

# Capacity Building on Regenerative Design by ACCIONA

*This document is a supporting material to the capacity building organized by the IURC Central Coordination Services in coordination with the Geographical Areas on March 7th, 2023. The training session was held in two sessions (morning for Asia & Australasia and China; afternoon for Latin America and North America) aimed to provide knowledge and understanding of the benefits and potential of regenerative approaches in creating resilient and liveable cities, as well to support the programme's worldwide pairings and clusters to path the way of their ongoing projects during the last year of the programme.*



## What is Regenerative Design?

As the latest IPCC report<sup>1</sup> concludes, human activity is irrefutably to blame for the planet's deterioration. In this context, sustainability, as an idea of not inflicting further damage to our ecosystems, is no longer enough for us to meet the present and future challenges that global warming poses. Therefore, *sustainable regeneration* is a step beyond sustainability.

The concept of **regeneration** is described as the act of **improving a place or system**, especially by making it more active or successful. Hence, regeneration implies a renewal process that relates to a variety of action to transform some set of physical and socioeconomic variables.

In this line, regeneration means **to evolve from** the concepts of **responsibility** (not to harm not harm the health of social and natural systems) and **resilience** (to adapt to a changing world through innovation) **to** the concept of **regenerative** which implies to repair the damage done to social and environmental systems and to bring our economic activities into alignment with the way that nature operates.

The **objective of regeneration** is to unite, add value and positively impact the planet. To do so, it is crucial that the following **three regenerative elements** are in place:

- Environmental recovery.
- Social justice.
- Financial transformation.

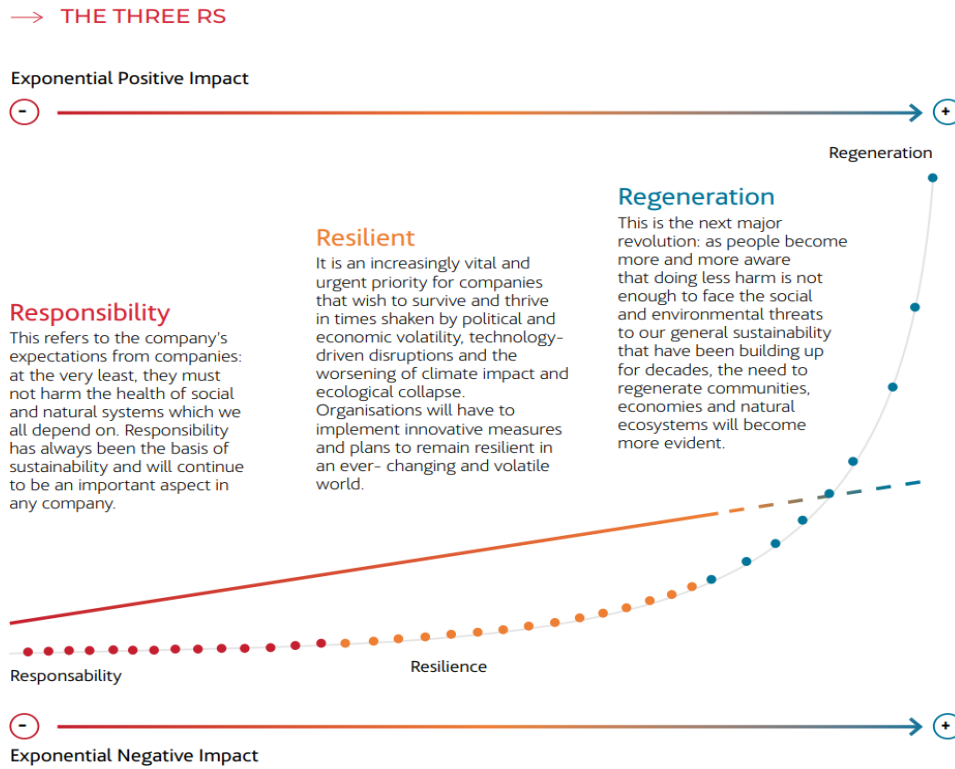
Understanding Regeneration as some form of repair or improvement, **Sustainable regeneration** is a commitment towards:

- Mitigation.
- The development of projects capable of removing some of these CO<sub>2</sub> emissions from the atmosphere.
- Reduction, to make a positive impact as an activity that generates a healthier planet and actions that fight to protect and repair biodiversity.

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<sup>1</sup> IPCC AR6 Synthesis Report of the IPCC Sixth Assessment Report (AR6) (2023).  
Link: <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>

Figure 1. Evolution of the 3Rs. From Responsibility, through Resilience to Regenerative



Source: ACCIONA Sustainability Report 2022

Together with the climate crisis, sustainable regeneration addresses systemic inequalities to reduce diversity gaps and, again, generate a positive impact on communities and society. That's to say, it increases the value of infrastructures' social services in order to improve their efficiency when it comes to transformational talent and carefully monitor the impact of activity on people and their well-being.

Sustainable regeneration recognises the interconnectedness between human and environmental wellbeing and focuses equally on both. Moreover, it emphasises the goal of creating net positive outcomes in human and environmental wellbeing, not just reductions in damage or doing no harm.

The Sustainable Development Goals (SDGs) and one of their universal values, "Leave no one behind," act as the compass that marks the path of sustainable regeneration and puts people at the centre of its objectives.

**Regenerative design** is an approach that aims to create sustainable systems and environments that are not only less harmful to the environment but also have the capacity to **restore and regenerate** natural resources. It is based on the idea that humans can play an active role in regenerating and improving ecosystems rather than just mitigating negative impacts.

**Regenerative design** relies on the **principles** of integrity, biomimicry, and circularity.

**INTEGRITY** - Integrity relates to the holistic perspective of involving in the process all the stakeholders while ensuring that actions align with stated goals and principles and the intended outcomes.

**BIOMIMICRY** - Biomimicry is the practice that seeks inspiration from the natural world, observing and analyzing biological structures, functions, and strategies that have evolved over billions of years. By understanding and applying these principles, the technologies, materials, and approaches that mimic or are inspired by nature's patterns, forms, and processes can be developed. The goal of biomimicry is not merely to replicate nature's appearance but to understand and leverage its underlying principles and strategies to address human challenges more sustainably and efficiently.

**CIRCULARITY** – Also inspired by natural ecosystems, circularity refers to the constant flows of materials and energy. In a circular economy, unlike in a linear economy based on a 'take-make-consume-throw away' pattern, the materials contained within products are reused, turning waste into a valuable resource. The circular economy is based on three principles, driven by design: to eliminate waste and pollution; to circulate products and materials (at their highest value) and; to regenerate nature. Additionally, circularity must be conceived as a local and regional level concept.

Within an **urban context**, regenerative design aims at revitalizing problem areas – namely by addressing shortcomings in natural and built environments, heritage conservation, social integration and employment and economic activities – in cities and their surroundings, but also in rural settings.

**Urban regeneration** increases urban prosperity and **quality of life** and also redistributes opportunities. Urban regeneration requires a diversity of approaches, such as redevelopment of brownfields, densification and intensification strategies, the diversification of economic activities, heritage preservation and reuse, public space reactivation and strengthening of service delivery.

Additionally, urban regeneration ensures affordability, access to services and involvement of local residents to promote local economic development, where public space is a key element of interventions, and cities reduce environmental impact and Greenhouse Gas (GHG) emissions. The preservation and valorization of historic and cultural heritage is a key opportunity for urban regeneration as well.

Regenerative design embeds a **systemic and holistic approach** for the environment, based not only in creating zero-emission or **circular cities**, but also in advancing further and creating a real **positive impact** on the environment by actively **improving the health of ecosystems** by reversing anthropological degradation and allowing for active natural recovery is advised. Regenerative design guarantees active ecological gain through endured responsibility and stewardship over resources, also providing benefits for social and natural capital. For example, by enabling a higher degree of biodiversity and creating a symbiotic relationship between natural and human-built systems.

## The regenerative concept for cities and regions

A **regenerative city** is one that has developed an environmentally enhancing, restorative relationship with the natural system whose resources it depends on, as well as fostering urban communities where people benefit from this process.

Within the city, this is likely to mean more green spaces, fewer cars, and more locally produced food, among other things. And the implications expand well beyond traditionally defined city limits to encompass a symbiotic, mutually beneficial relationship between the city and its surrounding region.

A **regenerative regional economy** is one in which financial value creation is inextricably linked to social and environmental value creation. In a regenerative economy it no longer pays to externalise costs onto society and future generations, but it does pay to replenish and restore stocks of natural, social, and human capital. A regenerative economy looks different from today's dominant model of capitalism in several ways.

A **bioregion** is a region whose limits are naturally defined by topographic and biological features (such as mountain ranges and ecosystems). This term is often used in regenerative literature.

Bioregions do not necessarily map to legal/national or municipal areas but include several ecosystems.

A **regenerative infrastructure** is one that creates the conditions for life and living systems to flourish in the projects and places and represents a shift towards a more pioneering and more activist mindset.

## Creating regenerative cities

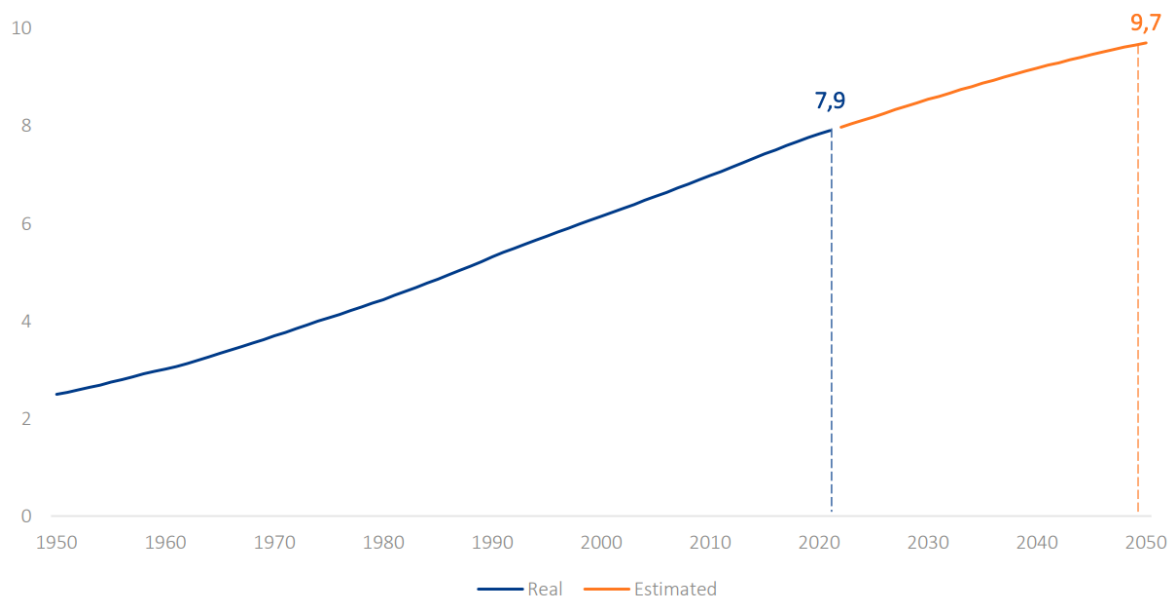
There are more people living in cities than not. Globally, over 55% of the population (4.4 billion inhabitants) lives in urban areas today. By 2045, it is expected that the world's urban population increases by 1.5 times to 6 billion and, **by 2050** this trend is expected to continue with the **urban population** more than doubling its current size, reaching nearly **7 of 10 people living in cities**.

Population growth will place **extra demands** on both resources and services in urban areas, posing major challenges. Some of the key challenges include:

1. **Urban Sprawl.** Rapid population growth often leads to unplanned urban expansion, resulting in sprawling cities. This leads to increased demand for land, infrastructure, and services, putting a strain on resources and exacerbating environmental issues.
2. **Housing and Affordability.** As the population grows, the demand for housing increases, leading to affordability challenges. Many urban areas struggle to provide adequate and affordable housing options for the growing population, resulting in informal settlements and slums.
3. **Infrastructure and Services.** The influx of people in urban areas puts pressure on existing infrastructure and services such as transportation, water supply, sanitation, healthcare, and education.

4. **Environmental Degradation**, contributing to increased pollution, resource depletion, and habitat destruction. Urban areas face challenges related to air and water pollution, waste management, and loss of green spaces.
5. **Social Inequality**, including limited access to basic services, economic opportunities, and social amenities disproportionately that may affect vulnerable and marginalized communities, leading to social exclusion and disparities.
6. **Transportation**. Increased population density often leads to inadequate transportation systems. This not only affects mobility but also contributes to increased air pollution and commuting times.

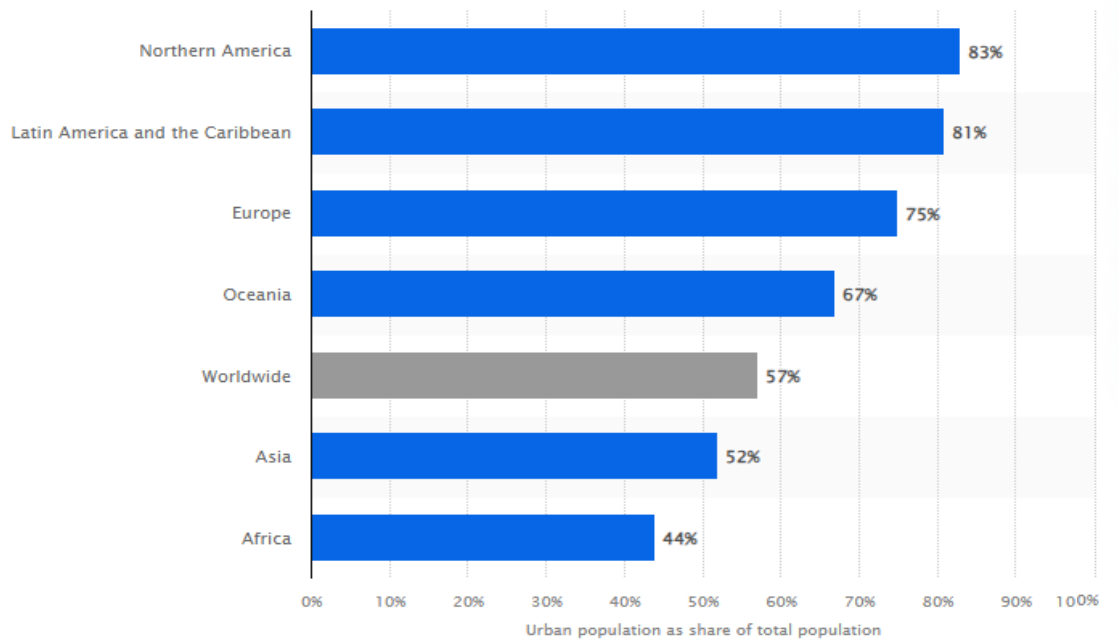
Figure 2. Global population projection 1950-2050



Source: United Nations - Population Division (2022)

In 2022, the **most urbanized regions** included **Northern America** (with 83% of its population living in urban areas), **Latin America and the Caribbean** (81%), **Europe** (75%) and **Oceania** (67%). The level of urbanisation in Asia is now over 50%. In contrast, Africa remains mostly rural, with 44% of its population living in urban areas.

Figure 3. Share of urban population worldwide in 2022, by continent



Source: Statista.com<sup>2</sup>

As the world continues to urbanise, **sustainable development** depends increasingly on the successful **management of urban growth**. Cities already are and will face challenges in meeting the needs of their growing urban populations, including for housing, transportation, energy systems and other social and water-related infrastructures. This scenario requires a **new approach for infrastructure development** turning the challenges into opportunities when they are approached from the regenerative perspective of **reimagine the infrastructures**.

In terms of the current **climate scenario**, urban areas play an increasingly important role in tackling climate change, due to their exposure to climate and disaster risk increases as they grow. Additionally, while cities are responsible for the 70 percent of Greenhouse Gas (GHG) emissions, they are also being hit more and more by climate change related shocks and stresses, ranging from more frequent extreme weather events to inflows of climate migrants. The urban areas' **response to the climate challenge** needs to be approached from **resilient infrastructures**, and innovation and the development of more sustainable cities.

Combining both, growing population and climate change, challenges, the **regenerative design** methodology arises as the **key tool** for urban areas to best achieve sustainable development.

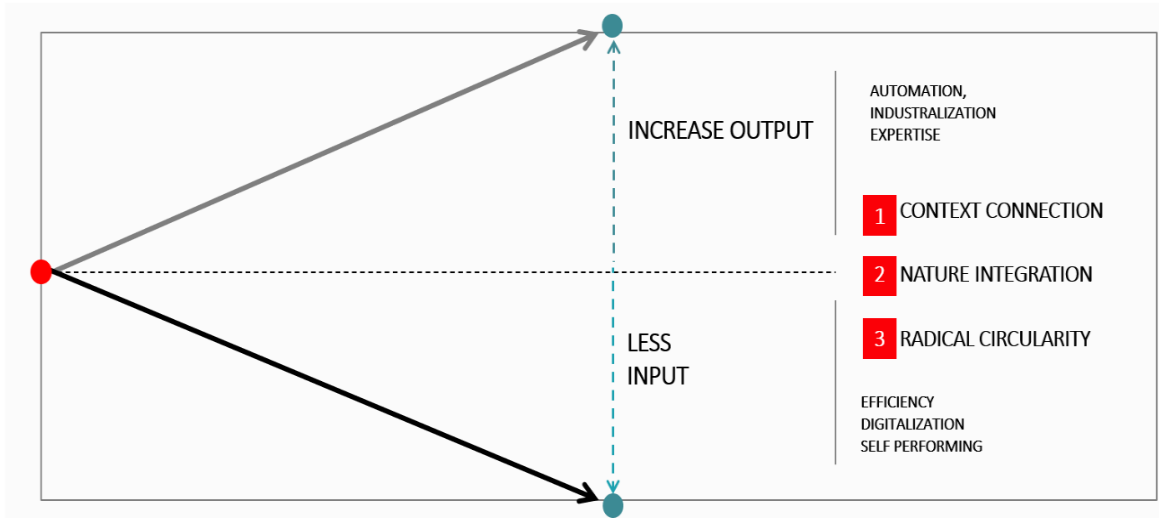
The **regenerative Infrastructure** sets the conditions for life and living systems to flourish as it requires the generation of a network in order to success. The approach takes into account three elements:

- Context connection.
- Nature integration.
- Radical circularity.

<sup>2</sup> Statista.com: <https://www.statista.com/statistics/270860/urbanization-by-continent/>

Figure 4. Regenerative Infrastructure

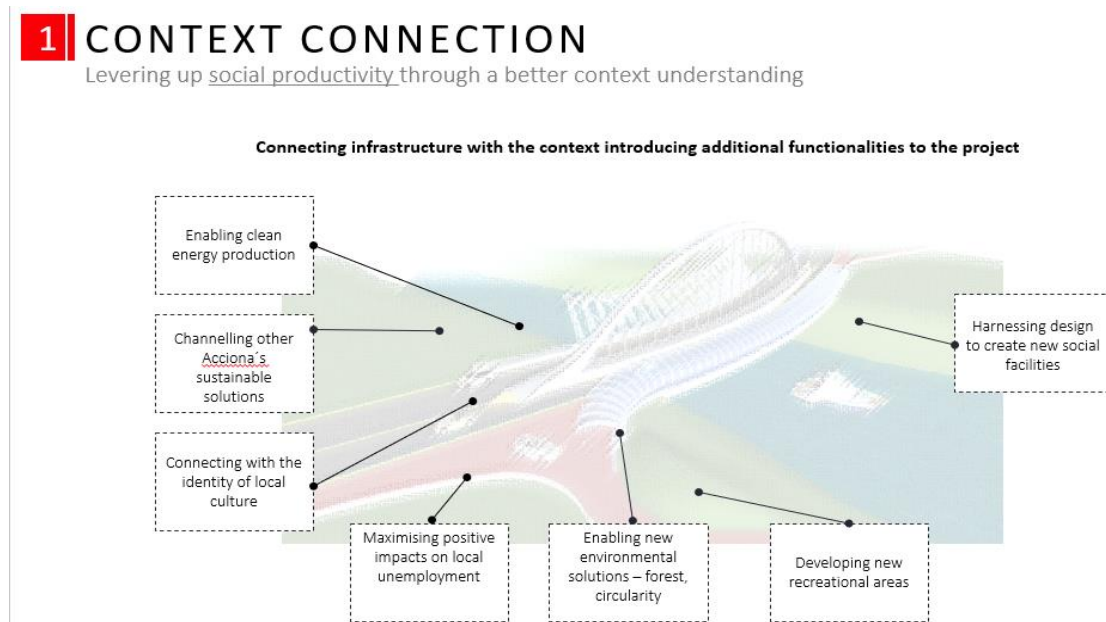
Boosting infrastructure performance. Balancing value creation and resource consumption



Source: ACCIONA's Capacity Building material

**CONTEXT CONNECTION** – It relates to the process of understanding and integrating the specific characteristics, needs, and dynamics of a particular site or community into the design and implementation of sustainable infrastructure projects. It recognizes that each location has unique social, cultural, environmental, and economic contexts that should be considered to create successful and regenerative solutions.

Figure 5. Regenerative Infrastructure. Context connection



Source: ACCIONA's Capacity Building material

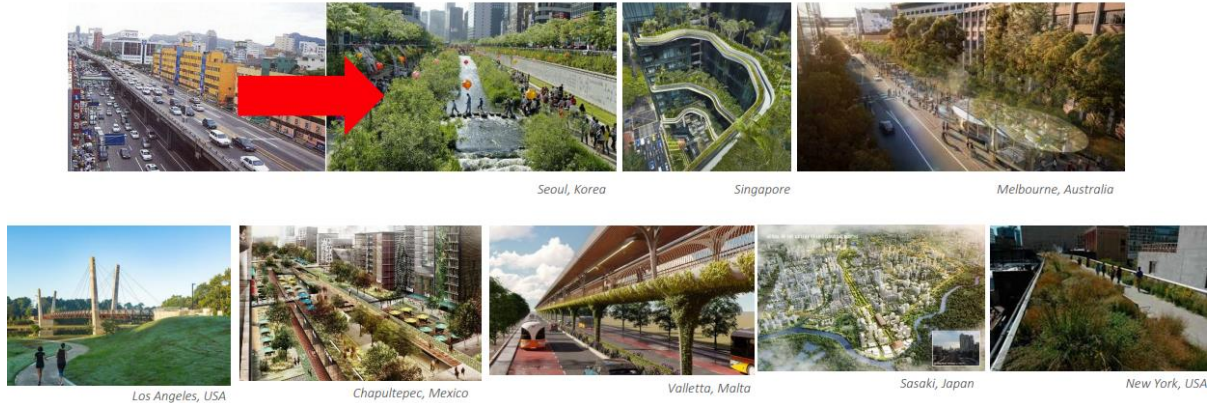
**NATURE INTEGRATION** - In regenerative infrastructures, it refers to the deliberate incorporation of natural elements and processes into the design and operation of built environments. This approach aims to create sustainable and resilient structures that harmonize with the surrounding ecosystem, provide ecological benefits, and enhance the overall well-being of people.



Figure 6. Regenerative Infrastructure. Nature Integration

## 2 NATURE INTEGRATION

Infrastructures that synergize with the planet rather than overpower it



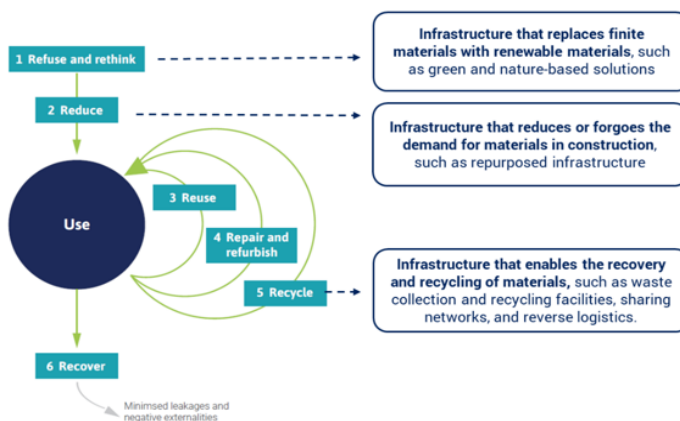
Source: ACCIONA's Capacity Building material

**RADICAL CIRCULARITY** – It means to apply the principles from the circular economy concept in the design, construction, operation, and end-of-life stages of infrastructure projects. The goal is to minimize resource consumption, waste generation, and environmental impact while maximizing resource efficiency, resilience, and economic value.

Figure 7. Regenerative Infrastructure. Radical circularity

## 3 RADICAL CIRCULARITY

Net-zero infrastructures



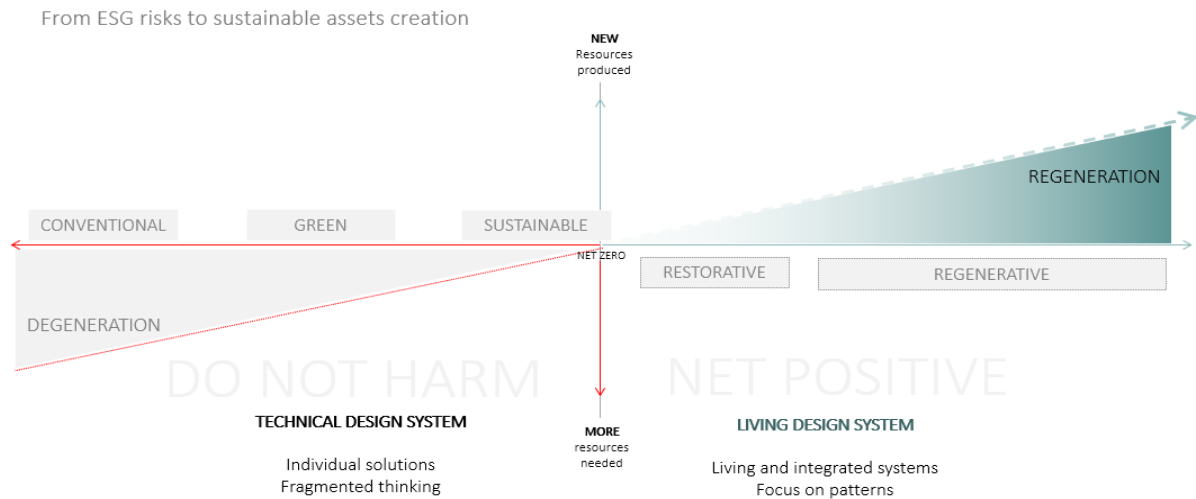
Other practices	Percentage
<b>Recycling materials</b> ✓ The use of recycled aggregates generates 40-70% fewer CO2	20%
<b>Reusing materials</b> ✓ Only 20-30% CDW is recycled or reused	20%
<b>Eliminating waste during construction</b> ✓ Up to 40% of waste is CDW	10%
<b>Eliminating waste from design:</b> ✓ Using only 50-60% of the amount of cement ✓ Designing with less but high-strength materials ✓ Using techniques such as post-tensioning can reduce 30% of steel.	50%

Source: Ellen Macarthur Foundation- [How the circular economy tackles climate change](#) (2021)

Source: ACCIONA's Capacity Building material

To summarise, a **regenerative approach** will include bringing together key partners, collaborators and communities in the design phase to build and tap into the capabilities needed to deliver regenerative outcomes; understanding future climate and socio-economic shifts; looking at designs that encourage biodiversity to thrive; realising the importance of community culture and the prevalence of inequality and unemployment; looking for ways to generate economic opportunities for the local workforce, including minorities.

Figure 8. Regenerative Infrastructure



Source: ACCIONA's Capacity Building material

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