CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

Over the last two decades, a large number of developing countries, including Malaysia have introduced industrial environmental emission/discharge standards and at the same time, some form of inventory of industrial pollution emission as well as conducting ambient environmental quality monitoring programme. However, it is generally recognized that the implementation of pollution control measures is seldom counter checked with measured ambient environmental quality. This is largely explained by the absence of a reliable and simple simulation model for quantifying the industrial emissions, and the follow up modeling of environmental quality to check the cumulative compliance with the environmental standards. Indeed, as a result of limited resources, a large number of developing countries have little information on industrial emissions of air-borne and water-based pollutants, the costs of pollution abatement, and the environmental and health impacts of these various emissions. This lack of information makes it difficult in the prioritisation of actions, and the implementation of cost-effective intervention.

Rapid growth in Malaysia in the past 10 years (1988 – 1998) has led to the approval of 2466 Environmental Impact Assessment (EIA) compliant projects (refer Table 1.1). Each project is purportedly adhering to the stated EIA approval conditions and has acceptable pollutant emission levels. Despite this legislative and institutional apparatus, it is generally recognized that the Department of Environment (DOE) and its regional offices lack the necessary information of the impacts of these new pollutant sources to set priorities, strategies and action plans in pollution management. Plant-level monitoring of air and water emissions by the industrial operators are usually imperfect with the monitoring equipment often defective, data collection and measurement methodology questionable, and there is commonly a lack of trained personnel on industrial sites. Although the regulations touch on every

aspect of environmental impact analysis, very little has been said about the cumulative effects of many adjacent industrial sites.

Table 1.1 The Number of Approved EIA Reports by the Department of Environment, Malaysia (April 1988 to December 1998)

Activity	State	Selangor	Negeri Sembilan	Melaka	Johor	Pahang	Perak	Kelantan	Tganu	Kedah	Perlis	Pulau Pinang	W. P. Labuan	W. P. K Lumpur	Sarawak	Sabah	> 1 State	Others	Sum
Agriculture		2	5		6	9			1	1		2			7	4			37
Airport		1													1				2
Drainage					4		4	3	1	1		2	2		1	4	1		23
Recycling			1	9	1	1	2	1	2	5	3	4				4			33
Fishery				1		1			1			1			2				6
Forestry		5	2	1	3	2	5	3	3	6					1	1	1		33
Housing		124	46	29	85	19	19		6	53		30		6	5	9			431
Industry		38	11	5	54	25	26	6	25	5	4	17	2		28	9	2		257
Infrastructure		88	31	33	86	14	31	4	6	34		15		14	17	8	7		388
Marine Port		2			4	2	1		1	4	1	2			10	2			29
Mining		2		1	8	6	3	1	1	1		2			10	4			39
Petroleum		15	10	5	8	6	1		27			2			29	7	6		116
Power Generation		7	3	5	3	3	3	1	1	3	1	4			10	5			49
Quarry		44	50	19	34	8	37	8	14	27	10	14		1	8	88			362
Railway		3			1							1					2		7
Transportation		1												6					7
Recreation		15	47	16	74	46	17	1	30	58		41	3	1	6	20			375
Waste Treatment		45	16	11	54	10	14		9	12		28	5	4	20	11	1		240
Water Supply		2	2	2	4	1	1	1				1				3			17
Others																		15	15
		394	224	137	429	153	164	29	128	210	19	166	12	32	155	179	20	15	2466

Assessing a proposed project relative to other known projects, at broader temporal and spatial scales, has important implications for determining the significance of environmental changes. For example, an EIA may conclude that environmental impacts attributable to an individual project are insignificant because of confined temporal and spatial scales. But environmental changes originating from repeated or multiple actions may accumulate over time and across space, resulting in cumulative impacts deemed significant. Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time.

Some authorities contend that most environmental effects can be seen as cumulative because almost all ecosystems have already been modified, even degraded, by humans. For instance, the heavily modified condition of the Malacca Straits is a result of hundreds of EIA approved industrial projects and activities regulated by a wide variety of agencies (federal, state, and local). William Odum (1982) succinctly described environmental degradation from cumulative effects as "the tyranny of small decisions."

As a response to these insufficiencies of information, this research project is initiated as a preliminary effort to build a pollution load database of the industrial sector based on approved EIA projects. Results from this research may be used in the future development of procedures and methods to analyze the cumulative effects of these pollution loads on environmental resources.

1.2 OBJECTIVES OF THE RESEARCH

The purpose of this research project is to serve as an initial attempt to build the pollution load database for Malaysia. As a start, the pollution loads for the approved EIA projects in the industrial sector in Malaysia between the years 1988 and 1998 are assessed. In this research project, the World Bank's U. S. based industrial pollution projection program named *Decision Support System for Integrated Pollution Control* (DSS/IPC) has been used as the tool to fulfill the research objective.

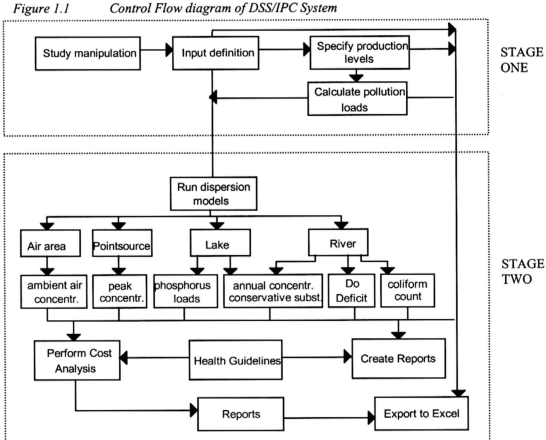
The pollution loads calculated from the DSS/IPC system would help to identify the major pollution sources and to assess the pollution situation in the area in the absence of monitored data on emissions and ambient concentrations. It also helps to highlight deficiencies in the existing system of data collection for the purposes of pollution management, helps to enable the process of gathering relevant information in a systematic way, enables continuously updating and processing this information, and quickly present it in a convenient format as a table, a chart or a map. The DSS/IPC system requires an inventory of industries for a given area, including data on key inputs or/and outputs in physical units (for those products whose processing

or manufacturing is most directly linked to a medium-specific pollution) and the types of existing controls, in order to estimate pollution loads.

1.3 SCOPE OF THE RESEARCH

The control flow in the operation of the DSS/IPC system is divided into two stages as illustrated in Figure 1.1. In this research study, use of the DSS/IPC system is confined to Stage One only.

Figure 1.1 Control Flow diagram of DSS/IPC System



In Stage One, after defining all the study-specific data, the pollution loads or area pollution inventory can be evaluated. Load calculation implies the multiplication of the production values with the related emission factors. In Stage Two, the pollution load calculated are used to estimate ambient concentrations using the dispersion models. The pollutant concentration values are compared with health guidelines to

assess, firstly, whether there are hazards to human health in any particular area, and, secondly, to identify industry- and location-specific least-cost solutions to reach acceptable levels of ambient quality. Since concentration values can be traced to the originating industrial processes, the cost analysis allows the identification of the contribution of specific processes to the ambient levels of pollution, as well as alternative control measures and the corresponding investments needed.

Due to the limited requirement of the research project being approximately one third (1/3) of a Master degree course work programme, the scope of research is confined to the assessment of pollution loads for the approved EIA projects in the industrial sector in Malaysia between the year 1989 and 1999; i. e., limited to Stage One of the research. The research would separately project the air, water, and solid waste emission loads, identify the main polluting industries and the pollutants, and is recognized as an initial effort in assessing the total pollutant load in Malaysia.