BIOREGIONAL APPROACH FOR REGENERATING URBAN SPACE

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ABSTRACT

Bioregional approach in architecture, rooted in the principles of place-based design and ecological resilience, proposes a holistic framework for regenerating urban spaces. This approach integrates local natural systems, cultural heritage, and regional material supply chains to create urban environments that are not only sustainable but also regenerative, actively restoring ecological balance and enhancing biodiversity. Today, it's not enough to provide sustainable design, which at best achieves a form of neutrality in which all negative impacts have been mitigated. It is now time to excel in regenerative design, where our approach to design needs to better factor in externalities and wider impacts that arise through supply chains and building processes in order to address the biodiversity crisis and ecosystem impacts of our industry. The aim of this article is to understand the principles of regenerative design and how it differs from sustainable design. To research "bioregionalism" as a regenerative design approach and introduce practical bioregional examples. Based on that, to understand how such an approach can help to regenerate urban space, what are the benefits of such an approach, and how does it add benefits?

KEYWORDS

Regenerative design; sustainability; bioregionalism; regenerative materials; clay

1. INTRODUCTION

1.1. Problem statement and background

The built environment faces a pressing need to evolve towards regenerative design, an approach capable of creating net-positive impacts for ecosystems, enhancing biodiversity, and strengthening resilience. It's an approach that better factors in externalities and wider impacts that arise through building material supply chains and building processes to address the biodiversity crisis and ecosystem impacts of our industry. *However, instead of limiting environmental damage, regenerative design aims to establish a beneficial coexistence of ecological systems that are able to actively restore the environment* (Reed 2007). Quoting one of the leading practitioners of regenerative design, Bill Reed: *"Regeneration goes beyond reducing harm- it implies active participation with ecological systems, using their health as a core basis for design"* (Reed 2007).

1.2. Methodology

Regenerative design – bioregional approach – regenerative local material.

From there, the research is set to better understand what regenerative design is, how it can create positives for people and the place. As the study unveils, since there are many regenerative approaches, each being a comprehensive subject, there is a limit set to this study to focus specifically on the bioregional approach and finally to investigate the potential of the use of regenerative local material, such as clay, in building design.

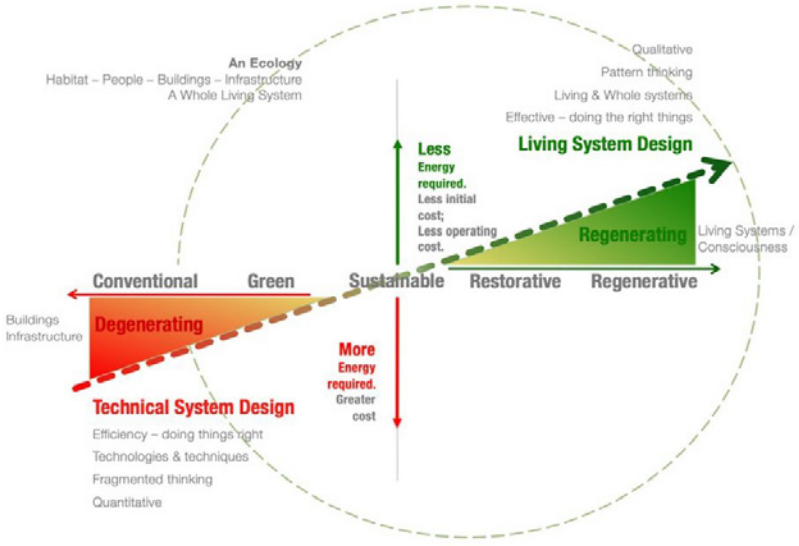

Figure 1. Scheme of the trajectory of environmentally responsible design.

2. BIOREGIONALISM IN THE CONTEXT OF REGENERATIVE DESIGN

To understand the principles of regenerative design. To explain that bioregionalism is an act of regenerative design.

By definition, Regenerative design is an approach in which human systems are designed to co-exist and co-evolve with natural systems over time. It proposes to deliver a net positive impact for the environment and enhance resilience. (UK Architects declare 2024)

A question arises about how it differs from “sustainability.” According to Bill Reed’s scheme of trajectory of environmentally responsible design (Figure 1), it is not intended that the two are in opposition but rather that ‘regenerative’ includes and transcends the ‘sustainable’. According to the UK Architects Declare Network scheme, it does so in three key ways. Within these key ways, it is possible to see how it aligns with bioregionalism principles: (Figure 1)

1. From being ‘less bad’ to being net positive.

By net-positive, meaning that projects are designed to rehabilitate and enhance ecosystems—such as improving watershed health, regenerating soils, and enhancing biodiversity—rather than merely reducing environmental damage.

2. Considering the whole web of life.

It’s a principle which is similar to Bill Reed's term of participation with nature (Reed 2007), where design solutions actively engage with and mimic natural processes, incorporating natural systems into built environments, and is covered in research of such topics as Biophilia and Biomimicry. Under this principle could also fit the approach of a place–based design integration, which means that such projects are developed with a deep understanding of the local ecological context and is a core idea of bioregionalism.

3. Holistic and systemic approach.

By holistic and systemic meaning, the principle of holistic resource management, for example, where regenerative projects aim to close resource loops by using materials that could be sourced from the local bioregion, making a positive contribution to the local economy, which is an act of practical bioregionalism.

3. BIOREGIONAL APPROACH

3.1 Concept origin and main principle

A bioregional approach that examines how specific geographic and ecological qualities can reestablish the connection between buildings and the unique places they inhabit.

Bioregionalism is a framework that aligns economic practices with the ecological and cultural characteristics of specific bioregions. These regions are defined by biology (for instance, by watersheds and bioclimatic characteristics) rather than by abstract political boundaries. In other words, it defines place through natural, ecological, and cultural systems rather than political boundaries. As a term it clarified and gained momentum in the early in the second half on 20th century however, the ideas around it are older and was formulated already around 1900's by Scottish town planner Patrick Geddes who is considered a proto-bioregionalist due to his ideas about expanding our notion of cities to way beyond their official city boundaries (Daniel Christian Wahl. 2017) making a case that the city and its region are in a symbiotic, relationship. One cannot know the city without first understanding its relationship with its city region. In the 1970s, as a term, bioregionalism was pioneered by Peter Berg and Raymond Dasmann and emphasizes the importance of developing a "bioregional consciousness," an intimate awareness of local natural processes. Since then, bioregionalism has emerged in various science disciplines such as ecology, geography, and environmental philosophy, and has started to influence regional spatial planning and design. Until recently, bioregionalism was deeply embedded in regenerative architecture, which views buildings as participants in ecosystems.

3.2 "Living-in-place" concept

Bioregionalism is both a philosophy and a practical approach. As a thought represents a philosophical shift towards reconnecting the built environment with ecological systems, thereby creating designs that sustain and regenerate local natural resources. One of the key concepts in Bioregional philosophy is the Living in place concept, which involves developing a (so-called) Bioregional consciousness, the awareness of the dynamical processes of nature in our local environment, which can help connect us to a specific site and its locale. (Glotfelty et al. 2014). Practically, it involves deeply understanding and integrating natural and cultural characteristics into the design and planning. What has happened nowadays is that most people, as spatial practitioners, may be experts in their fields of interest but know little about the place and the region they inhabit. To prove or disprove this point, a Bioregional quiz comes in handy, which was designed by Leonard Charles in 1981 (Charles 1981). It is a self-scoring test on basic environmental perception of place and consists of 20 questions, which are meant to quickly establish to what degree you, personally, are familiar with your own local bioregion. It consists of questions like;

- *1. Where is the water coming from that you will drink? Trace it from tap to precipitation. Where will it go?*
- *3. What soil series are you standing on?;*
- *4. What was the total rainfall in this area last year?;*
- *13. Name five grasses in this area. Are any of them native?*

The philosophy of living-in-place is about raising awareness, knowledge, and identity of the immediate environment, which makes people assume responsibility for the place in which they live and allows them to develop a sense of place. Such responsibility for the environment is also at the very heart of long-lasting sustainability.

3.3 Bioregional resources. Atelier Luma example.

As a practical approach, bioregionalism promotes sustainable development by advocating for local material resources, which in turn supports regional economies, minimizes ecological impacts due to a shorter material supply chain, and also re-establishes the connection between buildings and the unique places they inhabit.

Lot 8 building for the research design lab Allier LUMA in Arles, France, is a wonderful example of a practical contemporary bioregionalism approach in architecture. Atelier Luma is the research design lab that focuses on investigating new regional materials and has been deeply

Figure 2. Bioregional resource map of the LOT 8 building in Arles, France. BC Architects

connected to its geographic and cultural environment by investigating the Arles bioregion (Atelier Luma, 2023). They have been applying their research to constructed buildings with a particular example of the renovation of a former 19th-century train depot building called the Lot 8, where most of the renovation material is sourced from the close region originating from within 70 kilometres (Figure 2).

The resulting building is a showcase of innovative bio-sourced materials and regional industry by-products such as rammed earth, where clay as a binding material has been sourced from quarries of the Arles region, Panels made from sunflower fibres, rice straw, sea salt, etc., and showcases the previously mentioned regenerative design principle of whole-systems thinking at its best. In the process of researching possibilities of the local bioregion, designers and makers have activated the undervalued resources by experimenting with new forms and material prototypes.

By highlighting these resources and methods, the renovated building resonates with local heritage and landscape. Aesthetically, the results are infused with the territory's culture and natural surroundings. When a new material, for instance, showcases the lived experience of a place through its colours, style, or applications, it contributes to preserving and enriching local identity. The example clearly shows how bioregionalism can be applied in practice. As shown, it is a broad ecological and cultural philosophy, in comparison to the locally sourced material concept, which is related but differs in scale. It helps to develop a connection to a certain place; to be nested in it, therefore, it adds value and is a practice that is able to regenerate.

4. USE OF CLAY AS A BIOREGIONAL, REGENERATIVE MATERIAL.

4.1 Benefits of clay as a building material.

Clay is a product of Earth's erosion and compression. Whilst new clay deposits are constantly forming, it is a slow process; therefore, as a material, clay is best understood as a non-renewable resource, yet it can be considered as a regenerative material due to a number of reasons if used in its natural, unfired form.

Firstly, clay remains abundant across much of the Earth’s surface, which means it’s widely accessible and, as Atelier LUMA's example shows, it can be easily integrated into regional supply chains. Secondly, from a technical point

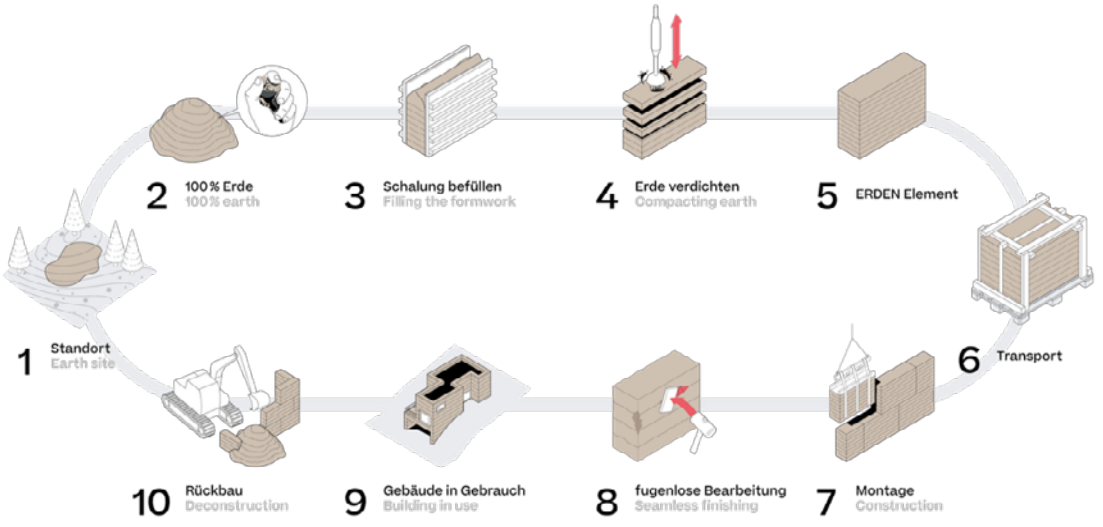

Figure 3. The diagram emphasizes the cyclical nature of rammed earth construction, which starts and ends with the natural earth, with minimal environmental impact.

of view, because of its water solubility, nearly all constructions of unfired clay can be returned to the biosphere at the end of their useful lifespan. (Figure 3.) (Islam, Massoud, Gormley, 2022). There are multiple known techniques in which natural clay is used as a binder for wall and floor constructions, such as rammed earth, earth blocks, and light earth (Figure 4).

These clay-based constructions make for healthy internal environments. As Martin Rauch, one of the contemporary pioneers of rammed earth constructions, points out: "..absorbing and expelling moisture is one of its (rammed earth) most remarkable properties. Because untreated rammed earth can still breathe, the building and its occupants can exchange moisture, and excess condensation is transmitted out of the wall through capillary action" (Heringer, Howe, and Rauch 2022). To summarize, clay-based construction's technical versatility and ecological compatibility can play a key role in a shift towards a cyclic approach to construction. (Islam, Massoud, Gormley, 2022)

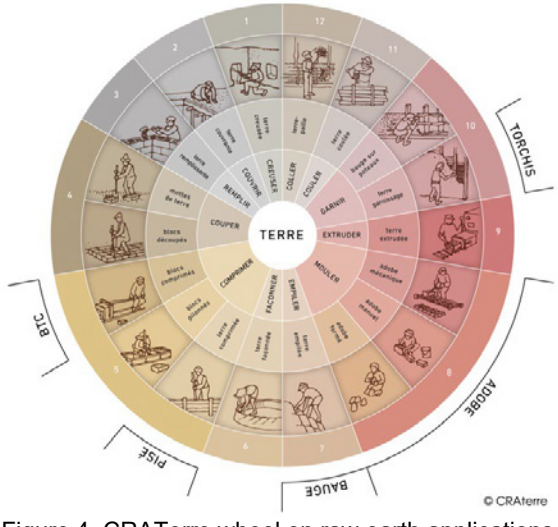

Figure 4. CRATerre wheel on raw earth applications. (Houben H, Guillaud H, 2006, Traité de construction en terre, Éditions Parenthèses)

4.2 Use of clay as a regenerative and bioregional act.

The benefits of clay in construction aren't only technical; more than this, it also provides a rich aesthetic palette that expresses cultural diversity and generates a strong sense of place, which can be felt when inside a house made of earth. This feeling directly resonates with the bioregional principle of living-in-place, anchoring

Figure 5. Fort V, Regional house of the Edeghem commune, BC Architects. Volunteers help to work on the production of more than 19,000 compressed earth blocks using locally sourced clay. Photo credit Thomas Noceto

Figure 6. Fort V, Regional house of the Edeghem commune, BC Architects. Regional House is a warehouse for children to learn about nature and ecology. The completed building reflects this educative and ecological approach through a radically sustainable and participatory architecture. Photo credit Thomas Noceto

one to an ecological and cultural context of a defined region (a “life-place”). When sourced from the local bioregion, or ideally from the building site itself, not only does it help to reduce the environmental impact of transporting material, it also reflects the unique characteristics of the place and is a result of bioregional awareness, which requires place-based knowledge, as mentioned in the bioregional quiz by Leonard Charles. It certainly aligns with the regenerative principle, which aims to add value to place and people by creating more resilient connections between regional industry and community, benefiting from one another. Clay construction is also well suited to a participatory, bottom-up design process, allowing communities to directly engage with their land, allowing them to, in regenerative terms, co-evolve with nature (Figures 5 and 6).

Clay-based systems, especially in landscape architecture, can be easily shaped to natural forms, therefore holding potential to create microhabitats for insects, birds, and microorganisms, and also holding the ability to directly positively influence the regeneration of the local environment.

5. CONCLUSION

Bioregional approach and regenerative design principles are not only compatible- they are deeply complementary. The bioregional approach is deeply nested within the regenerative design framework, emphasizing place-based living and local ecological awareness. It's an approach that helps to better understand how projects can be net-positive – one of the key goals of regenerative design. When shifting from theoretical knowledge to its application in praxis, clay-based constructions sourced from a local bioregion can serve as a powerful agent of practical bioregionalism that, in turn, can regenerate. It does so by materializing place-based identity, supporting local ecosystems, and fostering socio-economic resilience.

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