

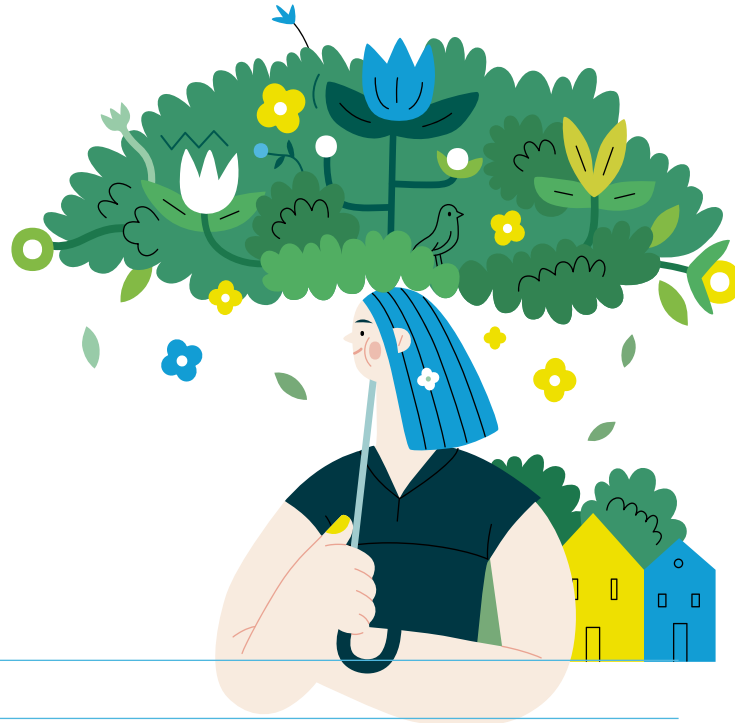
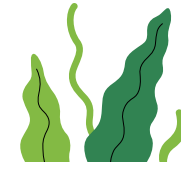
Trend book #15

The living and regenerative city

November 2024



Editorial



Perhaps it's time for a radical rethink of our relationship to the city and to the living world with it! For a long time, urban spaces were designed with a view to controlling and separation from nature. Natural elements were relegated to being ornamental, nuisances that need to be controlled or functional elements. This one-sided vision has not only impoverished our environments, it has also created a disconnect between humans and their natural surroundings.

The regenerative city calls for a paradigm shift. We should rethink our relationship with the living world, and see ourselves no longer as masters of our environment, but as players among others in a complex, interconnected ecosystem.

Imagine societies where the health of ecosystems, social health and human health are linked, where resilience matters more than performance, where sharing and mutual aid replace overexploitation and competition. Cities where ecological corridors matter as much as our mobility, where buildings and infrastructures are designed to welcome and encourage biodiversity.

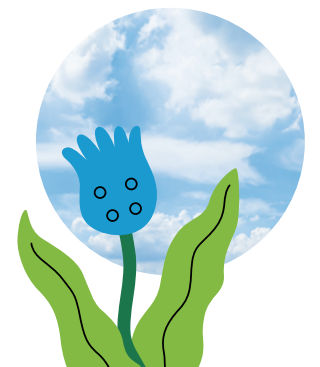
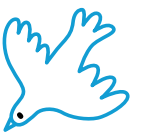
Such a vision implies a thorough transformation of our urban and architectural practices. We are no longer talking about simply "greening" our cities, but rather designing them as ecosystems in their own right, where each element – people, water, biomass, etc. – has its place and role to play. If we treat the city as a living organism,

this approach to urban metabolism allows us to develop regulatory mechanisms similar to those found in nature.

The benefits are far-reaching: cities will be more resilient, biodiversity will flourish, and the living environment will be healthier and more pleasant for all living things – human and non-human alike. The regenerative city is not a distant utopia, but an opportunity to reinvent our practices and find a new way of inhabiting our planet.

This Trend Note, "The living and regenerative city," seeks to explore the contribution of the regenerative approach to real estate and urban projects. With the help of concrete examples, feedback, studies and expert contributions, we explore the main levers and best practices that can be implemented to integrate into our projects the conditions that allow life to flourish, and that will ensure that our cities really are living.

We hope you enjoy reading it!



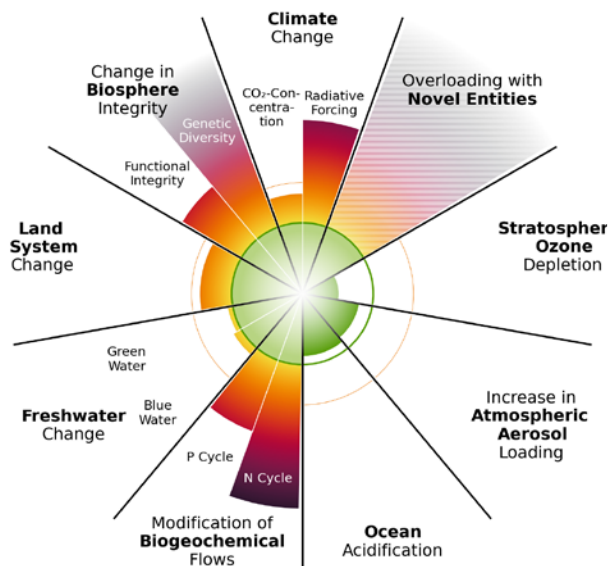
Context & issues

The regenerative approach forms part of a socio-ecological crisis affecting both the physical imbalances of our planet, including the collapse of biodiversity, and the increasing fragility of our societies. While humanity has progressively distanced itself from “nature” over the course of history, the regenerative approach calls for a paradigm shift in our relationship with the living world. The goal is for human activity to be “regenerative and fair” and to promote the development of societies while taking account of the planet’s limits.

Beyond the planet’s limits

For centuries, the Earth was thought of as an inexhaustible source of materials, yet scientists now warn us about the environmental impact of human activities, more specifically about the destabilisation of the Earth system’s equilibrium since the industrial revolution and the “Great Acceleration” (Steffen et al., 2007) following the Second World War.

Scientists have responded to these observations with theories that describe the Anthropocene as a new geological era or period in history, characterised by the significant geological influence of the human species on the environment, the biosphere and the Earth system as a whole.



In 2009, a team of around twenty international scientists led by Johan Rockström for the Stockholm Resilience Centre came up with the concept of planetary boundaries.

The scientists identified nine major processes that regulate explain the Earth system’s equilibrium. These processes are reflected in nine planetary boundaries that must not be crossed, at the risk of jeopardising this equilibrium and the planet’s habitability. According to the latest studies published, six of these nine boundaries have now exceeded their warning thresholds (Richardson et al., 2023).

✓ **Planetary boundaries**
Source: Richardson et al., Science Advances, 2023, published by Potsdam Institute for Climate Impact Research

Among these boundaries, the collapse of biodiversity is particularly alarming, with the current extinction rate outpacing the average for the last ten million years. (IPBES, 2019) Indeed, some scientists go as far as to predict a “sixth mass extinction.”

Ecosystems and the biosphere can only function through biodiversity. It helps to regulate the climate and the composition of the atmosphere and to supply clean water. It provides essential goods and services on which humanity depends for fundamental needs such as breathing, eating and healthcare.



FOCUS ON

Key figures from the 2019 IPBES report

Roughly

28%

of animal and plant species studied are now threatened with extinction, i.e. more than 1 million species

75%

of terrestrial surfaces have been severely altered by human activities

66%

of oceans are subject to increasingly significant cumulative impacts

More than

85%

of wetland surfaces have disappeared

In most biodiversity-rich tropical regions,

32M

hectares of primary or regenerating forest were lost between 2010 and 2015

50%

approximately half of the surface area of living coral reefs has been lost since the 1870s



The ecological ceiling and social justice

In spite of such a high level of ecological overshoot, we are still unable to meet the essential needs of all human beings.

Even though the global rate of extreme poverty has been reduced fourfold over the last three decades, as the world population has risen by 2.5 billion over the same period, “we are still a long way from widespread prosperity.” (Brunner et al., 2023). To access improved living conditions (housing, food, healthcare, education, etc.), people need a minimum income.

Yet 44% of the world’s population lives on less than \$5.50 a day (€150 per month), according to World Bank estimates (2017 data). In countries where the middle and wealthier classes have become richer, inequality has increased (Chancel et al., 2022).

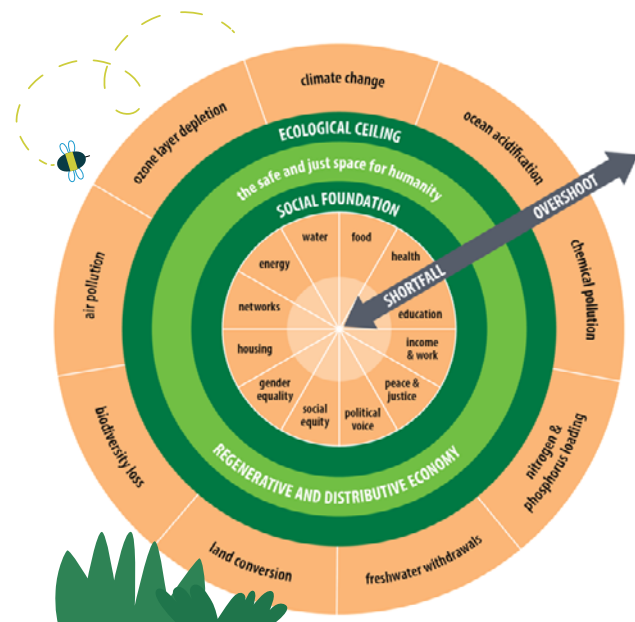


The reinvention of cooperation

The dominant production and economic model is rooted in on a culture focused on competitiveness, private property and the ownership of common assets.

This model may have helped to reduce extreme poverty in the world, but it is increasingly being challenged for its role in exacerbating economic and social inequalities, over-exploiting natural resources, and a short-term mindset that undermines long-term objectives such as preserving the habitability of our planet.

At the same time, a sense of social fragmentation is taking hold, as inequalities grow deeper, political polarisation increases, trust in institutions and experts is eroding, enclaves develop, social bonds weaken, situations of isolation become more common, and a decline in the democratic ideal is apparent.



✓ The doughnut created by economist Kate Raworth

“We are facing the most extraordinary challenge in human history. We need a fundamental shift in our approach and ambition. Simply reducing the negative impacts we cause on ecosystems in order to alleviate these pressures is no longer enough. We need to go further. We’re going to have to generate positive impacts, ideally net positive impacts, and even engage in the process of regeneration.”

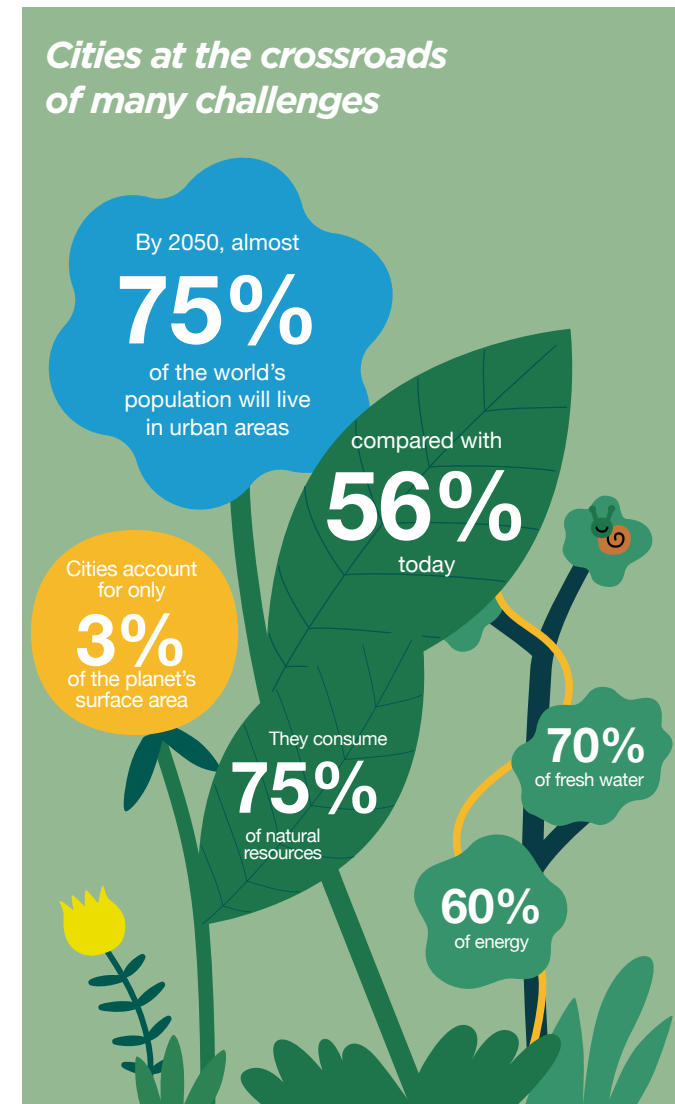
”
Christophe Sempels
Co-founder, CEO and head of action-research, Lumiä

In response to these social and ecological challenges, economist Kate Raworth has proposed a model that combines environmental issues with social justice: the “doughnut.”

The circle at the centre of the doughnut represents the “social floor,” a threshold to be maintained in terms of social minima (food, health, education, clean water, housing, access to decent work, gender equality, political representation, etc.). Beyond the outer circle is the “ecological ceiling” that must not be crossed (the planetary limits). The doughnut formed between these two rings represents the secure and just space for humanity, within which an inclusive and sustainable economy can thrive (Raworth, 2018).

GOOD TO KNOW

Cities at the crossroads of many challenges



✓ Matlosz et al., 2023

These trends combine with the growing vulnerability of populations to cumulative and overlapping global risks (climate, public health, geopolitics, the economy, etc.) and with governments that are finding it harder to provide for their populations.

The challenge for human societies, therefore, is to organise themselves in ways that will encourage cooperation, by enabling people to “oppose each other without slaughtering each other,” as Marcel Mauss puts it (Tyszler, 2016). The sociologist Alain Caillé argues that the challenge is to strike a balance between individual autonomy and collective interests in a “fragmented society” in which the common or collective good is sacrificed in favour of individual freedom.

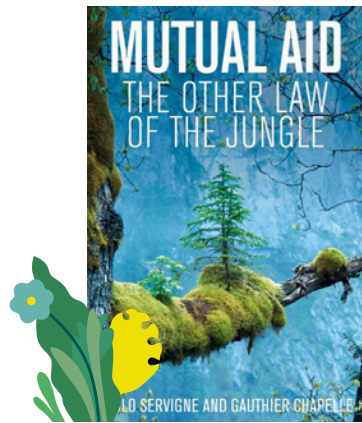
FURTHER READING



✓ **What lies ahead?**
7 Megatrends and their influence on construction, real estate and urban development



✓ **Trend Book #12**
Forging links, for convivial, supportive and inclusive communities



✓ Source: <https://www.fnac.com/livre-numerique/a16426064/Andrew-Brown-Mutual-Aid>

In response to these challenges, many academics are calling for a shift away from a culture of ownership and competition to a culture that values commons and sharing.

Pablo Servigne and Gauthier Chapelle, for example, urge us to look into “mutual aid, the other law of the jungle,” where the frame of reference is based on mutual aid, solidarity, the preservation of life’s great cycles and the preservation of ecological balance. Instead of the “war of all against all” model, these researchers propose a vision of coexistence based on “altruism,” “cooperation,” “solidarity” and “kindness.” (Servigne & Chapelle, 2019).

Although mutual aid is prevalent in times of crisis, with phenomena of extraordinary altruism, it is also very fragile and fades over time. Servigne and Chapelle explore the mechanisms that can be put in place to stabilise and strengthen “this natural propensity for mutual aid and altruism.”



“We are told that competition is natural, that it’s the law of the jungle. But in nature, you find a lot of altruism. It would be useful for the next century if we could all become skilled once again in helping each other.”

Pablo Servigne
Agronomist and doctor in biology

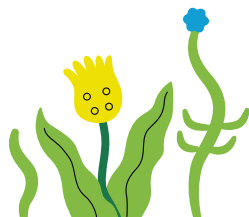
Following a trend towards privatisation, the idea of a degree of common ownership of essential goods is now gaining momentum, with a view to preserving them for the benefit of all.

The works of the American economist Elinor Ostrom, a Nobel Prize winner in 2009, show how common resources or common assets (such as forests, fishing grounds, oil deposits and pastures) can be managed more optimally by the communities who use them rather than by governments or private companies. This management is based on reciprocity and cooperation, and not on opportunism and the over-exploitation of common resources.



In recent years, the concept of “commons” has entered the urban and regional planning, reflecting a growing interest in producing, managing and sharing both tangible and intangible resources in a collaborative and open way (Kebir & Wallet, 2021).

Urban commons can provide solutions for unmet or inadequately met social needs, such as access to land and property, preservation of resources (fertile land, areas of biodiversity, etc.), strengthening social links, etc. (Diguët, 2019).



A crisis in our relations with the living world

Today’s environmental and social challenges can be seen as a reflection of a deeper crisis: that of our culture and our collective imagination.

The unique ability of human beings to imagine and share their visions through myths, stories and symbols has enabled societies to come together and carry out common projects.

And yet the prevailing culture and imagination of our time seem to promote lifestyles that are at odds with the fundamental principles of life: infinite growth (in a world of finite resources) and consumerism as the key to happiness.



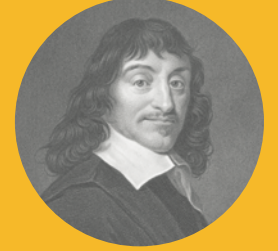
The separation of humans and nature has been a recurring theme throughout history:



Back in ancient Greece, the philosopher Aristotle (4th century BCE) distinguished between matter and non-human life, on the one hand, and human life, on the other



The 13th century scholar Roger Bacon was one of the originators of the scientific method, which allowed nature to be measured mathematically



In the 17th century, René Descartes, the founder of mechanism, claimed that technology makes us “the masters and possessors of nature”



The concepts of culture and society in opposition to nature were born in Europe in the 19th century.

The anthropologist Philippe Descola calls this vision “naturalism”: a relationship to the world that establishes human societies on one side and everything else, everything non-human, on the other. Nature was seen as a vast object that humans could make use of as they saw fit.

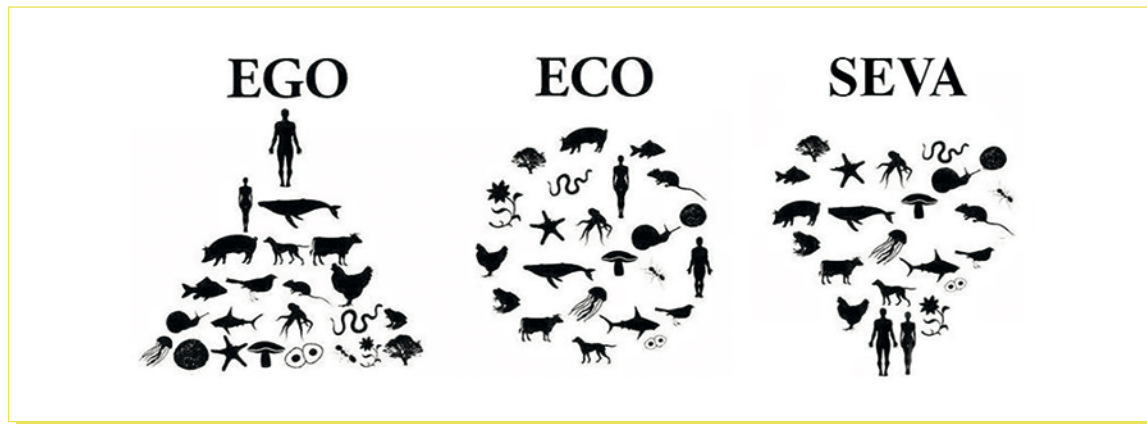
For Descola, this relationship with nature – “which we seek to control and which we conceive of as a resource outside ourselves” (Lecompte, 2022) – is a condition that leads to the degradation of our planet (accelerated destruction of living environments, collapse of biodiversity, climate change, disruption of the water cycle, etc.). He calls for a radical rethink of our relations with non-humans, which is “one of the great contemporary challenges, because it involves the viability of our future” (Descola & Morizot, 2023).

In a similar way, the philosopher Baptiste Morizot points out that the current ecological crisis is “a crisis in our relations with living beings,” a “crisis of sensibility” that has led to a profound disconnection with nature.

The “extractivist and financialized frenzy of the dominant political economy” has transformed the biosphere into “a reserve of resources available for production,” until they are depleted (Morizot, 2020). We urgently need to reconsider our relationship with all living things, human and non-human, without bringing the interests of humanity into conflict with those of nature.



Emerging from the current socio-ecological crisis implies a fundamental transformation of our place in the world. It is no longer a question of being master and possessor of nature (“ego” or “anthropocentric”), or of being incorporated into living environments in the same way as other living beings (“eco” or “biocentric”). It’s a question of “taking care of the environment and co-evolving with it, from a position of humility towards living things, but without relinquishing our own power to act”, or “seva.” (Brunel et al., 2023)



✓ Architect and urban designer Steffen Lehmann, 2010 – Source: Brunel et al. 2023

¹ EVA refers in Sanskrit to the attitude of selfless service, love, and humility towards living beings, in which humans take care of the Earth. (Brunel V., et al. 2023).

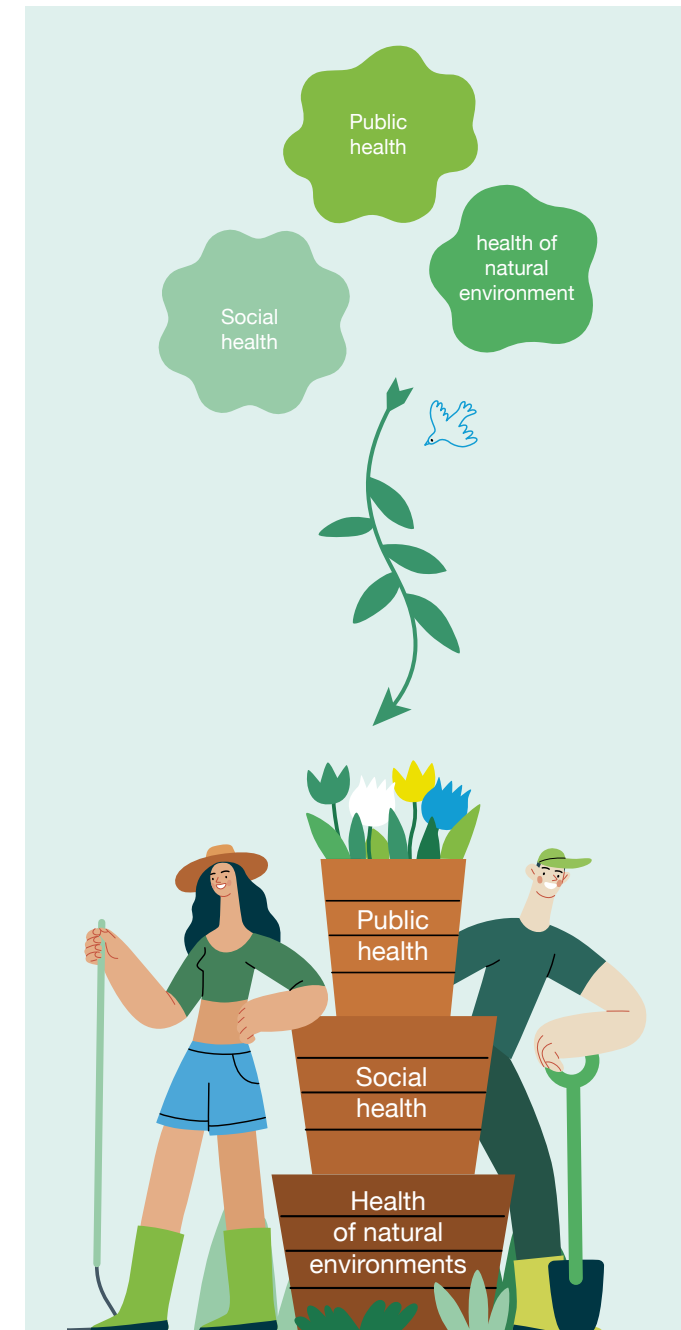
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The current ecological crisis, more than a crisis in human societies on the one hand, or in living beings on the other, is a crisis in our relations with living beings.
”

Baptiste Morizot
Philosopher (2020)



In the same perspective, the concept of “common health” (Michel Serres) refers to the fact that “public health” (the health of humans) depends on “social health” (mainly cohesion within human communities), which in turn

depends on the “health of natural environments.” We need to change our relationship with the living world so that we can find a model for society that combines the health of ecosystems, social health and human health.



✓ Illustration inspired by the Institut Michel Serres’ concept of common health

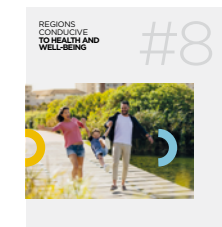
One Health for all

The “one world/one health” concept, which first appeared in 2004, was promoted by the World Organisation for Animal Health (WOAH), the World Health Organisation (WHO) and Food and Agriculture Organization of the United Nations (FAO). It recognised the interdependence of human, animal and environmental health. This approach aims to establish bridges and strengthen the connections between these three forms of health.



✓ The One Health concept
Source: INRAE

FURTHER READING



> Trend Book #8
Creating environments conducive to health and well-being

Urban planning for "regeneration": a paradigm shift?

Gone are the days when urban design was synonymous with urban sprawl, soil sealing, excessive consumption of raw materials, waste production, declining biodiversity, greenhouse gas emissions and urban heat islands. A radical overhaul of the way we approach urban planning and development is what regenerative urbanism is all about: drawing inspiration from natural processes and ecosystem functions to create autonomous, resilient urban spaces that can sustain themselves.



The changing role of nature in urban design

The way in which nature has become an integral part of the city mirrors changes in social concerns over time. The establishment of the first public gardens in the late 17th century – such as Hyde Park in London and the Tuileries Gardens in Paris – marked the beginning of a systematic effort to incorporate nature within cities.

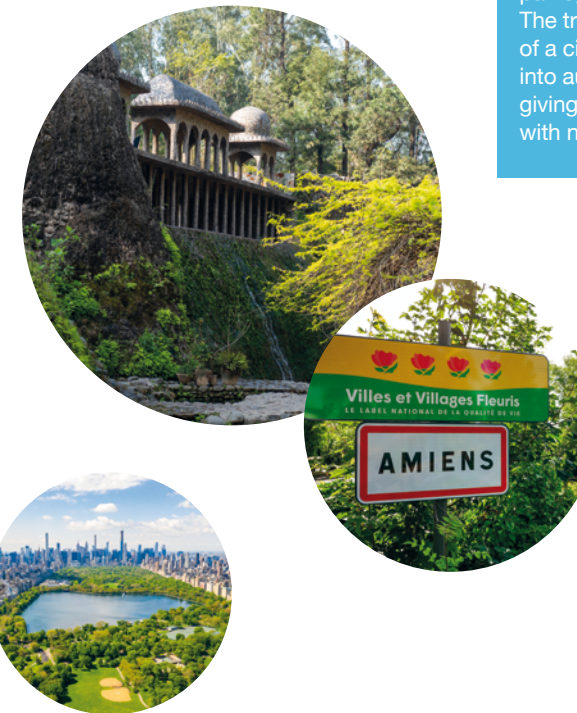
In the 19th century, the negative effects associated with industrialisation and rapid urban growth prompted a desire to beautify and improve urban spaces. Haussmann's transformation of Paris, with its ambitious greening policy, as well as the Central Park project in New York by landscape architects Frederick Law Olmsted and Calvert Vaux, both demonstrate a man-made, curated vision of nature. Urban parks became an essential part of city infrastructure, offering a tranquil escape from the industrial landscape.

Originally intended for hygiene and aesthetics, these green spaces served to beautify, provide shade and places for city dwellers to stroll.

This approach treats gardens, parks and tree-lined areas as a technical network and highlights their social function.



In the first half of the 20th century, modern architects and urban planners sought to reconcile humanity with nature, drawing inspiration from the early garden city concept, but reversed. They imagined a city where the ground would be comparable to a garden or park: "the city in a garden." Most modern developments are built on the outskirts of cities, akin to garden cities, yet some remarkable successes exist, such as Chandigarh in India.



INSPIRATION



Chandigarh, India: the city in a garden

The northern Indian city of Chandigarh was designed by the renowned French architect Le Corbusier and serves as a prime example of urban planning which places greenery at its core. The city's layout features large green areas, parks, gardens, tree-lined avenues and expanses of water. The trees rise taller than the buildings, giving the impression of a city blending into its natural surroundings. It is divided into autonomous sectors, each with its own green spaces, giving further emphasis to the concept of living in harmony with nature.



In the 1970s and 1980s, urban development policies began to increasingly incorporate green spaces, addressing new concerns such as the city's image and its potential for tourism. As a result, the concept of "nature in the city" gained widespread popularity among the public and became a key focus for municipalities aspiring to earn the prestigious French label, "Villes et Villages Fleuris," awarded to towns and villages particularly committed to floral and green space embellishments.

With the rise of sustainable urbanism in the 1990s, green space planning and development policies intensified.

This period saw the emergence of Landscape Urbanism in the United States, introducing an approach to urban planning that prioritised nature and landscapes over traditional building-focused development.

The practice also gained traction in France, where large parks and urbanised areas were being developed on a metropolitan scale, reflecting a similar shift towards integrating nature into urban environments.



INSPIRATION

Parc des Hauteurs, a project to enhance the landscape, urban fabric and socio-economic value of a plateau in the outskirts of Paris

The Parc des Hauteurs project, located on the Romainville Plateau northeast of Paris, which rises to an elevation of around 100 meters, spans the territories of Est Ensemble (including the towns of Le Pré-Saint-Gervais, Pantin, Les Lilas, Romainville, Noisy-le-Sec, Montreuil and Bagnolet), parts of Paris (19th and 20th districts), as well as the towns of Rosny-sous-Bois and Fontenay-sous-Bois.

The initiative aims to reclaim and open up various natural and recreational areas to the public, linked by a 30-kilometre “plateau walk.” This project seeks to reconnect the area with its natural heritage, enhancing green spaces, waterways, and biodiversity. It also serves as a model of sustainable urban development that respects both residents and the environment, emphasising active modes of transportation and promoting a harmonious relationship between urban life and nature.

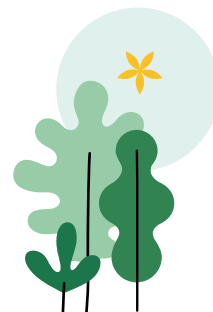


✓ *The Promenade Haute du Grand Paris: landscape design and its connection to the Parc des Hauteurs*
Source: Institut Paris Région

Green space planning and development policies underwent a major shift in the 2000s, driven by advances in ecology and heightened awareness of environmental challenges.

Today, the urgency to address climate change, biodiversity loss and the need to adapt urban areas to these impacts has

fundamentally reshaped the way we design spaces. This shift focuses on fostering biodiversity and creating ecological corridors that allow plant and animal species to move freely. In cities, greenery now manifests in various innovative forms, including green buildings, urban farms, permeable streets, community gardens, urban micro-forests and tree-lined pathways.



INSPIRATION

The City of Paris bioclimatic local urban plan: nature everywhere

Paris currently offers 1,883 hectares of green spaces open to the public, providing 8.6 m² of green space per inhabitant. The city’s Local Urban Plan aims to raise this ratio to 10 m² per inhabitant by 2040 by adding 300 hectares of green areas. This goal reflects a more holistic vision of integrating nature into urban life, encompassing not just traditional gardens and parks, but also the creation of urban forests, the greening of streets and deseeding school playgrounds to create a more sustainable and nature-friendly urban environment.



Environmental and social values are deeply intertwined, shaping new ways of coexisting that are fundamentally connected to our interaction with non-human life.



Take an urban farm, for instance: beyond producing fruit and vegetables, it serves as a hub for strengthening community ties, offering social reintegration opportunities, and providing educational resources. The concept of “nature in the city” has evolved from being merely aesthetic or functional to becoming an integral and vital part of urban life, essential for fostering sustainability and well-being in our environments.

Emerging trends in ecological urbanism

Emerging forms of ecological urbanism reflect a growing shift toward more sustainable, self-sufficient, and resilient urban models, central to an ecological regeneration approach.

Since the 1990s, the **concept of sustainable development** has become a fundamental aspect of urban planning. Urban planners began adopting holistic approaches to balance the economic, social, and environmental aspects of urban growth. Building on this trend, the 2000s witnessed the rise of eco-neighbourhoods – urban areas designed to minimise environmental impact. Notable examples include the Vauban district in Freiburg, Germany, and London’s BedZED (Beddington Zero Energy Development) eco-neighbourhood, both of which became benchmarks for environmentally-conscious urban design.



✓ *The Vauban district in Freiburg (Germany)*



In the past decade, ecological urbanism has continued to evolve, placing greater emphasis on integrating nature into urban environments. This has been demonstrated by the incorporation of green roofs and facades, ecological corridors and sustainable rainwater management systems.

This was also the period that saw the development of the urban model of the “sponge city” in China.

INSPIRATION

The sponge city

First developed in China in the 2010s, the “sponge city” model offers a transformative approach to addressing urban challenges like flooding and water scarcity.

This concept enhances urban resilience by incorporating green infrastructure designed to absorb, store, purify and reuse rainwater. It relies on nature-based solutions such as absorbent parks, green roofs, rain gardens, artificial wetlands and permeable pavements. By promoting natural infiltration and water retention, sponge cities reduce flood risks, alleviate urban heat islands and boost the availability of water for local needs. In 2015, the Chinese government launched a nationwide “Sponge City” programme, putting this approach to the test in 30 pilot cities, including Zhengzhou, situated along the Yellow River.



✓ The city of Zhengzhou, China

In recent years, as the perception of a fragile and increasingly threatened planetary ecosystem grows, several key concepts have been rediscovered and redefined.

Among these, territorial resilience has gained prominence, describing a territory’s ability – encompassing its inhabitants, institutions, businesses, infrastructure and networks – to function autonomously in the face of major shocks such as floods, pandemics or cyber-attacks. Beyond coping with immediate crises, territorial resilience also addresses the chronic stresses

that undermine urban life, such as air pollution, social inequality and ageing infrastructure. It focuses on adapting to long-term challenges driven by irreversible trends, including climate change, resource depletion and biodiversity loss.

This paradigm is increasingly being embraced by regions worldwide as a foundational framework and driver for transitioning economies and lifestyles. It emphasises the need for development models that respect planetary boundaries while ensuring the fulfilment of essential human needs, such as housing, health, food and education.

In parallel with this renewed focus on natural resources, urban metabolism is gaining ground, approaching the city as a living organism, analysing the flow of materials, energy, water and nutrients through the urban space. This approach views the city as a living organism, analysing the flows of materials, energy, water, and nutrients within urban systems. Thanks to urban metabolism, we can better understand and optimise these processes, reducing waste and enhancing resource reuse.

By integrating principles of circularity and favouring closed cycles, urban metabolism aims to minimise cities’ carbon footprints and promote more resilient, sustainable forms of development.



FURTHER READING



> **Trend Book #10**
Resilience, the future of sustainable territories

On a smaller scale, bioregionalism – a once-utopian environmental vision that first emerged on the West Coast of the United States in the 1970s – is experiencing a resurgence and undergoing revision.

This concept is based on the idea that all human activity should align with the ecological and cultural characteristics of “bioregions” – areas defined by natural boundaries, such as watersheds or ecosystems, rather than arbitrary political borders. Bioregionalism promotes local resource management, the protection of natural habitats and the adoption of environmentally sustainable lifestyles, tailored to respect each region’s unique ecological capacities and limitations.



Urban regeneration is part of a broader trend toward incorporating ecological processes into the urban fabric.

What sets it apart is its emphasis on the living being at the core of urban design and construction strategies, and its aim to create a virtuous circle centred on living beings, with net positive impacts on ecosystems and society. This approach is based on the ability of living organisms to repair, self-renew and regenerate themselves, and consists in creating or recreating conditions that enable both non-human life (ecological regeneration) and

human life (cultural and social regeneration) to express their full latent potential.

Unlike renaturation or ecological restoration, which aim to restore a deteriorated environment to a reference state through human intervention, regeneration reinforces the intrinsic self-renewal mechanisms of living organisms, by reactivating ecological processes that have been damaged or overexploited as a consequence of human activity, and by allowing living systems to thrive according to their own dynamics, without human intervention (Sempels & Thuillier, 2022).



Renaturation, or ecological restoration, derived from the Latin restaurare, meaning to repair or renew, is defined as any activity aimed at re-establishing an ecosystem in relation to a reference model, as defined by the International Union for Conservation of Nature (IUCN).

This restorative approach, while essential, focuses on returning an ecosystem to a previous state of ecological balance made possible through human intervention (for instance, cleaning up a river contaminated by industrial pollution to restore its original ecological conditions represents a restorative action).

The Nature Restoration Law, a key component of the European Green Deal

Adopted on June 17 2024, the aim of these regulations is to implement restoration measures across EU member states, to cover:

at least
20%
of the EU's terrestrial

and at least:
20%
marine areas by 2030

and by
2050
all ecosystems in need of restoration



Intermediate targets have been set to achieve this goal – restoring

30%
of degraded habitats by 2030

90%
by 2050

60%
by 2040 with priority given to Natura 2000 sites until

2030

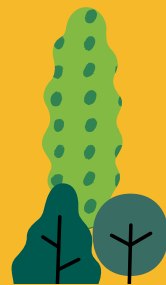
Each member state must submit national restoration plans to the European Commission within two years, outlining how it will meet these targets.

By 2030, the EU is also aiming to restore at least

25,000 km
of free-flowing waterways, as well as pollinators, agricultural and forest ecosystems

With an additional
3 Billion
trees planted by 2030

Each member state must submit national restoration plans to the European Commission within two years, outlining how it will meet these targets.



Levels of maturity in incorporating nature in urban planning in ecological urbanism trends

Various currents in ecological urbanism have led to a range of ways of integrating nature and vegetation into urban planning practices. According to Philippe Clergeau, emeritus professor at France's National Museum of Natural History, and Eduardo Blanco, a project manager at Energy Cities, these approaches vary in maturity and complexity. (Clergeau P., Blanco E., 2022).



The first tier involves extensively planting vegetation to meet the needs of city dwellers. This urban greening delivers essential benefits such as cooling the city, managing rainwater and improving public health. Widely adopted by municipalities, this approach is intended to **make the city more "liveable"**.

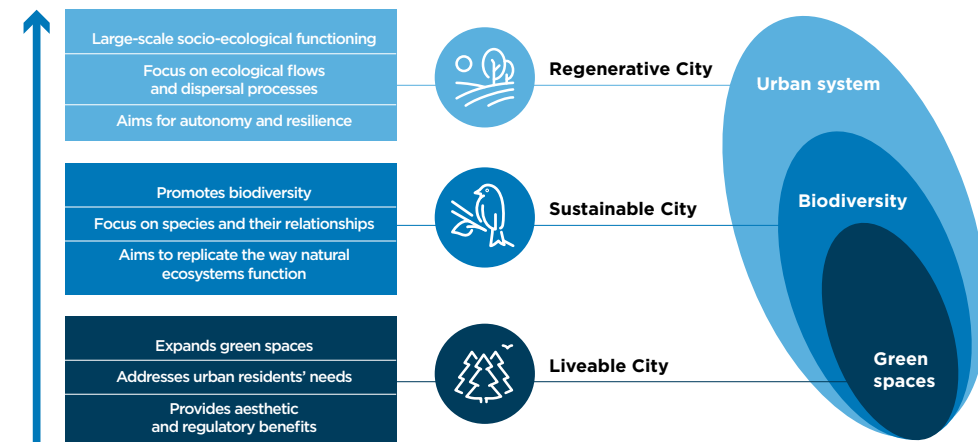


The second tier broadens the scope by introducing biodiversity, favouring local and naturally occurring species. Instead of restricting itself to a limited number of plants species available from nurseries, this approach promotes a rich variety of plant species, offering greater ecological stability than monocultures of individual species (rows of plane trees, sedum rooftops). The aim is to **create a more sustainable and resilient city.**



The third tier goes a step further by focusing on the self-sustenance of planted areas. The aim is to restore urban ecosystems to resemble natural systems as closely as possible, encouraging designers to create self-sustaining urban systems. In this approach, planted areas, neighbourhoods and even the city as a whole are designed to **self-regenerate** by taking account of ecological functions such as food chains and ecological corridors.

Diagram of the three levels of maturity of the "nature in the city" issue



✓ Clergeau and Blanco, 2022

The main principles of regenerative urban planning

Regenerative design stems from the environmental movements and ecological theories of the 1970s. American architect John Tillman Lyle, a pioneer of the movement, applied the concept to architecture and urban planning, and formalised it. He identified five core principles of regenerative design, which he implemented in the design of the **Center for Regenerative Studies** between 1976 and 1994. For Lyle, regenerative design means that the ecosystem concept should guide the relationship between humanity and nature, systematically incorporated into the design of human environments (Foissac et al. 2022).

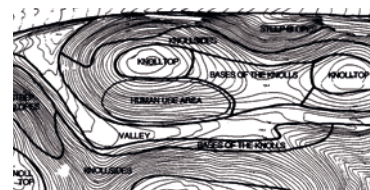
INSPIRATION

The John T. Lyle Center for Regenerative Studies

Located on the campus of California State Polytechnic University in Pomona, California, the project originated from a challenge presented to its students: to design a cooperative community where daily activities integrate available renewable resources, without causing damage to the environment. After several years of research carried out by a multidisciplinary team, the centre officially opened in 1994. The centre's design draws on the varied topography to create favourable microclimates. The use of semi-underground buildings and structures on stilts optimises energy efficiency and incorporates technologies such as earth tubes to cool the air. Water, energy and nutrient flows are designed to be cyclical, transforming waste into resources. The facility features integrated aquaculture and agricultural systems. Wastewater treatment ponds use water hyacinths to extract nutrients, and the site's slopes are terraced for agriculture. Active and passive solar devices, climbing plants on trellises and mobile Glauber salt panels complete the system, maximising the capture of solar energy and improving thermal regulation.

American architect John T. Lyle's principles of regenerative design

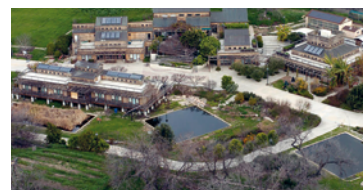
- 1 Let nature do the work
- 2 Consider nature as both model and context
- 3 Aggregate and not isolate
- 4 Seeking optimum levels for multiple functions
- 5 Match technology to need



✓ **Topographical analysis**
Source: <https://webpages.uidaho.edu/larc301/lectures/regen.htm>

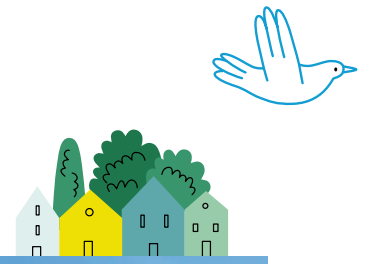


✓ **Masterplan**
Source: <https://www.cpp.edu/env/lyle/about/history.shtml>

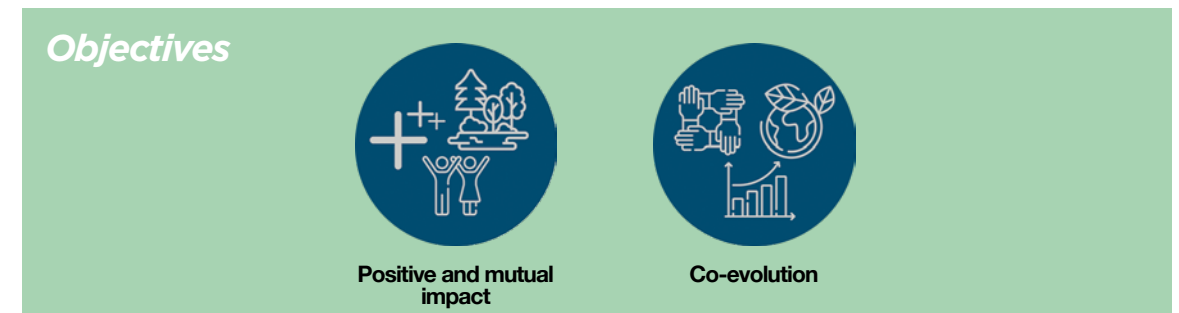
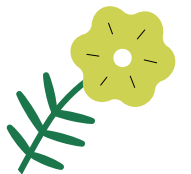


✓ **Current view**
Source: <https://ghvdesigns.myportfolio.com/john-t-lyle-center-for-regenerative-studies>

The concept was later more widely discussed in the field of urban planning and architecture, mainly in the English-speaking world, amid the rapidly growing trend towards green building and planning (Blanco et al. 2021). Professor Chrisna Du Plessis, from the University of Pretoria, South Africa, identifies "philosophical starting points" on which regenerative approaches are based (Foissac et al. 2022):



Regenerative urbanism – based on regenerative design – focuses on co-evolution and harmony between social, cultural and ecological systems. These principles are applied to the wider context of urban planning, encompassing public policy, infrastructure and communities. Researchers Eduardo Blanco, Kalina Raskin and Philippe Clergeau outline five theoretical principles for a regenerative urban project (Blanco et al. 2021), based on the analysis of a body of scientific articles:



Key principles of the approach:



A project with positive and mutual impact: the regenerative urban project must aim to have a positive impact on its entire ecological and social ecosystem. The positive benefits of the project must be mutual for people and their environment.



A co-evolutionary project: a regenerative project should re-establish links between urban and ecological systems, encouraging a long-term process of regeneration. The urban and ecological systems must evolve together over time to improve conditions of health and functioning.



Key principles of the design process



Site diagnosis: regenerative projects must be based on a systemic understanding of the reality, history and context of the site. This must include an understanding of how the ecological, social and economic systems interrelate. The urban system needs to be accepted and understood as a complex social ecosystem and must be integrated with local rationales and real needs.



A participative, community-based process: local stakeholders should be engaged in the diagnosis and design phases, harnessing their knowledge of the local context and involving them in the implementation and continuity of the project.



An ongoing process: the regenerative urban project is evolving and ongoing. Regeneration and the intended positive impacts are not achieved when the project is delivered; it is an ongoing, long-term process.

The authors use these principles to define regenerative urban projects:

“Regenerative urban projects help to improve the conditions of the project’s socio-ecosystem as a whole. They integrate ecosystemic and urban approaches to develop functional, resilient and evolving socio-ecosystems. This is achieved through a systemic diagnosis of the site’s social and ecological dynamics before any design work is carried out. This diagnosis enables us to understand the site’s logics, needs and aspirations and to define the criteria that will guide the choice of development strategies with a positive impact. The diagnosis and design must be participatory, drawing on local knowledge and establishing commitment to the project. Finally, the regenerative urban project catalyses long-term change and calls for commitment and ongoing monitoring.”



The objective of regenerative urban planning is not only to create ecosystems within the city, but also to turn the city into a vast social and environmental system that can sustain itself.

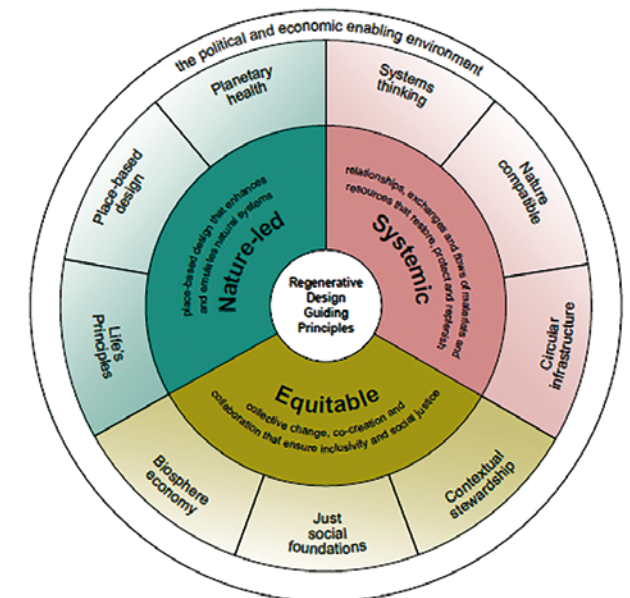


Blanco E. & Clergeau P. (2022)
Eduardo Blanco is an urban planning engineer and ecologist; Philippe Clergeau is emeritus professor at the National Museum of Natural History

A number of players offer guidelines and benchmarks to help put these principles into action, such as ARUP, an engineering consultancy, which published a guide to regenerative design in early 2024.

The aim is to encourage professionals in the built environment to reconsider their

approaches by working with a better understanding of nature and our impact on it. It presents a regenerative vision guided by “principles of life”, in which human and non-human living beings coexist harmoniously. It also introduces a benchmark to help steer action in society, the economy, politics and technology.



✓ Principles of regenerative design by ARUP, 2024

The regenerative approach in action

The regenerative approach brings with it a major paradigm shift in terms of the objective, the approach and the method used, compared to traditional territorial projects. Valérie Brunel and Sarah Dubreuil (2023) write that the regenerative consultant's role is to "work with local communities to strengthen the capacity for action, nurture the area's vitality and the development of its unique and singular character." Rather than "solving" local problems, regenerative development focuses on catalysing the community's capacities for self-healing. Once the concept has been established, how can it be applied to real estate and urban projects?

Developments in standards and regulations

In recent decades, there has been a considerable strengthening of standards and regulations for the protection of ecological ecosystems, which reflects a growing awareness of environmental issues on a global scale.

This section is not exhaustive. It provides an overview of the main regulatory and standard-setting instruments shaping environmental policies and guiding the practices of public and private players.



AT GLOBAL LEVEL

The COP 28

Meeting of the Conference of the Parties on Climate Change was held in Dubai in December 2023. An agreement was reached for the first time calling for a "transition away from fossil fuels in energy systems" by 2050. A loss and damage fund was set up to provide financial compensation to countries vulnerable to climate-related disasters (\$655 million).

COP 15

The meeting of the Conference of the Parties to the Convention on Biological Diversity, held in Montreal in December 2022, defined a new global framework targeting biodiversity preservation and putting it on course for regeneration. Key objectives included: a target to protect 20% of the world's land and seas by 2030 (compared with only 17% of land and 8% of seas in 2022); reducing by half the risks from pesticides and highly hazardous chemicals by 2030; and a commitment by wealthy countries to provide \$20 billion a year by 2025 and \$30 billion a year by 2030 to developing countries, i.e. three times current international aid for biodiversity. COP 16 is being held in Bogota, Colombia in November 2024.

The "Nature Positive" goal: a global goal for biodiversity

In 2022, the Kunming-Montreal Global Biodiversity Framework introduced a global target for biodiversity, committing businesses, governments and other stakeholders to halt and reverse biodiversity loss by 2030. The initiative to secure a "Nature Positive" world was established to support this ambition, offering practical tools and clear guidance to enable everyone to contribute.



EUROPE

European Green Deal, 2019

Sets a 55% reduction in greenhouse gas emissions at 55% by 2030 compared with 1990 levels.

CSRD (Corporate Sustainability Reporting Directive), came into force in 2024

New extra-financial reporting tool for European companies, improving information on ESG (Environment, Social and Governance) criteria.

Drinking Water Directive, 2024

Harmonises quality standards for drinking water in the EU. The directive strengthens quality standards, introduces a risk-based approach for water safety management, improves information for consumers and promotes universal access to drinking water for all. The new provisions will take effect as of December 31, 2026.

European LIFE funding programme

A European Commission financial instrument dedicated to supporting innovative projects in the fields of the environment and climate, whether private or public. The LIFE programme has been allocated a budget of €5.4 billion for the period 2021-2027, divided into 4 sub-programmes: (1) nature and biodiversity, (2) circular economy and quality of life, (3) climate change mitigation and adaptation, (4) clean energy transition.

European Climate Law 2021

Codifies the goal of achieving carbon neutrality by 2050.

European taxonomy, partially in effect in 2022, then fully in 2023

Classification system to characterise the environmental contribution of a company's activities, focusing on climate change mitigation and adaptation, water conservation, the circular economy, pollution and biodiversity.

SFDR (Sustainable Finance Disclosure Regulation), 2021

Regulation that seeks to provide greater transparency in terms of social and environmental responsibility on financial markets.

The European Biodiversity Strategy for 2030

Presented by the European Commission in May 2020 and adopted by the European Parliament in June 2021, aims to protect at least 30% of the EU land area and 30% of the EU sea area, restore degraded ecosystems, in particular by planting 3 billion trees, reduce the use of chemical pesticides by 50%, and devote at least 25% of agricultural land to organic farming. This strategy also enshrines the target of achieving ZNA (Zero Net Artificialisation) by 2050.

Nature Restoration Law, adopted in June 2024

Aims to restore at least 20% of the EU's degraded land and seas by 2030 and to restore all degraded ecosystems by 2050.

THE UNITED STATES

The America the Beautiful Initiative (2021)

The objective of the first report issued by the Biden-Harris administration was to conserve American land and oceans by 2030 (the “30x30” goal). The report stressed the importance of dialogue, engagement and continuing collaboration between states, tribal nations, private landowners and local communities.

Strengthening of the Endangered Species Act (ESA)

A federal law adopted in 1973 providing for a programme to conserve threatened and endangered plants and animals and the habitats in which they are found. The Biden-Harris administration reversed or revised several measures that had weakened the ESA taken by the previous administration.

ASIA

(focus on Singapore)

Environmental Protection and Management Act (EPMA), 1999

The EPMA is a cornerstone of Singapore’s environmental legislation. As an essential regulatory framework, it establishes rigorous standards for environmental protection and natural resource management. Its scope encompasses the regulation and control of activities liable to cause environmental damage, such as air, water and soil pollution. This legislation also provides guidelines for preventing, controlling and mitigating environmental pollution, as well as promoting the sustainable use of natural resources.

CRD reporting

In early 2024, Singapore unveiled new climate reporting requirements for listed and large unlisted companies, aligned with the IFRS standards of the International Sustainability Standards Board (ISSB). As in Europe, these measures will be implemented gradually starting in 2025.

LATIN AMERICA

Rights of Nature

Ecuador and Bolivia pioneered the principle of granting legal rights to nature. In 2008, Ecuador was the first ever country to enshrine the rights of nature in its constitution. This constitutional recognition means that nature is considered a legal entity with its own rights. In 2010, Bolivia followed this example by adopting the ‘Law of Mother Earth’, which recognises eleven fundamental rights for nature, including the right to live and exist.

Environmental crimes

Several countries have expanded their laws to tackle ‘environmental crimes’. Colombia, for example, approved a law on environmental crimes in 2021 which criminalises deforestation and other related offences. In 2023, Uruguay approved a bill to include environmental crimes in its Penal Code, which criminalised air, water and soil pollution.

Water protection

In Guatemala, the IUCN (International Union for Conservation of Nature) has worked on water security strategies, increasing institutional capacity and updating the regulatory framework for water resource management.



Applying the regenerative approach to the life cycle of a project

Implementing regenerative approaches in an area aims to (re)create the conditions that allow our ecosystems or environments to flourish through their own natural dynamics, without human intervention.

If we establish this virtuous circle centred on living organisms on an urban scale, we will be designing cities through nature and in harmony with living organisms. This section aims to suggest operational approaches for each stage in the life cycle of a regenerative project for real estate, urban or rural development.



✓ *St Andrews, Bromley-by-Bow, London*
Source: *Townshed Landscape Architects*

Diagnosis phase

The regenerative approach calls for a systematic diagnosis of the site to understand how the ecological, social and economic systems are interrelated.

This diagnosis helps us to understand the site’s logic and needs, so that we can determine the criteria that will guide the choice of operational strategies. It should be participatory, in order to draw on local knowledge.



Agro-pedo-biological diagnosis

Quentin Vincent, a specialist in soil ecology and co-founder of the start-up Sol&co, is encouraging agro-pedo-biological diagnoses to be carried out on urban soils in order to take better account of the potential of each plot and optimise its potential uses. The aim is to carry out a threefold diagnosis: pedological (on the organisation of the soil), agronomic (mainly on its fertility) and biological (on its biodiversity).

Principles of a regenerative development approach for a region, according to the Regenes Institute

- 1 Focus on the area, not the project
- 2 Focus on potential, not problems
- 3 Aim to contribute to the development of the capacities of a given system, so it can improve its vitality and support its own evolution
- 4 Capitalise on the history of the place and the experience it has offered
- 5 Ensure genuine participation

INSPIRATION

The European SOS 4 LIFE
(Save Our Soils for LIFE) project

The EU-funded project SOS 4 LIFE (Save Our Soils for LIFE) aims to demonstrate the feasibility of the European Zero Net Artificialisation strategy at municipal level, by focusing research on the ecosystem services provided by soils. A specific study in Carpi, Italy, assessed the quantity and quality of ecosystem services offered by different types of undeveloped land. Six indicators were assessed to show the services that can be provided by soils: soil biodiversity, buffering capacity, carbon storage, agricultural production, water regulation and water storage. This project has also allowed the development of tools to enable the ecosystem services provided by soils to be factored into the urban planning process.

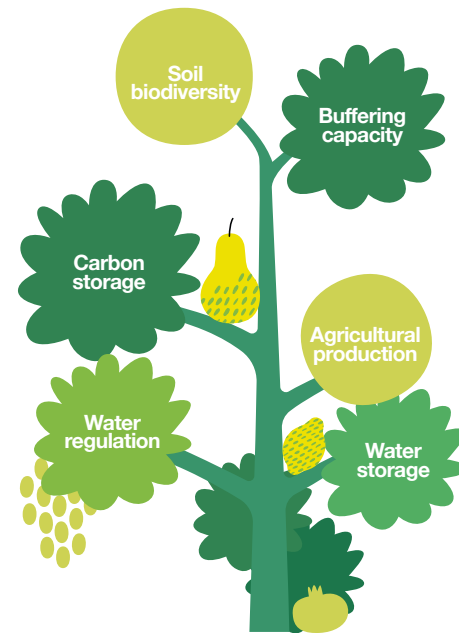


Illustration of the six indicators that were assessed to show the ecosystem services provided by soils



Ecosystem services are the services provided by nature and the benefits that humans derive from ecosystems.

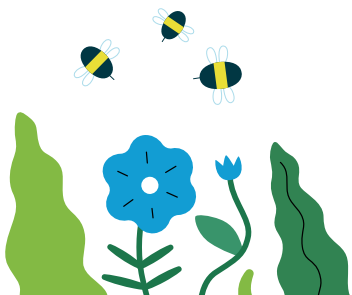


WWF (2016)

INSPIRATION

ELAN, support for enabling the ecological transition of local areas and real estate projects

Elan, a consultant in sustainable real estate and subsidiary of Bouygues Construction, offers an analysis of the ecosystem services provided by real estate projects to help create more sustainable living spaces in harmony with the living world. Through this approach, it is possible to measure and highlight the ecosystem services provided by a building/property development in relation to the existing site, at different design phases.



Design phase

The regenerative approach prompts us to rethink how a building can make a positive environmental and social contribution to its area, rather than the other way around.

Urban project objectives are modified, with non-built space becoming as important as built areas. Biodiversity and landscape (inventories, indicators, soil and habitat quality, etc.) are combined with a low-impact economy (soft mobility, short supply chains, bio-sourced materials); local stakeholders play a key role. (Clergeau, Blanco, 2022)

Valérie Brunel and Sarah Dubreuil (2023) have produced a table summarising the specific features of the regenerative approach to launching a project:



Non-regenerative approach

Regenerative approach

Aim of the project

Design of the project distinct from the context, focused on the final service provided

Integrated design in socio-ecosystems aimed at enhancing vitality.

Broadening of challenges to be resolved and multisolving

Design philosophy

Approach separating product/service design and use, linear

Systemic, emergent, local approach, based on the stakeholder system

Work at the level of the conditions of emergence

Criteria for project selection and investment

Degradation of socio-ecosystems not considered in decision-making criteria

The dynamics of socio-ecosystems and enhancing their vitality are driving forces in the development of the project (not among the options)

Resources and energy

Resource constraints are financial and material

Resource constraints are first and foremost social (time needed for mutual understanding and co-creation) and ecological (time needed to restore soils, trees, etc.).

Technological choice

High-performance technical solution

A robust solution that uses local resources in varying conditions

INSPIRATION

The EKKO residence, a collective, eco-friendly living space, Niel mixed development zone, Bordeaux

The EKKO residence, located in the Bastide Niel eco-neighbourhood in Bordeaux, France, is a project of the Launay Aquitaine group, designed by architect Duncan Lewis (Scape Architecture) that was delivered in July 2021. The residence has been designed to encourage people to live together, offering a tranquil green cocoon (including a three-dimensional communal garden of over 6,000 m³) and a number of shared spaces (including a recreation room with a large roof-top terrace, and an urban vegetable garden).

EKKO stands out for its ecological approach, with a focus on biodiversity and energy saving. It consists of 49 apartments constructed using bio-sourced materials, such as wood and hempcrete, to help regulate summer temperatures. The use of light tones and mineral materials for the roof and façades helps to reflect sunlight, further reducing the building's temperature rise in summer. The project also incorporates specific eco-friendly features such as the use of glazed flat tiles for the "Cool Roof" and ventilated terracotta shingles to improve thermal comfort. EKKO provides 100% of its residents' thermal needs and 50% of their electrical needs with renewable energy, thanks largely to a photovoltaic plant. The ventilated facades and three-dimensional garden create a harmonious, welcoming living environment, combining mineral features with greenery.



I ask why can't we design a building like a tree? A building that makes oxygen, fixes nitrogen, isolates carbon, distils water, strengthens soils, uses solar energy, produces food, creates microclimates, changes colours with the seasons. This means using nature as a model and mentor, not as an inconvenience. It's a delicious perspective.



Duncan Lewis (2022)
Architect, Scape Architecture



✓ **EKKO Bordeaux**
© Erlus Moeding

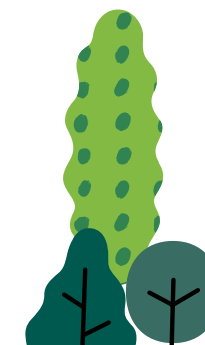


INSPIRATION

Régén'ère Azur, a call for projects for pilot urban regeneration sites in France

In 2024, the Club des Entrepreneurs du Pays de Grasse, in collaboration with the Lumiã research-action centre and the sociology consultancy Change It Use It, launched the "Developing a Pilot Site for Urban Regeneration" initiative. This call for projects seeks to identify landowners in the Cap Azur metropolitan authority area who wish to undertake an ecological and social regeneration project. The objectives include minimising negative impacts to unavoidable levels; generating positive impacts on ecosystems and human communities by reconnecting with the living world; experimenting with new cooperative ventures and strategic alliances between businesses and local authorities; and creating new tools for business and regional development designed to implement regenerative practices and models.

The winning entry was the 11.8-hectare site of the Grasse Hospital. Projects for restructuring the various technical areas, installing photovoltaic canopies over the car parks, greening the roofs to address the issues of heat islands and enhancing the green spaces will be reviewed to incorporate the principles of regeneration. The site holds significant potential for socio-ecological renewal, not only by improving environmental health but also by "caring" for its users (patients, carers, visitors, healthcare professionals and administrative staff) by allowing them to develop activities connected to natural ecosystems.



✓ **Grasse Hospital**
Source: ch-grasse.fr

Designing projects to incorporate micro-habitats for flora and fauna

Integrating micro-habitats for flora and fauna into construction and development projects is an approach that promotes biodiversity and ecological resilience in both urban and rural environments.

These micro-habitats, which can be located in various elements such as walls, parapet walls, facades, roofs, terraces, gardens, natural and artificial ponds, wetlands,

etc., provide vital refuges for a variety of animal and plant species. These spaces help to create ecological corridors (which facilitate the movement and survival of species) while also contributing to improving air quality, regulating local temperatures and enriching the living environment of human communities. By raising public awareness of the importance of biodiversity, these projects also strengthen the connection between humans and other living beings.

INSPIRATION

Habitat Royale, a residential project with a “net gain in biodiversity” in the Netherlands

In the Netherlands, near Beatrix Park in Amsterdam’s Beethoven district, Habitat Royale is an ambitious 94-home residential project that is strongly committed to biodiversity. It was designed according to the “Nature First” concept, with ecological conditions being key factors in its design. Dedicated spaces have been created for natural habitats, plants and animals, which will bring greater biodiversity to the area. The facade will provide micro-habitats for specific species depending on their orientation and height, and the planting of rich and diverse vegetation will give year-round food and shelter to the various species.

Another distinctive feature of Habitat Royale is its holistic approach to sustainable construction. The building was designed to be energy positive, generating more energy than it consumes and storing more CO2 than it emits. The materials selected are primarily biomaterials designed to be dismantled and reused, and a rainwater recovery system has been incorporated to maximise resource efficiency.

The project will feature six types of apartments catering to people at various life stages. Designed with future needs in mind, the apartments can be interconnected both horizontally and vertically. The building will have rooftop gardens and the ground floor will include a childcare centre, an orangery, and a creative space for workshops and temporary exhibitions.

Works are scheduled to get under way in 2025, with completion of the complex expected in early 2027.



INSPIRATION

Green bus shelters: refuges for bees and other pollinators in the Netherlands and England

European cities are taking an innovative approach to protecting bees and other pollinators by greening the roofs of bus shelters. In a pioneering initiative back in 2019, the city of Utrecht transformed 316 bus shelters into gardens featuring sedums, wildflowers and other plants chosen to attract pollinators and preserve biodiversity. Other cities have followed suit, including Leicester, which greened 479 shelters in 2021, confirming the attractiveness of this ecological model.

Not only does the greening of bus shelters provide a habitat for bees and other insects essential to maintaining biodiversity, but it also offers other benefits, such as reducing CO2 emissions and retaining rainwater.

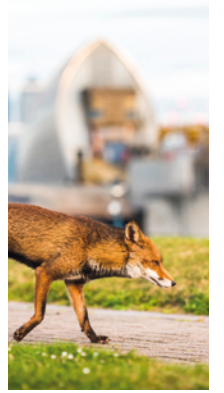


✓ Source: sain-et-naturel.ouest-france.fr

6 principles for urban rewilding, Citizen Zoo, UK

Urban rewilding is an approach devised by Citizen Zoo to transform urban spaces into functioning ecosystems capable of supporting a diverse range of wildlife and improving human well-being. Citizen Zoo has developed six key principles to achieve this:

- 1 Managing green spaces with wildlife in mind:** parks, gardens and other urban green spaces must be managed with a focus on the needs of wildlife, without compromising their value to humans.
- 2 Maximising the ecological potential of large green spaces:** large urban green spaces should be managed to achieve their full ecological potential, taking inspiration from rural rewilding methods (e.g. Richmond Park).
- 3 Designing urban areas as landscaped areas:** urban areas should be seen as a microcosm of what we want to achieve in large landscape areas as we learn to coexist with wildlife.
- 4 Pragmatism and adaptation:** the rewilding methods used in large-scale rural areas are not always appropriate for urban areas. They have to be tailored to the specific constraints of the urban environments studied.
- 5 Involvement of residents:** a crucial aspect of urban rewilding is the involvement and education of citizens, to reconnect them with nature and encourage more eco-responsible behaviour.
- 6 Making the most of every space:** no space is too small to matter. Lampposts, roofs, bus stops, balconies, windowsills, etc. could all support wildlife with a little innovation.



INSPIRATION

Reintroduction of beavers, Citizen Zoo, London, UK

The project to reintroduce beavers to the British Isles is an attempt to restore a species that has been absent for 400 years. There have now been a number of successful beaver reintroductions in the UK, but so far only one has taken place in an urban environment, in Plymouth, as part of a community engagement, habitat creation and flood management project. There are numerous environmental benefits from the presence of beavers. By creating dams, beavers transform rivers and streams into pockets of water that encourage aquatic biodiversity. Their constructions increase water infiltration into the water table, reducing the risk of drought and flooding, improving water quality and reducing erosion.

Citizen Zoo is now working on speeding up the reintroduction of beavers into London’s waterways. An initial pilot site has been identified with Ealing Council, in West London.



✓ Source: kondorwessels.nl

Implementation phase

The implementation of regenerative property and urban projects is based on principles found in other approaches that seek to minimise negative environmental impacts. This involves choosing bio-sourced and geo-sourced materials, construction techniques that require as little machinery and resources as possible and generate little waste, selecting the best materials for the context and available local resources, development or support for local supply chains, etc.

Beyond minimising the negative environmental impact, the regenerative approach aims to develop an area's ecosystem services. In this context, the choice of implementation can play a crucial role, as shown by the difference in growth between trees planted in individual pits and trees planted in trenches (which encourage better root development and greater tree resilience).

FURTHER READING



- ✓ **Trend note #13**
Low-tech, Just-tech, Right-tech: new approaches for cities and regions



The difference between a regenerative approach and the circular economy

In contrast to the linear economy based on the “extract, manufacture discard” model, the circular economy sets out to optimise the use of resources and reduce waste by promoting practices such as “reuse, repair and recycle.”

The regenerative approach differs from the circular economy as “it aims for co-evolution or symbiosis with living systems and for the integration of the social and systemic dimension, beyond the technical prism dominant in the circular economy (as mostly practised in the private sector). Beyond the technical dimension, the regenerative approach systematically includes consideration of governance dynamics, value sharing and support for the development capacities of the most vulnerable, for example.” (Brunel, Dubreuil et al., 2023).

Operational phase

The regenerative approach seeks to create the conditions for ecosystems to develop autonomously over time, minimising the need for constant human intervention.

In the operational phase, this means allowing natural processes to operate with minimal interference. As the effects of regeneration are often only visible in the long term, regular monitoring and ongoing evaluation are essential to measure success and refine practices based on the results observed. (Clergeau, Bonnaud, 2019).



Differentiated management of green spaces

Differentiated management involves tailoring green space maintenance to suit each area's unique use, location and ecological needs. This approach is often accompanied by an increase in the level of vegetation and of wooded areas, while also reducing (or eliminating) the use of pesticides and weed killers. Human intervention is much more targeted to allow living things to develop. Communication plays a key role in supporting this change as local people may initially perceive these new practices as a lack of cleanliness and maintenance.



✓ Source: Bayeux municipal website

The garden in motion, Gilles Clément

The concept of the garden in motion was developed by the French landscape gardener, Gilles Clément. It denotes a type of garden where plant species can develop freely and which redefines the role of the gardener. This approach places the emphasis on observation and advocates a stance of cooperation with nature, rather than control.



✓ **Example of differentiated management of green space**
Source: ville-liffre.fr

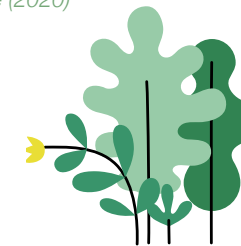
“

Rewilding above all means defending the right of certain environments to be in free evolution. Free evolution entails allowing autonomous ecological dynamics to re-establish themselves. Encouraging the regeneration of these environmental functionalities that work on their own. Strictly speaking, there is nothing to be done. It is enough to undo what we have damaged and redo what our past damage has destroyed.

”

Gilbert Cochet, Béatrice Kremer-Cochet

Naturalists and authors of *Rewilding Europe* (2020)



Ecological spontaneity encourages urban biodiversity

According to a number of studies, encouraging ecological spontaneity, i.e. giving free rein to ecological processes, increases biodiversity in all types of spaces, whether formal (parks and gardens) or informal (wasteland and woodlands), and at all scales (from the street to large parks). (Bonthoux, Chollet, 2021).

Other bio-inspired approaches

Several concepts go hand-in-hand with the regenerative approach, such as biomimetics, ecological engineering and nature-based solutions.

Biomimetics on the scale of a building, a neighbourhood and a local area

Biomimetics (also known as biomimicry) consists of taking inspiration from the solutions and inventions that have evolved naturally over the past 3.8 billion years. The approach was defined in 2015 by ISO TC 266 – ISO 18458 as a “philosophy and interdisciplinary design approach taking nature as a model to meet the challenges of sustainable development (social, environmental, and economic).”



INSPIRATION

Biomimetics on the scale of a building: the Mimesis building in Nice

For this project in the Nice area, which has been significantly affected by rising temperatures, the architects at Bechu & Associés took inspiration from the ferocactus, a cactus known for its straight, ribbed edges. The “pleated” façade design helps shield the building from direct sunlight, reducing exposure by 70% while still allowing natural light. As an “inhabited hill,” the building supports biodiversity and serves as an urban cool spot.



✓ © Agence Bechu & Associés

Ecological engineering

The purpose of ecological engineering is to promote the resilience of ecosystems. It comprises a range of techniques derived from traditional engineering and ecology, with the aim of improving and restoring biodiversity and ecological functions in all environments, whether natural or man-made.

INSPIRATION



Rejeneo, support for projects to restore natural ecosystems

A subsidiary of the Bouygues group, Rejeneo is a consultancy that supports companies in contributing to the development of carbon sinks and biodiversity, by financing natural sequestration projects (NBS) based on robust scientific methodologies. The aim is to define a climate and biodiversity contribution strategy that aligns with the goals of the Paris Agreement.

Set up in 2023, Rejeneo has already supported over 25 projects to restore natural ecosystems, allowing the sequestration of 28,000 tonnes of carbon.

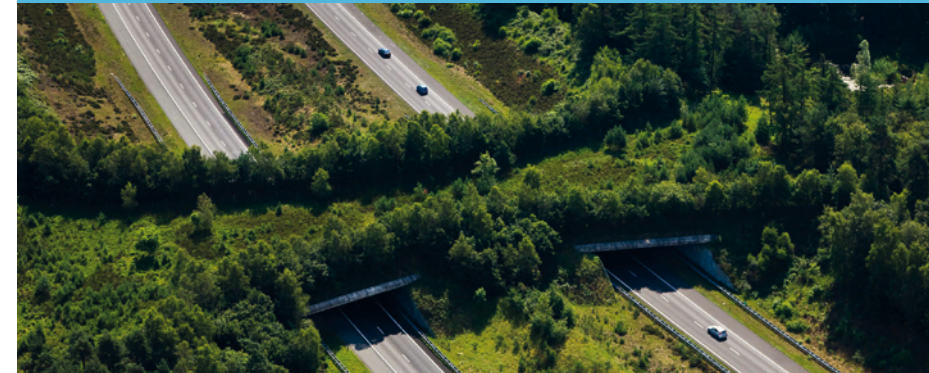
The projects financed in France and Europe encompass reforestation with a wide range of species adapted to climate change, restoration of peat bogs, planting and maintenance of hedges on farms, and re-meandering of waterways.

INSPIRATION

Wildlife crossings restore ecological continuity

Wildlife crossings are purpose-built passages that allow animals, plants, fungi and other organisms to cross obstacles, built by humans or resulting from their activities. These structures can take the form of bridges, tunnels or corridors and are incorporated into a modified environment to minimise the impact of human activity on biodiversity. Wildlife crossings help species move more freely, mitigating habitat fragmentation and promoting the conservation of ecosystems. Some wildlife crossings are designed to meet the specific needs of certain species or groups of species: examples include toad crossings for amphibians, worm tunnels for earthworms and fish elevators.

Overpasses are often designed in a diablo shape to encourage animals to use them and reduce construction costs. The Kootwijk wildlife crossing in the Netherlands is a striking example that allows animals to cross highways in safety.



✓ *The Kootwijk wildlife crossing, Netherlands*
© Siebe Swart



Nature-based solutions

Nature-based solutions are “actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (definition devised by the IUCN [International Union for Conservation of Nature] and adopted in 2016 at the World Conservation Congress). These solutions use the power of healthy natural ecosystems to “protect people [...] and safeguard a stable and biodiverse future.”

This concept is based on the essential recognition that ecosystems play a crucial role in limiting the effects of climate change while guaranteeing human survival. Healthy ecosystems are more resilient to extreme weather events and provide a multitude of ecosystem services that are essential to human life, such as CO₂ capture, water purification, climate regulation and crop pollination.



✓ **Keyline design**
Source: paysages-fertiles.fr

INSPIRATION

Regenerative hydrology

Regenerative hydrology is the science of regenerating freshwater cycles through land use planning (definition suggested at the Regenerative Hydrology Meeting in Annecy, France in 2022). The two main principles are to slow down rainwater and runoff to improve infiltration, and to increase vegetation density to encourage evapotranspiration. This approach is fully in line with nature-based solutions, based in particular on water, soil and trees.

This science is inspired by a number of approaches, including those of a pioneering Australian farmer, P.A. Yeomans, who introduced the keyline design technique in the 1950s to design agrosystems that are resilient to drought and flooding.

Labels and decision-making tools

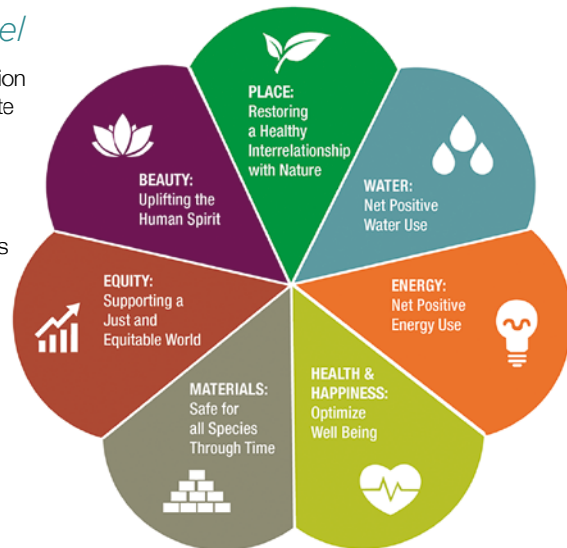
Several regenerative design tools and frameworks have been created to help implement the regenerative approach in practical application in urban development projects.

The main goals are to “structure the project design process to enable comprehensive site analysis, ensure community participation, maintain a process of continuous improvement, promote positive outcomes for both society and the environment, and ultimately encourage co-evolution between human society and natural urban systems” (Blanco, Clergeau 2022).

The Living Building Challenge (LBC) label

The Living Building Challenge (LBC) label is an international certification programme created in 2006 by the International Living Future Institute in the United States, acknowledged to be one of the most rigorous and ambitious certifications in ecological construction. It aims to encourage a regenerative built environment that goes beyond mere sustainability to generate positive impacts on the environment and on society. It encourages architects, contractors and building owners to focus on “Living” buildings that operate with the cleanliness, beauty and efficiency of nature itself.

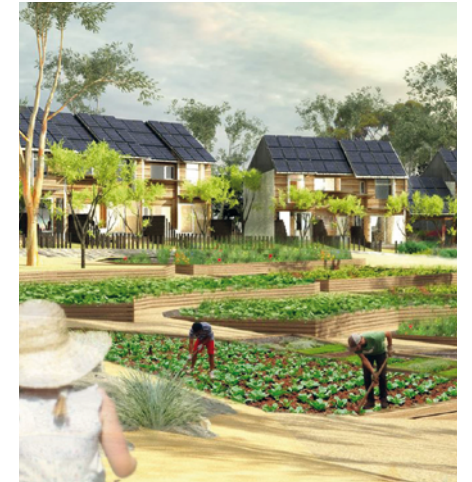
The LBC represents itself symbolically as a flower with seven petals that stand for the seven performance areas constituting the framework: materials, place, water, energy, health & happiness, equity and beauty. The flower enables designers to analyse the location of a site and the impact that the construction will have on the neighbouring environment and community both before construction and during the operational phase. Each petal incorporates specific imperatives, with a total of twenty mandatory requirements to achieve certification.



INSPIRATION

The Paddock eco village: an LBC-certified project in Australia

The Paddock in Castlemaine, a small town in Victoria, Australia, is an example of an LBC-certified project. Designed by Geoff Crosby, the development consists of 26 certified homes and focuses on strengthening the local ecosystem through commitment to biodiversity and local food production. Several strategies have been implemented to restore habitat and biodiversity, achieve water and energy self-sufficiency, and source materials locally. The project also aims to create a positive socio-ecological impact. It began with a three-day participatory ecological diagnosis of the site to identify its key characteristics in terms of water, soil, vegetation and wildlife.



✓ **Source:**
thepaddockcastlemaine.com.au

The LENSES Framework

Living Environments in Natural, Social and Economic Systems (LENSES), originally developed by Colorado State University's Institute for the Built Environment and now managed by the Center for Living Environments and Regeneration (CLEAR), is a participatory framework intended to guide teams in developing regenerative urban projects. The framework relies on third party facilitators whose role is to guide the various stakeholders in creating a systemic and shared understanding of the site, identifying its regenerative potential, formulating an action plan and implementing initiatives (Blanco et al., 2021).

INSPIRATION

Applying the LENSES Framework: the Nunduk project in Australia

The Nunduk project in Seacombe West in Victoria, Australia, exemplifies the application of the LENSES Framework for regenerative development. Located in a run-down area of Lake Wellington, this mixed-use project aims to revitalise the local ecosystem. After conducting a series of workshops using the LENSES Framework, the team identified the key relationships in the socio-ecosystem and defined priority initiatives. The process resulted in a master plan that includes around 800 homes, a community park, shops, a business centre, a marina, a hotel, a conference centre and restaurants, while incorporating innovative development strategies that should benefit the ecosystem and the local community. (Blanco et al., 2021)

Applying biomimetic theory to ecosystems and urban design: Ecosystem Services Analysis (ESA)

In New Zealand, the academic Maibritt Pedersen Zari has developed Ecosystem Services Analysis (ESA), a pioneering methodological framework for regenerative urban design through the application of biomimicry. This approach is based on assessing local ecosystem services to guide architectural and urban design.

The process consists of four main steps:

- 1 An assessment of the ecosystem services of the original ecosystem**
- 2 An assessment of the ecosystem services of the proposed urban project**
- 3 A comparison of the results to establish performance objectives**
- 4 The implementation of solutions, with evaluation and adjustments if necessary**

This method uses various indicators, such as the vegetation cover of the project, its ability to store and sequester carbon, the absorption rates of atmospheric pollution by vegetation, the availability of resources such as annual rainfall, and so on.



Administrative biodiversity compass

© Agence Vraiment Vraiment

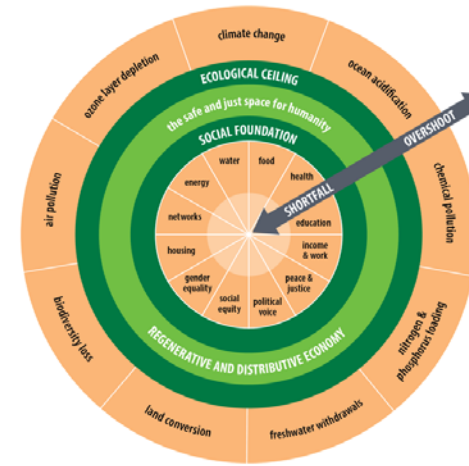
The administrative biodiversity compass is a methodological tool developed by the design agency Vraiment Vraiment to facilitate collaborative efforts on local biodiversity projects or for working on territorial projects (e.g. Local Urban Plans or Regional Plans for Spatial Planning, Sustainable Development and Territorial Equality), with a particular focus on taking biodiversity in to account in debates and discussions.

Reasons for using the Compass:

- 1 To nurture and develop a local biodiversity project**
- 2 To bring stakeholders' visions together**
- 3 To create a forum for dialogue on biodiversity and establish a set of arguments**
- 4 To encourage stakeholders to take a personal and/or professional stance on a given issue**



▼ Biodiversity compass
biodiversite-administrative.fr



INSPIRATION

Amsterdam, pioneering the use of the doughnut

Back in 2019, the city of Amsterdam was one of the first local authorities to introduce the doughnut framework to steer its local public policies to promote resilient and equitable development. The Amsterdam Doughnut Coalition was formed under the leadership of the city's Deputy Mayor, Marieke van Doorninck, bringing together elected representatives, citizens and experts to integrate these principles into public policies that affect crucial sectors such as health, housing and ecology. Following a process of collaborative workshops and in-depth audits of the territory, the city of Amsterdam adopted an ambitious five-year strategy in 2022 to establish a circular economy, with goals of halving the use of new raw materials by 2030 and achieving a fully circular economy by 2050. Among other things, the city has committed to creating a supportive ecosystem including exchange platforms, online marketplaces and repair services, increasing the accessibility of circular consumer goods.

Applying the Kate Raworth “doughnut” principles at territory level

The “Kate Raworth doughnut” model, a reinterpretation of the planetary boundaries framework, addresses the dual challenge of combining the imperatives of social justice with those of ecological preservation while finding the right balance between our planet's ecological limits and basic human needs. Some forty local authorities around the world have publicly expressed an interest in the doughnut since 2019 and are working to implement it to guide their public policies. (Saunier, 2024) The doughnut has been adapted and transformed into various systems and tools, such as the “portrait doughnut,” which consists of identifying or creating local indicators for each of the doughnut's themes and setting thresholds that cannot be exceeded. Most of these initiatives are in Europe and North America, although a few local authorities have also adopted them in Latin America and Asia.

INSPIRATION

An operational decision-support tool based on the territorialisation of boundaries

Association: Sustainable City by France
Partnership: École des Mines de Saint-Étienne (ongoing research)

The data traditionally used, or legally required, to carry out territorial diagnostics, which is essential prior to any planning, is no longer sufficient as a guarantee of resilience and prosperity. Most cities and regions no longer need to “develop,” but rather to regenerate, particularly by rediscovering the vital role of “non-human life” in our societies.

Sustainable City by France, an association which involves the French government, local authorities, businesses and experts, is based on the framework of planetary boundaries and social limits, represented in the famous doughnut model devised by Kate Raworth and the Doughnut Economics Action Lab, of which it is a partner. The association identifies and shares best practices, and organises inspirational territorial workshops in which political, scientific and economic decision-makers gather to formulate recommendations for shifting territorial trajectories.

Sustainable City by France is currently jointly supervising doctoral research with Natacha Gondran, a professor of environmental assessment at the Mines Saint-Étienne engineering school, which is seeking to create an operational decision-support tool based on the territorialisation of boundaries.

More information:
www.franceville durable.fr/lassociation/travaux-association/territorialisation-limites-planetaires

Imagining new levers

Recent years have witnessed a growing push to expand the realm of possibilities by “reclaiming our ability to imagine” to spark a shift toward a more “desirable” transition. The argument is as follows: despite widespread awareness of the ecological crisis and solutions having been identified (as highlighted by the latest IPCC report), the fact of taking action remains challenging, and current outcomes fall short of the urgent need. For many, this lack of action is due to the difficulty of projecting ourselves into a “desirable” future, where our lifestyles, production and consumption would shift significantly to align with planetary boundaries. In this section, we explore some of the levers that could help redefine our society’s core paradigm, paving the way for transformative projects.



Governance and intervention methods



If we can imagine it, desire it, dream about it, it is so much more likely that we will manage to put our energy and determination into making it reality.

The regenerative approach invites us to rethink our relationship with all forms of living organisms in a symbiotic and co-evolutionary way. In this way, the regenerative urban project creates links between the urban system and the ecological system, so that they evolve together over time, under good working conditions.

Its impact is mutually beneficial to humans and the environment. It calls for new alliances with nature, including a participatory framework involving both human and non-human life, as well as the recognition of Nature’s rights, and so on. It also calls for the invention of new modes of governance that encourage the involvement of stakeholders in localised cooperative ecosystems.



Rob Hopkins
Founder of the Transition
Towns movement

Offsetting the human perspective in the design process means systematically involving non-human stakeholders.

Empathy is a key element in all forms of design. Although we can’t actually interrogate animals, it’s important that we find a way to learn more about how non-human living beings, whether animals or plants, adapt to their environment and to the world around them.

There are several approaches that can help us understand the issues at stake, such as **design fiction**, **speculative and/or critical realism** (a contemporary philosophical movement that asserts that there is a reality beyond our representations or subjectivity).



INSPIRATION



Creating micro-parliaments for living beings in France

This initiative, under the leadership of the design agency Vraiment Vraiment and the citizen participation association, Open Democracy, seeks to establish a protocol designed to involve living organisms and biodiversity in local politics.

In other words, if a municipality wants to construct housing or an industrial zone, local residents could represent the interests of often overlooked entities, such as soils, birds or amphibians. Ultimately, it might even be possible to set up permanent bodies able to act as ambassadors for living beings. Although the group has already defined the general functioning of this new institution, one of the most pressing questions is how to represent the interests of non-humans.

INSPIRATION

New Zealand: the Whanganui River acquires a legal personality

In 2017, the Whanganui River, New Zealand’s third longest river at 290 kilometres, was granted its own legal identity, giving it the same legal rights as a person.

This landmark decision marked the culmination of a struggle that began in the 1870s, led by the indigenous Iwi people to protect the river from exploitation. The new legislation recognises the Whanganui River as a “living, indivisible entity,” encompassing all its physical and spiritual aspects, from its source to its mouth. The personification of the river means that its interests can be legally defended, with two representatives, one from the Maori tribe and one from the government. In addition, the tribe has been awarded NZ\$80 million in financial compensation and NZ\$30 million to restore the state of the river, ensuring its protection for present and future generations.



✓ Le Whanganui (New Zealand)

The goal of implementing regenerative approaches in an area is to (re)create the conditions that enable ecosystems or environments to thrive independently, without human intervention. Establishing this living-centred virtuous circle on an urban scale means designing cities using nature and with living beings and organisms.

To take this a step further, a number of players are developing new indicators, or proposing new architectural and real-estate approaches inspired by the principles of the living world.

INSPIRATION

Imagining new indicators

The design agency Vraiment Vraiment, in partnership with Banque des Territoires, is proposing the development of a hospitality barometer for biodiverse plots of land to “highlight what often goes unnoticed.” Much like air quality indices, this barometer consolidates various data points to evaluate the ecological functionality of a plot and its surrounding environment. It serves as both a guide for public action and a tool for raising awareness among citizens and other stakeholders in the area.



> **The Biodiversity Plot Hospitality Barometer**
Source: biodiversiteadministrative.fr

INSPIRATION

Bouygues Immobilier gives real estate and urban projects the properties of the living?

Based on regenerative thinking, Bouygues Immobilier has developed a concept building called Vivant (Living).

The purpose of this concept building is to create better balanced ties between both human and non-human living organisms, while simultaneously minimising negative impacts and creating net positive impacts, by taking inspiration from the properties of living organisms.

The idea is to rethink our living spaces by taking the 9 properties of the living (as defined by the Butterfly School, see below), to design projects aligned with their ecosystem. Examples include ensuring that each real estate project is unique, diverse (in terms of use, audience, etc.) and zero waste, by treating grey water as a resource.

This approach offers a fresh perspective for considering urban and real estate projects!



✓ **The 9 principles of living presented by the Butterfly School**
© Bouygues Immobilier

Drawing inspiration from the living: a shift from performance to robustness

Research by the French biologist Olivier Hamant, a scientist at INRAE (the French National Research Institute for Agriculture, Food and the Environment), provides a number of insights into how human societies can address environmental challenges by emulating living systems. His findings propose a shift from societal models that are centred on performance to those prioritising robustness. In an increasingly unstable world with a shortage of resources, robustness ensures the stability and resilience of systems, in spite of fluctuations.

A visionary tale

1.

The year is 2040 and Nova Verde stands as a model regenerative city.

Rather than merely reducing its environmental impact, the city generates positive benefits for all its inhabitants, human and non-human alike.

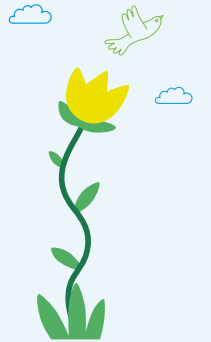
Under the leadership of Mayor Clara Duarte and in collaboration with all local stakeholders, the city has now mapped its soil and its ecosystem services and made them a core part of the urban planning process. At project level, ecologists operate upstream, providing preliminary ecosystem assessments that enable optimal use of resources while still taking account of the specific ecological characteristics of each plot of land.

The result is Terra Nova, a residential building constructed on a former industrial site. Umbrella species such as local bats have found refuge in the building's vegetated walls, which provide them with a sustainable habitat. Materials engineer Lila Mensah ensures on-site waste is carefully cleaned up and repurposed.

Excavated soil from nearby building sites is also reused and transformed into natural thermal walls. The building's bio-climatic design promotes biodiversity, integrating shared gardens and urban beehives, creating an environment where various species can thrive.

At Nova Verde, everything is geared towards civic engagement. Within the building, a co-owners' assembly, including a representative of non-human living beings appointed by a third-party committee, oversees compliance with the building's regenerative standards. Citizen committees encourage all residents to actively participate, dedicating 10% of their time to ecological initiatives. The results are routinely verified by experts.

The city is no longer a man-made environment, but a living entity where humans and non-humans coexist in harmony.



WHAT IF...?

- 1** Limited growth and continuous creation were integrated into urban planning?
- 2** Cities were designed in a decentralised way, with autonomous yet interconnected neighbourhoods?
- 3** The biomimetic approach were incorporated in all aspects of an urban or real estate project?
- 4** Regenerative city governance recognised Nature's rights and gave natural ecosystems a voice in decision-making?

Business models and taxation

A fundamental change in the economic model is still required to encourage the advent of the regenerative city.

In current real estate balance sheets, revenue is generated by the sale of land. This calls for new value indicators capable of taking into account the positive externalities created by a regenerative urban or real estate project, as well as enabling ecosystems to self-regulate and express themselves. Several innovative economic models are emerging as a way out of the traditional models that fuel the massive extraction and consumption of natural resources.



Economy of functionality and cooperation (EFC)

The economy of functionality is an economic model that focuses on use value rather than product sales. By calling into question the traditional “extract, produce, consume, discard” volume-based industrial model, this approach offers a lever to address the twin challenges of climate change and preserving natural resources.

The economy of functionality goes beyond the standard rental model, by integrating social and societal well-being concerns into its very nature, as well as a constant commitment to responsible development (shared use of assets rather

than increased individual ownership, greater product durability, co-production of solutions with beneficiaries, embedding solutions in local communities, etc.). It also aims to combine wealth creation with the development of intangible resources (skills, health, knowledge, quality of relationships, etc.).

The economy of functionality can be associated with the economy of cooperation, in which economic players (citizens, local authorities, businesses, etc.) in the same area cooperate by pooling uses to satisfy a need and limit negative externalities.

ADEME, the French agency for ecological transition, is committed to advancing the economy of functionality and cooperation within local communities and businesses through its Coop'ter programme. In 2024, ADEME will support several companies, including

Linkcity, the property development subsidiary of Bouygues Construction, as part of a collaborative 18-month initiative. The goal is to develop a product that aligns with the principles of the economy of functionality and to transform traditional economic models.

INSPIRATION

Cyneo: a project promoting material reuse in the French construction industry

The first Cyneo materials reuse centre opened at the end of 2023 on the Ardoines site in Vitry-sur-Seine, a few kilometres south of Paris. As a subsidiary of Bouygues Construction, Cyneo is dedicated to structuring a supply chain for quality reused materials by uniting a community of commercial and institutional players.

The aim is to encourage collaboration between players in the reuse sector, by pooling infrastructures (production, storage, prototyping and product display areas), sharing costs and leveraging expertise from all parties involved. Cyneo also provides insurance and legal advice, encourages best-practice exchanges, and offers monitoring of regulations and training courses. Cyneo's digital platform will make it possible to match up the availability and need for reused materials. Among the companies already involved with Cyneo are Remake (joinery), Tricycle (furniture, doors and sanitaryware), Textifloor (carpets and resilient flooring), Wasterial (tiling) and Circouleur (paint).



INSPIRATION

BAMB: Buildings As Material Banks

This innovative approach transforms buildings into banks of reusable materials. How does it work? By designing structures that can be dismantled and adapted, buildings can be selectively deconstructed to recover and recycle their components. Based on circular economy principles, this model encourages the use of durable, high-quality materials, which can enhance the overall performance and sustainability of buildings. This lease-back approach is leading to new forms of cooperation among companies, suppliers and subcontractors.



FURTHER READING



Find out more: **Trend book #9 Transitioning Cities**

A new paradigm for construction: the Hybrid Positive Economy Building (BHEP)

The “Hybrid Positive Economy Building” (BHEP) concept developed by the Bouygues group aims to reconcile innovative environmental features with a positive economic balance sheet. It proposes 6 sources of ecological, financial and societal value creation:



- 1 Intensity of use:** leveraging data to optimise development and maximise infrastructure usage
- 2 High quality of use:** design focused on health and user experience
- 3 Making the most of physical flows:** self-sufficiency in water, energy and heat, with the ability to exchange energy between neighbouring buildings, and the possibility of storing energy for deferred use to enhance flexibility throughout the district
- 4 Customisation, mutability, reversibility:** convertibility and reversibility of buildings to meet evolving needs
- 5 Materials bank:** incorporating the reuse and recycling of materials into specifications, so that buildings become materials banks for future generations of buildings, without having to draw on primary resources
- 6 Valuing positive externalities:** taking carbon costs and positive externalities into account to assess buildings' “green value”

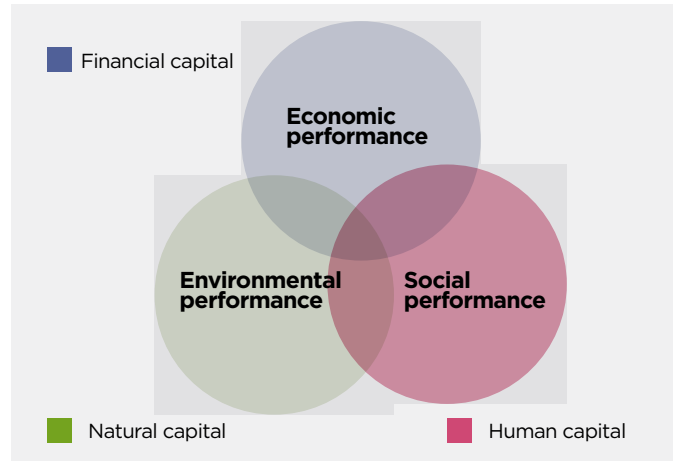


Triple Bottom Line

The concept of the Triple Bottom Line was devised by the author John Elkington in 1997.

Its purpose is to expand traditional accounting methods by incorporating a company's economic, environmental and social performance. Beyond mere financial results, this approach provides a more comprehensive assessment of the value created or lost by a company, by measuring its ecological footprint as well as the contribution it makes to social well-being.

Several calculation methods exist, including the CARE method, which was initially developed by two researchers, Jacques Richard and Alexandre Rambaud.

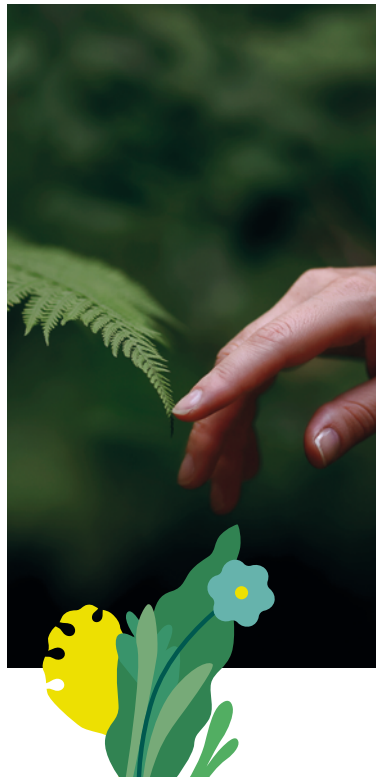


✓ **Global Business Performance**
Source: initiativesdurables.com

Symbiotic economy

The symbiotic economy is an economic model developed by Isabelle Delannoy that seeks to establish a mutually beneficial relationship between natural ecosystems and human activities.

In this model, the three spheres of the living, the social and the technological evolve in symbiosis, with the growth of one sphere favouring that of the other two.



Regenerative businesses

In recent years, the concept of the regenerative enterprise has emerged as a disruptive business model that aims to make a net positive impact on the living world.

Lumiá, a training and research centre on regenerative enterprise, defines it as follows:

“

A regenerative business aims to have a net positive impact, by relying on the self-renewal and continuous creation skills of non-human living organisms to regenerate themselves. It co-evolves with the ecosystems and human communities with which it interacts, seeking to reinforce the processes at the root of the Earth system's dynamic equilibrium.

”

There are 11 principles that describe a regenerative company (LUMIÁ, 2023):

- 1 Create net positive extended value for its stakeholders, ecosystems and society
- 2 Adopt a systemic vision
- 3 Be able to limit itself
- 4 Strengthen supporting and regulating ecosystem services
- 5 Distribute monetary value to stakeholders and for the common good
- 6 Strike a balance between performance and robustness (sub-optimality)
- 7 Create life-enhancing relationships
- 8 Develop co-evolving, cooperative and reciprocal relationships
- 9 Use bio-assimilable molecules
- 10 Be circular by design
- 11 Be rooted in the local environment, favouring sobriety and multifunctionality

INSPIRATION

Pochecho, a company in the vanguard of ecological transition

Pochecho is frequently mentioned as an example of a company that is able to take action without causing destruction.

Since it began manufacturing envelopes and pouches in 1928, Pochecho underwent a major transformation in 1997, focusing its investments and choices on three key priorities: protecting people's health by making its processes less hazardous to humans thanks to the use of natural, non-toxic raw materials; protecting the planet by combining industrial sobriety, material substitution, process redesign and reconnecting with the living world; and boosting productivity to stay ahead of the competition by focusing on controlled profitability rather than pursuing economic growth at all costs. A comprehensive strategy has been put in place to limit the impact of our activities on the biosphere as much as possible.

This includes self-sufficiency in water and heating, photovoltaic panels, recycling, reforestation, green roofing, phytodepuration, insulation and the elimination of polluting products.



✓ © Pochecho

Economic models aside, the introduction of new tax rules can act as powerful levers.

For instance, the tax burden on building permits can be used as a lever to stimulate the

creation of environmental and/or social value. For existing buildings, property taxes could be redefined, no longer based on existing square metres, but on the land's potential for densification or biodiversity.



INSPIRATION

A tax aligned with environmental objectives and building potential

Benoît Boldron, head of housing at Toulouse Métropole and Senior Lecturer and Associate Researcher at the Toulouse Jean Jaurès University, has suggested an Environmental Property Tax. This tax would use existing regulatory tools (municipal property tax exemption for a Real Environmental Obligation, Biotope Coefficient per Surface (CBS), under-density fee linked to the Minimum Density Threshold) to incentivise the renaturation of privately-owned spaces.

This tax would be based on the building potential of the plot and weighted according to environmental objectives.



INSPIRATION

Reduced VAT for biosourced, geosourced and reused materials

In January 2023, the co-authors of Manifesto for Happy and Creative Frugality (engineer Alain Bornarel, architect and researcher Dominique Gauzin-Müller and architect and urban planner Philippe Madec) launched a petition to reduce VAT on biosourced, geosourced and reused materials.

They requested a reduction in VAT from 10% to 2.1% on all types of renovation work, and from 20% to 5.5% on new construction work.

Their reasoning is that tax incentives will encourage widespread use of these materials, while also supporting emerging sectors.

A visionary tale:

In 2040, the town of Nova Verde embodies the principles of the regenerative economy.

Over the past decade, the city has undergone a transition in which every decision is based on its contribution to regenerating ecosystems and improving residents' well-being.

In this new paradigm, industrialists have assumed unprecedented roles, becoming the "guardians" of their territory, embodying a model in which the three spheres consisting of the living, the social and the technological evolve in symbiosis. They are now responsible for monitoring and revitalising the ecosystems in which they operate, restoring once-neglected rivers and transforming their industrial zones into havens of biodiversity.

In line with this vision, property taxation has also evolved. Taxes are now based on each plot's biodiversity or potential for densification. As a result, property owners who integrate their land into a green grid and transform it into a biodiversity reservoir benefit from significant tax breaks.

The construction sector has widely adopted the use of renewable, recycled and reused resources, thanks to reduced VAT on biosourced, geosourced and reused materials. Not only have these steps significantly reduced the environmental impact of construction, but they have also improved residents' quality of life.

Residents now play a central role as "members" of their community. By engaging in the management and upkeep of their living spaces, they are entitled to a wide range of benefits, such as reduced service charges. This participative model has created new bonds within the residences and in the neighbourhoods, enhancing the quality of life for residents.



WHAT IF...?

- 1** New financing solutions were developed to support regenerative urban projects, such as participative financing and social and environmental impact financing mechanisms?
- 2** Regenerative urban projects were assessed on the basis of their ability to generate positive externalities?
- 3** Property taxation were determined according to a plot's potential for densification or biodiversity, rather than existing structures?
- 4** Legislation evolved to create new tax incentives for regenerative projects?

Cultural shifts and new practices

If we want to ensure that our planet is habitable for everyone, our focus must shift from exploitation and competition to cooperation and care – for ourselves, for each other, and for the planet. Regeneration should extend beyond the ecological to include social and cultural aspects. It requires greater solidarity, social cohesion and pro-social values, as well as developing adaptive and learning abilities.

To speed up the process, many players are turning to storytelling as a catalyst for changes in individual and collective behaviour. The challenge would be to effectively reverse the symbolic value we assign to things and actions, so that we can set new values and social standards that are compatible with a sustainable future for all.



As all these solutions have been imagined by humans, it is not unreasonable to believe that we could imagine new ways of living together, perhaps even better ones.



Philippe Descola,
Anthropologist, in *Diversité des natures, diversité des cultures* (2010)

The role of new narratives

Human beings are inherently creatures of fiction. Through imagination, we can create or believe in collective fictions, mythical narratives by which we adhere to a set of rules and values.

Imagination is not an illusion or something unreal: it is the very foundation of our societies, shaping our relationship with the world, underpinning our economies, our political and legal systems and our social organisations. (Harari, 2011) As the real world changes, these collective imaginaries evolve, grow or are replaced. And yet, the narratives that have prevailed over the last fifty years are narratives of ever-increasing production and depletion of natural resources. For many players, one of the keys to a faster ecological and social transition is to imagine new, inspiring and engaging social narratives that will help us project ourselves into a sustainable future. This means “inventing scientifically based narratives that restore hope by drawing on our intelligence, our need to coexist and our need for meaning.” (Taddei, 2022)



Imagine this fable: one species breaks away, claiming that the 10 million other species on Earth, its kin, are just ‘nature’. That is not beings but things, not players but just a backdrop or convenient resources [...] This fiction is our legacy.



Baptiste Morizot
Philosopher and tracker, in *Manières d’être vivant* (2020)



At a national level, there are increasing calls for the development of new social narratives.

ADEME, the French agency for ecological transition, has called for a counter narrative of desirable sobriety and solidarity-based resilience: “This narrative should show that it is possible

to live and thrive through other means than consumerism, and that there are other ways to be happy, which are both desirable and meaningful. It should demonstrate what a socially fairer and more caring society could look like, one that respects the living world, in order to make it happen in the real world.”

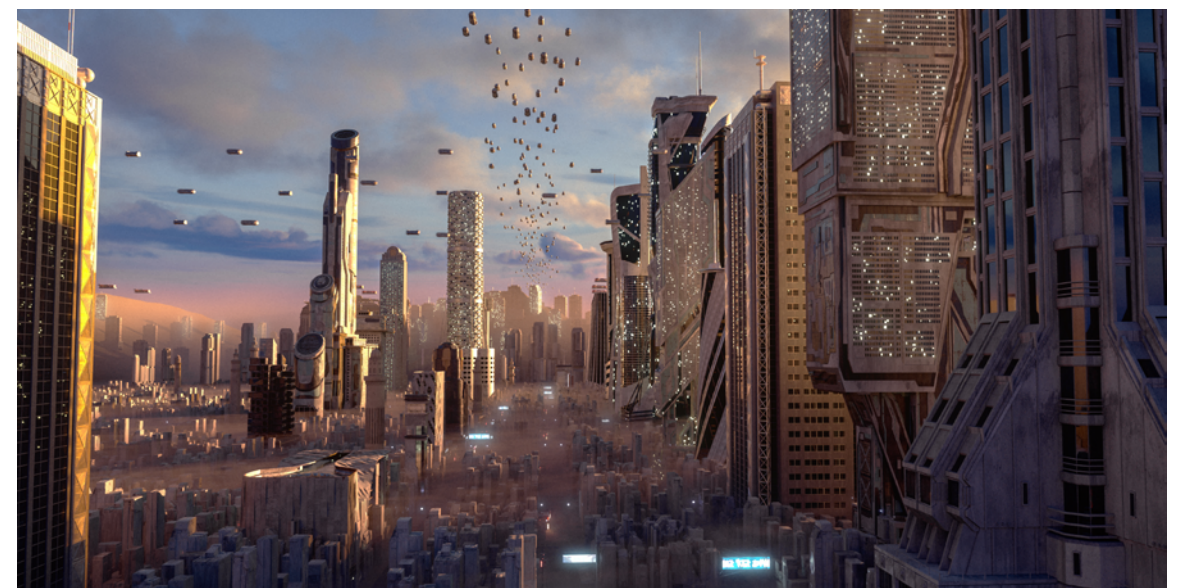
Types of urban imagination

Film culture has strongly influenced the way we imagine cities.

Ever since the early 20th century, science-fiction films have depicted cities characterised by verticality and technology, skyscrapers with flying cars on several levels – take, for example, Fritz Lang’s *Metropolis* (1927), Luc Besson’s *The Fifth Element* (1997) and Steven Spielberg’s *Minority Report* (2002).

A number of influential players, such as Elon Musk, share this super high-tech vision of our cities, and are shaping the future of technology by revolutionising mobility, space exploration and global connectivity.

And yet, amid the push for technological solutions, numerous players are raising the alarm about the environmental and health implications of high-tech, as well as the potential for geopolitical dependency (see books and articles by Guillaume Pitron, a journalist specialising in the geopolitics of raw materials). Meanwhile, writers, researchers, architects and thinkers are putting forward new urban and regional projects, intended to move away from an exploitative approach based on frenzied competition, to a cooperative approach based on taking care of ourselves, of others and of the planet.



INSPIRATION

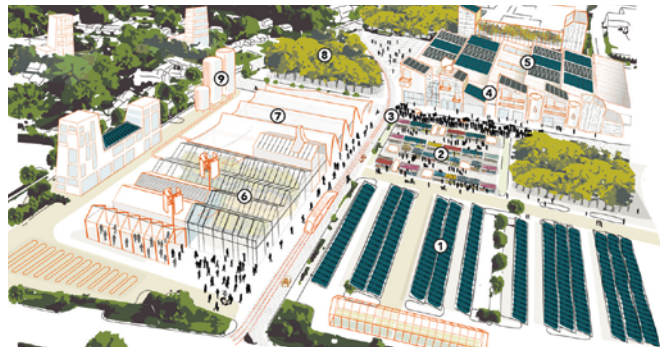
Just imagine: low-tech cities, promoting discerning urbanism (AREP)

AREP has published an inspiration booklet dedicated to “building” a truly sober, resilient and technologically (more) peaceful city, at every level.

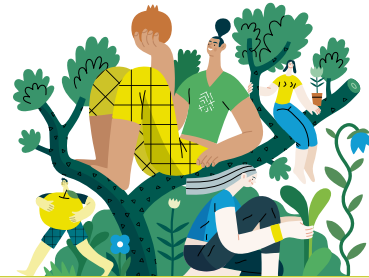
The aim is to propose visions of alternatives to the smart city that embody the low-tech city and expand the field of possibilities. This booklet offers new perspectives on the future of port areas, railway stations, business districts, shopping areas and urban motorways.



✓ Looking ahead to a redeveloped shopping area
Source: librairie.ademe.fr



- ✓ © Nils Le Bot (AREP)
1. Solar power generation
 2. Local market
 3. Democratic life
 4. Post-carbon housing
 5. New productive activities
 6. Urban greenhouses reusing shopping centre structures
 7. Reversible stretched canvas structures
 8. Rewilding
 9. Biogas storage



Moving away from the dream of individual homes to collective housing

To meet the European target of zero net land artificialisation, new ways of designing, building and managing urban areas are essential.

This means moving away from a model characterised by urban sprawl, to one that manages to combine land conservation and urban quality.

Despite a 2023 survey of 4,000 French people indicating that more than half (53%) would like to live in suburban housing estates², the challenge is to show how density can be combined with urban quality.

In its 2018 report *Faire la Ville dense, durable et désirable* (“Building dense, sustainable and desirable cities”), ADEME calls for a “renewed, multicriteria and more qualitative approach to density.” This report highlights how optimising density can enable easier access to services and activities, while also improving residents’ living environments, particularly by increasing the presence of nature and biodiversity in the city.

² L’ObSoCo/ADEME/Bouygues Construction/ France Ville Durable, *Observatory of Uses and Representations of Territories, Study on Quality of Life and Ecological Transition of Territories, Edition No. 4, 2023*

Beyond reimagining societal narratives and pioneering urban concepts, a new wave of projects is actively shaping a more sustainable, community-centred way of life. Eco-villages, green co-working hubs, community farms and co-housing initiatives are bringing to life a vision of “living better together.”

These projects experiment with simpler, cooperative lifestyles, grounded in shared values of sustainability, mutual support, resilience and connection. They serve as powerful sources of inspiration, guiding the transformation of our urban and regional landscapes.

FURTHER READING



> **Trend note #14**
Housing in the future, challenges and prospects

INSPIRATION

The Les Noés eco-village near Rouen, France

Architect: Philippe Madec
General contractor: Bouygues Construction

Les Noés is an eco-village project in the town of Val de Reuil, near Rouen. It was designed to provide residents with an environmentally friendly way of living that reflects their aspirations. Located on the banks of the Eure river, the Les Noés eco-village spans 4.5 hectares including 1.5 hectares of protected green space bordering the river.

It promotes social and functional diversity by combining individual and collective housing, a nursery, community gardens and a vegetable growing activity. An ecological park encourages wildlife exchanges and reintegration (donkey pasture, bird observatory, etc.), and green paths enhance the link between homes and the semi-natural riverbank. Some land reserves have been set aside to allow for housing densification in the medium term. With its fully integrated layout and a harmonious relationship with water (respecting the flood-risk prevention plan and using flood-prone areas through market gardening, which forms part of an educational project), the Les Noés eco-village serves as a living laboratory to guide future development projects.

In addition to receiving the Eco-Neighbourhood label at the end of 2016, this project already has three awards to its credit: the Grand Prix for French sustainable towns, the Silver Set Square for urban and landscape development in Le Moniteur’s Architecture Awards, and the Victoires du Paysage gold award in the category of neighbourhood development by social landlords. Another feature that sets the eco-village apart is its landscaping: it features more than 20,000 plants of 160 local species, preserves ecological continuity and provides flood risk management.



✓ **The Noés eco-village**
Source: construction21.org

The regenerative city offers an opportunity to introduce new ways of reconnecting human beings with the living world.

The Covid-19 lockdowns, for example, sparked a resurgence of attention to, and rediscovery of, those we share the world with. Human-deserted urban spaces gave

other species a chance to reclaim their place; birdsong was no longer drowned out by man-made noise pollution; animals (ducks, foxes, monkeys, etc.) wandered further into the city foraging for food. Being mindful of other species and acknowledging their presence helps us rediscover the rich diversity of life we share our world with.

Species in the city

Photos taken during Covid-19 lockdown



✓ Paris, France
© Olivier Borde, Bestimage



✓ Nara, Japan
© BBC.com



✓ Llandudno, Wales (England)
© BBC.com

INSPIRATION

Birdwatch during lockdown

On March 16, 2020, the French League for the Protection of Birds and the French National Museum of Natural History launched a joint project called "Confinés mais aux aguets" ("Locked in but on the lookout"), inviting people to take ten minutes out of their day to observe the birds around their homes. Today, citizen science programmes are on the rise, offering everyone an opportunity to play a part in urban programmes focusing on ecology observation and research.



The complexity of inter-species coexistence

One of the most striking examples of how complex inter-species coexistence can be in an urban environment is that of pollen.

Even though pollen plays a crucial role when it comes to plant reproduction and pollination, it can also be a source of public health problems, triggering a number of respiratory allergies. In many cases, the management strategies involve pruning or

removing pollen-rich plants. But there is a downside to such an approach: among the potential negative ecological consequences are reduced plant diversity and the loss of pollinator habitat. A more environmentally friendly and balanced management approach could involve planting varieties that are less allergenic and promoting public awareness of pollination periods, to limit exposure.



Can we coexist with "pest" species?

Many ecologists are questioning the conventional concept of "pest" species and are advocating a more nuanced and balanced approach to cohabitation between humans and non-humans.

This new way of thinking is based on a better understanding of ecosystems and the crucial role that species play in maintaining ecological balance. Insects, for instance, sometimes seen as parasites, play a key role in the pollination process, which in turn is vital for plant reproduction. Although rodents are commonly seen as vermin, they actually help to break down organic matter and aerate the soil, which in turn promotes plant biodiversity.

By favouring non-lethal management methods, such as using natural repellents or installing protective devices, there are ways of reducing conflicting interactions without causing harm to other species.

The role of new teaching models

An increasing number of players are recognising how essential it is to foster a **decompartmentalised, all-inclusive approach that bridges the different facets of a person's being and existence, and that combines knowledge, technical expertise, know-how and interpersonal skills.**

In France, this is known as "transition pedagogy," a term coined by the Transition Institute, and it is also referred to as "education for sustainable development," as promoted by the United Nations. It involves introducing a new style of teaching theory and practice. The aim of this new "Mind-heart-gut" teaching method is not only to



Many players actively involved in the ecological and social transition are using this holistic educational approach to raise awareness and help speed up the decision-making process that ultimately ensues.

This is the case, for example, with the Convention des Entreprises pour le Climat (CEC), which uses methods such as U Theory and Travail Qui Relie (Work That Reconnects) to run programmes to raise awareness and encourage change for business decision-makers.

Their mission is "to make the switch from an extractive to a regenerative economy irresistible by 2030."



offer students access to scientific content and knowledge (the cognitive dimension), but also to ways of thinking and acting (the behavioural dimension). There is also a strong emphasis on emotion and self-awareness (the emotional dimension).

According to the United Nations 2030 roadmap for "Education for Sustainable Development," scientific knowledge of the environment should no longer be the sole basis for education relating to sustainability, but also it should pay due attention to empathy, solidarity and practical skills, so that individuals feel themselves empowered to transform both themselves and society.



GOOD TO KNOW

The Mind-Heart-Gut approach can be applied to create richer, more engaging learning experiences on ecological issues, by combining scientific knowledge, sensory experiences and an emotional connection with nature.



U Theory

U Theory is a methodology for change and innovation developed by Otto Scharmer of MIT. The approach involves using a U-shaped process to tackle complex problems and generate profound change (to address environmental and social issues), by integrating individual and collective introspection. There are three stages to this approach, which can be represented in the form of a U-shape:

- **Down Engaging** in deep observation and active listening
- **Bottom:** Connecting with a source of inner inspiration
- **Up:** Rapidly prototyping ideas and iterating solutions

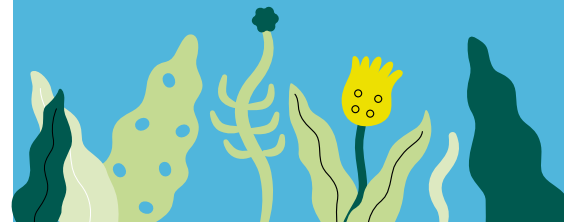
This approach seeks to transcend habitual ways of thinking in order to achieve deeper creativity and transformative innovation.

The Work That Reconnects

The Work That Reconnects is an approach developed by philosopher and environmental activist Joanna Macy designed to help us all “take part in healing the world” in order to achieve “the epochal shift from a self-destructive industrial growth society to a life-sustaining society.” (Macy, 2009). The process unfolds in a spiral of four steps:

- **Coming from gratitude:** recognising what sustains and nourishes us
- **Honouring our pain for the world:** acknowledging our reactions of fear, anger and sadness in the face of global tragedies, and being accountable for them.
- **Seeing with new eyes:** developing a new perspective on how we relate to the living world
- **Going forth:** identifying our aspirations harnessing our talents and resources in service of life, and finding allies to support meaningful action for change

The purpose of this programme is to connect us to the “web of life” so that we can transform despair and inertia into collaborative and creative action.



INSPIRATION

Nature Education Network

The RPPN is a nature-based educational network (Réseau de Pédagogie Par la Nature) that operates with the aim of promoting and developing educational initiatives that allow children and adults to focus on nature.

Drawing inspiration from Nordic educational models, it sets out to help people reconnect with their natural surroundings through outdoor learning methods. The RPPN provides teacher training, organises events and shares educational resources to promote a holistic understanding of ecosystems and a greater bond between humans and nature.

By encouraging children and adults to explore and learn in a natural setting, the network contributes to developing an ecological awareness and a profound respect for all living things.



A visionary tale

The culture of living together

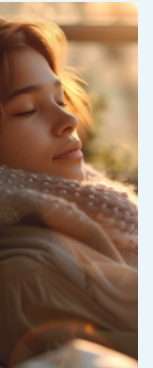
By 2040, the city of Nova Verde has completely transformed its relationship with nature and its inhabitants. Instead of trying to dominate the ecosystem, Nova Verde is seamlessly integrated into it, creating a balanced coexistence among plants, animals and people.

Education plays a central part in this vision, thanks to forest schools, where children connect with and learn to respect urban wildlife. Initiatives like installing nesting boxes for bats demonstrate the importance of cohabitation and acceptance of all the different elements of the ecosystem. The city also adopts practices such as eco-grazing and encourages respect for natural cycles, setting aside certain periods to encourage biodiversity and adapting human activities to the seasons.

Day-to-day urban life in 2040 revolves around the seasons and natural cycles. Residents live in harmony with their natural surroundings, reducing night-time lighting to support animal welfare, which also leads to savings in energy consumption. Waterways, streams and green spaces are given prominence to encourage city dwellers to reconnect with nature. Public areas are designed as places to meet and raise awareness, with an emphasis on initiatives and practices that encourage a closer relationship with living things. Every

citizen is given opportunities to engage in regenerative efforts by joining community ecological projects, rethinking their work-life balance, and embracing natural rhythms in their lives.

The city’s social and cultural landscape has also undergone transformation in support of this new vision. Media and influencers play a crucial role in encouraging citizens to embrace a greener lifestyle and to promote new virtuous social norms, such as encouraging responsible consumption, working as a community and making a commitment to solidarity. Through art, culture and new imaginary worlds created by media figures, local residents find inspiration and motivation to participate actively in this ecological transition. New vernacular is emerging, with terms and concepts suited to this harmonious coexistence with nature, challenging outdated views and paving the way for a future in which humans and ecosystems thrive together.



WHAT IF...?

- 1** We incorporated staged settings into property and urban projects to foster an appreciation for ecological spontaneity?
- 2** Regeneration were as much about social, experiential and cultural aspects as it was about ecological ones – a socio-ecological regeneration?
- 3** We accepted the return of nature and allowed it to reclaim its rights?
- 4** Restraint and resilience based on solidarity became a desirable and shared vision?

Further reading and viewing



The concept of the regenerative city is much more than an evolution in sustainable urban planning. It embodies a fundamental paradigm shift in how we envision, build and inhabit our urban spaces.

Beyond simply reducing negative impacts, the regenerative approach seeks to design urban environments that actively nurture healthy ecosystems and the well-being of all living beings. It encourages us to radically reconsider our relationship with “nature,” moving away from a dominating approach to one based on symbiosis and co-evolution.

This holistic vision of the city as a living organism brings with it fresh perspectives on how to tackle the environmental and social challenges we face. The aim is

to harmonise human activities with the ongoing evolution of life on our planet, to (re)align human community development with the natural systems that sustain them.

The regenerative approach calls not only for an overhaul of our urban and architectural practices, but also for a shift in our economic models and systems of governance. While these challenges are complex, the examples and initiatives in this Trend Note illustrate the relevance of regenerative approaches in urban environments.

This Trend Note is a call to action, inspiring us to reimagine and transform our cities into vibrant, regenerative ecosystems where human prosperity and the health of our planet thrive together.

Players

- **Regenes Group** offers support and training for professionals in architecture, planning and community development in the field of regenerative development on an international level. www.regenesgroup.com
- **La Convention des Entreprises pour le Climat** (Businesses for Climate Convention), a French public-interest organisation that runs awareness-raising and transformation programmes for business decision-makers, with the aim of ensuring that the shift from an extractive to a regenerative economy is irresistible by 2030. <https://cec-impact.org/>
- **Lumiã**, a centre for research, strategic innovation and training focusing on regenerative companies in France. It has published a study report on regenerative companies, which can be downloaded on its website. <https://lumia-edu.fr/recherche-action/publications>
- **Nous sommes vivants**, a French collective dedicated to supporting ecological transition in businesses and local authorities by regenerating living organisms. <https://noussemsvivants.co/>
- **Regenes Institute for Regenerative Practice** offers training in regenerative approaches across several continents. <https://www.regenerat.es>
- **Metabolic City Chair**, initiated by PCA-STREAM and supported by PSL University (launch in 2024), aims to study the city as a living organism to tackle environmental and social challenges. <https://psl.eu/chaire-ville-metabolisme>
- **Regen'Ecosystem**, an initiative created in February 2024, brings together professional and associative organisations to accelerate a regenerative economy.
- **Stockholm Resilience Centre**, an internationally renowned research centre dedicated to studying socio-ecological resilience and sustainability. www.stockholmresilience.org

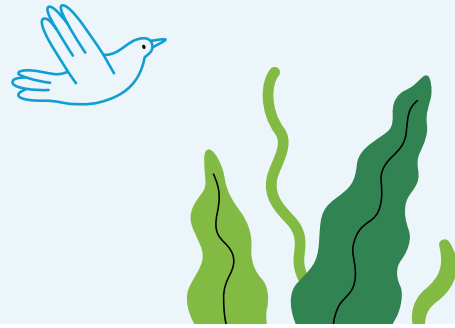
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- Morizot, B. (2020). *Ways of being alive*, Editions Actes Sud.

Training programmes

- **Butterfly School**: A movement co-created by AXA Climate, Lumiã, La Jolie Prod and Regenerescence, offering a 10-week digital course on regenerative business. <https://butterfly-regen.com/>
- **Regen'leaders**, a training programme from LUMIA designed to engage businesses in regenerative practices <https://lumia-edu.fr/page/regen-leaders>
- **Sator**, a training platform for transitions, offering a module by researcher and biologist Olivier Hamant: *Building Robustness: Learning from Nature to Make Systems Resilient*. <https://www.sator.fr/cours/construire-la-robustesse>
- **MOOC (massive open online course) by the Collège des Directeurs du Développement Durable (C3D):** *Understanding the Ecological Crisis to Reinvent the Business*
- **RegenSchool**: top management school, dedicated to helping companies adapt to the planet's limits.
- **Regenerative Economy Fresk**, a 3-hour workshop designed to engage organisations in the shift to a regenerative economy.





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Credits

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Strategy Department, Prospective Team – Bouygues Construction
– prospective@bouygues-construction.com

Editorial Committee: Virginie Alonzi, Elsa Favreau, Claire Meunier, Paola Sierra

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Bouygues Construction

1, avenue Eugène Freyssinet - Guyancourt
78061 Saint-Quentin-en-Yvelines Cedex - France
Tél: +33 (0)1 30 60 33 00

www.bouygues-construction.com
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