Status of international consortium on noise issues in developing and emerging countries

L. Finegold[1], D. Schwela[2]

[1] Finegold & So, Consultants, 1167 Bournemouth Court, Centerville, Ohio 45459 USA, LSFinegold@earthlink.net

[2] Stockholm Environment Institute, University of York, York, UK, dieter.schwela@sei.se

ABSTRACT

As part of the growing interest in developing appropriate concepts and approaches for a "Global Noise Policy", consideration needs to be given to how effective and affordable noise policies might need to vary based on factors which differ depending on the "state of development" of individual countries. Although there is no standard manner to distinguish between "developed", "developing" and "emerging" countries, it is obvious that countries do differ in terms of their level of technological development, their financial capabilities and the availability of other resources required for adequate management of community noise. They also differ in their level of knowledge about the effects of noise, their views about the proper role of national and local governments, and the availability of engineering techniques to control exposure to community and occupational noise. Since effective noise policies need to be based on adequate research to understand cultural differences in how people in various countries respond to noise exposures, this topic will be especially important in the future. This paper reviews some of the noise research and noise policy issues which need to be considered as efforts to develop global noise policy concepts proceed and, especially, the ways in which such concepts and exposure criteria might need to be modified to be relevant for "developing" and "emerging" countries. This paper describes the current International Consortium on Noise Issues in Developing and Emerging Countries as a forum to facilitate discussions and share relevant information among the Consortium participants and other interested acoustics professionals.

INTRODUCTION

Environmental noise continues to pose a significant threat to human health and the quality of life of millions of people throughout developing countries. Urbanization and the associated growth in industrialization and population mobility have resulted in the intensification of environmental noise, particularly in densely populated areas. Many developed, mainly Western, countries and individual cities are now taking actions to enhance their institutional and technical capabilities to monitor and control noise exposure and implement preventive actions to reduce the risks that environmental noise poses to their citizens. This document outlines a Strategic Approach (SA) to Environmental Noise Management (ENM) for developing countries to assist decision makers and stakeholders to formulate and implement effective ENM strategies.

The severity of environmental noise problems in cities of developing countries reflects the level and speed of economic and industrial development. As cities undergo the natural process of development, environmental noise becomes an increasingly severe problem. In the past, the major causes of environmental degradation occurred sequentially rather than simultaneously. However, today many cities of developing countries are suffering pressure from a combination of different driving forces (e.g. motorization, industrialization and increases in urban population density), each with a

greater intensity than has occurred elsewhere in the past, but without the well-developed civil infrastructure and financial resources to control them. The result is that the ability of many cities to cope with these combined pressures is often exceeded, leading to a deterioration of environmental quality in many developing countries and increasing negative impacts on their citizenry.

Environmental noise in developing countries has a number of impacts on human health, the quality of life and the environment, which have social and economic implications, as well as problems associated with increasing hearing loss in industrial settings. The effects of noise on humans can include:

- Annoyance
- Sleep disturbance
- Speech interference
- Cardiovascular diseases
- Increases in cardiovascular symptoms (e.g. blood pressure)
- Immune system deficiencies
- Hearing impairment
- Cognitive effects, especially in schoolchildren
- Task and job performance deficits
- Mental health effects.
- In addition, deleterious effects of noise on animals and of vibrations on sensitive, historic building structures can occur.

This paper outlines a Strategic Approach (SA) to Environmental Noise Management (ENM) in developing countries to assist relevant decision makers and stakeholders to formulate and implement effective ENM strategies. The SA aims to mitigate noise by facilitating the setting of noise priorities and by providing direction for institutional development and capacity enhancement. The SA is a natural extension of the recommendations of Agenda 21, derived from the 1992 United Nations Conference on Environment and Development (United Nations 1992), and the Plan of Implementation of the 2002 World Summit on Sustainable Development (WSSD) (United Nations 2002), which requests States to strengthen capacities of developing countries to measure, reduce and assess the impacts of noise, including health impacts, and provide financial and technical support for these activities. In addition, the Strategic Approach supports the UN Habitat Agenda on the Urban Environment and the UNHABITAT/UNEP Sustainable Cities Programme which note the health hazards of exposure to excessive noise, recommend criteria for maximum permitted and safe levels of noise exposure, and promote noise control as part of environmental programs (United Nations 2003; UN Habitat, 2008).

The structure of the SA on environmental noise management was discussed at the Workshop on Environmental Noise Management in Developing Countries at the INTERNOISE 2007 conference, held in Istanbul, 28-31 August 2007 and was then presented at the Noise Policy session at the 2008 Congress of the International Commission on Biological Effects of Noise (ICBEN 2008) (Schwela et al. 2008) and at the INTER-NOISE 2009 Congress (Schwela & Finegold 2009). During the Workshop at the INTER-NOISE 2007 Congress in Istanbul, the following observations were made:

Importance of an overall strategy. Although a step-by-step program of implementation of environmental noise policies is the most realistic way forward, it is also critical that it is done in the context of a clear, strategic approach. Many developed countries

lack this long-term vision, as do many developing countries. China appears to be one exception to this as it has developed an impressive strategy to tackle noise. In many ways, this could act as a model for other developing countries.

Importance of implementation and enforcement. According to the 2007 Workshop quite a few developing countries have theoretical noise policies, but the implementation and enforcement of them is poor. This is the result of (a) a lack of political will and (b) of the cost and technical feasibility of adequate noise control. It is probably unrealistic to expect a rapid improvement in implementation and enforcement, so a step-by-step approach would be preferable.

Importance of active citizen groups. There is generally little pressure on governments from citizen groups for action to be taken on environmental noise issues, at least outside of Europe. This is, in part, due to a lack of understanding of the impacts of environmental noise and the associated costs of these impacts. However, citizen groups in China are protesting about aircraft noise and increased noise from traffic on existing roads. When people are annoyed and stressed by noise they don't need to fully understand the impact it is having on them in order to protest. It is likely that these protests will grow as development brings with it an increase in noise.

'New' types of noises will emerge as countries acquire more consumer goods and transportation capabilities, including cars, airplanes and trains. In particular, many of the new consumer goods will result in increases in low-frequency noise. In China, low-frequency noise has become one of the problems which the responsible stakeholders have yet to tackle successfully. Although citizen groups in developed countries have had only had limited success in putting pressure on their governments to tackle environmental noise, it is important that citizen groups from developing countries link up with their counterparts in the developed world.

Importance of improved understanding of the impacts of noise. There is a general lack of understanding in many developing countries amongst both politicians and the general public of the impacts of environmental noise – the effect on stress levels, health, quality of life, etc. It is only when these impacts are better understood that governments will be motivated to tackle environmental noise and citizens will demand exposure to noise to be taken seriously.

Importance of low-cost solutions. At present, tackling environmental noise is not a political priority for most developing countries. It is going to be particularly difficult to persuade them to give some priority to environmental noise and put an effective noise strategy in place if they believe it is going to cost a lot of money. Therefore low-cost solutions are quite important. For example, noise measurement and mapping would be expensive – and probably unnecessary – since most people know where the noisiest areas are. All this means that it is important to highlight the cost-benefit advantages of tackling environmental noise, for example, money spent on noise reduction could result in savings on health costs, but this does require an understanding of the health effects of noise (see previous section).

Importance of not re-inventing research, policy and practice. A considerable body of noise research has been conducted over the past half century and has been summarized by international organizations such as the World Health Organization (WHO). In addition, the noise reduction policies and practices which have been shown to work in developed countries also need to be examined and adopted where relevant. It is important that developing countries linking with international bodies like the Interna-

tional Civil Aviation Organization (ICAO), even though many of these bodies do not yet concentrate on noise research or noise policies which are appropriate for developing nations. Involvement of developing countries will bring a new fresh, perspective to the deliberations of organizations such as ICAO and others. On the other hand, it is also quite important to make sure that both the body of literature on the community responses to noise and national noise policies are appropriate to the circumstances of developing countries.

ENVIRONMENTAL NOISE MANAGEMENT

Aim of Environmental Noise Management

The aim of Environmental Noise Management (ENM) is to maintain a low noise "soundscape" which protects human health and wellbeing, but also provides protection of animals and sensitive, historical structures. ENM is a tool which enables government authorities to set objectives to achieve and maintain a low noise soundscape to reduce the impacts of noise. Government authorities in collaboration with other stakeholders can determine the individual steps of the implementation of this process according to:

- local circumstances with respect to background noise levels community values and priorities
- technological feasibilities;
- cultural, social and historical conditions;
- technical expertise about noise control and knowledge about the legal aspects of noise policies, and
- available financial and human resources.

An effective ENM strategy is dependent of a number of factors such as knowledge of noise sources, noise monitoring networks, use of noise prediction models, noise exposure and damage assessments, health based standards together with a range of cost-effective noise exposure control measures, and the legislative powers and resources to implement and enforce them. Figure 1, below, presents a simplified cycle of ENM.

ENM as envisaged in the SA is a process which enables government authorities, in collaboration with other stakeholders, to:

- identify and establish appropriate policies on environmental noise;
- identify relevant legislative and regulatory requirements;
- identify all sources of environmental noise caused by human activities;
- set appropriate objectives and targets for human (and animal) health;
- set priorities for achieving objectives and targets;
- establish a structure and programs to implement policies and achieve objectives and targets;
- facilitate the monitoring of environmental noise and effects on human health;
- facilitate urban planning, corrective action and the prevention of adverse effects;
- ensure compliance with emission and noise standards;

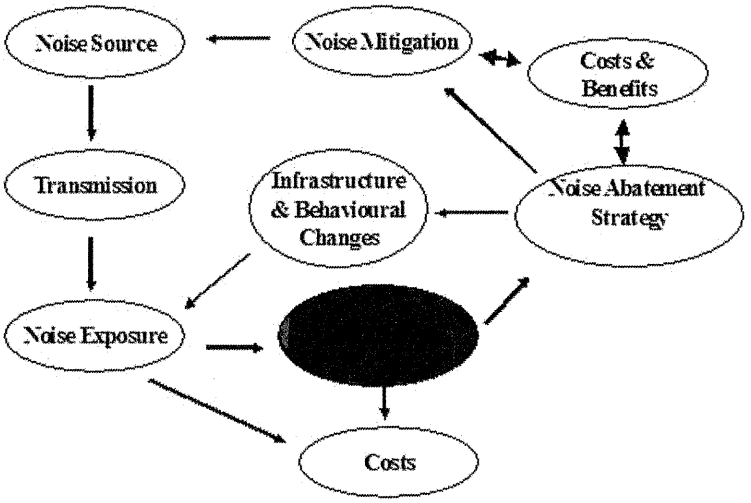

Figure 1: Model of policy process for community noise (Hede 1998; WHO 2000)

Guiding principles of Environmental Noise Management

Guiding principles related to ENM ensure the protection of human health from environmental noise (see Figure 2). However, a number of economic, institutional and political constraints may hamper the full implementation of these principles and, thus, must be addressed. For each component, challenges in developing countries are listed and an objective and tools for improvement of ENM is outlined below.

Figure 2: The Guiding principles of ENM

Access to Environmental Information: all stakeholders should have access to information regarding Noise
Awareness: Provision of information to all stakeholders
Best practice: application of state of the technology
Co-benefits: consideration of the benefits of integrated ENM, air pollution management including greenhouse gas reduction
Coherence: orientation of the efforts of all stakeholders including different neighbouring jurisdictions towards a common objective
Concerted effort: discussion and co-operation among all stakeholders involved
Compatibility: development of ENM compatible with regional, national and local needs
Continual Improvement: to promote the continual improvement of ENM as well as reduction of noise itself
Cost-effectiveness: ENM measured at least cost and highest effectiveness
Decentralization: implementation of decentralised ENM with regional, national and local components with due consideration to local capacity
Equity: fair and equal protection of all people from noise exposure and consideration of individual vulnerability
Integrated approach: development of integrated ENM (prevention, monitoring of adverse impacts, control of sources, and education)
Opportunity: sound solutions to noise problems at the suitable moment
Participation: active participation of the population in the development and implementation of the plans to minimise noise pollution and prevent the increase of noise levels
Polluter Pays Principle: individuals responsible for noise pollution should bare the cost of its consequential impacts
Precautionary Principle: where there are threats of serious or irreversible health damage, lack of full scientific certainty should not be used as a reason for postponing cost effective measures to prevent higher noise levels
Stakeholder: Commitment of all stakeholders to noise management
Sustainability: development of economically and socially compatible ENM which is sustainable over the long term and future generations
Stepwise approach: ENM following a target and milestone approach
Universality: comprehensive ENM including human health

Strategic Approach

The Strategic Approach (SA) for Environmental Noise Management in Developing Countries is being proposed by the Stockholm Environment Institute and aims to provide a coherent approach to mitigating noise by facilitating the setting of noise priorities and providing direction on institutional development and capacity enhancement.

The deterioration of noise levels observed in many cities of developing countries is a consequence of industrialization, urban growth, rural poverty and migration of people into urban areas. Environmental noise management aims at maintaining and/or re-installing levels of environmental noise that protect human health. Reduction of excess noise levels is necessary to support further development of developing countries because noise heavily affects public health and the costs on public health associated with noise can be huge. As in air quality management where the benefits of emissions reductions usually are much higher than the costs of source controls in environmental noise abatement the benefits of emissions reductions may also be much higher than the costs of reducing noise emissions. Moreover there may be co-benefits of noise and air pollution (including greenhouse gases) reduction.

The SA is a broad high-level approach that is flexible and adaptable to the needs of different countries and cities. The SA highlights the challenges existing in cities of developing countries and gives recommendations with respect to the most important components of a comprehensive noise management system in a rational and systematic manner. Challenges in environmental noise management in developing countries refer to government commitment and stakeholder participation, to weakness in policies, standards and regulations, to deficiencies in data for emissions, noise and public health impacts. Precise knowledge on noise emissions is often missing, incomplete or inaccurate. Noise emission standards are sometimes obsolete and do not reflect best technical practice. Measures to prevent and reduce noise emissions are often hampered by lack of source apportionment. Low cost and effective alternative technologies are rarely available. Noise monitoring systems are often limited in spatial coverage, not harmonized to each other, or are absent altogether. There is a lack in or absence of quality assurance/quality control plans, the data quality is unknown or poor. Little information exists in many developing countries on health and economic impacts of environmental noise. Risk perception, risk communication, information dissemination and awareness-raising are issues to be addressed. A major challenge is the availability of funding with good governance missing and low priority funding for environmental noise management. Key barriers to the adoption and implementation of the SA include lack of sufficient political will, lack of public awareness, inadequate infrastructure, lack of adequate data for emissions and receiver noise levels and poor surveillance of health impacts due to noise. All these issues have been addressed in the Strategic Approach and tools have been recommended to resolve the challenges and overcome the barriers.

The SA is aimed at all stakeholders who have a role to play in ENM, especially national and local government authorities. Government authorities in collaboration with a range of stakeholders can use the tools outlined in the SA document. The stakeholders also include: judiciary; private sector; civil society, non-government agencies; media, academia and development agencies.

CONCLUSIONS

This paper provides an overview of a recommended Strategic Approach for Environmental Noise Management in Developing Countries. A draft of the Strategic Approach has been compiled by SEI and future Workshops, Symposia, etc., in collaboration with international experts from developing countries, will be used to refine and evolve the concepts already developed. The SEI report will be used as a background paper for regional policy dialogues and to help cities in developing countries develop action plans for appropriate, effective and affordable noise mitigation. The most immediate step in this process is to develop an international consortium on acoustics experts and other interested persons to share information, plan meetings and Workshops, and promote the SEI concept with the governments of developing countries. The initial emphasis for the beginning of the International Consortium on Noise Issues in Developing and Emerging Countries has been of countries in Asia, although this will be expanded to include countries in South America, Africa and other areas of the world in the near future. Interested persons are encouraged to contact the authors of this paper for inclusion in these activities.

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