THE RAMPHAL INSTITUTE

FIRST RAMPHAL INSTITUTE INTERNATIONAL CONFERENCE ON MEGACITIES AND AIR POLLUTION

London, 27-28 September, 2018
Woburn House, 5th Floor, 20-24 Tavistock Square
London, WC1H 9QH, UK

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GROSVENOR

The Ramphal Institute's mission is to advance knowledge and education in the Commonwealth in social, economic, governance and environmental areas for the benefit of both the public and policy makers. Through this focus the Institute looks to promote the goals of democracy and development which are central to the Commonwealth.

- The Institute carries out analysis and studies within these areas and disseminates the result through online and printed publications, lectures, conferences seminars and workshops.

- The Institute capitalises on the unique advantages of an English speaking Commonwealth of 53 states as a forum to facilitate communication, understanding and the sharing of ideas and experiences between governments, businesses and civil society.

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Acronyms

ACU	Association of Commonwealth Universities
APPG	All-Party Parliamentary Group
ASAP East Africa	A Systems Approach to Air Pollution in East Africa
CIG	Cities and Infrastructure for Growth
CLGF	Commonwealth Local Government Forum
CO_2	Carbon Dioxide
CyAM	Siemens City Air Management
DEFRA	Department for Environment, Food and Rural Affairs
DFID	Department for International Development
IAQM	Institute of Air Quality Management
IPCC	Intergovernmental Panel on Climate Change
LSEPA	The Lagos State Environmental Protection Agency
LEZ	Low Emissions Zone
LG	Local Government
MaaS	Mobility as a Service
NAZCA	Non-state Actor Zone for Climate Action
NITI Aayog	National Institution for Transforming India
NO_2	Nitrogen Dioxide
O3	Ozone
OECD	Organisation for Economic Co-operation and Development
PM	Particulate Matter
PMEH	Pollution Management & Environmental Health project
SDGs	Sustainable Development Goals
ULEZ	Ultra Low Emission Zone
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organisation

Foreword & Acknowledgements

The Ramphal Institute conference on megacities and air pollution, on 27-28 September 2018, was a pioneering exercise to bring together experts from Dhaka, New Delhi, Gauteng, Lagos and London to exchange ideas on how to reduce toxicity in the air we breathe. The Ramphal Institute, with its vocation for the Commonwealth, organised an interactive event with the invaluable sponsorship support of Elsevier, the global data and analytics company specialising in science and health.

The Institute has been working on megacity issues with the Bangladesh Enterprise Institute, Dhaka, the National Institute of Urban Affairs, New Delhi, the Gauteng City Region Observatory, Johannesburg, and the Socio-Economic Rights and Accountability Project, Lagos. Our aim in this conference was to focus on improving air quality, looking not only at the science, but at policy and public relations aspects as they affect what city leaders can do.

Air pollution harms all ages. It is a silent killer. It affects not only physical but also mental health, and is linked to poverty and social inequality. The report which follows illustrates not only the commonalities, but also the differences in this issue, which affect both megacities with more than 10 million inhabitants, as well as smaller conurbations. One purpose of publishing this report is to spread its findings to civic authorities and governments throughout the Commonwealth and beyond.

"Air pollution harms all ages. It is a silent killer. It affects not only physical but also mental health, and is linked to poverty and social inequality..."

Many statistics shared in this event were shocking. Not everyone realises the full magnitude of the issue, graphically illustrated by the polluted air of New Delhi which equates, in harm to an individual's health, to the smoking of 44 cigarettes a day. Other statistics were surprising: in London for example, two fifths of the small particulates is the result of transboundary air pollution emanating from Europe, mainly from the agricultural use of nitrogen fertilisers, the release of ammonia, and the formation of secondary particulate pollution. Equally, pollution in Delhi and other megacities can be worsened by stubble burning in the surrounding areas. So, tackling urban pollution is a regional as well as an international challenge requiring cooperation beyond city limits and national borders. Yet to bring home the dangers to the public, so that real change takes place, as happened when the Great Smog in London in 1952 led four years later to a Clean Air Act, requires leadership, media and civil society advocacy.

The organisers hope that this conference will spur action. Two specific proposals which emerged, are for a Commonwealth Global Clean Air Initiative which, in turn, can lead to a UN right to clean air, comparable to the human right to clean air in the South African constitution, and linked to government commitments to the Sustainable Development Goals.

The Ramphal Institute invites readers of this report to contact us if they are interested in these proposals, or any other aspect. We should like to acknowledge with thanks the support of Grosvenor Britain & Ireland towards the publication and promotion of the report, our partner organisations and all speakers, chairs and panellists, as well as our Chief Rapporteur, Dr Sindra Sharma-Khushal. She was aided by two doctoral students, Zhang Hanbin of King's College, London and Peter Adesina, of Imperial College, London.

We are particularly grateful to Dr Robin Russell-Jones, and the organising secretary, Mandy Scholte, for their intensive work in realising a programme initially conceptualised by Dr Artemis Doutsi, Environmental Public Health Scientist, Air Quality and Public Health Group, Public Health England. The Institute's programme on megacities has been developed by Dr Adesoji Adeniyi, and initial conference organisation was undertaken by Hannah Papachristidis, graduate student at Columbia University, New York. In addition, we are most grateful to Malcolm Ransome, Adviser to the Ramphal Institute, whose introductions, fundraising efforts and support made this conference possible.

We hope the Ramphal Institute conference, and this report will have a lasting impact.

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Executive Summary

Air Pollution is a major public health issue which is impacting humans worldwide and adding to the global burden of disease. It is now one of the most significant causes of premature mortality, with an estimated 7 million deaths annually, second only to those caused by cigarette smoking. Many of the diseases caused by air pollution are similar to those caused by cigarettes: namely respiratory disease, cardiovascular disease such as strokes and heart attacks, and lung cancer. There is also a link with obesity, diabetes and dementia.

These facts are supported by more recent studies in London and in China. A large-sample study of live births in London investigated the long-term exposure to traffic related air during pregnancy and found that it adversely impacted fetal growth and birth weight[1]. Lower birth weight is associated with lower IQ. In addition, a longitudinal study in China investigated the effect of cumulative and transitory exposures to air pollution on cognitive performance in adults and found that long-term exposure to air pollution impedes cognitive performance in verbal and math tests. This effect is more pronounced as people age[2]. Indeed, studies have found a relation between air pollution exposure and dementia-related outcomes[3], so air pollution affects neurocognitive function at all stages of life.

The issue is vast with 91% of the world's urban population now live in areas where air quality levels exceed World Health Organisation (WHO) limits. There is also increasing awareness that air pollution can be a significant barrier to sustainable economic and societal growth, with the Organisation for Economic Co-operation and Development (OECD) estimating that outdoor air pollution could cost 1% of global GDP (USD 2.6 trillion annually) by 2060 as a result of sick days, medical bills and reduced agricultural output[4]. It is worth noting that Sadiq Khan, the Mayor of London, is already tackling this issue. In fact, on the first day of the conference, he unlocked an additional £6 million of funding for the £20 million Air Quality Fund to help London boroughs improve air quality.

One of the major parameters through which to measure air quality is particulate matter. Particulate matter is microscopic solid or liquid matter suspended in Earth's atmosphere. It occurs naturally through for instance volcanoes, forest fires and dust storms, but it can also occur from human induced activities such as the burning of fossil fuels.

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[1] Smith, R. B., Fecht, D., Gulliver, J., Beevers, S. D., Dajnak, D., Blangiardo, M., ... & Toledano, M. B. (2017). Impact of London's road traffic air and noise pollution on birth weight: retrospective population-based cohort study. bmj, 359, j5299.
[2] Zhang, X., Chen, X., & Zhang, X. (2018). The impact of exposure to air pollution on cognitive performance. Proceedings of the National Academy of Sciences, 115(37), 9193-9197.
[3] Power, M. C., Adar, S. D., Yanosky, J. D., & Weuve, J. (2016). Exposure to air pollution as a potential contributor to cognitive function, cognitive decline, brain imaging, and dementia: a systematic review of epidemiologic research. Neurotoxicology, 56, 235-253.
[4] OECD. (2016). The Economic Consequences of Outdoor Air Pollution, OECD Publishing, Paris, https://doi.org/10.1787/9789264257474-en

The recent Intergovernmental Panel on Climate Change (IPCC) special report on Global Warming of 1.5°C[5] above pre-industrial levels states that emissions of Carbon Dioxide (CO_2) will need to be reduced by 45% by 2030 and further notes that to limit warming will require unprecedented global action. In fact, as the Institute for Advanced Sustainability Studies (IASS)[6] notes, air pollution and climate change are closely related. Emissions from the extraction and burning of fossil fuels are key drivers of climate change and major sources of air pollutants. Climate pollutants, such as black carbon and tropospheric ozone have short atmospheric lifetime compared with CO_2 but have a high global warming potential and also negatively impact human health. Other greenhouse gases such as methane and hydrofluorocarbons will also require concerted action.

This report is the main input into the process known as the Talanoa Dialogue which will be deliberated by Member States at the 24th Climate Change Conference (COP24) at the end of 2018. The importance of COP24 is that it will send clear signals of actions needed in terms of emissions reductions and enable city leaders to access resources and accelerate activities to protect their citizens from harmful emissions.

Multilateral platforms and processes such as the Paris Agreement, the Sustainable Development Goals (SDGs), Cities Compact and the Non-state Actor Zone for Climate Action (NAZCA) Platform are providing cities with ways to track, mobilise, and finance progress to reduce emissions and exceed national commitments to address climate change. The UN Habitat III, the United Nations Conference on Housing and Sustainable Urban Development which took place in October 2016 in Quito, launched the WHO BreatheLife campaign and the New Urban Agenda adopted at the conference sets out commitments which have air quality co-benefits. However, there are clear challenges ahead as it was felt that there was inadequate attention given to the urban issue of air pollution.

The Commonwealth, with its unique global family, can encourage the cross-fertilisation of ideas in a mutually supportive and inclusive space. By connecting business and city leaders the bridging power of the Commonwealth can create a strong solution-oriented community to tackle the complex issue of air pollution, from best practice policy to low cost sensing and monitoring technologies.

The objective of 'The First Ramphal Institute International Conference on Megacities and Air Pollution' involving selected Commonwealth megacities, was to share issues and solutions to the challenge of air pollution which affects urban populations in Dhaka, Delhi, Gauteng, Lagos, and London. It was a stimulating event, with clear objectives and it energised participants to work towards achieving its objectives. The conference was held at Woburn House, the London headquarters of the Association of Commonwealth Universities (ACU).

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[5] IPCC (2018). Global Warming of 1.5°C: an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policy Makers: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

[6] Institute for Advanced Sustainability Studies. (n.d). Links Between Greenhouse Gases, Climate Change and Air Quality: https://www.iass-potsdam.de/en/output/dossiers/air-pollution-and-climate-change

Outcomes

Some of the key ideas and issues which came out of the conference were:

i. Greater political urgency will come by framing poor air quality as a public health concern and espousing a rights-based approach to clean air; the right to breathe clean air is as fundamental as the right to clean water.

ii. The nexus of inequality and air pollution makes this an issue of social justice.

iii. The scientific evidence for the adverse impacts of air pollution on health is robust and demands urgent action. Air pollution's impact on public health has far reaching consequences for sustainable and just development. The cost of inaction will far exceed the cost of action.

iv. There is a need for data driven policy and, as such, better data gathering, accessibility, analysis and communication systems across megacities.

v. Research and data should be transmitted to policymakers and citizens promptly, in a way they can understand. To deliver and develop this crucial unity, an adequate and optimum level of resources across science, economics and analytics are essential.

vi. Whilst the drivers of the issue do differ across megacities, there are commonalities and important lessons that can be shared in city planning, advocacy, outreach, behavioural, regulatory and fiscal approaches to managing the problem.

vii. Air pollution is a complex, multi-scalar issue which requires a complex, whole systems approach to solutions; this must be cross-disciplinary and cross-sectoral, with inclusive participation from all stakeholders.

viii. To limit emissions, and protect citizens from their impact, requires culturally sensitive and well-balanced incentives and communications. Positive persuasion is necessary.

ix. There is a need for locally credible and scalable urban science platforms and well capacitated and articulate local government sectors to communicate to national governments the unique needs of the city space. Cities need the devolution of resources from central to local government to effectively address this issue.

x. Multilateral processes such as the Sustainable Development Goals (and in particular Goal 11[7]) are providing valuable platforms through which to address this urban issue. However, the multiplicity of networks and processes can be burdensome and repetitive.

xi. Donors need to strengthen effective institutions, networks and alliances and develop local capacity.

[7] SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable.

Recommendations

1. As air pollution is a cross border issue, it is important to extend further research and discussion beyond megacities. In an urbanised world, smaller, fast-growing cities will face the same pressures that megacities are currently tackling. There can be a substantial and valuable transfer of knowledge, aided through enhancing data policies, management and availability, to facilitate sustainable transitions.

2. The convening power of the Commonwealth was applauded and the Ramphal Institute was cited as an ideal intermediary to bring together institutions, businesses, all government levels and all stakeholders from Commonwealth and other cities to holistically address the recognised complexities of the issue in a Commonwealth Global Clean Air Initiative.

3. The consensus view for this Commonwealth Global Clean Air Initiative should include a proposal to the United Nations to declare clean air as a fundamental human right, linked to government commitments to the Sustainable Development Goals.

Shanghai, China. Photo: public domain

CONFERENCE PROCEEDINGS

1 Issues Facing Megacities

1.1 Keynote – Pollution Problems in Megacities

Professor Frank Kelly, King's College, London

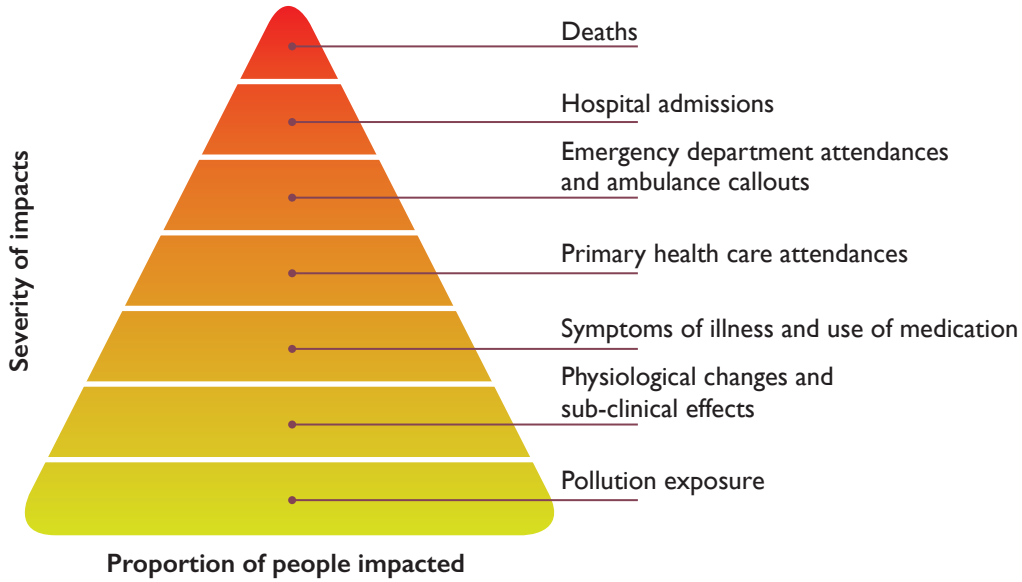
Megacities are diverse, they share many commonalities around sources of pollution which provides an evidence base for informing solutions.

Professor Kelly provided an overview of air quality issues in megacities. He noted that currently there are 23 megacities and this number is expected to increase to 37 by 2025, most with populations in excess of 20 million. Over half of the world's population live in urban areas and by 2050 this number is projected to double to 6.7 billion.

Air pollution is a widespread problem in megacities, regardless of development status, with the main pollutants of concern to human health being suspended Particulate Matter (PM), Nitrogen Dioxide (NO_2), and Ozone (O3). He put the problem into stark perspective as it is second only to cigarette smoking for premature deaths and affects our entire lifespan. Particulate matter varies in size with fine particulate matter having a mass per cubic meter of air of particles with a diameter generally less than 2.5 micrometers (PM2.5). PM2.5 is invisible to the naked eye. The invisibility of the issue can be detrimental to getting it onto the agenda for policy makers to act on and for people to respond to in their daily lives.

These pollutants can act synergistically, exacerbating health problems contributing to the global burden of disease, harming city dwellers at every level of development, from the womb to old age. As a consequence, air pollution also affects economic growth. The air pollution pyramid below is a common framework through which to describe the spectrum of health problems which can arise from exposure to air pollution.

FIGURE 1 AIR POLLUTION AND HEALTH IMPACTS PYRAMID



Professor Kelly presented the case-study of China and juxtaposed this with the air quality issues faced by London in the 1950s. Coal based power generation has driven growth in China and led to severe pollution episodes. He noted that China is going through similar processes to London albeit in a much shorter time span. He cited the example of the Clean Air Act of 1956 which was passed by the Parliament of the United Kingdom in response to London's Great Smog of 1952. The Act introduced measures to reduce air pollution which included the relocation of coal plants to outside city parameters and shifted the use of dirty to cleaner fuels in the house.

In China ambient air pollution is the fourth leading risk factor of mortality followed by household air pollution from solid fuels. As economic growth continues, there is a greater push from the population for better air quality. In addition, China's commitment to green growth is driving a shift away from coal-based emissions, leaving the leading source of air pollution to vehicular emissions.

There are a number of contributing elements to air pollution, including fireworks, ships in city ports, hinterland agriculture, urban transportation systems and vehicular emissions (brakes, tyres/road surface degradation and exhaust – which, by their nature, are widely dispersed).

Professor Kelly continued with the 'controlled diesel exhaust exposures study' which essentially found that diesel exposure resulted in black carbon and accelerated mortality. He ended his presentation with the 'Every breath we take: the lifelong impact of air pollution[8]' report which quantified the cost of exposure to air pollution on health as more than £20 billion/year in the UK. The report offers reform proposals and suggestions for the public.

[8] Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party. London: RCP, 2016 https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution

1.2 The Situation in Lagos

Engineer Augustine Ayodele Antonio, General Manager, Lagos State Environmental Protection Agency

There is a need for sensitivity and awareness of existing cultural norms in order to devise policies to induce behavioural change to address the issue of air pollution.

Engineer Antonio spoke of air pollution in Lagos which is the smallest state in the Federation with a population of 21 million, a growth rate of over 5% and the majority of industry in Nigeria. Lagos has five administrative divisions and within these are different industrial estates. The constituents of air pollution in Lagos are:

Improper waste management	• Noting inefficient landfills, and burning of refuse as contributors to air pollution.
Vehicular emissions	• Heavy congestion and public transport reliant on diesel are contributors to the issue. • A study conducted by the Lagos Metropolitan Area Transport Authority found that between 2003-2007 vehicles contributed 43% of ambient air pollution in Lagos. • Cultural norms also compound the issue with car ownership being a status symbol.
Industrial emissions	• Petrol and diesel energy generators are in use. • Whilst regulated, industries will work through the night when regulators are off-duty.

He said that the health impact of air pollution is consistent with other megacities and the greatest levels of PM exposure is found in industrial areas, followed by highways and homes. He identified poor planning and political issues as compounding the problem. For instance, homes are built before critical infrastructure such as roads are in place; power is an exclusive right of the Federal Government and accessing supply is unreliable.

However, there are systems and policies in place to address the issue of air pollution. These include:

- The Lagos State Environmental Protection Agency (LSEPA) is mandated to protect air, water, and land natural resources in the state and monitor all industrial, commercial and other activities which could result in pollution. LSEPA has reduced pollution from industrial sources by 70% through approaches such as capacity building and training, the advocacy of best available technologies and polluter pay principles;
- The Annual Tree Planting Day. This takes place on July 14. The unauthorised cutting of trees in Lagos is an offence punishable under the law. 4 to 5 trees must replace each felled tree;
- The Lagos Metropolitan Area Transport Authority coordinates transport planning policies and public transport infrastructure and is working on new, efficient buses and developing water transportation;
- The Ministry of Energy and Mineral Resources attends to energy needs and regulates the use of firewood by supplying 3kg gas cylinders as an alternative fuel;
- Working with the World Bank on monitoring air pollution through the Pollution Management & Environmental Health (PMEH) project.

Engineer Antonio noted some of the challenges: a lack of regulation to address air pollution; inadequate monitoring equipment; inadequate capacity to keep up with local trends in monitoring; growing population and the irregular supply of electricity.

In addition, he observed that to address this issue there was a need to include all stakeholders and develop effective management plans with proactive monitoring and compliance. He concluded with a call for assistance for capacity building, technical expertise, finance, and a platform for the exchange of ideas.

1.3 Pollution Problems in Indian Megacities and Strategies for Improvement

Professor Jagan Shah, Director, National Institute of Urban Affairs, New Delhi

> *There is not enough of a correlation between planning and public health outcomes. There is a need for greater exposure to this correlation so that the public can understand the outcomes of choices which have been made in the past.*

Professor Shah begun by noting the scale of the issue in India. In Mumbai, New Delhi and Kolkata air quality is four times above limits deemed safe by the national air quality index with around 670 thousand premature deaths in India associated with air pollution. This has a significant impact on economic production and public health discourse is shifting to reflect this reality by including 'new' environmental factors.

As with Gauteng and Lagos, Professor Shah reiterated data concerns, with inadequate capacity to: monitor air quality; maintain equipment; and deliver information to the public. He also noted failure in the governance of energy generation and transfer with generators constituting an unsustainable 50% of usage in India. Whilst grid power is available, power interruption is a significant problem and the back-up generator phenomenon continues to compound itself every year. There is an entrenched management inefficiency as the supply of electricity supply is not centrally controlled by states which decide on tariffs and distribution systems. He added that weak local governments are a stumbling block to progress. State and Central Governments are the main political powers and within these, the non-independence of departments and multiplicity of authorities can hinder responses to air quality concerns. He stressed the need for unified responses to be able to tackle this issue of air pollution.

Professor Shah presented some of the responses being enacted by India's cities:

- **Delhi's graded response plan** is the most advanced and comprehensive policy response in India, requiring stratified action when PM2.5 concentration breaches the acceptable level. The severity of the pollution level determines the type of actions to be taken and these are in itself designated to short, medium and long-term measures. Actions take the form of banning diesel vehicles which are over ten years old and the burning of crop residue, an alternate day odd/even number license plate permission policy, congestion tax, control of dust from construction sites, and developing non-motorised transport networks.
- The **'Breathe India Action Plan for Combating Pollution'**, developed by the National Institution for Transforming India (NITI Aayog), has proposed the action points below:

- **Partnerships:** internationally between cities such as Bangalore and London through C40 Cities Air Quality Network are helping to gather granular air quality data; nationally, such as the Smart Cities Mission which, amongst other things, looks at driving forward e-governance to fill capacity gaps and the adoption of smart technologies, data and data analytics to enable data-based policy making.

Professor Shah stressed the need to look beyond compliance and think about innovative and holistic ways in which to address the issue of air pollution. This includes addressing inequality which is embedded in policy, planning and design paradigms. He also noted the need to communicate the correlation of air pollution on health to the public and the importance of judicial activism to deliver change.

1.4 The Situation in The Gauteng City Region

Ms Gillian Maree, Senior Researcher, Gauteng City Region Observatory, Johannesburg

Inequality is a significant factor for the relationship between health and pollution.

Ms Maree provided an overview of air pollution in Gauteng, a provincial government in Northern South Africa, known as a city region and is the economic hub of the country. The region has an annual population growth rate of 3%, with economic growth being a driver for migration. The region has short wet summer rainfall periods and long, stable dry winters. In these colder months, air pollutants are trapped by temperature inversions in the valleys of Gauteng resulting in a noticeable brown haze which disperses with the summer rain.

Ms Maree noted the contributors to air pollution in the region as:

Mining	• Gold mining in particular which has the added stressor of radiation.
Domestic fuel burning	• Access to services is high in Gauteng, however cost is high which limits the ability to use electricity. As such, wood and paraffin are significant sources for heating with poverty being a driver of its use.
Vehicular emissions	• Gauteng is a car captive society and cars are seen as a status symbol. There tends to be an older fleet with poor maintenance.
Industry	• Relatively managed and well zoned within Gauteng, but there are issues around who carries the cost of greater efficiency. Many heavy industrial polluters have asked for exemption from the air quality standards stating compliance would be too expensive for them.
Waste treatment	• Incinerators, waste water treatment works and landfill sites are also contributors to the issue of air pollution.

She said there were data constraints in the region with the state of air quality monitoring lacking and many variables of interest not being captured (referred to by a field researcher as 'grossly incomplete'). She stressed the nexus of inequality and air pollution which extends to gaps in data, with poorer communities being under represented. However, Ms Maree noted progress with novel methods to cluster data which can enable a more holistic view of the issue of air pollution. Such methods include the use of satellite imagery to fill data gaps and utilising different survey instruments (such as the Quality of Life Survey[9]) to correlate areas of air pollution with reports of bronchitis and other illness.

[9] Graeme, J., Götz, G., Culwick, C., Parker, A., & Hamann, C. Quality of Life Survey V (2017/18). Gauteng City-Region Observatory: http://gcro.ac.za/research/project/detail/quality-of-life-survey-v-201718/

In Gauteng the provincial policy response to managing pollution has been through buffer zones, which aims to optimise the safe use of available land through the creation of practical buffers. However, habitation encroachment within the buffer areas is a growing concern and poor provincial planning and policy choices need to be addressed and a greater focus placed on inequality. She highlighted a worrying number of schools built close to pollution sources (244 near slime dams; 92 within 500m; 41 by hazardous sites). Such planning shortfalls remind us the present problems often derive from the choices we make.

Ms Maree concluded by drawing attention to the need for better tools for effective land-use planning and the integral role of data to bridge the disjuncture between policy development, implementation, monitoring and evaluation.

1.5 Q & A Strategies Available and Challenges Facing City Leaders

Engineer Augustine Ayodele Antonio, General Manager of LSEPA; Ms Gillian Maree, Senior Researcher, Gauteng City Region Observatory, Johannesburg; Professor Jagan Shah, Director, National Institute or Urban Affairs, New Delhi; Professor Frank Kelly, King's College, London; Dr Joanna Newman, Chief Executive and Secretary General, Association of Commonwealth Universities (ACU).

Moderator: Mr Richard Bourne, Trustee, Ramphal Institute

Summary of Comments by Discussants

The discussants identified the resonance across presentations which included: the interaction between science and governance and the recognition that there are issues with implementation; the observation that there is a need for a triple helix response of governments, businesses, and universities working together.

The ACU, through its networked centres of excellence across the Commonwealth, which have expertise on climate and sustainability issues, is planning to convene a new such network looking at cities. This will encompass issues such as data collection; the link between inequality and air pollution; the importance of the judiciary; different levels of government and how they do not act in consonance with each other.

Perspectives which emerged in the general discussion

On philosophy of governance: There is a structural and political deficit in the devolution of resources to local governments. Short sighted political objectives, at each level of governance can trivialize the issue of air pollution to political whims.

On outsourcing data collection: Universities were identified as key players in regards to data collection and monitoring. It was argued that data needs to remain within society and be accessible to all, which data commodification will not allow. However, it was observed that there is a need to ensure scientific capacity to deal with the data.

On data saturation: It was noted that with robust research on health impacts of some pollutants, it is not always the case that we need more data, but rather its effective use to take decisive actions. It was stressed that there needs to be a balance with data, showing that there is enough to see where plans are and where they need to be. This information is integral to policy makers to authoritatively show benefits of actions that have been taken to improve air quality.

On the fundamental difference between developed countries and the Global South: It was observed that the latter is still subject to inward migration and informal settlements. The discussants noted that planning needs to have a key role and air quality can help define this discourse. They also noted that there is a lot we can learn from other cities and local communities. Science and research within informal communities can help drive innovation and solutions which work for the whole.

On the Sustainable Development Goals (SDGs): Devolution is integral in implementing the SDGs which require bottom-up action.

2 Expert Inputs on Surmounting Obstacles in the Public Opinion, Economic, Political & Financial Spheres

2.1 Panel on Regulatory, Planning and Fiscal Controls to Reduce Pollution

Mr Guy Hitchcock, Low Emission Strategies Knowledge Leader, Ricardo Energy & Environment

Chair: Claire Holman, Chair, Institute of Air Quality Management (IAQM)

Three levers of managing vehicular emissions are: the reduction of traffic levels; easing the flow of traffic; regulating and encouraging cleaner vehicles.

Mr Hitchcock spoke of some of the wider strategic and targeted planning measures to reduce air pollution. He noted that there are three essential levers to managing vehicular emissions, namely: 1) reduce traffic levels 2) make traffic flow more efficiently; and 3) regulate or encourage cleaner vehicles. There were several key regulatory and fiscal measures to regulate or encourage cleaner vehicles in particular. These include the use of low emissions zones and wider fiscal policies such as parking charges differentiated by different vehicle standards. He highlighted the importance of a city's procurement standards for cleaner vehicles and the use of planning powers to support new fuelling infrastructure, set vehicle standards for site operation, and manage traffic flow for new developments. He also spoke on infrastructure and investment needs especially investment in public refuelling infrastructure, investment in low emission public fleets, and supporting emerging technologies such as Mobility as a Service (MaaS) and connected and autonomous vehicles. Mr Hitchcock finished by noting that it is not only about regulation, but also about working with people and partnerships to raise awareness of issues across industries such as bus and freight and in business forums.

Perspectives which emerged in the general discussion

Land use and land tenure: It was noted that indigenous land tenure can complicate effective planning policy.

Spatial sprawl and public transport: A good position to start from would be to ask what drives sprawl and to connect it to public transport first and foremost rather than it being the last planning item. Additionally, the correct incentive methods need to be implemented in the design and planning of public and alternative transport such as bus shelters, and distinct pedestrian and bicycle lanes.

2.2 Ramphal Partner Panel

Ms Gillian Maree, Senior Researcher, Gauteng City Region Observatory, Johannesburg; Mr Timothy Adewale, Deputy Director, Socio-Economic Rights and Accountability Project, Lagos; Ambassador Humayun Kabir, Vice-President, Bangladesh Enterprise Institute

Chair: Dr Adesoji Adeniyi, Ramphal Institute Associate and Senior Policy Advisor, Department for International Trade

The way forward is to work together, through the Commonwealth and across stakeholders, to build partnerships, innovate and facilitate the implementation of the SDGs.

Summary of Main Points by Discussants

Ms Maree said that currently environmental concerns are not at the forefront of the political agenda in South Africa. In addition, there is a struggle to find appropriate economists.

Mr Adewale, spoke of the clash between the Federal and State Government in Nigeria. He noted the need for devolution to enable Lagos State to make decisions on issues such as traffic control. He stressed that the right to a clean environment should be seen as a fundamental human right.

Ambassador Kabir noted that 28% of deaths in Dhaka are due to air pollution and spoke of the concept of megacity which has not as yet caught on at the city and policy level in Dhaka. He stressed that there are unique issues that Dhaka faces and this included migration which is transforming the city faster than policy and deal with it. The population density of Dhaka is also generally higher than other megacities with 40% of GDP originating in the Dhaka area and the growth of the city is unplanned and chaotic and the reality of growth and planning are not in synchronicity which compounds the air pollution issue. Ambassador Kabir added that some of the regulatory measures in place dealt with air pollution including the Biodiversity Act and measures around the use of brick kilns.

He highlighted challenges in creating and enacting policy measures including issues shared by other megacities such as a disconnect between local and central governments, sector specific rather than the cross disciplinary and holistic point of view and a reactive rather than proactive way of addressing the issue. He supported the way forward as working together with our existing networks such as the Commonwealth and across all stakeholders to build partnerships, innovate and facilitate the implementation of the SDGs, the by-product of which will be better air quality.

2.3 National Versus Civic Approaches

Dr Robin Russell-Jones, Medical/Scientific Advisor to the Chair of the All-Party Parliamentary Group (APPG) on Air Pollution

Chair: Mr Laurie Laybourn-Langton, Director, UK Health Alliance on Climate Change

> *By framing air pollution in terms of human health rather than as an environmental issue places it higher up the political agenda.*

Mr Laybourn-Langton opened the session observing that city leaders have grasped the political importance of air quality, but that this was not the case at government level.

Dr Russell-Jones spoke on national and civic approaches to air pollution. He noted that in the UK the majority of health impacts can be reduced by tougher action on motor vehicles, but argued that national governments will only act when pushed as we have seen through legal action in the UK from ClientEarth[10].

He briefly introduced us to the first pollution act passed in the UK: The Alkali Act of 1863 which addressed the visible issue of muriatic acid gas. This Act was highly effective as it set absolute limits on emissions which fell from 14,000 tonnes to 40 per annum. However, the second Alkali Act of 1873, which was designed to control emissions of dust, smoke and grit was much more ambiguous and introduced the concept of "best practicable means" i.e. the best available technology not involving excessive expense. This ambiguous concept would henceforth be the foundation for controlling air pollution in the UK. He then introduced national and civic actions which can be found in tables 1 and 2 below. Dr Russell-Jones noted that there needs to be a coordinated strategy across national and local governments to address the issue.

He noted the UK Government's 'Road to Zero' strategy which aims to reduce car pollution. The strategy expects that by 2040 all new cars and vans will have significant zero-emissions capability and at least 50% of new cars to be ultra-low emission by 2030. However, he expressed concern that this is too long a time scale to deal with the current severity of the issue. He argued that there is a need to introduce a new clean air act and joined previous panellists in stating that the right to breathe clean air ought to be a fundamental human right. He had earlier highlighted that this right is not yet adopted by the UN.

[10] In February 2018, ClientEarth won its third case against the UK government over the country's illegal and harmful levels of air pollution.

TABLE 1 GOVERNMENT ACTION

GOVERNMENT ACTION
Fiscal Disincentives
• Increase road tax on diesel vehicles
• Increase tax on diesel fuel
• Remove subsidy on red diesel
• Phase out transport refrigeration units running on diesel generators
• Introduce a diesel scrappage scheme
Emissions testing
• Testing regimens for new cars
• Make it illegal for garages to circumvent pollution control technology
• Ensure MOT can detect if pollution control devises have been tampered with
Green policies
• Incentivise growth of ULEZ (Ultra Low Emission Zone)
• Ensure electrical power contribution moves in line with climate change commitments
• Ensure EU directives governing air quality remain post-Brexit
• Create a green watchdog (to replace EU Court of Justice) that is independent of the government and able to act against the government in the event of a transgression

TABLE 2 CIVIC AND NATIONAL ACTION

CIVIC ACTION
Promote walking/cycling on health grounds
• Discourage driving to school
• Introduce pedestrian only areas
• Install cycle lanes
• Promote public transport, if necessary, with subsided fares
Reduce Congestion
• Traffic management
• Variable speed limits
• Fewer speed bumps
• Restrict access to residential roads
Charging Schemes
• Introduce or extend 'Clean Air Zones' or 'Low Emission Zones (LEZ)' or Ultra LEZ
• Increase parking charges for high polluting vehicles
• Identify and fine high polluting vehicles at the road-side
Planning policy
• Promote the installation of charging infrastructure for electric vehicles
• Encourage microgeneration projects as an alternative to diesel generators
• Give priority to air quality in planning applications, particularly if it affects schools
• Display air quality data

2.3.1 Gauteng City Region

Ms Gillian Maree, Senior Researcher, Gauteng City Region Observatory

There is a need for greater public awareness on the link between health and pollution in South Africa. Whilst the Right to Clean Air is in South Africa's Bill of Rights, its implementation is met with resistance.

Ms Maree noted that in the UK air pollution is strongly linked to transport, but this is not the case in Africa where other variables are significant contributors. She added that the right to clean air is enshrined in the Bill of Rights in South Africa and while there was no resistance to its inclusion in the Bill of Rights, there is resistance to its implementation.

She stressed that the important role of civil society and the value of robust research on the causal link of air pollution on human health in the UK was not available in South Africa.

Perspective which emerged in the general discussion

On Taxation: congestion charges, should be designed with spatial scope in mind and the public should be kept fully informed on the accrued benefits.

2.4 Media and Public Information Issues

Chair: Dr Russell-Jones, Medical/Scientific Advisor to the Chair of the All-Party Parliamentary Group (APPG) on Air Pollution

2.4.1 London Perspective

Mr Elliot Treharne, Air Quality Manager, London City Hall

Making an invisible problem visible through positive messaging, persuasion and engagement.

Mr Treharne spoke about the extraordinary progress by the Mayor of London in improving air quality and how this is communicated to the general public. He commenced by providing a historical perspective of the issue from the 13th through the 17th century and to the Tate Modern which was a Bankside power station and is now an iconic structure housing one of the largest museums of modern and contemporary art in the world. The Tate Modern in an example of how deeply engrained problems can be solved to create economic opportunity.

Mr Treharne noted that air pollution in London is an invisible problem compared to the past, however the invisibility means that the particles are even smaller and more threatening with health impacts falling most disproportionately on the most vulnerable. Therefore, air pollution is not only an issue about health but also of social justice. The messaging around air pollution thus needs to be so much wider than in the past, making this invisible problem visible through positive messaging, persuasion, and engagement. The Mayor of London is an evidence led politician and one who has a personal story around air pollution. Having developed adult onset asthma, he has been in the vanguard in expressing why it is important to act. He saw that this issue could mean that the city space in which we live, is undermining our ability to fulfill our potential. Regarding the 2012 Olympic legacy, air pollution has resulted in 10% less lung function which undermines young aspirant athletes.[11]

FIGURE 2 CLEAN AIR CAMPAIGN – LONDON[11]

He noted that the World Health Organisation (WHO) provides helpful benchmarks and tools to convey medical experts' warnings of where we are and where we ought to be in terms of air quality for better health outcomes. It is significant that nowhere in London meets the WHO standards. Fortunately, there has been media interest in some of the issues concerning air pollution such as the Volkswagen emissions scandal in 2015 which has maintained visibility of the issue to the general public.

Since 2016 there was greater awareness of pollution in the capital. A study by the Greater London Authority[12] summarises the actions taken by local authorities to improve air quality and includes to date 50 school air quality audits, Ultra Low Emission Zones and Low Emission Bus Zones, new demand driven Electric Vehicle infrastructure and targets to: reduce emissions by 45% by 2020; have zero emission bus fleets by 2037; and have zero emission taxi fleets by 2033.

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[11] Image Source: The Evening Standard. October 18, 2018. Hard-hitting air pollution posters to go on display on London's Tube network: https://www.standard.co.uk/news/london/hardhitting-air-pollution-posters-to-go-on-display-on-londons-tube-network-a3661891.html

[12] Greater London Authority. (2017). Local Authorities and Air Quality: A Summary of Action Taken by London Boroughs to Improve Air Quality: https://www.london.gov.uk/sites/default/files/borough_air_quality_report_2017_final_2.pdf

2.4.2 Lagos State Perspective

Mrs Olabisi Shonibare, Director, Pollution Control, LSEPA

The cost of clean energy adoption is a barrier to adoption in Lagos. Persuasion and sensitisation are the key processes being employed by the Lagos State Environmental Protection Agency (LSEPA) to increase awareness of air pollution.

Mrs Shonibare noted that the point source of air pollution in Lagos State is vehicular emissions and power generation which is being addressed through initiatives such as the development of communal generators, and shifting from diesel to gas where appropriate.

The story is different from that of London. In Lagos, the 2011 tree planting activity was largely viewed as a wasted effort by the public. In addition, the cost of clean energy adoption is a barrier to adoption in Lagos. The effectiveness of initiatives needs to be reassessed. The polluter-pays principle for instance is largely ineffective as industry is willing to pay and continue polluting. The balance of incentives is not optimal.

She added that persuasion and sensitisation are the key processes for the Lagos State Environmental Protection Agency with school advocacy being a key focal area.

Perspectives which emerged in the general discussion

Devolution of power: In London there is an effective working relationship with the national government. In the new Clean Air Strategy, the national government has agreed to devolve more powers to the city especially around road transport, but this remains limited in other areas such as construction, building emissions and the river. The UK also has the concept of 'Metro Mayors[13]' which allows for more strategic regional devolved governance.

The focus on children: There is a natural sympathy for and duty to children. The impact on children is an important way through which to drive forward the seriousness of health impacts associated with air pollution.

[13] Metro mayors are citizen elected chairs of their area's combined authority who work in partnership with the combined authority to exercise powers and functions devolved from Government.

3 New Scientific and Industrial Approaches Which Are Reducing Megacity Pollution

3.1 Keynote – The Global Context for Megacities After Habitat III, 2016

Professor Susan Parnell, Universities of Bristol and Cape Town

The SDGs are driving a call for a new commensurate global urban science to drive a radical transformative urban agenda.

Professor Parnell spoke about the global context for megacities following Habitat III. She noted that there is a confluence, if not consensus, on the primacy of cities whilst at the same time there are challenges to the city state from the Westphalian systems of governance. As the world becomes increasingly urban the urgency of addressing the unique cluster of urban questions becomes more pertinent and indeed, this urgency has represented in the shift from the Millennium Development Goals (MDGs) to the complex and non-linear SDGs which specifically reference cities in SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable. Ambitious action on air pollution will have co-benefits across all goals and in particular:

The urban question is secured across different multilateral platforms, from the Paris Agreement, the New Urban Agenda and the SDGs. She noted some thought the latter were too many and overlapping, but that is the point – it is not linear. Whilst the multilateral system has been important in setting a set of common goals, value space and action agenda there is limited convergence across these platforms, which is burdensome and inefficient for the city state and the national government. She observed the 'Ocean Focus' is on plastics; what is the 'Urban Focus'?

She spoke of the complex, multi-scalar nature of cities which demands a new institutional architecture of multi-level governance and hybrid multi-scale finance and governance. She also saw the need to bring together isolated science; that knowledge and politics should go together and to coordinate the science view more before engaging with the public. There is a need for locally credible and scalable urban science platforms and well capacitated and articulate local government sectors to communicate to the national government the unique needs of the city space. The national government needs to allow for wider devolution to the urban centres to allow them to make the decisions that are unique to them.

She said that there is a greater drive now for evidence-based reasoning and an understanding of just, inter-generational transitions. In addition, the integrated analysis of poverty and inequality is opening our understanding of the poverty/inequality nexus. These shifts provide a strategic entry point for the discussion around air pollution and in particular that health, as multi-scalar and multi-traction, can act as an apex issue.

She concluded by calling for a commitment to the right to clean air.

3.2 Science Panel

Chair: Mr Nigel Clear, Director of Conferences, Elsevier

3.2.1 The Individual Scale

Dr Ben Barratt, King's College London

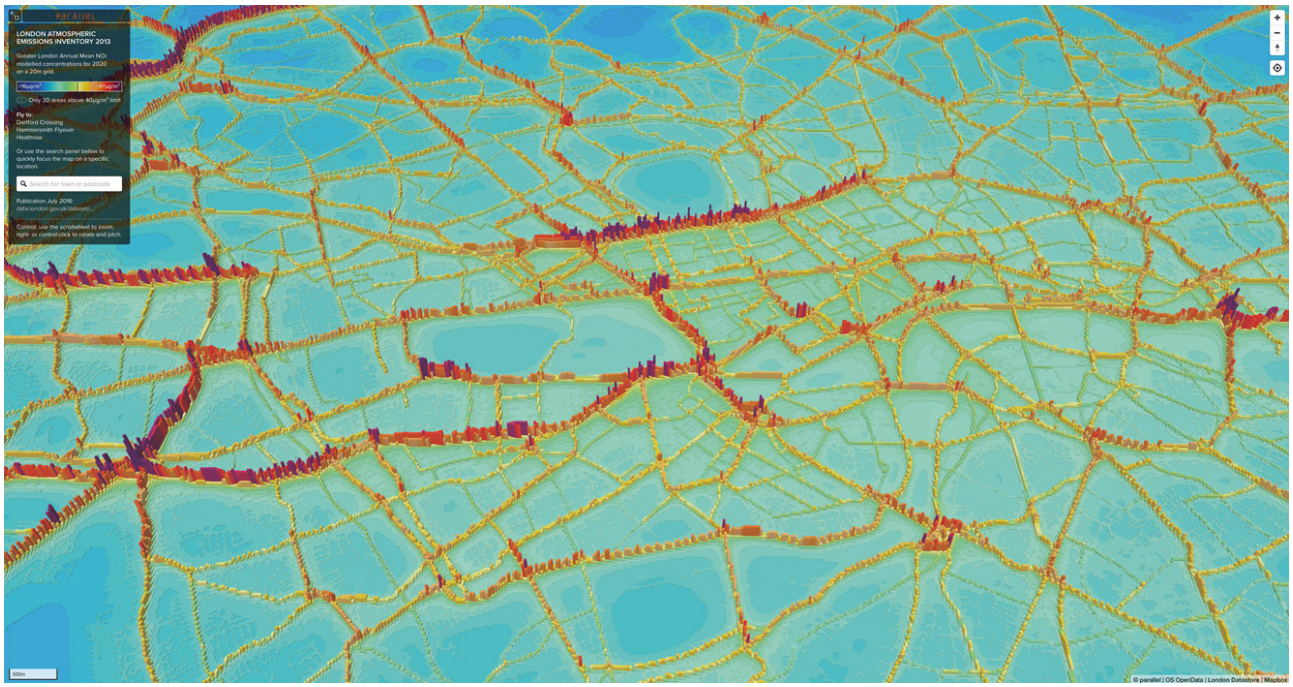
There are different microenvironments of exposure and these are dependent on an individual's daily choices which influences exposure dosage and the corresponding health impacts which in turn are dependent on individual sensitivity to pollutants. Framing air pollution in terms of personal health can be a powerful motivator for protective behaviour. Change can be affected on an individual scale through choice and at the city scale by acceptability.

Dr Barratt brought the issue of air pollution back to the individual and stressed that while air pollution is a large-scale issue, it is also a personal health issue.

The scale and location of outdoor sources of pollution are dependent on the pollutant, city and region. He presented a 3D map of London air quality from open source data visualisation software, an example of which is displayed in Figure 3 below. Everyone has slightly different exposure in London, and also in other cities like Hong Kong. Such visualisation can provide individuals with schemata of relevant data on personal exposure to air pollution.

Dr Barratt noted that there are different micro-environments of exposure and these are dependent on the individual's daily choices which influences exposure dosage and the corresponding health impacts which in turn are dependent on individual sensitivity to pollutants. Stronger health impact evidence would facilitate targeted policies around health, and emission control. Awareness of the health impact of air pollution needs to rise to the same level as that of water pollution. Personal exposure studies have the potential to improve public awareness and public engagement. Currently air pollution as a public health risk is poorly understood by the public which, if properly informed, they and their families would not take. As such air pollution becomes not only an environmental issue, or health issue, but also a social justice issue. It is a wide-ranging issue too as, for example, in the use of diesel in agricultural production across Europe which has not yet been addressed.

FIGURE 3 PARALLEL'S INTERACTIVE MAPPING AND DATA VISUALISATION SHOWING LONDON AIR POLLUTION[14]



The barriers to engaging the public are the same as that for climate change. This includes discredence or the general sense of disbelief, optimism bias, discounting events that are perceived to occur in the distant future, tragedy of the commons and the and societal norms or taking cues from peers. There is a need to engage, educate, and empower individuals to tackle this issue of air pollution.

Dr Barratt provided some examples of ways in which some of these barriers are being tackled:

- Using mobile or personal monitoring to make data relevant to individuals.
- Personal air pollution monitors with pupils at schools and policy makers.
- Apps such as CityAir which utilises high quality monitoring data in London and allows individuals to see modelled exposure near their home.

[14] Greater London Authority, London Atmospheric Emissions Inventory from which King's produced the modelled air quality map. 3D Mapping and Data Visualisation (2018): https://parallel.co.uk/3D/laei-no2

3.2.2 A Systems Approach to Air Pollution – Addis Ababa, Kampala, and Nairobi

Professor Francis Pope, University of Birmingham

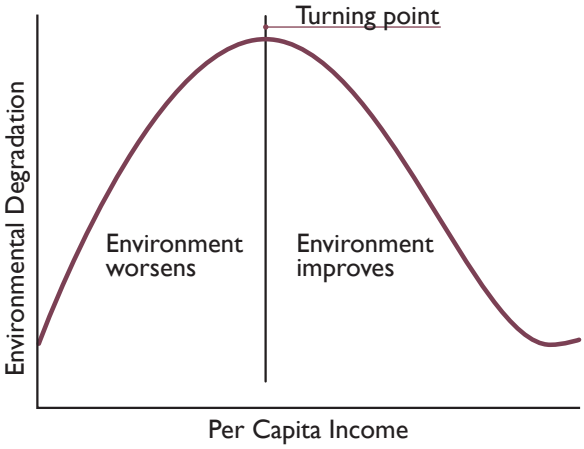
Nairobi has a projected population increase from 3.5 million to 7.1 million by 2030. The Business as Usual Scenario is that pollution will double as population doubles and the best-case scenario posits that as population doubles, air pollution remains constant. This is achievable through the transition to a low carbon economy.

Professor Pope presented on: A Systems Approach to Air Pollution (ASAP) in East Africa, funded by DFID, which brings together cross disciplinary actors in Addis Ababa, Kampala and Nairobi. He noted that indoor and outdoor air pollution is the most important risk factor in Ethiopia and Uganda to premature mortality and the second in Kenya.

He spoke about the Environmental Kuznets curve which other presenters also referenced and which essentially shows that with initial economic development there is an increase in environmental degradation. However, with the confluence of development and ambition by citizens for a healthier environment a turning point can be reached, producing a reduction in environmental degradation.

FIGURE 4 ENVIRONMENTAL KUZNETS CURVE[15]

Professor Pope presented a case-study of Nairobi which is a rapidly booming city. It is projected that population will increase from 3.5 million to 7.1 million by 2030. This would naturally place additional pressures on the city's air quality. The Business as Usual scenario posits that pollution will double as population doubles; the worst-case scenario posits that air pollution will quadruple as population doubles; and the best-case scenario posits that as population doubles, air pollution remains constant. This scenario is achievable with a shift to a low carbon economy. To get here there is a need to sensitise the population to issues of air quality, and this requires novel collaborations with other disciplines like artists and designers to convey data in a meaningful way to increase the visibility of air pollution. As illustrated in Figure 5 (on the following page).



[15] Original image source: https://en.wikipedia.org/wiki/File:Environmental_Kuznets_Curve.png

FIGURE 5 SENSITISING POPULATION TO ISSUES OF AIR QUALITY - POLLUTION LIGHT PAINTING IN COLLABORATION WITH AUDIO VISUAL ARTIST ROBIN PRICE

UN HABITAT UNIVERSITY OF BIRMINGHAM IOM arts council

Luwum Street, Kampala
PM 2.5 60 - 70 micrograms per cubic metre

As the light painter's sensor detects more pollution, it draws greater numbers of light particles into the photograph. The effect is as if the microscopic pollution has been enlarged and brightly lit up, shedding light on the invisible.

A barrier to moving forward however is paucity of data. Whilst low cost sensors are available, they have not as yet achieved optimum efficiency. Satellite observations can fill gaps but these only go back ten or so years. The revolution of citizen science and novel methods of data collection are working to increase public awareness.

3.2.3 A Global Perspective

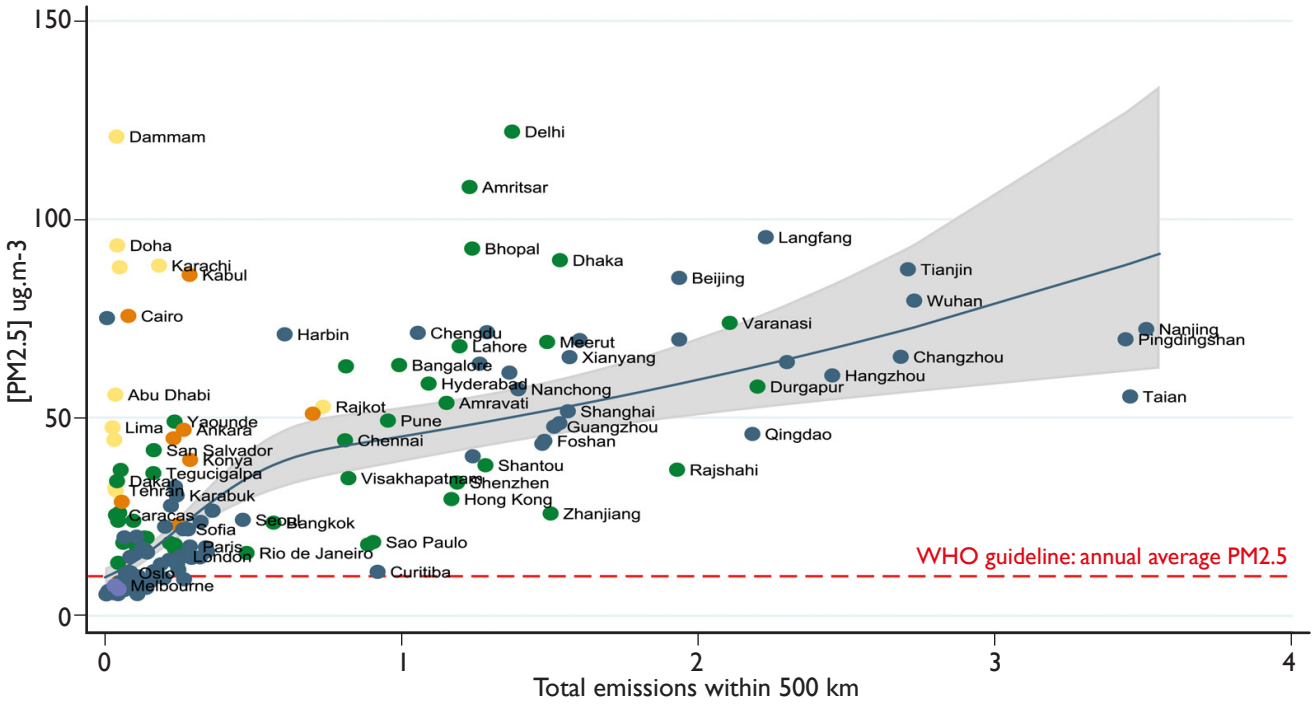
Professor Paul Wilkinson, London School of Hygiene and Tropical Medicine

Air pollution is correlated with socio-economic development, city population, and pollution from surrounding areas.

Professor Wilkinson provided a global perspective on air pollution. With a random sample of 250 cities he presented a set of regressions to illustrate how strongly air pollution is correlated with socio-economic development, city population, and pollution from surrounding areas.

On development status, he noted that as countries develop, they tend to send out polluting production to developing countries which means better air quality in the wealthier nation. There was also the lag effect wherein countries in transition from low to middle income see a growing demand for a cleaner environment. On stratifying cities population density, he found the air pollution issue rises quickly then continues to rise, albeit at a shallower rate. On pollution from surrounding areas he found that concentrations of PM2.5 are being driven from well beyond the city border. This is the case in London, where particle pollution is mainly derived from outside of the city and are therefore beyond the direct control of city administrators.

FIGURE 6 AIR POLLUTION FROM SURROUNDING AREAS



He concluded that for lower income cities, tackling air pollution is largely about removal of combustion processes and for higher income cities non-combustion processes are increasingly important considerations. Air pollution policies need to be aligned with a low carbon transition.

Perspectives which emerged in the general discussion

On the source of particulates: Vehicular exhaust emissions are indeed a significant contributor to air pollution. This is all part of understanding and managing the issue and expectations. Background and other vehicular emissions, such as tyre and road surface degradation, brake wear (which all apply to electric vehicles too) and the significant agricultural emissions also need to be addressed.

On individual awareness vs large scale change: There is a need for bottom-up (for ground swell of support) and top-down (to enact changes) approaches to tackle this multi-scalar issue and the alignment of objectives simplifying targeted action. Citizen data is powerful in shifting the attitudes and in London, such data has influenced the Mayor. Data to influence policymakers does not need to be perfectly polished. It remains a challenge to fully comprehend the problem, its composition, what can be achieved and what needs to happen. It is important to understand and remember that air pollution is a risk multiplier.

Ethnicity as factor for risk: Ethnic differences influence vulnerability to risk factors, so for instance South Asian's have a higher risk of diabetes and incidence of lactose intolerance. There are also socioeconomic differentiations to exposure and this again elicits social justice and inequality arguments.

3.3 Current Challenges and Opportunities

Chair: Mr Malcolm Ransome, Advisor to the Ramphal Institute

3.3.1 Department for Environment, Food and Rural Affairs, UK (DEFRA)

Dr Iain Williams, DEFRA

There are challenges working across government departments and levels, but there has been clear progress. Clean air legislation ought to ensure responsibilities and deliverables are balanced between local and national government.

Dr Williams spoke of a need for a whole systems approach to improving and protecting the UK's environment. DEFRA has recently completed consultations on the Clean Air Strategy which sits alongside the UK's Industrial Strategy, Clean Growth Strategy and 25 Year Environment Plan. The latter adopts a comprehensive long-term approach to protecting and enhancing natural habitats and landscapes. The objective of the plan is to improve the environment within a generation with cleaner air, water, thriving plants and animals and a cleaner greener country.

THE 25 YEAR ENVIRONMENT PLAN'S AIMS TO ACHIEVE 'CLEAN AIR' BY:

- Meeting legally binding targets to reduce emissions of five damaging air pollutants; this should halve the effects of air pollution on health by 2030.
- Ending the sale of new conventional petrol and diesel cars and vans by 2040.
- Maintaining the continuous improvement in industrial emissions by building on existing good practice and the successful regulatory framework.

He noted that poor air quality is the largest environmental risk to public health in the UK, and while air pollution is mainly an urban issue, it is also a rural issue. Agricultural ammonia emissions for instance remain a significant contributor to the problem, as does NO_2 with the vast majority of the UK non-compliant with averages. The 2017 NO_2 Plan aims to tackle the latter by working closely with local authorities to reduce NO_2 from vehicular emissions.

He identified a challenge in working from central government to local authorities. Clean air legislation ought to ensure responsibilities and deliverables are balanced between local and national government. He stressed that within a complex multi-variate system, trade-offs will ensue but the solutions are there and are similar to those introduced by previous presentations. Solutions include for instance

access restrictions, retrofit technologies, electric vehicles and infrastructure as well as the promotion of alternative transport, amended parking charges and social science for behavioural change. He also noted the UK government's commitment of £10 million to improve modelling and assessment which will facilitate evidence-based policy making, monitoring and evaluation.

Perspective which emerged in the general discussion

On working across government: Mechanisms for cross government work have improved significantly but there remains work to be done. There are networks across the government and joint teams for addressing issues. The 25 Year Environment Plan is a good example of cross government work as it requires many sectors of government to work together as this is a government plan not just a DEFRA plan.

3.4 International Civil Society Advocacy Panel

Chair: Dr Carl Wright, Secretary-General Emeritus, Commonwealth Local Government Forum; Trustee, Ramphal Institute.

3.4.1 Clean Air Asia

Mr Bjarne Pedersen, Executive Director, Clean Air Asia

Whilst there is an increased awareness and understanding of addressing air pollution through sound policy measures there are also regressive policies in some regions. Such trade-offs will occur but need to be balanced.

Mr Pedersen introduced Clean Air Asia, an international NGO founded in the Global South. Air pollution is a major issue in Asia with 99% of cities in the region experiencing unhealthy air quality levels according to the WHO guidelines. The mission of Clean Air Asia is to reduce air pollution and GHG emissions in Asia and contribute to a liveable and healthy Asia for all people, both now and in the future.

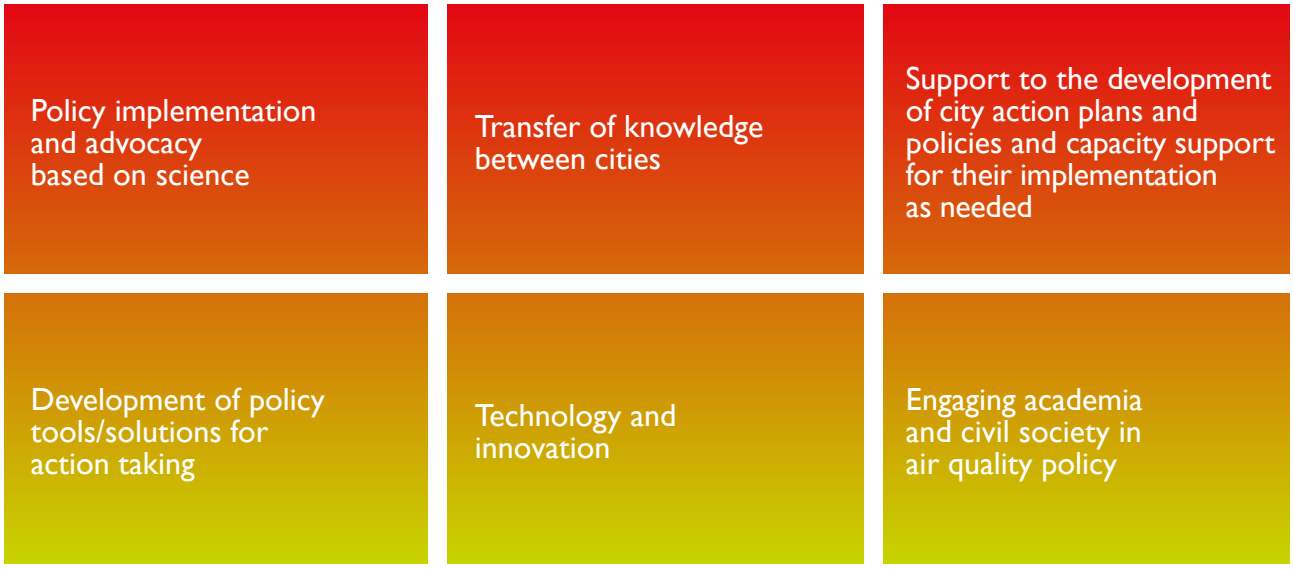
Its activities include: informing stakeholder about air pollution and its association with climate change, and sustainability; building capacity; advocating for the development and implementation of effective and appropriate policies and practices; tracking progress of polices; and disseminating data and knowledge.

He noted the challenges of working in a changing problem space with shifts in the management and manifestation of air pollution. In China for instance, following its sets of 5 Year Plans has seen a marked decrease in air pollution by 30%, but this decrease is due in part to addressing some of the less challenging issues. As such further reductions will require innovative and novel methods to facilitate further reductions.

In the region, the focus is now shifting to India, with Vietnam, Indonesia, Malaysia, Mongolia and the Philippines emerging as the next layer of focus countries. He noted that there is an increased awareness and understanding of addressing air pollution through sound policy measures, but there are also regressive policies in some regions. He gave the example of the Philippines shift to Euro 2 Diesel.

The private sector are important players in improving air quality and companies are engaging with and seeking opportunities to pilot technologies at the city level. He gave the example of Siemens and their new software solution to air pollution and the associated lack of compliance with emission-control thresholds. Siemens City Air Management (CyAM) software is a cloud-based software suite with a dashboard that displays real-time information on the air quality detected by sensors across a city and predicts values for the upcoming three to five days.

He concluded that while there is great value in real time data, it must be converted into action to address air quality. He noted the following areas of need:



3.4.2 International Union of Air Pollution Prevention Associations

Mr Richard Mills, Director-General, International Union of Air Pollution Prevention Associations

State partner representatives change all the time, destabilising decision making, NGO representatives can provide stability and coherence.

Mr Mills also gave examples of his observations in China: many years ago, when they were resistant to acknowledging air pollution, the US Embassy set-up a monitoring station on their roof and publicised the accumulated data to the world at large and the citizens of Beijing which allowed for a shift in public opinion. He noted that civil society influence was important in this case but the determining factor was the action of China's government.

He further noted the different models of civil society. From the traditional model of advocacy and public engagement to the specialist NGO and others that represent environmental workers. The latter functions under the moto of serving the environment by serving its members.

He argued that the developing world does not have equivalent NGOs to the International Union of Air Pollution Prevention Associations though there are sophisticated alternative structures. These however are disrupted by migration and movement and as networks fall away, they are not able to rapidly replicate themselves.

Mr Mills noted the strengths and weakness of NGOs as:

STRENGTHS	• Can drive innovation. • Contribute an alternative centre of technical expertise to engage meaningful debate. • State partner representatives change all the time, destabilising decision making. NGO representatives can provide stability and coherence.
WEAKNESS	• NGOs are single bodies and in the air pollution arena the levers that need to be pulled are broader perceptions.

Perspectives which emerged in the general discussion

On moving beyond the narrow NGO remits and realising co-benefits: Being boxed into a single remit is definitely an issue, especially as air pollution is so closely entangled with issues such as climate change and inequality. It was noted that Clean Air Asia is interested in the co-benefits agenda and deriving value in working in partnerships to remove some of the barriers to achieving impactful results. This includes partnerships with organisations such as Transparency International to tackle corruption.

On the international donor community: Frustration was expressed in working with the international donor community as there can be a trade-off with accepting funding and promoting the donor's agenda. However, it is integral to work with local partners and communities to be impactful.

On the SDGs: Air pollution is specifically mentioned in two targets, under health (SDG3) and cities (SDG11) and, in principle, related indirectly to other targets beyond SDG 3 and 11; however, the debate around the SDGs has not recognised these overarching considerations.

4 How Five Commonwealth Megacities Can Make More Effective Use of the Commonwealth and International Arena to Achieve Their Air Quality Goals

4.1 The Commonwealth Context Panel

Chair: Mrs Patsy Robertson, Chair, Ramphal Institute

4.1.1 Commonwealth Secretariat

Mr Abhik Sen, Partnerships, Commonwealth Secretariat

> *The convening role of the Commonwealth Secretariat allows Ministers and senior officials to discuss, deliberate and come together on issues through a free and frank exchange of views.*

Mr Sen gave an overview of the Commonwealth and the Secretariat. He noted that the Commonwealth is a voluntary association of sovereign states and constitutes 53 nations, each of which are shareholders and the board of governors of the Secretariat. The Secretariat focuses on servicing and supporting member governments by convening governments around identified policy issues, and providing research, technical assistance and strategic advice.

The mandate of the Secretariat is provided by the Commonwealth Heads of Government who meet every two years. The most recent meeting was held in London in April 2018. For the first time, urban challenges received greater attention as their populations shift to majority urban.

The Secretariat convenes meetings with Commonwealth Ministers at the margins of other gatherings such as the United Nations General Assembly, the Annual Meetings of the IMF, the UN Framework Conference on Climate Change (UNFCCC) and so forth. During these meetings big policy issues are addressed, tackled and common action plans are agreed on and then actioned by the Secretariat and accredited organisations. The value of these meetings is that it allows ministers and senior officials to discuss, deliberate and come together on issues through a free and frank exchange of views. The Secretariat's primary role is to serve member state governments, but it also functions as a convener and facilitator of collaborative work across the over 80 accredited Commonwealth organisations. Where there are accredited organisations such as the Commonwealth Local Government Forum (CLGF) or the Ramphal Institute, which has a deeper knowledge base for tackling specific policy issues, the Secretariat realises the value of offering a supportive role rather than repeating efforts.

Mr Sen spoke of a relatively new initiative introduced by the Secretariat on 'Innovation and Partnerships', anchored in SDG 17 which is about partnerships and embedded in the Commonwealth Charter and Strategic Plan. The Secretariat is thus working towards facilitating innovative approaches and delivery to achieve outcomes through partnerships with an initiative such as the Commonwealth Innovation Hub, a digital platform designed to tap and unleash the ideas and innovation potential of the Commonwealth.

4.1.2 UK Department for International Development (DFID)

Ms Rubbina Karruna, Cities Advisor, DFID

Working with governments and local authorities to address demand-led issues might lead to trade-offs. As such, policy responses need to be balanced with these trade-offs in mind.

Ms Karruna noted the focus of DFID on low-income countries concentrated in South Asia and Sub-Saharan Africa with cities being an important area of focus for DFID's economic development strategy. She stressed the importance of working on urban development as more vulnerable people move into cities and highlighted that air quality is moving up their agenda with DFID's Cities and Infrastructure for Growth (CIG) programme:

CITIES AND INFRASTRUCTURE FOR GROWTH

- Provision of up to £165m over 5 years (2017-2023) in two phases of £82.5m.
- Providing technical support on city and regional interventions in 3 focus countries: Burma, Uganda and Zambia with the objective of increased inclusive economic growth and job creation.
- Interventions are aimed to aid city economies to become more productive, deliver access to reliable, affordable, renewable power for businesses and households, and strengthen investment into infrastructure services, including from the UK.

Ms Karruna addressed the need to work in partnership with mayors of cities; however, there is a challenge in identifying the level of government to work with as there are differences in political power structures. In addition, there is a need to balance policy responses with trade-offs in mind. For instance, in creating jobs, industrialisation and infrastructure development can drive some of the issues around air pollution.

She noted DFID's work to empower cities by: taking a systems approach; supporting data and research; navigating governance issues; and engaging civil society. It is also important to remember to ask: how can megacities learn from each other?

Perspectives which emerged in the general discussion

On DFID and the Commonwealth: DFID works with 28 Commonwealth States, with Nigeria and Pakistan being two of the larger countries in terms of investment. DFID is not only focusing on capital cities, but secondary cities as well to see opportunities to balance urban growth. Working across countries with their unique complexities is, of course, challenging. The importance of demand led flexible technical assistance was stressed, in addition to working in partnership with national and local governments and navigating between them.

NGO Dialogue with DFID: There was a call for NGO dialogue with DFID to enable NGOs to offer suggestions and possible collaborations to further the work of DFID.

On the Commonwealth Secretariat's Innovation and Partnerships programme: It was emphasised that this work occurs at many levels outside of London and the UK. For instance, India's International Training & Assessment Courses provides technical training on a plethora of issues and is open to Commonwealth member states. The Secretariat engages in awareness building and facilitating governments to send people to benefit from such training.

Commonwealth Small States: Thirty of the Commonwealth's 53-member countries are Small States. The issues of small island countries are championed by the Commonwealth. Regarding cities, it is also important to include these Small States in the discussion as they face unprecedented challenges posed by slow onset events such as sea-level rise and subsequent inward migration to urban centres.

Forums with urban focus: The UK government withdrew core funding from UN Habitat in 2011, but still works with them on a project basis.

Integrated policies and how to track impacts: The complex, integrated nature of challenges means that it requires a long-term approach. Improvements in longitudinal progress tracking are being addressed through investment in research.

4.2 Helping Cities Navigate the Various Alliances That Exist - What Use Are They For Overworked City Leaders and Officials?

Chair: Ms Rubbina Karruna, Cities Advisor, DFID

4.2.1 Commonwealth Local Government Forum (CLGF)

Dr Greg Munro, Secretary-General, CLGF

> *Organisations need to work together to share inputs and to amplify achievements.*

Dr Munro said there is a multiplicity of alliances and networks and these need to work together and amplify what they are doing.

The CLGF was started around 25 years ago and is a membership-based organisation with about 50% of its members Ministers responsible for Local Government (LG), 50% mayors or heads of LG Associations as well as associate members from the academic sector. The CLGF has three main areas of focus: i) support of governance and democracy; ii) localisation of the SDGs; and iii) cities. For the latter the CLGF tries to hone in on niche areas to add value and these are: devolution of powers in large cities, navigating tensions around large cities; urban trade and foreign direct investment in cities; building smarter cities; resilience and inclusivity.

The CLGF is a member of the Global Task Force on Local and Regional Governments which is a group of more than 25 organisations working to amplify the voice of LGs and to 'fight our corner' to ensure that LG is recognised in issue spaces such as the SDGs.

Dr Munro stressed that advocacy and lobbying in relation to the SDGs is now vital and quoted the Deputy Secretary-General of the UN, Amina Mohammed's comment to LGs: 'we need you more than you need us' which refers to the fact that if the SDGs fail in cities than it fails globally. He noted that a challenge faced by UN organisations is moving away from academic reasoning to practicality.

He expressed concern around the competitive alliances and networks which have arisen with the large quantity of organisations and said that there was a need for organisations to work together to share inputs to amplify achievements. Funders have a responsibility here to expand existing networks and join existing alliances. This becomes a responsibility of members and cities to pull relationships and networks together towards common goals in order to develop effective networks.

4.2.2 Academia - Helping Cities Navigate the Various Alliances that Exist

Dr. William Avis, University of Birmingham

Academia can act as a bridging entity to bring together the wealth of organisations and entities working on air pollution in the urban space.

Dr Avis noted that there is an array of active organisations and initiatives being implemented in urban spaces and there is an increasingly conducive environment for cross-disciplinary research. He argued that academia can help cities navigate some of these various alliances through: funders fostering a conducive environment for multi-stakeholder interdisciplinary research; engaging with stakeholders at all stages of the research process from planning to delivery; nurturing open and inclusive spaces and places of debate and discussion; and prioritising knowledge translation and synthesis in forms that stakeholders want, can understand, and in a manner that does not reinforce silos.

He gave the example of A Systems Approach to Air Pollution (ASAP) in East Africa which is looking to develop an interdisciplinary understanding of the causes and consequences of air pollution and how an expanding array of user groups are engaged in the process. From the outset of the project the ASAP East Africa team engaged with key partners and stakeholders to facilitate a more holistic picture of the problem space. It has also looked at creating spaces and places of debate through quarterly webinars and public events as well as ways and means of synthesising and translating research through reading packs for events, webinars and literature reviews.

As a component of ASAP, Dr Avis has been working on vulnerability scoping studies in Nairobi which look at the exposure of children to air pollution to create a picture of the locations where potentially vulnerable populations spend time. The data generated from this study simplified into a 24-hour snapshot of air pollution during and after the school day and this in turn can help schools to develop policies to protect children from harmful air pollution.

Perspectives which emerged in the general discussion

On the opposition between action and research and specifically what is action: An example is India where gender issues have been challenged to alleviate poverty and the right of women to have property in their name has empowered them. This is an example of doing something active.

On inclusivity of LG: This is an ongoing battle.

On improving UN Habitat: The new director is asking the right question – how can value be added although the financial situation remains dire?

4.3 What Next? Networking Commonwealth Megacities, Research and Advocacy, the Role of the Ramphal Institute

Chair: Mr Richard Bourne, Trustee, Ramphal Institute

The ensuing discussions were framed around the overarching questions below:

Is there scope for further meetings in this same vein to share best practice, issues and solutions on Air Pollution?

- The consensus was that there is scope for further meetings; however, it was proposed that it may be worthwhile to broaden engagement to secondary cities and with other megacities like those in China as their experiences and solutions would be of value.
- It was suggested that solutions developed in the conference should be championed by the Commonwealth and by extension the Ramphal Institute.
- It was suggested that it could be of value to have a continuous programme of knowledge sharing and transfer beyond the conference.

Is there scope on wider issues shared by megacities including finance, poverty alleviation, etc?

- There was a consensus on avoiding unnecessary duplication of efforts, though there was debate on whether the focus should be solely air pollution or naturally connected to its problem space, namely climate change.
- Some suggested alternative, yet associated, areas of focus were: inequality in conjunction with poverty alleviation; the welfare state, economics and governance; the role of NGOs; LG capacity building; enabling engagement between government and policy implementers.

Is there a Commonwealth opportunity here?

- There was a consensus that yes, there is a Commonwealth opportunity especially given its role as convener.
- It was identified that SDG 11 does not have natural networks so this could be a hooking opportunity.
- It was suggested that a linking mechanism could be health education, and it could be of value to convene a meeting of Commonwealth health experts to tackle air pollution.
- The Commonwealth and Ramphal Institute should continue to convene networks. A partnership approach will be a good way forward.

Can the Commonwealth coalition push a Human Right to Clean Air?

- The consensus was that this initiative for clean air should be Commonwealth led.
- It was suggested that a global rights-based approach to air pollution and climate change could be adopted in due course.

5 Conclusions

Air pollution is a pervasive, complex issue and is a risk multiplier. It has significant health impacts from the womb to old age and is costly for economic growth and costly for societal growth. To address air pollution will require a whole systems approach that is cross-disciplinary, cross-sectoral, with the appropriate devolution of powers from central to local government.

All actors, from the individual, civil society, to local and national government need to be involved in order to tackle air pollution. This will require: collaboration with researchers to generate data, undertake analysis and deliver sound evidence-based policy; increasing data capacity in developing countries; and translating data into relatable public awareness campaigns.

Multilateral processes such as the SDGs, and the Paris Agreement provide valuable platforms to pursue a transformative urban agenda but can be held in silos which need to be broken. The array of stakeholders acting together on interconnected issues such as, climate change, air pollution and inequality must to come together to share inputs and amplify achievements.

The Commonwealth is a valuable platform to bring the multiplicity of voices together and the Ramphal Institute can be a valuable convener to advance the global right to the clean air.

Annex

Conference Programme

DAY ONE (Thursday 27th)

Segment A

9.00-9.30	Refreshments
9.30-9.45	Welcome: **Mrs Patsy Robertson,** Chair, Ramphal Institute
	PRESENTATIONS: ISSUES FACING CITY LEADERS
9.45-10.15	Keynote by **Professor Frank Kelly:** King's College, London: Pollution Problems in Megacities
10.15-10.45	**Engineer Augustine Ayodele Antonio,** General Manager, Lagos State Environmental Protection Agency: The Situation in Lagos
10.45-11.15	Tea & Coffee Break
11.15-11.45	**Professor Jagan Shah,** Director, National Institute of Urban Affairs, New Delhi: Pollution Problems in Indian Megacities and Strategies for Improvement
11.45-12.15	**Ms Gillian Maree,** Senior Researcher, Gauteng City Region Observatory, Johannesburg: The Situation in the Gauteng City Region
12:15-13:15	**Q & A Session and Discussion with Audience:** Strategies Available and Challenges Facing City Leaders **Engineer Augustine Ayodele Antonio,** General Manager of Lagos State Environment Protection Agency; **Ms Gillian Maree,** Senior Researcher, Gauteng City Region Observatory, Johannesburg; **Professor Jagan Shah,** Director, National Institute or Urban Affairs, New Delhi; Professor Frank Kelly, King's College, London; **Dr Joanna Newman,** Chief Executive and Secretary General, Association of Commonwealth Universities (ACU) Moderator: **Mr Richard Bourne,** Trustee, Ramphal Institute
13.15-14.00	Lunch Break

Segment B

	PANEL DISCUSSION
14.00-14.30	**Panel on Regulatory, Planning and Fiscal Controls to Reduce Pollution** **Mr Guy Hitchcock,** Low Emission Strategies Knowledge Leader, Ricardo Energy & Environment Chair: **Dr Claire Holman,** Chair, Institute of Air Quality Management
14.30-15.20	Panel: **Ramphal Institute Partner Bodies** *14.30-14.45* **Ms Gillian Maree,** Senior Researcher, Gauteng City Region Observatory, Johannesburg; *14.45-15.00* **Mr Timothy Adewale,** Deputy Director, Socio-Economic Rights and Accountability Project, Lagos

	15.00-15.15 **Ambassador Humayun Kabir,** Vice-President, Bangladesh Enterprise Institute Chair: **Dr Adesoji Adeniyi,** Ramphal Institute Associate and Senior Policy Advisor, Department for International Trade
15.20-16.00	Tea & Coffee Break
16.00-16.40	**National versus Civic Approaches** **Dr Robin Russell-Jones,** Medical/Scientific Advisor on Air Pollution to the Chair of the All-Party Parliamentary Group (APPG) **Ms Gillian Maree,** Senior Researcher, Gauteng City Region Observatory Chair: **Mr Laurie Laybourn-Langton,** Director, UK Health Alliance on Climate Change
16.40-17.20	**Media and Public Information Issues** **Mr Elliot Treharne,** Air Quality Manager, London City Hall **Mrs Olabisi Shonibare,** Director, Pollution Control, Lagos State Environmental Protection Agency Chair: **Dr Russell-Jones,** Medical/Scientific Advisor to the Chair of the All-Party Parliamentary Group on Air Pollution
17.20	Close of Day One
18.00 -20.00	**Conference Reception:** Royal National Hotel, Meeting Room 1

DAY TWO (Friday 28th)

Segment C

9.00-9.30	Refreshments
9.30-10.00	Keynote by **Professor Susan Parnell,** Universities of Bristol and Cape Town – The Global Context for Megacities after Habitat III, 2016
	PANEL DISCUSSION
10.00-11:00	**Science Panel** **Dr Ben Barratt,** King's College London **Professor Francis Pope,** University of Birmingham **Professor Paul Wilkinson,** London School of Hygiene and Tropical Medicine Chair: **Mr Nigel Clear,** Director of Conferences, Elsevier
11:00-11:30	Tea & Coffee Break
11.30-12.00	**Dr Iain Williams,** Department for Environment, Food and Rural Affairs, UK – Current Challenges and Opportunities **Chair: Mr Malcolm Ransome,** Advisor to the Ramphal Institute
12.00-12.30	**International Civil Society Advocacy Panel** **Mr Bjarne Pedersen,** Executive Director, Clean Air Asia **Mr Richard Mills,** Director-General, International Union of Air Pollution Prevention Associations Chair: **Dr Carl Wright,** Secretary-General Emeritus, Commonwealth Local Government Forum; Trustee, Ramphal Institute
12.30-13.20	Lunch Break

	PANEL DISCUSSION
13.20-14.10	**The Commonwealth Context Panel** **Mr Abhik Sen,** Partnerships, Commonwealth Secretariat **Ms Rubbina Karruna,** Cities Advisor, UK Department for International Development Chair: **Mrs Patsy Robertson,** Chair, Ramphal Institute
14.10-14.50	**Helping cities navigate the various alliances that exist** – What use are they for overworked city leaders and officials? **Dr Greg Munro,** Secretary-General of the Commonwealth Local Government Forum; **Dr William Avis,** University of Birmingham Chair: **Ms Rubbina Karruna,** Cities Advisor, UK Department for International Development
14.50-15.30	**What next?** Networking Commonwealth Megacities, Research and Advocacy, the Role of the Ramphal Institute Chair: **Mr Richard Bourne,** Trustee, Ramphal Institute
15.30-16.00	Tea & Coffee Break
16.00-16.30	**Closing session:** A follow-up to previous session and key points from
	Dr Sindra Sharma-Khushal, Senior Research Associate, Ramphal Institute – Chief Rapporteur
16.30-17.00	**Thanks and Closure of Conference:** **Mrs Patsy Robertson, Chair,** Ramphal Institute Chair: **Mr Nigel Clear**

Front cover photo: Cityscape. © AJ Nakasone. Back: Beijing cityscape under heavy hazy air pollution. © Yao Zhen Jia.
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