ENVIRONMENTAL DATABASES

Case Study : Air Pollution Databases for Greater Cairo

By

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ABSTRACT

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Most of the countries, if not all, face a wide range of environmental problems that have adverse impacts on human health and are considered as impediment to economic development. Air pollution is one of these modern problems that have occurred as a result of the rapid urban and industrial growth. Vast quantities of potentially harmful waste products are being released into the atmosphere and the cleaning properties of the atmosphere and the carrying capacity of the environment have not been taken into consideration. Air pollution has an adverse effect on the health and well being of the people and causes widespread damage to vegetation, crops, wildlife, materials, buildings and climate. Illness or premature death due wholly or in part to air pollution places a great burden upon society by way of increased costs of medical treatment and through the loss of labor. In addition, air pollution reduces economic values and personal comfort and well-being.

Addressing such environmental problems and strategically plan how to control them become then a high priority; and different tools have to be used for that purpose. The need for information being a basic requirement for such an exercise lead to the development of "Environmental Information Systems" (EMS) as a vital tool. Basically, an EMS facilitates and streamlines the flow of environmental information from data sources to decision makers. It also provides decision makers with the necessary analyses required to, inter-alia, manage natural resources, prevent and control pollution, develop strategies and adjust policy conditions.

Air pollution is a major and serious environmental problem in Egypt in general, and in Greater Cairo in specific. Pollutants emitted into the air are

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causing serious health and environmental degradation, and are projected to double in the next ten years if no control strategy is developed. Adopting an air pollution control strategy ensures that air pollutants concentrations are reduced or are maintained below a specific or general level that is deemed acceptable.

The basis for such a strategy is an Integrated Air Quality Information System where data from monitoring and emission studies is collected to be evaluated and assessed. An integrated Information System is composed, inter-alia, of a number of databases.

This thesis attempts to contribute to resolving the air pollution problem by designing a Conceptual Model for an Air Quality Database, with special emphasis on three issues:

- urban air quality;
- traffic air pollution; and
- energy.

Relevant and appropriate environmental indicators have been selected for each one of the issues. Environmental indicators are important tools to translate quantities of environmental data into succinct of information that can be readily understood and used by decision makers and the general public. Such indicators are developed with reference to environmental quality, national goals and international agreements. They are also used to support decision makers in the design of a strategy for urban air pollution control.

The choice of indicators was based on the ranking of the air pollution sources with respect to their emissions. The present monitoring capabilities in Egypt have also been taken into consideration.

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The proposed database considers, as an initial phase, high priority issues that can be addressed with available national resources, both human and financial. This work can be extended during subsequent phases to include lesser priority issues.

A model has also been developed for the rapid assessment of air pollutants loads from the disposal and open-burning of solid waste and from industrial sources, for which no comprehension monitoring or data exist.

This study also recognizes the need for more elaborate Information Systems to effectively address the air pollution problem at a strategic national level, but it was meant to present a practical and feasible problem-solving tool, given the existing constraints.

These constraints range from basic ones such as the low awareness and priority on environment among the general public and decision-makers, to limited air monitoring activities, lack of quality assurance and quality control procedures passing by insufficient funding and leading to an insufficient knowledge of ambient air quality and air pollution sources.

The most important findings and conclusions of this study have been that Environmental expertise and data in Egypt are scattered and poorly coordinated and that organizations responsible for the generation , collection and analysis of environmental data are not willing to allow access to the data and information they held. In addition to that, the data itself is questionable and in most of the cases unreliable. Conflicting data sets for the same issues indicate that no rigorous procedures for quality assurance and quality control are applied.

As for air monitoring programmes, there is no accurate estimation of emissions of important air pollutants and no emission inventories; and in general terms one can say that Egypt lacks a comprehensive map of air

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pollutants.

To address all these weaknesses and gaps, **it is recommended** to enhance the cooperation and coordination among the relevant concerned institutions. There is also a great need for a rigorous quality assurance and quality control system.

Air emissions studies should be more widely conducted. New monitoring programmes for stack emissions and indoor air pollution need to be developed.

At the strategic level, planning of an urban air pollution control strategy should be based on data collected from the ambient air monitoring and the emission studies. A preliminary assessment of the costs of damages resulting from air pollution should be conducted and a cost-benefit analysis of the required interventions should be elaborated.

Finally, a framework for a "National Air Pollution Control Strategy" should be developed and adopted by the Government of Egypt.

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