CLOSING THE GAP BETWEEN SCIENCE AND POLICY ON AIR POLLUTION AND HEALTH - THE *AIRNET* ENTERPRISE [1]

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ABSTRACT

This paper discusses critical issues underlying the interface between air quality science, stakeholder participation and policy development within the context of the European AIRNET Network multi-stakeholder project. The paper argues that it is not only the content of air pollution and health issues that stakeholders consider important, but also the process and mechanisms by which the interface operates. A visual representation of the interaction between science, society and stakeholders in the development, dissemination and evaluation of effective air quality policy strategies is provided. The paper discusses the role of AIRNET in supporting the Clean Air for Europe (CAFE) program and assesses the AIRNET experience in establishing a network to bridge the gap between air quality policy, stakeholders, the public, and scientific communities.

[1] The European Network AIRNET was initiated within the Quality of Life and Management of Living Resources programme of the European Commission, QLRT-2001-00441, Key Action 4, Environment and Health. The content of this paper has formed the basis for the AIRNET Science-Policy Work Group end-report discussions to sharpen its focus on the science-policy-stakeholder interplay on air pollution and health. It has also functioned to generate the outline of the draft report presented at the AIRNET-NERAM Rome Conference on Strategies for Clean Air and Health, November 5-7, 2003. The authors are grateful for the many suggestions from the Work Group.
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SCIENCE-POLICY-STAKEHOLDER INTERPLAY

Past and recent improvements in environmental quality, including air quality, are the result of weighing ecological, economic, and social interests in decision-making. Despite this success, air pollution is still one of the major environmental factors affecting human health (Brunekreef and Holgate, 2002) and concern over the substantial health impact remains high. In addition, substantial investments have to be put into further emission reductions to decrease the remaining risks, which may trigger debate on "value for money." The science-policy-stakeholder interplay in the area of air pollution becomes therefore even more important when developing health-effective and cost-efficient control strategies and measures that are transparent and sound, and carry public support (Figure 1).

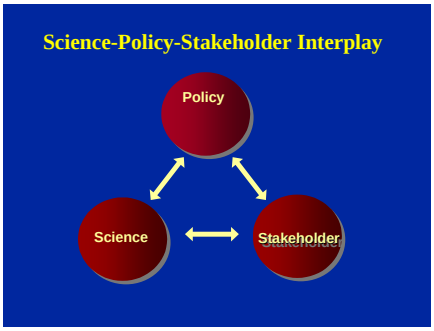

Figure 1. Science-policy-stakeholder interplay in effective air pollution control strategies.

It seems difficult to define what the science-policy-stakeholder interplay (or interface, as it is often called) is really about. Bringing scientists, policy makers, stakeholders, and the public together is a difficult process. Ideally, these parties should be allies in efforts to promote more sustainable approaches in environment and health to bring the exposure and health risk down to healthy or acceptable levels, but the interface between the players is often under-developed or functions poorly (Samet and Lee, 2001; Ginsburg and Cowling, 2003) and, in addition, traditionally such parties may have been more antagonistic than cooperative. Scientists may not view policy makers as legitimate clients for their research results. Policy makers may not perceive the research community as the producer of relevant information for decision-making processes. Policy makers often desire a level of certainty which science cannot offer (Matanoski, 2001).

There are a number of critical issues in this interface. Firstly, there is a need for better communication of scientific information to those who need it, ask for it, or have the right to know about it. Secondly, there is a need for scientists to better understand stakeholder interests and perspectives. Finally, there is a need for developing views on what science-policy-stakeholder interplay is, or how it should operate as a process. Noteworthy, many institutions develop risk communication strategies nowadays to break these communication barriers down, and the approaches have developed into a discipline in its own right.

Therefore, it seems that it is not only the content of air pollution and health issues that players consider important, but also the process and mechanisms by which the interface operates. This interplay and co-operation between science, society, policy, and stakeholders could be visualised as displayed in Figure 2, based on the premise that they all play a role in the generation, dissemination, and evaluation of policy options.

Why do we need this interplay? The use of models and techniques to assess the various impacts and the application of aggregated impact indexes to support scenario analyses and outlook-type of assessments make it necessary to get broad support from scientists, policy makers, and stakeholders. On the one hand one needs to know what the different information needs of the various stakeholders are in order to get the outcomes as informative and targeted as possible. On the other hand one needs agreement on problem definition and framing, various risk characterization aspects, decision rules, preferred methodology and assessment models, and necessary input data in order to increase confidence and support for the outcomes and their implications for decision-making. Furthermore, integrated assessments of air pollution and of control policy options and strategies have also to be considered from the perspective of sustainable development. Development and monitoring of effectiveness of sustainability strategies therefore also need broad interplay between the various players in this field. Current views on environmental and health consider three different perspectives:

- "*human-social perspective*" *(people)*
- "*ecological perspective*" *(planet)*
- "*economic perspective*" *(profit)*

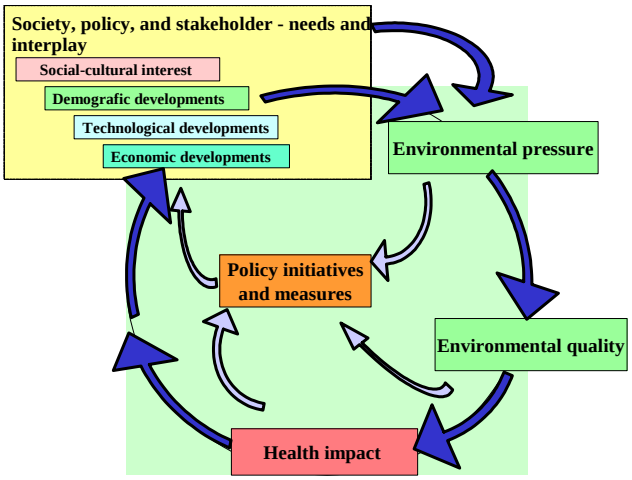

Figure 2. Science, society, policy and stakeholder interaction and co-operation in generation, dissemination, and evaluation of risk-based policy options and priorities.

Therefore, such an interplay is also needed to allow "people" and "planet" players to take their responsible positions to achieve a sustainable development in a (many times) market-driven economy ("profit").

AIRNET

The European AIRNET Network is a multi-stakeholder project in the field of air pollution and health (http://airnet.iras.uu.nl). The main objective is to create a widely supported basis for public health policy related to improving air quality in Europe and regulatory needs to achieve that goal.
The specific objectives are:

- To develop an interpretation framework for the (final and intermediate) result of research supported by the 4th and 5th EU Framework Programmes, as well as nationally funded studies;
- To collect, discuss and interpret the (final and intermediate) results of research supported by the FP4 and FP5 programmes, as well as nationally funded studies;
- To draw policy-relevant recommendations from the activities mentioned.

AIRNET is co-ordinated by the Institute for Risk Assessment Sciences, Utrecht University, Utrecht, the Netherlands, and the Netherlands Environmental Assessment Agency, RIVM, Bilthoven. AIRNET, and the Science-Policy Work Group in particular, functions as a structure and forum to get the science-policy-stakeholder interplay working for air pollution and health (AIRNET News 2, 2003). Within AIRNET the scientific input that is needed to better meet the end-user's needs is discussed to support authoritative institutions to start building a more targeted and sustainable policy. The objective of the AIRNET Science-Policy Working Group is to facilitate an interactive communication and review forum in air pollution and health. The aim is to discuss and interpret the outcomes of air pollution health risk research and impact assessments and to link these outcomes with the various end-users' needs, policy issues, and abatement strategies and control measures. Thus, it forms a bridge-building network between policy, stakeholders, public, and scientific communities on end-user relevant research outcomes and its implications. The actual structure of AIRNET as a network in Europe can be visualized as displayed below (Figure 3):

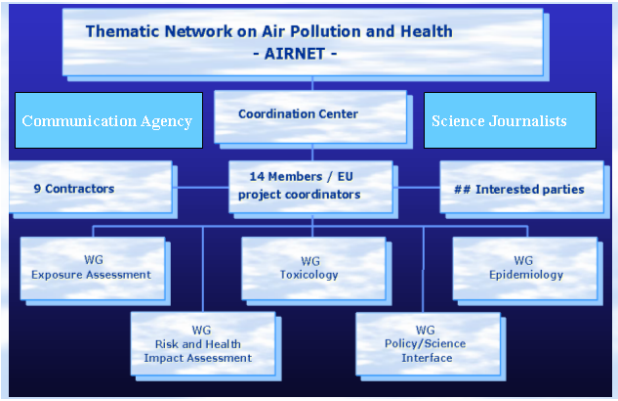

Figure 3. The AIRNET multi-stakeholder network structure.

AIRNET'S ROLE IN THE "CLEAN AIR FOR EUROPE" (CAFE) PROGRAMME

The Commission of the European Union has initiated the Clean Air for Europe (CAFE) programme to strengthen its air pollution policy (http://europa.eu.int/comm/environment/air/cafe). This will be based on the best available science and will be created in a broad, open, and transparent dialogue with the scientific community, as well as with the public and stakeholders. The major objectives of CAFE are:

- To review existing air quality standards and national emission ceilings as set out in recent legislation, and to contribute to the review of international protocols on the basis of the best and most recent scientific and technical information, taking into account experience of implementation of existing legislation and protocols;
- To develop new, flexible and comprehensive mechanisms for gathering information leading, in the longer term, to the further development of objectives and indicators for outdoor air quality;
- To identify where there may be a need for additional measures to reduce emissions from specific sources;
- To propose and update a strategy at regular intervals which defines appropriate air quality objectives for the future and cost-effective measures for meeting those objectives.

The AIRNET Network supports the work of CAFE by providing new research findings in an interpreted manner as a result of a process in which the views of the various end-users and stakeholders have been incorporated explicitly. The five separate reports produced by AIRNET on exposure, toxicology, epidemiology, health impact and science-policy include some major findings directly of interest to decision-makers. Among the major highlights are: (i) the relevance of population and personal exposures to estimate and interpret health effects and contributing sources, (ii) the strengths and weaknesses in the health effects evidence of short-term and long-term exposures, (iii) new ways to assess quantitatively health effects and burden of diseases, (iv) new insights in particulate matter components which seem mostly relevant for health effects (primary anthropogenic particles), (v) framing of risk issues including uncertainty analysis, and (vi) developing a science-stakeholder-policy interplay based on end-user needs and methods of communication and (understandable) information transfer. This output improves the two-way communication between CAFE and the various communities (international, national, and local decision makers, civil society representatives, interest groups, industry etc.), through science-policy-stakeholders interplay, and focussing on building transparency and trust. The output of AIRNET has been included in the reference list.

STRATEGIES FOR CLEAN AIR AND HEALTH

Air pollution and health issues and targeted control strategies apply to the level of both supranational, national and local/domestic policy makers. Keeping this in mind, it is obvious that the society-policy-stakeholder interplay should also function at these levels and has therefore to incorporate the different needs generated at these various levels. For AIRNET this means that one has to offer research outcomes, evaluations, and decision-making recommendations at the various levels of decision-making interest (international, national, local). It is this science-policy interplay perspective that the AIRNET management team focussed the second Annual

AIRNET-NERAM 2003 Conference on “Strategies for Clean Air and Health” and generated a targeted communication strategy. In its final year 2004, AIRNET has tried to implement this communication strategy in so-called ‘network days’. These days were held in the Netherlands, Sweden, Hungary, and Spain to try to cover different regional aspects of air pollution issues. At each of these occasions an interactive working format was chosen to stimulate the science-policy-stakeholder interactions (roundtables, speaker’s corner, breakout groups, plenary sessions, and regional European air pollution input and information needs i.e. West, East, North, or South). Also the AIRNET 2004 Prague Conference has been organised in this way incorporating also the outcome of the various network days. The AIRNET-NERAM 2003 conference statement is available for downloading (http://www.irr-neram.ca or http://airnet.iras.uu.nl). The interplay network model used is displayed in Figure 4 including the main issues and working formats of interest.

Figure 4. The multi-stakeholder communication set-up and framework applied in AIR-NETwork days and annual conference.

AIRNET’S LESSONS LEARNED

To what extent has AIRNET “bridged the gap” and what are the lessons learned to act as a multi-stakeholder network? Historically, the wish to create an overarching “science-policy” network in Europe was generated by scientists themselves. The participation of the few stakeholders at the beginning and identifying their information gaps rapidly resulted in a need to increase their number, to incorporate different levels of stakeholders, and to try to identify their information needs more thoroughly. AIRNET also learned that the science-stakeholder interface is interpreted differently by the different players, is not naturally occurring, does not work by itself, and requires lots of planning, and structure and energy (e.g. with AIR-NETwork days). Furthermore, with respect to dissemination of research findings, scientists found it hard to write in a concise and non-specialist way; therefore AIRNET provided guidelines, and also contracted science journalists to help. And because effective communication between stakeholders also appeared crucial; AIRNET contracted a communication agency to help to increase its effectiveness in that direction. Finally, organisation of a network requires considerable planning; there was no “recipe” available on how to optimally run a network. Knowing WHAT you wish to achieve is not sufficient, one should also know HOW you wish to achieve it. In fact many participants also recognized that science-policy interface must be considered as a continuous (learning) process rather than a static consultation type of interaction mechanism. It also appeared difficult to get all “players” actively involved; therefore defining a clear task and responsibility seems of crucial value. Despite the learning process during the lifetime of the project, AIRNET has been greatly appreciated for its efforts to have structurally built such a network in Europe.

REFERENCES

AIRNET News Issue 2. October 2003. http://airnet.iras.uu.nl.

Brunekreef, B., and Holgate, S.T. 2002. Air pollution and health. *Lancet* 360:1233-1242**.**

Dybing, E., and Totlandsdal, A.I. 2004. Air pollution and the risks to human health – a toxicological perspective. http://airnet.iras.uu.nl

Fudge, N., Totlandsdal, A.I., and Sanderson, E. 2003. AIRNET stakeholder survey: a report of end-users' air pollution and health information needs. http://airnet.iras.uu.nl.

Ginsburg, E.O., and Cowling, E.B. 2003. Future directions in air quality, science, policy and education. *Environ. Intern.* 29:125-135.

Hoek, G., and Katsouyanni, K. 2004. Air pollution and the risks to human health – epidemiology. http://airnet.iras.uu.nl.

Hurley, F., and Sanderson, E. 2004. Air pollution health impact assessments – an introduction. http://airnet.iras.uu.nl.

Janssen, N., and Sanderson, E. 2004. Air-pollution exposure assessment. http://airnet.iras.uu.nl.

Matanoski, G. 2001. Conflicts between two cultures: implications for epidemiological researchers in communicating with policy makers. *Am. J. Epidemiol.* 154:S36-S42.

Samet, J.M., and Lee, N.L. 2001. Bridging the gap: perspectives on translating epidemiological evidence into policy. *Am. J. Epidemiol.* 154:S1-S3.

Van Bree, L., Fudge, N., and Tuomisto, J.T. 2004. Air pollution and the risks to human health – Science/Policy Interface. http://airnet.iras.uu.nl.