



## POLICY BRIEFING

May 2015

### **‘A nation that destroys its soils, destroys itself’: Pathways towards the sound management of urban soil**

Our urban soils - essential to the resilience and prosperity of our cities and the wellbeing of our population – are under threat. Urban soils are unprotected by UK and international law and are not included as a resource worth protecting in negotiations over the United Nations’ Sustainable Development Goals. This briefing calls on policymakers to work closely with the engineering and environment sectors to implement a framework that values and protects urban soils as a resource for future generations.

#### **The scale of the threat**

Urban soils are an essential non-renewable resource and an often overlooked determinant of environmental and public health. They provide a vital support mechanism for the constructed environment as well as the enormous variety of green infrastructures in cities. They have the potential to help mitigate flooding, improve community wellbeing, increase biodiversity and store carbon, all of which ultimately help in the fight against climate change.

The water holding capacity of soil – and therefore its flood and drought resilience – relies upon its organic carbon content. These carbon levels are rapidly reducing<sup>1</sup> due to climate change and as organic wastes are produced during food and textiles manufacturing processes but not returned to the soil. A 2014 report published by the House of Lords Science and Technology Select Committee identifies 30 million tonnes of organic wastes produced each year in the UK that have come from the land but are currently not returned to it<sup>2</sup>.

This makes soil more susceptible to the damaging effects of climate change in future, resulting in a vicious cycle of soil degradation. The health of our soils in urban areas is central to the mitigation of flood risk. While floods can affect all communities, the vast majority of UK’s population lives in an urban area. This means that urban soils are particularly vulnerable to degradation and are consequently disproportionately affected by increased rainfall as a result of climate change.

<sup>1</sup> Rusco, E., Jones, R.J. and Bidoglio, G. (2001). *Organic matter in the soils of Europe: Present status and future trends*. EUR 20556 EN. JRC, Office for Official Publications of the European Communities, Luxembourg.

<sup>2</sup> House of Lords Science and Technology Committee. (2014) *Waste or resource? Stimulating a bioeconomy*. London: TSO.

## The consequences of neglecting our urban soils

The total annual cost of soil degradation in England and Wales is likely to sit at around £1.2 billion a year<sup>3</sup>. The social and economic devastation caused by flooding is readily apparent. But the issue hidden in plain sight is that the muddy flood waters are taking even more soil organic matter and minerals out of our soils, exacerbating the vicious cycle of climate change - soil degradation - climate change - soil degradation. The devastating effects of recent flooding in our cities could have been reduced if our soils were capable of storing and transmitting water at the same time as retaining their strength so that they are not washed away.

The impact of soil quality on public health is also a consideration. Research conducted at Durham University also shows that people living near brownfield land (previously used or derelict land that requires intervention to bring it back into productive use) are significantly more likely to suffer from poor health than those living in areas with little or no brownfield land.<sup>4</sup> This reveals that populations are much more sensitive to the environmental landscapes than what may be acknowledged by current policy in the UK.

### A way forward

Recent scientific studies on mineral-organic interactions conducted by researchers at Durham University<sup>5</sup> highlights that minerals actively stabilise organic matter in terrestrial environments. Engineers have the skills to preprocess recycled minerals together with organic wastes to improve soil, which could increase flood resilience, store carbon and improve soil health and plant growth as well as moving us closer to a circular economy.

Soil organic matter levels have, and continue to, drop in the vacuum of legislation protecting soil. We urge policymakers to work closely with the engineering sector as well as environmental specialists to develop a policy framework for the effective management of urban soils.

## Our recommendations

- The UK can and should become a global leader in the governance of urban soil security, thus preserving this vital resource for future generations.
- The Government should produce and deliver a national framework on how to protect and nurture our urban soils, recognising both the challenges of the current geopolitical climate and the need to future-proof our cities against extreme weather events.
- Urban soil must be recognised as an essential part of the UK's environmental policy, and in particular as a central tenet of the United Nations' Sustainable Development Goals.
- In respect of health, brownfield land needs to be included as a form of environmental deprivation that has direct consequences for public health.
- Further progress on England's flood risk management strategy should emphasise the development of techniques for processing and reintroducing organic wastes into the soil in order to enhance soil organic carbon and increase water holding capacity, working closely with engineers in industry and academia.
- A cost-benefit analysis of waste preprocessing with a view to optimising soil amendments to increase water-holding capacity should be conducted. This should be further supported by flood modelling specialists to advise on where to apply the soil amendment technologies for maximum benefit.

For more information visit [www.robustdurham.org.uk](http://www.robustdurham.org.uk) or email [karen.johnson@durham.ac.uk](mailto:karen.johnson@durham.ac.uk).

<sup>3</sup> National Audit Office (2014) Environmental protection: Briefing for the House of Commons Environmental Audit Committee.

<sup>4</sup> Bamba C, Robertson S, Kasim A, Smith J, Cairns-Nagi J M, Copeland A, Finlay N, Johnson K, 2014, 'Healthy land? An examination of the area-level association between brownfield land and morbidity and mortality in England'. *Environment and Planning A* 46(2).

<sup>5</sup> Johnson, K.L., Purvis, G.W.P., Lopez-Capel, E., Peacock, C.L., Gray, N.D., Wagner, T., März, C., Bowen, L., Ojeda, J., Finlay, N., Robertson, S.R., Worrall, F., Greenwell, C. (2015). 'Mechanistic understanding of carbon stabilisation in manganese oxides'. *Nature Communications* (provisionally accepted).