Abstract

The main challenges facing African cities are climate sensitivity, waste, and urban growth. Nature-Based Solutions (NbS) relying on natural processes are definitely a good idea, but to be successful, they need multifunctional materials. This research explores Biochar, a carbon-rich material produced through biomass pyrolysis, as an improvement agent for urban NbS in Africa. By analysing 78 peer-reviewed articles, policies, and case studies (2019-2026) via a systematic literature review, this research assessed: (1) Biochar efficiency in water management, soil fertility, and ecological function; (2) carbon sequestration in urbanising settings; and (3) economic, policy, and institutional drivers of Biochar adoption. Results show that Biochar-treated soils enhance infiltration by 40-60%, pollutant removal by up to 80%, and sequester 2.5-3 tons of CO_2-equivalent per ton. However, uptake in African cities is hindered by fragmented governance, lack of best practice regulations, lack of affordability and capacity. This research advocates for an integrated framework linking feedstock, pyrolysis, NbS in implementation pathways, and outcomes. This approach offers insights for planners and policymakers to integrate Biochar into circular urban economies and climate adaptation. Research findings conclude that Biochar-boosted NbS represent a significant expansion of scalable, cost-effective methods for sustainable urban development. However, it is necessary that such development is backed up by supportive policies, economic incentives, and participatory governance approaches tailored to the African context.