for mixed-use neighborhood development."

To achieve this, "eight bridging concepts emerged for the site design, which directly and indirectly connect the following bio-geophysical and social elements of the city: (1) habitat connection, (2) estuary health, (3) mobility, (4) meaningful public space, (5) cultural centers, (6) community centers, (7) marketplace, (8) food networks, and (9) youth education. In addition to ecological and social connections, the design for Las Salinas regenerates the complexity and health of the landscape in multiple ways. Stormwater is slowed and allowed to infiltrate the soil and recharge the aquifer using appropriate landscaping and design, pervious pavements, and the reuse of water. Sediments are filtered through the landscape before reaching the sea. Spaces for social integration and interaction with nature (e.g., parks, boardwalks, beaches) are abundant." (Gibbons et al. 2018).

Las Salinas design plan as shared on the USGBC website. Climate change has led to a dramatic reduction in rainfall in coastal Chile. Water-sensitive design strategies reduce potable water demand, increase rainfall infiltration, and prevent saltwater intrusion of the coastal aquifer.

While there is still a long way to go from the planning and remediation phases to construction, and there is no guarantee that the regenerative direction of the project will continue, the project already demonstrates how working across scales to add value and manifest potential on a specific site can play a catalyzing role in the regeneration of the landscape. Gibbons et al. highlight that:

"Development and design team members are confident that the collaborative atmosphere they established during the planning process will continue through the construction phase and beyond. They feel that the energy, field of will, and caring that has been developed will continue to grow and evolve. They see this manifesting in the collaborative relationships which are forming in the community. Collaborations between regional stakeholders have already resulted in urban forestry and watershed regeneration initiatives, and more mutualistic relationships continue to emerge. Shifting from a conventional and transactional development and design proposal to a regenerative, reciprocal, and co-creative one has garnered the support of eighteen activist groups, including municipal planners who had initially opposed the development."

More info can be found here: https://www.usgbc.org/articles/chilean-energy-company-revitalizes-coastal-community

A more elaborate description can be read in Gibbons et al. (2018), Regenerative Development as an Integrative Paradigm and Methodology for Landscape Sustainability, Sustainability, 10.

T-Mobile N. California, US —an organizational and business regeneration process

"Lead by growing leadership capacity in everyone, every day, in every interaction."

Max Shkud, 2024

⇒ How can a regenerative approach in business elevate care, creativity, and imperturbability of employees?

The following example illustrates what can be achieved by adopting a regenerative development approach in a commercial business context. The focus here is on how RDD can help to elevate the potential of employees in a way that improves business performance. It is an example shared by Max Shkud (2024), a longtime student and collaborator of Carol Sanford. Shkud starts his case study description pointedly:

"Picture a large sales organization grappling with poor performance, internal strife and division, and team distrust. Now, add the pressure of HQ slashing headcount, all while your targets remain unchanged. In a remarkable turn of events, this very organization transforms itself within months, emerging as one of the company's most customer-centric, cohesive, accountable, and high-performing divisions. Remarkably, none of this was achieved by typical organizational change approaches, such as skills training, feedback, coaching, inspirational visions, mission statements, reorganizations, new incentives, or changes to performance management. Nor was it driven by a heroic leader or consulting rockstar wielding their own charisma, agency, or brilliance."

Instead, Shkud observes, success was rooted in a developmental approach that cultivated the capacity and capability of employees at all levels of the organization to think from the mind of a CEO. It all started by transforming their relationship with customers, which was done in a way that "awakens the will and agency of people and grows their capacity to apply creative energy to improving customers' lives as a way to supercharge business growth." Shkud describes five "first principles" that guided the thinking and work:

Design for potential, not problems: "Instead of trying to fix problems, behaviors, and people, aim for something bigger than the problems, something that's important to customers and the business and offers an exciting growth opportunity for all. (The problems get fixed as a by-product.)"

Work with wholes, not fragments: "Engage and grow whole people to work on the whole of a business to serve the whole of customers' lives; this builds caring, ownership, accountability, and cohesion. Restrain fragmentation that leads to narrow-mindedness, silos, personal agendas, lack of alignment, and wasted energy."

Engage and develop everyone; everyone becomes a leader: "Everyone has the potential to lead and evolve the business, thus everyone must have an opportunity to be developed as a leader. Use every challenge, stretch goal, and inflection point as an opportunity to grow leadership." Shkud explains that this sends a powerful message that neither title nor seniority matters. Instead, what matters is the will, agency, and creative intelligence that each person brought to this important endeavor.

Use an indirect approach of capability development, not training or behavioral manipulation: "Foster change through the development of will, character, and critical thinking abilities in everyone; these qualities are also the biggest contributors to innovation, agility, and performance."

System-actualization drives self-actualization: "Grow people by challenging them to lead the evolution of the business."

The results of this initiative were both impressive and far reaching. Shkud highlights: "The organization experienced significant leaps in customer sentiment and overall sales performance, in large part due to the development of the frontline sales associates." According to one of the initiators within the company, agility, adaptability, and responsiveness to rapid changes improved considerably. The teams became imperturbable, even during the challenges presented by the COVID pandemic. In addition, the organization became a talent factory known for growing people and preparing them for leadership roles across the company. As a result, there were no external hires into its leadership during the subsequent 6-7 years—all were filled with internal talent. Shkud concludes:

"Reflecting on this lifechanging experience, it becomes evident that the initiative's success hinged on activating the will, agency, and creative intelligence of people at every level, especially the frontline employees. Fired up and rising to the challenge, they brought their deepest creativity and passion to the game, encouraging and supporting each other to surpass what anyone thought was possible. This wasn't a case of bottom-up or top-down change—it was a tidal wave, deeply transformative for everyone involved."

More info can be found here: https://www.linkedin.com/pulse/case-study-unleashing-mind-ceo-t-mobile-max-shkud-4ncqc/ and more examples from business are shared in Carol Sanford's Books.

Other interesting examples to explore include:

Playa Viva, Guerrero, Mexico —a socio-economical-ecological regeneration process

⇒ How can people- and place-sourced potential inform a tourism business so that it can elevate the social, economic, and ecological health of the place in which it is nested?

The Playa Viva regeneration process is described in detail in Mang & Haggard (2016) and in Gibbons et al. (2018). It is exemplary with regard to the transformative results it has achieved and the integrative (economic, ecological and societal) impacts it has produced. The central aim of the Playa Viva resort from the beginning was to develop the capacity of the local community to create livelihoods that contributed to growing and evolving the health of the region—for example, establishing a permaculture farm that educated and hired locals in understanding how to *grow water* through developing a healthy hydrological system. While starting with outside experts, the farm is increasingly being run by local employees, and current and former employees are now educating others across the watershed.

Local employees of the resort are increasingly taking on responsibility for maintaining and improving the resort's operations, which are designed to support and grow the health of the unique ecological systems it inhabits. The economic effect can be seen in the change in the local village of Juluchuca; when Playa Viva was first established it was a dying village, the population decreasing annually as youth fled to big cities and the U.S. for jobs. Now it is growing, attracting others from the area and sourcing new employment and small businesses. One highlight of this project is how a regenerative approach allowed the facilitators to shift the role of the turtle poachers that had been decimating the local turtle population into turtle rangers that not only protect the turtles but have evolved an educational role for themselves, informing and involving local schools in the ecology of their seascape and the role of the turtles.

More info can be found here: https://www.youtube.com/watch?v=-mAQwhS6xNw.

A more elaborate description can be read in Gibbons et al. (2018), Regenerative Development as an Integrative Paradigm and Methodology for Landscape Sustainability, Sustainability, 10.

Colgate South Africa —a business transformation and regeneration process

⇒ How can businesses build a great country by developing caring, discerning, responsible, and self-determining employees?

This truly transformative and fast business regeneration process is described by Carol Sanford (2011 and 2023). It starts with a promise made by its general manager in 1993, during the time that apartheid was being dismantled: "We will help to build a great country while building a great company." It remains one of the most significant, meaningful, and successful business transformations ever undertaken in which change was led by employees from every level and work group in the organization.

More info can be found here: https://carolsanford.medium.com/are-corporations-outsourcing-responsibility-59bc74dbbcfc and a more elaborate description can be read in Carol Sanford's Book (2023), No more gold stars. Regenerating capacity to think for ourselves. Tamara Packer c/o InterOctave, Inc.

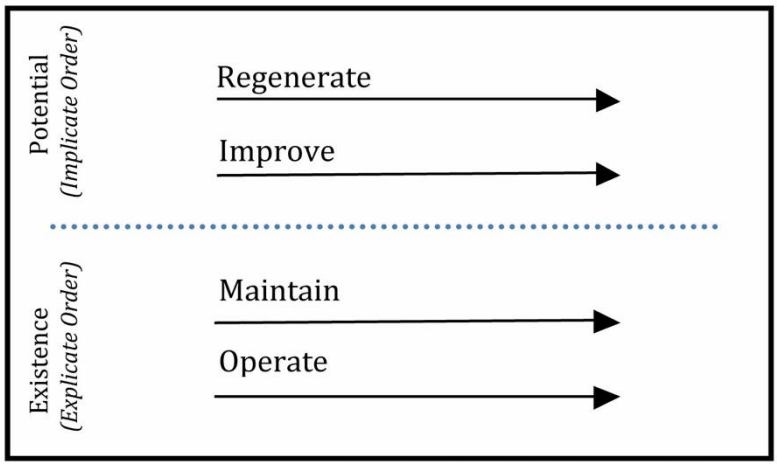
IV. REGENERATION, RD AND RDD IN EXISTING EU LEGISLATION

The evolution of environmental legislation and initiatives within the European Union since the 1990s reflects a concerted effort of policymakers to address various facets of sustainability and the impact of climate change. Spanning from biodiversity conservation to the control of greenhouse gas emissions to manufacturing of sustainable products to a nature restoration plan, this body of policy demonstrates an ongoing commitment to support societal resilience and target climate neutrality. In what follows, an analysis of a representative subset of EU policies is presented with the objective of evaluating the extent to which current legislation incorporates regenerative development and design principles. Furthermore, a perspective is offered on how these legislative initiatives could be enhanced through the adoption of a regenerative development and design approach. As an innovative tool, the Levels of Work (see page 23), a fundamental living systems framework introduced by Charles Krone and refined by practitioners of RDD, has been utilized. This framework enables design for the holistic evolution of all work. Please note that the Levels of Work framework describes how living systems work and is not the same as the Levels of Paradigm framework (page 41), which describes what sources our thinking.

As a framework, the Levels of Work suggests that every living system engages in multiple, distinct, interacting, and mutually reinforcing types of activity that guarantee its continuing capacity to survive and evolve (Mang and Haggard, 2016). The framework depicts the four-fold nature of value-adding processes that enables any living system to sustain and continue to develop itself in a world that is nested, dynamic, complex, interdependent, and evolving. Work at the lower levels is focused on existence (what is already manifested), while work at the higher levels is concerned with potential (what could be but is not yet manifested). How we think about, understand, design, and manage our work is shaped by which level we are engaging in. For instance, when we design work from the levels of existence, it is hard to see new potential beyond what already exists. Working from existence creates path dependency—when past events or decisions constrain present-day events and decisions. When we are conscious of potential, we can overcome this process of path dependency and unlock new potential for systems evolution in a way that makes work at the lower levels of the hierarchy become more effective.

The framework depicts four Levels of Work that are essential to any living system's continuing evolution. The lower levels are focused on current existence. To ***operate*** is to increase the efficiency of energy and material use. To ***maintain*** means to be concerned with sustaining the desired effect and effectiveness of operations in the face of perturbations and environmental uncertainty. Living systems can maintain themselves only if they are resilient to change and disruption. The higher levels are focused on potential. To ***improve*** involves increasing the capacity of living (human and natural) systems to meaningfully contribute. When living systems improve the functioning of the bigger systems they are part of, they unlock new value or potential. At the level of ***regenerate,*** the work is designed from the uniqueness of each living system and its unrealised potential. Regeneration means that the living system has acquired new capabilities that allow higher integration, integrity and sophistication. The living system has become more than it was before and is able to achieve more than before.

To enable the evolution of living systems, the understanding, aims, and goals developed at the regenerative level need to guide the work at the other levels. By contrast, most contemporary sustainability practices develop strategies in response to an existing problem or opportunity.



Repetition of FIG—2: *LEVELS OF WORK FRAMEWORK © 1984 by Charles Krone Associates is licensed under CC BY-SA 4.0. To view a copy of this license, visit http://creativecommons.org/licenses/by-sa/4.0/*

Important to mention here is that the four levels of work described by the framework are interdependent and necessary to one another. The hierarchy does not imply greater or lesser importance, any more than it implies that some levels of work are good, and others are bad. Rather, the hierarchy describes the difference in scope, complexity, and potential for systemic influence as one moves from one level to another. In order to become more effective in system redesign and create conditions in which all living systems can thrive, we must learn to integrate the work of all four levels, while holding regeneration as the overall source for guidance (Mang & Haggard, 2016).

This analysis of EU policy does not set out to make judgments of good or bad, but rather aims to highlight the potential opportunities to increase the systemic effectiveness and benefit of these pieces of legislation, pinpointing their original inspiration and intent. We have opted to present the assessed legislation and initiatives in a chronological way.

1992 - Habitats Directive

Habitats Directive (Council Directive 92/43/EEC, 21/05/1992)

Initiated in 1992, the Habitats Directive (Council Directive 92/43/EEC, 21/05/1992) emerged thirteen years after the Birds Directive and establishes a comprehensive conservation framework for biodiversity within the European Union. Its aim is to restore or maintain natural habitats and species of Community interest (pg. 1 of the directive) from a nature conservation point of view. Aligned with the Birds Directive, it directs all Member States to enforce stringent protection measures for species, both within and beyond Natura 2000 sites. These measures

encompass the prohibition of deliberate capture or killing in the wild, disturbance during critical life stages, destruction of breeding sites, nests, or eggs, and the use of indiscriminate means of capture. Member States are additionally obligated to ensure that species development aligns with maintaining a favourable conservation status. The directive further mandates the identification, protection, and management of core areas for habitat types and species.

The Habitats Directive has a clear focus on conservation (> 60 counts), protection (>10 counts) and maintaining (> 5 counts). The measures taken pursuant to this directive are designed to maintain or restore. It calls for awakening stewardship, living up to standards, prioritizing critical issues (list of protected species), and providing a problem-solving approach to reduce degradation. In these ways, it is an example of a legislation originating from the operate level of work as it focuses on achieving higher standards for habitat sustainment.

Its emphasis on habitats as a necessary basis for biodiversity conservation also suggests the possibility for a maintain level of work as habitats (and our interactions with habitats) will need to adapt to continue to host healthy populations under rapidly changing environments (global changes). The directive serves as a tool to support continuous monitoring, conservation, and protection of habitats. Its ongoing review and adaptation protocols ensure it is adaptive in terms of tackling emergent challenges and maintaining alignment, making it a continually evolving endeavour. In this regard, it embodies one of the principles of RDD: be a work in progress.

Although the terms regeneration or RDD were virtually unknown at the time, and therefore don't appear in the text of the directive, it contains several elements that point in a regenerative development direction:

- Article 3 states that "… Member States shall endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora…" This suggests a recognition that habitats are subject to continuous change and that this opens the possibility for their ongoing improvement and complexification. However, it doesn't yet address itself to the possibility of mutually beneficial relationships among human and natural systems, such as those shaped by Indigenous management practices and systems (agricultural, land and water), which generally extend and upgrade the overall quality of wildlife habitat.
- Article 6 calls for "… appropriate management plans specifically designed for the sites…" This is consistent with the RDD emphasis on the importance of working in place, discovering opportunities and solutions that are location specific and unique rather than generic. By implication, the development of site-specific management plans offers an occasion to bring new place-sourced and potential-oriented approaches to habitat management.
- Article 10 asks policy makers "…to encourage the management of features of the landscape which are of major importance for wild fauna and flora…" Again, the directive points to a more systemic perspective and approach that provides a rationale for introducing insights and methods from RDD.

This analysis suggests that the Habitats Directive, although narrow in its conception, could be complementary to larger initiatives focused on harmonizing human and natural systems,

fostering co-evolution, rather than only conservation/maintenance, integrating the areas of concern with the larger systems where they are nested. Indigenous and RDD modes of thinking would prompt the discovery of ways to reconceive and redesign human spaces as ecosystems, as it is possible to increase wildlife available habitat while preserving reserves within an integrated whole.

Such sophisticated solutions imply and require participation from all local stakeholders so that their distinctive perspectives and bodies of knowledge can ensure the wholeness, coherence, place-sourced appropriateness, long term viability, and political acceptability of the resulting initiatives. There is an opportunity to move past current polarizing narratives that pit the space needs of one species (us, humans) against the needs of all other species.

2003 - EU Emission Trading System – ETS (Directive 2003/87/EC)

DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

The European Union Emissions Trading System (EU ETS), launched in 2005, is the world's first and largest international cap-and-trade system designed to control greenhouse gas emissions within the European Union. It is one of the key instruments implemented by the EU to combat climate change and to achieve its emission reduction targets. The system revolves around imposing a cap on the aggregate greenhouse gas emissions permissible for covered sectors, e.g. electricity and heat generation, energy-intensive industry sectors, aviation and since 2024 also maritime. As of 2027, emissions from buildings and road transport sectors will be part of a separate new ETS.

This overall limit is then subdivided into allowances, each signifying the entitlement to emit a specific volume of greenhouse gases. These allowances are exchangeable among companies operating within the system. The key attributes of the EU ETS encompass the cap-and-trade mechanism, where emission allowances are allocated or auctioned to covered entities, allowing companies to trade allowances based on their specific foreseen emissions. Certain industries at risk of carbon leakage receive free emission allowances, with the proportion of auctioned allowances gradually increasing over time. Companies must comply by surrendering allowances equivalent to their actual emissions, facing penalties if exceeded. The system's market mechanism establishes a carbon price, incentivizing companies to reduce emissions. Additionally, the EU ETS enables the linking of emission trading systems across different regions, fostering a more extensive and interconnected carbon market. Evolving through various phases with continual adjustments and reforms, the EU ETS directive helped to raise awareness about the importance of emission reductions and helped to mobilize the industrial sector to address climate disruption.

EU ETS represents a mechanistic, purely operate level of work approach. It has been built to reliably reproduce a pattern of behaviour (reducing emissions) and action (trading) to achieve predictable results (control greenhouse gas emissions). It works from well-defined ground rules and enables participants to make choices that are consistent with proven practices and as such works from the level of what already exists.

EU ETS serves an important purpose as a transitional strategy to buy time to discover more transformational and life-affirming approaches. The risk is that it could so easily become the default baseline and therefore reinforce the status quo, discouraging the kind of investment and innovation required to find deeper, more systemic, and more enduring solutions. The question that RDD would raise is therefore: How could Europe's industrial activity simultaneously contribute to a healthy economy, society and ecology and how could an evolved EU ETS directive create the right enabling conditions to achieve this? What would be the specifics that make the evolved EU ETS work and what boundaries would need to be implemented to guarantee its effectiveness?

2015 – Circular Economy Action Plan, adopted in 2020.

European Commission, Directorate-General for Communication, Circular economy action plan – For a cleaner and more competitive Europe, Publications Office of the European Union, 2020.

A first EU Circular Economy Action Plan (CEAP) was adopted in 2015 and a second in 2020. The second CEAP sets the focus on establishing sustainable products as the standard in the European Union, fostering consumer and public buyer empowerment. The focus centres on sectors with substantial resource utilization and high circularity potential, encompassing electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction, and buildings, as well as food, water, and nutrients. The objectives include minimizing waste, optimizing circular practices for the benefit of individuals, regions, and cities, and positioning the EU at the forefront of global endeavours promoting circular economy (Circular Economy Action Plan, 2023).

The CEAP explicitly mentions regeneration in the introduction: "To fulfil this ambition, the EU needs to accelerate the transition toward a regenerative growth model that gives back to the planet more than it takes, keeps its resource consumption within planetary boundaries, and therefore strives to reduce its consumption footprint and double its circular material use rate in the coming decade."

This plan sets out to maintain the present economic model by reducing the negative impact of unrestrained waste production and virgin resource use. It is grounded in a strong sense of the problems (waste, pollution) that need to be solved and how to reduce degradation of our environment. It sets the goals for awakening stewardship and prioritizes critical issues such as pollution and resource depletion. In this regard it is a representative of the operate level of work.

The thinking behind this legislation focuses on problems and opportunities currently in existence. It seeks to sustain the desired effect and effectiveness of operations and activities in the face of perturbations (climate change) and environmental uncertainty (waste, pollution, lack of natural resources). These are precisely the kinds of things that should be the focus at the operate level of work. However, effort put into improving efficiency and limiting perturbations do not have the capacity to see new potential and generate breakthrough insights (see page 44).

2018 - European Green Deal

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal. Brussels, 11.12.2019 COM(2019) 640 final

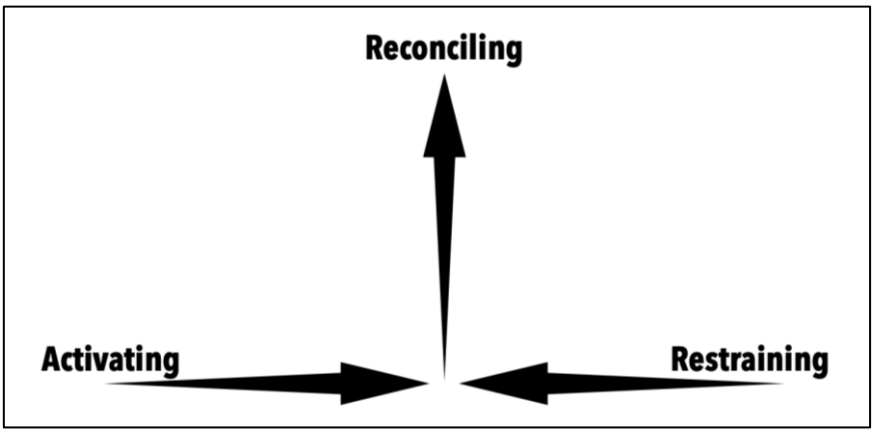
The European Green Deal (EGD) (European Commission, 2018) represents a framework for policy initiatives with the overarching aim of making Europe resilient and climate neutral by 2050. The plan is also to update existing laws and regulations on climate, and introduce new rules boosting the circular economy, building restoration, biodiversity protection and enhancement, sustainable farming, and innovation. The EGD is a package of policy initiatives, a roadmap, that aims to set the EU on the path to a green transition. The EGD aims to prompt the efficient use of resources by moving to a clean, circular economy and stopping climate change, reversing biodiversity loss, and cutting pollution. It outlines investments needed and financing tools available and explains how to ensure a just and inclusive transition.

The EGD covers all sectors of the economy, notably transport, energy, agriculture, buildings, and industries such as steel, cement, ICT, textiles, and chemicals. With the EGD, Europe strives to be the first climate-neutral continent. It is also designed to decouple economic growth from resource use and to leave no person or place behind. The European Green Deal has been developed as an overarching approach to give direction to and integrate efforts across a variety of policy domains to ensure coherence. It aims to transform the EU into a climate-neutral, environmentally sustainable, non-toxic, and fully circular society and economy by 2050. As such, it is a macro level approach. The EGD aspires to be the compass for recovery, ensuring that the economy serves people and society and gives back to nature more than it takes away (see EU Biodiversity Strategy).

The EGD represents a conceptual shift beyond a problem-solving orientation, as it sees problems (climate change, pollution, inequality) as activators and motivators for society to change things for the better by turning climate and environmental challenges into opportunities for new creativity. The Green Deal calls for people to explore new potential and avenues to improve and make more meaningful contributions to the world. In this way, it is an example of an improve (or evolve) systems level of work. The goal is to awaken an activated sense of desire and mission to promote progress for human beings and all other natural systems. The EGD also evokes a sense of mission and agency that is grounded in the belief that we can take charge of our own destinies and dedicate ourselves to making the world a better place, not limiting ourselves to doing damage control regarding the mistakes of the past. Much will depend however on how well the original ambition is safeguarded from the restraining forces that it evokes. There is a general tendency in policymaking wherein as soon as new policy encounters restraining forces, it collapses into compromises that weaken its original ambition. An RDD approach, called the Law of Three (see Fig. 6), works specifically with such restraining forces in a way that reconciles rather than compromises. This framework enables RDD to work with these tensions as a source of creativity, patiently continuing to ask questions until new, reconciling potential shows up.

The Law of Three is a powerful and foundational framework in regenerative practice that has the potential to help us move past polarization into reconciliation, where people who previously were in conflict bring their unique perspectives to a space of co-creation.

In any interaction, there are always three components: (1) an activating force, such as the desire to create something new, (2) a restraining force, such as the limits of the current system or the inertia of the existing way of doing things, and from the interaction of these two forces, a third (3) will emerge which will either be a compromise, in which both parties agree to lose something of what they want, or a reconciling force which harmonises the tension into a third way forward in which some previously unseen and unrealised potential is revealed, and which activates the will of the whole. This third component is not visible prior to the interaction because it is generated from the interaction.



FIG—6: LAW OF THREE © Regenesis.

RDD can help increase the effectiveness and success of the EGD by bringing in a higher order of understanding that works toward a reconciling force and unlocks new potential for transformation. For instance, when asking the questions: What is the potential of a new economy in Europe? How can climate and environment-friendly innovation strengthen Europe's economy and ecology and improve the wellbeing of all inhabitants on the continent as well as curbing climate disruption? How can EGD build capacity and capability in Europeans to deal with increasing turbulence and change and in their landscapes to increase resilience and security? An RDD approach thus brings in a holistic and strategic perspective on what is needed to increase the wealth- and health-generating capability of Europe's lands and its peoples and how the potential of nested levels of integration can be harnessed.

2020 - Biodiversity Strategy 2030 – (COM(2020) 380 final)

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030 Bringing nature back into our lives - COM/2020/380 final.

Aligned with directives that came before (e.g. habitats, birds, water, among others), the EU's Biodiversity Strategy for 2030 (BDS) emerged in 2020. The BDS is a comprehensive and long-term plan to protect biodiversity and reverse the degradation of ecosystems. It builds on the understanding that the biodiversity crisis and the climate crisis are intrinsically linked, that

biodiversity is crucial for safeguarding EU and global food security, well-functioning ecosystems, well-functioning economies, and healthy societies. It expresses the ambition of “ensuring that the economy serves people and society and gives back to nature more than it takes away”. The strategy aims to put Europe's biodiversity on a path to recovery by 2030 and contains specific actions and commitments. BDS aims to address the five main drivers of biodiversity loss and sets out to deliver an enhanced governance framework to fill remaining gaps, ensure the full implementation of EU legislation, and pull together all existing efforts. This includes the Nature Restoration Law and enlargement of existing Natura 2000 areas. The Biodiversity Strategy recognizes that we need nature in our lives. “From the world’s great rainforests to small parks and gardens, from the blue whale to microscopic fungi, biodiversity is the extraordinary variety of life on Earth. We humans are part of, and fully dependent on this web of life: it gives us the food we eat, filters the water we drink, and supplies the air we breathe. Nature is as important for our mental and physical wellbeing as it is for our society’s ability to cope with global change, health threats, and disasters.” (COM2020 380 by EU). Also, it recognizes that well-functioning ecosystems are key to boosting our resilience and preventing the emergence and spread of future diseases. There is a clear recognition of the benefits of ecosystem services, e.g. the value of green urban spaces.

Key terms in the BDS text include nature (>85 times mentioned), protect (>85 times), restore/restoring (>60 times). The term regeneration is found only in the context of regenerating fish stocks. The narrative is problem oriented and utilizes metaphors of battle (the “fight against climate change”) while remaining steadfastly anthropocentric—protecting and restoring biodiversity is characterized as “the only way to preserve the quality and continuity of human life on Earth”.

The Biodiversity Strategy calls for stewardship, living up to standards (protect, restore), and prioritizing critical issues (CO2 emission, biodiversity loss). It brings in new ways to tackle biodiversity decline and climate mitigation simultaneously, e.g. through adoption of NbS, by bringing nature back to agricultural land and urban and peri-urban areas. The goal is to engage people to take responsibility for the integrity of social and ecological systems. It seeks to awaken and activate a sense of aspiration and participation. It highlights our longing to experience ourselves as part of the web of life, and our need to be close to Nature and green places. It encourages a sense of agency, mission, and contribution, asking citizens, businesses, and institutions to promote progress for human beings and all other natural systems.

From the Levels of Work perspective, the BDS works simultaneously on two levels. The maintain level to avoid ecological and economic breakdown and the improve level to generate higher order value, seize new potential and establish a new relationship between people and nature as allies that can work together in ways that make both better. For instance, it seeks to shift actions toward increasing the value-adding capacity of human and natural systems by recognizing the relevance of biodiversity in addressing climate change and food security, and by highlighting the relevance of natural systems in maintaining and improving human health. The BDS is informed by a vision of harmony among humans and nature. It recognizes that healthy economies depend on healthy ecologies and that the health and quality of life of humans depends on the health and quality of the environments in which they live. The aspiration of “giving back to nature more than we take” clearly illustrates the ambition to improve Europe’s natural environment as a way to also improve Europe as a whole.

An RDD perspective can help to increase the effectiveness of this approach as it sets out to build the capabilities needed to work with increasing levels of complexity, differentiation, and integration. The RDD focus on supporting living systems evolution by fostering the qualitative characteristics that make each system distinct helps to reinforce the understanding that humans are part and parcel of nature with a unique role to play and contribution to make.

The implementation and success of the BDS will depend on how well the original ambition is safeguarded from the restraining forces that it evokes. The RDD practice to find a reconciling force rather than to develop compromises can help to safeguard the ambitions of the BDS.

2020 – EU Taxonomy

Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (Text with EEA relevance) - PE/20/2020/INIT.

The EU Taxonomy (EUT) entered into force in 2020 and is a pivotal component of the European Union's sustainable finance framework, serving as a crucial tool for enhancing market transparency. “It helps direct investments to the economic activities most needed for the transition, in line with the European Green Deal objectives. The taxonomy is a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate.” (see https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en).

As a classification system, it defines the levels of environmental contribution and, at the same time, it aims to ensure that no harm is done to the environment (Do No Significant Harm - DNSH principle). Focused on meeting the EU's climate and energy targets for 2030 and supporting the European Green Deal, the creation of a common language and definition of environmental sustainability was seen as imperative. As such, the EUT facilitates a shared understanding among financial and non-financial entities of economic activities that can be understood as environmentally sustainable today. By fostering common ground, it aids in amplifying sustainable investments, promoting investor confidence, safeguarding against greenwashing, encouraging environmentally friendly business practices, and alleviating market fragmentation. This regulation mandated the European Commission to establish a comprehensive list of environmentally sustainable standards for the most impactful activities, defining technical screening criteria for substantial contribution and DNSH through delegated and implementing acts (EU Taxonomy for Sustainable Activities, 2024).

The EUT recognizes the systemic nature of global challenges: “Given the systemic nature of global environmental challenges, there is a need for a systemic and forward-looking approach to environmental sustainability that addresses growing negative trends, such as climate change, the loss of biodiversity, the global overconsumption of resources, food scarcity, ozone depletion, ocean acidification, the deterioration of the fresh water system, and land system change as well as the appearance of new threats, such as hazardous chemicals and their combined effects.”

The EUT recognizes the importance of ecosystem services. However, its objectives are more narrowly focused and lacks a systemic framework integrating the different focuses: climate change mitigation, adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention, and control, protection and restoration of biodiversity and ecosystems (see Article 9). In the EUT, regeneration is used only in the context of forests and agriculture. The text does not include ideas on regenerative development or regenerative design.

The EUT includes some elements of the improve level work, such as a focus shift to increase the value-adding capacity of human and natural systems (recognizing the need for a systemic and forward-looking approach to environmental sustainability). Bringing in an RDD perspective can help elevate the thinking beyond what already exists, to the potential that can be achieved. For instance, shifting the perspective to a regenerate level helps to identify more clearly what the appropriate way of working is, which definitions or technologies can genuinely revitalize living systems, and what needs to be unlearned or abandoned to allow systemic transformation.

2020 - The New European Bauhaus (NEB)

https://new-european-bauhaus.europa.eu/about/about-initiative_en

The New European Bauhaus (NEB), launched in September 2020, is a creative and interdisciplinary initiative that connects the European Green Deal to our living spaces and experiences. NEB calls on all of us to imagine and build together a sustainable and inclusive future that is beautiful for our eyes, minds, and souls. It refers to regeneration in the context of regenerating nature and buildings. NEB aims at creating a new lifestyle that matches sustainability with good design, needs less carbon, and is inclusive and affordable for all, while respecting the diversity that we have in Europe and beyond. In January 2023, the Commission released the 'New European Bauhaus Progress Report', which describes NEB's three values and three working principles. The values are beautiful, sustainable, and together, and the working principles are participatory approach, multi-level engagement (spatial dimension) and trans-disciplinary approach.

In the 'New European Bauhaus Compass', a value for sustainability is coupled with a paradigm shift regeneration and creating new positive relations with nature (pg. 5). The highest ambition for the NEB is to regenerate and reconnect to nature. The paradigm shift is expressed as a "behavioural change" and a definition of values that go beyond protect, maintain, restore, etc. and are more related to a potential for human vocation in the world. As an initiative, NEB clearly extends its thinking beyond current existence to the potential of what is possible. It aims to create positive impact beyond sustaining what is, calling (implicitly) for enabling new potential. It expresses a vision of harmony, positive relationship with nature, and togetherness. While the text refers to regeneration, regenerative development and design is not explicitly mentioned. Some elements of regenerative development are imminent, such as addressing the unrealized potential inherent in the relationship between a given system and the larger systems within which it is nested. NEB has the capacity to incorporate and transform how we

work on all four levels of work. A focus on potential has already lifted the thinking and can, with a bit of effort, be elevated to the regenerate level.

NEB has the mission and the capacity to awaken an activated sense of desire and action to promote progress for human beings and all other natural systems. It is grounded in the belief that we can take charge of our own destinies and dedicate ourselves to making the world a better place, a belief that is expressed by concepts of participatory approach and multi-level engagement. Properly deployed, NEB has the potential to allow us to see more possibilities in the world for ourselves and others and look beyond what is to explore what could be.

NEB lays the groundwork for anchoring our endeavours in the principles of living systems, the basis from which it becomes possible to understand the interconnectivity of our actions. This is a prerequisite for regenerative level of work, that grows systemic capacity for vitality, viability, and evolution (Sanford, 2016). Because regenerative work respects the autonomy and self-determination of people and living systems, it is committed to helping them become increasingly good at accomplishing their own actualization. The key to rising to this level is the development of consciousness, or of a conscious mind, and new capabilities to enable living systems actualization (Sanford, 2016).

2021 - European Climate Law (REGULATION (EU) 2021/1119)

Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') - PE/27/2021/REV/1.

The European Climate Law (ECL), adopted in 2021, establishes a framework for achieving climate neutrality within the EU by 2050, including the aim of achieving negative emissions in the EU thereafter. The law supports the ambitions for a binding EU target of a net domestic reduction in greenhouse-gas (GHG) emissions of at least 55% by 2030 (compared to 1990 levels), and lead to a climate target of 90% reduction in net GHG by 2040 (based on the Impact Assessment and the advice of the European Scientific Advisory Board on Climate Change). It further introduces rules to ensure continuous progress toward the global adaptation to climate change goals in the Paris Agreement and requires EU institutions and Member States to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change, ensuring that the adaptation policies are coherent, mutually supportive, provide benefits for sectoral policies, help integrate these measures into all policy areas, and focus especially on the most vulnerable people and sectors. It focuses on a transition toward a climate-neutral economy. The law recognizes that ecosystems would assist in maintaining, managing, and enhancing natural carbon sinks and promote biodiversity while fighting climate change. It also recognizes that natural environments (forests) can provide many other services, recognizes the importance of stakeholder engagement, and specifies the powerful role of citizens and communities (see Article 9).

The ECL mentions the word regeneration in the context of regenerating natural environments but lacks an integrated view of climate, humanity, and economy as a whole. Much of the content focuses on measures to reduce emissions and is thus focused on problem solving. The ECL seeks to maintain what is (current climate) or restore what was (emissions back to 45% of

the level of 1990), and therefore the thinking originates from the operate and maintain level of work. The ECL regulation aims at achieving net zero greenhouse gas emissions for Member States as a whole by 2050, mainly by regulating union-wide greenhouse gas emissions and removals, investing in green technologies, and protecting the natural environment. A living systems perspective could help to increase the effectiveness of the ECL, given that a healthy carbon cycle is but one feature of living systems. In living systems, all vital cycles (water, nutrients, energy and oxygen/carbon) are balanced and integrated in a coherent whole from its smallest (e.g. a cell) to its largest scale (e.g. planet). An RDD approach could thus help make clear the links between these cycles and therefore prevent unintended byproducts from a too narrow focus on emission reductions. For instance, biodiversity is vital to ensure carbon drawdown into soils and oceans, but this is often overlooked in terms of climate neutrality. An RDD approach would also help to shift from managing problems (reducing carbon emissions) to enabling potential (e.g. healthy oxygen/carbon cycles). For instance, as it is understood today, the ECL sets the tone for emission reductions in society but as far as we know, it does not consider healthy oxygen/carbon cycles in oceans.

2021 – Sustainable Finance Disclosure Regulation

Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (Text with EEA relevance) - PE/87/2019/REV/1.

The Sustainable Finance Disclosure Regulation (SFDR), in application since 2021, constitutes a set of EU regulations designed to standardize and enhance the disclosure of sustainability-related information within the financial sector. As part of the broader EU sustainable finance agenda, SFDR contributes to aligning private capital flows with sustainable and environmentally friendly activities, supporting the EU's overarching sustainability and climate ambitions (Sustainability-related Disclosure in the Financial Services Sector, 2023). SFDR ensures that investors receive consistent and clear information regarding the environmental, social, and governance (ESG) aspects of financial products. Key objectives include promoting transparency by mandating that financial market participants, including investment firms and fund managers, disclose how they incorporate sustainability risks into their investment decision-making processes.

SFDR also aims to prevent greenwashing by setting disclosure standards, enabling investors to make informed decisions. SFDR introduces a phased implementation approach, including a taxonomy classification system for identifying environmentally sustainable economic activities and disclosure requirements for financial products. The SFDR is situated at the first two levels of work. The text does not include the word regeneration, nor ideas related to regenerative development or regenerative design.

2022 – Corporate Sustainability Reporting Directive

Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (Text with EEA relevance) - PE/35/2022/REV/1.

The Corporate Sustainability Reporting Directive (CSRD), published entered into force in January 2023, was developed to ensure that corporations reveal reliable, relevant, and comparable environmental, social and governance data—a game changer in ESG reporting. The integration of SFDR, EUT, and CSRD are the central components of the new sustainability reporting framework for sustainable finance in the EU.

After the Global Reporting Initiative (GRI), corporations started to report on their impacts on nature under the umbrella of impact materiality, but the lack of clear guidance meant that this often resulted in reports that were patchy, incomplete, inadequately transparent, or lacking necessary depth. The CSRD Directive, in addition to modernizing and strengthening reporting rules, pinpoints the social and environmental information that companies must report on, altering the 2014/95/EU Directive.

As from 2024, entities are (1) obliged to report on both financial and impact materiality, (2) unable to pick and choose only those Key Performance Indicators (KPIs) that make them look good, and (3) obliged to include a sustainability report that will be an integral part of their annual report (i.e. have true legal value). Corporations subject to the CSRD will have to report according to European Sustainability Reporting Standards (ESRS). The standards are developed in a draft form by the EFRAG, European Corporate Reporting Lab . This approach is highly likely to uncover many previously hidden corporate impacts and dependencies, as well as their potential financial repercussions for the disclosing entity.

A broader set of large EU companies, as well as listed SMEs, will now be required to report on sustainability. This is applicable to companies already reporting on non-finance (2024 with first report in 2025), big companies not yet under the non-finance reporting on biodiversity and ecosystems (start in 2025, first report in 2026), and small and medium companies, credit institutions, and insurance companies (starting in 2026, first report in 2027). This directive also proposes the non-mandatory principle that “Nature may be considered as a silent stakeholder”, a small (albeit non-enforceable) step in the direction of giving nature rights and a voice. This cements the concept in EU law that nature exists in its own right.

By laying out clear guidelines, CSRD strengthens the operate level work in its field. By improving transparency and challenging the way reporting has been operating in recent years, CSRD prompts corporate entities to upgrade their practices in order to meet the intent of sustainability reporting. The CSRD may invite corporations into a space where they consider their dependency on and relationship to nature. Bringing in a living systems perspective and a developmental approach could increase CSRD’s effectiveness, moving it from a mere bureaucratic, box-ticking tool to an instrument that develops the ecological understanding of the nestedness of businesses in their ecosystems and the reciprocal value exchange that is needed in any living system to survive and thrive in the long term.

2022 – Eco-design for Sustainable Product Regulation

DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for the setting of eco-design requirements for energy-related products.

As part of the second CEAP, the **Eco-design for Sustainable Products Regulation** (ESPR) was unveiled on March 2022 as a key aspect of the European Commission's strategy to advance environmentally sustainable and circular products. The proposal expands upon the existing Eco-design Directive, which presently focuses solely on energy-related products. This proposal establishes a comprehensive framework to prescribe eco-design requirements for diverse product groups, aiming to significantly enhance their circularity, energy performance, and overall environmental sustainability. Applicable to nearly all physical goods in the EU market (with a few exceptions such as food and feed), the framework permits the establishment of rules for groups of products with shared characteristics. It encompasses a broad spectrum of requirements, including product durability, reusability, upgradability, reparability, presence of substances hindering circularity, energy and resource efficiency, recycled content, remanufacturing, and recycling practices, as well as carbon and environmental footprints. Furthermore, it includes information requirements, introducing the concept of a Digital Product Passport. The projected impact by 2030 indicates substantial primary energy savings equivalent to around 150 billion cubic meters of natural gas, underscoring the potential transformative influence of this sustainable products framework (Eco-design for sustainable products Regulation, 2023).

The thinking behind the ESPR is aligned with the aim to reduce the negative impacts of unsustainable business practices and materials, such as overconsumption of resources resulting from planned obsolescence. It is situated at the operate level of work and does not refer to the concept of regeneration, nor addresses RDD. RDD requires thinking beyond material use. However, there is no reason that eco-design should not take into account living systems principles and dynamics. For this reason, there may be future possibilities for ESPR to broaden its remit.

2022 – Nature Restoration Law (COM(2022) 304 final 2022/0195 (COD)

Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on nature restoration - COM/2022/304 final.

The proposal for a **Nature Restoration Law** (NRL) was published in 2022 and fits within the framework of the EU Biodiversity Strategy for 2030. It integrates a comprehensive restoration objective to facilitate the long-term recovery of nature within the EU's land and sea, coupled with mandatory restoration targets tailored for specific habitats and species. These measures are designed to impact a minimum of 20% of the EU's land and sea by 2030, eventually extending to all ecosystems requiring restoration by 2050. The proposed targets include those based on existing legislation for wetlands, forests, grasslands, rivers and lakes, heath & scrub, rocky habitats, and dunes. These targets aim to enhance and re-establish biodiverse habitats on a large scale, fostering the revival of species populations through habitat improvement and expansion. More importantly, the proposal addresses concerns of biodiversity loss and the imminent collapse of agricultural, marine, and terrestrial ecosystems that will severely impact the wellbeing, health, and resilience of Europe and its inhabitants. Specifically, NRL aims to

achieve outcomes such as reversing the decline of pollinator populations, enhancing forest biodiversity, maintaining and expanding urban green spaces, promoting biodiversity in agricultural ecosystems, and restoring various marine habitats. Furthermore, the proposal emphasizes the identification and removal of barriers to river connectivity, with the ambitious target of restoring at least 25,000 km of rivers to a free-flowing state by 2030 (The EU Nature Restoration Law, 2023).

The legal basis for the NRL proposal is Article 192(1) of the Treaty on the Functioning of the European Union that sets out how Article 191 of the Treaty should be implemented. Article 191 supplies the objectives of EU environmental policy: preserving, protecting, and improving the quality of the environment; protecting human health; utilizing natural resources prudently and rationally; promoting measures at the international level to deal with regional or worldwide environmental problems and to combat climate change.

Furthermore, the memo explains: "The proposal for a regulation on nature restoration sets out an overarching objective: to contribute to the continuous, long-term and sustained recovery of biodiverse and resilient nature across the EU's land and sea areas by restoring ecosystems and to contribute to achieving Union climate mitigation and climate adaptation objectives and meet its international commitments." The text points toward an emphasis on recovery and natural resilience.

According to Article 3, good condition means "a state where the key characteristics of an ecosystem, namely its physical, chemical, compositional, structural and functional state, and its landscape and seascape characteristics, reflect the high level of ecological integrity, stability and resilience necessary to ensure its long-term maintenance." Chapter II describes the targets and obligations to restore. The text is very much focused on restoration (>335 counts), ecosystems (>280 counts), biodiversity (>155 counts), climate change (>60 counts), but also on improve (>33 counts). The text does not mention the words regenerate or regeneration.

This reflects thinking originating from maintain and improve levels of work. For instance, the definition of "sufficient quality of habitat" uses maintain level work as a goal, as does the definition of "favourable reference area", which is linked to ensuring "long-term viability".
On the improve level, examples include a call for actions to "enhance the Union's natural capital (pg. 15)", Article 4 "Member States shall put in place the restoration measures that are necessary to improve to good condition areas of habitat", and a set of obligations to improve biodiversity of agro-ecosystems and forests (pg. 13). The word improve or related words (e.g. improvement) is often mentioned in the context of improving the biodiversity or conditions of protected habitats.

NRL is an ambitious piece of legislation that sets out to strengthen the ways the EU operates, maintains, and improves the quality of the ecosystems within its bounds. It speaks of achieving higher standards (biodiversity increase instead of decrease) through capable and disciplined practices (measures, technologies, etc.) and through reducing toxic substances. It is concerned with sustaining the desired effect and effectiveness of preservation and restoration activities in the face of perturbations and environmental degradations. It also attempts to address the need to increase the value-adding capacity of human and natural systems (recognition of the importance of ecosystems and ecosystem services and the benefits of good functioning

ecosystems). It suggests the possibility of a potential harmony between humans and natural systems and includes provisions to help realize the unique, value adding potential of places or landscapes, all of which are core elements of RDD.

However, regenerative level of work is not explicitly present in either concept or language, which is unfortunate, because the policy might have generated less controversy had it explicitly addressed itself to enabling the self-determination and value-adding capacity of the many communities that it will affect. As we have described before, language that reinforces the disconnect between people and nature, also reinforces the perceived conflict between human progress and progress of nature. An RDD perspective could help reconcile this polarized view as it helps to build understanding of living systems in nested relationships and challenges the idea that human progress must always come at the expense of nature. If the NRL could come to be understood as a living systems regeneration law, which explicitly means that both people and nature benefit, and if it could enable the co-creative development of both people and their places, it has the potential to gain more support and effectiveness. Given the ambition of the NRL, it offers an excellent scaffold for introducing an RDD approach into communities that are directly impacted by NRL requirements. Through its focus on improving the systemic wealth-generating capacity of people and places, RDD speaks directly to the concerns of many of these communities. Through its emphasis on local self-determination and innovation, it supports the ability of local people to find differentiated solutions that not only address the larger needs of Europe but upgrade the vitality and viability of their own communities and environments.

Summarizing overview

European Legislation	Code	Status	Level of Work	Presence of RDD Principles or Elements
Habitats Directive	Directive 92/43/EEC	EN	Operate and Maintain	Yes - Systems actualizing, Story of Place
EU Emission Trading System	Directive 2003/87/EC	EN	Operate	No
Circular Economy Action Plan (CEAP)	COM/2020/98 final	EN	Operate	No
European Green Deal	Legislative train on COM COM2019)640	EN	Improve	Yes - Systems actualizing, Working from Potential
Biodiversity Strategy 2030	COM(2020) 380	EN	Mostly Operate and Maintain but also Improve	Yes - Systems actualizing, Working from Potential
EU Taxonomy	Regulation (EU) 2020/852	EN	Mostly Operate and Maintain, but also Improve	Yes - Working from Potential
New European Bauhaus	COM(2021) 573 final	EN	Improve and Regenerate	Yes - Working from potential, autonomy, self-determination of living systems, and consciousness
European Climate Law	Regulation (EU) 2021/1119	EN	Operate and Maintain	No – although mentioning regenerating natural systems
Sustainable Finance Disclosure Regulation (SFDR)	Regulation (EU) 2019/2088	EN	Operate	No
Corporate Sustainability Reporting Directive (CSRD)	Directive (EU) 2022/2464	EN	Operate	No - but promotes working toward improvement
Eco-design for Sustainable Products Regulation (ESPR)	Directive 2009/125/EC	EN	Operate	No
Nature Restoration Law (NRL)	COM(2022) 304 final	P	Maintain & Improve	Yes - Systems actualizing, Working from Potential

Table—1: Overview of reviewed EU legislation according to the Level of Work Framework.
EN means enforced and P means proposal.

Conclusion

As stated in the beginning, a small subset of EU environmental legislations has been reviewed in terms of their regenerative potential. The main focus was to explore whether regeneration or RDD elements appear in the texts and if not, what could be the added value of adopting a RDD approach. From this review, it appears that legislation and expressed ambitions are primarily focused on responding to existing problems and opportunities which is not uncommon as these legislations have been created under the currently existing paradigms. Viewed from the perspective of the Levels of Work framework, they are mostly concerned with operate and maintain levels of work; making sure that what already exists operates well and is maintained into the future. They seek to increase performance, efficiency, and resiliency, work that is necessary for any living system, whether it is a forest, a marine ecosystem, a neighbourhood, a business, or a society.

As such, these policies are essential as they work to safeguard and sustain our societies and environments and increase their resilience in the face of change and perturbation. At the same time, these policies fall short of creating the conditions to imagine a future where the concept of co-evolutionary partnership with nature is seen as a valued source of potential. The question that is becoming more and more relevant as the acceleration and magnitude of change and disruption increase, is whether we are building the new capabilities that are required. How are we going to learn how to reconcile polarities and deadlocks, avoid pitfalls like populism or an overreliance on technological fixes, replace Cartesian reductionism with living systems understanding, and acquire higher order mastery in managing complexity, integrity, and integration? RDD can provide a coherent approach for establishing co-evolutionary partnership by pursuing sustainability, just transition, resilience, and adaptation within the conceptual framework of living, evolving systems. RDD can provide the thinking needed to develop the capabilities of living systems, social as well as natural, to express their full potential for diversity, complexity, and creativity.

The performed review revealed that recent legislation shows an increasing tendency to embrace complexity and dynamism in its thinking, reflecting the higher levels of work, although this generally showed up as aspirations rather than a true transformation in methods or rules. Taken as a whole, the strategies and directives we studied remain primarily concerned with reducing negative impacts, conserving nature and biodiversity, and encouraging humans to do things to nature (restoration). Still, the intention to move toward approaches in which humans participate as nature is clearly there. Bringing an RDD perspective and approach has the potential to enrich Europe's ambitions by shifting its orientation away from problems and toward potential, and by enabling the intrinsic potential of socio-ecological systems to flourish.

This requires a profound shift in perspective, one that highlights the pressing need to build the capabilities for people to think and act as full members of a living world, as part of Nature. There is a basic ecological and living systems literacy that needs to be cultivated, along with an appropriate level of humility in the face of dynamic complexity. A shift toward thinking from and caring for the whole is also needed, recognizing, and building from the uniqueness of place and seeing the potential of local people, places, and economies to make meaningful contributions to policy and practice.

Resistance toward the Nature Restoration Law, especially from rural communities, demonstrates the importance of a more inclusive approach, one that integrates local knowledge and values, while building the capabilities that the future is going to require. The Law of Three, which seeks reconciliation rather than compromise, offers an example of the kind of capabilities that it might be valuable to develop. The gold standard for regenerative legislation is that it grows systemic wealth, generating capacity for everyone it touches—people, communities, ecosystems, economic sectors, member states. The next generation of legislation could increase its effectiveness by specifically including a developmental approach to building regenerative capability and a culture of care, responsibility, and will, rather than specific, narrowly defined outcomes. It should seek ways to support human communities to become living systems enablers, encouraging the full expression of the distinctiveness and unique potential of their places. And it should enable communities to explore and develop the inherent will to care.

Of course, none of this is business as usual. But this research project was based on the premise that business as usual is no longer adequate to meet the urgent needs we are facing. It is our sincere and optimistic belief that a profound shift in thinking is possible, that RDD can make a significant contribution to this shift, and that EU policy, especially with regard to environmental legislation, can benefit from the new insights it brings.

To come back to Albert Einstein's famous quote: "We cannot solve our problems with the same thinking we used when we created them", regenerating our ways of thinking has the potential to catalyse a developmental future where humans again can live in harmony with the natural world and its universal laws. The EU's existing legislation and expressed ambitions provide a sound foundation to evolve future legislation and ambitions based on thinking originated from the highest level of work, one that fosters thriving living systems that are beneficial for all life on Earth.

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V. POTENTIAL AND CONSTRAINTS OF A RDD APPROACH

Potential of RDD as a meta-discipline to elevate governance, innovation and planetary health

"Real change will only begin when we realize that we are the Earth regenerating herself."
Source unknown

It should be clear by now that a fragmented approach that deals separately with multiple intertwined crises will inevitably fall short, that our current theory of change is ineffective, and that the modern Western worldview and way of living is depleting humans and the planet. It should also be clear that the meta-crisis requires a meta-response, and this is what the meta-discipline of RDD aims to bring. A benefit of working regeneratively and developmentally, of evolving place- and people-sourced potential, is the enrichment that it can bring to the sustainability field and the world at large: the regeneration of spirit and growth of capability; the will to become a co-creator rather than a victim of change; the inspiration to step into the essence of who we are and who we are called to become; the capability to envision and enact a new role for humans on the planet and to perceive today's turmoil and upheaval as a form of blessed unrest; the determination to manage ourselves, to maintain commitment, humility, and imperturbability, and the willpower to turn break-down into break-through. The all-encompassing nature of an RDD approach evolves our consciousness and competency to serve as instruments for a better future for every living being. It enables our *becoming* and our *homecoming* as a contributing species within a family of species that share our unique planet. RDD is not an endpoint and not a solution. It is a process-in-progress which depends on our continuous evolution toward becoming a better keystone species, the enablers of increased vitality, viability, and wealth-generating capability for all.

An RDD approach can lead to significant impact. In a forthcoming report about regenerative investing, a study of the global market shows that conventional approaches to impact and change projects, impact investing and sustainability had on average a global failure rate of 70%, measured across both financial and impact returns. Whereas analysis of projects over 30 years that worked with the principles and frameworks of RDD, on average had a 60-70% success rate across financial returns, and impact measures across economy, ecology, society, and culture/heritage (Henmil Group Family Office, forthcoming). Not only does commitment to a deep and ongoing process of RDD help increase the success of projects, it can yield many results, including:

- The capacity to think like natural systems and act accordingly (living systems understanding and living systems actualization).

- New ways to align with and enable living systems to express higher levels of vitality, viability and capacity for evolution (living systems evolution).

- The ability to see new potential that can reconcile what earlier seemed impossible and that can offer a way out of polarization (identifying new potential).

- Higher order thinking and creativity to address challenges, avoid path-dependency and overcome deadlocks (unlocking new potential).

- New forms of co-creation that connect personal development to organizational/project development to urban and rural development (co-evolution of nested living systems).

- New ways of finding common ground, caring, and connection to place for people across diverse ideological spectra (shared understanding and shared responsibility).

- New energy, stamina, and willpower to engage with complexity and work toward living system actualization (working from essence).

- Long-term focus and commitment by people and projects that learn how to be imperturbable in the face of challenge or adversity (building mastery in self-determined accountability).

- New ways to unlock and co-create economies-of-place rather than being ruled by economies-of-scale (uniqueness of place-sourced economic development).

Lara Lee, who experienced first-hand what a RDD approach can bring, summarizes the benefits succinctly: "The benefits for society of any organization operating from a regenerative paradigm is that the organization is conscious of the effects that it is producing in the larger social, economic and planetary systems. It is about taking responsibility for those effects. It is about seeking to operate in a way that is beneficial for all the stakeholders as well as the larger system. It is about seeking to grow in a manner that is constantly generating value. Value means beneficial effects, which is broader than financial and economic value only. It is about doing so without negative effects. The organization is growing and thriving. It is keeping itself healthy and productive. It is contributing beneficial value-adding effects to its larger systems. It is co-evolving with society, with natural systems, with the Earth, in a way that's healthy for all the parties."

Constraints: Important pitfalls & barriers that stand in the way of developing regeneratively

Working from a *regenerate life* paradigm (see Fig. 4) is not easy because it requires us to think and act differently. This goes against much of our Western social conditioning and requires both mastery in discernment and sustained effort to not fall back into habitual modes of thought. Below we will give a short (non-exhaustive) overview of important pitfalls that we have encountered in our research and experience. More detailed descriptions can be found in Carol Sanford's books.

- While few people are aware of this, the energy saving tendency of our brain often stands in the way of our ability to absorb new information. The work of psychiatrist Iain McGilchrist (2012) shows that there is a tendency to see only that which we believe in and give attention to. This is because information that challenges our assumptions and worldview requires a lot of the brain's processing energy. When we encounter new information our mind's default is to either discard it (as not relevant or not true) or mold it so that it can fit in a pre-existing paradigm. Sanford and Haggard (2020) write:

  "One of the biggest challenges to learning how to work regeneratively is the assumption that one is already working regeneratively. […] One must break the unconscious habit of resisting the new paradigm by familiarizing it, reinterpreting and appropriating its ideas and language in order to integrate them into old ways of thinking. Getting comfortable is a process that extends the content of one's thought without actually lifting and transforming it."

  In short, our mind has **a tendency to fit new ideas into existing paradigms.** The founders of Regenesis highlight David Bohm's distinction between *thoughting*, which means downloading or recycling old thoughts, and *thinking*, which means creating new thoughts. The latter is hard work for the mind, so whenever it can, it will prefer thoughting. That is the energy saving tendency of our brain and one of the most important reasons why prejudice and jumping to conclusions are such hard patterns to overcome.

- A related tendency is to pick elements out of a coherent theory of knowledge and **mix and match** these elements to fit preexisting ways of thinking and working. Selecting parts of the RDD theory and technology and blending it with business-as-usual practice, misses the point that these different epistemologies, cosmologies and ontologies are "incommensurate, that the potentials they enable are of different orders" according to Sanford (2023). She points out that "the appropriate relationship with these ideas is commitment to the whole of the theory of knowledge and the worldview from which they gain their meaning and power." What is more, elements of RDD "must not be turned into a **checklist of abstract concepts**, which not only robs them of meaning but also creates the illusion that one is thinking regeneratively, when in fact one is clinging to an older paradigm" (Sanford & Haggard 2020). They go on by stating that shifting paradigms should make a profound change in one's assumptions and that old ways of framing reality therefore no longer make sense. Elevating our thinking helps us to recognize potential that was invisible before and to reconcile conflicts that seemed irreconcilable.

- We systematically underestimate our own impact, which transition scientist and professor Jan Rotmans (2023) calls "**the illusion of powerlessness**". This is the feeling that our individual impact is too small to matter in the grand scheme of things. Carol Dweck (2017) describes the concept of a fixed mindset, which refers to the belief that our abilities and skills are barely developable. She writes that a fixed mindset leads us to be less keen on taking on challenges and more likely to give up if we don't succeed at difficult things quickly. This can then lead to a self-fulfilling prophecy and a vicious circle of thinking. If we believe we have no influence, we can become passive and stop trying, which can then confirm our belief that we have no influence. In her book No More Gold Stars: Regenerating the Capacity to Think for Ourselves, Sanford (2023) refers to this as an "**existence-based way**

of thinking" that can stand in the way of "awakening in ourselves what we need to dedicate ourselves to if we are to undertake our own becoming." She eloquently unpacks the impacts of behaviorism and relativism, which "invites us to abandon the discipline of examining ourselves and our thinking processes. This surrender results in failure to understand our conditioning and prevents us from evolving beyond our preexisting biases and attachments."

- Our Western innovation culture is heavily focused on doing and on moving fast. It has no infrastructure in place to build discernment, the ability to discern which actions to take, and to develop self-management and responsibility for wider systems implications. On the whole, we are not taught how to restrain tendencies that stand in the way of cultivating a deep understanding of our systemic contexts. Nor are we taught the leadership skills needed to refrain from action if negative spill-over effects may arise. This leads to a deeply embedded pattern of reactivity: the quick fix mentality leads us to fix problems in isolation of the wider context, which creates more problems, and more quick fix solutions and so on. Such thinking also ingrains a focus on better, rather than best, because this can be achieved faster and as such locks innovation into a culture of optimization rather than transformation. Such a culture of quick fixes is underpinned by an underlying theory of change that believes that the most effective way to change is by encouraging more and more actions, and, as Sanford and Haggard (2000) observe, not by building the thinking capabilities that enable discernment about which actions to take. Without these capabilities, they argue:

  "Old paradigms are unconsciously dragged into almost everything that people do, severely limiting what they see as possible and desirable. The fastest way to bring profound change to our economies is to interrupt this tendency to think in familiar and comfortable ways. Over and over again, people and institutions need to be invited into to a regenerative way of viewing things. Through repeated disruption of their patterns, they will begin to transform their thinking processes and, ultimately, the world they are able to image, long for, and create."

- Related to this is also our tendency towards compromise, which stands in the way of the transformation that the world needs right now. In their Manifesto, Regenesis writes:

  "We can't get where we need to go by making compromises. The catastrophic destruction of the world's living systems is the natural result of a humanity that lives from the belief that we must always choose lesser evils. This belief tells us that to feed our population we must degrade our soil; that to heat our homes we must destroy our atmosphere; that to support our urban centers we must deplete our aquifers. Regenerative development asks us to reject these premises and envision instead a world of human activity in which compromising the health of one system for the convenience of another has become a powerful and pervasive taboo."

- Another important hazard to avoid, according to Max Shkud, a leadership development and organizational change consultant who has been practicing the regenerative approach in business for years, "is protecting people from complexity". The world is getting increasingly complex, volatile, and ambiguous, "so simplifying things for them is a mistake".

Community development and regenerative practitioner Beatrice Benne (2018) adds: “To meet the challenges facing us at this time in history, we need to increase the ability of the systems that we create to deal with complexity. As we do that, we also need to develop our capacity to embrace more complexity so that we can operate these complex systems effectively. It is not development in the abstract, but through the work itself.”

VI. THE ALIGNMENT BETWEEN RDD AND INDIGENOUS SCIENCE AND CULTURE

"Regenerative practice from a Western perspective closely aligns to Indigenous systems thinking in a sense that regenerative systems thinking and doing are circular. So, what we are starting to see is a shift from square systems thinking —which is about individualism, extraction, patriarchy and power— and what I call squarization —the disconnection and displacement of not only Indigenous peoples but humanity due to colonization, Westernization and urbanization— into more regenerative, circular thinking. The exciting part is in the third element of convergence where these two [Western regenerative and Indigenous regenerative] circular systems are starting to touch each other. It is like a binocular, to use a metaphor, where it is not about the two lenses but the third view that gets generated when we apply that binocular view. That third view creates the unfolding space of our unfolding future."
Johnnie Freeland, 2024

The knowledge traditions of First Peoples and the relevance of Indigenous wisdom today

RDD works from the premise that modern societies must learn to become indigenous to place again, striving to develop new ways of living in harmony with and as fully participating members of the natural world. For this reason, RDD acknowledges that we have much to learn from the science and cultures of Indigenous peoples. Many recent Western scientific findings confirm the insights of Indigenous wisdom, and RDD brings together these modern and ancient insights and tailors them to the magnitude and speed of change today. Cultivating an understanding of traditional Indigenous wisdom may help to awaken the ancestral knowledge that modern societies will need if they are to transition beyond degenerative ways of living. Perhaps this can help us to remember the intrinsic processes of *becoming* and *belonging* that will be a necessary dimension of our quest toward a regenerative future.

In what follows, we offer a brief overview and outline of the knowledge traditions and cultures of our planet's First Peoples[5]. This is a cursory and necessarily incomplete exploration into the rich background of Indigenous epistemologies, cosmologies, ontologies, and technologies. Although it represents a(n) (over)simplification of the complex history of Native ways to understand and live in the world, we hope that it inspires deeper exploration and study to uncover the dimensions and details needed to paint a fuller picture.

[5] Please note that we adopt the view of the United Nations Declaration on the Rights of Indigenous Peoples which does not adopt or recommend a universal definition for Indigenous Peoples (Decision CBD/COP/DEC/14/13). As used in the report, Indigenous Peoples is a term used internationally by representatives, organizations, and conventions to refer to individuals and communities who are, on the one hand, self-identified as indigenous and, on the other hand, are members of local communities that maintain inter-generational connection to place and nature through livelihood, cultural identity and worldviews, institutions and ecological knowledge. The term is not intended to ignore differences and diversity within and among Indigenous Peoples and between them and local communities; Indigenous Peoples have recognized and distinct rights, which are not extendable to the broader and encompassing concept of local communities.

To trace the roots of more regenerative ways of being and living, one must go back in time tens of thousands of years, when its practices were customary among most of Earth's human inhabitants. For all their great diversity, Indigenous Peoples and cultures share commonalities in worldview and value systems that unite them with each other and differentiate them from modern and postmodern industrial cultures (see for instance Sahtouris, 2000; Fernández-Llamazares et al., 2021). For one, First Peoples saw themselves as an integral part of nature. They also shared the view that the universe and nature are alive and sacred, despite many differences in formulation. These views were passed down over generations and are still present in many surviving Native cultures today (Fernández-Llamazares et al., 2021). "In fact, our Western industrial culture is the only one in history that has not known that the Earth is alive." (Sahtouris, 1996). Cultures as geographically distant from each other as Native Americans and Australian Aborigines understood that human and natural law were mirrors of one another, formulated in accordance with what we are now discovering is essential in terms of sustainability: laws of balance, harmony, respect, responsibility, mutual sustenance, and reciprocity (see for instance Sahtouris, 2000; Kimmerer, 2015; Yunkaporta, 2020; Fernández-Llamazares et al., 2021). Whole systems thinking is a core capability of Indigenous traditions. In the words of Anne Poelina (2022), Professor and Nyikina Warrwa wisdom keeper from the Kimberley region of Western Australia:

"Indigenous wisdom right across the planet is grounded in what we call *law of the land* not *law of man*, and what we are saying as wisdom keepers is that unless we are factoring in Indigenous wisdom, Indigenous knowledge, Indigenous science, Indigenous law, we will not be able to right-size the planet."

What Poelina highlights is the deep knowledge of and relationship to place as a living system that all communities of First Peoples have had to develop in order to survive over the long term. This is reflected in the word *indigenous*, which comes from the Latin word *indigena*, meaning sprung from the land; native. It refers to a process of ***belonging*** to place, which brings with it a responsibility of ***caring*** for place. Most Indigenous communities see themselves as belonging to the land, as opposed to the contemporary view of living on the land. In his paradigm-shifting book Sandtalk: How Indigenous Thinking Can Save the World, Tyson Yunkaporta (2020), a researcher who belongs to the Apalech clan in Queensland, Australia, writes that Aboriginal People have no word for *culture* because culture and nature are in their view not separate fields. Instead, they have a phrase approximating the concept of culture which means "being like our place". The same is true for the word *nature* which also does not exist in many Native languages because the very concept of being outside of nature is foreign to them (Sheila Watt-Cloutier, 2022). This highlights both the importance of language, because words build worlds, and the importance of an understanding of and rootedness in place. By belonging to the land and thereby learning how life works in a particular place, Indigenous People have been able to develop systems of ethics and governance models in alignment with natural systems (Kimmerer, 2015; Yunkaporta, 2020).

In addition to a deep understanding of how living systems work, Native communities regard themselves as a vital part of these systems. From this perspective, people have a role to play in the sustenance and thrivability of living systems. In contrast to contemporary science, where an expectation of objectivity requires investigators to place themselves outside the field of

study, Native people do not isolate themselves, or the object of study, from their context. They have long understood the *observer effect*, which has only recently been discovered in quantum science and which shows that pure objectivity is an illusion (Sahtouris, 2000; Frank et al. 2024). Yunkaporta (2020) refers to *kinship-mind*, which reflects the:

"Aboriginal worldview that nothing exists outside a relationship to something else. There are no isolated variables—every element must be considered in relation to the other elements and the context. […] An observer does not try to be objective but is integrated within a sentient system that is observing itself." Astrophysicist Adam Frank, theoretical physicist Marcelo Gleiser, and philosopher Evan Thompson (2024) echo this idea when they conclude that it is time to "create a new scientific culture that views ourselves both as an expression of nature and as a source of nature's self-understanding".

Related to this point, most of our planet's First Peoples understand that not only do their actions matter in the grand scheme of things, their quality of being matters too, in the sense that one cannot know any part, let alone the whole, without participation, respect, and humility (see for instance Sahtouris, 2000; Restoule et al., 2010; Yunkaporta, 2020). As a result, Indigenous pedagogies today focus on the development of a human being as a whole person. Cognitive knowledge is valued, but self-awareness, emotional growth, social growth, and spiritual development are also imperative (see for instance Antoine et al., 2018).

Sages from different spiritual traditions have translated this insight into what is commonly referred to as the Law of Attraction—your thoughts and unconscious beliefs determine not only what you create in the world, but also what you attract in life (for an overview see de Vries, 2012). Professor of Aboriginal Education Jean-Paul Restoule and colleagues (2010) observe that:

"Indigenous researchers are well aware that who we are matters immensely to how we approach our research, as well as what we may see when looking at a research question. One way in which Indigenous research is distinct from other research approaches is that, in locating self, we identify ourselves not only by our social markers, such as gender, but we also locate ourselves in relation to spirit."

The word *spirit* comes from the Latin word *spiritus*, which means breath, or breath of life. Today it is often understood as the soul, the immaterial essence, animating principle, or actuating cause of an individual life. Indigenous scholars define spirit as the mysterious energy that pervades the universe and gives life its unique essence (Restoule et al., 2010). Indigenous ontologies and epistemologies were, and still are, rooted in worldviews that are inclusive of both the sacred and the secular, the spiritual and the material (Hoffman, 2013). Honoring the sacredness of nature provided a code of conduct as to what should or should not be done by humans. To put this code into practice, Native communities have developed a wide range of techniques and practices, including rituals, ceremonies, protocols, and rites of passage to govern ways of being and ways of acting in the world.

After studying many years with Indigenous wisdom keepers from many different cultures, evolutionary biologist Elisabet Sahtouris (2000) summarized a common cosmological perspective: "To be sacred is to be inviolable, to be treated with the utmost respect. To have

a sacred contract with nature is to care for it, protect it, give back for what you take". In her book Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants, Robin Wall Kimmerer (2015), Professor of environmental biology and enrolled member of the Native American Citizen Potawatomi Nation, shares the guidelines for Honorable Harvest that have been passed down among her people for generations, not through the written word but through small acts of daily life:

"Know the ways of the ones who take care of you, so that you may take care of them.
Introduce yourself. Be accountable as the one who comes asking for life.
Ask permission before taking. Abide by the answer.
Never take the first. Never take the last.
Take only what you need.
Take only that which is given.
Never take more than half. Leave some for others.
Harvest in a way that minimizes harm.
Use it respectfully. Never waste what you have taken.
Share.
Give thanks for what you have been given.
Give a gift, in reciprocity for what you have taken.
Sustain the ones who sustain you and the Earth will last forever. "

It is important to note that while most scientists still refer to this deep understanding as indigenous knowledge, Sahtouris (2000) calls it science, as science comes from the Latin word *scientia* which means knowledge, awareness and understanding. She eloquently distills the difference between modern Western science and ancient Indigenous science:

"Indigenous people have taught me that good science can be done without tearing it out of the seamless and sacred fabric of life. They have always known this is a participatory universe, which Western scientists only now acknowledge. We simply cannot observe it without changing it. Indigenous peoples understand science and spirituality as aspects of the same reality—an intelligent, conscious continuum with physical and non-physical aspects. They are aware that all parts and aspects of nature are in constant non-physical communication."

Sahtouris is referring to the recent recognition by modern physicists that **everything is connected to everything else** and is in constant dialogue through non-locality, zero-point energy, and quantum entanglement (Brooks, 2024). This interconnectedness between all things was traditionally understood as a Law of Oneness, or One Source, which informs the concept of Relationality (de Vries, 2007; Antoine et al., 2018): we are all related to each other, to the natural environment, and to the spiritual world, and these relationships bring about interdependencies and responsibilities. In other words, Indigenous thought focuses on the whole picture because everything within the picture is related and cannot be separated (Antoine et al., 2018). For example, many Native American Peoples and cultures hold a kinship view of life, referring to other-than-human life forms as *relatives* (Wall Kimmerer, 2015). Modern science now confirms these insights: evolutionary biology and DNA mapping show that all life forms (and all humans) are descended from one common ancestor, all life on Earth is related.

One might ask how ancient cultures gained their insights without advanced technologies and instruments to study the natural world. The answer is to be found in the different way that they have gathered their knowledge. As Native American educator Greg Cajete (1994) observes, Indigenous cultures do science in a ***high-context environment***, studying phenomena *in situ*, while industrial cultures do science in a *low-context environment*, isolating phenomena to study them. This difference, he explains, has to do with the different purposes behind their respective pursuits of knowledge. Native Peoples and cultures leave what they study in place because they seek knowledge that will allow them to integrate harmoniously into nature. By contrast, Western cultures remove the objects of study from their natural contexts to study them in laboratories because they seek knowledge that will allow them to control and manipulate nature for their own purposes (as described in Sahtouris, 2000). Western science tries to study nature objectively, as an outside observer, reducing phenomena to their tiniest parts to understand them. Ancient Indigenous science studies nature from the viewpoint of a participant. The focus is not so much on parts as on the relationships and interdependencies among aspects, both natural and spiritual, of a whole. Willie Ermine (1995) reports: "Indigenous philosophies are underlain by a worldview of interrelationships among the spiritual, the natural, and the self, forming the foundation or beginnings of Indigenous ways of knowing and being."

The author Paula Underwood Spencer, a wisdom keeper with Native American Oneida roots, sums up the difference between the Western and Traditional way of knowing in her paper 'A Native American Worldview' (1990). She shares the story of Hawk and Eagle, which has been passed down by her ancestors to help build understanding about different modes of perception. She writes:

"When hunting, Hawk sees Mouse . . . and dives directly for it. When hunting, Eagle sees the whole pattern . . . sees movement in the general pattern . . . and dives for the movement, learning only later that it is Mouse. What we are talking about here is Specificity and Wholeness. Western science deals from the specific to generalities about the whole. Indigenous science begins with an apprehension of the Whole, only very carefully and on close inspection reaching tentative conclusions about any Specificity. Indigenous science is based on a profound immersion in and awareness of the whole circumstance. Rather than mistrusting personal experience, Indigenous science has learned to thrive on it. The standards for personal honesty are excruciatingly exact and taught from earliest childhood. Educational structures like the Vision Quest have as one goal coming to terms with accuracy outside of or devoid of your own assumptions or the assumptions of your society. The idea is that you are always —if you are wise— moving toward enhanced accuracy. You will never entirely arrive at complete accuracy, but you are constantly trying to move in that direction."

She ends the article with a translation expressed in English from the 'Strong Spirit Path', a Native American Tradition, which beautifully expresses Indigenous understanding of the world and which is remarkably aligned with recent insights from quantum theory:

“UNIVERSE

is Space
which contains Energy

Energy
of its nature moves
as it moves
it produces Change

Change is
it was<>it is<>it will be

sometimes we call this past, present, future
and we say it is Time
it is not time
it is Change

you see how it is
how everything in Universe
is Energy
flowing from one place to another

what we call matter
is merely a relatively stable form
of Energy
which is also changing
also moving
only more slowly
like Earth and Ocean
each at its own pace

all things that contain Energy
are alive
as all things are formed of Energy
all things are alive
and all things are related
each to the other
always”

Although sampling only a small subset of the rich philosophical traditions of First Peoples, this survey provides a sense of the epistemologies, cosmologies, and ontologies that enabled them to develop cultures and governance systems in harmony with their local environments and the planet as a whole. Raymond Cole (2020) offers this overview:

“Accepting the generalization, Indigenous peoples’ worldviews hold deep reverence for the land and other species, view everything dependent on everything else, consider humans

inseparable from the living and inanimate world, and all things are sentient, contain spirit, and need to be respected. Moreover, contrary to Western conceptions of land as a bundle of rights, within the Indigenous cultures' gift economy, property carries a bundle of responsibilities."

Anna Poelina (2023) refers to this bundle of responsibilities as a Duty of Care in her address to the IUCN (International Union for the Conservation of Nature) Global Biodiversity Framework Workshop in 2023. As Sathouris (2000) points out, "The point is not to romanticize Indigenous peoples, who have been and are as human as all others, but to acknowledge and learn from their traditional best—from their deeply spiritual respect for and scientific knowledge of nature." While many surviving Indigenous cultures have lost their old values and lifestyles to colonialism, the allure of modern culture, or other reasons, wisdom keepers the world over, have carefully safeguarded and reconstructed ancient knowledge—knowledge based on millennia of observation that has been passed from generation to generation. These sophisticated sets of knowledge and practice are broadly referred to as Indigenous and Local Knowledge (ILK). Diverse as they are, they often share a strong emphasis on nurturing positive, responsible and reciprocal relationships among humans and their non-human kin, are grounded in lived experiences, and are anchored in local cosmology, governance and language (Fernández-Llamazares et al., 2021).

Much of this knowledge and understanding accords with practices of sustainability and regenerative development, addressing not only what is needed to live in harmony and balance with the natural world, but also what it takes to play a role as a custodian species of our planet. In the words of Yunkaporta (2020): "Indigenous knowledge is not about the *what* but the *how*." One of the major features that sets Indigenous ontology apart is the belief that humans have a role to play in sustaining healthy living systems, in a way that safeguards and guarantees the further evolution of life. Multiple scientific studies have shown that Indigenous Peoples and their lands are crucial for the long-term persistence of Earth's biodiversity and ecosystem services (O'Bryan et al, 2021; Convention on Biological Diversity, Article 8(j) and LBO-2). Although Indigenous peoples make up just five percent of global population (while representing a disproportionate percentage of the world's poorest people), they protect 80 percent of the world's remaining biodiversity according to the Convention on Biological Diversity (Press release 20.07.2022). What is more, the environmental quality of Indigenous Peoples' lands in biodiversity hotspots surpasses that of non-Indigenous lands, even given the political discord and violence that many native communities face (Beattie et al, 2023).

Indigenous science goes beyond simply safeguarding biodiversity. Evidence shows that native communities have developed models of agriculture that promote, rather than degrade, biodiversity and environmental health. For instance, a study by Maezumi and colleagues (2018) in the Amazon illustrates that native communities adopted regenerative agriculture practices around 4500 years ago. The study shows that ancient Indigenous peoples practiced polyculture agroforestry in the Amazonian rainforest, and that this is responsible for the overwhelming abundance of edible plants that can be found there now. In contrast with contemporary farming practices, this indigenous approach maintained a closed canopy and continuously enriched the soil, so that the same land could be used again and again. As a result, this type of soil, called Amazonian Dark Earth, is much more fertile than unmanaged Amazonian soil (Maezumi et al., 2018). In other words, the richest soils and ecosystems of the Amazon are not found in the pristine, uninhabited parts of the forest, but in those that have been previously

inhabited by humans. Indigenous ways of knowing, being, and operating are thus an invaluable living repository of in-depth information on how to safeguard and regenerate life within the ecosystems within which they were developed (Sahtouris, 2000; Gorissen, 2020; Yunkaporta, 2020; FPP et al. 2020; IPBES 2019).

Clearly, many Indigenous societies have long ago mastered the science and governance that are essential for living harmoniously and sustainably within their local environments. These capabilities also extended to **equality, democracy, and peacekeeping**. For instance, in reconstructing Aboriginal history before contact with European colonists, Bruce Pascoe, a writer of Bunurong, Tasmanian, and Yuin heritage (2018), noted that prior to contact the First Peoples of Australia had developed sophisticated systems of agriculture, aquaculture, food storage and preservation, and housing, leaving many archaeological traces in the landscape. Although some of this evidence is tens of thousands of years old, there are no archeological traces of warfare. This leaves one to wonder how widely diverse groups of Aboriginal people living in a challenging environment managed to avoid warfare. As Pascoe (2018) puts it:

"This absence [of war] demands respect, and the skills employed to bring about the longest lasting pan-continental stability that the world has known must be investigated […] there must have been an intellectual musculature, not just to forge that peace, but to maintain it."

As for gender equality, Yunkaporta (2020) writes that women have never been subjugated because there is a unique equity in Aboriginal culture. While there are male and female energies, these do not equate to standards of masculine and feminine behavior found in Western societies. He goes on:

"Traditionally, our men are tender, empathic, and nurturing. Our women are strong, determined decision makers and pack a punch should it be required."

He notes that Aboriginal culture has a completely different relationship to violence, which is regulated in a distributed way rather than in the centralized way that is dominant in Western culture (Yunkaporta, 2020). As in most Indigenous cultures, Aboriginal governance systems have been developed to mirror the *patterns of creation*—what we generally understand as patterns of nature, where there is no centralized control (see for instance Sahtouris, 2000; de Vries, 2012; Kimmerer, 2013, Yunkaporta, 2020). This mirroring between human and natural patterns of behavior arises because **everything on Earth is nature and therefore follows the same natural and physical laws—the patterns of creation**. According to Yunkaporta, this principle applies universally:

"I have previously talked about civilized cultures losing collective memory and having to struggle for thousands of years to gain full maturity and knowledge again, unless they have assistance. But that assistance does not take the form of somebody passing on cultural content and ecological wisdom. The assistance I am talking about comes from sharing patterns of knowledge and ways of thinking that will help trigger the **ancestral knowledge** hidden inside. The assistance people need is not in learning about Aboriginal Knowledge but in remembering their own."

This implies that going forward does not mean going backward. Rather, it calls on us to **bring the best of modern Western science into dialogue with the best of ancient Indigenous science, in a way that is equal, respectful, reciprocal, wise, benevolent and evolutionary**. While modern science excels in managing entropy and the creation of technological instruments and devices, ancient science excels in the development of whole, rooted, and essence-sourced human beings that are able to understand and enable negentropic evolutionary processes. Such processes allow living systems to become more and do more over time, which as we have seen is the essence of developing regeneratively. This calls for a renewed joint venture between modern science and spirituality, one that integrates intellect, spirit, consciousness, and heart. As biologist Marja de Vries (2012) points out:

"There is a growing perception among scientists that overemphasizing the intellect is starving their own hearts and souls. They, too, are feeling an increasing need for an integration of their own experiences on the one hand with scientific reality on the other. At the present time, we are therefore seeing that scientists are endeavoring to unite their scientific understandings with spiritual insights on a much wider scale than was previously the case."

While science and spirituality have long been separated in Western cultures, recent scientific discoveries "show that both the concept of spirituality and the nature of spiritual experiences of reality are fully consistent with Western science, and in particular with the systems view of life", according to Capra & Luisi (2014). They argue that it is of the utmost importance to introduce both ecological and spiritual dimensions into education at all levels. They go on by stating that:

"The notion of spirituality is very consistent with the notion of embodied mind that is now being developed in cognitive science […] it is a profound sense of oneness with all, a sense of belonging to the universe as a whole […] as we understand how the roots of life reach deep into basic physics and chemistry […] how life has evolved for billions of years by using again and again the same basic patterns and processes, we realize how tightly we are connected with the entire fabric of life".

Psychiatrist Iain McGilchrist (2012) goes even further and posits that science without spirituality is irrational; it is unscientific to imagine that we can understand everything because we have a way of analyzing it into ever smaller parts. He posits that, "Spirituality is simply a question of having an open enough mind to see that that there are things in the world at large that transcend what we can know and fully comprehend, that are not fully accounted for in a reductionist, materialist account." Jonathan Rowson (2012), Director of The Social Brain Centre at the RSA in London, adds that it is important to "broaden our notion of the spiritual, and link it to a wider sense of epistemic humility." Bringing together Western and Indigenous science as Johnnie Freeland shared in the interview, might generate a new third view, one that is more appropriate to the circular and spiral way that living systems unfold, one that helps humanity find its place in the web of life again and one that lifts up and regenerates.

VII. CONCLUSION

"Humans have a more complex motivational structure and more capability to solve social dilemmas than posited in earlier rational-choice theory. Designing institutions to force (or nudge) entirely self-interested individuals to achieve better outcomes has been the major goal posited by policy analysts for governments to accomplish for much of the past half century. Extensive empirical research leads me to argue that instead, a core goal of public policy should be to facilitate the development of institutions that bring out the best in humans."
Elinor Ostrom, Nobel Prize acceptance speech 2009

The challenge before us today is thus to develop a new science, one that marries the best of modern Western and ancient Indigenous science and elevates not only our understanding, but our being and practice in the world too. Or, as Casey (2023) puts it: "Rather than thinking the world would be better off without us, we could begin to see that we are not only necessary to Nature, we are Nature. Seeing things in this way, as inextricably linked, dynamically entwined, and continuously unfolding is the basis of the epistemology known as Regenerative Practice. We see strong parallels between the worldview of Regenerative Practice and Indigenous ways of being and being in relationship to living systems, and we are curious about what those resonances could produce if we looked at combining them more intentionally."

In conclusion, to regenerate the living systems in which we are nested, we first must understand how they work and what our role as humans is to maintain, revitalize and catalyze their capacity for evolution. In other words, as humans we must learn to master the process of negentropy: to create increased order, differentiation, resilience and sophistication in the living systems in which we are nested. We must evolve the way we think and act in the world in a way that is spirit-lifting, respectful of, and supportive to other life forms. Creating the appropriate enabling conditions that avoid path-dependency is the step we need to make now. We hope that the present study is a steppingstone in this regard and that it may spark new conversation, new exploration, and new ways to create policy and governance.

The whole world is now the only relevant unit of concern,
and the long term is the one focus from which to develop our strategies.
Developing regeneratively means that development, not growth, is our goal,
that creating thriving living systems is our ambition,
that potential, not problems, is our starting point,
that transparency, co-creation, co-evolution and co-existence
are our guiding principles, and that design replaces politics.
Developing regeneratively means discovering that
everyone is needed and everyone wins[6].

[6] Inspired by the article from Gabel (2015).

VIII. APPENDIX

Glossary

Ancestral knowledge is the deeply embedded ancient knowledge that is innate in humans but is often dormant in the Western world. It is woven into the epistemologies (ways of knowing), and written, oral, and spiritual traditions of our ancestors and refers to a capability to connect and engage with the deeper patterns of life and to apprehend wholeness in phenomena.

Autopoiesis, or self-creation in Greek, describes the capacity of a living entity to produce itself (Maturana and Varela, 1980). The Merriam Webster dictionary describes it as the property of a living system (such as a bacterial cell or a multicellular organism) that allows it to maintain and renew itself by regulating its composition and conserving its boundaries.

Cartesian reductionism is the view that all of nature works according to mechanistic laws, and everything in the material world can be explained in terms of the arrangement and movements of its parts within an undifferentiated space.

Cognitive science refers to the interdisciplinary, scientific study of the mind and its processes with input from biology, linguistics, psychology, neuroscience, philosophy, computer science, artificial intelligence, and anthropology. It examines the nature, tasks, and functions of cognition.

Consciousness is the ability to purposefully direct one's thoughts, memories, feelings, sensations, actions, and choices. Consciousness depends upon, but is more than, self-awareness, awareness of one's environment or world, and the relationships among them. The discipline of RDD works on building consciousness, as it brings the capacity to discern meaning, cultivate self-management, and activate will and agency, all of which are requirements for sustained transformational change.

Cosmology, or worldview, refers to the process of sensemaking, and results from the process of weaving our belief systems into a story of how the world works.

Development is understood as the ongoing and conscious process of *de-veiling* or *unfolding* to reveal and manifest the true natures and essences of things. It requires seeing the potential that exists within an entity or activity, given its essence, and then building on what is currently there in a way that increases value and value-generating capability. (TRP course materials, 2014).

Duty of Care refers to a moral or legal obligation to ensure the safety and well-being of others. In indigenous traditions, it also refers to the obligation to care for the land and the many life forms that share the land with humans.

Ecology is the natural science of the relationships among living organisms, including humans, and their physical environment. Ecology considers organisms at the individual, population, community, ecosystem, and biosphere level.

Ecosystem is a system that environments and organisms form through their interactions. It is the whole of biotic and abiotic factors that form a unique identity in a specific place.

Entropy is defined as a gradual decline into disorder.

Evolution, as a process pertaining to development, is moving things from lower to higher orders of expression. Being of higher order implies a greater level of effectiveness in integration, resilience and dealing with complexity (adjusted from TRP course material, 2012). It is defined as movement to new levels of order, differentiation, and organization—the opposite of entropy—in which "cooperation (deriving from the mutuality of interest among organisms and ecosystems) rather than competition" is the primary driver (Mang & Reed, 2012). (This is very different from the industrial era definition of evolution as a struggle over scarce resources wherein individuals and species compete to survive.)

Epistemology is the theory of knowledge. It addresses beliefs about what qualifies as knowledge and how (that is, the processes by which) we come to know anything.

Indigenous comes from the Latin word *indigena*, meaning sprung from the land; native. The related term *First Peoples* recognizes that, rather than a single group or category, there are many indigenous communities or nations across the world, each of them separate and unique.

Indigenous knowledge systems emerge from and are embedded in relationships to specific lands or territories, resulting in cultures and communities that, while distinct, share many core values and patterns across regions.

Indigenous science refers to the wisdom and knowledge systems that have been developed by indigenous and First Nations peoples. In some cases, these date back tens of thousands of years and include approaches that are still practiced today.

Knowledge refers to the sum of what is known—a body of truth, information, and principles. It includes the accumulation of facts, information, or skills obtained through education or experience. Knowledge does not imply understanding; one can know a fact without understanding what it means.

Life includes all living entities, from bacteria to humans to ecosystems to Earth itself. This concept is more encompassing than that of *nature*, which is understood to be separate and distinct from the world of humans, their activities, and artifacts.

Living systems refer to all life forms that are open (permitting the flow of energy and material across their boundaries), and are differentiated by their autopoietic capacity, i.e., they are able to use the exchange of energies and materials with their environment to self-organize and self-maintain and evolve. Every living system must continually increase its vitality, viability, and capacity for enabling further evolution if is to thrive and endure (TRP course, 2018).

Living systems thinking, or sometimes referred to as evolutionary systems thinking is core to the work of regenerative development, as it builds on the aspects of aliveness and evolutionary capability of living entities. It thus differs from the (cybernetic) systems thinking approach that came out of engineering and influences most organizational and change efforts today. Living systems thinking looks at the pattern of the whole and thinks about shifting this underlying pattern to develop the system to another level. Instead of working at the level of existence it works to weave together potential (realization or evolution of potential) and existence (manifestation of potential) in a virtuous cycle (TRP course materials, 2014).

Mechanistic worldview, or Cartesian worldview, is a way of seeing the world, and the universe, as a machine. It refers to the view that all of nature works according to mechanistic laws, and everything in the material world can be explained in terms of the arrangement and movements of its parts within an undifferentiated space. Because machines cannot evolve (as compared to living systems), viewing the world mechanistically implies that eventually everything will succumb to processes of entropy.

Meta-crisis is a term to describe the interrelatedness of crises. Capra & Luisi (2014) observe that climate change, biodiversity loss, environmental degradation, social unrest, food and energy security, fairness and equality… are all just different facets of one single crisis.

Meta-discipline refers to an approach that integrates different disciplines, which are inherently fragmentary, into a coherent whole that is more than the sum of its parts.

Modern Western science refers to the sciences that emerged in the 17-18th Century. Western science is regarded as the international standard for credible scientific inquiry and discovery. It seeks objectivity and rationality wherein knowledge is constructed and validated through empirical observation, experimentation, and analysis. Much of modern Western scientific thought is governed by the long-dominant Cartesian–Newtonian mechanistic paradigm that emphasizes reductionism and linear thinking.

Negentropy is the reverse of entropy. An active and purposeful process that leads a system to become increasingly ordered, it is what differentiates life from other forms of organized matter.

Nestedness refers to the fact that every entity is part of and interdependent with something bigger.

Neuroscience is the study of the nervous system, with a primary focus on the brain.

Ontology refers to a system of beliefs about how things come into being, how we become who we are and bring other creations into the world.

Path dependency is a concept that refers to the societal tendency where past events/activities determine present events/activities. Change trajectories often fail because no strategy has been put into place to avoid path dependency, so the outcomes are, more often than not, repetitions of the past.

Place refers to the unique, multi-layered network of ecosystems within a geographic region that results from the complex interactions through time of the natural ecology (climate, mineral and other deposits, soil, vegetation, water, wildlife, etc.) and culture (distinctive customs, expressions of values, economic activities, forms of association, ideas for education, traditions, etc.) (Mang & Reed, 2021). According to the discipline of RDD, regenerative solutions are specific to a given place and require an understanding of how the interdependencies between the social and ecological systems in a place can support and enhance life. (Benne & Mang, 2015).

Potential is defined as the inherent ability or capacity for growth, development, or coming-into- being that has not yet been manifested. It is the difference between what something is versus what it could be. Potential is realized in the form of increasing ableness at higher levels of complexity. When something's potential is manifested, it is able to generate higher order value. Higher order is a term that comes from complexity science and does not mean hierarchically superior. Instead, it implies a greater level of effectiveness in working with or integrating things at increasing levels of complexity.

Quality of being refers to the core aspect of RDD's cosmology that everything in existence has three interrelated dimensions – function, being and will. Quality of being is determined by the quality of the energy present – automatic, sensitive, conscious, creative, unitive, etc.

Quantum physics or quantum science refers to the theoretical basis of modern physics that explains the nature and behavior of matter and energy on the atomic and subatomic level. The nature and behavior of matter and energy at this level is sometimes referred to as quantum theory and quantum mechanics.

Reductionism is the view that all of nature works according to mechanistic laws, and everything in the material world can be explained in terms of the arrangement and movements of its parts. From this perspective one and one equals two, while in holism/living systems science one and one equals three.

Regenerate, as a process, includes three key ideas: a radical change for the better; creation of a new spirit; and returning energy to the source (Mang, 2001). It is defined as an evolutionary process by which a living system, through the enfolding connection with its life source, rebirths into existence a higher order patterning for functioning, relating, and adding value in harmony with the whole (Mang, 2009).

Regeneration is a biological and spiritual phenomenon of renewal that leads to a higher order of vitality, viability, and evolutionary capability. Regeneration allows a system to become more and do more. In developmental terms, regeneration is understood as a process that gives new life or energy to something that has been depleted of its physical vitality or meaning. Successful regeneration within a system leads it to evolve and continually develop new potential (TRP course, 2018). The dictionary definition of regeneration addresses both the action and the source of this new potential: 1) to create anew and 2) to be born of a new spirit (Bill Reed, 2018). Regeneration is also defined as the creation of a new improved state or condition that improves the value-generating capacity of the entity or system as a whole by increasing the potential of the resources—biological, human, and/or material—that are the basis for an entity

or system's functioning, thereby infusing new life energy and vitality (Mang & Reed, 2012). Regeneration is the instrument for evolution by which life on the planet has sustained itself for billions of years (Capra, 2020).

Regenerative is defined as tending to or characterized by regeneration, which comes from *generare* in Latin, meaning to give birth or generate. Initially in the early days of biology, the term regenerative was used to indicate a functional self-renewal or, more often, a morphogenic replacement of lost or damaged parts or structures in organisms or ecosystems (Morseletto, 2020). More recent systemic understanding in the field of ecology defines regeneration as a process of renewal that leads to a higher order of vitality, viability, and evolutionary capability (TRP course, 2018). Higher order here refers to a higher level in terms of the system's wealth -and health generating ability. In other words, regeneration allows a system to become more and do more. *Becoming more* means that regeneration enables the achievement of higher levels of complexity and sophistication. *Doing more* means that regeneration enables new potential through the accomplishment of new capability and the enactment of new roles. In simple terms, regenerative is defined as enabling social and ecological systems to maintain a healthy state and to evolve (Brown et al, 2018).

Regenerative development refers to a system of developmental technologies and strategies that works to enhance the ability of living beings to co-evolve, so that the planet continues to express its potential for diversity, complexity, and creativity through harmonizing human activities with the continuing evolution of life on our planet, even as we continue to develop our potential as humans. Regenerative development provides the framework, and builds the local capability, required to ensure regenerative design processes achieve maximum systemic leverage and support through time (Mang & Reed, 2012).

Regenerative design is a design process that engages and focuses on the evolution of the whole of the system of which we are part. Logically, our place—community, watershed, and bioregion—is the sphere in which we can most readily participate in this way (Reed, 2007).

Relationality is the concept that we are all related to each other, to the natural environment, and to the spiritual world, and these relationships bring about interdependencies.

Restorative comes from the word restoration or (re)staurare in Latin, which means to repair or give back or build up again. In recent literature the definition is proposed as "the return to a previous or original state" (Morseletto, 2020). However, Shanon (2015) points out that: "It is important to note that the concept of restoring an ecosystem is a bit of a misnomer. This is because ecosystems are not static —you can't return an ecosystem to its original condition like you can with a painting or a vintage radio. An ecosystem, like any living thing, can never stand still and can only be in process —either a process of evolution, or a process of de-evolution."

Salutogenetic comes from the word salutogenesis, which refers to the study of the origins of health and focuses on factors that support human health and well-being, in contrast to factors that cause disease.

Spirituality involves the recognition of a feeling or sense or belief that there is something greater than oneself, something more to being human than sensory experience, something that transcends what one can know and fully comprehend.

Systems actualization as an aim of regenerative practice is the process of helping a living system (place, organization, landscape, etc.) manifest its unique, value-adding potential in relation to the larger wholes of which it is a part.

Systems theory is the transdisciplinary study of systems; it addresses itself to cohesive groups of interrelated, interdependent components that can be natural or artificial. Systems theory differs from living systems theory in that it fails to address the evolutionary and autopoietic dimension that characterizes living systems.

Systems thinking is a way of making sense of the complexity of the world by looking at it in terms of wholes and relationships rather than pieces and parts. It differs from living systems thinking insofar as it is grounded in a mechanical rather than a living view of the world.

Technology refers to an organized and coherent system of techniques and practices (including tools and instruments) used to engage with the world. The kind of technology we adopt or create is based upon our epistemology, cosmology, and ontology.

Traditional Ecological Knowledge (TEK) is defined as knowledge and practices passed from generation to generation and informed by cultural memories, sensitivity to change, and values that include reciprocity. TEK aims to enable the graceful, intentional adaption to change. It is the original form of living systems thinking, focusing on sustainability and living rightly on the Earth. Intrinsic to TEK is the indigenous world view that humans are part of nature. Rooted in spiritual health, culture, and language, TEK is a lifeway (Berkes, 1993).

Thrivability refers to the potential of qualitative growth that supports full prosperity of the human and more-than-human world in full co-creative partnership between people and planet.

Understanding is the capacity to grasp and see phenomena from the inside out, in terms of processes rather than content, and in terms of being rather than function. It occurs when we see something as a whole and how multiple qualities or energies come together to form this whole "To understand is to see the way things belong together and to see why they are together as they are" according to Bennett (1992) in Elementary Systematics.

Vitality indicates the presence of aliveness and energy, qualities that are necessary to any living organism. It implies the ability to act from internal stimulus and energies and not only in response to external stimulus. It speaks to a life force or drive that comes from within (TRP course materials, 2014) and is related to the concept of intrinsic motivation in developmental psychology. Vitality has been defined as the capacity to live, grow, or develop, the characteristic, principle, or force that distinguishes living things from nonliving things and a healthy capacity for vigorous activity (Mang & Reed, 2012).

Viability refers to the ability to gain the nourishment required to stay alive over time. Increasing viability implies greater capacity and increased strength and intelligence to engage in effective,

mutually value-generating transactions with its proximate environment and gain greater realization from communication and transactions in a world in which things have a systemic and thereby interrelated nature. (TRP course materials, 2014).

Whole systems thinking, or holism, refers to the theory that the universe and especially living nature is correctly seen in terms of interacting wholes (such as living organisms) that are more than the sum of their elementary particles.

Interviews

This desktop research has been complemented by interviews with practitioners in the field who have been applying regenerative practice in various environments and who shared their insights and experience with us.

Interviewee 1: Dominique Hes, a regenerative practitioner and policy advisor in Melbourne, Australia.

Interviewee 2: Max Shkud, a regenerative practitioner, leadership and organizational development consultant and student and collaborator of Carol Sanford in San Francisco, US.

Interviewee 3: Pamela Mang, co-founder of Regenesis and Education Program Director of the Regenesis Institute for Regenerative Practice.

Interviewee 4: Lara Lee, an experienced independent board member, chief executive and former senior operating executive in global public companies who worked with Carol Sanford.

Interviewee 5: Johnnie Freeland, a regenerative practitioner, Indigenous systems navigator and Whakapapa Centered Designer of Ngāti Te Ata Waiohua and Ngāi Tuhoe Maori descent in New Zealand.

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