

Ecourbanism - regenerative health care design for people and planet

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The foundations for a climate-smart regenerative health care system rely on building-back adaptive capacity & resilience into cities, to foster wellness and to deliver greater agency for citizens to address the biodiversity & climate change emergencies. Bottom-up measures are needed, enabled through urban design, that consider the whole system. One measure, agroecology, can play an important role.

"There are limits to the burdens that the natural system and its components can bear, limits to the levels of toxic substances the human body can tolerate, (and) limits to the amount of manipulation that man can exert upon natural balances without causing a break-down in the systems".

Dubois & Ward 'Only One Earth, the care & maintenance of a small planet' (1972)

Living at the best and worst of times

Fifty years on from the cautions aired in 'Only One Earth', ahead of the First UN Human Environment Summit, Sir Partha Dasgupta, lead author of 'The Economics of Biodiversity: The Dasgupta Review' (2021) stated *"we have been living at both the best and worst of times"*, and he noted that *"we have disrupted Nature's Processes to the detriment of our own and our descendant's lives."*

The Climate Change Emergency

In 2015, the Paris Climate Agreement set a 1.5°C limit for global heating in 2050, but in May 2022, the Met Office forecast a 50/50 chance that this would be exceeded in the next five years. The astonishing speed of heating reflects the 50% rise in pre-1800 atmospheric CO₂ levels to 420.97ppm in May 2022 (NOAA). A Climate Emergency was declared by the UK government in 2019, and **"Code Red for Humanity"** was announced in the IPCC 6th Assessment of Climate Change (4.2022).

Urban areas are responsible for 70% of carbon emissions forcing climate change that urban populations are particularly vulnerable to; effects including over-heating, poor air quality, water supply, and long supply chains for food. The IPCC co-chair Debra Roberts has stated: *"We point very clearly to the cities of the world as a key place for mobilisation."*

The Biodiversity Emergency

A biodiversity emergency was declared by professional bodies & cities including Manchester and Cambridge in 2019, and the United Nations 'Decade for ecosystem restoration' commenced in 2020. However, **"Biodiversity loss cannot be halted without addressing climate change, but it is equally unfeasible to adapt to climate change without addressing biodiversity loss."** (POST, 2009).

Biodiversity is essential for ecosystem reliability, and the delivery of a plethora of ecosystem services (ESS) on which humanity is dependent, including fertile soils, crop pollination and clean water. Erosion of biodiversity, especially at different trophic levels within an ecosystem, affects the quality, distribution and abundance of (ESS) flowing from natural assets. Habitat and biodiversity loss is also known to be behind 75% of infectious zoonotic pandemics. Vaccinologist Professor Sarah Gilbert has said that a new pandemic could be more lethal and contagious than Covid-19, suggesting we should be prepared.

The significance of 2030 to the future

The United Nations outlined 17 Sustainable Development Goals (SDGs) in 2015 to implement UN Agenda 2030, which address the inter-connectivity of global challenges. 2030 is also a milestone for halting and reversing both climate change and mass biodiversity loss (IPCC 2022, IPBES 2019), because if actions are delayed beyond 2030, there is an increased risk of positive feedback loops that may exacerbate and accelerate the emergencies. Currently the world is not on track to meet 2030 targets. The IPCC chair Hoesung Lee said *"We are at a crossroads. The decisions we take now can secure a liveable future."*

Homo sapiens urbanus

Mass urban living is a new phenomenon and we are still adapting to it. Over the last 220 years, the global population multiplied eight-fold and urban populations rose from 3% in 1800 to 55% today. They are projected to reach 70% by 2050. European average urban populations grew quickly in the early industrial period and increased from 51.1% in 1950 to 74.9% in 2020 (WEF 11.2020), with very high levels in The Netherlands (92.2%) & Belgium (98.1%). Yet humanity evolved as a component of a biodiverse environment, and we are each

biodiverse ecosystems. Densification of cities often leads to less space for nature and natural processes, which are increasingly squeezed out, shaded out, or disconnected; therefore restoring regenerative natural systems is essential.

Ecourbanism & Biophilic Design

Ecourbanism considers the whole system, and uses biophilic design as a positive response to nature deficits in cities, and planning salutogenic places for living. *"Humanity is not merely indivisible from, but evolved as a wholly owned subsidiary of nature"* (Everard, 2016); the human microbiome is vital for our health and wellbeing, and it co-evolved with abundant biodiversity. However, modern urban lifestyles can adversely affect microbiome dynamics leading to NCDs. Biophilic principles can be applied at building to city scales.

The human microbiome is established via environmental exposures during the first ten years of life, and augmented thereafter. The influences, including contact with nature and food, are referred to 'exposome', which complements the human genome in the body's responses to stressors affecting health (HEP 2020). Biophilic design adds pathways to augment the exposome by increasing potential everyday contact with nature and natural processes, including encounters with 'microbial old friends' (Woodward et al 2019).

Challenging demographic trends

As the human population becomes more urbanised, it is also ageing; by 2050 over 65 year olds will outnumber under fives by 2:1 worldwide. Elders are more vulnerable to excess heat, poor air quality, novel infectious diseases, loneliness, financial constraints, and may suffer from one or more chronic conditions. The World Bank highlighted the need for cities to be 'age ready' and 'age friendly' (World Bank, 2022), and the 'UN Decade on Healthy Ageing' began in 2021. In Europe, 20% of people are currently already over 65, a status projected to rise to 30% by 2050 (Ageing Europe, 2020), but by mid century, 80% of older people worldwide will reside in low and middle-income countries.

Age-aware design of neighbourhood climate mitigation measures include convivial, safe, accessible therapeutic places that are informed by universal design, they need social and cultural potential, and should be underpinned by nature-based solutions meeting climate change & biodiversity challenges. Measures may include additional street seating, shelter from rain or wind, rain gardens, planting to bring summer cooling, and active participatory spaces for raising food, or tending green/blue infrastructure.

Wealth, Health, & Social Justice

Cities generate more than 80% of global GDP (MGI, 2011), but the urban condition creates significant inequalities and stressors affecting health and wellbeing. This includes non-communicable diseases (NCDs), which are the leading cause of death and long-term disability world wide (41 million deaths, WHO). Michael Marmot wrote *"Health inequalities are not inevitable and can be significantly reduced... (they) are unfair and putting them right is a matter of social justice"* (Marmot, 2010). An erosion of coping-resources and the diminution of 'the commons' over time has deprived many people of agency over their lives, contributing to ill health. Environmental Commons are flourishing renewable natural resources, which should not be privatised, or used in the pursuit of economic growth or profits (Standing, 2019). If cities are a key generator of wealth, it should be a matter of self-interest to invest in healthy resilient places for citizens to live and work in.

Thinking Differently

Overburdened health care services are a safety-net for many conditions that salutogenic urban design could have helped to avoid. Conversely, the health sector is also responsible for 4.4% of carbon emissions and the pharmaceuticals that eventually enter the environment. The NHS is taking action to be operationally net zero by 2045, but hospital trust landscapes could actively sequester and store carbon too, through mineralisation and improved soils. Prof. Manning at Newcastle University has found that crushed concrete ab-

sorbs 80-86 tonnes of atmospheric carbon/ha/year; applied to parking, with +/-620 porous spaces per hectare, sequestration rates could be significant. Urban soils also have great carbon sequestration and storage potential; Renforth et al (2019) estimated this could be as much as 7 million tonnes/year across the UK, so improving soils offer further climate mitigation options. Improved soils could be used to raise fruit, for example, edible landscapes have been installed at Khoo Teck Puat Hospital in Singapore.

The need for transformational change

The UN Environment Programme report 'Healthy Planet, Healthy People' (2019) identified urbanization as one of five key drivers of change, and it advocates transformative, over incremental change because *"it is critical to ensure urban systems designed today are made as sustainable as possible"* (HPHC, 2019, p560).

Cities are complex socio-ecological systems that do not respond to cause-and-effect assumptions due to inherent complexity, patterns and interrelationships that create uncertainty and surprise. Transformative environmental change should promote resilience and adaptive capacity, and this involves the consideration of change dynamics at different scales, starting from the bottom upwards. Greening cities from the window sill and balcony, to street and neighbourhood can involve everyone to create significant change.

Urban Agroecology

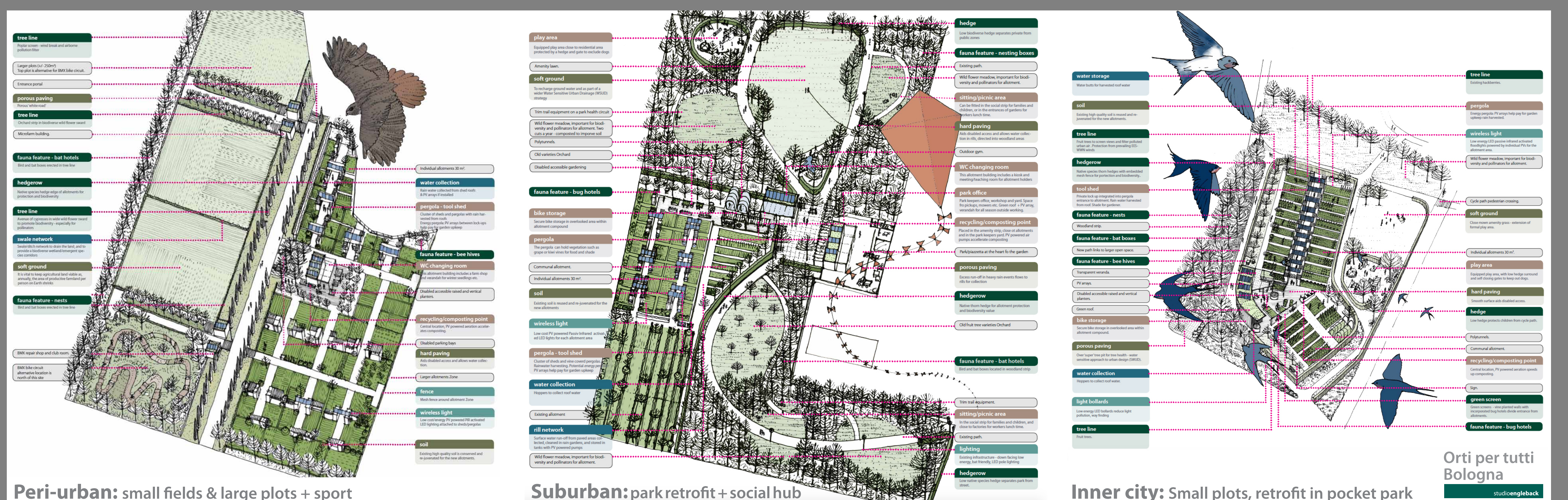
The various scales at which agroecology can be implemented also provides a bottom-up solution that provides multifunctional benefits. The UK imports half of its food, including 66% of fruit and vegetables (The Grocer 17.2.2017). Over-reliance on long supply chains creates vulnerabilities, which the UK experienced during the 1939-45 war, when the 'Spades not Ships' and 'Dig for Victory' initiatives to grow food in cities, became very important. Since 1945 urban areas have expanded and become denser, paving over many former growing spaces. Today, most people are physically detached from food production, but the Covid-19 lock-downs demonstrated the great importance of green and growing space to the wellbeing of dense urban populations.

Urban Agroecology addresses the health of people and environment both directly and indirectly, playing a part in building-back adaptive capacity and resilience within the urban sphere. The range of typologies include: peri-urban farming and market gardens, urban food forests, community and allotment gardens, easement and verge gardens, private and rooftop potagers, or growing herbs, tomatoes or beans on balconies and window sills. Improving urban soils is key, and has multiple benefits for biodiversity, carbon storage, water holding capacity and city cooling. Contaminated soils are no-go for food, but can provide the means to ameliorate urban temperature extremes. These interventions generate social and health benefits as well as sustainable cultivation of a diversity of crops, and better access to nutritious food.

Concluding thoughts

This poster sets out the rationale for a foundation to a climate-smart regenerative health care system, based on by up-streaming health care to the design or retrofitting of where we live, whilst concurrently contributing to measures that address the twin environmental emergencies. The little time remaining to meet 2030 targets requires truly rapid transformational change. Action is need to 'level up' all existing urban areas via significant investments in blue and green infrastructure that improves lives and health outcomes now, whilst building adaptive capacity for future environmental challenges.

New development, was supposed to have been net zero carbon by 2016 under the Code for Sustainable Homes, which was withdrawn in 2015 to favour business-as-usual models. Many new developments tend to have a very high proportion of sealed surfaces, limiting adaptive capacity. Recently, simplified planning zones have been introduced to accelerate development to meet the government's target of building 300 000 homes per year, informed by the National Design Guide (2019) and Model Design Codes (2021). However, the guidance does not actively foster a whole systems approach to creating healthy places to live in - this should be changed. Meanwhile, there may be greater hope attached to rolling out agroecological projects in peri-urban zones, retrofitting existing neighbourhoods and vacant spaces at different scales, as part of the Levelling-Up Agenda, and a wider view of health care.



Brooklyn Grange 1acre rooftop farm



Edible Main Street



Fruiting Hedge



Kitchen Gardens in a community land trust act as 'community builder' - with manual



GROW 2 EAT edible landscape manual

