

# Building a Shared Future for all Life: Why We Need More Green Building

Danjuma Peter Waniko

**Abstract**— Three decades after the Convention on Biological Diversity was signed, the situation of the planet's biodiversity remains bleak, placing human health and wellbeing, and even survival, at risk. Action to address the causes of biodiversity loss has expanded since the first International Day for Biological Diversity was marked in 1993. Nevertheless, the threat to biodiversity has reportedly grown because the scale of action has not been enough to stem the tide. Humanity's material footprint, for example, has increased by 113% over the last thirty years, dwarfing productivity and efficiency gains. Though not the sole cause of biodiversity loss, the built environment plays a major role, with linkages to all five primary drivers – climate change, habitat destruction, pollution, invasive species & resource overexploitation. The scale of these impacts is, furthermore, set to increase in the face of rapid urbanization. The built environment also offers opportunities to address biodiversity loss through green building practices like dematerialization, site optimization, effluent and emissions management, circularity, and design-for-deconstruction. These will need to be complemented with more sustainable urban planning, like measures to better integrate the built and natural environments. The concern, however, is that the transition to a more sustainable built environment is not progressing quickly enough, with most progress occurring in developed countries. More action in developing countries is necessary to scale up sustainable urban development and green building practices. Progress is being made, an example of which is the recent establishment of green building council in Nigeria, Africa's largest economy. Faster change is however needed, with major changes required across multiple sectors. These include the elimination of barriers, provision of infrastructure to support green buildings, fiscal and regulatory incentives to build green, and, above all, political and professional leadership.

**Index Terms**— Biodiversity Loss, Biodiversity, Green Building, Environmental Conservation, Sustainable Building, Natural Resource Conservation.

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*"All Nature is linked together by invisible bonds and every organic creature, however low, however feeble, however dependent, is necessary to the well-being of some other among the myriad forms of life" George Perkins Marsh, Man and Nature, 1864, p.109*

## 1 INTRODUCTION

Three decades ago, the world's leadership signed the Convention on Biological Diversity, as part of the continuing global response to the biodiversity loss and the threat this posed to humanity's health, wellbeing, and, even, survival. 'Biodiversity loss can destabilize ecosystems, promote outbreaks of infectious disease, and undermine development progress, nutrition security and protection from natural disasters' [24], [35]. It provides substantial economic benefits, for example, to tune of over \$8 billion per annum in Nigeria [25]. Biodiversity loss is, therefore, not an abstract problem. It is a human development challenge, but more important, a human survival issue [8], [22]. The CBD, which promotes the conservation of biological diversity, is humanity's response to this threat, with 22nd May (29th December until 2001) set aside to annually commemorate the convention, maintain awareness, and sustain action.

Action to address the causes of biodiversity loss has expanded since the first International Day for Biological Diversity (aka World Biodiversity Day) was marked in 1993. Three decades on, however, the picture remains bleak. Not to say nothing has been or is being done [4], [24]. Indeed, political leadership and action has grown markedly at global, national, and local levels. Nevertheless, the threat to our planet's biodiversity has, if anything, grown over the passing decades [9], [30], [28], [36]. Why? Because, though impressive, the scale of action has not been enough to stem the tide. Expansion of conservation areas and curtailments on extractive industries, for example, have been dwarfed by the exponential growth in demand for natural resources. Efficiency and productivity gains mean fewer resources are required per unit of production than

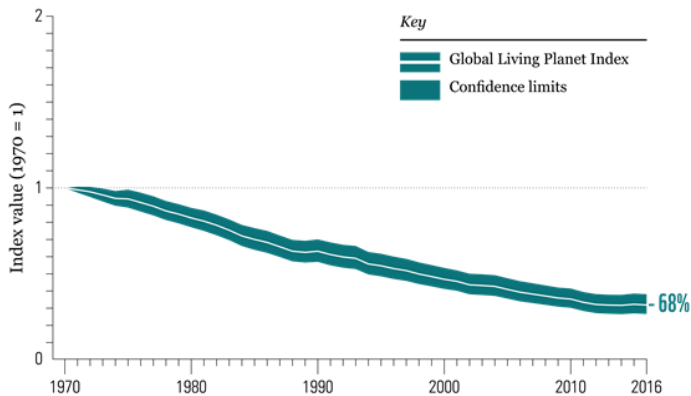
30 years' ago (as much as a third less). However, humanity's material footprint – the total amount of raw materials extracted to meet our needs – increased by 113% in the same period.



*Ninety percent of the Upper Guinean Rainforest – once extending across much of West Africa – has been reduced to disconnected fragments as the result of our insatiable quest for land and natural resources to feed human development, with devastating impacts on ecosystems and biodiversity [14].*

The situation for the planet's biodiversity therefore remains dire. According to the latest Living Planet Report, 'Biodiversity...is being destroyed...at a rate unprecedented in history...with 1 million species [of animals, plants & insects] being threatened with extinction.' [36]. Most of our planet's terrestrial and aquatic ecosystems have been altered for the worse by human activity, resulting in precipitous declines in population sizes of the species within them. Losses are greatest in the planet's most biodiverse regions (the tropics), which recorded

a 94% decrease (65% for Africa) between 1970 and 2016. Evidence of this loss is seen in Nigeria, where the country's high population growth rate and rapid urbanization are cited as key factors behind a disturbing decline in biodiversity [2], [25].



Seventy-five percent of our ice-free land surface has been significantly altered, most of the oceans are polluted, and close to nine tenths of wetlands have been lost, resulting in a '...68% decrease in population sizes of mammals, birds, amphibians, reptiles and fish between 1970 and 2016' [37].

## 2 BUILDINGS, URBANIZATION & BIODIVERSITY LOSS

How does this relate to green building? All five primary drivers of biodiversity loss – climate change, habitat destruction, pollution, invasive species & resource overexploitation – have direct or indirect linkages with the built environment [5], [13], [21]. Therefore, though not the sole cause of biodiversity loss – agriculture, industry, transportation & energy are similarly culpable – the built environment plays a major (even the leading) role in this existential drama. Beautification of private gardens and city parks with “exotic” but non-native species disrupts the ecological balance, impacting the survivability of native species. Extraction, processing & transportation of natural resources to meet demand for construction materials degrades habitats and pollutes the environment. Discharges (waste, emissions & effluents) from buildings contaminate air, land & waterways. Construction of buildings and the infrastructure needed to service them, furthermore, results in the urbanization of previously natural land.



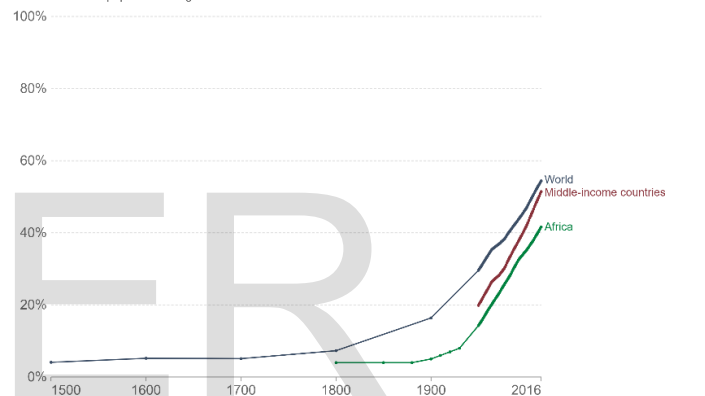
Rapid urbanization in combination with unsustainable building design choices & construction practices is directly & indirectly fueling biodiversity loss [7].

Urbanization modifies the natural environment in ways harmful to resident species, for example, making pervious

surfaces impervious. Urban expansion requires land, destroying, disturbing or fragmenting habitats. Construction and operation of buildings disturbs the land and species living on it, generates pollution, and creates noise & light which harms local fauna. The scale of these impacts is, furthermore, set to increase as the world's cities become home to more than two billion additional people by 2030 [16], [27]. According to some scenarios, accommodating this could require the conversion of an additional 1.2-1.6m square kilometers of land to urban use by 2050 [6], [23], [31]. This is of relevance for biodiversity in Nigeria and the rest of the Global South, where 97% of the world's population growth and 80% of urbanization is projected to occur in the next two decades. The population of African cities, for example, is expected to double by 2050 [17], [23], [27]. This, according to the World Green Building Council [33], will drive a huge increase in construction activity, '...with 80 per cent of [buildings] that will exist in 2050, yet to be built.'

### Urbanization over the past 500 years, 1500 to 2016

Share of the total population living in urban areas.



Source: OVID based on UN World Urbanization Prospects 2018 and historical sources (see Sources) OurWorldInData.org/urbanization • CC BY Note: Urban areas are based on national definitions and may vary by country.

The exponential growth in numbers of people living in urban areas that began during the Industrial Revolution continues today, though the locus of growth has shifted to the developing world, particularly Africa whose cities will need to accommodate an estimated one billion more people by 2050 [23].

## 3 GREEN BUILDING AS A SOLUTION TO BIODIVERSITY LOSS

The built environment also offers opportunities to arrest, and even reverse, biodiversity loss through green building [18], [21], [32]. Dematerialization can reduce as much as a quarter of materials consumed, decreasing demand for raw materials. Energy and water efficiencies mitigate climate change and reduce freshwater extractions. Site optimization and biodiversity integration decreases the impact of buildings on sites and surroundings. Downstream impacts of buildings on ecosystems are mitigated through strategies to address waste, emissions, and effluents. Integration of end-of-life considerations introduces circularity into building designs, reducing both demand for virgin materials and landfilled waste. Of course, more green building alone will not do it. Increased green building activity must be complemented with more sustainable urban planning. For example, measures to better integrate the built and natural environments – semipermeable pavements & sustainable urban drainage systems, green and blue infrastructure incorporating local and native biodiversity, wildlife corridors, invasive non-



native species controls – are needed to mitigate the ecologically harmful consequences of buildings.

There is some concern that the transition to a more sustainable built environment is not progressing as rapidly as it must. This is justifiable in that most progress over the last few decades has occurred mainly in developed countries [10], [11], [12], [20], [29]. In the cities of North America, Europe and parts of Asia buildings incorporating, at least, some green features are commonplace. The story is different in Nigeria and much of the Global South, where green building penetration remains low. Policy, financial, technological, political, and regulatory barriers, amongst others, continue to limit uptake. Nigeria, Africa's largest economy, has less than twenty buildings that have been certified "green" under a recognized rating system (e.g., LEED, EDGE, Green Star). Most new construction, especially at the lower end of the market, still does not incorporate any "green" features. Faster action is therefore necessary to scale up sustainable urban development and green building practices in response to the threat of biodiversity loss.



Urban planners need to integrate the built and natural environments to protect and enhance biodiversity, with the added benefit of improvements to human health & wellbeing [19].

Nevertheless, progress on green building is being made in the Global South. Africa, for example, now boasts ten green building councils, up from one just over a decade ago [33]. Action on issues like climate change, building energy efficiency, nature conservation, resource management, extended producer responsibility, and sustainable urban development is gathering apace across the continent [10], [29], [34]. A case in point is Nigeria, where a National Biodiversity Strategy & Action Plan is in place, though updating is necessary to address the impacts of urbanization and construction. The country's legislature recently passed a long-delayed Climate Change Act which strengthens building energy efficiency standards. A building energy efficiency code has also been approved by the national government. Though yet to be backed by legislation, two of the country's 37 subnational units – Lagos & Plateau States – have incorporated it into local building codes. The volume of discourse on the need to revise the country's National Building Code is growing, presenting the opportunity to embed green building principles within it. Engagement amongst built environment professionals and stakeholders is growing, with increased demand for green building training and accreditations. A growing (albeit still small) share of investment into the

energy sector is going into renewable energy. Access to financial products targeted at sustainable urban development and green building is being simplified. Last, but not least, Nigeria now has a green building council that is actively working with local, regional, and global partners across the entire spectrum to promote sustainability in the built environment.

#### 4 CONCLUSION

Faster change is however needed in light of the scale of the challenge and how far behind the developed world is in relation to sustainability in the built environment. Delivering this will require major changes across multiple sectors [1], [3], [20], [29]. It will require strategies that identify, target, and eliminate visible and invisible barriers to green building in the cities of the Global South. More investment in infrastructure and services that support and incentivize green building, e.g., renewables, sewage treatment, recycling services, is needed. Governments need to devise fiscal and regulatory instruments to tip the balance in favor of more sustainable building. Above all, political and professional leadership needs to step up engagement with the public to expand awareness and generate demand. As nature continues to suffer under relentless pressure from development, these, and more, will be needed to transform the built environment from "villain" to "hero" of the story. To borrow the CBD's slogan for the 2022 World Biodiversity Day, the task of "Building a shared future for all life" requires more green building, particularly in the burgeoning cities of the Global South.

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Danjuma Waniko, a Chartered Surveyor & Chartered Environmentalist, is President of Green Building Council Nigeria

## REFERENCES

1. Abisuga A.O. & Okuntade T.F. (2020). The Current State of Green Building Development in Nigerian Construction Industry: Policy and Implications. In: Gou Z (ed.). *Green Building in Developing Countries. Policy, Strategy and Technology*. 129-146. Springer, Cham, Switzerland
2. Anwadike B.C. (2020, April 8). Biodiversity Conservation in Nigeria: Perception, Challenges and Possible Remedies. *Current Investigations in Agriculture and Current Research*. 8(4), 1109-1115. Retrieved 10 May 2022 from <https://lupinepublishers.com/agriculture-journal/fulltext/biodiversity-conservation-in-nigeria-perception-challenges-and-possible-remedies.ID.000293.php>
3. Darko A., Chan A.P.C., Owusu-Manu D., Gou Z. & Man J.C. (2020). Adoption of Green Building Technologies in Ghana. In: Gou Z (ed.). *Green Building in Developing Countries. Policy, Strategy and Technology*. 217-235. Springer, Cham, Switzerland
4. Dias B.F.S. (2020). The Slow but Steady Progress in the Implementation of the Biodiversity Agenda. *International Union for Conservation of Nature*. Retrieved 14 May 2022 from <https://www.iucn.org/news/world-commission-environmental-law/202007/slow-steady-progress-implementation-biodiversity-agenda>
5. Elmqvist T., Zipperer W. & Güneralp, B. (2016). Urbanization, habitat loss, biodiversity decline: solution pathways to break the cycle. In: Seta K., Solecki W.D., Griffith C. & Corrie A. (Eds.). *Routledge Handbook of Urbanization and Global Environmental Change*. 139-151. Routledge, London & New York. Retrieved 10 May 2022 from [https://www.srs.fs.usda.gov/pubs/ja/2016/ja\\_2016\\_zipperer\\_001.pdf](https://www.srs.fs.usda.gov/pubs/ja/2016/ja_2016_zipperer_001.pdf)
6. Gao J. & O'Neill B.C. (2020). Mapping global urban land for the 21st century with data-driven simulations and Shared Socioeconomic Pathways. *Nature Communications*. 11(2302). Doi: <https://doi.org/10.1038/s41467-020-15788-7>
7. German Centre for Integrative Biodiversity Research (IDIV) Halle-Jena-Leipzig. (2019, 9 December). Urban growth causes more biodiversity loss outside of cities. *EurekAlert!* and American Association for the Advancement of Science. Retrieved 14 May 2022 from <https://www.eurekalert.org/news-releases/721838>
8. Gray, M.A. (1990). The United Nations Environment Programme: An Assessment. *Environmental Law*, 20(2), 291-319. Retrieved 14 May 2022 from <http://www.jstor.org/stable/43265919>.
9. Jackson T. (2008). Chapter 4, The Challenge of Sustainable Lifestyles. In: *The Worldwatch Institute. State of the World 2008: Innovations for a Sustainable Economy*. Retried 16 December 2014 from [https://www.worldwatch.org/files/pdf/SOW08\\_chapter\\_4.pdf](https://www.worldwatch.org/files/pdf/SOW08_chapter_4.pdf).
10. Jones S.A. & Laquidara-Carr D. (2021). *World Green Building Trends 2021. Smart Market Report*. Dodge Construction Network, Bedford, Massachusetts. Retrieved 15 May 2021 from <https://www.construction.com/toolkit/reports/World-Green-Building-trends-2021>
11. Khan J.S., Zakaria R., Shamsudin S.M., Abidin N.I.A., Sahamir S.R., Abbas D.N. & Aminudin E. (2019, January). Evolution to Emergence of Green Buildings: A Review. *Administrative Sciences*, 9(1), 1-20. Retrieved 15 May 2022 from <https://www.mdpi.com/2076-3387/9/1/6/pdf>
12. Kibert C.J. (2003). Green buildings: An overview of progress. *Journal of Land Use & Environmental Law*. 19(2), 491-502. Retrieved 15 May 2022 from [https://www.researchgate.net/profile/Charles-Kibert/publication/236144351\\_Green\\_buildings\\_An\\_overview\\_of\\_progress/links/543d15b80cf2c432f74248ff/Green-buildings-An-overview-of-progress.pdf](https://www.researchgate.net/profile/Charles-Kibert/publication/236144351_Green_buildings_An_overview_of_progress/links/543d15b80cf2c432f74248ff/Green-buildings-An-overview-of-progress.pdf)
13. Kondratyeva A., Knapp S., Durka W., Kühn I., Vallet J., Machon N., Martin G., Motard E., Grandcolas P. & Pavoine S. (2020). Urbanization Effects on Biodiversity Revealed by a Two-Scale Analysis of Species Functional Uniqueness vs. Redundancy. *Frontiers in Ecology and Evolution*. 8(2020). Retrieved 14 May 2022 from <https://www.frontiersin.org/article/10.3389/fevo.2020.00073>
14. Litz V. & Kelleher S. (2022). Reducing Deforestation, Forest Degradation, and Biodiversity Loss. *West Africa Biodiversity and Climate Change (WA BiCC)*. Retrieved 12 May 2022 from <https://www.wabicc.org/en/thematic-areas/reducing-deforestation-forest-degradation-and-biodiversity-loss/>
15. Marsh G.P. (1864). *Man and Nature: Or, Physical Geography as Modified by Human Action*. New York, Scribners.
16. Muggah R. & Hill K. (2018, 27 June). African cities will double in population by 2050. Here are 4 ways to make sure they thrive. *World Economic Forum*. Retrieved 14 May 2022 from <https://www.weforum.org/agenda/2018/06/Africa-urbanization-cities-double-population-2050-4%20ways-thrive/>
17. OECD & SWAC. (2020). *Africa's Urbanization Dynamics 2020: Africapolis, Mapping a New Urban Geography*, West African Studies. OECD Publishing, Paris. DOI: <https://doi.org/10.1787/b6bccb81-en>.
18. Ogden L.E. (2014, February). Does Green Building Come up Short in Considering Biodiversity?: Focus on a growing concern. *BioScience*. 64(2), 83-89. Doi: <https://doi.org/10.1093/biosci/bit019>
19. Ojala T. & Campbell I. (2020). *Building in biodiversity for climate, for health*. Urban Insight. Retrieved 14 May 2022 from [https://www.swecourbaninsight.com/wp-content/uploads/2020/10/urban-insight-report\\_building-in-biodiversity\\_booklet.pdf](https://www.swecourbaninsight.com/wp-content/uploads/2020/10/urban-insight-report_building-in-biodiversity_booklet.pdf)
20. Onuoha I.J. & Okeahialam S.A. (2018). Comparison Study on Green and Sustainable Building Policies in Developed and Developing Countries. *Journal of Construction Project Management and Innovation*. 8(1), 1797-1813. DOI: <https://doi.org/10.36615/jcpmi.v8i1.159>
21. Opoku A. (2019). Biodiversity and the built environment: Implications for the Sustainable Development Goals (SDGs). *Resources, Conservation and Recycling*. 141(2019), 1-7. Doi: <https://doi.org/10.1016/j.resconrec.2018.10.011>.
22. Roe D., Seddon N. & Elliott J. (2019). Biodiversity loss is a development issue: a rapid review of evidence. *IIED Issue Paper*. IIED, London. Retrieved 14 May 2022 from <https://pubs.iied.org/sites/default/files/pdfs/migrate/17636IIED.pdf>
23. Ritchie H. & Roser M. (2019, November). *Urbanization*. Our World in Data. Retrieved 15 May 2022 from <https://ourworldindata.org/urbanization>
24. Secretariat of the Convention on Biological Diversity. (2020). *Global Biodiversity Outlook 5*. Montreal. Retrieved 14 May 2022 from <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>
25. Secretariat of the Convention on Biological Diversity. (2022). *Nigeria - Main Details. Country Profiles*. Retrieved 12 May 2022 from <https://www.cbd.int/countries/profile/?country=ng>
26. Sustainable Europe Research Institute. (2009). *Overconsumption? Our use of the world's natural resources*. [Slater B & Warhurst M (eds.)]. Retried 24 January 2014 from <http://old.seri.at/documentupload/SERI%20PR/overconsumption-2009.pdf>.
27. United Nations, Department of Economic and Social Affairs, Population Division. (2019). *World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420)*. United Nations, New York. Retrieved 10 May 2022 from <https://digitallibrary.un.org/record/3833745/files/WUP2018-Report.pdf>
28. United Nations. (2022). *Ensure sustainable consumption and production patterns*. United Nations Statistics Division. Retrieved 12 May 2022 from <https://unstats.un.org/sdgs/report/2019/goal-12/>
29. Usman A.U. & Khamidi M.F. (2012, July). *Green Building for African Countries Opportunities Approaches and Challenges*. [Paper Presentation]. 11th Annual Symposium on Sustainability Science and Management, Kuala Terengganu, Malaysia. Retrieved 10 May 2022 from [https://www.researchgate.net/profile/Usman-Aminu-Umar/publication/233996749\\_Green\\_Building\\_for\\_African\\_Countries\\_Opportunities\\_Approaches\\_and\\_Challenges/links/09e4150dee5389ea92000000/Green-Building-for-African-Countries-Opportunities-Approaches-and-Challenges.pdf](https://www.researchgate.net/profile/Usman-Aminu-Umar/publication/233996749_Green_Building_for_African_Countries_Opportunities_Approaches_and_Challenges/links/09e4150dee5389ea92000000/Green-Building-for-African-Countries-Opportunities-Approaches-and-Challenges.pdf)
30. VanDeveer SD. (2011, March). *Consuming environments: options and Choices for 21st Century Citizens*. In: *Pardee Center Task Force Report. Beyond Rio+20: Governance for a Green Economy*. Retrieved 26 November 2014 from <http://www.bu.edu/pardee/files/2011/03/Rio20TFC-Mar2011.pdf>
31. World Bank. (2022). *Overview. Urban Development*. Retrieved 14 May 2022 from <https://www.worldbank.org/en/topic/urbandevelopment/overview#1>
32. World Green Building Council. (2022a). *About Green Building*. Retrieved 12 May 2022 from <https://www.worldgbc.org/benefits-green-buildings>
33. World Green Building Council. (2022b). *Africa. Our Green Building Councils*. Retrieved 14 May 2022 from <https://www.worldgbc.org/our-regional-networks/africa>
34. World Green Building Council. (2022c). *How green building is facilitating*

- rapid sustainable growth in Africa. <https://www.worldgbc.org/news-media/how-green-building-facilitating-rapid-sustainable-growth-africa>
35. World Health Organization & Secretariat of the Convention on Biological Diversity. (2015). Connecting Global Priorities: Biodiversity and Human Health. Summary of the State of Knowledge Review. Retrieved 14 May 2022 from <https://www.cbd.int/health/doc/Summary-SOK-Final.pdf>
  36. World Wildlife Fund for Nature. (2020). Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. & Petersen, T. (Eds). WWF, Gland, Switzerland. Retrieved 10 May 2022 from <https://f.hubspotusercontent20.net/hubfs/4783129/LPR/PDFs/ENGLISH-FULL.pdf>
  37. Zoological Society of London & World Wildlife Fund for Nature. (2020). The Index. Living Planet Index. Retrieved 10 May 2022 from [https://www.livingplanetindex.org/projects?main\\_page\\_project=AboutTheIndex&home\\_flag=1](https://www.livingplanetindex.org/projects?main_page_project=AboutTheIndex&home_flag=1)

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