

Are Western Noise Policies Appropriate for Developing and Emerging Countries?

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ABSTRACT

This paper examines the issue of whether current Western noise policies would be appropriate and effective for use in developing and emerging countries. Differences in noise sources, available finances and noise control technologies, cultural norms, climate, views concerning the role of the government, etc. make it possible that different approaches might be needed in developing and emerging countries in order for their noise policies to be effective. It describes the current status of an international consortium of scientists and engineers, government representatives, and key stakeholders which are being organized to address this important topic. The World Health Organization and the International Commission on Biological Effects of Noise will be major partners in implementing the International Consortium. This paper presents a concept for a Strategic Approach to Environmental Noise Management in Developing Countries which has been developed by the Swedish Environmental Institute (SEI) to provide a foundation for the Consortium. It also describes the 2010 and future plans for annual Workshops, symposia and special sessions at acoustics Congresses, and to promote the evolving SEI concept with the governments of developing countries. The 2010 effort includes a web-based Forum sponsored by Tsinghua University and additional future projects are being planned.

INTRODUCTION

Environmental and occupational noise continue to pose significant threats to human health and the quality of life of millions of people throughout developing and emerging countries around the world. Urbanization and the associated growth in industrialization and increased population mobility have resulted in the intensification of noise exposure, 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 mitigate noise exposure and to implement preventive actions expected to reduce the risks which noise exposure poses to their citizens. This paper outlines a Strategic Approach to Environmental Noise Management (ENM) for developing and emerging countries to assist decision makers and stakeholders in formulating and implementing effective ENM strategies.

The severity of environmental noise problems in cities of developing and emerging countries reflects their level and speed of economic and industrial development. As cities undergo the natural process of development, environmental noise, especially, 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 and emerging 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 con-

trol 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 and emerging countries and increasing negative impacts on their citizenry.

Environmental noise in developing and emerging 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, such as hypertension (i.e., chronic increased blood pressure)
- Immune system deficiencies
- Hearing impairment
- Cognitive effects, especially in schoolchildren
- Job and task 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 and emerging countries to assist relevant decision makers and stakeholders to formulate and implement effective ENM strategies. This Strategic Approach aims to mitigate noise by facilitating the setting of noise management priorities and by providing direction for institutional development and capacity enhancement. The envisioned Strategic Approach is a natural extension of the recommendations of Agenda 21, derived from the 1992 United Nations Conference on Environment and Development [1], and the Plan of Implementation of the 2002 World Summit on Sustainable Development (WSSD) [2] which requests States to strengthen capacities of developing and emerging 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 programmes ([3]; [4]).

The structure of the Strategic Approach for noise management was discussed at the Workshop on Environmental Noise Management in Developing Countries at the INTERNOISE 2007 conference, held in Istanbul on 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) [5], and also at INTERNOISE 2009 [6]. During the workshop at the INTER-NOISE 2007 Congress, 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 this is done in the context of a clear, strategic approach. Many developed countries lack this long-term vision, as do many developing and emerging countries. China, for example, 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 and emerging countries.

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

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 an 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 impacts 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 more cars, larger trucks, airplanes and trains. In particular, many 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 and emerging 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 and emerging countries amongst both politicians and the general public of the various impacts of environmental noise – the effects 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. Even less is known about how people in developing and emerging countries might respond to noise exposure differently from people in developed countries, which is another reason to more closely examine the applicability of Western noise policies for the developing and emerging countries. "Community annoyance", in particular might very well be different between these various areas of the world due to difference in expectations about the acceptability of various noise sources and their accompanying levels.

Importance of low-cost solutions. At present, tackling environmental noise is not a political priority for most developing and emerging countries. It is going to be particularly difficult to persuade them to give a high priority to environmental noise and to put an effective noise management 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. 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 improved 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 developed over the past half century, particularly in the U.S. and Europe, and has been quite well 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 and emerging countries link with international bodies like the International Civil Aviation Organization (ICAO), even though many of these bodies do not yet concentrate on noise research or noise policies which are particularly appropriate for developing and emerging nations. Involvement of developing and emerging 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 and emerging 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. Environmental Noise Management 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, plus community values and priorities
- technological capabilities;
- cultural, social and historical conditions;
- engineering (i.e., technical) expertise about noise control;
- knowledge about the legal aspects of noise policies, and
- available financial and human resources.

An effective Environmental Noise Management strategy is dependent on a number of factors, such as knowledge of noise sources, noise monitoring networks, use of noise prediction models, noise exposure and noise 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 presents a simplified cycle of Environmental Noise Management.

The Strategic Approach to Environmental Noise Management as envisaged 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 major sources of environmental noise caused by human activities;
- set appropriate objectives and targets for human (and animal) health;
- set priorities for achieving realistic objectives and targets;
- establish a structure and supporting programs to implement policies to achieve objectives and targets;
- facilitate the monitoring of environmental noise and its effects on human health;
- facilitate urban design/urban planning, corrective action and the prevention of adverse effects;
- ensure compliance with emission and immission noise regulations, guidelines and Standards;

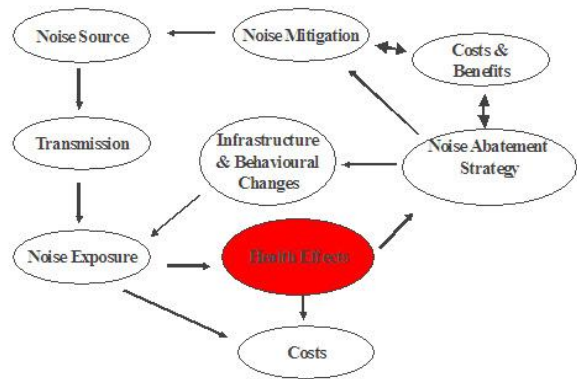


Figure 1: Policy process for community noise [7]; [8]

Guiding Principles of Environmental Noise Management

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

Access to Environmental Information: all stakeholders should have access to information regarding noise

Awareness: Provision of information to all stakeholders

Best practice: application of the state of available technology

Co-benefits: consideration of the benefits of integrated Environmental Noise Management, 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 involved stakeholders

Compatibility: development of Environmental Noise Management compatible with regional, national and local needs

Continual Improvement: to promote the continual improvement of Environmental Noise Management as well as reduction of noise itself

Cost-effectiveness: Environmental Noise Management measured at least cost and highest effectiveness

Decentralization: implementation of decentralised Environmental Noise Management with regional, national and local components, especially with due consideration of local capabilities

Equity: fair and equal protection of all people from noise exposure and consideration of individual vulnerability

Integrated approach: development of integrated Environmental Noise Management (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 and related effects

Stakeholder: Commitment of all stakeholders to noise management

Sustainability: development of economically and socially compatible Environmental Noise Management which is sustainable over the long term and future generations

Stepwise approach: Environmental Noise Management following a target and milestone approach

Universality: comprehensive Environmental Noise Management including the full range of noise sources and human health effects

Strategic Approach

A Strategic Approach for Environmental Noise Management in Developing and Emerging Countries is being proposed by the Stockholm Environment Institute, in conjunction with the International Commission on Biological Effects of Noise (ICBEN) International Noise Team 9, Noise Policy and Economics, and aims to provide a coherent approach to mitigating noise by facilitating and coordinating the setting of noise priorities and providing direction on institutional development and capacity enhancement by setting the stage for discussions among relevant noise policy experts, government representatives, involved NGOs, and the public.

The deterioration of noise levels observed in many cities of developing and emerging 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 adequately protect human health. Reduction of excess noise levels is necessary to support the sustainable development of developing and emerging 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 Strategic Approach to Environmental Noise Management is a broad, high-level approach which is flexible and adaptable to the circumstances and needs of different countries and cities. The Strategic Approach highlights the challenges existing in many cities of developing and emerging 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 and

emerging countries refer to government commitment and stakeholder participation, to weakness in existing policies, regulations and standards, to deficiencies in data for emissions, recipient noise exposure 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 harmonised to each other, or are absent altogether. There is a lack in or absence of quality assurance/quality control plans, and the data quality is unknown or poor. Little information exists in many developing and emerging countries on the health and economic impacts of environmental and occupational noise exposure. Risk perception, risk communication, information dissemination and awareness-raising are issues to be addressed in the future. 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 Strategic Approach include lack of sufficient political will, lack of public awareness, inadequate infrastructure, lack of adequate data for emissions and receiver noise levels, lack of adequate engineering noise controls and poor surveillance of health impacts due to noise. All these issues have been addressed in the SEI Strategic Approach and tools have been recommended to resolve the challenges and overcome the barriers.

The envisioned Strategic Approach is aimed at all stakeholders who have a role to play in Environmental Noise Management, including both national and local government authorities. Government authorities in collaboration with a range of stakeholders can use the tools outlined in the SEI Strategic Approach 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 and Emerging Countries. A draft of the Strategic Approach has been compiled by SEI and future Workshops, Symposia, etc., in collaboration with international experts from developing and emerging countries, will be used to refine and evolve the concepts which have been initially developed. The SEI report will be used as a background paper for regional policy dialogues and to help cities in developing and emerging countries develop action plans for appropriate, effective and affordable noise mitigation. The major issue to be addressed is whether existing noise policies in predominantly Western countries, with their strong emphasis on noise control at the source rather than a noise mitigation approach based on a flexible approach which emphasizes negotiation between government agencies, noise producers relevant stakeholders and the public's values and priorities, will be appropriate, affordable and effective as a sustainable approach for developing and emerging countries.

The most immediate step in this long-term process is the further development of the International Consortium of acoustics experts, professional societies and other interested persons to share information, plan meetings and Workshops, and promote the SEI concept with the governments of developing and emerging countries. Interested persons are encouraged to contact the authors of this paper.

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