

## **A strategic approach on environmental noise management in developing countries**

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### **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 associated growth in mobility and industrialization has resulted in the intensification of noise in densely populated areas, causing deterioration in noise exposure. Many cities in developing countries are now having to take action to enhance their institutional and technical capabilities to monitor and control noise exposure and implement preventive actions in order to reduce the risks that noise poses to their citizens. This document introduces to and outlines a Strategic Approach (SA) on Environmental Noise Management (ENM) in 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 development. As cities undergo economic and industrial development environmental noise becomes an increasing problem. In the past, the major causes of environmental degradation occurred sequentially rather than simultaneously. However, nowadays many cities of developing countries are having to suffer the pressure of a combination of different driving forces (e.g. motorization, industrialization and increase in urban population density), each with a greater intensity than has occurred elsewhere or in the past and without the well-developed civil infrastructure and financial resources to control them. The result is that the ability of many cities to cope with the combined pressures is often exceeded leading to a deterioration in environmental quality in many cities of developing countries.

Environmental noise in developing countries has a number of impacts on human health and the environment, which have social and economic implications. These include:

- Cardiovascular diseases
- Increases in cardiovascular symptoms (e.g. blood pressure)
- Hearing impairment
- Cognitive effects
- Speech interference
- Sleep disturbance
- Performance deficits
- Annoyance
- Mental health effects.

This paper is an overview of the SA on environmental noise management (ENM) in developing countries the outline of which was discussed at the Workshop on Environmental Noise Management in Developing Countries at the internoise 2007 con-

ference, held in Istanbul, 28-31 August 2007. At this workshop the following observations were made:

### **The importance of an overall strategy**

Although a step-by-step program of implementation of environmental noise policies is probably the realistic way forward, it is critical that it is done in the context of a clear, strategic approach. Many developed countries lack this as do most developing countries. China appears to be the exception to this. The seminar heard about the impressive strategy which the Chinese Government has developed to tackle noise. In many ways, this could act as a model for other developing countries.

### **The importance of the implementation and enforcement of noise policies**

The seminar heard that quite a few developing countries have theoretical noise policies, but that the implementation and enforcement of them is poor. This is partly the result of a lack of political will and it is partly because of the cost. It is probably unrealistic to expect a rapid improvement in implementation and enforcement, so a step-by-step approach would be more realistic.

### **The importance of active citizens' groups**

There is little pressure on governments from citizens groups for action to be taken on environmental noise. This is, in part, due to a lack of understanding of the impacts of environmental noise. But the seminar did hear of some pressure. Here are citizens groups in China protesting about aircraft noise and about increase noise from traffic on existing roads. When people are annoyed and stressed out 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. The seminar also heard that 'new' noises will emerge as countries acquire more consumer goods. 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 citizens groups in developed countries have only had limited success in putting pressure on their governments to tackle environmental noise, it is important that citizens groups from developing countries link up with their counterparts in the developed world.

### **The importance of improved understanding of the impacts of noise**

It came across at the seminar that there is a 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 will governments be motivated to tackle environmental noise and will citizens demand that noise be taken seriously.

### **The 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 important. For example, noise mapping would be expensive – and probably unnecessary since most people know where the noisiest areas are. It also means 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).

### The importance of not re-inventing research, policy and practice

This means developing countries using the research that has already been done (often by countries in the developed world) but also, importantly, by the WHO. It also means examining, and adopting where relevant, the noise reduction policies and practices which have been shown to work in developed countries. And it means linking into international bodies like ICAO, even though many of these bodies are flawed. In fact, it may be because they are flawed that developing nations should get involved as they may bring a new fresh, perspective to their deliberations.

## ENVIRONMENTAL NOISE MANAGEMENT

The aim of Environmental Noise Management (ENM) is to maintain a low noise sound-scape that protects human health and wellbeing but also provides protection of animals. ENM is a tool which enables governmental authorities to set objectives to achieve and maintain a low noise sound-scape and reduce the impacts on human health and animals. Governmental authorities in collaboration with other stakeholders can determine the individual steps of the implementation of this process according to:

- o local circumstances with respect to background noise levels and technological feasibilities;
- o cultural and social conditions; and
- o financial and human resources available.

An effective ENM strategy is dependent of a number of factors such as source knowledge, noise monitoring networks, transmission of noise prediction models, 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 presents a simplified cycle of ENM.

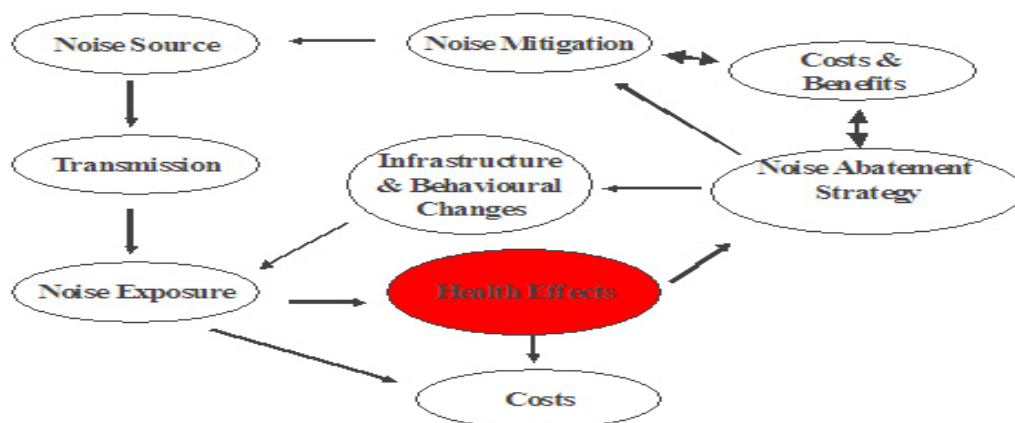


Figure 1: Model of policy process for community noise (Hede 1998; WHO 2000)

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

- o identify and establish appropriate policies on environmental noise;
- o identify relevant legislative and regulatory requirements;
- o 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;
- account for changing circumstances.

Figure 2 depicts the policy cycle in a slightly different form but of same content and the stakeholders involved in the different stages of the cycle.

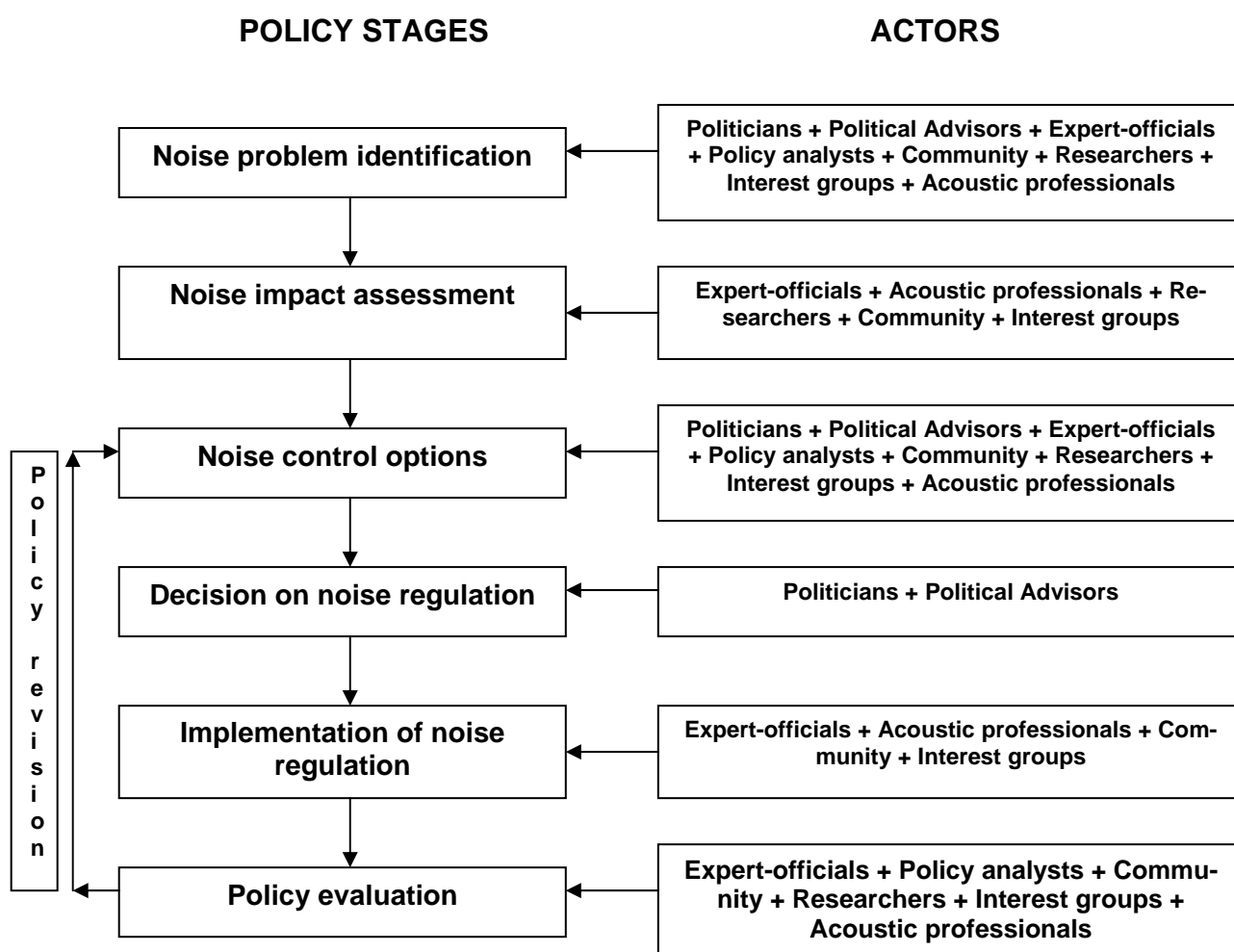


Figure 2: Policy stages and actors (stakeholders) (Hede 1998; WHO 2000)

### STRATEGIC APPROACH

The Strategic Approach (SA) on Environmental Noise Management in Developing Countries aims to provide an approach to mitigating noise by facilitating the setting of noise priorities and providing direction on institutional development and capacity enhancement. The SA is being proposed by the Stockholm Environment Institute in collaboration with Tamer Elnady, Egypt, Lawrence Finegold, USA, Samir Gerges, Brazil, John Stewart, UK, Tian Jing PR China.

The SA is a strong follow up of the recommendations of Agenda 21, derived from the 1992 United Nations Conference on Environment and Development, and the Plan of Implementation of the 2002 World Summit on Sustainable Development (WSSD 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 SA supports the UN Habitat Agenda on the Urban Environment and the UNHABITAT/UNEP Sustainable Cities Program which notes the health hazards of exposure to excessive noise and recommends develop criteria for maximum permitted and safe levels of noise exposure and promote noise assessment control as part of environmental programs (UNHabitat 2008).

The SA is intended to help developing countries and mega and major cities in developing countries to develop and/or improve their actions in preventing further deterioration of noise levels by a rational noise management. The deterioration of noise levels observed in many cities of developing countries is a consequence of industrialization, urban growth, and migration of people into urban areas as a consequence of poverty. 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. It is based on a set of guiding principles, which include precautionary and polluter pays principles, sustainability, stakeholder commitment, application of best practices, cost-effectiveness, risk awareness, and access to environmental information. The Strategic Approach 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 harmonised 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 good data for emissions and noise levels and poor surveillance of health impacts due to noise. All these is-

sues 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 governmental authorities. Governmental 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-governmental agencies; media, academia and development agencies.

## **GUIDING PRINCIPLES OF ENVIRONMENTAL NOISE MANAGEMENT**

Guiding principles related to ENM ensure the protection of human health from environmental noise (see Box 1). However, a number of economic, institutional and political constraints may hamper the full implementation of these principles.

### **Box 1: 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

For each component, challenges in developing countries are listed and an objective and tools for improvement of ENM is outlined. The final section identifies the issues relating to the adoption and implementation of the Strategic Approach.

## **STRUCTURE OF THE DOCUMENT**

The document is divided into eight sections which cover the key components of ENM:

- Introduction
- Environmental Noise Policies
- Environmental Noise Governance
- Emission
- Environmental Noise Modelling
- Environmental Noise Monitoring
- Human (and Animal) Health and Economic Risk Assessments
- Financing of Environmental Noise Management

## **USE OF THE DOCUMENT**

The SA can only be implemented if the ideas developed in it are generally accepted by all stakeholders. It is, therefore, logical to bring the SA to the attention of inter- and supranational organizations, governments, environmental protection agencies, industry, academia, media, aid agencies, and non-governmental organizations.

Although some developing countries have made progress in addressing urban noise, they are still vulnerable to the actions taken by neighboring jurisdictions. This is particularly the case with regard to the export and import of reconditioned vehicles which are unsuitable to meet current and future emission standards. In addition, the effects of global trade in noisy consumer products can inhibit a country's progress in addressing noise.

Global cooperation is therefore necessary to facilitate a more harmonised approach to ENM, especially with regard to the adoption of environmental noise and emission standards. One key tool is the need to establish a flexible mechanism for the exchange and sharing of environmental noise data among neighboring jurisdictions.

## **OVERCOMING THE CHALLENGES**

The ideas in the SA have been developed under the viewpoint of helping countries and cities to overcome barriers to development:

- lack of sufficient political will
- inadequate infrastructure, training and resources
- lack of good quality noise data
- lack of necessary knowledge on emissions
- poor assessment of the health impacts of environmental noise
- need for the document to be translated into different languages.

These barriers can be overcome as described above by:

- gaining ministerial support in developing countries for the SA
- gaining support from international agencies especially with regard to technical and financial support
- undertaking cost-benefit analyses and health impact studies
- translation of the document into different regional languages

## **CONCLUSION**

This paper gives an overview over the Strategic Approach for Environmental Noise Management in Developing Countries. A first draft of the Strategic Approach has been compiled by SEI and a final draft will be produced in collaboration with several international experts from developing countries in the near future. This draft will be used as background paper for regional policy dialogues and to help cities in developing countries develop action plans for noise mitigation.

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