

<b>Institution:</b> University of the West of England (UWE), Bristol
<b>Unit of Assessment:</b> 17 - Geography, Environmental Studies and Archaeology
<b>Title of case study:</b> Improving the Management of Air Quality
<p><b>1. Summary of the impact</b></p> <p>Evidence from research at UWE Bristol has enabled UK local and national governments and international governments (South Africa, Nigeria) to enhance their processes and procedures for managing air quality. UWE researchers have contributed to the policy and technical guidance issued by UK Governments, and they have directly advised the UK Government and devolved national and London administrations on legislation, regulation and official guidance. The research has contributed to the widespread recognition of the spatial extent of air quality problems, ensuring continued support of air quality management at a local level. The research activity and experience gained has been shared through international agencies, learned societies and interest groups. This extends to the EU, China, Brazil, and India, and specifically the Republic of South Africa through the development of the National Framework for Air Quality Management and in Nigeria through collaboration with the National Space Research and Development Agency.</p>
<p><b>2. Underpinning research</b></p> <p>The Air Quality Management Resource Centre (AQMRC, est. 1997) at UWE operates at the interface of air quality science and policy in the context of the legislative regimes established by the UK Environment Act 1995 and the 1996 EU Air Quality Framework Directive.</p> <p>The research work of the centre has been based around the work of Prof <i>James Longhurst</i> (Director AQMRC, 1996-date), Dr <i>Nicky Woodfield</i> (Senior Research Fellow 1997-2004), Dr <i>Clare Beattie</i> (Senior Research Fellow 1998-2006), Dr <i>Nurul Leksmono</i> (Research Fellow 2001-2009), Dr <i>Tim Chatterton</i> (Senior Research Fellow 2001-date), Dr <i>Enda Hayes</i> (Senior Research Fellow 2004-date), Dr <i>Jo Barnes</i> (Research Fellow 2008-date), Dr <i>Rose Bailey</i> (Research Fellow 2012-date) and 16 PhD Students. This group has collectively engaged in a range of research activity, testing and evaluating the effectiveness of national and local policies and practice for air quality management. Since its establishment, the group has secured in excess of £5 million for air quality research and has generated some 225 peer reviewed outcomes. In addition to RCUK support, AQMRC has been commissioned to undertake an extensive range of research and support work for governmental bodies, including numerous UK Local Authorities, Defra, DfT, the UK Government In-House Policy Consultancy, Welsh Government, Scottish Government, European Commission, the South African Department for Environmental Affairs and the Nigerian National Space Research and Development Agency. The group's findings have demonstrated the important inter-relationships between local and national actions in the management of air quality, and the policy and other support structures that need to be in place to ensure effective and efficient overall management of air pollution.</p> <p>At the time of the first UK Air Quality Strategy in 1997, local authorities were required to declare 'Air Quality Management Areas' (AQMAs) in cases where the (then new) health-based air quality objectives were likely to be exceeded. Initial expectations were that these would be required in only a handful of locations, mainly in major cities. A decade later, UWE research identified that over 60% of UK local authorities had declared one or more AQMAs, indicating an air pollution problem in the UK of a hitherto unimagined scale. The research revealed the new spatial pattern of air pollution within the UK at the start of the 21<sup>st</sup> Century. AQMRC has tracked and evaluated the development of the LAQM process from 1996 (R1) through to the present day. This work has included technical analyses of air pollution using both modelling and monitoring data. It has studied policy processes (including the Local Air Quality Management process itself (R2,3,4)), Local Transport Planning (R6), and carbon management processes in local authorities. It has addressed associated activities such as stakeholder consultation and engagement (R5), and work on public attitudes and behaviours. This body of research has led to an unparalleled understanding of the complex interplay of air quality management activities at local and national levels, and has demonstrated the need for national government to provide significant practical support to agencies and local authorities managing air quality in terms of funding, technical advice, information and guidance (R2,3,4). It has also demonstrated the requirement for strong statutory policy frameworks</p>

to ensure that air quality remains on the political agenda in the face of competing priorities that may have a higher political profile (particularly at a local level).

The AQMRC's work has shown that national and local efforts by public authorities have been effective in providing an improved understanding of local air quality. However, the unexpected scale and magnitude of exceedences of the air quality objectives means that there is an urgent need for substantial reductions across large areas of the UK (R3,4). The research activity has highlighted the need for governments at all spatial scales to improve their evidence base on the effectiveness of intervention measures, and on quantification of costs and benefits including source apportionment and the reduction in concentration required by differing sources (R2,3,4). AQMRC's research has identified key barriers to improvement including: a lack of political will; variable support for politically difficult but necessary decisions; a lack of dedicated funding for large projects; limited training and competency of personnel; inadequate access to technical resources for monitoring, modelling or management action; and the non-alignment of competing national policy aspirations (R2,3,4). A particularly important finding has been the need for collaborative working within and between spheres of government, and their interaction with stakeholders. In order to take forward these conclusions, AQMRC's research has recommended the formal incorporation of air quality into wider strategies and plans, extending the focus of management away from local hotspots, and strengthening the relationship of air quality management with land use planning and transport plans. A particular opportunity identified by AQMRC's work was to establish synergies with carbon management initiatives. These conclusions are now finding clear expression in national and local policies and actions for the management of air quality.

### 3. References to the research

- R1. Longhurst, J.W.S., Lindley, S.J., Watson, A.F.R. and Conlan, D.E. (1996) The introduction of local air quality management in the United Kingdom. A review and theoretical framework. *Atmospheric Environment*, 30 (23), pp. 3975-3985. [http://dx.doi.org/10.1016/1352-2310\(96\)00114-8](http://dx.doi.org/10.1016/1352-2310(96)00114-8)
- R2. Beattie, C. I., Longhurst, J.W.S. and Woodfield, N.K. (2001) Air quality management: evolution of policy and practice in the UK as exemplified by the experience of English local government. *Atmospheric Environment*, 35 (8), pp. 1479-1490. [http://dx.doi.org/10.1016/S1352-2310\(00\)00311-3](http://dx.doi.org/10.1016/S1352-2310(00)00311-3)
- R3. Longhurst, J.W.S., Beattie, C.I., Chatterton, T., Hayes, E.T., Leksmono, N.S. and Woodfield, N.K. (2006) Local air quality management as a risk management process: assessing, managing and remediating the risk of exceeding an air quality objective in Great Britain. *Environment International*, 32(8), pp. 934-947. <http://dx.doi.org/10.1016/j.envint.2006.06.006>
- R4. Longhurst, J.W.S., Irwin, J.G., Chatterton, T., Hayes, E.T. and Leksmono, N.S. (2009) The Development of Effects Based Air Quality Management Regimes. *Atmospheric Environment*, 43(1), pp. 64-78. Invited contribution to 50<sup>th</sup> anniversary special edition. <http://dx.doi.org/10.1016/j.atmosenv.2008.09.050>
- R5. Leksmono, N.S., Dorfman, P., Burnet, F., Gibbs, D.C., Longhurst, J. W. S. and Weitkamp, E. (2010) Enhancing consultation practices on Air Quality Management in local authorities. *Journal of Environmental Planning and Management*, 53 (5), pp. 559-571. <http://dx.doi.org/10.1080/09640561003633680>
- R6. Olowoporoku, A. O., Hayes, E. T., Leksmono, N. S., Longhurst, J. W. S. and Parkhurst, G. (2010) A longitudinal study of the links between Local Air Quality Management and Local Transport Planning policy processes in England. *Journal of Environmental Planning and Management*, 53 (3), pp. 385-403. <http://dx.doi.org/10.1080/09640561003613179>

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#### 4. Details of the impact

Across the UK, some 30,000 deaths a year are linked to air pollution (House of Commons Environmental Audit Committee, 2010) at an estimated cost to society of c. £20 billion. The research of UWE's Air Quality Management Resource Centre (AQMRC) has strengthened the policy frameworks that ensure local councils and local citizens across the UK can understand the risks posed by air pollution in their localities and engage in its management. AQMRC played a major role in the development of new understandings by government and wider society of the changing nature of air pollution in the UK. It ensured that detailed knowledge of local air quality was understood and taken up by national governments (including Defra, the Scottish and Welsh Governments, DOE Northern Ireland and the Greater London Authority) and in the c. 400 UK Local Authorities tasked with managing air pollution at the local scale. This research work has had a direct impact on national and local policy and practice (S2,3,4). The research has identified the importance of a well-trained and resourced workforce to assess and manage air quality. In order to support these developments, the AQMRC co-founded a new professional body, the Institute of Air Quality Management (IAQM - <http://iaqm.co.uk/>), dedicated to the professional profile and development of the air quality workforce. IAQM recently celebrated its 10<sup>th</sup> anniversary. With more than 300 members, the Institute represents a very large proportion of UK air quality professionals and is acknowledged as *the* air quality professional body.

##### *Influence on Government guidance to local authorities*

AQMRC's research informed Policy and Technical Guidance produced by UK governments in 2009 (and previously in 2003; S6,7,8,9). It provided advice to governments and local authorities via a Help Desk (referenced in S6,7,8,9) and produced FAQs on behalf of UK governments on the implementation and interpretation of LAQM policy and technical guidance. The 2009 guidance is still in force and used by all UK local authorities in undertaking their statutory LAQM duties. All of these contributions are informed by AQMRC's research (S2,3,4).

##### *Impact on the Government's In-House Policy Consultants' review and its policy outcomes*

In 2010, AQMRC research findings were central to the review of the LAQM process undertaken by the Government's In-House Policy Consultants (IHPC). This review of LAQM was tasked "to make recommendations with a view to (i) improving air quality outcomes; and (ii) making better use of available LAQM resources" (S10). AQMRC had been involved in supporting the LAQM process for over a decade in partnership with Bristol-based Air Quality Consultants Ltd. Through this work, UWE research contributed to a continual refinement of the LAQM policy framework and technical guidance. This included major revisions in 2003 and 2008/9 leading to the publication of a number of new or updated guidance documents, and via recommendations to Defra and the DAs on the basis of emerging research findings (S2,3,4). The key findings of a Defra/DA review of the LAQM process drew heavily upon UWE research (S2). This included commissioned work that surveyed air quality officers' opinions of the entire LAQM process and the interactions of air quality with other policy areas (S10). This built upon the long history of survey based research on LAQM practice undertaken by AQMRC and reported in the literature (e.g. R2,3,4). The list of conclusions and recommendations of the 2010 IHPC review read as a reflection of UWE research findings across the previous decade. In particular, the review endorsed the findings of R1-5 in noting the considerable mismatch between the roles of central and local government envisaged when the 1995 Act was devised, and what had happened in practice since then. IHPC favourably reported the efforts of authorities who had entered into collaborative arrangements at regional or sub-regional level to manage air quality. Such arrangements offer the potential for reducing the costs and raising the quality of LAQM, as identified by AQMRC (R2) in 2001 and reconfirmed in 2009 (R5). UWE research (e.g. R6) had identified that the role of the Department for Transport (DfT) was critical in improving air quality. The IHPC review reaffirmed this in recommending that DfT develop a more concerted plan for delivering its responsibilities and raising the profile of air quality issues. It echoed UWE findings that the current distribution of responsibilities for transport was not conducive to effective delivery of transport measures which could be helpful to air quality (R2,3,4). It also reflected UWE's recommendation of closer alignment between climate change and air quality policy packages, particularly at the local level. The outcomes from this review have directly influenced the policy prescriptions and practices of central and local governments.

### *Influence on the National Framework in South Africa and Practice in Nigeria*

UWE research outcomes have been recognised internationally for their contribution to the effectiveness and efficiency of the processes for managing air quality. AQMRC has been an invited participant in fora across the world (e.g. IUAPPA, the International Union of Air Pollution Prevention Associations in Australia, Brazil, Mexico, and South Africa), examining process and practice enhancements for air quality management. UWE research findings were particularly influential in the development of the National Framework for Air Quality Management in the Republic of South Africa where they “contributed to a paradigm shift in air quality management...moving from a source-based to an effects-based management approach” (S1). The team collaborated with the University of Kwa Zulu Natal and CSIR to develop the framework for the Department of Environmental Affairs. The group used the opportunity to translate UK and European experience into a format suitable for the South African context, and the AQMRC co-authored Framework now provides the template for national, provincial and municipal air quality management in the Republic (S1). AQMRC’s research on the air quality in the Niger Delta is impacting on the air quality management practices of national agencies in Nigeria. According to the Nigerian National Space Research and Development Agency (S5), AQMRC’s research has directly influenced the policy priorities of the Agency and those of the National Environmental Standards and Regulations Enforcement Agency.

### **5. Sources to corroborate the impact**

#### **- All files available through UWE -**

- S1. Testimonial by Special Advisor, Department of Environmental Affairs, Atmospheric Policy, Regulation & Planning Directorate, Fedsure Forum Building, North Tower, Pretoria, 0001, South Africa. [1 on REF Portal]
- S2. Testimonial by Science Division, Chief Scientist’s Department, Welsh Government, Cathays Park, Cardiff, CF10 3NQ. [2]
- S3. Testimonial by Air Quality Policy Manager, Scottish Government, Directorate For Environment & Forestry, Environmental Quality Division, Victoria Quay, Edinburgh EH6 6QQ [3]
- S4. Testimonial by Swedish Environmental Protection Agency, Air Quality and Climate Change Unit, Research and Assessment Department, SE-106 48 Stockholm, Sweden. [4]
- S5. Testimonial by National Space Research and Development Agency, Federal Ministry of Science and Technology, Obasanjo Space Centre, Abuja, Nigeria. [5]

#### *Government Guidance References*

- S6. Department for Environment, Food & Rural Affairs and Environmental Protection Division and the National Assembly For Wales (2003) Local Air Quality Management: Technical Guidance (LAQM TG03). London and Cardiff. [Link](#)
- S7. Department for Environment, Food & Rural Affairs (2009) Local Air Quality Management: Technical Guidance (LAQM TG09) London and Cardiff. [Link](#)
- S8. Department for Environment, Food & Rural Affairs and Environmental Protection Division and the National Assembly For Wales (2003) Local Air Quality Management: Policy Guidance (LAQM PG03) London and Cardiff. [Link](#)
- S9. Department for Environment, Food & Rural Affairs (2009) Local Air Quality Management: Policy Guidance (LAQM PG09) [Link](#)
- S10. M. Faulkner and P. Russell (2010) Review of Local Air Quality Management: final report. A report to Defra and the Devolved Administrations. [Link](#)