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Urban Green Infrastructure - closed POST breakfast event

Tuesday 6th May 2014, 0830-1000, Jubilee Room

This event followed up on last year's urban green infrastructure POSTnote. POST held this event for parliamentarians to discuss with academics and policy representatives the evidence for the effectiveness of urban green infrastructure in supporting different aspects of human wellbeing, and challenges to its implementation and maintenance in the UK.

The event was chaired by Chi Onwurah MP and attendees, including MPs, peers and parliamentary staff, heard briefly from nine speakers during general discussion of the issues:

- **Professor Richard Mitchell, Professor of Public Health at Glasgow University and Co-Director of Centre for Research on Environment Society and Health (CRESH)**
- **Professor Jim Harris, Chair of Environmental Technology, Cranfield University**
- **Professor Rosie Hails, Centre for Ecology and Hydrology, Chair of the Natural Capital Initiative and Member of the Natural Capital Committee**
- **Diane Smith, Interim Chief Executive, Town & Country Planning Association**
- **Dr Shepley Orr, Department of Civil & Environmental Engineering, UCL**
- **Dr Ian Mudway, Analytical & Environmental Sciences Division, King's College London**
- **Dr Mathew White, European Centre for Environment and Human Health, Exeter University**
- **Peter Massini, Urban Greening Team Leader, Greater London Authority**
- **Tom Butterworth, Natural England's Senior Adviser for Local Government**

Breakfast Briefing Summary

- **Professor Richard Mitchell** discussed the evidence[1] that contact with 'nature' can have direct effects on physical health, such as reductions in blood pressure, which is based on experimental studies of physiological responses to exposure to green spaces as well as population studies looking at health outcomes and use of green space. There are also indirect effects on health through cooling effects of vegetation during heat waves and reductions in flood risks, both of which are likely to become more important with climate change. He highlighted that the benefits of green infrastructure were particularly relevant to tackling mental health issues, which are having a growing and costly impact. However, mental health issues were also linked to inequality, and groups that are least well off in society are twice as likely to have poor access to green space in European urban areas. Even the physical outcomes of inequality, such as cardio-vascular disease, were reduced with access to green space. There are differences between socio-economic groups as to whether green space was used, but the major overall determinant is green infrastructure use in childhood.
- **Dr Ian Mudway** set out the health effects of rapid dieselisation of cars in recent decades, particularly on children. Eighty-five percent of children in Tower Hamlets live in homes that have levels of nitrogen dioxide in excess of air quality standards. There are a number of measures, such as Low Emission Zones, that can be used to reduce the levels of transport emissions, but measures can also be implemented to increase the rate of absorption. In theory, green infrastructure could be used to absorb air pollutants, with models suggesting

[1] Hartig, T, Mitchell, R, de Vries, S, Frumkin, H, 2014, Nature and Health, Annu. Rev. Public Health, 35:21.1-21.22

that use of green walls and roofs along street 'canyons' could lower pollution levels by 40 to 60%, but this has yet to be replicated in real world conditions. Given that levels of pollution drop off with distance from the kerbside, clear health benefits can be shown for green corridors that separate pedestrians and cyclists from traffic.

- **Professor Jim Harris** described how natural features in urban areas can provide benefits to humans. The studies he is leading on urban ecosystems showed any unsealed surface can deliver ecosystem services, such as reductions in surface water run-off, and can be counted as 'natural capital'. The benefits being considered include allotments in urban areas, which have yields as high as commercial horticultural land, sequestration of carbon by soils and vegetation and reductions in flood risk. The extent of the benefits are dependent on the size, form, quality and connectivity of green infrastructure in urban areas. Fragmentation of the green infrastructure by development has negative effects on the level of benefits supplied and the supply of benefits is also very dependent on management, which often correlates with how well engaged local communities are with the management and use of green infrastructure. He noted that effective mapping of urban green space provides a significant opportunity to improve the gaps in data on green space management and to inform a wide stakeholder group. Some studies were heavily dependent on volunteers to gather data, but volunteers are less effective for negative recording as there is less incentive 'to go where things aren't'. He also suggested that green infrastructure was often an afterthought for planners, and that the majority of local authorities do not have access to the relevant expertise, with only 35% retaining an ecologist to advise them. The UKNEA has included development of the NEAT Tree website, which adapts policy tools to facilitate the Ecosystem Approach in policy and decision-making processes across the built and natural environment.[2]
- **Professor Rosie Hails** provided an update on the work of the Natural Capital Committee. The second report of the committee, published in March, highlighted the high value of restoring urban air quality, with the gain in health estimated at between £9 and 20 billion.[3] The report also highlights that in some urban areas natural capital itself could play a role in improving air quality as well as delivering a wide range of other goods too (recreation, flood protection, wildlife) and access to high quality natural capital enhances wellbeing. However, there remain a number of gaps in the evidence, such as where will investment in natural capital produce the most effective outcomes and what aspects of green infrastructure support what outcomes. The committee is seeking to identify interdisciplinary research needs in order to bring together public health and environmental disciplines. This will allow the gathering of compatible datasets, such that socio-economic factors can be integrated into models of the urban environment. This is just one part of the committee's 25 year plan to maintain and improve England's natural capital within this generation, which will set out measures to restore the aspects of green infrastructure that will provide the highest returns in benefits.
- **Dr Mathew White** stated that 1 in 6 adults and 1 in 10 children in the UK suffer from depression or anxiety, which may be influenced by the effects of urbanisation. Incidence of depression are 30% higher in areas of the Netherlands with lower access to green space. Based on data from the British Household Panel Survey, which followed the health and wellbeing of members of >5,000 households for 18 years, the benefits to mental health of living in an urban area with relatively high vs. low local green space was about a third of the benefit of being married (compared to single/divorced) and a tenth of the impact of being employed (vs unemployed). Moving to a greener urban area was associated with an immediate improvement in mental wellbeing, but the evidence that this is related to

[2] http://www.eatme-tree.org.uk/project.html

[3] Natural Capital Committee 2014, The State of Natural Capital: Restoring our natural assets, second report to the Economic Affairs Committee.

increased socialisation and physical activity remains limited. There are also studies showing that access to 'blue space', that is areas adjoining rivers and canals or coastal areas has greater or similar benefits.

- **Dr Shepley Orr** summarised the evidence in relation to green infrastructure and social wellbeing, while highlighting that evidence on social outcomes was patchy overall. There are between ten and fifteen studies on the effects of urban parks, green space and trees on social wellbeing that suggest green infrastructure has both a mediating effect on social cohesion and levels of social capital as well as these being an outcome of access to green infrastructure. Social capital, which can be broadly defined as the resource linked to a networks of relationships, is a resource that increases community resilience, whereas social cohesion refers to a sense of belonging and inclusion. Green infrastructure can contribute to both a sense of community and place. Although difficult to value these distinct social benefits, available evidence suggests that public open green space may reduce crime rates and increase civic participation and that they are some of the key benefits generated by green infrastructure.
- **Diane Smith** described her involvement with the EU Green and Blue Space Adaptation for Urban Areas and Eco Towns (GRaBS). Much of this work had been based on the Adaptation Strategies for Climate Change in the Urban Environment (ASSCUE) project at Manchester University, which found that for every 10% decrease in green infrastructure there was a 0.7°C rise in temperature. The TCPA has also long been proponents of garden cities and that there was overwhelming evidence that green infrastructure improved people's quality of life and that at least 40% of any urban area should be green infrastructure. The TCPA had assumed leadership of the Green Infrastructure Partnership because it is key to health and equality issues. Local authorities and the planning system bear the burden of delivering the green infrastructure to support these benefits, and although some are doing well, such as the GLA, many others are not.
- **Peter Massini** highlighted that UK cities are likely to increase in density in coming decades, particularly London. Green infrastructure is an integral part of cities, not a counterpoint to it, but there need to be clarity about the functions it was supporting rather than just the form, as at present. The focus of planning should be on the systems of green infrastructure rather than individual green spaces, particularly how network of green spaces interact to provide multiple benefits. Refocussing parks to meet the future needs of urban areas would require moving beyond consideration of just amenity benefits to the wider benefits of the network of green spaces. Provision of benefits should inform the development of new management approaches to cities' green infrastructure. For example, flood risk in Lewisham town centre is reduced by remodelling of the green space areas upstream of it, so arguably the beneficiaries should contribute to the funding of those spaces. Funding for green infrastructure needs to move to a model where it is treated as a utility, rather than just an amenity.
- **Tom Butterworth** reiterated the National Planning Policy Framework definition of green infrastructure – 'a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities'. He highlighted that local authorities should have green infrastructure strategies planned, giving the example of Cumbria where 4 of the 7 local authorities have strategies in place, 2 are still working on them and 1 has failed to do so. He suggested that a similar ratio for planning was reflected across local authorities in England but that the quality of strategies produced across the country was variable, with access to green space lowest in areas with the highest health inequalities. Cities are leading the way in developing effective strategies, with the GLA green grid and initiatives in Birmingham, Bristol and Newcastle. Bristol is going to be the EU green capital in 2015 and Birmingham is to become the UK's first biophilic city (a network of cities promoting abundant green infrastructure).

A number of points were raised in the discussion between parliamentarians and academics:

- The available evidence suggests that access to green space can increase overall levels of wellbeing by 40%. This includes studies that measure changes in blood pressure with exposure to green space, although studies of direct physiological changes are short term and do not account for other factors involved in wellbeing, such as marital status or inequality. Population studies can provide insights into how much effect different factors have on wellbeing, but there are issue defining the type and quality of 'nature' to which people are exposed to.
- A 50% reduction in pedestrian exposure to air quality pollutants can be achieved through using back street routes with lower levels of traffic, but there is relatively low public awareness of pollutant concentrations on different streets. Pollution levels stay consistently high until around the 12th floor of a high rise building and residences above street level are unlikely to see any benefits for air quality. Air pollution is second only to smoking as a cause of premature mortality, but remains politically challenging to address because of strongly held values in relation to car use.
- The physiological mechanisms by which poor air quality causes asthma and allergenicity are not well understood, but there is a clear cut association.
- While it is clear that mental wellbeing declines with rapid urbanisation, the evidence for the use of green space as an effective medical intervention remains limited. The Royal College of General Practioners has started a feasibility studies with GPs on complex interventions involving use of green spaces. However, the evidence on the quality of green space required to deliver mental wellbeing benefits is limited, but it is known that different socio-economic groups use green space differently and it is challenging to design green space to meet all wellbeing needs.
- The issue of who pays for green infrastructure, the initial capital cost is often borne by the developer but the local authority has to pay for the cost of maintenance while other sectors, such as tourism or water companies enjoy the economic benefits. However, Welsh Water is starting to pay for reduced sewage flow as a result of green infrastructure reducing surface water flows.
- The costs and benefits of brownfield versus green field development. Studies in Philadelphia have shown the benefits from greening vacant lots, but even when density is increasing additional green infrastructure in the form of green roofs and walls can be incorporated. If brownfield sites aren't used, new settlements will need to be created instead, with eight additional garden cities proposed (beyond the existing Ebbsfleet proposal that has been in process for the last fifteen years).
- The use and form of existing urban areas will also need to be considered in the light of proposed measures to reduce car use; it is not possible to build to reduce congestion, so streets need to be remodelled to meet functions other than car use, although this will only be possible in areas with high public transport spending, such as London.
- The asset value of green space needs to be realised through attaching values to the services they provide, with charges levied on the appropriate economic sector.
- It is critical to avoid exclusion of deprived groups, as shown by the correlation between antidepressant prescribing and proximity to green space. Birmingham has used its available datasets to map future green infrastructure provision against areas of health inequality and the TCPA has been working on the 'planning out poverty' project in various deprived communities in Liverpool, Shirebrook, Leeds and Tottenham Hale.
- It was noted that the delivery of green infrastructure requires interdepartmental co-operation and joined up approaches at the local level so is likely to remain a challenging policy area.